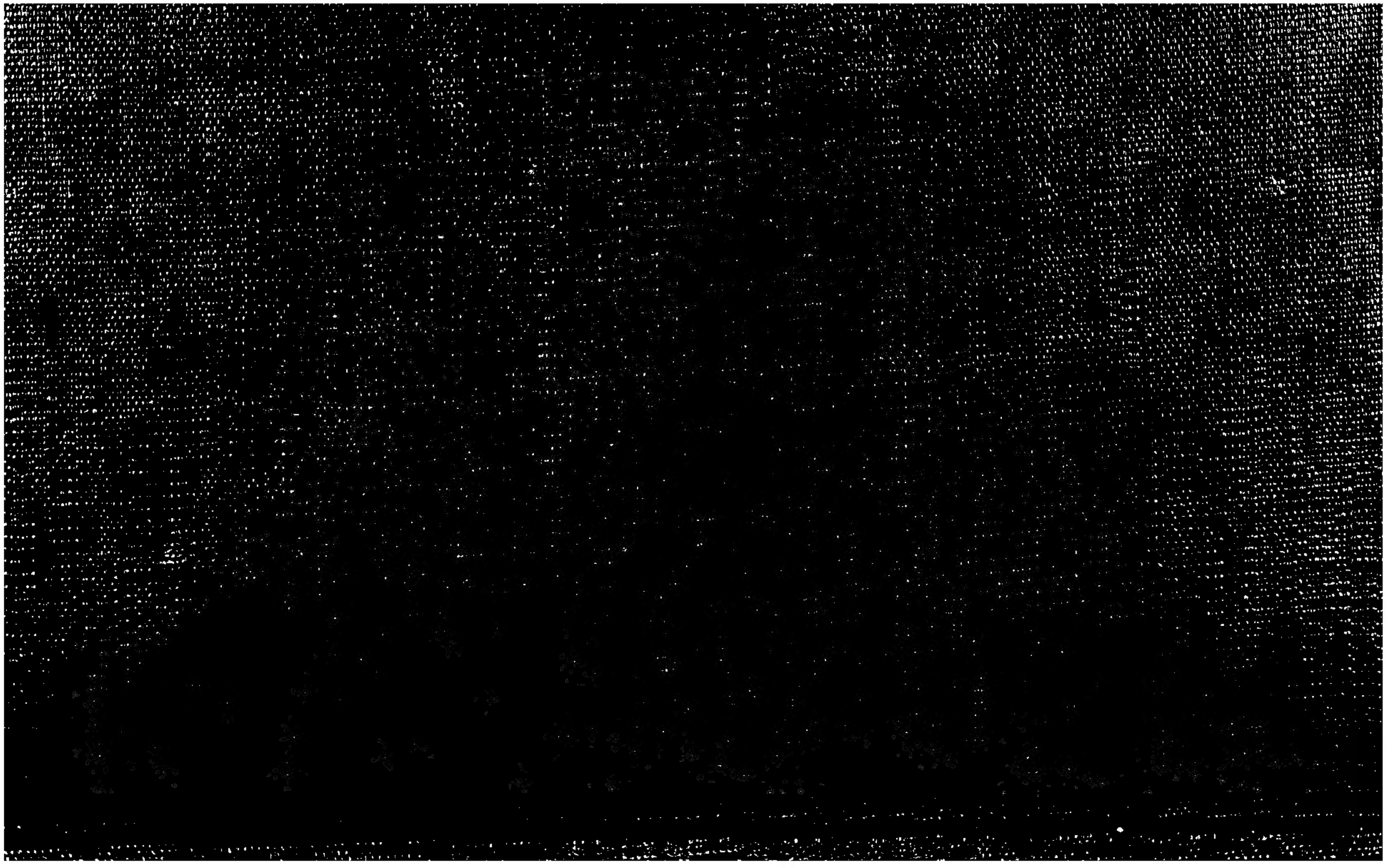
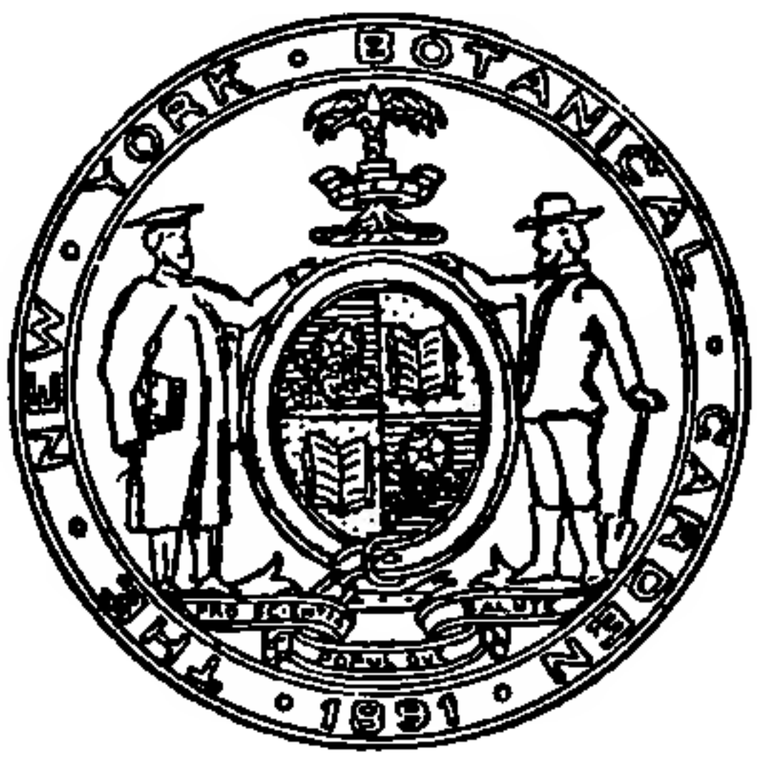


JOURNAL
OF
THE NEW YORK BOTANICAL GARDEN

DOROTHY E. HANSELL
EDITOR



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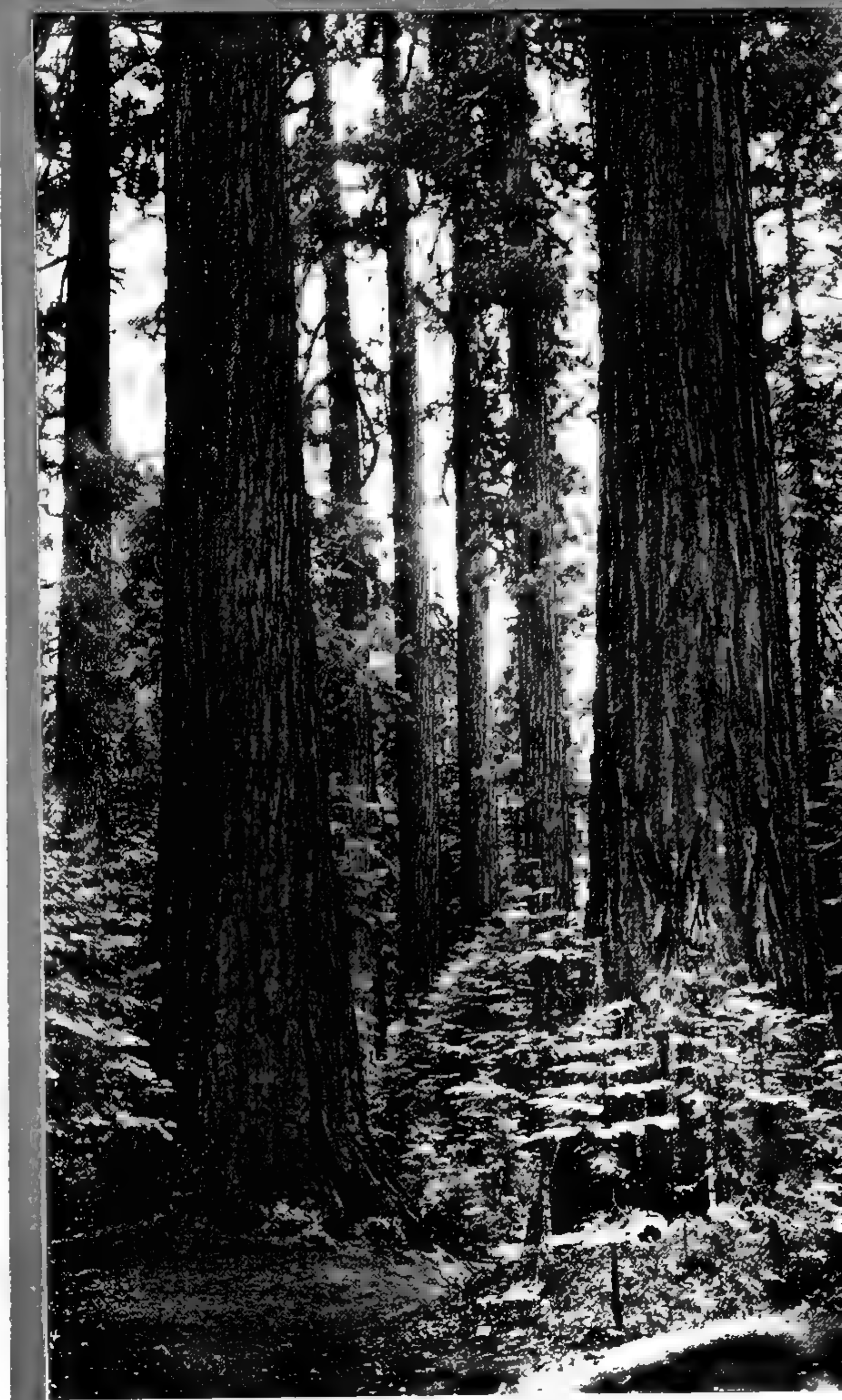

GIANT SEQUOIAS IN THE CALAVERAS GROVE

JANUARY EVENTS AT THE GARDEN

Courses of Study

Outdoor Flower Gardening — 6 sessions on alternate Thursdays, 8-10 p.m.
Jan. 5 - March 16, 1950 Instructor: *Mr. Arthur King* $10; to married couples, $17

General Botany II — 12 sessions on Mondays, 8-9 p.m.
Jan. 9 - March 27, 1950 Instructor: *Dr. H. W. Rickett* $10; to married couples, $17

Systematic Botany Laboratory — 12 sessions on Mondays, 9-10 p.m.
Jan. 9 - March 27, 1950 Instructor: *Dr. H. N. Moldenke* $10; to married couples, $17

Lessons in Botany — 8 sessions on Tuesdays, 2-3:30 p.m.
Jan. 10 - Feb. 28, 1950 Instructor: *Mr. G. L. Wittrock* $10; to married couples, $17

Nature Study for Teachers — 15 sessions on Wednesdays, 4-6 p.m., totaling 15 credit hours of work
Feb. 15 - May 31, 1950 Instructor: *Mr. G. L. Wittrock* $10; to teachers, $5

Free Saturday Programs

3 p.m. in the Lecture Hall

Jan. 7 ***Tongass Timberland*** and ***Timber and Totem Poles***
Two motion pictures of Alaska from the U.S.D.A. Forest Service

Jan. 14 ***Tropical Birds and Flowering Trees of Trinidad*** — *Gladys Gordon Fry*, Ornithologist

Jan. 21 ***Plants to Grow Indoors in Wintertime*** — *Jean Hersey*, Author of "Garden in Your Window"

Jan. 28 ***Diatoms, Jewels of the Sea*** — *Joseph F. Burke*, Honorary Curator

Feb. 4 ***Flower Development, Growth and Movement of Plants In time-lapse motion pictures*** — *P. W. Zimmerman*, Boyce Thompson Institute

Feb. 11 ***New York State Parks—A motion picture***

Members' Day Program

At New York Genealogical Society, 122 East 58th Street

Jan. 5 ***A Garden for Gourmets*** — *Albert C. Burrage*

Museum Exhibits

Arts and Crafts of Haiti—an exhibit contributed by Mrs. O'Donnell Iselin, during January in the rotunda of the Museum Building.

Conservatory Displays

Winter-flowering plants will continue to be shown in House 6 of the Conservatory daily, 10 a.m. to 4 p.m.

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JOURNAL

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THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 51 JANUARY 1950 NO. 601

Giant Sequoias A Century Ago

An Account of the Big Trees of the Calaveras Grove As Seen in 1854 by Henry Sheldon Anable

SONORA, TUOLUENNE* CO., CAL.
JUNE 20TH, 1854

A FRIEND having arrived from Sacramento, with whom I had previous to leaving that city made arrangements for visiting the "Big Trees" we provided ourselves with good riding horses and after a late breakfast on the morning of the 6th of June, we started, and in due time arrived at Columbia, distant four and one half miles. This is one of the largest and loveliest mining towns in the southern mines. . .

At Columbia we were joined by three other gentlemen, one of whom, Mr. Joseph Lapham, acted as guide. Our route lay through a rich mining section to the Stanislaus river, the descent to which is very steep; we crossed on a very good rope ferry boat. The hills or rather mountains on each side are being graded, and in a short time it is expected that the Sacramento stages will cross at this ferry. . . .

At 6 p.m. we arrived at the "Big Trees" very much fatigued, having ridden 30 miles on horseback, neither of us being very much accustomed to it.

It seems that some person had been to these trees as early as 1850 as there is a man's name cut in one of them in July of that year; in 1852 some hunters described them but no one believed their story, so no one took any pains to ascertain the truth until in 1853, Capt. Hanford and Mr. Lapham having heard of them went to satisfy themselves. Forseeing

*The unusual spelling of "Tuolumne" and "Calaveras" is perhaps an attempt to translate phonetically old Indian names into English. I am unable to find any indication that either was ever officially spelled as indicated in the letter.—Newton B. Drury.

NEARLY 100 years ago — in 1854 — a Wisconsin newspaper, the *Sheboygan City Times,* published one of the earliest reliable first-hand descriptions of the big trees or giant sequoias of California.

Recently, a photostat of the author's own typewritten letter was presented to the New York Botanical Garden by Mr. and Mrs. Anthony Anable of New York City. Mr. Anable is the grandson of Henry Sheldon Anable (1815-1887), who in his late thirties left his home in Sheboygan on an overland trip to California with his brother Samuel. The month of June 1854 found him in Sonora, California, from where he made a visit to the group of big trees which now comprise the Calaveras Grove. Though discovered only two years before, these were already "creating quite a sensation through the land," Mr. Anable wrote. His description of the trees, taken directly from his letter (with minor alterations, chiefly in punctuation) is republished here.

The Calaveras Grove, according to Newton B. Drury, Director of the National Park Service of the United States Department of the Interior, was the only area containing giant sequoias or "big trees" to receive publicity and special attention until some years after 1854. Specimens of leaf and fruit sent to England from this grove provided the material from which a botanist named the new species. Most of the early visitors, in writing letters home, gave exaggerated accounts of what they had seen. But Mr. Anable was a keen and accurate observer. When parts of his letter were quoted to Mr. Drury the latter replied:

> "The measurements of diameters and circumferences are more accurate than most of the early records. However, I think some of the height measurements are quite excessive. The tallest sequoia tree in the Calaveras Grove, living today, is 310 feet high and most of the larger trees are less than 280 feet in height. It seems doubtful if any of the trees which have fallen very greatly exceeded 300 feet because we have no record of a giant sequoia now living which is over 312 feet in height. Apparently in measuring the length of the fallen trunks, which are broken into many sections, no deduction was made for the gaps between sections."

When Henry Sheldon Anable eventually came east again he came all the way to the Atlantic coast, where he settled and became a distinguished man. To this day he is often referred to as the Father of Long Island City, where he took a leading part in the laying out of the streets. Anable Avenue, adjoining the present City Hall there, has been named in his honor. He also figured in the final incorporation of the city, which he served in many public-spirited ways.

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that this in time would become a place of great resort, they took up all the land surrounding the grove, and Mr. William Lapham built a hotel for the accommodation of visitors. They also cut down one of the largest of the trees, the bark of which they took off, also a transverse section of the

wood, and Capt. Hanford is now exhibiting it in New York, to the astonishment of all beholders.

The stump of this tree, which stands within twenty feet of the house, is twenty-five feet across the top without the bark, including the bark at widest part it is 31 feet in diameter. The tree was 295 feet high. All of these trees are symmetrical in form, are very straight and tapering like the mast of a ship; as an evidence, the one cut down is 30 feet from the ground, 14½ feet in diameter; 60 feet from the ground, it is 13 feet and 200 feet from the ground it is 10 feet in diameter without the bark. Four men were engaged 22 days in cutting it down, axes were no use, it was accomplished by boring into its center with long augurs. When cut off it could only be felled by upsetting with wedges. And when it did fall it crushed everything in its way and buried one half of itself in the ground. I looked over the end of the body and concluded that I would not like "to fall off that log." On the trunk of this tree they are now building a double ten-pin alley, and contemplate building a summer house over the stump. After supper we were all standing on this stump, when I suggested joining hands to see how many men it would require to reach around. We stood with our heels on the outer edge and found it took 14 men with outstretched arms and hands joined; we then stood on the ground with our toes to the tree, 17 of us could not join hands and there being no more men Mrs. Lapham came to complete the circle. The top of the stump is smoothly planed, and parties often dance upon it; four sets of cotillions can be formed upon it at the same time.

One side of the "Pioneers' cabin" has been burned out. On the inside of this hole we measured 31 feet and 50 feet high, burning through one side forming a chimney, and in the hollow thus formed 20 persons could lodge comfortably.

The tree "Hercules" measures 98 feet in circumference and is 375 feet high but is considerably defaced by fire. The "Father" as it lays on the ground is 425 feet long. This was the tallest of any, and has probably lain on the ground for ages; it is hollow nearly its entire length; on the uppermost side a pair of horses and barouche could easily be driven.

Mr. Lapham has sold the bark of one tree for $1,000. This they are now stripping, intending to take it to Europe for exhibition; it is 92 feet in circumference and 315 feet high. One old tree, whose roots are upturned, measures 41 feet across at the roots. There is a hollow tree laying on the ground, which has been burned through the center from the roots upwards, about 100 feet from the roots the fire has burned through on one side making an opening about 50 feet long. At this entrance we rode our horses in and *rode them through,* and came out at the roots; this we all did several times. Our horse and men were all of good size, and at one point we were obliged to lean a little to one side, but this was in the

AN EARLY PARTY ENTERING THE CALAVERAS SOUTH GROVE

Calaveras Big Trees State Park, near the north fork of the Stanislaus River, is an area of many fine sequoias. On 50 acres there are more than 150 large individuals of which 85 are 10 feet or more in diameter and many are nearly 300 feet high. The south grove, shown above, is not yet included in the state park, the area under protection now consisting only of the north grove, a scene in which is shown on the cover. Photographs are by courtesy of the Save-the-Redwoods League.

thickest part of the tree, where the burning and decay were not very even; a half hour with an axe would remedy that defect.

There are on the land owned by the Laphams 115 of these trees, smallest of which is 10 feet in diameter. The tops of the most of them have been broken off by the weight of snow during the winter. They are a distinct species of Arbor Vitae of which no others are known to exist; the Indians say there are no others in California. They have been named "Washingtoniana Gigantea."† They are situated high up in the mountains in Calavera* County, in a beautiful valley that requires but the arm and persevering energy of the Yankee, to make it "bloom like the rose." The largest

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† For the history of the scientific naming of the tree which by one early botanist was called "Washingtonia" (not Washingtoniana) and which has most recently been designated as *Sequoiadendron giganteum,* see the note by H. W. Rickett on page 15.

* See footnote on first page of article.

Washingtonianas are supposed to be over 3,000 years old; they show that number of circles in the wood.

When first reported few would credit the story of their gigantic size, and even when the bark of one was put in San Francisco, and a section of the wood exhibited, many shrugged their shoulders and pronounced a grand humbug, but now there is a good hotel there and parties are to be seen going and coming every day, their existence is now no longer doubted.

The Washingtoniana is the largest perfectly formed tree ever discovered; they seldom have any branches under 100 feet from the ground. Travelers tell of large trees found in India and Africa and in Mexico there is a Cypress measuring 76 feet in circumference and another 118 feet, but Humboldt says that this last upon close examination is found to be three trees grown together. There are trees in Africa that are 90 to 100 feet in circumference that are but 50 to 60 feet high; Humboldt tells of one 90 feet in circumference, and only 12 feet high.

It is much to be regretted that fire has destroyed so many of them, as there are few that are not in some way injured by it. The one cut down is not the largest, nor is the one they are now stripping, but the bark is smoother, nor had the fire touched them.

Mr. Lapham will soon have a fine ranch, the soil is good, timber and the best water abundant. He is clearing the land as fast as he can; good paths are cut out leading from the house to all the trees, so that one can easily get about.

California is full of large trees of from 30 to 40 feet in circumference; there is an oak standing in the levy at Sacramento, that I measured and found to be over 40 feet in circumference.

We stayed two nights at the "Big Trees," and on the morning of the third day started for the great cave of Calavera, distance 10 miles, most of the way over a very blind trail, which we lost several times. This is a part of the country where white men are not very plenty, there being no mining until near the cave, where we arrived about 4 o'clock p.m. very tired and ravenously hungry.

We explored the cave after supper and brought away some beautiful specimens of stalactite of which we found immense quantities in the cave, and the next day returned to Sonora feeling well repaid for our trip.

Lost in the Arctic

By Melville T. Cook

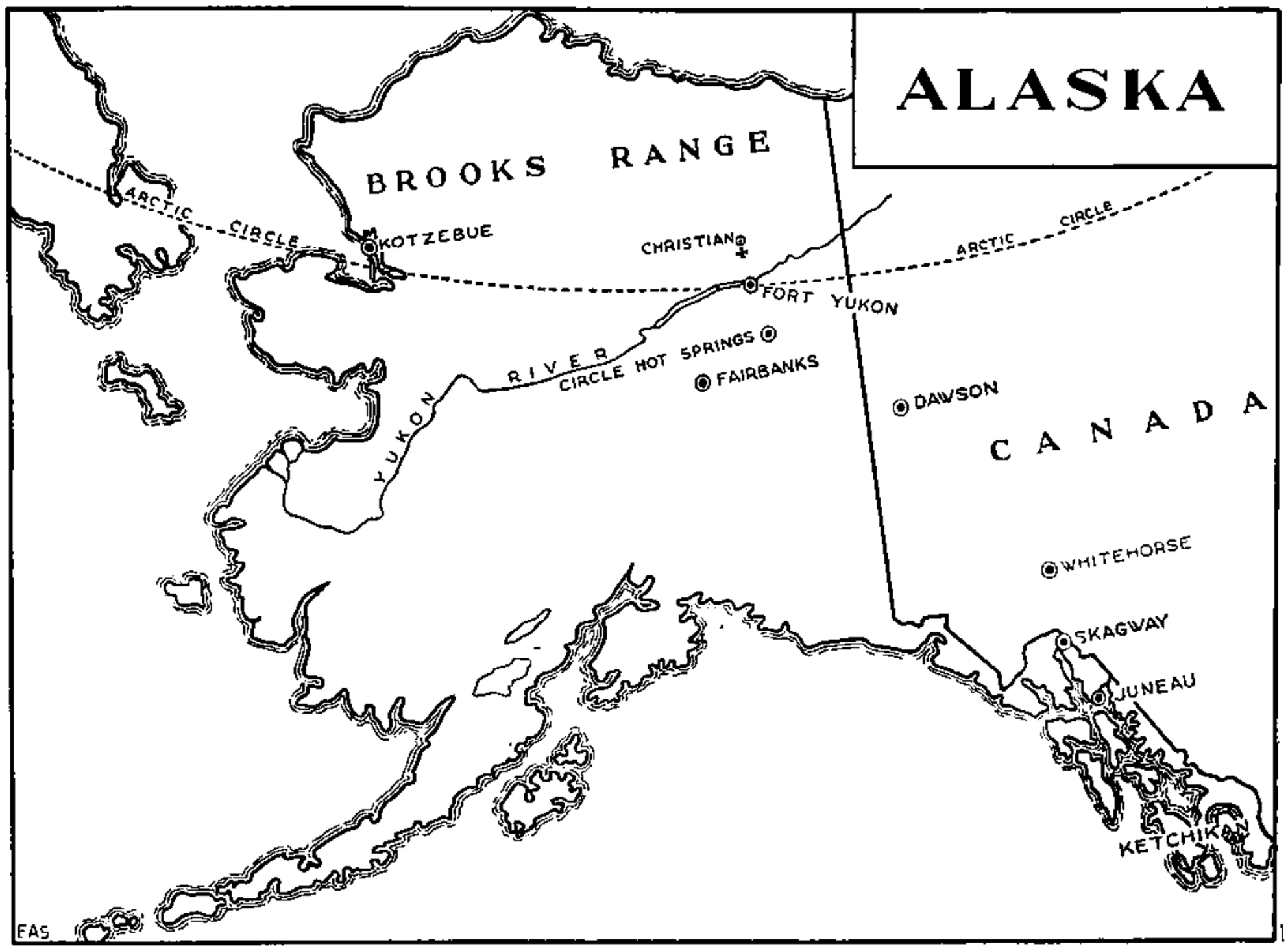
OUR trip to Alaska was intended for a joy ride and not for the purpose of studying botany, but of course a botanist cannot be expected to close his eyes to the plants of a country in which he is traveling.

The voyage from Seattle to Juneau was made in the inside passage among the many beautiful wooded islands of the west coast which look tempting to any botanist. Fishermen villages and pulp mills were seen at several places. A brief stop was made at Ketchikan and a two-day stop at Juneau, with drives into the country made at both places. These towns have very few miles of improved roads and travel is limited.

The climate in this part of Alaska is mild with a high rainfall. The forests had the general appearance of the rain forests of the tropics which I have visited in the past, but of course the flora was very different. The predominant trees and shrubs were coniferous and there were none of the vines which are so abundant in tropical forests. The undergrowth of shrubs and herbaceous plants was dense and rank and almost impenetrable in many places and I have no doubt it would have required as much effort to cut a road as in the tropics. I was told that the coniferous vegetation at the higher elevation was bent over by the heavy snows of long winters and much of it never resumed the upright position. This makes the ascent to these elevations very difficult.

The predominant trees were spruce, hemlock, and red and yellow cedar. The red cedar was used by the Indians for making totem poles before that custom went out of fashion. The yellow cedar grows tall and straight and dies from the top, giving the appearance of a disease, but this is instead a natural dying. The great number of these dead trees is very characteristic of these forests. Birch and a species of poplar were abundant here and in the interior. These forests can probably furnish pulpwood for many years to come but for some reason this industry has not yet been developed in Alaska. I was told that a mill is being estab-

A pleasure trip made to Alaska last summer by Dr. "Mel" T. Cook and Mrs. Cook ended in their being grounded on a mountain side above the Arctic Circle, where the temperature was often below freezing. There they remained for a week before being rescued. The story of their experience, including their botanical observations, is given here. Dr. Cook, since his retirement in 1940 as Plant Pathologist and Vice-Director of the Insular Experiment Station at Rio Piedras, Puerto Rico, has been in the department of Botany at Louisiana State University, Baton Rouge.



Points on the Alaskan itinerary of Dr. and Mrs. "Mel" T. Cook last summer are shown on the map above, which was prepared by Eduardo Salgado of the Garden's staff. The airplane in which they were attempting to reach Circle Hot Springs from Fort Yukon came to a fuel-less landing fifty miles directly north of their starting point. The village of Christian was only ten miles farther north, but to reach it would have been impossible, even had they known of its proximity, because of the swampy nature of the valleys.

lished. There was some lumbering and logging evident. Log houses were common in Whitehorse (Canada), Fairbanks (Alaska), and other places. Several of them were two stories and a few were three stories high. The logs were peeled and stained and the houses very artistic.

Willows and alders were abundant. The willows were not as large as farther south, but the alders were fully as large, though they became smaller as we traveled north. Mountain ash was quite common.

One of the most conspicuous herbaceous plants was a blue lupine which was found scattered over parts of Canada and Alaska. Plants of this species growing near the foot of Mendenhall glacier were 3 or 4 feet in height. Those growing in Brooks range, 50 miles north of the Arctic Circle, were less than one foot in height but were the largest of the herbaceous plants observed in that area. Dandelions were found in considerable abundance at Whitehorse and some other places. They

were not so plentiful as farther south but were very large and beautiful. Mustard was found in many places, except the extreme north. A species of water-hemlock (*Conium*) was observed frequently in both northern Canada and Alaska. One of the most interesting plants seen at Ketchikan, Juneau, and some other places was a very small species of *Cornus* not more than 6 inches in height, each plant bearing a single cluster of flowers.* The genus *Rubus* was quite abundant near the coast but not so common in the interior. We were told that wild currants also were abundant and we saw a few plants. We were also told that the berry fruits had a high water content and were not especially good except for jelly. Dock (*Rumex* sp). and yellow pondlily were observed in several places that we visited. A few common flowering plants were observed in yards, also a few species that were new to us.

We were delayed in Juneau because of bad flying, or rather bad landing weather at Skagway.† The flight was in a small eight-passenger amphibian plane up the valley and gave us a fine view of beautiful mountain scenery and the Mendenhall and Muir glaciers. Skagway is a town of less than 1,000 persons and is of some historical interest. During the gold rush days the population was about 10,000. We went from there by the Alaska Yukon Railway over the White Pass to Whitehorse. This gave a good view of the trail over which prospectors marched single file in their effort to get to the gold fields. It is very distinct and can be seen from the railroad. About 3,500 pack horses were sacrificed in this march. The scenery for the first half of this route was beautiful. Whitehorse was uninteresting except for the rapids in which so many men lost their lives in the gold rush days. The steamer trip to Dawson is worth while but unfortunately we could not get passage. This trip requires two days down and six days for the return. We went from Whitehorse to Fairbanks by plane, which took us to an elevation of about 10,000 feet in order to clear the mountain ranges. Fortunately the weather was good and we had a wonderful view of the country.

Fairbanks is an interesting town of about 7,000 or 8,000 inhabitants and is the center for tourists. In many respects it is a boom town, the last of our frontiers. The thermometer drops frequently to as low as —60° F. in the winter, but the climate is delightful in summer. The trees are not so abundant as on the coast.

The trip from Fairbanks to Kotzebue was by plane at an elevation of about 8,500 feet. Kotzebue is a village of about 300 Eskimos and 100 whites, but in summer the Eskimo population may be larger. All the

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* If not the common bunchberry *C. canadensis*, this was probably *Cornus suecica*, the similar but slightly taller species which is also common in Alaska.

† Skagway is the Indian name for bad or high winds and we were told that the name is very appropriate. Planes were not permitted to leave Juneau for Skagway unless the weather reports were favorable.

On the airplane trip from Juneau to Skagway, the Cooks had an excellent view of Muir and Mendenhall glaciers. Muir is shown above and Mendenhall, which is about 20 miles north of Juneau, is seen in the distance below. In the foreground is one of the few herds of cattle in Alaska, grazing in a field of lupine such as Dr. Cook describes seeing as a prominent flowering plant in several parts of the country which he visited. Photographs copyright by Winter & Pond, Juneau.

Eskimos except the very old people speak English. The vegetation is sparse; in fact, much of the country was covered with snow at the time of our visit. The attractions at this point are the white whale hunt with the natives, the Eskimo dance, and the midnight sun. Fortunately the weather was clear and we got a good view of the midnight sun except that we were about two weeks too late to see it at its best. This northern region was frozen to such a depth during the ice age that the ground thaws only a few inches down during the summer. The result is no drainage ditches and poor sanitation. Typhoid fever would be epidemic if the government did not require annual inoculations which are given to the entire population by the government doctor.

The next day we started on our trip to Fort Yukon and Circle Hot Springs, which was for the purpose of seeing the swamp vegetation and wonderful vegetable growing center. The trip to Fort Yukon gave us a good view of the swamp region, which is broken by many streams, lakes, and ponds of various sizes. The vegetation is coniferous and from the air it appears in rows along the streams and around the lakes as regular as though planted by man. This is probably caused by depositing of seeds at various water levels.

Fort Yukon is a village of about 500 whites, Indians, Eskimos and breeds. The Episcopal Church has a mission and small hospital which cares for the health of the people.

We started from Fort Yukon to Circle Hot Springs but unfortunately our pilot became confused and we were lost. After a vain effort to get his bearing, we ran out of gasoline and were compelled to land on a mountain side (Brooks range), 50 miles north of the Arctic Circle and at an elevation of 3,200 feet. The landing wheels and both doors were knocked off. Fortunately we were not injured except for a few scratches and bruises. Mrs. Cook had the most severe bruise where the belt buckle rested against her body. The pilot put the doors back in position and chinked the edges with insulation from inside the plane for protection against the cold. The adhesive tape from the first-aid kit was used to close the broken flexi-glass as a protection against the mosquitoes. The pilot thought we would be rescued within a few hours.

The vegetation was alpine, consisting of a thick mat of moss and lichens covering mud and rocks. The herbaceous plants were small. Species of the following genera were collected just before our rescue: *Bupleurum americanum* C. & R., *Saussurea augustifolia* DC., *Senecio resedifolius* Less., *Polygonum bistorta* subsp. *plumosum* (Small) Hult., *Arnica louiseana* Farr., *Lupinus arcticus* Wats., *Senecio frigidus* (Rich.) Less., *Salix reticulata* L., *Salix* sp., *Eritrichium aretioides* Cham., *Eriophorum vaginatum* subsp. *spissum* (Fern.) Hult., *Pedicularis lanata* Wild. (fruit), *Pedicularis langsdorfii* Fisch., *Pyrola grandiflora* Radius, *Dryas octopetala* L. *Ledum decumbens* (Ait.) Lodd., *Anemone narcissiflora* subsp. *interior*

Hult., *Arenaria arctica* Stev., and *Antennaria*‡ sp. All the species are quite common in the Yukon Valley except the *Eritrichium* and it is not rare. The determinations were made by Dr. J. P. Anderson of Iowa State College, who for many years was a botanist in Juneau.

A few species of trees grew in small holes. The height of these trees was regulated by the depth of the holes and the wind. Old willow trees of 3 or 4 inches, bearing 1 to 3 catkins, were common. Alders occupied the larger holes of 3 or 4 feet and small clumps were in the open. Coniferous trees as much as 10 feet high could be seen in the valley.

Our food consisted of emergency rations (spam, ship bisquits and malted milk tablets) and a cargo of 90 dozen eggs intended for the hotel at Circle Hot Springs. The water in holes was cool, clear and good. We were able to patch the cabin as a protection against cold and mosquitoes. Although it was midsummer the sun did go out of sight behind a mountain range for a short time at midnight. However, it was always light enough to read — if we had had anything to read.

The temperature was low enough to make thin films of ice on the outside at times and 43° F. in the cabin. We did not suffer, but we were very uncomfortable. The mosquitoes were abundant and troublesome during the warm periods but a fairly high wind kept them away most of the time. A light rain the first morning made the vegetation too wet to burn but after that the pilot set fire to the moss and kept it burning most of the time. It burned rather slowly and made a good smoke which did not rise very high. It was this smoke that enabled the 10th U. S. Rescue Squadron to locate us.

Life under these conditions was monotonous but there was nothing that we could do to relieve our condition. Most of the native population leaves the interior in the summer and goes to the beach or rivers where they can live on fish. The trails are poor and usually end in the swamp. Any attempt to walk out is likely to prove disastrous. Pilots are instructed to stay with their planes.

The pilot had told us that planes would start in search two hours after he was due in Fairbanks and that we would be located within a few hours. The search was started as he said, but since we were far from where we were supposed to be, we were not located until the seventh day. The sound from the U. S. B-17 plane piloted by Capt. Charles E. Hale and Lt. Eldon J. James was sweet music to us. The pilots dropped emergency rations and circled over us for 3½ hours until the two helicopters driven by Capt. Eugene T. Nogar and Lt. Edward Manlove arrived and took us to Fort Yukon. We left 86 dozen eggs and 25 gallons surplus gasoline on the mountain.

We were met at Fort Yukon by the entire population, including the

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‡ In this genus more species have been described than actually exist. What appear to me to be mere apomictic lines have been described as species.

doctor and two nurses from the Episcopal Church hospital, but since we were not in need of medical services we went on to Fairbanks.

The U. S. Rescue Squadron is a very efficient organization to which we wish to express our gratitude.

The Sourwood—A Neglected Tree

By James G. Esson

This article is the second in Mr. Esson's Journal series on woody plants that are deserving of wider use in gardens. The first, on the leatherwood (Dirca palustris), appeared in March 1949.

ONE might wonder why a tree so magnificent as the sourwood or sorrel tree (*Oxydendrum arboreum*) is so seldom seen in gardens. Its shiny leaves (with an acidulous taste which gives the plant its name), its summer flowers and brilliant autumn foliage—characters which give it notable garden value from July to fall—are unduly neglected. The tree's slow growth is probably one explanation. Nurserymen, like most men, look for quick returns, and garden designers are concerned largely with immediate effect. No doubt, too, many gardeners would question its hardiness in relation to its native haunts.

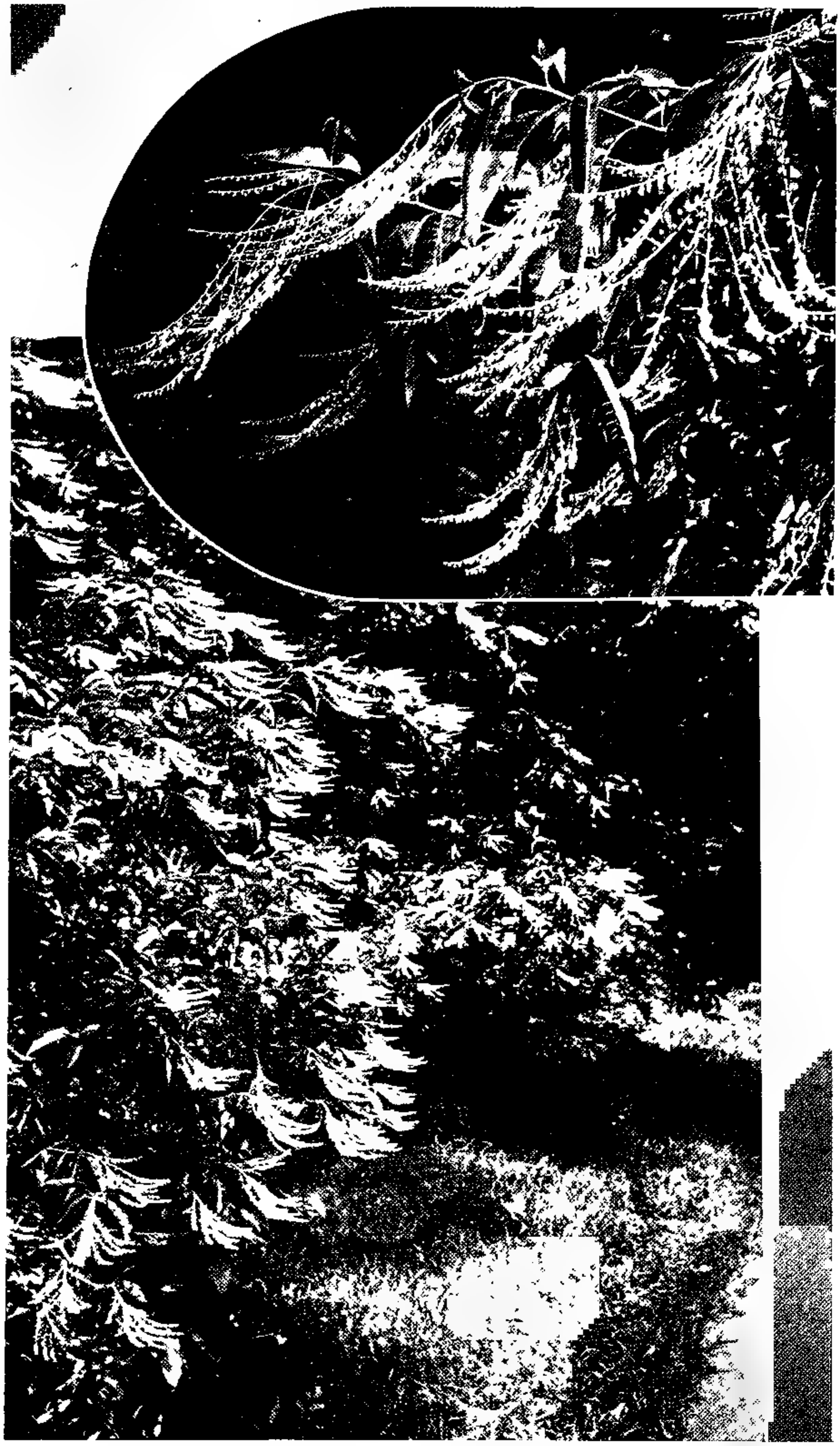
There is much more to be said for the sorrel tree. It seems to be immune to attacks from insect pests and diseases. It is the only true tree representative of the Heath family which can be grown in gardens in northeastern United States. While *Rhododendron maximum,* also of the Heath family, may become arborescent, it is only found so in its native Appalachian Mountains.

The sorrel tree is notable botanically in that it is one of the few genera claiming only one species to its name. In a way this is interesting, especially if we delve a little into its history. Gronovius, in his *Flora Virginica* (1739), described it under the title *Andromeda arborea,* as also did Linnaeus in his *Species Plantarum* (1753). In 1778, the year that Linnaeus died, DeCandolle, the noted French botanist and projector of the *Prodromus* (1824), was born. He saw fit, for technical reasons, to withdraw this plant from the genus *Andromeda,* and became the author of the name by which it now stands.

THE SOURWOOD TREE ALONG A NEW YORK PARKWAY

(Shown on the opposite page)

Long white curving fingers of bloom extend from the tips of the branches after mid-July. The pale greenish-white seed-capsules which follow the flowers hold the tree in this same attractive form until the end of the season.



It is significant that Catesby* in his *Natural History of Carolina, Florida and the Bahama Islands* (1731), has a very lovely color plate of a chattering plover with a fruiting branch of what he calls the sorrel tree. Thus it appears that DeCandolle simply latinized the first English name that was given to the plant—and this is one of the names by which it is still known today.

Among English gardening and botanical publications it was first mentioned as *Andromeda arborea* in the fourth edition of Philip Miller's *Gardeners' Dictionary* (1754). The description is so similar to that of Gronovius that it is doubtful if Miller knew the plant at that date, although Bean in his *Trees and Shrubs Hardy in the British Isles* says it was introduced in 1752. In 1827 in Loddiges' *Botanical Cabinet* it is illustrated in color (plate 1210) and we read here: "In England it is tolerably hardy when established, but tender while young." Curtis' *Botanical Magazine* 1836 (plate 905) describes it as a large shrub growing in London. The *Botanical Cabinet* and *Botanical Magazine* both list it as *Andromeda.*

Toward the end of the nineteenth century we find the sorrel tree listed in Nicholson's *Dictionary of Gardening* as *Oxydendron,* a name which could be ascribed to an editorial error.

The sorrel tree, according to Sargent in his *Silva of North America* is "distributed from Mount Pleasant, Westmoreland County, Pennsylvania, to southern Indiana and middle Tennessee, and southward along the Alleghany Mountains to western Florida and the eastern shores of Mobile Bay, and through the elevated regions of the Gulf states to western Louisiana." To have said "Appalachian Mountains and the Piedmont" instead of Alleghany would have been more accurate, for the distribution actually extends over most of the length of the Appalachian chain and out into the coastal plain. It is thoroughly hardy in southern New York and along the eastern part of New England to Boston and possibly on the coast of Maine.

Although it is known to have attained 75 to 80 feet in its native soil, *Oxydendrum arboreum* is rarely seen more than 30 feet tall in gardens. It carries a straight trunk which becomes light grey and furrowed with age. Young branchlets have reddish-green bark the first winter. The smooth glistening green leaves, produced alternately, have a petiole ⅝ inch long. They are delicately serrated and range from 5 to 7½ inches in length and to 2½ inches broad, in shape best described as oblong-lanceolate. Though they give the effect of being evergreen, the tree is deciduous, losing its foliage after a brilliant autumn display, in which the leaves throughout October assume intense shades of scarlet, crimson and orange, competing with the tupelo as exhibiting the brightest red of all. They are well demonstrated in volume 4 of *Addisonia*, plate 139.

The white andromeda-like flowers, coming in late June from the tips of the current year's growth, are fully expanded by mid-July in a normal

*For information on Mark Catesby and his work, see the Journal of the New York Botanical Garden for January 1949.

season. They are arranged in pendent panicles 4 to 10 inches long, individual flowers being 5/16 inches long.

As the flowers fade, creamy white fruits develop and, although these ripen in September, the empty capsules remain, giving the tree a pleasing appearance until fall.

Propagation is best obtained by seeds sown in spring on fine grade vermiculite that is used as a quarter-inch layer above humusy soil; or on peat or finely screened leafmold, to either of which a liberal quantity of sharp sand has been added. Lath shades will assist growth in the early stages, but, although the sorrel tree will grow in some shade, it will flower better in an open location when finally planted in permanent quarters. Like most of the Heath family it favors a slightly acid soil. For best development it requires some moisture content in the soil, but with it good drainage. During the past dry summer many sorrel trees showed evidence of suffering from the drought.

The Botanical Name of the Big Tree

By H. W. Rickett

THE correct botanical name for the big tree is rather difficult to determine. The name *Sequoia* was given by Endlicher in 1847 to the redwood, *S. sempervirens.* It had been named *Steinhauera* by Presl nine years earlier (unfortunately in a publication not available here), but the name *Sequoia* is conserved by international action and *Steinhauera* rejected. For those who regard the big tree as of the same genus as the redwood, this ends the matter so far as the name of the genus is concerned. However, there can be little doubt that the two are distinct, as Buchholz has made clear in the *American Journal of Botany* for 1939, page 536. He there proposes the name *Sequoiadendron.*

Several earlier botanists also considered the big tree to be in a genus distinct from the redwood. Lindley, in 1853, published the name *Wellingtonia,* but this is merely a later homonym of Meissner's name of 1840 for an entirely different species, and therefore illegitimate. Winslow proposed *Washingtonia* in 1854, but this name is rejected because the same name was applied to a genus of palms and is conserved for that genus. This leaves the last name, *Sequoiadendron,* the valid one.

The specific epithet *gigantea* was applied by Endlicher in 1847 to what he thought was the tree originally described (but not named) by Douglas and which we know to be the big tree. Unfortunately, Endlicher included in his application of the name references to descriptions and figures of entirely different species, so that the species *Sequoia gigantea* might technically be classed as a *nomen dubium.* In order to save the familiar name it is necessary to stretch a point and exclude these references from Endlicher's species.

When Winslow described the genus as "Washingtonia" in 1854, he proposed the specific name *californica.* However, he wrote: "If the 'Big Tree' be a *Taxodium,* let it be called now and for ever *Taxodium Washingtonium.* If it should be properly ranked as a new genus, then let it be called to the end of time *Washingtonia Californica.*" Provisional and alternative names are illegitimate according to the International Rules of Botanical Nomenclature, therefore Winslow's names are ruled out.

Gordon, in 1862, offered *americana* as a synonym, but synonyms are also illegitimate. If it should be ruled that *gigantea* is illegitimate, a new epithet would have to be made. But in the meantime the most acceptable name for the big tree is *Sequoiadendron giganteum.*

NOTICES AND REVIEWS OF RECENT BOOKS

A Much Needed Text For Botany Students

PLANT AND ANIMAL GEOGRAPHY. Marion I. Newbigin. Revised by Prof. H. J. Fleure. 298 pages, 39 illustrations and maps, indexed. E. P. Dutton, New York. 2nd edition 1949. $5.

One of the notable deficiencies among botanical texts has long been a plant geography that can be used for an undergraduate course. That this lack should have been at least partly fulfilled by this book by a geographer is both a reflection of the immaturity of plant geography as a botanical science and an indication of the broad grasp of things possessed by some students of geography. It also shows its author to have been at the same time a scholar of deep understanding and erudition and a teacher of great ability.

This book covers a wide field and is, of course, highly generalized. Rather than attempting to present an encyclopedic account of the distribution of plants and animals, the author has chosen a few examples, the more familiar ones, from the mass available, to illustrate her principles.

She has wisely realized that plant communities are basic, and that they may be relatively integrated systems, while animals are dependent on them, and animal communities are usually so loosely integrated as to scarcely exist at all. She gives brief accounts of plant and animal classification, soils, climatic changes and vegetational changes. It is a pity that the chapter on soils (not written by the author) is so far below the level of the rest of the book as to reflect scarcely at all modern understanding of the subject, especially its tropical aspects.

Plant communities and some of their animal associates are discussed in some detail, and quite satisfactorily. The last part of the book is on floristic and faunistic regions. It is interesting that she does not find the two sets to coincide in many respects. Doubtless the faunal regions are valid, at least from the point of view of the mammalogists. Many botanists, at least American ones, may not find some of the floral regions particularly convincing. The separation of the Mediterranean and Indo-African desert regions as distinct major areas, while the arid southwestern part of North America is included in the "Northern Lands" or Holarctic, is certainly merely a reflection of greater familiarity with the former.

Her distinction between a tropophytic and a mesophytic forest belt in eastern North America with their common boundary in the vicinity of New York (p. 118) will probably leave the botanists of that region wondering what she means. Ecologists may question some of her explanations as over-simplification. Indeed, if this is not true, then the ecologists have been guilty of the opposite sin. Occasional errors will be found, resulting from lack of sufficient familiarity with the details of plant taxonomy and distribution.

However, none of these faults will outweigh, for the average user, the value of the book as a text and as an outstanding piece of generalization.

F. R. Fosberg.

No More Drudgery?

FRONT PORCH FARMER. Channing Cope. 171 pages, illustrations, introduction by Louis Bromfield. Turner E. Smith & Co., Atlanta, Ga. 1949. $2.75.

This book is a short, enthusiastic account of the author's system of soil improvement and pasture management adapted to conditions prevailing in the Southern States. The author calls his system "front porch farming" which he defines as "the production of milk-fed beef on a system of all year, permanent, perennial grazing crops" (page 150). His aim is to eliminate the drudgery from farming.

"The front porch farmer sets in motion a series of fast-growing, nutritious, perennial, soil-holding, moisture-holding, soil-improving crops; he stimulates and enriches them with minerals (a very easy process), gathers them with livestock controlled from field to field with simple fencing, markets the livestock (and thereby the plants which produced the livestock) when they mature, and transacts the entire business (once it is established) without leaving his easy-chair more often than the spirit moves him. It is that easy." (pages 3-4)

Unfortunately, the author's discussion for the most part is somewhat superficial and little more than a general introduction to those plants which he himself has tried and found useful. For the technical details, the indispensable know-how, he invariably refers the reader to his local agricultural experiment station (as on page 28). He recommends crops for each season to build up the soil, along with half a ton of top-dressing per acre annually.

Even in "front porch farming," it seems that certain chores, such as mowing, fertilizing, milking, care of newborn calves and cultivating the family garden, must be attended to. These, if performed by the owner, necessarily compel him to vacate that easy-chair on the front porch. It is this reviewer's painful duty to report that the life of perfect ease has not yet been discovered.

GOVE B. HARRINGTON,
Katonah, N. Y.

Contemporary Garden Design

GARDENS IN THE MODERN LANDSCAPE. Christopher Tunnard. 184 pages, illustrated, index, bibliography. Chas. Scribner's Sons, New York. Second (revised) edition 1949. $5.

Mr. Tunnard has written a stimulating book on the contemporary movement in garden design. It is perhaps better adapted to the professional landscape architect or designer than to the layman, but its profuse illustrations help to make his points clear and understandable.

The review of previous movements in landscape design is concise and quite impartial. Some of the theories expressed about modern concepts would certainly lead to violent argument among fellow professionals, but his point of view is clearly stated and well documented.

MARY DEPUTY LAMSON.

History of Agriculture

TITANS OF THE SOIL. Edward Jerome Dies. 213 pages, illustrations, index. Univ. of N.C. Press, Chapel Hill, N.C. 1949. $3.50.

Brief, interesting biographies of 26 men who have contributed to the development of American agriculture have been arranged to form a fair history of agriculture. Two proofing errors in the chapter on Dr. Shull should be noted. The fifth generation of inbred corn did not give "athletic" offspring. These resulted from the marriage of two lines of inbred corn — to retain the author's fanciful terminology.

The 1948 corn crop was probably 1,000 times the 3,649,510 bushels listed for it.

In the note on Luther Burbank the use of species in place of variety will bother botanists more than anyone else.

Normally I would not point out specific errors in a review, but where I detect so few, they seem worth correcting.

VIRGENE KAVANAGH.

Organic Gardening In an Inorganic Form

STONE MULCHING IN THE GARDEN. J. I. Rodale. 164 pages, illustrated. Rodale Press, Emmaus, Pa., 1949. $3.

For nine years I have hopefully petted, pampered, sprayed and resprayed a plum tree, and raised maggot-infested, fungus-covered parodies of the grocer's fruits. Last winter I stone-mulched the spot. This summer I have enjoyed a large crop of delicious plums. (It just happens that for the first time I can remember, my tree flowered during several days of bright, dry weather, host to a horde of bees . . . perhaps a mere coincidence.) But to the book, which is difficult to evaluate without evaluating the entire Organic Gardening movement, for the mark of the cult is seen even as a disciple bears the mark of his prophet.

That the art of stone-mulching is a rational agricultural practice, tried and approved by the ancients, interpretable in terms of contemporary scientific theory, undeservedly neglected in the present day, and open to designed and needed experimentation, is beyond the point. All of that can be accepted from the start by scientific investigators and practical workers. The present treatment of the subject, however, is designed to appeal not to them but to that gullible segment of the population which can be induced to purchase panaceas for halitosis, for sterility of soil or sow, or for the evils of our present national economy; and perhaps also to that omnivorous hurried group who fail to read between the lines.

Inconsistencies shriek at the reader from the start. On the jacket, the high-pressure blurb proclaims Rodale's stone mulching "A new invention in gardening!" But on the flyleaf the invention is credited to Virgil and Pliny. Moreover, we now find the organic-gardening Rodale Press sponsoring a completely inorganic type of gardening. In the text, three widely different rock-sites are considered as though identical in their horticultural effects — surficial rock mulches, crushed stone substrata, and soil-filled bedrock crevices. The last-named is illustrated by a gnarled and gnomish tree, extremely typical of this site-type, but hardly a recommendation for Rodale's "invention." The scientific validity claimed for this horticultural approach is somewhat counteracted by the fact that only one of the eight additional authors is credited with a professional affiliation.

Be it in plant science or organic gardening, it has been said that scientists are men who follow (or think they follow) the principles of applied logic and scientific method, whereas faddists and cultists are men who, knowing naught of these principles, occasionally simulate the gestures and less occasionally hit upon results that should abash the so-called scientists. Now there are many gradations between these two extremes of intellect, but that disclosed in this present volume on stone mulching does not represent one of the intermediate stages.

FRANK E. EGLER,
Aton Forest,
Norfolk, Conn.

450 Years of Smoking

THE STORY OF TOBACCO IN AMERICA. Joseph C. Robert. 296 pages, plus 24 pages of index, illustrations. Alfred Knopf, Inc. N.Y. 1949. $5.

Joseph C. Robert, associate dean of the graduate school of Duke University, in "The Story of Tobacco in America," has given us one of the most interesting, complete and charming narratives we ever hope to read about the weed that has blanketed the globe and cast its gracious spell on men of all races.

With a sure hand and an attractive style, Mr. Robert unfolds the story of the bewitching vegetable that has had such a thumping effect on the social, economic and political aspects of every age since the time of Columbus. Directly or indirectly, tobacco has affected the course of many men's lives. It furnished the life-line for the colony of Jamestown. It determined the position taken up by the British army toward the close of the American war for independence. It was indirectly responsible for turning an indolent Patrick Henry into America's greatest orator. It helped ameliorate the condition of workers in the slave days. It made many a man a millionaire.

Mr. Robert takes the reader from the discovery of tobacco by men who shipped with Columbus right down through Colonial days (when the pipe was the prime favorite) and on through the per-

iod when snuff and knee-breeches held sway, later to give way to the quid and trousers, going into and beyond the time when the cigarette challenged and took first place in the hearts of tobacco lovers.

JOHN T. STACK,
Managing Editor,
The Tobacco Leaf.

Fibers and Fabrics

TEXTILE FIBERS AND THEIR USE. Katherine Paddock Hess. 599 pages, illustrated, indexed. J. B. Lippincott, Philadelphia. Fourth edition, 1948. $4.50.

The fact that this book, in its fourth edition, consists of a completely revised text of former issues, proves the vitality not only of the subject but also of the author's manner of presentation. Essentially a book for classroom use, it is arranged to impart progressive information about fibers, their application and their processing.

Section I covers such subjects as construction of fibers and yarns, application of dyes, and design. In Section II classification and properties of natural and synthetic fibers are given. Section III provides a practical analysis of the consumer and the textile market, and advice on the selection and care of fabrics. Class problems and a very complete story of the jacquard machine are included in an appendix.

In a book of this type, so complete in its practical and technical details, it is particularly pleasing to note that a sectional bibliography at the end of each unit provides a complete plan for additional study.

W. F. LEGGETT.

San Marino Story

THE HUNTINGTON BOTANICAL GARDENS 1905-1949. Personal recollections of William Hertrich. 167 pages, illustrated indexed. The Huntington Library, San Marino, California. 1949. $5.

There is no one better qualified to record the story of the Huntington Botanical Gardens than William Hertrich, Curator Emeritus. Mr. Hertrich's personal recollections of the last 45 years trace the development of San Marino Ranch and its transition into a public institution.

Henry E. Huntington was a man of great practical vision. The long-range programs that he and Mr. Hertrich planned resulted in the complete units that comprised the estate. This book is a record of the buildings, the plant collections, even the number of cut flowers used in the house during one season. Notable incidents are the founding of the City of San Marino, the first avocado orchard, and the first major tree surgery in Southern California.

The text and illustrations carry the reader from "before" to "after." Yet this volume is more than a story of San Marino Ranch. It is also symbolic of the development of the West Coast during the same period of time.

MARY NOBLE,
Home Gardening for the South.

Value from Vegetables

VEGETABLE SCIENCE. H. D. Brown & Chester S. Hutchison. Edited by R. W. Gregory. 452 pages, illustrated, indexed. J. P. Lippincott Co., Philadelphia, Pa. 1949. $5.

For the student who is interested in the academic phases of vegetable production and for the commercial grower concerned with the economical production of healthful food crops, "Vegetable Science" presents a condensed summation of the latest facts concerning the many new developments in the production of vegetables. The preface and the chapters on the importance and food value of vegetables should be valuable reading for all who are interested in the future of agriculture. The brief history and description of vegetable plant characteristics at the beginning of each chapter on cultural practices, together with the review questions and list of references at the end of the chapter, help to make this book a splendid text.

W. V. CUTLER,
Long Island Agricultural and
Technical Institute.

Culture of Fruits From Coast to Coast

FRUIT SCIENCE. Norman Franklin Childers. Edited by R. W. Gregory. 630 pages, illustrated, indexed. J. P. Lippincott Co. Philadelphia, 1949. $5.

A comprehensive study of fruit-growing throughout the United States, this

book is a valuable work for students who wish to compare varieties, and cultural and marketing methods for each deciduous fruit in different regions. But the interpolation of so much information applicable to the Pacific Coast only, would be confusing to a student of fruit-growing in the East.

The list of suggested collateral readings following each chapter is excellent.

The book is marred by literally scores of grammatical and typographical errors. Factual errors include recommendation of ammonium sulfate instead of aluminum sulfate for acidifying soil. Ammonium sulfate would injure or destroy the plants when used in quantity.

DONALD FERGUSON,
Long Island Agricultural and Technical Institute.

Timely Compilation

DICTIONARY OF GENETICS. R. L. Knight. 183 pages. Chronica Botanica Co., Waltham, Mass., Stechert-Hafner; New York, 1948. $4.50.

Within a few months biologists will celebrate the 50th anniversary of the rediscovery of Mendel's law of inheritance. Dr. Knight's volume is an indication of the growth of genetics during this time. The subtitle also says that it includes "Terms used in Cytology, Animal Breeding and Evolution." It might have added 'Systematics' as well (especially Biosystematy), for the bulk of the terms used in the newer developments of systematics also are included. It is a helpful and timely compilation, especially at a time when the borderlines between the fields of cytology, genetics, evolution, and taxonomy are being obliterated.

W. H. CAMP.

Notes, News, and Comment

Staff Conferences. To open the autumn series of monthly conferences of the staff and students at the Garden, of which Dr. P. P. Pirone has been given charge this year, Dr. George L. McNew, recently appointed director of the Boyce Thompson Institute, Yonkers, N. Y., spoke Nov. 16 on "Botanical Trends in the Agricultural Colleges." Dr. McNew was brought to the Institute from Iowa State College to succeed Dr. William Crocker upon his retirement.

On December 14 Dr. E. H. Fulling, founder, publisher and editor of *The Botanical Review* and *Economic Botany,* presented kodachrome slides of the Canadian Rockies and Alaska.

Lectures. The Westchester County Tree Protective Association heard Dr. Donald P. Rogers speak in Yonkers Nov. 17 on the subject of "Rot." Dr. Robert S. de Ropp addressed the Torrey Botanical Club at the Garden the evening of Nov. 1 on "Recent Studies on the Physiology of Plant Tumors." Dr. H. N. Moldenke has lectured in recent weeks to the City Gardens Club on "The Land of Mañana," the Cornwall Garden Club on "The World in My Garden," New York University School of Medicine on "Poisonous Plants of the World," and Phi Sigma Society of Hunter College on "Plants of the Bible."

Affiliated clubs which have taken advantage of the Garden's schedule of programs have included the North Suffolk Garden Club, where G. L. Wittrock spoke Sept. 20 while he showed the Garden's two short films; Litchfield Garden Club, where Dr. P. P. Pirone spoke Sept. 8; Philipstown Garden Club, which was addressed by T. H. Everett Sept. 21; Riverdale-on-Hudson Garden Club, Dr. H. W. Rickett, Oct. 1; and Little Gardens Club of New York City, Dr. Bassett Maguire, Nov. 7 on "Western Desert Flowers."

Advisory Council. Mrs. John W. Roberts of Mamaroneck addressed the Advisory Council at the New York Botanical Garden on chrysanthemums Oct. 26. Dr. W. J. Robbins and Mr. Charles B. Harding addressed the annual meeting of the Advisory Council held on Dec. 7, at the home of Mrs. Harold Irving Pratt.

Meetings. Dr. William J. Robbins attended the autumn meetings of the National Academy of Sciences in Rochester Oct. 24-26. Two days later he was in Washington with the Advisory Council of the National Arboretum.

Northrop Memorial. Dr. Harold N. Moldenke has been appointed to the Board of Directors of the Alice Rich Northrop Memorial, an organization of

which Mrs. N. L. Britton was one of the founders. The group administers a camp for underprivileged children of New York City at Mt. Washington, Mass., giving them special instruction in nature study. The Northrop herbarium is at the New York Botanical Garden.

Opportunities. The Department of Landscape Architecture, Graduate School of Design, Harvard University, is offering a scholarship for the academic year, 1950-51, carrying a stipend of $600, the equivalent of the tuition for one year.

Several Government positions in the agricultural field are open, and the U.S. Civil Service Commission, Washington 25, D.C., is accepting applications. Among the positions to be filled, some in this country and some abroad, are agriculturist, agricultural extension specialist, field agent, agricultural science administrator, plant quarantine inspector, and seed technologist. Other positions are open in the field of home economics and related specialties.

Visitors. Autumn and early winter visitors at the Garden have included J. R. S. Fincham, Botany School, Cambridge, England; William T. Winne, Union College, Schenectady; George Lawrence, Bailey Hortorium; M. Ishaque, Jessone, East Bengal, Pakistan; R. F. Williams, Australian Scientific Research Liaison Office, London; F. P. Cullinan, Bureau of Plant Industry, Beltsville, Md.; H. Christine Reilly, Sloan-Kettering Institute for Cancer Research; Mr. & Mrs. Leonard J. Brass, Lake Placid, Fla.; Mason E. Hale, Jr., Yale University; Caroline K. Allen, Pawling, N. Y.; Gladys E. Baker, Vassar College; Alex D. Hawkes, Coconut Grove, Fla.; Mulford B. Foster, Orlando, Fla., Regina Duffy, Columbia University; H. S. Jackson, University of Toronto.

Returning to Egypt. A four-year fellowship from the Faculty of Science of the University in Alexandria, Egypt, has been completed by Hasan M. Yusef, who has been carrying on research work at the Garden since February 1946, while studying at Columbia University. He is being awarded a Doctor of Philosophy degree this month. His thesis, based on his Garden work, in the physiology of the fungi, with special reference to nutrition, is entitled "An Investigation of the Requirements of Some Hymenomycetes for Specific Essential Metabolites."

Before returning to Farouk I University to teach mycology, Dr. Yusef (who has simplified the spelling of his name since living in America) is visiting the plant pathology departments of Minnesota, Wisconsin, and Cornell Universities.

John L. Merrill

THE New York Botanical Garden lost a life member and an officer of more than forty years' service in the death on Dec. 18 of John L. Merrill, Vice-President. Mr. Merrill, who was 83, had been a member of the Corporation since Jan. 10, 1916. Two years later, at the annual meeting, he was elected Assistant Treasurer. On Oct. 10, 1918, he was made a member of the Board of Managers and was elected Treasurer.

Mr. Merrill's association with the Garden came through his position as assistant to James A. Scrymser, founder of Mexican Telegraph and of Central and South American Telegraph Companies, later known as All America Cables, Inc. Mr. Scrymser was also one of the founders of the New York Botanical Garden, and he had served as the Garden's Treasurer from 1912 until his death in April 1918. It was later that year that Mr. Merrill was chosen to succeed him and he continued as Treasurer until Jan. 11, 1937.

During this period Mr. Merrill was a member of the executive and finance committees, and from 1918 to 1928, a member of the endowment committee. On Jan. 11, 1932, he was also chosen Vice-President, and he served in the two offices for the next five years. He remained Vice-President until the time of his death.

Mr. Merrill was a former president of All American Cables, Inc., and, since 1940, chairman of the board of the American Cable and Radio Corporation, an affiliate of International Telephone & Telegraph Corporation.

Active in international affairs of the western hemisphere and always working

toward greater solidarity among the nations, he was the recipient of honors in Brazil, Bolivia, Ecuador, Chile, Colombia, Venezuela, Peru, and Argentina, also in Mexico, the Dominican Republic and Haiti. From 1927 to 1940 he was President of the Pan American Society. He was interested in American history, and he took part in the work of numerous historical and patriotic organizations.

Pierre Jay

A member of the Board of Managers from 1938 until poor health required his resignation on Nov. 27, 1945, Pierre Jay, 79, succumbed to a long illness Nov. 24, 1949, at his home in New York. He had been a member of numerous committees of the Board during his years of service.

Chairman of the Fiduciary Trust Co. from 1930 to 1945 and honorary chairman since that date, Mr. Jay was first elected to the Corporation of the Garden in 1914. He resigned four years later and was again elected in 1934. On Sept. 16, 1938, he was named to succeed the late Henry W. de Forest on the Board of Managers, and upon the death of Col. J. E. Spingarn he was named, in January 1940, to the executive committee. He resigned from this appointment in 1943. Meanwhile, in January 1938, he was placed on the Garden's finance committee and two years later on the pension committee, and he continued to serve on both until his retirement from the board and its activities.

A graduate of Yale in 1892, Mr. Jay was granted an honorary Master's degree in 1917. As a young man he collected mosses during an expedition to South America. His specimens are deposited in the Botanical Garden's herbarium. In 1944 Mr. Jay contributed to the expedition to Table Mountain in Surinam which was carried out by Dr. Bassett Maguire.

He was an annual member of the Garden throughout his years of association with the institution.

Helen A. Scribner

THE Advisory Council's Chairman during eight years (1926 through 1933), Mrs. Arthur H. Scribner, died in New York Nov. 8 at the age of 81. These were years during which the organization was making its first determined efforts to promote the esthetic beauty of the grounds.

Mrs. Scribner was elected a member of the Advisory Council in 1925 and became its chairman in January 1926, upon the resignation of Mrs. George Perkins. New committees were immediately appointed for horticultural development, and on April 21, 1927, over the signature of Helen A. Scribner as chairman, the Advisory Council sent a long report to the Board of Managers, asking that more attention be devoted to the beauty of the grounds — though without neglecting the botanical plantings.

"As a body," wrote Mrs. Scribner, "we are concerned with the esthetic development of the Garden. There is at present no area where plants are selected and arranged primarily for esthetic effect." The existing style of planting was deplored.

"'Plantation,' as frequently used at the Garden," the report said farther on, "is but another term for the old-fashioned isolated 'bed,' long ago cast into the discard by all modern gardeners. These beds, placed without formal design and unrelated, mar the effect as a whole of any piece of ground, however beautiful, and should in our opinion never be allowed to occupy any important site in an extended vista. They increase, we feel, the stereotyped effect, which effect, the Olmsted report* states, 'one seeing elsewhere would at once recognize as a Botanic Garden style' which, it adds, 'is to be avoided at almost any cost.'"

Among the esthetic plantings recommended by the Advisory Council at that time were (1) selected groups in front

*The Olmsted report was a comprehensive plan for improvement of the New York Botanical Garden's grounds, issued in 1924 by Olmsted Brothers, Landscape Architects, of Brookline, Mass.

Sarah V. Coombs

A tribute to the career of Sarah V. (Mrs. Jerome W.) Coombs, long active in horticultural circles, whose death occurred Nov. 29, will appear in next month's Journal.

of and around the important buildings and conservatories, (2) more naturalistic planting similar to that of the narcissi, (3) a herbaceous border primarily for display, (4) a winter garden of formal design, and (5) a formal flower garden. Further, to protect these plantings, walls around the garden and motorcyclist guards were requested.

These suggestions were to be adapted to the Olmsted plan by which the Garden then was being developed. Existing plans and conditions, however, did not make it feasible to accept more than a few minor points from the report of the Advisory Council, Dr. N. L. Britton, Director-in-Chief, emphasized as he replied in detail on each of the features proposed. This report, however, was the starting point of the perennial border at the southeast end of the conservatory, which, ever since its establishment, has been known as the Advisory Council Border. Plans were drawn by Mrs. Ellen Shipman, landscape architect, the following year, but at the end of 1928 the perennial border was postponed, largely because of labor costs.

Shortly after Mrs. Elon Huntington Hooker succeeded Mrs. Scribner as Chairman of the Advisory Council in December 1933, she appointed Mrs. Scribner as the chairman of a new committee to work on the perennial border project as a liaison between the council and the designer. Under the immediate supervision of T. H. Everett, who had become the Garden's horticulturist in 1932, the perennial border became established in 1934. The following spring witnessed the first of a series of teas suggested by Mrs. Scribner and carried out by the Advisory Council near the prize garden then in existence near the end of the perennial border.

Mrs. Scribner was a member of the Garden's Board of Managers from Jan. 11, 1932, until she resigned on Jan. 8, 1934.

Although Mrs. Scribner, who was Helen C. Annan before her marriage, was an active worker in many organizations, among them the Horticultural Society of New York and the League of Women Voters, it is believed that her greatest effort went toward the New York Botanical Garden. Her husband, who died in 1932, was president of the publishing firm of Charles Scribner's Sons.

William J. Bonisteel

WORD came last month from Mexico City of the death there on Dec. 12 of William J. Bonisteel, who had been a member of the Corporation of the New York Botanical Garden since January 1933. From 1925 until 1942, when he went to Latin America on a wartime job concerning drug crops, he taught at Fordham University's College of Pharmacy, where he was head of the botany department. As a special investigator at the New York Botanical Garden, in 1941 he undertook a cytogenetic study of *Digitalis* under a grant-in-aid from the Wellcome Foundation.

A native of Michigan and a student at the University there, he later obtained his master's and doctor's degrees from Columbia, working on the genus *Aconitum*. He then taught *materia medica* there before joining the Fordham faculty.

Over a period of eleven years he contributed book reviews and articles, chiefly on drug plants, to the Journal of the New York Botanical Garden, and he also lectured at the Garden on several occasions. At the Herb Conference of April 7-8, 1942, he spoke on "Commercial Production of European Drugs in America" and for the April Journal he wrote "Problems and Possibilities in the Growing of Drug Plants." It was later that same month that he went to Latin America for the Office of the Co-ordinator of Inter-American Affairs and, except for very short visits, he never returned from there.

For *Addisonia* in 1931 and 1937 he prepared descriptions of *Atropa Belladonna* and *Aconitum noveboracense,* plants of two of the genera in which he was interested, cytogenetically and taxonomically. At his summer home in Pine Plains, N. Y., he cultivated for experimental purposes special strains of drug plants with high alkaloid content.

He was long active in the Torrey Botanical Club and was also a member of the American Society of Plant Taxonomists, the New York Microscopical Society, Botanical Society of America, and the A.A.A.S.

He was the author of many technical and popular papers which appeared in botanical, pharmaceutical, and trade magazines. During 1941 and the first half of 1942, he was editor of *Torreya.*

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Membership in

THE NEW YORK BOTANICAL GARDEN

and what it means

TO THE INSTITUTION, membership means support of a program that reaches several hundreds of thousands of persons annually.

Briefly, this program comprises (1) horticultural display, (2) education, (3) scientific research, and (4) botanical exploration. To further this work and to disseminate useful information about plant life to the public, the Garden issues books and periodicals, both scientific and popular, and presents lectures, programs, radio broadcasts, and courses of study in gardening and botany. The laboratories and large herbarium and library serve the staff in its research and educational work, while the extensive plantings at the Garden give the public vistas of beauty to enjoy the year around. The public is also free to use the Botanical Garden's library, and, under direction, to consult the herbarium.

TO THE INDIVIDUAL, membership means, beyond the personal gratification of aiding such a program, these privileges:

Free enrollment in courses up to the amount of the annual membership fee paid.

A subscription to the Journal (published monthly) and to Addisonia (issued irregularly).

Admission to Members' Day programs and use of the Members' Room also at other times.

A share of plants when made available for distribution. (These plants may include the Garden's new introductions into horticulture.)

Personal conferences with staff members, upon request, on problems related to botany and horticulture.

Free announcements of special displays, lectures, broadcasts, programs, and other events.

A membership card which serves as identification at special functions at the Botanical Garden and also when visiting similar institutions in other cities.

* * * *

Garden clubs may become Affiliate Members of the New York Botanical Garden, and thus receive certain privileges for the club as a unit and others for individual members. Information on Garden Club Affiliation will be sent upon request.

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* * * *

Classes of membership in the New York Botanical Garden in addition to Industrial Memberships are:

	Annual Fee		*Single Contribution*
Annual Member	$ 10	Member for Life	$ 250
Sustaining Member	25	Fellow for Life	1,000
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Contributions to the Garden may be deducted from taxable incomes.

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I hereby bequeath to The New York Botanical Garden, incorporated under the Laws of New York, Chapter 285 *of* 1891, *the sum of*___ _____.

Gifts may be made subject to a reservation of income from the gift property for the benefit of the donor or any designated beneficiary during his or her lifetime.

All requests for further information should be addressed to The New York Botanical Garden, Bronx Park, New York 58, *N. Y.*

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FEBRUARY
1950

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FEBRUARY EVENTS AT THE GARDEN

Courses of Study

Nature Study for Teachers 15 sessions on Wednesdays, 4-6 p.m.
totaling 15 credit hours of work

Feb. 15—May 31, 1950 Instructor: *G. L. Wittrock* $10; to teachers, $5

Free Saturday Programs

3 p.m. in the Lecture Hall

Feb. 4 ***Flower Development, Growth and Movement of Plants*** *P. W. Zimmerman*
In time-lapse motion pictures — Boyce Thompson Institute

Feb. 11 ***New York State Parks—***
A motion picture from the New York State Conservation Dept.

Feb. 18 ***Gardens of Cloister and Castle*** *H. W. Rickett*
Bibliographer

Feb. 25 ***New Fields for Garden Adventure*** *Paul F. Frese*
Editor, Popular Gardening

Mar. 4 ***Flowers of the Pacific's Tropic Isles*** *Richard S. Cowan*
Technical Assistant

Mar. 11 ***The Ways in Which Insects Harm Plants*** *Louis Pyenson*
L. I. Agric. & Tech. Institute

The spring program will open March 18 with a series of four motion pictures showing National Parks as vacation spots.

Members' Day Program

At New York Genealogical Society, 122 E. 58th Street

Feb. 2, 8:30 p.m. ***Gardening Efficiently*** *T. H. Everett*

Museum Exhibits

Arts and Crafts of Haiti, a colorful exhibit of oil paintings, boxes, bags, mats, rugs, jewelry, and other objects, will be continued until late in February. It will be followed in March by an exhibit of plants used by the North American Indians.

Conservatory Displays

Primulas and cyclamens will be among the dominant plants of the floral displays in the conservatory. Noteworthy indoor flowering shrubs in the display include *Viburnum Tinus, Rhododendron mucronulatum,* and *Erica melanthera.*

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CAROL H. WOODWARD, Editor

VOL. 51 FEBRUARY 1950 NO. 602

Strophanthus, Sarmentogenin and Cortisone

The Botanical Aspects of the Story of the Newest "Miracle Drug"

By Joseph Monachino

STROPHANTHUS, a group of chiefly woody-stemmed climbers from tropical Africa, rocketed to importance as the potential source of what has been described as "one of the greatest of all the miracle drugs of the age" when it was announced in the press last August that a substance extracted from the seeds of at least one species could be transformed by chemical treatment into CORTISONE. The chemical substance derived from certain strophanthus seeds is a glucoside known as SARMENTOGENIN.

Cortisone — so named because it exists in nature in the cortex, or outer layer, of the adrenal gland — is the drug which, along with related synthetic hormones, holds promise for the successful combat of arthritis and rheumatic fever, other chronic degenerative diseases, heart ailments, hardening of the arteries, high blood pressure, perhaps even cancer. The laboratory procedures for the synthesis of these compounds, however, are among the most complicated in all chemistry; the products, so far, among the rarest in the world.*

Consequently, when it was revealed that the costly and complicated process by which the substance had heretofore been made experimentally could be simplified through the use of sarmentogenin from seeds of *Strophanthus,* presumably *S. sarmentosus,* this tropical plant became

* The only method of manufacture of cortisone previously known was with the use of ox-bile in a series of some 40 highly complicated chemical steps. If oxen were to be used exclusively in preparing cortisone, the drug necessary for the relief of one arthritic patient for one day would require 40 head of slaughtered cattle, thus for one year 14,600 head. The medicine must be administered regularly, like insulin in diabetes. For the continued relief of the estimated seven million arthritics in the United States, in a single year 100 billion cattle would be needed, or about ten times the entire cattle herd in this country.

famous over night. A rush for strophanthus seeds began, and several expeditions, one sponsored by the United States Government and others by drug manufacturers, set out for Africa. Cables were sent to Asia as well as Africa, requesting seeds of species native there. Meanwhile, the New York Botanical Garden collected herbarium specimens from institutions here and on other continents and initiated a critical taxonomic study of the entire group.

Chemical and pharmacological studies so far have been centered on the plants known from Africa. These began around 1861, when the famous explorer, David Livingstone, reported that an extract from the seeds of *Strophanthus Kombe* was used as an arrow poison in East Africa. Investigation resulted in the isolation, from the African species *S. Kombe, S. hispidus,* and *S. gratus,* of a drug called STROPHANTHIN, which has been used for more than half a century in a manner similar to digitalis.

Problems Ahead

Whether the seeds from which sarmentogenin was isolated and cortisone was later synthesized were of the species *S. sarmentosus* is a question not yet solved. There is considerable doubt. Whether the seeds must have a certain age or condition in order to yield sarmentogenin is another problem. Whether other species not yet tested may be of even greater value as a source of the glucoside is a possibility calling for investigation. Whether any species is sufficiently abundant in the wild to provide enough seeds even for experiment may be a factor in the development of the drug for eventual clinical use. Moreover, some plants do not fruit abundantly and they frequently grow in places not easily accessible. Even elephants are said to be a factor in the rarity of strophanthus fruits in some areas, as they are fond of eating the young follicles.

It has been estimated that sufficient cortisone to relieve one arthritic patient for one year might be obtained from about one ton of the feather-light seeds. Before studies in the genus were initiated at the New York Botanical Garden, there was in the herbarium of this institution hardly a pinch of seeds of the species *S. sarmentosus.* Individually counted, there were precisely 26 seeds, representing two collections of the species. Of all the work in 1949 that has come to the writer's attention, a two-month effort of numerous collaborators to collect seeds of the genus indiscriminately as to species has resulted in hardly five pounds of the material reaching the United States.

Although the genus is predominantly African it is entirely possible that some Asiatic species may prove equally important as a source of sarmentogenin or some closely related compound. The use of *S. Cumingii* as an arrow poison in the Philippines points to the existence in that widespread species of glucosides of possible medicinal value. Wells and Garcia

SEEDS OF STROPHANTHUS KOMBE

From the Economic Museum of the New York Botanical Garden

David Livingstone in 1861 described how the tribes on the Shire River in East Africa near Mozambique used for their arrows a poison called "kombi" derived from strophanthus seeds. Some species are known to be the source of strophanthin and of the arrow poison used in Africa; seeds of one or more species not yet identified with certainty have yielded sarmentogenin, from which cortisone can be synthesized. The great variability in size and shape of seeds can be seen here. In *Strophanthus* it is not always possible to identify a species from seeds alone.

(22)* have investigated its stem and root bark (under the name of *S. letei* Merrill), but its seeds have not yet been given attention.

Another common species in the Orient is *S. divergens* (*S. divaricatus*), frequently seen in South China and in the Hong Kong area as a high climber in rocky ravines and woodlands or as a small branched shrub on hillsides. "In July and August its large green fruits are conspicuous on the hillside, but they do not become hard and woody until winter." (6)

It was an African species, and apparently a fairly common one, from which two American chemists, Walter A. Jacobs and Michael Heidelberger, isolated sarmentogenin a score of years ago. They discussed the background of their experiments in the Journal of Biological Chemistry for 1929. But they had no idea of relief from arthritis even when they published their results. They merely had a supposedly new glucoside to which they gave a name based on what they believed to be the species. Here are some significant facts and conclusions from their report:

What Seeds Were Used?

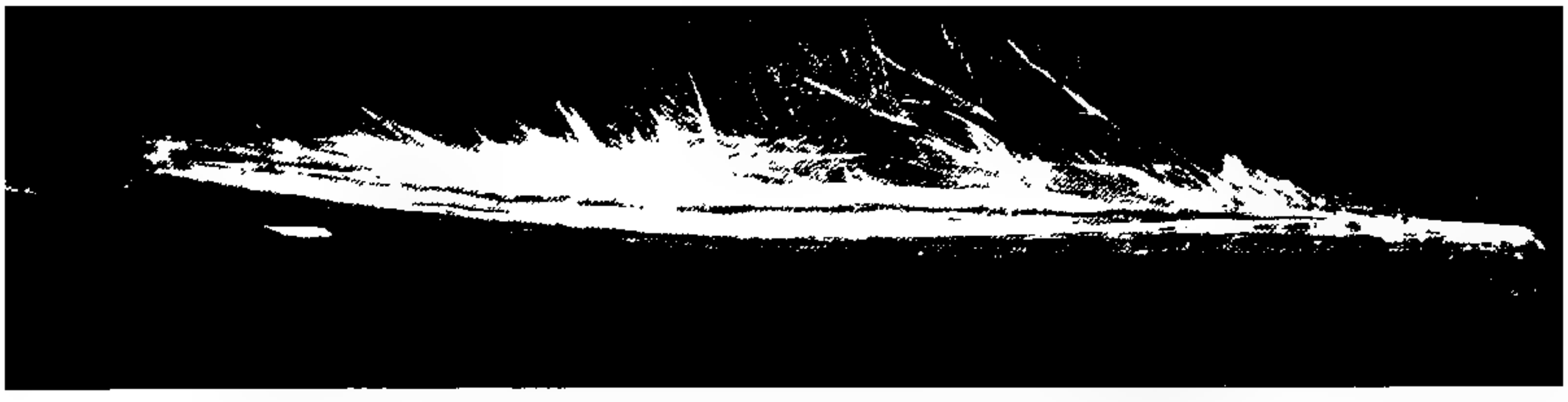
The first sample of strophanthus seeds, purchased from a commercial source as "S. hispidus" and weighing about 20 pounds, yielded 31 grams of sarmentogenin. No sample of these first seeds was retained. All subsequent tests with *S. hispidus* and *S. Kombe* failed to yield appreciable amounts of sarmentogenin, thus proving the misidentity of the first sample.

Another sample of strophanthus seeds (2,500 grams, or about 5.5 pounds) had been given to Dr. Jacobs several years before 1929 by Dr. J. C. Munch, at that time connected with the Pharmacological Laboratory of the Bureau of Chemistry (subsequently called the Food, Drug and Insecticide Administration), United States Department of Agriculture at Washington. This sample was originally identified as *S. sarmentosus,* and specimens in the hands of several pharmacognosists appeared to verify the determination. This Munch sample also yielded sarmentogenin. Some of the seeds were retained by Dr. Munch for toxicity experiments at the Bureau of Chemistry at Washington. In connection with his own observations, Dr. Jacobs thought it of interest to consider certain data presented by Kohn and Kulisch in Europe in 1898. The "strophanthin" supposedly derived from "S. Kombe" seeds by these workers, Dr. Jacobs suggested, was not true strophanthin but was probably sarmentogenin.

Dr. Jacobs also tested *S. hispidus*, *S. sarmentosus*, and *S. gratus* obtained from officials connected with the Lands and Forests Department of Freetown, Sierra Leone, West Africa. He also obtained small quantities of *S. Courmontii* from J. B. Clements, Chief Forest Officer of Nyasaland Protectorate, and *S. Eminii* from Director A. H. Kirby of the Department of Agriculture of Tanganyika Territory. In *S. Courmontii* and the Sierra Leone *S. sarmentosus* he found only traces of bitter glucosides too small for study. Dr. Jacobs thought that this low glucoside content might possibly be referable to differences among individual plants of the same species or perhaps to seasonal influences. He does not mention the other species in conection with the isolation of sarmentogenin, although he states that *S. Eminii* was found to be fairly rich in bitter glucosides.

With the data available to the writer, all approaches in the attempt to trace the real identity of the sarmentogenin-yielding species present a wide margin of doubt. Only flimsy speculations from guesswork can be

* Numbers in parentheses refer to the list of references at the end of the article.



SEED POD AND SEED OF STROPHANTHUS KOMBE

From a specimen in the Economic Museum of the New York Botanical Garden

This is a mericarp, that is, one follicle of the double-follicle fruit which is characteristic of the genus *Strophanthus* and of its family in general. The species *S. Kombe* is native to East Tropical Africa. The outer wall of the mericarp has been removed, as is often the practice in the commercial export of strophanthus fruits. About one-half natural size.

made. There is evidence against *S. sarmentosus* being the right species. Dr. Jacobs' Sierra Leone sample did not respond to experiment like the Munch sample. It is almost certain that the Sierra Leone material was correctly identified. Undoubtedly it is true, as Jacobs and Heidelberger themselves caution, that individual conditions might have accounted for failure in the Sierra Leone sample. *S. sarmentosus* is the most common species in West Africa and by now experiments not yet published must have been conducted with it; yet there is no indication that any particular demand has been made for this species. What is the species, then, which has yielded or in the future will provide sarmentogenin for the production of cortisone?

S. Kombe and *S. hispidus,* two commercial species, are almost certain to be excluded. The seeds of *S. gratus* differ so much from those of *S. sarmentosus* that the mistaken identity of Munch's sample would — or should — have been obvious had it consisted of the former. *S. Eminii* is an East African species. The circumstances attending Munch's material and the commercial "hispidus" originally tested by Jacobs seem to indicate a West African origin of the species producing sarmentogenin. However, the "S. Kombe" supposedly used by Kohn and Kulisch has an East African distribution.

Both the commercial sample of "hispidus" and that of Munch's "sarmentosus" were of a substantial amount. It is therefore the present writer's guess that the species could not be extremely rare.

If *S. sarmentosus* is not the sarmentogenin-yielding species, the above arguments seem to favor *S. Preussii.**

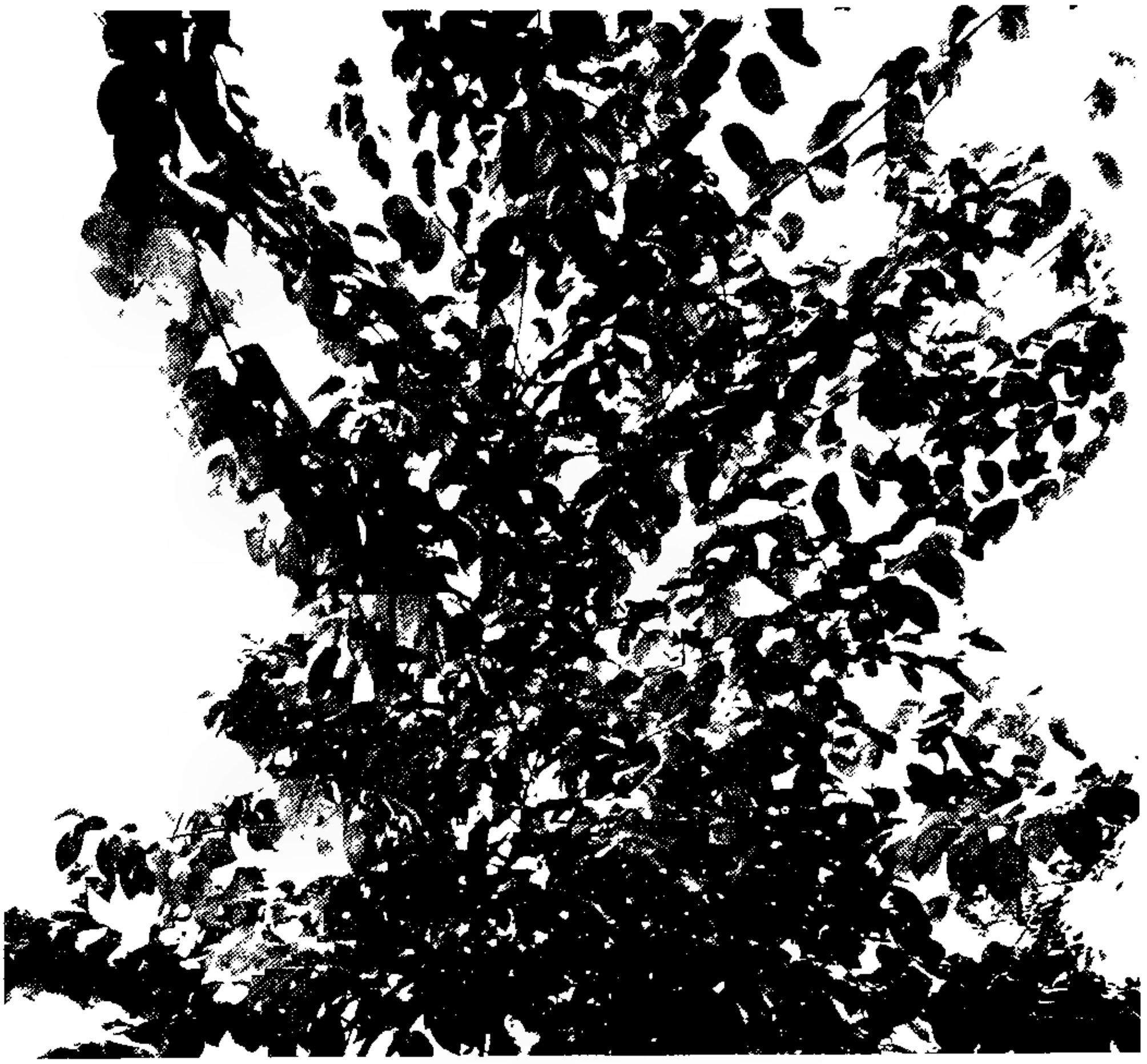
A 1936 paper on sarmentogenin by Tschesche and Bohle (20) has just become available. In this the authors state that a SARMENTOCYMARIN* like that of Jacobs and Heidelberger's was extracted from commercial seeds called "S. hispidus" originating from Nigeria. A specimen of these seeds was sent to Prof. Markgraf who reported that it was probably a mixture, perhaps of *S. Barteri* and *S. Preussii.*

S. Barteri is a relatively rare plant. If it is presumed that the species yielding sarmentogenin is fairly common, and moreover is not *S. sarmentosus* in any of its forms or varieties, ecological or seasonal phases, then the evidence again points to *S. Preussii.* For obvious reasons, however, this evidence cannot be given great weight. The problem still remains unsolved.

The recurrence of the designation "hispidus" for the commercial samples which provided sarmentogenin is not too significant. Indeed, *S. hispidus* is very common; it has at least one species in its synonymy, and two related species with similar hispid indumentum. But the

*At this point the writer wishes to stress emphatically that his suggestion of *S. Preussii* is a mere guess based on necessarily incomplete arguments.

*This was one of the substances derived along the way in the complicated process of obtaining sarmentogenin.



STROPHANTHUS SARMENTOSUS AT THE BOTANICAL GARDEN

This woody climber, which has grown to a height of nearly 15 feet among the economic plants in the conservatory, was started in 1935 from seed obtained through Dr. E. D. Merrill from the Atkins Institution of the Arnold Arboretum in Cuba.

commercial seeds under this name, according to Dalziel (1937), are found to be entirely or in great part of *S. sarmentosus,* which is an altogether different looking plant. Mathiesen, who commented on the anatomy of fourteen species of *Strophanthus,* stated that the occurrence of clustered crystals in the embryo is unique for *S. sarmentosus.* There is no knowledge whether the pharmacognosists who examined the seeds furnished by Dr. Jacobs observed this character in verifying the identification.

The presence or lack of sarmentogenin in *S. Preussii* should soon be given experimental evidence, as the New York Botanical Garden has obtained an excellent seed sample of about 200 grams of this species and has already submitted it for investigation.

Publications revealing experimental data on sarmentogenin-yielding species should become available not too far in the future. Prof. Reichstein and his Swiss co-workers have been investigating the problem for a number of years, and at this time, spurred on by competition presented by other investigators, will probably publish some of their findings. Although all seems quiet on the English front, it is unbelievable that no elaborate experiments are being conducted by the British.

Can Some of Original Seeds be Found?

It is extremely likely that some seeds of the original sample used by Dr. Jacobs are still in existence. If they can be located it might, with careful examination, be possible to identify the plant, or at least to eliminate many species. The colored illustrations of seeds in Gilg's monograph (4) might be helpful in such identification study. The material accumulated at the New York Botanical Garden should be most valuable. According to the Dispensatory of the U.S.A., Smelt gives a number of chemical tests by which seeds of different species of *Strophanthus* can be distinguished from each other, and Mathiesen (12) describes seeds of various species. The active principle in strophanthus seeds is apparently very stable, and it is conceivable that their viability is likewise long lasting. It seems too much to expect germination in seeds more than twenty years old, but an attempt to grow some of them should nonetheless be made, providing that a sufficient quantity is at hand.

Wild Sources and Cultivation of Strophanthus

Should it eventually be ascertained that the only sarmentogenin-yielding species are very rare ones, hope for arthritic sufferers would be pushed at least six to ten years into the future, when cultivated stands of the plant would begin to produce. With present chemical techniques, even the more common species in the wild cannot individually supply a sufficient amount of seeds to reach most of the sufferers. Collections of the rarer species might require a crew of persons devoting full time to the task in order to maintain in well-being a single arthritic. Until crops from large-scale plantations can be harvested, therefore, the wiser course will be to allocate all collections to experimental research. This will give more opportunity for the discovery of short-cuts in the manufacture of cortisone, or the discovery of an equally effective related compound which it might be possible to obtain from some abundant starting material.

The successful cultivation of strophanthus has good possibilities in tropical and subtropical regions. A number of species have already been cultivated as ornamentals or curiosities in Asia, Africa and the Americas. *S. sarmentosus* was introduced in Florida and Cuba in 1927, and it has flowered out-of-doors as far north as Highlands County, in the abandoned Nehrling Nursery at Sebring, Florida. *S. gratus* has been grown in Florida, Jamaica, Tobago, Trinidad, Pará in Brazil, Borneo, and Saigon in Cochinchina; *S. Preussii* in Dominica in the West Indies; *S. speciosus* in southern California and in Queensland; *S. caudatus, S. sarmentosus,* and *S. gratus* in Hawaii. A collection of *S. Petersianus* (?) is available from cultivation in Trinidad. The Index of Plants in the Botanic Gardens, Singapore, lists for the year 1912 the following species: *S. gratus, S. brevicaudatus, S. dichotomus, S. hispidus, S. Jackianus, S. Petersianus,*

and *S. singaporianus.* The Buitenzorg Botanical Garden has cultivated *S. caudatus, S. caudatus* var. *undulata, S. Cumingii, S. dichotomus* var. *Marckii* (*S caudatus* f. *Marckii*), *S. gratus, S. hispidus,* and two undetermined species. *S. Boivini, S. hispidus,* and *S. Wallichii* have been cultivated at Calcutta; *S. Boivini,* also at Réunion, in the Indian Ocean.

In establishing a plantation of strophanthus there might be some initial difficulty, but with a little experience a cultural technique should be developed which will eventually produce fruiting plants. Most of the liana species can be trained either as vines or erect shrubs.

Exploratory Tests with Related Plants

Other genera of the Apocynaceae, or Dogbane family, offer possibilities for investigation and some of these are now being tested. *Nerium* (the oleander) is botanically close to *Strophanthus;* its toxic character has been known since antiquity, and it has been, like strophanthus, grouped with the digitalis series of poisons. *Cerbera* and *Thevetia,* of the same family, are also botanically associated with plants having a digitalis-like action. *Acokanthera* contains the glucoside OUABIN, said to be identical with G-STROPHANTHIN obtained from *S. gratus.* It is reported of *Carissa ovata* var. *stolonifera,* known as "currant bush" in Queensland, that an alcoholic extract of the bark rapidly killed frogs when injected into them, and that experimental evidence suggests the resemblance of the active principle to strophanthin and ouabin. K-STROPHANTHIN-A (a crystalline fraction from the Kombe type of strophanthin) is reported to be identical with CYMARIN obtained from various species of *Apocynum.* It is not unlikely that from the closely related Milkweed family, the Asclepiadaceae, similar medicinal substances may be obtained.

TYPE SPECIMEN OF THE GENUS STROPHANTHUS

(On the opposite page)

Collected by D. Kleinhof in 1750 in Java, the specimen photographed is probably the first *Strophanthus* ever collected by a botanist. It was made the type of *Echites caudata* described by Nikolaus Laurens Burman in 1768.* In 1802 the French botanist, Pyramus de Candolle, proposed the new genus *Strophanthus,* and this species is now known as *Strophanthus caudatus.*

This historical sheet was borrowed from the Conservatoire Botanique at Geneva, Switzerland. It is one of more than 2,000 specimens that are on loan from some 25 institutions for a critical study of the genus now being conducted at the New York Botanical Garden.

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* *The notes on the sheet read:*

En Java 1750. Frutex est volubalis flagellis sese figens aliis rebus, in altioribus crescens locis. Flos est pentandria monogynia. Fructus nondum observatus. 23 Echites caudata. Cumonya seu Mangoenong. Translated, the description means that it is a twining shrub fixing itself by its branches on other plants, growing in the higher places. The flower is pentandria monogynia. Fruit not yet observed. Native name "Cumonya" or "Mangoenong."

En Javre
1750.
Fagraea est valuable
plant, cujus flores figura
exhibens Linnæus.
Folia est pentandria
monogynia. Fructus
nondum observatus.
23 Echites racemosa

THE TYPE SPECIMEN OF THE GENUS STROPHANTHUS

(For description, see the opposite page.)

Plant-Competitors of Strophanthus

The brilliant research of Russell E. Marker and co-workers published in the Journal of the American Chemical Society (11) for a period of over ten years presents another avenue of approach to the discovery of a starting material for the synthesis of cortisone. His investigations have been on the steroidal sapogenins and their conversion to certain sex hormones. His findings, based upon experiments with more than 400 species collected mainly in Mexico and southern United States and comprising over 40,000 kilograms of plant material, deserve careful consideration. He stresses the importance of the Liliaceae, and his studies particularly suggest assays with *Dioscorea* and *Agave*.

Numerous inquiries have been received at the New York Botanical Garden regarding his "Dioscorea mexicana." This name is not listed in the *Index Kewensis* or in the Gray Herbarium cards, and it was overlooked by Knuth in his revision of the genus in the *Pflanzenreich*. However, it was validly published in *Horticulteur Belge, Journal* (1837) 4:99, plate 76. The article is credited to Guillemin by the *Index Londonensis*. Unfortunately, the type was not given any precise distribution: "Se trouve au Mexique" — which, with the numerous species found in the country, is not very elucidating. Neither the description nor the illustration may prove adequate for identifying the species with certainty.

Unaware of the previous homonym, C. V. Morton, in studying a plant which at the time appeared to be a new species, named it, by coincidence, "Dioscorea mexicana." This name was never published by Morton, but a herbarium sheet bearing the epithet is deposited at the New York Botanical Garden.

How the confusion in names occasioned an odd situation was witnessed by the writer. Several men from a drug house asked to examine the "Dioscorea mexicana" sheet, of which they evidently had knowledge from a previous visit. They scrutinized Morton's plant most avidly, took careful note of the appearance of the species and the collection data. They apparently were making plans to go to Mexico or send an agent there to search for the species. Their interest was to find the plant which they claimed Dr. Marker called "Dioscorea mexicana" and reported to yield BOTOGENIN from which cortisone could be synthesized.

Obviously, Dr. Marker's *Dioscorea* remains to be identified. It would be sheer coincidence if it were either Morton's plant or that described in *Horticulteur Belge*. Some remarks made about it suggest *Dioscorea macrostachya,* but Marker's original publication has not been seen by the writer.

Both *Strophanthus* and *Dioscorea* exemplify the confusion which often results from chemical work on plants not botanically verified and the great waste of effort, time, and money.

Still other genera scattered throughout the plant kingdom have received notice. Dr. Percy L. Julian was reported to have said that the new compound S extracted from soya beans is chemically analogous to cortisone. *Areca, Arisaema, Balanites, Chlorogalum, Digitalis, Lilium, Samuela, Smilacina, Smilax, Trigonella, Yucca, Zanthorrhiza,* and others have entered the picture.

Description of Strophanthus

The genus *Strophanthus* was erected by Pyramus De Candolle in 1802. His concept embraced four species, one being Asiatic. Without seeing the fruit of any of the species, he nevertheless deducted from analogy the position of his new genus near *Nerium* and *Echites.*

The generic name is very apt. It is from the Greek and refers to the long tails of the corolla-lobes which are twisted in the bud. All of the four original species have this character, and with few exceptions so have the 50 or more species known to date.

De Candolle explained the name *Strophanthus* as "fleur en lanière" — thong-flower. If a common name is needed it might well be THONG-FLOWER,

or, for greater euphony, STRAP-FLOWER.

The Genus *Strophanthus* can be described as follows:

PLANTS woody, mostly climbing; sometimes erect shrubs or small trees. Climbers often erect or suberect in the lack of support, particularly when young; can be trained to be either vines or bushy erect plants. Some species, such as *S. hispidus,* climb 80 ft. or more to tops of trees and have stems several inches in diameter; *S. Eminii* and *S. mirabilis* are greatly branched bushes; *S. Welwitschii* and other species are sometimes ground creepers. Stems sometimes corky-winged; branches mostly spotted with lenticels. Latex present or absent.

LEAVES short-petioled, opposite, rarely 3- or 4-whorled (as in *S. speciosus*), entire. In different species they differ greatly in shape, venation, texture, and other details. Entirely glabrous, or puberulous, or hispid with long bristles, or may be thickly woolly superficially like mullein leaves. Develop mostly after flowering has begun, but exceptions to this are not rare. *S. Ledienii* is aways leafless at the beginning of its blooming period; others, like *S. sarmentosus,* may or may not have leaves at that period, depending on individual variations.

INFLORESCENCES terminal. Cymes 1-3 branched, many- or few-flowered; sometimes, particularly in species with large flowers, reduced to a single flower. Bracts, like the calyces, differ greatly in shape, size, and texture in the various species; they may be very small or very large, narrowly linear or broadly leafy; they are early deciduous.

SEPALS 5, almost free to the very base, little or greatly imbricate depending on their

A MEXICAN ROOT WHICH MAY BE A SOURCE OF CORTISONE

Imported as "Dioscorea mexicana," this large root is believed to be *Dioscorea macrostachya.* A root known as "D. mexicana" (an obscure name) has been used in experiments for the production of cortisone. The specimen shown here was sent to the New York Botanical Garden by Maximino Martinez of Mexico City.

width, sometimes spreading or reflexed when the flowers are matured. Glandular at base within; glands 5-20, scale-like or lobular, differing greatly in size.

COROLLA with cylindrical tube flaring at the upper part, often showy, white or yellow to reddish or purplish, the different parts of the corolla—tube, lobes and scales—often of different shades and colors. Corolla-lobes 5, the expanded part mostly broadly ovate, rarely narrow; tips rounded in *S. gratus* or rarely merely pointed, but mostly long-tailed, the tails 2-3 times as long as the corolla-tube and linear, or remarkably elongated and thread-like, sometimes over one foot long and dangling from the canopy. Scales 10 (except in *S. Jackianus*), free to the base or partly united, small and inconspicuous or large (as in *S. Thollonii* and *S. gratus*), included within the tube or exserted far out.

STAMENS 5, inserted at the ampliate part of the corolla-tube. Filaments very short. Anthers arrow-shaped, longitudinally dehiscent, without pollen in the upper and lower parts; tips of anthers sometimes merely inconspicuously short-apiculate; often the connectives at the apex are elongated into long, lanceolate points 2-3 times the length of the fertile part of the anthers and forming a cone over the stigma.

CARPELS 2, on a slightly concave receptacle; often half inferior, glabrous or hairy; united at apex just below the style. Ovules numerous. Style long-filiform. Clavuncle cylindrical, 5-10 flabellate-crested. Stigmas of two short apiculi.

FOLLICLES 2, ventrally dehiscent; various in shape and size, sometimes over one foot long, either narrow or up to 4 inches in diameter. These fruits ripen long after the flowering period; they may be situated at the lower part of the plant or high up. Species vary in the number of fruits per plant; *S. hispidus* and *S. sarmentosus* may have 10-20 fruits to each individual. *S. gratus* yields on an average 2.2 lbs. (avoirdupois) of seeds per plant.

SEEDS very numerous, spindle shaped, occasionally lanceolate or almost oval, roughly about half an inch in length but differing in shape and size in different species; densely hairy to glabrous, gray to deep brown. Awn up to 4 inches long, with a thick coma of long hygroscopic hairs toward the apex. Embryo of two fleshy cotyledons and a small club-shaped or cylindrical radicle.

General Distribution of the Genus

The genus *Strophanthus* has a natural distribution only in Africa and Asia.

In Africa it is found throughout the whole continent south of roughly 15°N, in forests, savannas, and steppes. It reaches its greatest diversity in the equatorial areas of Central Africa. Staner and Michotte (17) enumerate 18 species for the Congo. Other distributions in Africa can be had from Hutchinson and Dalziel (8), Stapf (18, 19) and Braun (1). Only one species, *S. speciosus* (*S. capensis*) reaches the Cape.

Only two (or one) endemic species belonging to a very distinctive section may be found in Madagascar. The genus is not reported from the native flora of Réunion and Mauritius.

Skipping Arabia and Persia, as is to be expected, the genus is found in southern India (7). *S. Wallichii* is reported as frequent in the Mals of Orissa (5), and has been collected in the Andaman Islands. *S. Wightianus* is known from several districts in Travancore (15). *Strophanthus* has not been reported from Ceylon.

The Malay area (16) has several interesting species. French Indo-China (14), Hainan, and the coastal areas of southern China (21) are within the distribution of the genus.

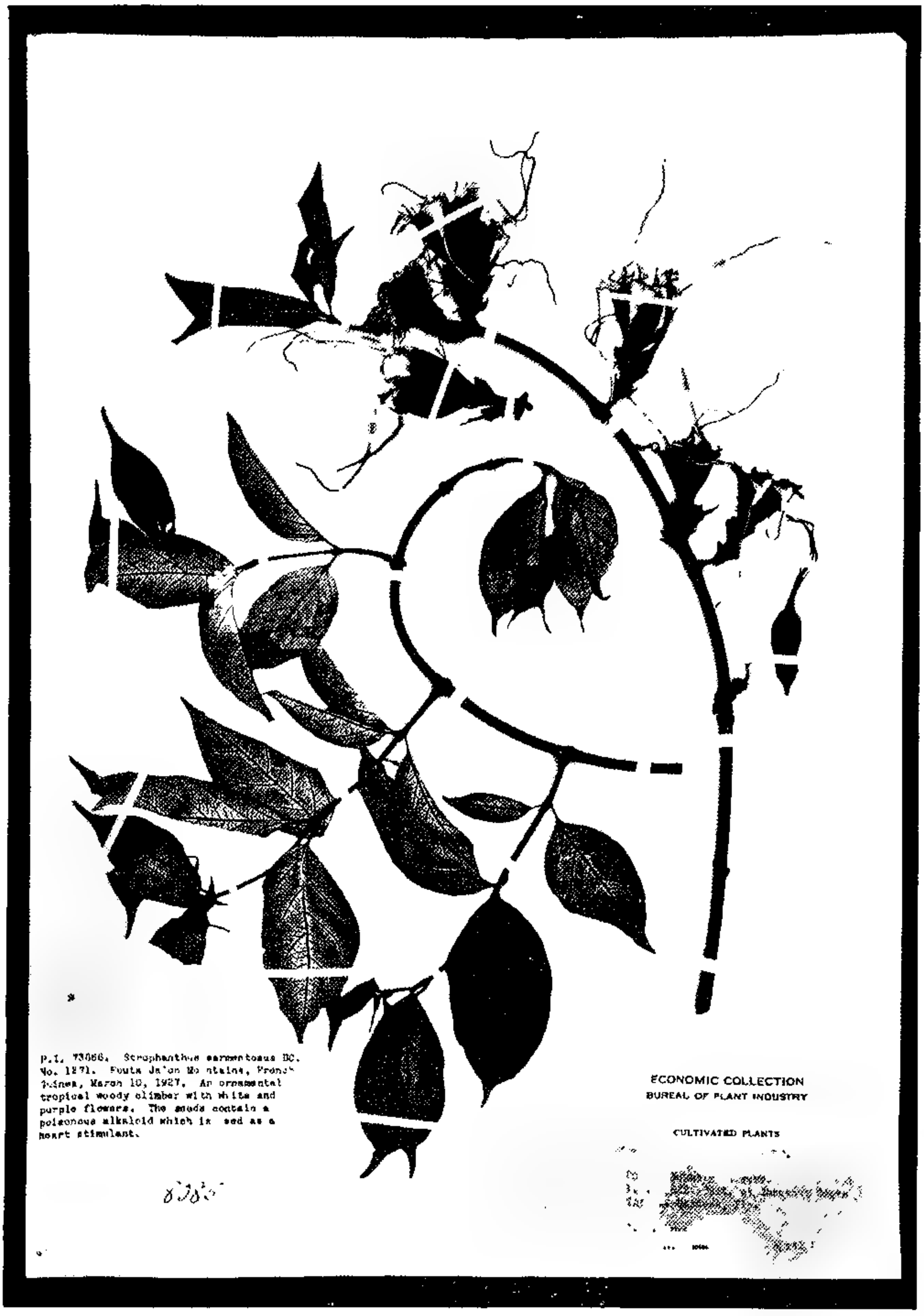
Strophanthus is not known from Formosa. The one endemic species in the Philippines is widespread there. The genus reaches the Netherlands Indies. *S. caudatus* is reported scattered in Java (10). The writer could find no record of the genus in New Guinea. It is not known from Australia, New Zealand, or New Caledonia.

HERBARIUM SPECIMEN OF STROPHANTHUS SARMENTOSUS IN FLOWER

(On the opposite page)

This plant was originally introduced by the United States Department of Agriculture, Bureau of Plant Industry, as an ornamental tropical woody climber, at Coconut Grove, Florida, from the Fouta Jalon Mountains, French Guiana, March 10, 1927. The above specimen was taken from it eight years later.

In some districts of West Africa the seeds of this species, as well as those of *S. hispidus, S. gratus,* and *S. Preussii,* are the source of arrow poison used by the natives. All of these species, including *S. speciosus* and *S. caudatus,* have been cultivated in the conservatory of the New York Botanical Garden. The name of the drug sarmentogenin was derived from the specific name *S. sarmentosus.* However, it is not now certain that the seeds from which sarmentogenin was extracted were correctly identified.



A CULTIVATED SPECIMEN OF STROPHANTHUS SARMENTOSUS

(For description, see the opposite page.)

Taxonomic Studies

The genus has been fairly well covered taxonomically. The most complete treatment is that of Gilg (4). The 43 species known to him were elaborately described; a complete synonymy was presented and collections were cited. There are ten plates in his work, one being colored illustrations of seeds of 18 species. Since Gilg's monograph, published in 1903, about a dozen additional new species have been proposed, many by Staner (17).

The earlier monograph by Franchet (2) (1893) is also an excellent one. This consists of 74 pages and 11 plates; 35 species are described, many as original.

Monographic studies on the genus have been initiated at the New York Botanical Garden. For this purpose the herbarium collections of *Strophanthus* from almost all the major herbaria of both the New and Old World have been borrowed. About 25 herbaria have provided over 2,000 sheets of the genus. Also new collections of both botanical specimens and seeds are being made in connection with these studies.

Final Words and a Beginning

Changes in the strophanthus picture are expected to be so rapid that tomorrow may witness important developments altering some of our concepts. The information and views the writer has presented are the products of available information gleaned up to this day (Nov. 11) from published literature and recent communications received from various correspondents of the New York Botanical Garden. It is suspected that most of the recent developments in research laboratories are guarded as confidential data not to be made public until some strategic moment arrives.

It is hoped that experimental work has been, and will be, successful in yielding positive results and that new vistas in certain branches of medicine will be opened by strophanthus. This is an age—with such discoveries as the power of atomic fission and the curative properties of penicillin—that has been educated in miracles. It is not unnatural to hope that through strophanthus there will be another miracle, that it will provide for a beginning of some new approach in the cure of degenerations of the human body, both pathological and natural.

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Pascal Celery and Its Origin

By Roger L. de Vilmorin

(Translated from the French by Carol H. Woodward)

IN order to understand the origin of Pascal celery, which is only one stage in the improvement of celery, a brief history of the appearance and evolution of varieties seems necessary.

Celery, *Apium graveolens,* a plant of Eurasian origin which is especially abundant in the Mediterranean region, is a typical example of man's improvement of a wild species. In its wild form celery was known to the Chinese, the Egyptians, the Greeks, and the Romans, who used it for ornamentation, for its medicinal properties, and as a condiment; in fact, wild celery is a slightly poisonous plant which was once used to combat various maladies as well as drunkenness.

It was only in the 16th century that celery became truly a vegetable, especially in Italy. It is, moreover, from this country that it obtained its common name. The first celeries cultivated were types with hollow stalks, recalling a cutting celery.

It is again in Italy during the 17th century that the first celery with solid

stalks appeared. La Quintinye (1626—1700), gardener to Louis XIV, cultivated it and knew the method for blanching it and making it tender. He wrote about it in his "Perfect Gardener" ("Le parfait jardinier, ou Instruction pour les jardins fruitiers et potagers, avec un traité des Orangers et des reflexions sur l'agriculture").*

But it is at the end of the 18th century that a series of improvements began which gave us most of our varieties. The first catalog of the Vilmorin Company in 1778 mentions two varieties: solid celery and striped rose. White solid did not appear until later.

In 1877, Vilmorin introduced dwarf (large ribbed) white solid which is still being cultivated there. This was a notable improvement since it was the first variety without runners.

One great step in the improvement of celery is due to Chemin, a market gardener of Issy near Paris, who in 1875 discovered solid golden white celery, known in the trade as Paris Golden Yellow Self-blanching, but elsewhere bearing his name. Vilmorin put it on the market in 1884 and exported tons of it to America, where it had great success.

It was in a seed plot of the solid golden white celery that a grower in the neighborhood of Nîmes (Gard), Henri Pascal, discovered in 1884 his now famous celery. Here is the text of what he wrote at that time to the firm of Vilmorin:

"It was in pulling out my solid golden white celery in order to blanch it that I recognized that certain stalks were superior to others. I found them excellent for cooking, they are good besides, and well formed."

Vilmorin received seed of this in 1887 and put it to the test; the variety

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*In John Evelyn's translation of La Quintinye, under the title "The Compleat Gardener," published in 1693, is the statement, under "Works to be done in September" (Volume 2, part six, page 166):

"We bind up our *Cellery* with one or two bands below, and then we raise a Butt or Bank about it, either with very dry long Dung, or with very dry Earth, to whiten it; but we must have a care not to tie it up in very dry weather. The same caution must be observed in all Plants that are to be tied, after which, we cut off the extreamity of the Leaves to prevent the sap from ascending and spending itself to no purpose, by which means it is kept down in the Buried Plant, and makes it grow thick."

Under "Works to be done in October," page 167, the section starts: "We continue the same Works as in the preceding Month except *Graffing*, the Season for which is now past, but we are particularly busie in preparing *Cellery* and *Cardons*."

Under "Works to be done in November": "This is peculiarly the Month of the greatest Work and Labour of all, in order to the avoiding the inconvenience of wanting Garden necessaries, which is an ordinary Companion in this dead Season, to those that have been wanting in timely foresight; for in earnest, the *Cold* fails not to make great Havock in the Gardens of the lazy; and therefore at the very beginning of the Month, however flatteringly fair soever the weather appear, there must be some dry long Dung brought and laid near the *Endive, Artichokes, Chard Beets, Cellery, Leeks, Roots,* &c. that being ready at hand, it may with the more facility in few hours be thrown upon every thing that needs it, to prevent their destruction."

was then not very well established, for it gave some types with smaller stalks like the original solid golden white. After several years of selection, in 1890 Vilmorin separated out Pascal solid white, retaining for it the name of its discoverer. The variety which the firm has called Giant Pascal is a very vigorous and extremely productive variety, with short, very broad, thick, remarkably fleshy ribs, entirely true green when exposed to the light, but which blanch rapidly if only tied or earthed up. The leaves are upright, vigorous, but short and dark green. It keeps quite well during the winter in storerooms. This variety has always had great favor, and from different seed merchants it has received various names. To the American trade Pascal celery is best known in its unblanched form.

In 1887, Vilmorin introduced American solid white celery, known in the trade as White Plume.

From this moment on the varieties became numerous. Vilmorin's third edition of the book of pot herbs ("Les Plantes Potagères") in 1904 (now out of print) mentions nearly forty varieties, without counting the root celeries.

An improvement over the Chemin celery, Improved Golden, with longer stalks, more yellow in color, was introduced in 1922 by the Vilmorin firm. This variety was to replace Chemin but the American customers then demanded the return of the older type, as it was better adapted to their style of packing.

Since then economic conditions have changed, Americans have become producers of celery seed, and if we in France export less than formerly, we have at least the satisfaction of seeing the old French varieties still receiving honor in the U. S. A.

A Woodland Gladiolus Garden

By Mary F. Barrett

TWENTY-FIVE years ago an American visitor to Canada gave some gladiolus corms to a Canadian ex-soldier. From this apparently trivial incident has developed an occupation, part hobby and part livelihood, which has served and attracted visitors from most of the states of the Union and from many parts of Canada.

John Blair, a native of North Bay, Ontario, about 225 miles north of Toronto, had served with the Royal Canadian Dragoons throughout World War I, had been gassed, and had retired on a pension to the little town of Magnetawan on Ahmic Lake, about 55 miles south of his former home.

There he acquired one and a quarter acres of woodland on the lake front about three miles from the town and began to raise and eventually to experiment with gladioli.

Now, every morning, Mr. Blair, with a boat full of blossoming stalks, makes his way to the Magnetawan wharf. Thither from all directions come the motor boats, fast or slow, of the summer campers, who buy supplies, get the mail, make dates (in a telephoneless region), eat ice cream cones, or reclaim the automobiles which have no access to the camps. By early afternoon Mr. Blair's flowers again have traversed the lake, but this time in many other boats.

The Blair garden was hewn out of the Canadian "bush," which mostly consisted of maple and white birch. About one-third of an acre is given to the garden proper. The climate, he says, is perfect for the plants, but sand had to be brought in, as the clay soil was unsuitable. The three divisions of the garden: for mature plants, for plants from last year's "bulblets," (corms), and for seedlings, are raised a few inches above the surrounding soil, and are edged with boards to prevent washing. The rows run east and west to obtain maximum sunlight.

Blair plants during the first or second week of May, using clean perfect corms which have been soaked for three hours in a solution of lysol: 1 teaspoonful to a quart of water. The holes are made six inches deep, and the ground is soaked so thoroughly that it needs no more water until the plants are a foot high. When in bloom they require much water, which has to be carried from the lake. Spraying against insects is done with DDT until the blossoms appear. Then nicotine sulfate is substituted so as not to kill bees and humming birds. The "bulbs" are dug October 1.

Mr. Blair buys his corms from dealers in the United States and Canada. As he is not obliged to raise only marketable varieties, and as he destroys all which do not come up to his standards, his garden presents an unusual assortment of tall strong stalks bearing large, numerous, and beautifully colored and marked flowers. His 15,000 plants include about 100 varieties.

The blossoms are frequented by humming-birds, whose savage attempts to drive one another away are incongruous with their gentle appearance, and by bees; but the crosses so made are insignificant, Blair says. He himself has done much along these lines—some of his hybrids, as yet without names, are Helen of Troy x Excell, with flowers six inches across, rose pink with a deeper throat and a white midrib (known as No. 42012); and Rosa van Lima x Crystal, with pink flowers having a cream throat and a crinkled perianth (No. 41053). Now he is most interested in breeding for a blue color, and is crossing Abu Hassan, whose rather small flowers are purplish-blue, with Snow Cruiser's seven-inch white flowers.

An interesting sport, recently found by Mr. Blair, has appeared from a corm of Heavenly White, which itself is a sport of Rosa van Lima. Rosa

van Lima has a pink perianth with a white midrib on each perianth part. The perianth of Heavenly White is without color except for Rosa van Lima's carmine on the throat and at the separation of the sepals and the petals from the perianth tube. The new sport shows reversion to Rosa van Lima in an occasional pink petal, or a band of pink on a sepal or a petal. The exterior of the tube, too, is faintly pink.

In 1949 Mr. Blair planted 5,500 small corms, and before the end of August four varieties, all over three feet tall, were in flower: Mauve Rose, Barbara Scott (large white), Leeuwenhorst (pink), and Cattleya Violet (mauve). His seed bed is to be used mostly for his own hybrids.

When asked which are the most beautiful varieties Blair replies, "All." However, a few of the names which he cites (in addition to those already mentioned) are: Lady Jane (cream), Parthiana (deep mauve), Bengasi (pink), Tunias Mahomet (deep rose), Mansoer (dark red), Lemon Ice (yellow), Paul Rubens (purple).

Visitors always are made welcome to this beauty spot on a rather lonely Canadian Lake.

Sarah V. Coombs

MRS. Jerome W. Coombs of Scarsdale died after a month's illness on Nov. 29. Her uncommonly active interest in plants spanned most of the 81 years of her life. She had been a member of the New York Botanical Garden since 1929, of the Corporation since 1934, and of the Advisory Council since 1935.

In the Garden's library are copies of dozens of authoritative horticultural articles that she wrote, and more will yet appear. There are also copies of her books, "South African Flowers for American Gardens" and "Handbook of Flower Show Judging," of which she completed a revision within the past year. On the shelves also are highly valued publications from her own library, presented several years ago. In the Garden's conservatory are several rare plants which she brought back from the South African desert in 1935. And among staff members there is the memory of a pleasant, energetic woman of rare capabilities: — an amateur who won the respect of the professional horticulturist and botanist.

A love of flowers and scholarly interest in them had been engendered by her father, the Reverend Charles H. Hall, when Sarah Virginia was a little girl in Brooklyn. In the surroundings of Holy Trinity Church, where he was rector, she made an early acquaintance with garden plants, and with her father she made frequent excursions into the woods of New England and North Carolina in search of wild flowers.

As a young woman she gave occasional concerts on the violin, but plant life eventually claimed more of her attention than music.

Upon her marriage in 1895 to the Brooklyn lawyer, Jerome W. Coombs, her botanical interests broadened to include the fungi. For many years she and her husband collected and studied mushrooms, keeping careful records. The books that they used together then — most of them priceless volumes now out of print — bear marginal notes that are a treasure to the mycophagist. More than 100 species of mushrooms were eaten by them during these years.

But it was in horticulture that Mrs. Coombs' name was widely known.

When she moved to Scarsdale in 1902 she planted some of the lesser known

shrubs and trees around her home on Ardsley Road — a climbing hydrangea, fringe-tree, pink horsechestnut, silverbell, several varieties of magnolia, fancy lilacs, and rare rhododendrons, as well as unusual perennials. When in 1920 she built the house at 22 Wayside Lane, she set out two fine specimens of *Cryptomeria japonica,* another silverbell, a styrax, a pink dogwood, a double-file viburnum, and a crab apple (*Malus spectabilis*), all of which have grown to be magnificent specimens, attracting many admirers during their blooming seasons.

She was responsible for choosing and planting the hundred varieties of crab apple trees at the Scarsdale Woman's Club, and for many years she grew and arranged the flowers for the Church of St. James the Less in Scarsdale, in a little garden behind the bell tower.

An early devotee of color photography, she was traveling over the country photographing wild flowers more than forty years ago, in the days when one had to twist two color plates around until they focused over one another, then bind them together with paper tape.

In garden flowers, iris became one of her specialties, then gladioli, and she was as keenly concerned with the botany of these plants as with their horticultural aspects. From gladioli, her interest spread to other plants native in South Africa, and so powerful was their fascination for her that in 1934 she embarked on a six-month expedition for the purpose of studying them in the wild. In South Africa she spent ten weeks with the close companionship of eight women botanists at the National Botanic Garden at Kirstenbosch. She visited the great desert area known as the Karroo, and she brought back specimens of unusual and ornamental plants from this excessively dry region.

Mrs. Coombs' trip was in part the inspiration for the Botanical Garden's exhibit of South African plants in 1935, when some of her treasures from 7,000 miles away were first put on display. She contributed an article to the Garden's Journal at that time, and later that year her book, "South African Plants for American Gardens" was published by Stokes. It was illustrated with her own color photographs. Since then she has written many articles on South African plants and their horticultural uses, principally for the *National Horticultural Magazine, House and Garden, Flower Grower, Gardeners' Chronicle of America, Herbertia,* and the *New York Times.* She cultivated many species successfully in her own window garden, and gave away many plants to horticulturally minded friends.

Mrs. Coombs was a member of the Horticultural Society of South Africa, of the Royal Horticultural Society of England, and of the Colonial Dames. One of the founders of the Scarsdale Garden Club, she was also a former president. She was at one time chairman of horticulture for the Federated Garden Clubs of New York State and, for eleven years, until 1938, of the National Council of State Garden Clubs, Inc. It was in this capacity that she prepared a handbook of horticultural programs and projects for garden clubs. She organized the Judging Schools which ever since have been an important part of Federated Garden Club activities in all the states, and it was her constant insistence on rigid standards that has given these courses in flower show judging the rating that they hold today. She served as chairman of the judging school accrediting committee for the National Council from June 1942 until January 1946, and after that as honorary chairman. The "Handbook of Flower Show Judging" which the Council published in 1942, was essentially her creation, and, working again with the late Mrs. William Crocker, she prepared the basic material for the book issued in 1949 under the new title of "The Handbook for Flower Shows."

Two trips to Alaska in the early 1940's gave her an interest in Alaskan wild flowers, and she contributed articles on this subject to several magazines, after writing one for the Journal of the New York Botanical Garden, published in December 1944.

For many years Mrs. Coombs was in constant demand as a lecturer, and she often spoke on programs at the Botanical Garden. She also reviewed a dozen or more books on gardening subjects for this Journal.

She had recently been working at the New York Botanical Garden on the nomenclature of one of the amaryllids. Only a few days before the onset of the illness which claimed her life a month

later, she drove to the Garden from Scarsdale to spend the day in the library doing research for further writing. The third of a series of articles on "South African Amaryllids as House Plants" is to appear in *Plant Life* this year.

In fact, she had undertaken an astonishingly heavy schedule of writing, with occasional lecturing, after a serious illness lasting nearly a year in 1945 and '46. A large part of her work with the Federated Garden Clubs also was resumed. Without such activity, she felt, she would not be content. It is not often that the products of one's later years have such potentiality for lasting value as Mrs. Coombs' work.

Notes, News, and Comment

A.A.A.S. With meetings of the American Association for the Advancement of Science taking place in New York City between Christmas 1949 and the new year of 1950, members of the staff of the New York Botanical Garden played a prominent part in arrangements, in addition to the numerous papers that they gave.

Dr. H. W. Rickett, as chairman of the systematic section of the Botanical Society of America, supervised plans for a number of the sessions and presided at meetings both at the McAlpin Hotel and at the New York Botanical Garden. The Garden was host at an all-day session of the systematic section of the Society with the American Society of Plant Taxonomists and the American Bryological Society on Wednesday, Dec. 28. During the morning papers were given by Dr. Bassett Maguire on "Taxonomy of the Rapatiaceae," by Richard Cowan on "A New Genus of the Rutaceae," and by Dr. H. K. Svenson of the American Museum of Natural History on "The Status of *Hypericum dissimulatum.*"

After lunch in the Members' Room, which was attended by more than 100 botanists, Dr. Maguire showed his kodachrome motion picture film of his last year's trip to Cerro Marahuaca, following the Kunhardt Sipapo expedition in Venezuela, in a successful search for the blowgun bamboo, *Arundinaria Schomburgkii.*

In a symposium the preceding day on the phytogeography of South America, Dr. Maguire spoke on the Guianas.

Dr. H. A. Gleason was the speaker of the evening at the annual banquet of the Botanical Society of America, giving an address on the species concept, as retiring president.

At meetings of the physiological section of the Botanical Society of America with the American Society of Plant Physiologists, Dr. William J. Robbins presented a paper on "Evidence on the Functioning of Vitamins, Hormones, and Organic Nutrients," and Dr. Robert S. de Ropp spoke on "The Comparative Action of 3-Indoleacetic Acid and the Crown Gall Bacterium on Plant Tissue."

Dr. A. B. Stout spoke before the general section of the Botanical Society on "Intraspecific Incompatibilities in Diploids and Polyploids of *Petunia.*" The following day he was scheduled to talk on "The Genetics of Unilateral Hybridization in *Petunia.*"

At an evening conference on uniform-

ity of literature citations, Dr. H. W. Rickett spoke from the editor's point of view.

Dr. P. P. Pirone was chairman of local arrangements for the American Phytopathological Society and Dr. Donald P. Rogers for the Mycological Society of America.

Staff Conference. Members of the staff who attended the A.A.A.S. meetings in New York the last week in December reported on them at the monthly conference Jan. 18.

Visitors. Among those who visited the Cryptogamic Herbarium during the week of the meetings, where, on Dec. 28, Dr. Geneva Sayre assisted Miss Rosalie Weikert in acting as hostesses, were Inez M. Haring, Vassar College; Norman Potter, Cornell University; Arn Harvill, Jr., University of Alabama; Kenneth A. Wagner, Florida State University; L. J. Gier, William Jewell College, Liberty, Mo.; R. L. McGregor, University of Kansas; Rolla Tryon, Missouri Botanical Garden; Paul M. Patterson, Hollins College, Virginia; Donald Richards, Chicago Natural History Museum; H. A. Gleason, Jr., Hartford Seminary Foundation; Clark Rogerson, Cornell University; Bertram J. Harrison, Brigham Young University; Rex N. Webster, Middlebury College, Vermont; Henry Herpers, New Jersey Geologic Survey; Alexander H. Smith, University of Michigan; John L. Blum, Canisius College, Buffalo; Bernard Lowy, Iowa State University; William Bridge Cooke, Washington State; Henry A. Imshaug, University of Michigan; Francis Drouet, Chicago Natural History Museum; Josiah L. Lowe, New York State College of Forestry; and A. J. Bernatowicz, University of Michigan.

Dr. A. J. Sharp of the University of Tennessee remained in New York for several days after the meetings and will return in March from the Gray Herbarium to continue work on his collections of Tennessee and Mexican plants.

Howard A. Crum of the University of Michigan worked on Mexican mosses in the Cryptogamic Herbarium until after the middle of January.

Joseph Ewan of Tulane University spent several days after the meetings doing bibliographic research in the library.

José Cuatrecasas, who arrived from Colombia at the time of the meetings to become associated with the Chicago Natural History Museum, came to the Garden on several days to discuss South American plants.

Dr. I. Wahl visited the physiological laboratories Jan. 3 on his way from the University of Minnesota to Palestine.

Before and after Christmas Dr. H. S. Jackson, mycologist at the University of Toronto, investigated material in the Thelephoraceae in the Botanical Garden's herbarium.

Among the many other botanists who stopped at the Garden before and after the meetings were Jean M. Voegeli, University of Minnesota; Sid Diamond, New York State College of Forestry; F. A. Varrelman, Mississippi Southern College; David D. Keck, Carnegie Institution of Washington, Stanford, Calif.; Robert T. Clausen, Cornell University; S. N. Das-Gupta, University of Lucknow, India; Frank E. Egler, Aton Forest, Norfolk, Conn.; Rupert C. Barneby, Wappingers Falls, N. Y.; Julian A. Steyermark, Chicago Natural History Museum; Charles Gordon Shaw, Washington State College; M. J. Murray, Kalamazoo, Mich., working on mint genetics; Gabriel Gutiérrez V., Facultad de Agronomía, Medellín, Colombia; W. H. Camp, Academy of Natural Sciences of Philadelphia; Stanley J. Smith, N. Y. State Museum; S. F. Blake, U. S. Dept. of Agriculture, Beltsville, Md.; Ida K. Langman, Philadelphia, J. C. Th. Uphof, University of Tampa; S. S. Beneke, Michigan State College; William G. Gambell, Jr., and R. A. Laubengayer, Wabash College; Miriam L. Bombard, United States Forest Service; E. P. Killip, Smithsonian Institution; Lazella Schwarten, Arnold Arboretum; Lillian Nagel, Harris Teachers' College, St. Louis, Mo.; Reed C. Rollins, Harvard University; Elbert L. Little, Jr., U. S. Forest Service; Robinson S. Abbott, Bucknell University; Marion Ownbey, Washington State College; Jules Brunel, Institut Botanique, Montreal; Charles T. Mason, Jr., University of Wisconsin; A. Hunter Dupree, Harvard University; and F. R. Fosberg, who left Washington Jan. 4 for a survey of island vegetation in the Pacific.

NOTICES AND REVIEWS OF RECENT BOOKS

Forester, Sportsman, Conservationist

A SAND COUNTY ALMANAC and Sketches Here and There. Aldo Leopold. 226 pages, illustrated. Oxford University Press, New York. 1949. $3.75.

"A Sand County Almanac" is more than just another entertaining account of the observations of a naturalist story teller. Aldo Leopold, forester, sportsman, conservationist, and naturalist of note, has given expression here not only to his experience as a student and lover of wild life but also his convictions that history is recorded in the natural world as well as in the story of empires and that man needs to be educated as to his rootage in the land and the cultural values of the wilderness.

In his foreword Mr. Leopold says "There are some who can live without wild things and some who cannot. These essays are the delights and dilemmas of one who cannot." The sketches, some of which are reprints in whole or part, are arranged in three parts. The Almanac is Part I where he relates the happenings at his "shack" on the Sand County farm where he and his family week-end and try to rebuild the land.

The episodes he discusses are arranged by calendar months and the sportsman speaks in his comments on the habits of game birds and the delights of fishing while the forester makes observations on the trees in his wood lot or gives us a flashback on the hundred years spanned by a great oak that he felled after it had been struck by lightning. The naturalist mourns the vanishing flora and wishes that idle spots and highways might be found where the full native flora could be saved.

In the second part, "Sketches Here and There," he recounts episodes over the years in different parts of the country. The essays are poetic in their portrayal of the beauty of the wild places that fade away before the inroads of civilization and portray relentlessly the penalties that follow man's interference with the balance of nature.

The "Upshot of the Matter" is set forth in Part III where he tries to "make shift with things as they are" and, accepting the mechanized era, still find ways to preserve wilderness areas for recreation and scientific use. He analyzes outdoor recreation into component parts and concludes that the job of recreational development is not alone "building roads into lovely country but of building receptivity into the still unlovely human mind."

Added pleasure in reading Mr. Leopold's book is given by the delightful sketches of wild creatures by Charles W. Schwartz.

RUTH N. WETZEL,
Mt. Vernon, N. Y.

Lichens, Completely Described

NATURAL HISTORY OF THE DANISH LICHENS. Olaf Galløe. Parts I -VII, $12 each. Einar Munksgaard, Norregade 6, Copenhagen, Denmark.

The first seven parts of Olaf Galløe's proposed series of ten volumes on the natural history of the lichens of Denmark have appeared. Anyone interested in lichens, who has seen the work thus far, is impatient for its completion. The author deals with Danish lichens genus by genus, discussing the phylogeny, morphology, anatomy and ecology of each. Recognizing the variation within a species, he discards the customary collective description of a species in favor of describing, wherever possible, standard individuals of the species. Thus, for many species, instead of a single description, which may be inadequate as a result of not taking into consideration the variation among individuals or unsatisfactory because of attempting to include all possible variation among individuals, anywhere from two to ten specimens are precisely described as to habitat and vegetative and reproductive features.

The work is profusely, carefully and beautifully illustrated by the author himself. For example, to accompany the 62

pages of descriptive text in Part VII, there are 101 plates including 657 figures, many of them in color. Unusual skill has been exercised in depicting accurately the details of habit and external form as well as those of the internal anatomy of vegetative and reproductive structures. The plates alone place this fine work among the standard references for the lichenologist. To any amateur in the field who might be fortunate enough to have it available, it should prove a most valuable source of information and aid in clarifying his ideas about lichen structure.

BABETTE I. BROWN,
University of Rochester.

Backdrop for Travelers By an Ecologist

BRITAIN'S GREEN MANTLE. A. G. Tansley. 267 pages, illustrated, indexed. George Allen & Unwin, London. 1949. $5.

The British Isles lie approximately in the latitude of Labrador, but standing as they do in the path of moist westerly Atlantic winds and girdled by the sea, they enjoy an equable and temperate climate. The soft verdure of the "Emerald Isle," so characteristic and strikingly different from the harsher and wilder vegetation of eastern North America, is primarily a function of the climate. In "Britain's Green Mantle" Professor Tansley analyses from the ecologist's point of view the mosaic of plant communities which compose the islands' vegetation. From fen and dune to moor and woodland, each microclimate is examined in such detail as to include basic facts about soils, plant-successions, and the role of man and animals in modifying the natural balances. An historical outline, tracing the gradual spread of grass and arable land at the expense of the oak-forests which extended over much of lowland England in Roman times, emphasizes the semi-natural, domesticated character of the plant cover, — that neat, gardenlike quality which charms and impresses the American visitor.

Technical language is used sparingly, and the terms are then fully explained, so that this volume makes available in easily digestible form and handy format much of the essential information presented in an earlier and larger work, "The British Isles and their Vegetation" (1939). It is highly recommended to all who are interested in the structure, composition and history of the British landscape. The numerous photographs, unfortunately not all well reproduced, range from extensive panoramas to intimate plant portraits and form admirable illustrations to the text.

RUPERT C. BARNEBY,
Wappingers Falls, New York.

Nutrient Needs of Crop Plants

DIAGNOSTIC TECHNIQUES FOR SOILS AND CROPS. Edited by H. B. Kitchen. 308 pages, 5 color plates plus 62 black and white figures, indexed. American Potash Institute, Washington, D. C. 1948. $2.

The authors of this book, all eminent scientists in their respective fields, have brought together in one volume much of what is now known about diagnosis of soils and crops for optimum production. Various methods of determining the fertility status of soils and nutritional requirements of crops are comprehensively described, compared and evaluated. The book gives a critical appraisal of important phases of the recent rapid progress in determining nutrient needs and describes appropriate applications of fertilizers and complementary uses of various procedures. This publication is a major contribution in its field.

W. F. LOEHWING,
University of Iowa.

Indoor Adventures With Plants

GARDEN IN YOUR WINDOW. Jean Hersey. 272 pages, illustrations by Gertrude Herrick Howe; indexed. Prentice-Hall, Inc., New York. 1949. $3.

Jean Hersey has a genius for titling chapters (this is not the first book in which this has been evident). As you turn the pages of "Garden in Your Window" and read "Rainbow in Three Seasons," "Background for Extravaganza," "Strange and Rare Excitements," "Small Fry Like Their Own," "The Uninvited Pest," and "Orchids for You" — among numerous other headings for a text well interspersed with photographs, charts and drawings — you scarcely

know whether to start at the beginning or to read a chapter wherever the book happens to open.

Either course will be rewarding, for Mrs. Hersey not only tells you what you can grow indoors, and how, but she weaves a web of adventure around every plant and every situation. She is well aware of the possibilities of plants for adding an extra measure of joy to the life of a child: for example, filling colored eggshells with soil, setting them in egg cups, sowing seed of quick-growing annuals about ten weeks before Easter, and having blossoming Easter eggs for the spring holiday.

The book appears light and fanciful, but it is packed with practical directions from one who has had long and successful experience with growing plants indoors.

CAROL H. WOODWARD.

Condensed Guide for Farmers In Warm Countries

A HANDBOOK OF TROPICAL AGRICULTURE. G. B. Masefield. 196 pages, indexed. Oxford University Press, London and New York. 1949. $4.

This is a small book dealing with both crops and livestock and giving the maximum of information in a simple form to non-technical persons — travelers, business men, farmers and administrators and others — rather than to specialists in the subject. It is in four parts, the first being an introductory section dealing with soils, implements, irrigation, and certain economic aspects. Part II (100 pages) deals with crops, Part III with diseases and pests.

The book is full of concentrated information, such as the amount of land two to four oxen can plow in a day (p. 14), names of main tropical ticks and of the diseases they transmit (pp. 144-5), and the five main types of tropical locusts (pp. 139-141). A few essential facts, such as spacing of plants per acre and methods of pollination of the main tropical crops are given in the appendices.

The book would have been improved by illustrations and even a short bibliography which could serve as a guide to further reading.

F. R. IRVINE,
London, England.

Antibiotics and Sulfonamides

THE MIRACLE DRUGS. Boris Sokoloff. 308 pages, illustrations, bibliography, index. Ziff-Davis, New York, 1949. $3.

In a field as prolific and vital as that of antibacterial agents a co-ordinating book of this character will be welcomed at frequent intervals by the interested layman. Dr. Sokoloff has sifted the welter of information pouring into scientific journals and has woven it into a thoroughly readable account of dramatic achievement. The necessary omissions and occasional inaccuracies of such a work can be readily overlooked.

The story of sulfonamides is less familiar than that of penicillin and deserves the attention given in this book. Penicillin still receives the lion's share, however, for it remains the least toxic and most widely useful of the "miracle drugs." Discussion of a number of newer antibiotics brings out the difficulties to be dealt with, for no matter how potent a new drug may be, its usefulness is measured by the degree of toxicity to the host organism. Another hampering factor is the ease with which bacteria are able to develop resistance to it. Nevertheless, the list of useful antibiotics has multiplied. To penicillin's spectacular conquests can now be added advances in the treatment of tuberculosis, undulant fever, peritonitis, human plague, whooping cough, tularemia, and even some virus infections. Although some diseases are so far unaffected by the new antibiotics, this is truly the beginning of a golden age for medicine.

MARJORIE SWIFT,
Heyden Chemical Corporation,
Princeton, N. J.

Chemicals for Plant Protection

A CATALOGUE OF INSECTICIDES AND FUNGICIDES. Vol. II. Chemical Fungicides and Plant Insecticides. Donald E. H. Frear. 153 pages, indexed. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc. New York, 1948. $5.50.

Following closely upon the first volume, which was reviewed in this Journal by Dr. James G. Horsfall, Director of the Connecticut Agricultural Experiment Station, in July 1948, Volume II of Frear's Catalogue of Insecticides and Fungicides has appeared. The work is

completed — at least for the time being — in this volume with a tabulation of chemical fungicides and plant insecticides. The extensive introduction dealing with organic compounds is followed by sections on chemical fungicides, condensation products, plant product fungicides, miscellaneous fungicides, plant insecticides, miscellaneous plant products, references and author index, numerical patent list, and an index of chemical compounds.

CAROL H. WOODWARD.

Growing and Marketing Crops

CROP MANAGEMENT AND SOIL CONSERVATION. Joseph F. Cox & Lyman E. Jackson. 572 pages, illustrated, indexed. John Wiley & Sons, Inc., New York. Second edition, 1948. $3.

Two agricultural experts have co-operated in writing an excellent text that presents the major operations required for the successful growing and marketing of crops very clearly. Emphasis is placed on practices that reduce cost of production, increase yields, improve quality, maintain fertility and make for efficient marketing. A feature consists of suggestions to teachers for using the book in a manner calculated to interest, inspire and challenge the student to make the most of his opportunities.

WALTER THOMAS,
Pennsylvania State College.

For Boys and Girls

THE FIRST BOOK OF BUGS. Margaret Williamson. 45 pages, illustrated. Franklin Watts, New York. 1949. $1.50.

It would be fun to be 6 or 8 or even 10 again, just to have an introduction to the world of insects with such a book as this. Though simple to read and easy to comprehend, with its many illustrations, it is packed with information that an interested child is likely to remember all his life.

THE STORY BOOKS OF WHEAT, RICE, OIL, COAL, SUGAR. Maud & Miska Petersham. 5 books, 30 pages each, illustrated. John C. Winston Co., Philadelphia, 1948. 75c ea.

These five story books cover an important group of products all derived ultimately, at least in part, from plants. Illustrations are in bright color, and the history and production of each subject are given in entertaining form.

Miscellaneous Volumes

LAW ON THE FARM. H. W. Hannah. 399 pages, indexed. Macmillan, New York, 1949. $4.50.

A man who is lawyer and farmer both has written a guide for the layman who needs to know what his rights and liabilities are in connection with his land. Nearly 100 pages of legal references at the end include forms for many different types of lease for farm property.

HOW TO BUILD GARDEN FURNITURE. Edited by H. J. Hobbs. 50 pages illustrated. Home Craftsman Publ. Corp. New York. 1947. $1.50.

Abundant diagrams and photographs clarify the instructions for making tables, benches, settees and chairs for outdoor use.

Guides for Gardeners, Arrangers, Cooks, Artists, Nature Lovers

THE TRICK OF GROWING HOUSE PLANTS IN EVERY WINDOW. Sophia Naumburg. 80 pages, illustrated by Alfred S. Muscari; indexed. Floral Art, West Englewood, N. J. 1949. $2.

Pages in yellow, gray, and green indicate the sections devoted to plants for south, north, and east or west windows in this simplified guide to indoor gardening. Introductory chapters give general instruction, charts summarize information on pests and diseases and on how to care for gift plants, and more than 40 plants for various indoor situations are described. The type is large and easy to read, and the spiral binding keeps the book flat while it is being used.

GROWING ROSES. Frank R. Norris. 95 pages, illustrated with color plates and drawings. Borden Publishing Co., Los Angeles, Calif. 1949. $1.25.

Here is a simple rose book, written for the beginner, spirally bound and compact. The author is a West Coast grower.

BIRDS IN YOUR BACK YARD. Ted Pettit. 210 pages, illustrated, indexed. Harper & Bros., New York. 1949. $3.

The increasing interest in making birds as much a part of a garden as the customary flowers, shrubs and trees has brought into print yet another book on attracting birds. Ted Pettit tells first of all how to study the birds that come into one's yard. Drawings by George Greller aid in the identification of those that he describes. Aided by sketches

by Donald Ross, he gives directions for making bird houses for different species, tells what to plant to attract the birds to one's grounds, devotes a chapter to birds in winter, another to bird baths, explains some tricks of bird photography, and concludes with comments on bird watching which, with the rest of the book, make birds seem the principal reason for having a back-yard garden.

BEGINNER'S GUIDE TO SEASHORE LIFE. Leon A. Hausman. 128 pages, illustrated, indexed. G. P. Putnam's Sons, New York. 1949. $2.

Only half a dozen seaweeds are included in this handbook of living things to be seen along the beaches. Nearly 250 forms of animal life are illustrated.

FLOWERS—FRUIT (Two books). J. Littlejohns. 24 pages, illustrated. Pitman Publ. Co., New York. 1949. $1.50 each.

Full-page illustrations in color show successive stages in the creation of watercolor paintings of fruits and flowers. Preliminary drawings are also shown, and directions are given in each book for exercises in painting.

BETTER HOMES AND GARDENS GARDENING GUIDE. Fleeta Brownell Woodroffe & Guy M. Neff, editors. 218 pages, illustrated, indexed. Meredith Publ. Co., Des Moines, Iowa. 1949. $1.

Practical material culled from a year of *Better Homes and Gardens* magazine results in a mammoth gardening guide, covering landscaping, construction, lawns, garden flowers, vegetables and fruits, house plants, and garden maintenance in 130 separate articles, elaborately illustrated. The 1949 guide is now available, and the next edition will be available in a few months.

FLOWER CRAFT. Patricia Easterbrook Roberts. 177 pages, illustrated by Jack Grainger. Indexed. Crown Publishers, New York. 1949. $2.75.

It probably is possible to operate a flower shop without knowing a pistil from a stamen in a flower and without knowing the difference between botanical and common names; but it would seem that such fundamental background information would be of value for anyone working day by day with plants. If the book is as practical as it should be (and as it seems to an uninitiated person), the labeled vignette which precedes chapter one is an unfortunate choice as an introduction to the volume.

THE GARDEN WORKBOOK AND DIARY. Compiled and edited by Wellesley-in-Nassau, N. Y., for the 75th Anniversary Fund of Wellesley College. Doubleday & Co., Garden City, N. Y. 1949. $2.50.

Half a dozen lines or so for each day of the year provide space on the page for the gardener's own notes. The suggestions for daily gardening tasks cover various parts of the country.

COOKING WITH AN ACCENT. Isabella Gaylord. 116 pages, indexed. The Herb Grower Press, Falls Village, Conn. 1949. $2.

"Cooking with an Accent" has become familiar to readers of *The Herb Grower* magazine. Here are many enticing ideas and recipes for improving cookery through the discreet use of herbs.

WINTER BOUQUETS WITH COLOR. Ruth Gannon. 72 pages, illustrated. Studio Publications, New York. 1949. $2.85.

Arrangers of flowers will welcome this well arranged guide to the art of combining dried flowers, fruits and foliage into attractive, semi-permanent compositions. Directions are clear, all the way from when and how to gather plants for drying, to the completed work of art. The illustrations are of exceptional quality, particularly in the pleasantly subdued tones of the color reproductions.

A CONSERVATION HANDBOOK. Samuel H. Ordway, Jr. 76 pages, glossary, index. The Conservation Foundation, New York. 1949. $1.

This is a true handbook, of a size that fits the hand or the pocket, and yet contains sufficient explanation of essential terms to make it indispensable for any worker in forests, on range lands, in parks, or natural areas. The terms defined are not in alphabetical order, but are arranged in logical order in chapters which deal with conservation and resources generally, with the nature of renewable resources, with approaches to conservation practice, and with the various types of lands on which management is practised. The book concludes with a 15-page glossary, with which the index is combined.

CAROL H. WOODWARD.

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PUBLICATIONS OF THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

An Illustrated Flora of the Northern United States and Canada, by Nathaniel Lord Britton and Addison Brown. Three volumes, giving descriptions and illustrations of 4,666 species. Second edition, reprinted. $15.

Flora of the Prairies and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex by K. K. Mackenzie. From Vol. 19, Part 1, of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marion A. & G. L. Wittrock in the Journal for March 1942. 15 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal, 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 15 cents.

The Flora of the Unicorn Tapestries by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second edition 1947. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at the New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts by E. J. Alexander. 64 pages, indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. 50 cents.

Review of Juniperus chinensis, et al by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.

Periodicals

Journal of The New York Botanical Garden, monthly, containing news, book reviews, and non-technical articles on botany, exploration, and horticulture. $1.50 a year; single copies 15 cents. Free to members of the Garden. Now in its 51st volume.

The Garden, a quarterly, designed to stimulate the laymen's interest in the world of plants and the science of plant life through articles written in popular vein. $2 a year in the United States; all other countries, $2.50. Published by the Garden's Manhattan office at 801 Madison Avenue, New York 21, N. Y. Now in its second volume.

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Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

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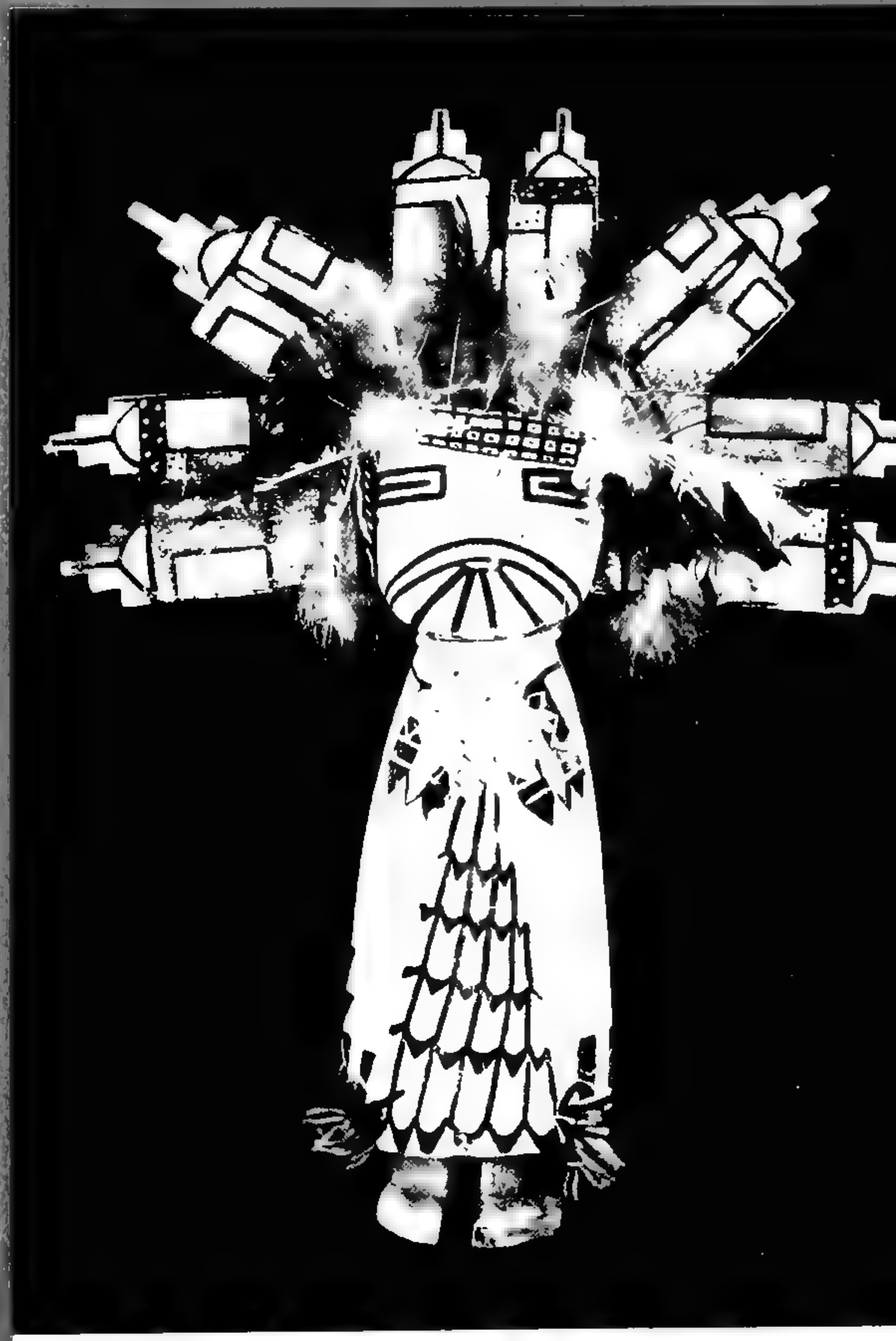

RAIN-MAKING DOLL OF HOPI INDIANS

ON EXHIBIT DURING MARCH AND APRIL

IN THE MUSEUM BUILDING

MARCH EVENTS AT THE GARDEN

INTERNATIONAL FLOWER SHOW

Grand Central Palace - March 20 - 25, 1950

The Tulip and the Rose in Design will be the theme of the New York Botanical Garden's exhibit on the third floor of Grand Central Palace for the International Flower Show. Opposite this display, the Volunteer Associates, working through the Manhattan office, will maintain a book and gift shop for raising funds for the Garden

Courses of Study

Plant Propagation 4 sessions on Thursdays, 7:30-9 p.m.
Mar. 23—Apr. 13, 1950 Instructor: *Frank C. MacKeever* $5

Free Saturday Programs

3 p.m. in the Lecture Hall

Mar. 18 ***National Parks as Vacation Spots*** Four motion pictures

Mar. 25 ***Plant Forms in Textile Design*** *John Kent Tilton*
Director, Scalamandré Museum of Textiles

Members' Day Program

At New York Genealogical Society, 122 E 58th St.

Mar. 9, 3 p.m. *Lord Aberconway*

Museum Exhibits

Handicrafts of the Indians of the United States, in which native plants have been used, are being shown during March and April in the rotunda of the Museum Building at the New York Botanical Garden. All the objects and materials shown are on loan from the American Museum of Natural History.

In the four cases are implements and utensils relating to food, articles of apparel, examples of weaving, and ritual and medicinal objects.

Conservatory Displays

Special floral exhibits will continue through the Easter season in the Conservatory, which is open daily from 10 a.m. to 4:30 p.m.

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JOURNAL
of
THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 51 MARCH 1950 No. 603

A Gardener's Tour of the West Indies

By John V. Watkins

DURING the summer of 1949, in company with four nursery owners, I made a gardener's air-tour of the Greater Antilles. Since my undergraduate days, when I had studied Popenoe's engaging "Manual of Tropical and Subtropical Fruits," I had wanted to visit these lands where the exotic fruits, tree ferns, palms, and colorful ornamental plants are grown outdoors. When my Caribbean trip was finally made, it was after a quarter-century of experience in growing plants in a semi-tropical climate, years that gave me a working acquaintance with many of the species that are planted in West Indian gardens. Yet, in spite of this long training period, many methods in gardening were completely new to me, and, as a result of this trip, my concept of tropical gardening has changed materially.

As the clipper came in for the landing at Havana's Rancho Boyeros airport, the dramatic quality of the "Queen of the Antilles" became apparent. The first plant species to come into focus was the royal palm as it grows everywhere on this island. This is the tree of life to the Cubans; the leaves are used for thatch, the boots for the walls of the dwellings, and the fruits for pig feed. The royal palm (*Roystonea regia*) is now protected by law.

On the auto trip from the airport to the city, the first things that impress a garden-conscious traveler are the fertile red clay soil and the luxuriant vegetation that it supports. Here, plants grow magnificently with a minimum of attention. In the dooryards flourish roses, four-o-clocks, petunias, plumbago, tuberoses, oleanders, copperleaf, and allamandas.

Havana, a city of a million flower-loving people, is noted for her ficus trees. Several species and several horticultural clones are used in avenue

About the Author

MR. WATKINS, who is Associate Professor of Horticulture at the University of Florida, is the author of "ABC of Orchid Growing" of which a new edition is to appear less than two years after its original publication by Ziff-Davis of Chicago in 1948. Another book, "Your Florida Garden," is to be published soon, and a third, "Gardens of the Antilles," is in preparation. In 1939 the author contributed to the Botanical Garden's Journal an article entitled "Propagating Tropical Shrubs by Leaf-Bud Cuttings."

After graduation from the University of Pittsburgh, Mr. Watkins studied horticulture and landscape design at the University of Florida, then undertook additional work at Harvard and Cornell. He received the degree of Master of Science in Agriculture from Florida, where he is now teaching plant propagation, nursery management, and landscape horticulture. He has produced numerous bulletins on gardening for the State Extension Service, as well as magazine articles, and he is secretary of the Florida Nurserymen's Association.

plantings. One of the best known is upright-growing *Ficus nitida.* This is the tree that forms the pleached allée over the world-famed Prado and along the Central Highway for many miles. On the outer shoulders of this important road, the surface roots interlace and graft where they touch, to form a perfect anti-erosion mat. Even though it is riddled with thrips, this is one of the finest examples of good choice of plant materials that I have ever seen.

The beautiful, weeping, thrips-resistant *Ficus benjamina* is a favorite with all visitors. Fiddle-leaved *Ficus pandurata,* magnolia-leaved *Ficus elastica,* and vigorous *Ficus altissima* all serve as street trees. For some reason, palms are not widely used for avenue plantings, preference being given to true woody species.

From the standpoint of planning, selection of plant materials, maintenance, and a generally pleasing atmosphere, the residential boulevard called Fifth Avenue must be classed with the world's best. The Latin people who live here are strongly influenced by European concepts of gardening and, as a result, the plants are carefully tended, usually closely clipped. There is no question that upper class Cubans have a better feeling for scale in plant materials than we do on the continent. The beautiful flesh-pink oleander that is so abundant in this flower-bedecked city seldom exceeds six feet in height. It is held to this reasonable stature by frequent pruning. The same clone in the Gulf States reaches a height of fifteen to twenty feet and almost invariably looks ragged and unkempt. Allamanda, another favorite in Caribbean lands, is restrained so that it looks

neat and trim; bougainvillea standards and casuarina hedges are closely clipped to appear constantly at their best. In short, topiary work, the shearing of plants for pleasing effect, is a fine art in the hands of the skilled gardeners of Cuba.

In Havana the formal style of gardening, sometimes called the architectural, is unquestionably right for the diminutive urban plots. Formality first of all demands finish, and here this basic requirement approaches perfection.

Plants mean different things to different people. Latins, no doubt, use standards in evaluating their garden plants that are at variance with standards evolved in an Anglo-Saxon world. When I visited Cuba, I was delighted with the vivid colors, the beautiful scale-relationship, and the expert maintenance. Yet, the philosophy of *laissez faire* influences garden art in the islands, and for the most part, home owners seem to be quite satisfied to grow trees, shrubs, vines and flowers that are perfectly adapted to the climate and soil. Contrast this pleasantly relaxed attitude with that of the average American garden clubber who squanders time, effort and money in frustrated attempts to fit rare, exotic plants into the uncongenial environment of a sunbaked backyard.

Here, too, plant propagation reaches no great heights of scientific or

IN THE ATKINS GARDEN AT SOLEDAD, NEAR CIENFUEGOS

One of the 260 species of palms in cultivation there is shown at the left, while the ceriman, *Monstera deliciosa,* appears at the right. (Photographs by courtesy of Harvard University.)

Harvard House at the Atkins Garden in Cuba is shown here beneath a planting of royal palms, with a tall Washington palm at the corner. (Photograph by courtesy of Harvard University.)

manual attainment. In the main, the trees, shrubs and vines most frequently noted were those varieties which are easiest to increase vegetatively. Cuttage, layerage and division are the methods chiefly used. Seedage is required for palms and some flowering leguminous trees, of course. Graftage is restricted to the increase of oranges and mangoes.

To a horticulturist the flower markets near Havana's huge cemetery are well worth visiting. In spirit and atmosphere they resemble the great New York flower market on 28th Street. Tuberoses, zinnias of all classes, dahlias of good size and substance, glads of good cut-flower quality, excellent asters and the ubiquitous roses are the principal items during

June. *Asparagus plumosus,* the indispensable florist "fern", is much in evidence.

The famed Tropical Garden is included in all tours of the city. This fanciful garden is reminiscent of the romantic, picturesque style of the nineteenth century. The precipitous hills, deep chasms, waterfalls and winding paths lend themselves to this style of gardening. The fairy-tale shelters and refectories do much to enhance the mood of a by-gone day.

The Atkins Garden near Cienfuegos has the distinction of being the tropical arboretum nearest to the continental United States. Here, more than two thousand kinds of plants comprise the living collection. Under the direction of Harvard University, this beautiful tropical garden of 220 acres is making a real contribution to the botany, biology and horticulture of the New World tropics. It would be impossible to catalog even the most impressive of the plants that grow here. Suffice it to say that the palm collection is one of the best in the world. There are more than seventy kinds of tropical figs; euphorbs and cacti are arranged in huge collections, and the best of the native species are prominently displayed. Research that will benefit the sugar industry is an important function of this station. Authorized groups of students, under responsible leadership, are encouraged by Harvard to use the garden for study.

Two Famous Gardens in Jamaica

Hope Garden, on the Liguanea Plain, near Kingston, Jamaica, is the most highly developed, most carefully maintained, fastest growing tropical botanic garden in the New World. While this may appear to be a lavish description, Hope is really a great garden. The breathtaking entrance drive, the spacious lawns, the variety of plant material, and the meticulous perfection of maintenance all contribute to make this a mecca for horticulturists the world around. As one enters by the motor road the specimen palms first command attention; then are seen the colorful beds of seasonal flowers arranged at intervals along the drive between the palms.

Here is the most unusual treatment of plant material that I have ever seen. Crape-myrtle plants, merely rooted cuttings some fourteen or sixteen inches long, are bedded out in early spring (February-March). These oversized cuttings grow leafy tops then and bloom in June and July! Crape-myrtle is the classic example of a woody plant that blooms on current growth, as flower buds are not formed in autumn and carried over in a resting stage. These diminutive shrubs, less than two feet in height, produce tremendous, gorgeous, lacy panicles for the summer show. In September, when the crape-myrtles are through blooming, the plants are lifted, cut back, and returned to the nursery. The driveway beds are then set with small poinsettias that have been growing in the nursery area behind the scenes. These colorful euphorbs produce their gay red

bracts for the holiday season quite dependably, and then, when they pass from the scene, the early-spring shift is made back to crape-myrtles. This rotation of poinsettias and crape-myrtles as bedding plants is quite a unique approach that well may be adopted by superintendents of municipal, industrial and institutional plantings in Florida. Certainly it is the intent of this gardener to try the Hope Garden method on the campus of the University of Florida. In the opinion of Jack Downes, Hope's superintendent, the crape-myrtle is the most refined of all tropical plants.

A homey note was the fact that the summer annuals seen were those so well known to gardeners in the States. The globe amaranth in white or shades of amaranth, the usual zinnias, the blue or white torenias, marigolds of the newer types, and ageratum all grow here.

Also at Hope Garden, rose lovers may see a large collection of the types of this northern flower that have proved successful in this land — a tropical region where, on the Liguanea Plain, the best of East Indian mangoes fruit with perfection.

It is interesting to note how the plant houses at Hope Garden resemble the conservatories at the New York Botanical Garden, the Phipps Conservatories in Pittsburgh and other great collections of tropical plants that are managed by graduates of the Royal Botanic Gardens at Kew in England.

Diminutive by all standards, Castleton Garden, also in Jamaica, is made notable by the gorgeous specimens that were planted here as the garden was being developed during the latter part of the Victorian era. Because of the high elevation, the 100-inch rainfall, the constant temperature, and the high humidity, plants do exceptionally well here, the araucaria trees have grown to magnificence beyond description in the eighty-odd years that they have been at Castleton. The large open turf areas, so British in conception and maintenance, add a finishing touch to this garden in the tropical rain forest.

Dr. Liberty Hyde Bailey, dean of American horticulturists, and David Fairchild, the noted plant explorer, have both made several visits here and Superintendent Jack Downes told me that Dr. Bailey is enamored of the pair of palms to the right of the gate, labeled *Pigfetta elata*. The only cultivated specimens in the New World, these palms from a Pacific rain forest are made distinctive by the murderous shiny brown bristles which arm the petioles.

In his charming book, "A Naturalist in Cuba," the late Thomas Bar-

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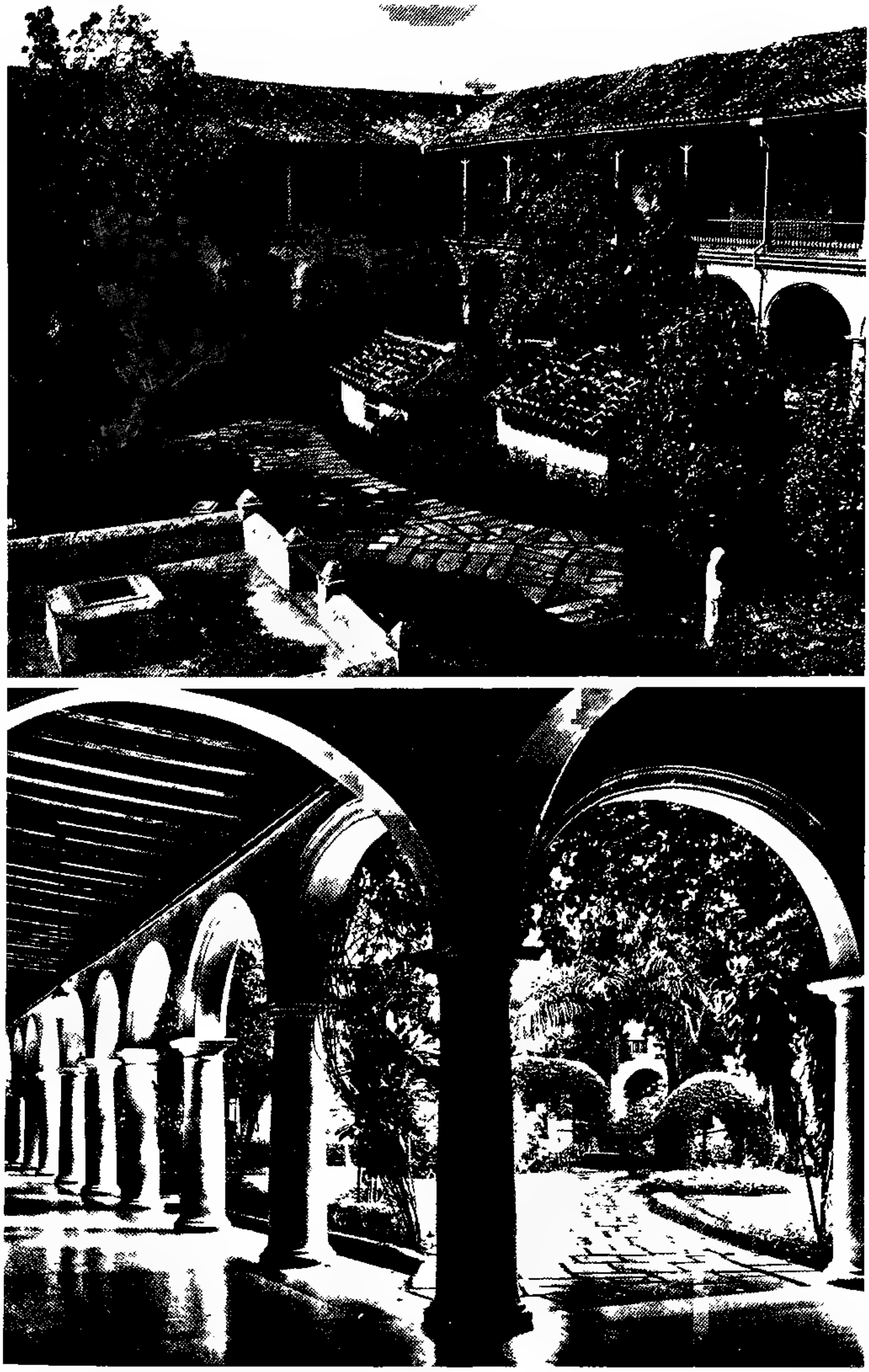
COURTYARD GARDENS IN HAVANA

(On the opposite page)

Two views in the old Santa Clara convent in Havana, now occupied by the city's public works department. (Photographs from Cuban Tourist Commission, New York.)



bour describes *Amherstia nobilis* as being something really special. I was able to see this rare tree in full flower at Castleton, but felt that, with blossoms rather dull pink in color, it missed by a very wide margin being the most beautiful tree in the world.

Cut Flowers for the Caribbean Market

There is little of horticultural interest to be seen in Haiti with one exception, and this exception is one of the outstanding horticultural enterprises in the Caribbean area.

At an elevation of some five thousand feet near the summer resort of Kenscoff is the famous plantation that produces cut flowers and fresh vegetables for the great cities of the Caribbean. This is an operation that staggers the imagination. In connection with a most unusual tourist hotel, the corporation employs half a hundred persons to grow and pack a never-ending supply of garden produce. In this temperate climate the fertile red clay soil grows delectable strawberries of giant size, head lettuce of delicious flavor, broccoli, celery, radishes and other cool-weather vegetables. The chief money crop, however, is cut flowers. Shasta daisies grow to perfection and they are in constant demand because they stand up well in the tropical climate of the Antillean cities. The quality of Kenscoff snapdragons is excellent, and these ship well before midsummer heat arrives. To be seen in these mile-high gardens are beds of China asters, carnations, larkspurs and glads by the acre. Spotted here and there throughout the fields are bearing avocado trees. Roses and geraniums run riot in the dooryard of the hotel and in June I saw spireas in full flower and apples ripening on young trees.

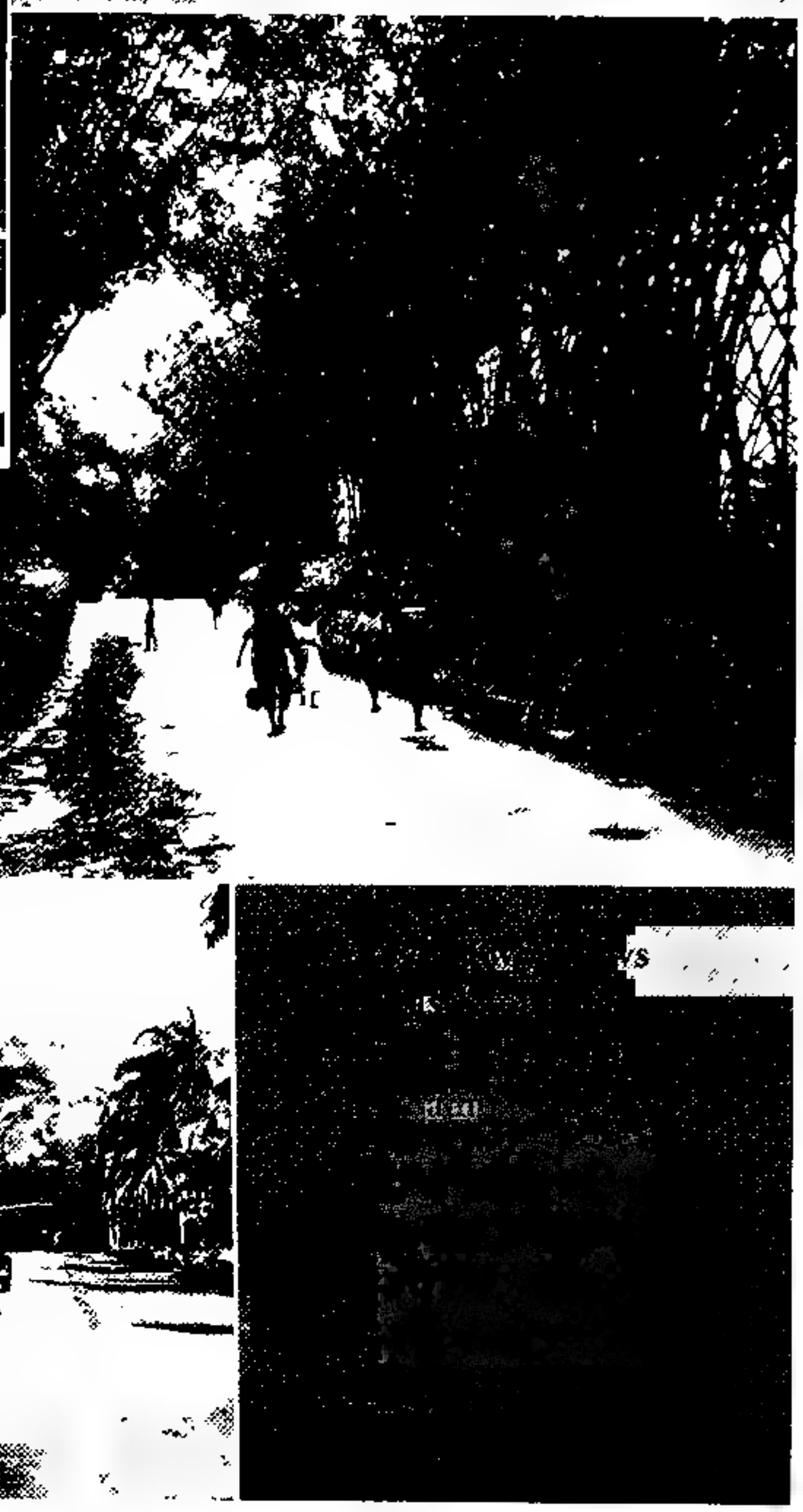
On the other side of Port au Prince, within easy taxi distance, the *Service Technique* (Experiment Station) has experimental plots of crops under irrigation. These demonstrations are cultivated by tractor-drawn tools. Rice plantings and the loading of bananas into lighters are other phases of crop production that will interest traveling gardeners.

Home fruits, for the most part, are crowded into indeterminate thickets where the jungle presses in upon the swept yards that surround the diminutive dwellings. Here bananas, plantains, coffee, cacao, coconuts, avocados and mangoes compete with each other for light, plant food and water. Mangoes are such an important item in the Haitian diet that it has been said that whenever invasions have been planned against the other republic on Hispaniola, May, June or July has been chosen as the time so that the invading army can subsist on mangoes.

Old and New World Influences in Puerto Rico

San Juan, Puerto Rico, has been strongly influenced by American appreciation of gardening and uses of plant material; yet, too, there

SOME CONTRASTS IN THE JAMAICA SCENE



still remains much of the Old World in the plantings of the patios and tiny dooryards in the older sections of the second city of the Antilles.

In the Condado Beach section, neighborhood of the well-to-do, front yards are covered with immaculate stands of St. Augustine grass (*Stenotaphrum secundatum*). They can be kept neat and trim because lightweight, modern lawnmowers are for sale at the mail order stores, and city water is available for irrigation.

Here are the same palms, gay shrubs and flowering annuals that are seen in Fort Lauderdale and St. Petersburg. Here are the ubiquitous casuarina hedges, so neatly trimmed, the tidy edgings of artillery plants, the plots of wedelia and the sheared bougainvilleas. Tuberoses (*Polyanthes tuberosa*) are favorites here as in all Latin communities, and vines are admired for wall decoration; Queen's wreath (*Petrea volubilis*), Rangoon creeper (*Quisqualis indica*), allamanda (*Allamanda cathartica*), and different clones of *Bougainvillea* are planted. The crape-myrtles (*Lagerstroemia indica* and *L. speciosa*) are employed as street and dooryard trees, and in the planting strips stand many kinds of ficus to cast their welcome shade upon the sidewalks.

At the other end of the island (about half an hour by local airline), is Mayaguez, the home of the Federal Experiment Station. Here may be seen one of the greatest collections of economic tropical plants in the New World.

The government building is most attractive as it stands on an eminence overlooking a sweeping, palm-studded lawn. The turf of *Zoysia matrella* is one of the most beautiful lawns in the Caribbean as it grows to perfection on this moist soil of fertile red clay. The Borinquen royal palm appropriately dominates this scene. Its botanical names, *Roystonea borinquena,* is significant, for the genus commemorates General Roy Stone, noted for his work in the island, and Borinquen was the aboriginal name for Puerto Rico. A more suitable memorial would be difficult to devise, and the cultivation of this endemic plant is a beautiful thing to behold.

Outstanding, in the opinion of this gardener, is the beautiful aroid planting at Mayaguez. Behind the main building in a little valley where the soil is acid, moist, and very fertile, the huge epiphytic and terrestrial arums have grown into a naturalistic group that is one of the most remarkable demonstrations in the West Indies. This aroid garden is well worth traveling many air-miles to see.

Such unusual plants as fifteen-foot mussaendas, fruiting plants of *Gardenia thunbergia* and that most famous of all tropical fruits, the mangosteen (*Garcinia mangostena*) are to be seen here. On a hill above the main building is an orchard of bearing mango trees. Here I sampled some two dozen kinds or more of the best of the East Indian clones.

Back in Rio Piedras, the capital, again, before leaving for home, one

of the most successful horticultural ventures in the itinerary was visited. An American family has developed a colossal nursery here that specializes in foliage plants for air shipment to the continent. This establishment is remarkable from the standpoint of volume, efficiency of management, breadth of plant materials listed, and stream-lined production methods.

Taiwania, the Monarch of Chinese Conifers

By Hsen-Hsu Hu
Fan Memorial Institute of Biology
Peiping, China

THE recent discovery of a living fossil, *Metascquoia glyptostroboides*,[1] has aroused keen interest all over the world in the rich flora of China. This country is not only rich in many striking angiosperms, but is renowned for her rare conifers as well. Besides *Metasequoia,* which is the Chinese equivalent of the North American redwoods, China has many other rare coniferous genera not found in North America or Europe.[2] Among these *Cephalotaxus* and *Cryptomeria* are found also in Japan, while *Dacrydium* is found in Indo-China. All the rest are endemic in the celestial empire. The only North American coniferous genus which is not found in China is *Taxodium.*

Tallest Trees of China's Forests

Of the Chinese endemic conifers the genus *Taiwania* is of special interest, next only to *Metasequoia,* for in this group are the tallest trees in Chinese forests, trees quite comparable to the American coastal redwoods and the Douglas fir. There are two species to this genus: one towers up to 60 meters, while the other reaches a height of 70 meters. The type species *Taiwania cryptomerioides* was discovered at Wôsyonken, Nantô, on the western slope of Mt. Morrison, at an elevation of 2,000 meters by Konisi [or Konishi] in 1904. The tree was said to occur in central ranges at 1,800 to 2,600 meters altitude, usually scattered through the forests of *Chamaecyparis obtusa* and *C. formosensis,* where it was easily recognizable by its dark greenish crown always rising higher than that of other conifers.

In his article "The Taxads and Conifers of Yunnan"[3] E. H. Wilson wrote:

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[1] See the Journal of the New York Botanical Garden for September 1948, in which Dr. Hu has described the discovery of the living form of this species.

[2] These are *Pseudotaxus, Cephalotaxus, Amentotaxus, Dacrydium, Keteleeria, Pseudolarix, Nothotsuga, Cryptomeria, Glyptostrobus, Taiwania,* and *Fokienia.*

[3] Journal of the Arnold Arboretum 7:37-68. 1926.

"On Arisan in central Formosa the Taiwania grows scattered through the forests of *Chamaecyparis formosensis* Matsum., *C. obtusa* var. *formosana* Hay., *Trochodendron aralioides* S. et Z., evergreen Oaks, Lauraceae, Symplocos and evergreen shrubs in a narrow belt between 7,000 and 8,000 ft. altitude. In my opinion it formed in ancient times forests with the Trochodendron but has been defeated in the struggle by the two Chamaecyparis and the present trees are mere survivals. On Matsu-yama, a mountain in the Arisan forest reservation, it is more common than on Arisan itself. . . . So far as my own observations go it is everywhere in Formosa a rare tree. Small trees are very uncommon and seedlings extraordinarily rare. . . . In the open it is a singularly beautiful and attractive Conifer densely branched, has graceful handsome branchlets and attractive green leaves. Tall trees in the forests are strikingly distinct but singularly like old Cryptomeria trees, and both suggest gigantic Lycopods. In the dense forests the crown is small, domeshape, oval or flattened, the branches few and small. . When the top is broken lateral branches assume an erect position. . . . In height the Taiwania overtops all other trees on Arisan and probably attains upwards of 200 ft. The highest I measured was 190 ft. tall and 130 ft. to the first branch. The girth is up to 30 ft.; the trunk is straight and mast-like, buttressed at the base. . . "

On June 28, 1916, Dr. Heinrich Handel Mazzetti of Vienna discovered near Nanalo,[4] west of Champutung,[4] west of Tsekou on the Salween River in northwestern Yunnan, giant trees of *Taiwania* which in habit and bark reminded him of Sequoia. These he identified with the type tree of the genus *Taiwania, T cryptomerioides.* In the same paper on Yunnan Wilson wrote, in reference to this discovery:

"The occurrence of Taiwania, of *Libocedrus macrolepsis* Benth. and Hook. and of *Pseudotsuga Wilsoniana* Hayata, in western China and on the mountains of Formosa and at no place in between these widely separated regions is a remarkable fact in plant distribution."

In October 1935, Mr. Chi-Wu Wang of the Fan Memorial Institute of Biology collected specimens of *Taiwania* at Shi-gi-tung, Champutung, Northwestern Yunnan, in a ravine among thick forest, at 2,500 meters, and also at Bar-ru-lah, Salween-Chiukiang divide, Champutung, under forest, at 2,800 meters. The tree here attains a height of 23 meters with a circumference at breast height of 7 meters.

China's Oldest Tree

In January 1942, the same explorer discovered giant trees of *Taiwania* at Bih-Kiang Hsien on rocky slopes and in a ravine among mixed evergreen forest of oak and magnolia at 2,300 to 2,600 meters. The trees here attain a height of 40 to 50 meters with a diameter at breast height of 3 to 4 meters. When Mr. Wang felled a tree 50 meters high and counted its annual rings, he found it to be over 1,600 years old. For all we know this is the longest-living tree ever authentically recorded in China. Bih-Kiang Hsien is situated not far from the eastern bank of the Salween, and at a latitude more than 1.5° south of Champutung where Handel-Mazzetti first discovered the *Taiwania.*

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[4] These place-names are given as Ninalo and Chamnutung in E. H. Wilson's report, "The Taxads and Conifers of Yunnan," in the Journal of the Arnold Arboretum 7:58. 1926.

Three seedlings of *Taiwania Flousiana* as they appeared at the New York Botanical Garden three or four months after germination.

In 1939 Prof. H. Gaussen of the University of Toulouse, France, studied the specimens of *Taiwania* collected in Yunnan, and found the Yunnan tree to represent a new species which he named *Taiwania Flousiana*.[5]

In February 1948, Mr. C. T. Hwa, an assistant in the department of forestry, the National Central University, Nanking, discovered a grove of a score of giant trees of *Taiwania* growing at an altitude of 2,800 feet in western Hupeh, on the border of Li-Chuan and En-Shih provinces. He had been sent there by Prof. W. C. Cheng to conduct a field study on the newly discovered *Metasequoia* in Szechuan and Hupeh, in company with Prof. Ralph W. Chaney of the University of California. The discovery of *Taiwania* in western Hupeh is of botanical interest next only to the discovery of *Metasequoia*. The trees found here attain a height of 40 meters. When in the autumn of the same year Prof. Cheng and Mr. Hwa went to Szechuan and Hupeh to make further field studies on *Metasequoia*, Mr. Hwa was left behind to collect *Metasequoia* and *Taiwania* seeds. He succeeded in collecting a large amount of *Metasequoia* seeds in October, but of *Taiwania* only a very small amount. A portion of these Prof. Cheng sent to Dr. E. D. Merrill at the Arnold Arboretum, and a portion to the New York Botanical Garden.[6]

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[5] This species differs from the type tree in Formosa in the staminate cones having more than 30 anthers and in the fruiting cones having 27 to 36 scales. In *T. cryptomerioides* the fruiting cones have slightly fewer scales.

[6] These seeds germinated during the summer of 1949.

At first Prof. Cheng could not decide whether the Hupeh *Taiwania* is of the same species as that of Yunnan or that of Formosa, or whether it is intermediate between the two, thus bridging over these two species and rendering them conspecific. But by careful study Prof. Cheng is convinced that the Hupeh tree is identical with that of Yunnan, while the type species is confined to the island of Formosa.

Distributional Questions Raised

The discovery of *Taiwania Flousiana* in western Hupeh raises a number of interesting botanical problems. First, it shows that in the geological past *Taiwania Flousiana* was not limited in distribution to the remote region of northwestern Yunnan. Perhaps western Hupeh is not the only other locality where this towering *Taiwania* survives from the mesozoic era. Even in historic times it may have a much wider range of distribution than it has now. In Yunnan its excellent timber, turning red in color in age, is highly valued for coffin-making. The ruthless axe of the lumberman may have caused its extinction in wide areas in western China south of the Yangtze. The hoary patriarchs of the Hupeh grove survive to this day only by mere chance.

Two specimens of *Taiwania Flousiana* from Yunnan, in the herbarium of the Fan Memorial Institute of Biology.

Secondly, the existence of the genera *Taiwania* and *Libocedrus* in Yunnan and in Formosa, and of the species *Pseudotsuga Wilsoniana, Keteleeria Davidiana,* and *Juniperus formosana* also in both Yunnan and Formosa, shows the close relationship between the coniferous flora of these now widely separated regions; yet the occurrence of distinct species in the genera *Taiwania* and *Libocedrus* in Yunnan and Formosa (*T. Flousiana* in northwestern Yunnan versus *T. cryptomerioides* in Formosa, and *Libocedrus macrolepis* in Yunnan versus *L. formosana* in Formosa) shows that these distant regions have been so long separated in the geological past that they have, at least in these two genera, evolved distinct species.

Lastly, *Taiwania* has a wide range of distribution and is adaptable to quite different ecological environments. In northwestern Yunnan it grows at 2,800 meters, and in western Hupeh at 900 meters. In Hupeh it has the same forest associates as *Metasequoia,* which consist of deciduous genera, such as *Fagus, Betula, Ostrya* and *Cercidiphyllum.* In Yunnan it lives among evergreen forests of oak and magnolia. The forest association of the type species *T. cryptomerioides* in Formosa also consists of evergreen trees and shrubs. This may prove to be the original ecological association of the *Taiwania* trees of the Cretaceous and Eocene periods just as the evergreens found in northwestern Yunnan comprise the association at the present time; while the deciduous forest associates of *Taiwania Flousiana* in western Hupeh belong to the Arcto-Tertiary flora of Miocene age surviving to this day. From this fact we can deduct also that *Taiwania* will prove to be hardy in the northern states of America such as New York, although its original home is the southern provinces of Yunnan and Formosa.

Taiwania in America

E. H. Wilson in 1938 had brought back to the Arnold Arboretum three young seedlings of *Taiwania cryptomerioides* from the forests of Arisan, and had also raised a nice stock of young plants from the seeds collected therefrom. If these can endure the climate of Boston, then the seedlings of *T. Flousiana* may be planted in the open in New York also. It is the sincere hope of the author to see the tree monarchs of eastern Asia well established in American gardens through the recent discovery of *T. Flousiana* in western Hupeh together with *Metasequoia,* in order to compensate the long neglect rendered to these noble conifers in the past.

Some Woody-stemmed Ground Covers

By J. H. Beale

NINETEEN forty-nine was a most discouraging year for anyone striving for a good lawn — and this embraces almost everyone who owns a garden, large or small. The exceptionally dry weather during the period when lawns should have been looking their best caused many to wonder whether there might be other plants better adapted than grass to withstand drought.

There is no substitute for grass where a comparatively level area is used for lounging or recreation. No other plant making a dense growth is as comfortable to walk on, and no other plant will tolerate so well the wear of constant use.

Some years ago a good deal was written about the turfing daisy (*Matricaria Tchihatcheeii*), which it was said would require very little mowing and was ornamental if allowed to flower. What has become of it? In spite of its reputed good qualities, grass remains the favorite.

In many gardens, however, there are areas where a grass carpet is unnecessary — for example, on steep slopes where, because of the exposure or the rapid run-off of water, it is impossible to keep the surface adequately covered with grass; or again, under trees where the shade is so dense that even when reseeded every year grass dies out in summer.

In such locations other plants may be substituted for grass with a decided improvement in appearance. Though the initial outlay will be greater than for grass, there will usually be considerable reduction in the cost of upkeep.

On slopes of any great degree of steepness plants should be set closer together than would be considered necessary on more nearly level ground, in order that the slope may be covered with vegetation reasonably quickly to prevent erosion. For the same reason it is not always advisable to remove grass growing on the slope but to allow the new cover plants to smother it out as they increase in size.

Cover Plants for Sunny Areas

Which, then, are some suitable plants to replace grass? To name first those which require exposure to the sun, perhaps none are better than the low forms of juniper, for among them may be found material for either large or small areas.

Mr. Beale, who is Superintendent of the Arboretum at the Boyce Thompson Institute for Plant Research in Yonkers, New York, has taught the subject of Cultivation of Trees and Shrubs in the Garden's Two-Year Course in Practical Gardening since 1942.

The creeping juniper (*Juniperus horizontalis*) makes a dense mat of prostrate stems with grey-green foliage. Much brighter in color are the blue-grey upturned shoot ends of the Waukegan juniper (*J. horizontalis Douglasii*) which is, perhaps, the gem of this very prostrate group. Of rather slower growth and about midway in color between these two is the blue creeping juniper (*J. horizontalis glauca*).

Increasingly used for ground-cover purposes is the Sargent juniper (*J. chinensis Sargentii*) which loosely piles branch upon branch to a height of about 18 inches. Its color is a greyish-green, and where a bolder effect is desired than can be obtained with the creeping junipers it can be highly recommended.

The Japgarden juniper (*J. procumbens*) is darker in color but does not have the distinctive character of the Sargent juniper. Both have a slow rate of growth which is desirable.

Among native plants there are several that are suitable. The common, low-growing juniper seen in old fields (*J. communis depressa*) is a wide-spreading plant that attains a height of about 3 feet. Its color is a pleasing grey-green, but it is too large for use in small gardens. The mountain form (*J. communis saxatilis*) also forms broad patches, but its more horizontal branches are usually under 2 feet high. In color it resembles its slightly taller cousin.

Distinct in habit of growth is the shore juniper (*J. conferta*) as its shoots grow upright from procumbent branches. It is bright green with the growing shoot tips a contrasting pale green. Like the mountain form of the common juniper, one plant will eventually cover an area 8 to 10 feet in diameter.

There are a number of broad-leaved woody plants, both deciduous and evergreen, that also make pleasing ground covers. The wintercreeper euonymus (*Euonymus Fortunei*), and its purple-leaved form (*E. Fortunei colorata*) can be used in either sun or shade. Both are evergreen, and the purple-leaf shows its coloration only in winter. To some it is attractive; others prefer the more subdued green. Stems of both will climb if there is anything in their vicinity to which they can attach themselves.

Some of the trailing roses can be used as ground covers, but they seldom make a sufficiently dense cover to prevent considerable weed growth unless pruning is neglected to the point where a lot of old wood is also obvious. If the weed problem can be taken care of no justification is required for growing them.

The rock cotoneaster (*Cotoneaster horizontalis*) is another favorite. Usually under 3 feet in height, its horizontal, fern-like branches and the multitude of tiny white flowers followed in autumn by small red berries, all attest to the reason for its popularity. Much smaller and clinging more closely to the ground, the creeping cotoneaster (*C. adpressa*) is

appropriate for small areas. It is unfortunate that the evergreen species *C. Dammeri* (sometimes called the bearberry cotoneaster) is not sufficiently hardy in the vicinity of New York to warrant recommendation, for this is the most prostrate of the group and grows quite rapidly.

The spring heath (*Erica carnea*), being related to the rhododendrons, requires the same acid soil conditions. A sun-loving plant about 10 inches high, it puts on a show of tiny red flowers in late March and April, and a smaller display in November in a mild season. It is a much more reliable plant than its July flowering relative, the Scotch heather (*Calluna vulgaris*) which is apt to be badly injured and is occasionally killed during severe winters. Both, however, grow densely enough to smother all but a few strong weeds.

The sunrose (*Helianthemum nummularium*) is not sufficiently sturdy to cope with native growth, but where the latter can be kept in check it will make neat little mats of growth and a colorful display of flowers in June.

A plant having decided merit for larger areas, poor soil, and more natural surroundings than the average suburban garden, is the northern bayberry (*Myrica pensylvanica*) with shiny odorous leaves and pale grey berries in fall. If allowed to it will grow quite tall, but if the tall shoots are cut out it can be maintained at a height of 3 to 4 feet.

Low Woody Plants for Shade

To turn now to evergreen shade-loving ground covers, the Japanese pachysandra comes first to one's mind. Opinion as to its ornamental value is usually quite definitely for or against; nevertheless, it is without doubt one of the most satisfactory ground covers for shady places. When exposed to the sun the leaves turn yellow and are smaller. Even though its spread is by underground stems, the plant never becomes weedy.

To be found in every old-fashioned garden in spring are the blue flowers of myrtle or periwinkle (*Vinca minor*), which has now become a popular shade plant that forms a green carpet about 8 inches high.

The Baltic ivy (*Hedera helix baltica*) is a little hardier than the English ivy (*Hedera helix*) and in the north is replacing it as a ground cover. The bolder foliage of both kinds stands out in sharp contrast to the smaller leaves of many other plants used for this purpose. During winters when the snowfall is light the leaves are likely to be injured by frost.

A refined, completely prostrate plant for the poorest kind of sandy ground in sun or light shade is the bearberry (*Arctostaphylos uva-ursi*). It has very small leaves, little white flowers and, later, red berries. It should always be set out from pots as it is exceedingly difficult to transplant.

Another dwarf, some 6 inches in height, but with upright stems, is the checkerberry, or wintergreen (*Gaultheria procumbens*). This, however,

requires at least average amounts of humus and moisture in an acid soil.

The sandmyrtle (*Leiophyllum buxifolium*), 1½ feet in height, and the lower-growing variety called Alleghany sandmyrtle (*L. buxifolium prostratum*) prefer light shade and need acid soil, but both are particularly showy when in bloom in June.

Finally, a word about Japanese honeysuckle (*Lonicera japonica*), much advertised as a ground cover. There can be no question about its good qualities as a soil-binding plant or about the sweet odor of its white blossoms. But neither can there be any doubt that it has become one of our most noxious weeds, for it is ruining acres of valuable pasture land and doing untold damage by smothering young tree growth in woodlands. Hall's honeysuckle, a variety of *L. japonica*, can be equally obnoxious. There are many other plants which may be substituted for grass without fear of their becoming weeds, so if you have ever considered using Japanese honeysuckle in any form as a ground cover, don't, *don't*, and yet again DON'T!

NOTICES AND REVIEWS OF RECENT BOOKS

Lysenko and the Death of Genetics in Russia

HEREDITY EAST AND WEST: Lysenko and World Science. Julian Huxley. 246 pages, portrait, index. Henry Schuman, New York. 1949. $3.

DEATH OF A SCIENCE IN RUSSIA. The Fate of Genetics as Described in *Pravda* and Elsewhere. Edited by Conway Zirkle. 319 pages. Extended table of contents but no index. Univ. of Pennsylvania Press, Philadelphia. 1949. $3.75.

THE SITUATION IN BIOLOGICAL SCIENCE. T. D. Lysenko, *et al.* 636 pages. [Complete stenographic report: Proceedings of the Lenin Academy of Agricultural Sciences of the U.S.S.R., July 31 - August 7, 1948.] List of speakers by sessions but no index. International Publishers, New York. 1949. $5.

On the evening of July 31, 1948, a gaunt-faced man with deep-set eyes and an unruly shock of hair arose from his seat and called the general meeting of the members of the Lenin Academy of Agricultural Sciences of the U.S.S.R. to order. This man was Trofim Denisovitch Lysenko, President of the Academy. The meeting, with some 700 in attendance, had been called to consider and discuss "The Situation in Biological Science." The sessions continued through nine sittings until August 6. The tenth and last sitting convened at 11 A.M. the morning of the 7th. Within the following hour the laws of heredity had been officially declared non-operative in Russia and the science of biological genetics completely obliterated throughout the Soviet Union.

We, with our roots deep in western civilization, scarcely can comprehend such a situation or imagine how it possibly could have come to pass for, only a decade or two ago, Russia was producing some of the most brilliant geneticists and scholarly works in this field the world has yet seen. Today these cytologists and geneticists, at best, have been deprived of their positions and dispersed, some have simply disappeared, and the remainder, usually the most erudite and productive, are known to have died under mysterious conditions which Russian officials refuse to discuss.

None of these three books should perhaps be recommended over the other; instead, they complement each other. As a unit, they piece together such information as we have concerning the death of the science of heredity in Russia.

One who is not overly conversant with the numerous technical details of the genetics of plants and animals should first read Huxley's work. Thus they will be acquainted with the background of the controversy and, at the same time, gain considerable knowledge of the place of genetics in everyday life, both from a practical and a philosophical standpoint. For example, Chapter 4—*Genetics as a Science* is the most lucid condensed introduction to genetics and evolution this reviewer has ever read. Huxley is deeply angered but, as would be expected of a former Director-General of UNESCO, he strives mightily to retain a completely philosophical attitude. Personally, he has had considerable contact with Lysenko and so can write convincingly of his manners and methods.

Zirkle approaches the situation from a different angle. He looks upon himself primarily as an editor with the prerogative of adding such pertinent explanations and pungent comments as he sees fit in various parts of the text, especially in the footnotes. This book contains much not found in Huxley's. It starts with a series of extended quotations from various authors who have closely watched the Russian scene, or who have actually lived in it, such as Th. Dobzhansky and H. J. Muller. From these writers, viewing the scene as they do from different angles, one begins to see the deep tragedy of the whole affair. Then Zirkle chooses from the speeches before the sessions of the Academy those most pertinent, so as to permit the reader to see what was going on and how the nefarious thing was accomplished. His footnotes are most helpful.

It should be pointed out, however, that neither Huxley nor Zirkle was able to consult the entire transcript of the stenographic report of the speeches before completing their respective works, being forced to rely entirely on the texts of these as printed in *Pravda*. (When their texts were being prepared, neither knew that an official stenographic report —complete with identified and unidentified heckling from the audience and rostrum, the disturbing noises in the auditorium, applause, etc.—would be available.) Huxley gives us no extended quotations; it is therefore most interesting to compare the speeches as reported in *Pravda* (quoted by Zirkle) with these same ones in the complete stenographic report of the Proceedings.

Revealing as were the texts printed in *Pravda,* the complete stenographic report must stand as one of the world's amazing documents. As is evident, even on the opening page of the report, the Congress was "rigged" from the start and designed to heap ridicule on cytologists and geneticists. Those scientists anywhere who still have sympathetic feelings toward the Communist regime and who, often from high places, serve as apologists for it, might do well to carefully read these three books and see for themselves how scientists are treated by the present Soviet leaders and how scientific facts and truths are distorted, crushed and finally obliterated when they happen to run counter to the dictates of the Party.

The complete report of the Proceedings has in it more quotations out of context, distorted statements of the concepts of others, half truths stated as the whole, malicious slurs, obvious bad manners, and plain unvarnished lies, than any volume of the same size this reviewer has ever read. In removing the heckling from their printed text, the editors of *Pravda* showed considerably more judgment and taste than the present Russian leaders of biological thought. Strangely, the most persistent and crudest of the hecklers was Lysenko himself. In spite of his presumed craftiness, Lysenko reveals himself in both his papers and heckling asides as a very small man, with no valid philosophical outlook, and an abysmal scientific illiteracy. It has long been known that Lysenko is incapable of comprehending any mathematics beyond simple arithmetic; being unable to fathom the basic logics of the mathematics necessary for an understanding of genetic analyses, his obvious inferiority complex leads him to belittle all such methods. His political position is now such that he is able to demand conformance to his views by others; any disagreement leads to complete ruin, often to death.

One who is not thoroughly grounded in classical Darwinian theory, who is not

fairly well trained in modern genetic methods, who is not conversant with advanced agro-biological concepts, who is not familiar with basically good farming methods and equipment and who, therefore, would not automatically catch the tortured half-truths, the announcements of results of "experiments" made completely without any scientific checks, and the patent untruths, might easily read the speeches by Lysenko and his fawning cohorts and come to the conclusion that, quite possibly, they did have the better of the argument with the geneticists. Valiant as the rear-guard action of the geneticists may at first appear to have been, it is rarely logical. These men were fully aware of what previously had happened to their old leader, N. I. Vavilov (exiled to a Siberian work camp where he died probably in 1942), and others who had been courageous enough to point out to Lysenko his gross errors and inconsistencies. The majority of those left realized that they were no longer able to save their science; instead, they were fighting for their very lives. In such a situation it is difficult to be lucid or completely logical.

The trained biologist can read this report with its masses of semantic drivel and realize that not only the science of genetics has now been destroyed in Russia but that, there, sound scientific method also has been consistently extirpated from the whole field of biology. Whether the scientifically untrained Lysenko—the titular leader of biological thought and the head of all agricultural research in Russia—is a conscious charlatan, or has been trilbyized by the diabolically clever Court philosopher, I. I. Prezent, may never be known. In these days no Soviet official or Russian citizen dare save his memoranda or jot down his intimate and true thoughts for posterity. In Russia, the closer to The Throne one searches, the less truth one expects to find.

W. H. CAMP,
The Academy of Natural Sciences of Philadelphia.

Forest Improvement

GENETICS IN SWEDISH FORESTRY PRACTICE. Bertil Lindquist. 173 pages, illustrated, indexed. The Chronica Botanica Co., Waltham, Mass., English edition. 1948. $3.50.

This book, first published in Swedish in 1946, deals with practical forestry from a genetical point of view. The early forest exploitation in Sweden has resulted in a marked deterioration of the genetic quality of Swedish forests. The author fully recognizes this deplorable condition and makes the following suggestions for its immediate future improvements:

> 1. Map the forests of the country for natural stands of pine, spruce, birch, oak, ash, alder, elm, beech, maple, and lime. 2. Divide the country into provenance zones. 3. Set up a list of standard requirements for "élite" trees of each forest species considering type and rate of growth, branching habit, timber quality, cone production, and disease resistance. 4. Collect seed from "élite" or dominant trees in genetically good stands for reforestation projects. 5. Protect "élite" trees in various provenances for future use in breeding.

Long-term measures advised for the improvement of Sweden's forests are:

> 1. Establishment of plantations for seed production by planting grafts of "élite" trees in areas which are sufficiently isolated to insure high quality seed. 2. Stimulation of flowering and fructification by strangulation, girdling or grafting. 3. Formation of seed plantations in each provenance zone since as a rule good mother

trees produce very fast growing progeny when raised in a zone to which they belong. 4. Initiation of long term progeny tests of "élite" trees from which data on the inheritance of genetic factors may be obtained. 5 Hybridization of "élite" trees for heterotic types and more desirable progeny.

The author discusses silvicultural methods, cost of forest regeneration and stabilization as well as the future economic status of forestry in Sweden. This well written book certainly stimulates the reader to consider the present forestry condition prevailing in countries other than Sweden.

A bibliography of the current literature on forest tree improvement of importance to Swedish forestry practice concludes the book.

CLYDE CHANDLER,
Boyce Thompson Institute for Plant Research.

Monumental Reference Work For Taxonomists

BIBLIOGRAPHY OF CULTIVATED TREES AND SHRUBS. Alfred Rehder. 825 quarto pages, indexed. The Arnold Arboretum, Jamaica Plain, Mass. 1949. $20.

This large volume of finely printed pages began as a bibliographic supplement to the author's invaluable "Manual of Cultivated Trees and Shrubs." It will undoubtedly join Rehder's "Bradley Bibliography" as one of the important literary tools available to the taxonomist, whether or not he is interested in cultivated plants. Its object is to supply references to the authorship of all names of cultivated woody plants; it even includes — a welcome innovation — names of families and their major subdivisions.

Most of the work was completed after the author's retirement from the Curatorship of the Arnold Arboretum in 1940, in his seventy-seventh year. It will long stand as a monument to his meticulous care and indefatigable industry in the service of systematic botany.

H. W. RICKETT.

Roots in the Earth And Their Moisture Needs

PLANT AND SOIL WATER RELATIONSHIPS. Paul J. Kramer. 347 pages, bibliography, index. McGraw-Hill Book Co., New York. 1949. $4.50.

The water relations of soils present many problems based largely on the heterogeneous nature of the soil itself. To these problems are added the various reactions of rooted plants to soil moisture conditions. The author has presented the inter-relationships between the physical soil moisture system and the physiological plant system. Approaching this complex problem from the historical point of view he has presented a well rounded picture of our present knowledge in this difficult field. Listing about 500 of the more important contributions he has digested a far greater number in the preparation of the text. The book is valuable not only to investigators, teachers, and students but also to all workers in the field of applied plant production and to the layman who wishes to understand what is taking place in the root zone of the plants he wishes to grow. The book is well documented but is surprisingly free of technical passages and the general reader will find it easy to understand.

HOMER LEROY SHANTZ,
Santa Barbara, Calif.

Inspiration for Planters

THE HOME BOOK OF TREES AND SHRUBS. J. J. Levison. 524 pages, illustrated; 23 pages of index. Alfred A. Knopf, Inc., New York. Second edition, completely revised, enlarged and reset. 1949. $10.

After nine years, Mr. Levison has prepared a greatly enriched edition of his work. Although the plant lists diminish in usefulness in proportion to the distance from Long Island Sound, where he lives, there is an inspiration of value anywhere to be gained from the profusion of photographs. I hope this book will reach the hands of practitioners of only fair competence who are doing too large a share of the landscape planting of today. From his long professional career the author has knowledge of the questions for which a ready reference is necessary: insect pests and diseases, pruning and tree surgery, easy identification of the common trees, books for further study.

This Journal's reviewer of the first edition pointed to some errors in the descriptive botany which are now corrected. In the event of a third edition, consideration might be given to the following objections:

The reference to the use of yellow birch as a street tree in Rochester is

obsolete; it has long passed into the limbo of unsuccessful experiment.

It were well if the Chinese elm, *Ulmus parvifolia,* with its lovely mottled bark and autumn display of fruit and colored foliage, were coming into wide use but I suspect the reference is to the commonly offered *Ulmus pumila,* a lesser tree in all respects.

If *Catalpa bungei* is named, and correctly so, the Manchurian catalpa, it is an uncommon tree of normal habit from Asia. The ugly malformation, *C. bignonioides nana,* which is listed in some catalogs as *C. bungei,* is the plant described in the text.

It is disturbing to have poison ivy and poison sumac treated in the paragraph on *Rhus* with no discrimination other than that inherent to their common names.

Sophora japonica is a tree of twenty-five meters, not twenty-five feet.

BERNARD HARKNESS,
Bureau of Parks, Rochester, N. Y.

Notes, News, and Comment

Members' Day. The innovation of having a Members' Day program in the evening at a downtown auditorium brought more than 200 persons to the New York Genealogical Society Feb. 2. T. H. Everett spoke on "Gardening Efficiently."

Invitation Lectures. Four Thursday morning programs on the maintenance of ornamental trees and shrubs were given to an invited audience early in the year at the home of Mrs. Thomas J. Watson in New York. Sponsored by the Garden's Manhattan office, the series was planned by Dr. P. P. Pirone. Speakers were Dr. Donald Wyman, Horticulturist at the Arnold Arboretum; Dr. B. C. Blackburn, author and lecturer in horticulture, Gladstone, N. J.; Norman Armstrong, professional arborist, White Plains, N. Y.; and Dr. Pirone himself.

Visitors. Charles Beall, who in 1946 was a volunteer worker in the Garden's Plant Pathology department, returned in January to visit Dr. B. O. Dodge. He is now with the Skogshögskolan Experimentalfältet in Stockholm, Sweden.

Josiah L. Lowe of the College of Forestry at Syracuse was at the Garden Jan. 26.

Professor John S. Turner of the Botany School at the University of Melbourne, Australia, visited the physiological laboratories Jan. 31. On Jan. 20, Professor Francis Ryan of the Department of Zoology at Columbia was a visitor there.

Lectures. Dr. P. P. Pirone addressed the Wilmington Garden Club on "Maintenance of Shade and Ornamental Trees," Jan. 9. At the annual banquet of the Watchung Nature Club in Plainfield, N. J., Dr. H. N. Moldenke spoke on "The Land of Mañana" Oct. 18.

W.B.O. Field. News of the death of William B. Osgood Field reached the Garden late in the year. He was elected a member of the Corporation January 11, 1915, and served continuously until his death on October 6, 1949.

Advisory Council. Election of officers at the annual meeting of the Advisory Council of the New York Botanical Garden Dec. 7 resulted in Mrs. James C. Mackenzie being named second vice-chairman, succeeding Mrs. Charles Burlingham, and Mrs. Hugh Peters being chosen corresponding secretary, succeeding Mrs. Philip B. Weld. Mrs. Thomas D. Thacher remains the Advisory Council chairman, Mrs. Guthrie Shaw first vice-chairman, Mrs. Barent Lefferts recording secretary, and Mrs. Junius A. Richards treasurer.

Torrey Club. Dr. H. W. Rickett was elected representative of the Torrey Botanical Club at the Seventh International Botanical Congress to take place in Stockholm next July. Dr. Donald P. Rogers was re-elected recording secretary and Rutherford Platt was chosen to continue as the club's representative on the Garden's Board of Managers, at the annual meeting January 17.

London Conference. Camellias and magnolias will be companion subjects at a conference being arranged by the Royal Horticultural Society for April 4 and 5 in London. There will be a competitive show as well as a program of lectures and discussions. In addition, a six-day tour of Cornish gardens has been arranged, to start from London March 25. One-day trips out of London will take place March 31 and April 1.

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SOME ORCHIDS AT THE BOTANICAL GARDEN

A PAINTING BY GERTRUDE LAWRENCE BERGER

APRIL EVENTS AT THE GARDEN

Courses of Study

Field Botany 7 sessions on Saturdays, 1:30 -3 p.m., totaling 15 credit hours
Apr. 15—May 27, 1950. Instructor: *G. L. Wittrock* $5; single trip — $1.00

Outdoor Gardening Practice 8 sessions on Thursdays, 7—8:45 p.m.
Apr. 20—June 8, 1950. Instructors: *Arthur King* and *Edward J. O'Keefe* $15;
Joint fee for married couples, $25

Garden Construction 8 sessions on Tuesdays, 7—8:45 p.m.
Apr. 25—June 13, 1950. Instructor: *A. C. Pfander* $15;
Joint fee for married couples, $25

Free Saturday Programs

3 p.m. in the Lecture Hall

Apr. 1 ***Spring Pointers for the Beginning Gardener*** *Arthur King*
Instructor in Practical Gardening,
New York Botanical Garden

Apr. 8 ***Wild Flowers of Rocky Mountain National Park*** *Walter Shannon*

Apr. 15 ***Honey Bee Culture in the Northeast*** *Norman H. Foote*
Long Island Agricultural and Technical Institute

Apr. 22 ***Learning Mosses for Pleasure***—or: Why Be A Rolling Stone? *Geneva Sayre*
Russell Sage College

Apr. 29 ***Nature Study in Your Back Yard*** *Ted Pettit*
Boy Scouts of America

Members' Day Program

At New York Genealogical Society, 122 E. 58th St.

April 13, 3 p.m. ***Orchid Growing for Everyone*** *C. Leslie Erickson*

Spring Displays

Although the species crocuses in the Rock Garden are among the first herbaceous plants to flower in spring, it is the daffodils which give the first broad expanse of color. In the Flowering Meadow south of the Rock Garden, on the long slope west of the woodland road, and beneath the trees and along the paths in many parts of the grounds, daffodils will be blooming for several weeks from mid-April on.

Those who have been watching for earlier signs of spring have already seen the scattered yellow of the winter and spring flowering witch-hazels, of the dogwoods, *Cornus mas* and *C. officinalis,* and of the native spicebush. But it is not until the forsythia blooms, along with the daffodils, that the yellows become dominant.

When color begins to appear among the flowering bulbs and early shrubs and ground covers in the Thompson Memorial Rock Garden, toward the end of April, the two gates to the five-acre enclosure are kept open daily for the public.

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JOURNAL

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CAROL H. WOODWARD, Editor

VOL. 51 APRIL 1950 NO. 604

Kenaf—A Potential New Crop

By Gilbert H. Ahlgren & Alexander Dotzenko

MANY crops now grown in America have been introduced from other continents. So many have been brought in that one might think the useful plants of the world by now were all well known and fully exploited; yet plant explorers are still searching far and wide for new crops to add to our agricultural assets. Their efforts are meeting with reasonably good success.

One of the newest crops in this hemisphere is KENAF (*Hibiscus cannabinus*). This may prove to be a valuable and effective substitute for jute (*Corchorus capsularis*), which has long been a leading source of soft fibers for manufacturing rugs, carpets, twine, burlap, bags, electric cable covers, and many other important products.

Almost the entire world supply of jute is grown in India and Pakistan, but the production in those countries has decreased from 9½ million 400-pound bales in pre-war years to 8½ million in 1948 and 7½ million in 1949[1]. This is because India and Pakistan are putting more of their land into food-producing crops.

Kenaf was first privately introduced into this hemisphere in El Salvador. In 1941 the Board of Economic Warfare of the United States Govern-

THE authors of this article are Research Specialist and Research Assistant, respectively, in the Farm Crops Department, Rutgers University — the State University of New Jersey — at New Brunswick. Dr. Ahlgren, who is also Chairman of the Department of Farm Crops, is author and co-author of several agricultural books and of "Three Billion Bushels of Corn" which appeared in this Journal in January 1948.

[1] Grau, R. Ramos. News of the Cuban Sugar Industry. Sugar 44:26-30. 1949.

The kenaf plant on the left belongs to the variety *vulgaris,* that on the right represents the *viridis* variety. These are the two important varieties grown in Cuba.

ment distributed kenaf seeds in the American tropics[2]. Since that time kenaf has received special attention in Cuba, where it appears to be well adapted and where its culture offers several advantages. First, in case of national need, it is a dependable, readily available fiber crop. Secondly, it lengthens the employment period in the sugar industry since its harvest follows the sugar season. Finally, the growing of kenaf in Cuba will help in crop diversification and also provide another cash crop.

Although the climate of New Jersey is far different from that of Cuba, in the spring of 1949 the Division of Plant Introduction of the United States Department of Agriculture[3], in co-operation with the Office of Foreign Agricultural Relations of the U.S.D.A., sent seed of kenaf to this state for testing[4] Accordingly, on June 3, about a quarter of an acre was planted in rows 3 feet apart at the Agricultural Experiment Station at New Brunswick. A fertilizer treatment of about 500 pounds of a 4-12-8 mixture was given the area prior to planting.

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[2] Crane, Julian C. Kenaf—Fiber Plant Rival of Jute. Economic Botany 1:334-350. 1947.

[3] The complete designation is Division of Plant Introduction and Exploration, Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture.

[4] The plants were grown as part of the State and Federal co-operative project for testing and evaluating plants of potential value made possible under the Research and Marketing Act of 1946 and known as the New Plants Project NE-9.

In spite of the extreme heat and drought of the 1949 season this kenaf planting made remarkable growth. Plants ranged in height in late October at the time of the first frost from 6 to 9½ feet. The average height was about 7½ feet. The stems varied in diameter from 1.9 to 3.1 cm. with an average of 2.4 cm. (about one inch). Flowering began in late September and continued until the first frost.

On October 19, portions of the field were harvested to determine the total green and dry matter produced per acre. The calculated green yield was 48,776 pounds per acre, or better than 24 tons. About 32.4 percent of this was dry matter, accounting for 15,800 pounds. On separating the stems from the leaves it was found that 58.4 percent of the plants consisted of stems and 41.6 percent leaves. By weight, the stems were com-

The plants in this stand of kenaf in New Jersey were 118 days old and about 7 feet tall.

posed of 38.5 percent bark, in which is found the fiber, and 61.5 percent the central woody cylinder. The fiber content is said to run from 4 to 6 percent of the green weight of the crop.

In contrast, the yield of hemp (*Cannabis sativa*) per acre in the United States is approximately 10 to 12 tons of green matter, or less than half that of the new crop. Approximately 40% of the hemp plant consists of leaves and the remaining 60 percent of stems, which give from 2¼ to 2½ tons of air-dry retted stalks, again about half the yield of kenaf. Compared to these fiber crops a good yield of a forage sorghum (*Sorghum vulgare*) would be 8 to 10 tons of green material or 2 to 3 tons of dry matter per acre. The sorghum would be about 90 percent stems and 10 percent leaves.

The fiber produced from kenaf is a soft or stem fiber, and can be utilized for the same purposes for which jute fiber is used[2]. In fact, tests with sugar bags made from jute compared to those made from kenaf fiber show the kenaf to be superior.

In 1949 kenaf was grown in Florida, Texas, Indiana, New Jersey and perhaps other areas in the United States of which the writers are not aware. In Florida and Texas, at least, it appears to have reasonable possibilities as a commercial fiber crop. Its usefulness as a crop in New Jersey, however, at this point remains to be determined. Perhaps it could be used as a woody plant for soil improvement purposes if it does not prove practical to grow it here for fiber, since much of it consists of material resistant to rapid decomposition. This characteristic is especially important, since our common green manure crops, such as vetch and ryegrass, are used up rapidly in the soil by strong oxidation processes. Woody materials, being more resistant to decomposition, persist for several years and thus make a more lasting contribution to the soil organic matter content.

Under the hot and dry summer of 1949 kenaf grew very vigorously and rapidly. Planting in May followed by a more typical New Jersey summer with normal rainfall might have given even bigger plants and larger yields, though a cooler season could retard growth somewhat. Considering the root growth also, a total yield of about 30 tons or more of green material was produced per acre in about 125 days at New Brunswick. A plant of such tremendous vegetative vigor, especially one containing so much fiber and woody material, should be studied further to determine its place in our agriculture.

General view of the kenaf planting at New Brunswick, N. J., in October 1949.

Plants to Avoid in Small Gardens

By Louise Aldrich Meissner

SO often the inexperienced gardener is presented with plants which "are easy to grow anywhere and have such lovely flowers!" These plants will prove a real burden and will require many hours of hard work to get rid of them. So — to paraphrase an old saying: *Timeo Danaos et dona ferentes* — I would say "Beware of *friends* bringing gifts!"

I am still trying to get rid of *Campanula rapunculoides, Sedum sarmentosum,* and the knotweed, *Polygonum Sieboldii,** which friends unwittingly introduced into my Long Island garden fifteen years ago. These well-meaning neighbors had large garden space where vigorous plants like these could spread and multiply and indeed give a wonderful color effect. But I do urge you to do some investigating before you allow them to enter your gates.

Campanula rapunculoides has bright purplish-blue flowers and is often found growing happily along roadsides and about old neglected yards.

Sedum sarmentosum is a creeper — sometimes called the stringy stonecrop. It has brilliant yellow blooms and light green leaves and will completely cover your rock garden in a surprisingly short time, rooting at every point and even extending into the lawn. Keep this pest out of your garden if you want to grow anything else in it.

Sedum album must be watched too. Farrer says it is "pestiferous in its powers of propagation so that within a year of receiving two squashed sprigs in a letter you will be casting it out by cartloads — every fragment grows with fearful rapidity."

The *Polygonum* was given me by a friend who knew I was interested in flower arrangement and thought she was doing me a favor. The roots of this pest seem to go down to China and no matter how hard you try to dig them out it still appears —truly such persistence is to be admired, but not in an unwanted plant! The prince's feather (*Polygonum orientale*) is not to be confused with the above. This is a tall annual with long panicles of pink flowers — an interesting old-fashioned plant often used in Victorian bouquets.

One of the greatest of all nuisances is the Chinese lantern plant (*Physalis Alkekengi*). Avoid it as you would the plague! It has little to recommend it — except for its highly colored bladder-like seed-pods; it spreads tremendously and is difficult to eradicate.

Lesser pests, which have their charm in the garden as long as they can be kept where they belong, are the perennial blue ageratum or mist-flower

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* Also known as *P. cuspidatum.*

(*Eupatorium coelestinum*) and the false dragonhead (*Physostegia virginiana*) — which I have heard called "obedience plant" because if a flower in the spike is pushed from one side to another it will remain in that position. The fleshy white roots of this plant work their way rapidly through the soil in every direction, but they are readily pulled up in spring. I consider it a good perennial for the large border but would not recommend it for a small place. The variety "Vivid" is less vigorous and of a much more clear and pleasing color — better adapted to the more intimate garden.

The perennial ageratum is also a worthy flower — adding a good soft blue color note to the late-blooming border and mixing well in bouquets with other composites, such as zinnias, marigolds, and small dahlias. It appears quite late in spring, resembling mint when breaking through the ground, and is easily kept within bounds.

Then there is the blue *Tradescantia* or spiderwort — a hardy perennial of many varieties and forms. It self-sows so freely that one is continually digging up the seedlings the following year. There is a lovely pure white variety and a good sky blue one, also there are many shades of pink and rose. If the flowers are cut off after blooming, the plants can better be kept from spreading.

A rapid creeper which must be controlled is the bugle (*Ajuga genevensis*). Its spikes of bright blue flowers above the low mat of leaves are very effective — in their place. The variety *metallica crispa* or *atropurpurea* with bronze foliage is not such a fast spreader. This one is of more value for its leaves than for the flowers. There is also a less known variety with variegated foliage. One advantage of these ajugas is, however, that they will thrive in part shade and under trees.*

The plume poppy or tree celandine (*Bocconia cordata*) is a handsome perennial with tall plumy masses of flowers in terminal panicles above beautiful heavy foliage. This plant also spreads by underground suckers.

The early-flowering herb called celandine (*Chelidonium majus*) is attractive, particularly for its ferny, graceful foliage. The yellow flowers are small but bright in spring and if allowed to go to seed will carpet the ground. In a waste, shady place they are fine, but they can be too persistent for pleasure where other flowers are wanted.

The aromatic annual herb *Hedeoma pulegiodes*, or American pennyroyal, is of no horticultural value but is often grown for the flavor of the leaves. This self-sows with great profusion. Another interesting annual member of the Mint family is *Perilla*, the beefsteak plant — which resembles a dark-leaved *Coleus*. The leaves are a lovely wine red with bronzy luster,

* See pages 179, 180, and 200 in the Journals for July and August 1949, where Mrs. Francis R. Williams writes of the successful use of varieties of bugle in her shaded garden.

but if you once let this one go to seed you will have hundreds more the next spring.

The fall-blooming asters or Michaelmas daisies are useful in shady corners, and if not allowed to go to seed they will prove of real value from September into October. The late-blooming *Aster tartaricus*, however, which is of a good lavender-blue with yellow eye, needs to be kept under control. Though it is interesting on account of its great height — often 5 to 6 feet — it is so vigorous that it must be ruthlessly weeded out of the garden each spring.

The pink locust (*Robinia hispida*) is a most attractive small tree or shrub, with graceful pinnate foliage and panicles of showy pink pea-shaped flowers in June, but it must be watched. Like the sumac, it spreads very rapidly by underground suckers which extend out into the lawn. It particularly likes our sandy Long Island soil in which to advance its ranks.

In closing, the best I can say is: "Forewarned is forearmed."

Among My Wild Flower Books

By Samuel H. Gottscho

IN the early nineties, largely through the influence of the writings of Henry David Thoreau and John Burroughs, and as well the illustrated articles of William Hamilton Gibson, people young and old, began to be seriously interested in Nature study. This, of course, embraced the study of wild flowers. Although none of these writers had published a book solely on this subject, their journals, articles and books abound with references to our native flora.

John Burroughs was born in April, and of all the months he loved it best for it was the beginning of spring. The search for and finding of the first hepatica and arbutus was a happy custom, faithfully observed each year, and marked the beginning of his homage to the dearly loved wild flowers in their haunts as each bloomed at its appointed time.

As early as 1878, his journal expressed the hope that somebody would write a wild flower book simple enough to enable folks to learn the names of the wild flowers without being obliged to attempt the use of a key. Later, in 1891, he published an essay "Among the Wild Flowers" in *St Nicholas* magazine. This eventually became the first chapter of the book

For a survey of the popular wild flower guides of the seventies and eighties, see Mr. Gottscho's article, "The Golden Age of Wild Flower Illustration in America" in the Journal for July 1949.

called "Riverby." In the last paragraph of this essay, he again made a similar appeal for an elementary wild flower book. His plea was heeded by Mrs. William Starr Dana (later Frances Theodora Parsons) who found it an inspiration for her "How to Know the Wild Flowers," quoting part of it opposite the preface.

Flower and Fern Books of Nineties

Mrs. Dana's book, the first of many dealing with wild flowers in a simple way, was published by Charles Scribner's Sons in 1893. It has always been a popular book, having had many revisions and reprintings. It is also a very readable book, with the flowers arranged in groups according to color. The writer's word portraits are most illuminating and supplement the detailed botanical identification notes. The early editions contained only excellent pen and ink drawings by Marion Satterlee, but later, adequate color plates were added to the book. Like many of the following books, this is now out of print.

Mrs. Dana also wrote a very helpful book on ferns, but her book of wild flower essays, "According to Season," deserves special mention here. It is a book to read particularly in the winter months for it might be termed a glorious catalogue of the floral delights which we can enjoy during the coming season. Preceding the first chapter is a beautiful invocation to Nature in which Mrs. Dana, a great lover of the outdoors, humbly asks that her infant son be likewise endowed

The Lounsberry-Rowan Guides

"A Guide to the Wild Flowers" by Alice Lounsberry was brought out in 1899 by Frederick A. Stokes Company. This book is distinguished by its arrangement of the flowers according to the location in which they grow. It is illustrated by Mrs. Ellis Rowan and the color plates are particularly to be commended, not only for a fine rendition of the flowers, but also for the natural landscape backgrounds against which the flowers are shown. In 1901 the same publisher brought out "Southern Wild Flowers and Trees," also by these two ladies. It is a fine compendium of the flora of the South written with popular appeal. The illustrations are similar in character to those of the first book and are equally beautiful and instructive. I must also mention their "Guide to the Trees" because of the full-page color illustrations which portray tree, bark and foliage in summer and autumn, together with inflorescence, all done on one plate and of great help in identification.

In the same year Harper & Brothers published "Flowers of the Field, Hill and Swamp" by Caroline A. Creevy. This book also groups the flowers for identification according to the location where they can be found. The descriptive material is botanical and other information rather pithy and condensed. The text is accompanied by the realistic drawings of Benjamin Lander.

"Nature's Garden" and Others

One of the best known and loved wild flower books came out in 1900, "Nature's Garden" by Neltje Blanchan. This also has gone through many editions. Its flower biographies, with special emphasis on insect relationships, are very complete and sympathetic. They express the author's love of wild flowers and her intimate acquaintance with them. The photographic illustrations in black and white, and some in color, are excellent the work of two good nature photographers of that period, Henry Troth and A. R. Dugmore.

Did you ever hear of Maud Going? She wrote two books, "With the Wild Flowers," 1896, and "Field, Forest and Wayside Flowers," 1899, both published by Baker & Taylor Company, New York. As stated on the title page of the last-named, both books are "Untechnical Studies for Unlearned Lovers of Nature." These essays cover the wonders of familiar plant life. They are readable and helpful to an understanding of the many phenomena that attend the relations of flowers and insects.

In 1898 G. P. Putnam's Sons published a somewhat different book, "Wild Flowers of the Northeastern States, Three Hundred and Eight Individuals Drawn and Described from Life by Ellen Miller and Margaret Christine Whiting." The illustrations are life-sized line drawings which, if so desired, can be hand-colored by the owner.

The Mathews Perennial

For over forty years F. Schuyler Mathews' "Field Book of American Wild Flowers" has been a standard reference book of identification for many thousands of wild flower lovers. Likewise, it has been this writer's constant companion in field or study. Note the subtitle, "Being a Short Description of Their Character and Habits, a Concise Definition of Their Colors and Incidental References to the Insects which Assist in their Fertilization." Published by G. P. Putnam's Sons, it is still in print and at present the forty-third impression is on sale. The author's twenty-nine color plates and three hundred line drawings are most excellent illustrations. Though lacking color, the line drawings are admirable portraits, with important features of the plant or flower clearly stressed to aid identification.

One of my favorite books of this period is Mabel Osgood Wright's "Flowers and Ferns in their Haunts," published in 1907 by the Macmillan Company. This book tells of the wild-flowering jaunts of the author traveling around the neighborhood of her home at Fairfield, Connecticut, in a chaise drawn by her pony, "Nell Gwynn." In fact, she dedicates the book to this understanding and helpful partner of her botanical excursions, "in recognition of our friendship of fifteen years and of her intelligence in knowing when to stand still!"

This book is written in a somewhat narrative style, introducing "Flower Hat," a lady artist and companion on some of her trips; but a character of greater importance is "Time O' Year," a friendly, native inhabitant who knows where and when the arbutus blooms and where the pools are, in which large trout lurk. The text follows the seasons and the blooming of several hundred wild flowers and ferns, while an ingratiating little story about the author's friend and mentor, "Time O' Year," weaves in and out through the book.

Mrs. Wright, the author, was also an accomplished flower photographer and the book is mainly illustrated by her excellent location pictures of wild flowers and by line cuts and vignettes of close-ups made from her photographs. In addition to these are some pictures furnished by J. Horace McFarland.

Mrs. Wright wrote several good bird books and a number of novels and children's books, but her little volume of nature essays, "The Friendship of Nature," should be referred to here as it has much to do with wild flowers. These articles originally appeared in the *New York Times* and *Evening Post* and are highly inspirational in character. One of these, "The Story of a Garden,' is unusual in its approach and beauty of style—it is a perfect gem of nature writing.

Vacation Companions

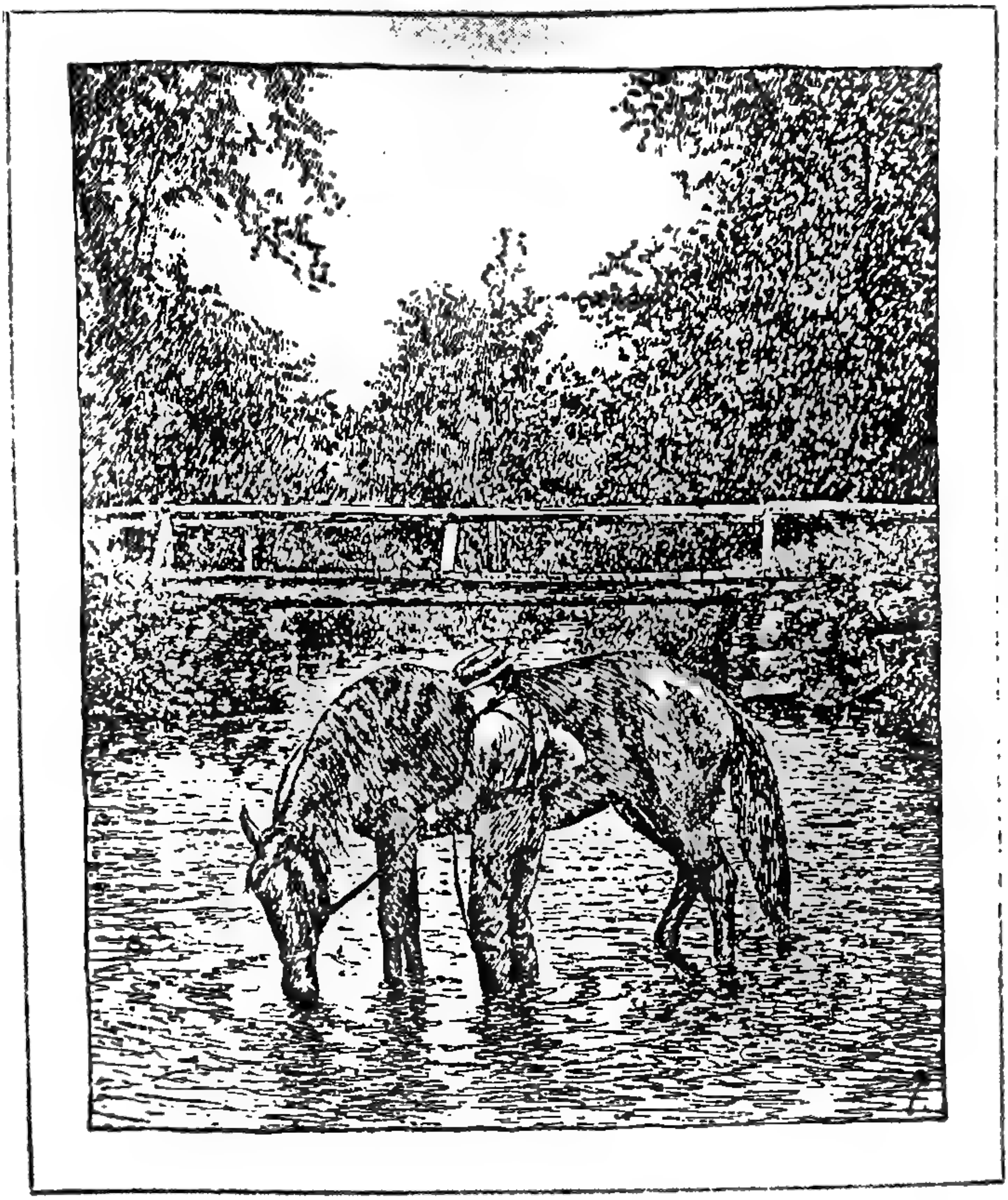
Harriet L. Keeler, better known for her books on trees, garden flowers and shrubs, wrote two excellent wild flower books published by Charles Scribner's Sons and brought out in pocket-size volumes, intended for field use. "Our Early Wild Flowers" is a well-written guide book on the spring flower arrivals, each botanically and popularly described. It was illustrated by clear line drawings by Mary Keffer and by several charming color prints of the spring flowers in groups, done in her early years by the late Eloise P. Luquer.

"The Wayside Flowers of Summer," also by Harriet Keeler, is intended to be the companion of the vacation sauntерer along the roads and fields and has similar illustrations and text. "Our Northern Autumn," published in 1920, completes this author's study of our flowering seasons. It is an interesting book devoted to the flowers, fruits and colorful leaves of this season, illustrated by line drawings, half-tones and six color plates. The concluding chapter is an ardent appeal for conservation by means of public and private wild flower sanctuaries.

"Wild Flowers Every Child Should Know" by Frederic William Stack, published in 1909 by Doubleday, Page & Company, is far from being as juvenile as the title would indicate, for its interesting information is worthy of the attention of an adult with an advanced interest in this subject. It is, however, only sparsely illustrated, for the most part by Henry Troth, whose good photographs have unfortunately suffered from inadequate reproduction.

For Westerners

"Rocky Mountain Wild Flowers' by Frederic Edward Clements, Ph. D., "An Illustrated Guide for Plant Lovers and Plant Users," deserves attention even if it treats of many species which do



This Book is Dedicated to

Nell Gwynn ✦ My Pony

(by whose name there hangs a tale)
in recognition of our friendship of
fifteen years, and of her intelligence in
knowing when to stand still

Opposite is the dedicatory page of "Flowers and Ferns in their Haunts," by Mabel Osgood Wright. This pen-and-ink sketch was drawn over one of her photographs and converted to a line illustration by bleaching out the underlying photographic image.

not grow in our northeastern states. The illustrations by Edith Schwartz Clements, Ph. D., are quite unusual. These twenty-five full-page color plates of groups of nearly related species are beautifully done and in many cases the intermingled flowers make an intriguing mosaic. The text is rather technical and beyond the average interested reader. "Flowers of Mountain and Plain" by Edith Schwartz Clements is a condensed edition of the foregoing published in 1923 by the H. W. Wilson Company. The same excellent set of plates is used in this book with popular, concise descriptions of the various flowers instead of the advanced botanical text of the former book.

In 1924, the National Geographic Society published "The Book of Wild Flowers" with 242 color illustrations by Mary E. Eaton, who for years was the staff artist at the New York Botanical Garden, and eight enlarged color pictures of grass flowers by E. J. Geske. This book was a compilation of illustrations, related articles and flower biographies that had been published in the *National Geographic* magazine at various times since 1915. I must particularly commend Miss Eaton's wild flower portraits—they are most excellent and truthful. I own the second edition of 1933, no longer available, but an occasional copy may be found second hand. It is a worthwhile addition to any collection.

Among the rarities in my little collection is "Bog Trotting for Orchids" by Grace Greylock Niles, published in 1904 by G. P. Putnam's Sons. A real orchid enthusiast, she details her adventures and findings on trips through the bogs and swamps where Massachusetts, Vermont and New York meet. She dressed in short skirts, rubber boots and rubber gloves to protect her from poison ivy and sumach and equipped herself with a grubbing tool, vasculum and lunch basket. By following streams and rough woodland paths, this intrepid lady, accompanied by her dog Major, found in that one section nearly all of the orchids native to New England. Her description of the quantities of some of the rare orchids of today makes us, of the present, quite envious.

Picture Guides

One of the handy and very helpful wild flower guides for the beginner was the Chester A. Reed "Flower Guide—Wild Flowers East of the Rockies," published in 1907 by Doubleday, Page & Company, with many subsequent reprintings until the plates were worn out. In spite of the small color illustrations and meager text, this pocket-sized book was greatly liked by beginners because it could be easily carried to the field. Throughout the years it has assisted many thousands to develop an interest in wild flowers.

In 1918 the State Botanist of New York, Homer D. House, finished his "Wild Flowers of New York." This work was published by the State in two volumes with more than two hundred large illustrations in color which have been of great service to the writer. These volumes, with their clear illustrations, are of great value to anyone who must rely on pictures as well as detailed botanical text to clinch identification. The Macmillan Company in 1934 brought out the same work in one volume with the title "Wild Flowers."

With the exception of Schuyler Mathews' "Field Guide," all of the foregoing wild flower books are out of print, although most of them can be obtained in the second-hand book shops. The remainder of this article will be devoted to those that are still in print.

Volumes Still in Print

"The Flower Finder" by George Lincoln Walton, M.D., was published originally in 1914 by Lippincott and has gone through several printings. It is illustrated by the author's own line drawings. The flowers are grouped according to color with necessary descriptions for identification given in simple language.

Although not a wild flower book, the monumental work of Mary Vaux Walcott should be referred to here. Her four hundred or more color plates of North

"Rock Polypody," *Polypodium vulgare,* an illustration facing page 197 of "Flowers and Ferns in their Haunts," by Mabel Osgood Wright, who took this photograph about 1895. It is an excellent example of a fern location close-up, and is a copy made from one of her lantern slides.

American wild flowers represent many years of work. They are beautifully reproduced and the flowers all pictured in scale. Publication of the original de luxe edition in 1925 was made possible by one hundred and forty subscribers, each of whom paid five hundred dollars for the complete work of five volumes. A later and less expensive edition is still available.

In 1931 Joseph E. Harned, a botanist of many years and a resident of Maryland, published his "Wild Flowers of the Alleghanies." This book was very fully illustrated by F. Schuyler Mathews. In addition to all necessary botanical details, its text gives much interesting information dealing with the uses of the individual plant and the flower lore connected with it.

Very early in his developing interest in wild flowers, the writer knew he would not be happy until Britton & Brown's "Illustrated Flora of the Northern United States and Canada" was on his shelves. To all botanists and serious wild flower students, it has for many years been the last word, or, better—the court of last appeal for reference and comparison. This great work in three volumes features more than 4,600 species* in line drawings showing characteristics of the plant and flower. It is quite appalling to realize how few of the total the average interested person can learn to know.

The Latest Books

A recent book, "The Illustrated Encyclopedia of American Wildflowers" by Ethel Hinckley Hausman, published by the Garden City Publishing Company, is a low-priced book. It features one thousand American wild flowers, covering the greater part of the country from the Atlantic to the Pacific oceans. The author gives us five hundred line drawings from her own pen and sixteen full-page color plates by Tabea Hofmann, showing habitat groups of wild flowers that grow near together in certain locales at particular periods. The common and botanical names are indexed and cross-indexed.

Another recent publication, "Wild Flower Guide to the Northeastern and Midland United States," by Dr. Edgar T. Wherry, is a worth-while book for the more advanced student. It has many illustrations in line and color and mentions some five hundred species to be found in the territory covered. Its arrangement is based on the evolution of flower features. The popular name selected for each plant is not always the one most familiar to the average lover of wild flowers.

"American Wild Flowers" by Harold N. Moldenke, published in 1949 by Van Nostrand, is an exhaustive survey of American wild flowers from coast to coast and north to south. It is a splendid book for the more advanced students of wild flowers who would like to extend their acquaintance to cover the flora of all sections of our country, thus enabling them to study the resemblances and differences of species of the same family as they grow in various parts of the United States.

Needs of Today's Nature Student

The foregoing deals with wild flower books treating of the species found east of the Rockies and north of the Carolinas and intended to be used by persons who would like to learn the wild flowers of this large area. Floras which are limited to a specific section of the country and which are more or less technical have been avoided.

After several years' study of the books in his collection, it is the writer's opinion that those published recently leave much to be desired. The older books, through their inspiration and enthusiastic presentation of the joys associated with wild flowering and with sympathy for the problems of the novice, were far more successful in gaining wild flower converts.

In conclusion, it might be fitting to quote from a letter written by John

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* The successor to this work, which has been prepared in recent years at the New York Botanical Garden and is to be published soon, treats around 6000 species. C. H. W.

Burroughs in 1878 to a friend who contemplated writing a popular botany. After suggesting a grouping according to color, he writes, "Also arranged according to their blooming, March, April, May, etc. so that one can identify any flower they find without having to analyze it. The key in botanies is no key at all to most people, but a combination lock. Make the subject clear and easy and your book will be a success."

Teach a child or grown person the names of twenty-five common wild flowers and you will make him desirous of learning two hundred. He will quickly outgrow a simple book and want those more advanced.

NOTICES AND REVIEWS OF RECENT BOOKS

Bluebook of Wild Flowers For Today's Motorist

A TRAVELER'S GUIDE TO ROADSIDE WILD FLOWERS, SHRUBS AND TREES OF THE U. S. Kathryn S. Taylor, editor. 182 pages, drawings by Dorothy Falcon Platt & Dorothy Lincoln Park with 4 illustrations in color; bibliography, index. Farrar, Straus & Co., New York. 1949. $3.

Here is a small book that pioneers a glorious idea. The Automobile Bluebook used to tell of points of interest like historic buildings, a town's chief industry, the spot where a vivid event took place. Duncan Hines has expounded places to eat. Now the Garden Club of America and the National Council of State Garden Clubs, Inc., aim to tell motorists about the most conspicuous flowering plants in every state.

This is too much to put wholly into one book, especially into less than 200 pages. But this Traveler's Guide is a thrilling start. It copes honestly with many problems, such as the seasonal one and how to coordinate the flowers seen, for example, on U. S. Route 40 in Utah with their descriptions in another section of the book.

If the editor had held strictly to the title, she would have had more space for the adventuring motorist who is not primarily seeking notable floral displays and examples of land use. The abbreviated facts about the flowers of the highways and byways from Maine to California are so tantalizing, there ought to be more of them.

Some omissions are hard to understand. Anyone who has driven through the Appalachians in West Virginia and seen fire pink so brilliant in the woodsy roadcuts never forgets this flaming red. The West Virginia pages don't mention it. The motorist along the beaches in Monterey County is arrested by the gorgeous mats of sea-thrift, but where is this in the California section? The riches of the Driftless Area of Wisconsin are not mentioned, although that state has a blank half page.

Since each state is rendered by a different author, there is considerable variation in the handling of the material (Florida, Illinois, New Jersey, Oklahoma are among the best). All material could have been full length. Massachusetts has space for more about its wonderful Berkshire County, which is hardly mentioned. The same is true of Ohio and its unique Hocking County.

But what of this, if the book is a real appetite-whetter? From its pages emerges a vision of a diverse, colorful flora —and one that is accessible. The section devoted to identification of flowers from all the United States is featured by hundreds of eloquent pen-and-ink drawings. Lots of motorists are going to have their eyes opened by this book and increase the pleasure of their travel. May the idea of this trail-blazing book continue to grow and prosper.

RUTHERFORD PLATT.

Phases of Gardening History

GARDENER'S TRIBUTE. Richardson Wright. 254 pages, indexed; bibliography. J. B. Lippincott Co., Philadelphia and New York. 1949. $3.50.

What would be dry history to most of us has a way of springing to life under Richardson Wright's sprightly pen. This is especially true of his latest of many books on gardening, travel and the "contented life."

"Gardener's Tribute" introduces the reader to eight distinct phases of gardening history, each with its special settings and set of characters. Among them are the nineteenth century plant explorer Robert Fortune, France's rose-loving Empress Josephine, Harison also of rose fame, flower painters who contributed to Audubon's bird prints, and old gardening editors. Mr. Wright himself can be considered a modern counterpart of the latter in connection with his bigger job of Editor-in-chief of *House & Garden* magazine.

As explained in Chapter One, called "Anniversary," Mr. Wright gives as his reason (as though he needed one!) for writing this delightful volume "the completion of having given to one small piece of land, one small, north-sloping wedge of Connecticut terrain, thirty years of my best horticultural efforts." And he dedicates each chapter of his tribute book to a different contemporary who has contributed to or shown a particular interest in horticulture. These people are John C. Wister, Robert S. Lemmon, J. Horace McFarland, Elizabeth B. Peterson, Francis C. Coulter, Gertrude Albion Wright, Samuel H. Gottscho, and Mrs. Francis King.

Every ardent gardener and flower lover may well wish his name were on the roster, but will doubtless content himself in enjoyment of a book that is both informative and immensely readable.

ALICE L. DUSTAN.

Zinnias, Marigolds, and More

HOW TO GROW ANNUALS. Ann Roe Robbins. 300 pages, indexed. Illustrated by L. J. Robbins. Macmillan, New York, 1949. $3.50.

"How to Grow Annuals" is an excellent book to recommend to the amateur of the zinnia, petunia, and marigold class who would like to enlarge his scope of annual gardening.

The author has listed twenty-five annuals which she prefers and which are more or less basic. Of these twenty-five she has gone into detail giving history, description, recommended varieties, culture, also uses and plant combinations in handy quick reference form.

There are also brief summaries of other annuals or plants commonly treated as annuals. The appendix contains a list of U. S. Agricultural Experiment Stations and lists of annuals by color and for various other uses.

It has been my observation that amateurs tend to sow seed and plant their tender annuals too soon, and here as elsewhere I find the recommended dates too early for this local area (southwestern Connecticut), which fits better in zone F than E in the given spring and fall frost zone maps.

The beginner will find the suggested border combinations helpful. However, the person who follows the author's recommendations and plants a prominent bed of cleome and edges it, for instance, with ageratum will be greatly disappointed at times with the cleome's midday "sleeping" habit and consequent weedy appearance. This feature is especially bad during a hot dry summer or the next day after a rain.

SAMUEL F. BRIDGE, JR.,
Greenwich, Conn.

Tapestry of Words

THE JOYFUL GARDENER. Agnes Rothery. 274 pages, illustrations, bibliography, index. Dodd, Mead & Co., New York. 1949. $4.

Written in exquisite English and with interesting contrasts — the Hanging Gardens of Babylon finding their counterparts in our twentieth century penthouse gardens — this delightful book sets forth some of the details in the history of gardens and their plants. Humor linked with good advice shows an amazing depth and breadth of knowledge of many types of gardens. There are passages to quote, such as an old lady's advice on choosing a gardener: "Look at his trousers. If they're patched in the knees, you want him; if they're patched in the seat, you don't."

This book compares in workmanship and beauty with the tapestries of bygone days which still are treasured.

"A good book is like a garden carried in the pocket." The Joyful Gardener proves the statement.

The clear strokes of the pencil-drawn illustrations by Lee Vitale give a quality rarely seen today.

ANNE DORRANCE.

Ecological Study

MINIMUM AREAS FOR DIFFERENT VEGETATIONS. Arthur G. Vestal. Illinois Biological Monographs Vol. XX., No. 3, 129 pages. 1949. $2 (paper); $3 (cloth).

It has been known for twenty years or more that the structure of any type of vegetation follows certain mathematical laws. The relation between the size of the area and the number of species, if plotted on a graph, develops a typical S-shaped curve. For each kind of vegetation there should be discoverable an included portion which would be small enough for detailed study but large enough to be satisfactorily representative of the whole. Dr. Vestal locates this area by finding on the species-area curve two points, the upper of which denotes an area exactly fifty times as large and with twice as many species as the lower. An intermediate area one tenth as large as this will then serve well as a representative sample of the vegetation. He has brought together summaries of statistical studies in many kinds of vegetation from all parts of the world and for each of them has computed their representative areas. These range in size from plots less than a meter square in some kinds of herbaceous vegetation, or even smaller in the lichen growth on rocks, up to twenty-one acres in tropical forests, and the number of different species included in them varies from only three up to two hundred.

H. A. GLEASON.

Fresh Approach to Forestry

GREEN GLORY, THE FORESTS OF THE WORLD. Richard St. Barbe Baker. 253 pages, 64 pages of photographs. A. A. Wyn, New York. 1949. $3.50.

For its illustrations alone, which the cover rightly calls magnificent, this book is worth owning. Like a familiar brand of paint, the pictures cover the earth.

The text itself is a vivid running description of the earth's forests, interspersed with interesting comments on individual species and notable individual trees. At frequent intervals the importance of forests, both for what they produce and for what they do, is emphasized. Mr. Baker tells dramatically of evils that have followed deforestation and gives some good accounts of notable restoration projects. With his main thesis, his wide erudition, and his fresh and interesting approach, no one can quarrel.

Unfortunately, this reviewer finds, on matters of detail with which he is most conversant, enough slips to warrant his being exceedingly cautious in using the text as a solid reference. Thus on page 79 trees are credited with absorbing nitrogen from the air through their leaves. On page 227 it is stated that the pine reserves of Mexico thus far have not suffered. On page 129 Christian fanaticism is blamed for the deforestation of Greece, a disaster which had been chronicled by Plato. And on page 31 the hardwood forests of the United States are most inadequately described.

At this critical juncture of history, it is imperative that the conservationist be extraordinarily scrupulous about scientific detail. Working as he does upon matters whose benefits are economically diffused, his only hope of success lies in creating an atmosphere of complete confidence in his advice.

PAUL B. SEARS,
Oberlin College.

Broad Survey of Agronomy

PRINCIPLES OF FIELD CROP PRODUCTION. John H. Martin & Warren H. Leonard. 1,176 pages, illustrated, indexed. Macmillan, New York. 1949. $7.

This large book of five sections gives quite a complete survey of the general field of agronomy, and in addition is written in an attractive manner, one which should provoke the student of agriculture to desire even more information than is presented in the text. Should this be the case, there is an extensive and well selected reference list for each chapter that runs to nearly 1,500 numbers for the text. Furthermore, there are 19 pages given over to definitions of the more difficult and unusual agronomic terms.

On the whole, the new text is a decidedly valuable contribution to the agricultural field in general, and particularly to a better understanding of the produc-

tion of our field crops in such a way as to leave our soils fertile and productive for future generations.

HENRY DORSEY,
University of Connecticut.

Crop Coverage

POTATO PRODUCTION. E. V. Hardenburg. 210 pages, illustrated, indexed. Comstock, Ithaca, N. Y. 1949. $3.

Written primarily as a college text, this book covers the field of potato production well. It should also be of value to growers and handlers because of the information contained on culture, storage, and marketing quality. In addition to these practical factors, it presents technical information on the botany and breeding of potatoes and also adequately covers the major diseases and insect pests.

The description of the many potato varieties now commercially being grown is most complete, and the references will be of great help to students. Clearly written, the book is also excellently illustrated and serves well the purpose for which it was prepared.

JOHN C. CAMPBELL,
Rutgers University.

Birth of U. S. Forestry

BREAKING NEW GROUND. Gifford Pinchot. 522 pages, illustrated with photographs and cartoon reproductions, indexed. Harcourt, Brace, New York. 1947. $5.

Pinchot's autobiography covers the period in his life from 1885, just before he entered college to study forestry at his father's advice, to 1910, when he was dismissed as Chief of the U. S. Forest Service by President Taft. The intervening years cover Pinchot's forest training in Europe; his appointment in 1898 as Chief of the Forestry Division of the U. S. Department of Agriculture, which in 1905 under his direction became the U. S. Forest Service; the Conference of Governors called by Theodore Roosevelt, which formally inaugurated the "conservation movement"; and the fight between the conservationists and the "interests" for control of public lands and natural resources in the West and Alaska.

Pinchot was dedicated to the activities in which he engaged, and he had a lasting influence upon them. Some of the principles upon which the Forest Service still relies took form very early in Pinchot's mind. In his student days he became convinced of the need for Government control of all timber cutting, both public and private, "a conviction," he writes, "which has grown steadily with the years and was never as strong as now." He saw the ownership of natural resources and their management as a great political and moral issue. "Conservation is a foundation of permanent peace among nations, and the most important foundation of all." He writes fervently of both forestry and conservation, and always spells those words with capital letters. He reveals himself as a religious man and a fighting crusader. He was well acquainted with the political leaders of his day and credits many of them, especially President Theodore Roosevelt, for much of his success.

Although the book is largely an account of the development of the Forest Service and the subsequent fight over Government control of public lands possessing coal, timber, or water power sites, the author interleafs personal anecdotes and spares no opinion of those with whom he dealt. It is a frank and plainly written account that expresses a forthright and fearless life. The latter third of the book is heavy with detail, as if Pinchot wished to keep the record straight about the controversy over control of public lands in Alaska which cost him his job. It is well to have a first-person record from the man who played such an important part in the outcome of this controversy and attendant events.

The book should be read for what it is —an eyewitness account of events by one who was very much involved in those events. The author states in a prefatory note that the quotations he cites are often given in part, without deletions indicated, so that the full context of the numerous quotes is always in doubt. There are some errors in fact, for example, the statement (p. 319) that the Federal agency of 1905 that dealt with soil surveys was the forerunner of the present Soil Conservation Service. No one interested in forestry or conservation in this country, however, can fail to find a great deal that will interest him in this account of our early efforts in those fields by one who had so much to do with them. The work is an important contribution to the history of resource-use in America.

EDWARD H. GRAHAM,
Chief, Biology Division,
U. S. D. A. Soil Conservation Service.

California's Giants

TREES OF YOSEMITE. Mary Curry Tresidder. 134 pages, 34 linoleum block prints by Della Taylor Hoss; bibliography, glossary, index. Stanford Univ. Press, Stanford, Calif. Second edition 1948. $3.

The block prints which were the inspiration for this volume are an inspiration to the reader as well. But they are by no means the meat of the book; they are the appetizer.

For anyone visiting Yosemite National Park, this book is an indispensable guide to the trees of every trail. The habitat of every species is given and many individual specimens are located. The book carries the authority of one who was born and brought up in the park and who thus has had the opportunity of a lifetime of intimate acquaintance with Yosemite's magnificent trees.

SEQUOIA AND KINGS CANYON NATIONAL PARKS. John R. White and Samuel J. Pusateri. 212 pages, illustrations, bibliography, index. Stanford Univ. Press, Stanford, Calif. 1949. $3.

All the information that a traveler or camper might wish to have seems to be given in this volume devoted to Sequoia and Kings Canyon National Parks in California. The sequoias themselves occupy a section of the book; other trees, shrubs, and herbaceous plants, including ferns, also the birds and four-footed animals are listed with brief descriptions. Past and present of the parks are fully described. Trails are mapped and are described from mile to mile. All the needed suggestions and regulations for visitors to the parks are provided.

REDWOOD COUNTRY. The Lava Region and the Redwoods. Alfred Powers. 292 pages, indexed. Duell, Sloan & Pearce, New York. 1949. $3.50.

Alfred Powers' book on the Lava Region and the Redwoods is a volume in the American Folkways series. It is prefaced with Walt Whitman's "Song of the Redwood Tree" and opens with an account of the discovery of *Metasequoia,* known as the "dawn redwood." The history of the region which extends from central Oregon to central California and east as far as the corner of Idaho and the northern half of Nevada is carried just past the middle 19th century. There are dramatic tales woven in with the fokelore and botany of this vast area.

THE STORY OF CALIFORNIA BIG TREES. Howard E. Davenport. 44 pages, illustrated. Calaveras Grove Assn., Stockton, Calif. 1949. $1.

This paper-covered booklet has been prepared in the interest of the Calaveras Grove Association, which is attempting to acquire the southern Calaveras Grove to add to the present area of the state park.

CAROL H. WOODWARD.

Floristic Studies

THE FLORA OF THE ERIE ISLANDS. An Annotated List of Vascular Plants. (Contrib. No. 9) Earl L. Core. 105 pages, illustrated, indexed. Ohio State Univ., Franz Theodore Stone Laboratory, Put-in-Bay, Ohio. 1948.

Forty photographs and maps illustrate this annotated list of the vascular plants of a group of islands whose history goes back to 1679 when French explorers first named one of them "Isle des Fleurs." Since 1896 the number of species recorded has grown from 612 to around 1,000. A generous section of the report is devoted to ecology.

THE FERNS OF MAINE. Univ. of Maine Studies, Second series, No. 62. Edith Bolan Ogden. 128 pages, illustrations, glossary, bibliography, index, map of Maine. Univ. of Maine Press, Orono, Maine. 1948. $1.

Each fern specimen that has been studied is listed. The principal forms are illustrated and keys are provided for families, genera and species. The use of bold-face type for botanical names in the keys, for counties where specimens have been found, for authors' names in the bibliography, and for the principal page reference in the index is of great aid in locating information in the book.

Philodendron Friendship

THE PLANT IN MY WINDOW. Ross Parmenter. 148 pages with drawings by the author. Thomas Y. Crowell Co., New York, 1949. $2.50.

An account of the unique friendship between the author and an abandoned little plant — both exiled to the sahara of a modern city — is given here. The graphic description, the growing understanding of plant life and its relationship to human existence, all these make the reading of this little book a delightful experience.

It so happens that "The Plant in my Window," *Philodendron scandens,* is by far the most valuable addition to our list of "fool-proof" houseplants within the last 20 years. Its introduction about 1930 was accidental — it arrived with a shipment of orchids from Colombia at the Missouri Botanical Garden, and has since taken the country by storm.

WERNER LIEB,
New Rochelle, N. Y.

Background of African Crops

AGRICULTURE IN THE SUDAN. J. D. Tothill, editor. 974 pages, illustrations, maps, diagrams, tables, bibliography, index. Oxford University Press, London and New York. 1948. $10.

This book is written in non-technical language, and 28 different agricultural experts have co-operated in preparing the various chapters on the archaeology of agriculture in that region, and on climate, geology, soils, transport, land tenure, revenue from land and crops, and the fractionation of land, as well as doing special chapters on education and nutrition.

Another large section of 450 pages deals with crops, weeds, locusts, irrigation problems, animal husbandry and foodstuffs, and fertilizers and manures. The late Dr. F. Crowther contributed two chapters on the organization of experimental work and in a review of such work (154 pages) he summarizes the main discoveries made in agricultural research in that region. The final chapters are devoted to agriculture in each of the seven provinces, each written by a different agricultural expert.

Scientists of all kinds, including nutrition experts, will find much of interest in this mine of information. Even the non-expert, anxious to study African conditions and life, will find a great deal of interesting and useful material, and the figures themselves give one a good idea of the background of the country.

There are bibliographies of publications on Sudanese agriculture itself, and also on agricultural research in that region, followed by a glossary of Arabic and vernacular words by Dr. Tothill. The book has a useful 17-page index.

F. R. IRVINE,
London, England.

Introduction to Trees

FAMILIAR TREES. William Alphonso Murrill. 174 pages, illustrated; paper covers. Published by the author, Gainesville, Fla. 1946. $3.

The title, the dedication (to the Boy Scouts of America), and the preface indicate the character of this book, which, Dr. Murrill states, he has written especially for persons living east of the Rockies.

Part I is a Cinderella-like story in which a dryad, guardian of the trees on a Virginia farm, acts as fairy godmother, and a young forester, a graduate of Cornell, plays the part of prince. A simple plot makes this introduction to trees suitable for upper elementary school grades.

Part II discusses specific trees of the northern states in simple language. Besides the usual details of quantity, distribution, characters, etc., Dr. Murrill has collected much additional teaching material useful in junior high school grades and of interest to adult readers, such as history of the species in this country, uses, famous or unusual examples, meaning of names, legends, and superstitions.

Among the most interesting items here are recollections of his boyhood contacts with certain trees. The text is illustrated with photographs showing habit, bark, leaves and flowers.

Southern trees, native and exotic, are represented in lists or brief descriptions.

The last chapters summarize useful trees, poisonous species, and tree worship. An excellent list of source books and regional texts is appended.

MARY F. BARRETT.

Notes, News, and Comment

Cover Picture. The orchids shown on the cover of this month's Journal are one of many paintings made at the New York Botanical Garden by Gertrude Lawrence Berger. In a recent exhibit of 56 oils and watercolors shown at the Barbizon-Plaza Art Galleries, 31 had been created at the Garden. Mrs. Berger's paintings are now on view at the Washington Square Inn, 1 University Place, New York City.

Living near the New York Botanical Garden, Mrs. Berger for the past eight years has visited the grounds and greenhouses almost daily, painting both indoor and outdoor subjects

Gift of Green. The Garden's sound and color motion picture, "The Gift of Green," has been placed in 91 school and institutional libraries in all parts of the United States and in Hawaii for free distribution. Reservations for the film may be made by writing to Sugar Information, Inc., the organization which, under the name of the Sugar Research Foundation, financed the production of the film for the New York Botanical Garden. The address is 52 Wall St., New York 5, N. Y.

Gold Medal. Mary E. Eaton, who was Artist on the Garden's staff from 1911 until 1932, was awarded the Grenfell Gold Medal by the Royal Horticultural Society in London for a two-day exhibit of her paintings early in the year. This award, it is said, is generally given for living plants, seldom for a group of paintings. While at the Garden Miss Eaton painted many plates for *Addisonia*. She also illustrated several wild flower guides, and much of her work, which depicted almost entirely native American plants, appeared as well in the *National Geographic*.

Advisory Council. Two new members were elected to the Advisory Council of the Garden by the Board of Managers Dec. 20. They are Mrs. Montgomery B. Angell and Mrs. Donald B. Straus, both of New York City.

Meetings. In Philadelphia Feb. 17 and 19, Dr. William J. Robbins attended meetings of the Research Committee of the American Philosophical Society and the Board of Trustees of *Biological Abstracts*. In Washington Feb. 11, Dr. H. W. Rickett attended a conference on Co-operative Efforts in the Publication of Original Scientific Research. The meeting was called by the National Research Council.

Staff Conferences. Howard C. Reynolds, a graduate student at the Garden and graduate assistant in the Department of Botany at Columbia University, addressed the staff conference Feb. 14 on "Mexican Wild Flowers and Culture." His talk was illustrated with kodachromes which he took while serving as instructor on a field trip last summer for students of Texas A. & M. College.

On Mar. 16, Dr. Geneva Sayre, Chairman of the Biology Department of Russell Sage College, Troy, N. Y., spoke on "Taxonomic Problems in Mosses."

Lectures. T. H. Everett was the speaker at the February meeting of the Horticultural Society of New York. His topic was "Pilgrim Plants in American Gardens."

Richard S. Cowan addressed the Worcester County Horticultural Society Feb. 23 on "Hawaiian Scenes and Flowers." The affiliated Garden Circle of New Rochelle heard Mr. Everett speak on "Begonias" Jan. 3, and the Working Gardeners of Bronxville, another affiliated club, heard Dr. H. N. Moldenke Jan. 31 on "The World in my Garden."

Pacific Plants. Sidney F. Glassman, graduate student at the University of Oklahoma, began three months of work in the Garden's herbarium in February. Preparing material for his doctor's degree, he is identifying plants he collected during the war on the island of Ponape in the Pacific.

Bequest. A gift of five hundred dollars has come to the Garden through the will of Martha Prentice Strong, a life member, who died Oct. 28. Interested particularly in the daylily breeding work of Dr. A. B. Stout, she stipulated that the disposition of the fund be determined through consultation with him.

Rare Books. Early botanical and horticultural works have recently been added to the Botanical Garden's library through the estate of Adolph C. Hexamer, whose grandfather, Dr. Frederick M. Hexamer, died in Stamford, Conn., in 1909. Dr. Hexamer had amassed a large library of botanical and horticultural works, among the most valuable of which were volumes that he brought with him as a young man from Switzerland. The books selected by the Garden were acquired from his granddaughter, who gave the institution first choice of the contents of the library.

Born in Germany in 1833 and educated in both medicine and botany at Zurich, Switzerland, Dr. Hexamer came to the United States shortly after the middle of the century. After a few years of medical practice in New York City, he abandoned this career in favor of the nursery business, and for many years raised crops on a large part of what is now the real estate development known as Lawrence Farms between Chappaqua and Mount Kisco. In Bailey's "Cyclopedia of Horticulture," M. G. Kains has mentioned Hexamer's business of raising new varieties of plants to be distributed as premiums by the New York *Tribune*

Dr. Hexamer wrote extensively, and in 1885 became editor of the *American Agriculturist,* extending his influence through this journal for some twenty years. He also edited books for the Orange Judd Publishing Co. and wrote one volume on asparagus culture.

Known as a powerful force in the horticultural and agricultural associations of his period, Dr. Hexamer is also recognized as the first man to grow strawberries on a commercial scale for the New York market. In 1876 he won an award at the Centennial Exposition in Philadelphia for an exhibit of 550 named varieties of potato.

Collections of alpine plants which he made in Switzerland shortly before he came to America are deposited in part in the New York Botanical Garden's herbarium.

Coltsfoot and Coal. Commenting on the article by Leonard J. Buck on "Association of Plants and Minerals" in the Journal for December 1949, Mrs. Frances R. Williams of Winchester, Mass., writes that coltsfoot (*Tussilago farfara*) likes coal.

"I have often got coltsfoot roots in Salem, Mass.," she says. "The plant was probably brought there by the early settlers, for it grows around their old mill pond and early harbor. The huskiest, thickest roots are those that grow in the freight yard, right along the track, where coal has been spilled and plenty of cinders are gathered.

"I grow it in my shaded yard, where it makes a good ground cover. But I have watched it elsewhere and the plants in the freight yards are the best."

Mrs. Williams quotes from Eleanour Sinclair Rohde's book, "A Garden of Herbs," page 57: "In other parts of Scotland there is a curious belief that where coltsfoot grows abundantly, it indicates the presence of coal."

Havemeyer Lilac Collection Presented to Garden

SPRING finds the first of the lilacs in the Havemeyer Memorial Lilac Planting set in place in a newly landscaped area north of the Rose Garden. The plants are the gift of Mrs. Theodore A. Havemeyer from the large collection developed by her husband, who died July 30, 1936, at Brookville, Long Island. For the establishment of the lilac planting as a memorial to her husband, Mrs. Havemeyer has contributed $20,000 to the New York Botanical Garden.

The Havemeyer estate, Cedar Hill Nursery, contained one of the country's

outstanding collections of lilac species and varieties, particularly of the hybrids developed by Lemoine in France. From this collection, 550 lilacs have been selected by the Botanical Garden. These were moved from Long Island to the Garden last fall and heeled in for the winter. Planting out was begun in March.

The new lilac planting, which has been designed by Marian Cruger Coffin, is being made a continuous unit with the Rose Garden, the present road between the two plantings being eliminated. The total area is about five acres. Two large beech trees have been moved from the region of the magnolia collection. The lilacs are being irregularly grouped around a lawn in the west-central portion of the area.

Two sitting areas now being built will provide pleasant views of both the Lilac and Rose Gardens, and at the southern end of the Rose Garden a shelter is being constructed. Working in co-operation with Miss Coffin has been Henry F. du Pont, Chairman of the Garden's horticultural committee, who has contributed toward the expense of the sitting areas.

Rules for Developing a Worthy Garden Suggested by Lord Aberconway

FOUR precepts for the development of a garden of permanent value were offered by Lord Aberconway, distinguished English horticulturist, in an address to members of the New York Botanical Garden and their guests at the New York Genealogical Society the afternoon of March 9.

"*First,* if you want your garden to go on" he said, "let your children have a hand in it."

"*Second,* let the garden be properly designed from the start. Don't let it be just a collection of fortuitous plants." Then, he emphasized, one should adhere to the plan and not let one's favorite flower or most abundant plant overrun the landscape.

"*Third,* when you have a first-class plant, have a good display of it; make a first-class showing of it."

"*Fourth,* in your main planting have a number of rare plants."

In the interest of bringing more new plants into gardens, Lord Aberconway said that he hoped for new rulings on both sides of the Atlantic that would permit the entry of rare plants of special interest with less formality than at present. The plant quarantine regulations, he pointed out, while designed to keep new insect pests and plant diseases out of each country, have also kept out many worthy plants by letting them die during the process of inspection.

At his home at Bodnant, North Wales, Lord Aberconway has outstanding collections of rhododendrons, camellias, magnolias, gentians, orchids, and other plants, with some of which he has done some significant work in breeding. From 1921 to the beginning of 1950 he was President of the Royal Horticultural Society, an organization whose membership grew from 33,000 to 36,000 during the last year of his presidency.

A Commander of the British Empire, Lord Aberconway also holds a Victoria Medal of Honor in Horticulture, which may be held by only 63 persons, the number representing the years of Victoria's reign. The Doctor of Laws degree attached to his name he claims to be the only LL.D. ever given in appreciation of a garden. It is an honorary degree bestowed on him in Wales.

Immediately preceding the Members' Day meeting, Lord Aberconway was the luncheon guest of the Volunteer Associates of the New York Botanical Garden, with the press attending, and the evening before he was guest of honor at a dinner given for outstanding horticulturists of the New York area, by the Board of Managers and the Advisory Council.

Exhibit on Tulip and Rose in Design Brings Gold Medal to Garden

FOR an exhibit entitled "The Tulip and the Rose in Design" the New York Botanical Garden was awarded a gold medal at the International Flower Show in New York March 20-25. The exhibit, which measured forty feet in length, was presented as a sort of collector's garden, with beds of tulips and roses dominating the foreground. On either side, at the rear, were glass shelves containing objects representing several centuries of art and craftsmanship, in which roses and tulips figured as the decorative element.

Among the objects shown were Italian brocades, flower-covered dishes and vases from many countries of origin, urns, lamps, metal ornaments, permanent bouquets made of papier-maché, wax, and shells, a dog and cat in Meissen ware adorned with flower patterns, and numerous other articles. At the center background were lengths of textiles, chiefly brocades of historic interest, lent by Scalamandré, and a chintz provided by Brunschwig et Fils. The rose and tulip wallpapers which formed the background for the two sections in which the objects were displayed was a gift of Nancy McClelland, Inc.

Many individuals lent personal property for the exhibit. More than half of the remaining articles came from Elinor Merrill, Antiques, of New York City. Other firms which contributed by loans to the display were French & Company; Molla, Inc.; Ruth McCracken; and Mr. John, Inc., all of New York City.

The exhibit was principally arranged by Mrs. Charles Burlingham, who as a volunteer worker has been in charge of the Garden's museum exhibits for the past two years or more. The Garden's Flower Show committee consisted of T. H. Everett, chairman; A. C. Pfander, vice-chairman; E. J. Alexander, Mrs. Charles Burlingham, Mrs. W. Redmond Cross, Elizabeth C. Hall, Mrs. O'Donnell Iselin, H. W. Rickett, Mrs. Wallace Whittaker, and Carol H. Woodward.

Near the Garden's exhibit the Volunteer Associates maintained a money-raising booth, where books, subscriptions, herbs, sachets, and other articles were sold.

A booklet on "The Tulip and the Rose in Design" was prepared for distribution at the Flower Show. The remaining copies will be mailed to anyone sending his name and address and a three-cent stamp in care of this Journal.

"Green Thumb"—Where Did it Originate?

A dozen or more dictionaries, encyclopedias, and other reference works have failed to reveal the origin of the term "green thumb" in its application to a natural ability for growing plants successfully. Yet the phrase is in constant use. Morgan T. Riley, author of "Dahlias, What is Known About Them," who has been searching for the source of the term, has brought his query to the New York Botanical Garden, after having learned that the Research Department of the New York Public Library had been unsuccessful in tracing the origin of the words beyond an allusion to their use in England and Wales in the early 1800's.

Clues on the origin of "green thumb" will be welcomed by the Journal of the New York Botanical Garden.

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

Membership in
THE NEW YORK BOTANICAL GARDEN
and what it means

TO THE INSTITUTION, membership means support of a program that reaches several hundreds of thousands of persons annually.

Briefly, this program comprises (1) horticultural display, (2) education, (3) scientific research, and (4) botanical exploration. To further this work and to disseminate useful information about plant life to the public, the Garden issues books and periodicals, both scientific and popular, and presents lectures, programs, radio broadcasts, and courses of study in gardening and botany. The laboratories and large herbarium and library serve the staff in its research and educational work, while the extensive plantings at the Garden give the public vistas of beauty to enjoy the year around. The public is also free to use the Botanical Garden's library, and, under direction, to consult the herbarium.

TO THE INDIVIDUAL, membership means, beyond the personal gratification of aiding such a program, these privileges:

Free enrollment in courses up to the amount of the annual membership fee paid.

A subscription to the Journal (published monthly) and to Addisonia (issued irregularly).

Admission to Members' Day programs and use of the Members' Room also at other times.

A share of plants when made available for distribution. (These plants may include the Garden's new introductions into horticulture.)

Personal conferences with staff members, upon request, on problems related to botany and horticulture.

Free announcements of special displays, lectures, broadcasts, programs, and other events.

A membership card which serves as identification at special functions at the Botanical Garden and also when visiting similar institutions in other cities.

* * * *

Garden clubs may become Affiliate Members of the New York Botanical Garden, and thus receive certain privileges for the club as a unit and others for individual members. Information on Garden Club Affiliation will be sent upon request.

Business firms may become Industrial Members of the New York Botanical Garden. Information on the classes of Industrial Membership and the privileges of membership will be sent upon request.

* * * *

Classes of membership in the New York Botanical Garden in addition to Industrial Memberships are:

	Annual Fee		*Single Contribution*
Annual Member	$ 10	Member for Life	$ 250
Sustaining Member	25	Fellow for Life	1,000
Garden Club Affiliation	25	Patron	5,000
Fellowship Member	100	Benefactor	25,000

Contributions to the Garden may be deducted from taxable incomes.

Contributions to the Garden are deductible in computing Federal and New York estate taxes.

A legally approved form of bequest is as follows:

I hereby bequeath to The New York Botanical Garden, incorporated under the Laws of New York, Chapter 285 *of* 1891, *the sum of*_____.

Gifts may be made subject to a reservation of income from the gift property for the benefit of the donor or any designated beneficiary during his or her lifetime.

All requests for further information should be addressed to The New York Botanical Garden, Bronx Park, New York 58, *N. Y.*

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MORELS IN MAY

SPRING FESTIVAL

at

The New York Botanical Garden

May 10 - 14, 1950

Wednesday, May 10 *Pan-American Day*, with exhibits of exotic flowers flown in from Pan-American countries.

Thursday, May 11 *Garden Club Day*, with special tours arranged around the grounds and buildings.

Friday, May 12 *Netherlands Day*, with a program for school children in the morning and a tulip specimen show and program in the afternoon.

Saturday, May 13 *Bronx Neighborhood Day*, with square dancing on the lawn following the showing of "While the Earth Remaineth" in the afternoon.

Sunday, May 14 *Your Garden Day*, with John Kieran and James J. Lyons among the speakers at an afternoon program with band music.

FREE SATURDAY PROGRAMS

3 p.m. in the Lecture Hall

May 6	***Fenlands, The Grassy Shires,*** and ***Gardens of England***	Three motion pictures
May 13	***While the Earth Remaineth***—A motion picture with symphonic background	*Frank E. Gunnell*
May 20	***Plants for the Terrace***	*Joy Logee* Danielson, Conn.

MORELS IN MAY

(The cover picture)

Believed by many to be the tastiest of all mushrooms growing wild, the morel (*Morchella esculenta*) is the first edible fungus sought in spring by mycophagists. In conifer woods in the vicinity of New York, it can often be found in abundance during May.

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JOURNAL

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CAROL H. WOODWARD, Editor

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Truffles

Subterranean Treasures for the Epicure and Botanist

By Donald P. Rogers

FOR some two thousand years in the civilization of western Europe, whenever cooking has reached the dignity of an art, the truffle has been without a peer among resources for the epicure. It is no new thing that truffles have been granted popular acceptance as the special symbol of the gourmet, for so it was in Rome in classical times, and so again has it been ever since the French and Italian renaissance. Only during those ages when neither learning nor manners nor gastronomy has been held in wide esteem have truffles been ignored by men and left to those humbler animals who always know good food when they smell it.

An object less luscious in appearance would be hard to imagine. Truffles grow completely buried in the soil. They are usually irregular in shape and lumpy or warted on the surface; and whether pinkish or ochre-colored, as are many of the less highly flavored species, or brown to black, as are the kinds more greatly esteemed, they wholly resemble small stones. The resemblance is, in fact, so complete that one digging truffles in stony soil has to discard many likely looking pebbles for every truffle that he finds.

Although men with sufficient persistence and luck in finding a favorable area may collect truffles unaided, the most successful means of uncovering them is provided by animals, pigs or more commonly dogs, whose keener sense of smell enables them to locate the buried treasure without the aimless digging and the endless unfruitful excavations of a man with a trowel. The animals are specially trained for the purpose, and people who gather truffles for the market rely on them wholly.

From the days of Theophrastus, the great Greek botanist, and Pliny, the Roman naturalist, down to modern times the nature of truffles has been a subject of conjecture and fantastic invention. Theophrastus recognized them as vegetables; but his successors for many centuries rejected his judgment. For most of two thousand years truffles were held to be special

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formations *of*—not merely in—the soil, perhaps more like concretions than anything else; they were believed to be brought into existence in one way or another by the action of warmth, rain, and thunder. Occasional naturalists considered them to be tumorous outgrowths of the roots of trees. The first real knowledge of the nature of truffles resulted early in the eighteenth century from the studies of the greatest of Italian botanists, Micheli, who recognized that they were fungi and gave them their proper place in scientific classification. From his work and that of his successors it is known that truffles are mushrooms—that is, the fruits of fungi—closely related to the well known and greatly esteemed sponge mushroom or morel; that they live in association with the roots of various trees, from which they derive their food and to which they apparently yield up materials used by the tree in its growth; and that the spores, which in all fungi serve the same function as seeds, are scattered by insects or small animals that are attracted by the odor of the truffles and use them as food.

Truffles are commonly thought of as a product of Mediterranean lands, chiefly France and Italy; and it is true that they are nowhere else systematically gathered for the table. They occur, however, throughout the north temperate zone; and more than sixty kinds grow in North America. Most of these are known chiefly or only from the west coast states—Oregon, Washington, and northern California –in part because truffles seem to be more abundant there, and in part because the native ground-squirrels provide by their food-hunting excavations a hint of places where truffles may be growing. Of the few truffles found in the eastern states, most have been unearthed by botanists who were digging for something else. So great has been their rarity in the east that those truffles that have been collected have been preserved as objects of scientific study and have found their way into botanical museums. All of their qualities are better known than their taste, since it would be sacrilegious for a botanist to eat his specimens. There are, nevertheless, some American species, dark and aromatic, which deserve all of the praises that have been spent on their Mediterranean kin. And at least one of these, *Tuber dryophilum*, has been found most abundantly in the east.

It would be expected, judging from European experience, that such a species could be collected successfully by the use of trained dogs; and so it has proved. For two brief periods a New Yorker, Mr. Lorenzo Robba, has had the benefit of the superior nose and European education of an imported truffle-dog, and both times their collaboration has produced fair numbers of excellent truffles. Other hunters, lacking a dog's assistance, have succeeded in getting mostly pebbles. Both gastronomes and botanists would be aided in their respective pursuits by the activities of this specialized sort of field-dog.

* * * *

Next month Dr. Rogers will tell about the training of truffle hounds.

Bergen Swamp, Western New York's Haven for Rare Plants

By W. C. Muenscher

All photographs by the author

BERGEN Swamp [1] is a relatively primitive area in the midst of a highly developed agricultural region. Located in Genesee County, a little more than 20 miles from Rochester, it is within a few hours ride by motor or rail from the principal centers of population, industry, and higher education in western New York State. The strategic, as well as vulnerable, position of this unique remnant of natural history associations has been recognized for some time, and in 1936 a small group of interested individuals in and about Rochester formed an organization [2] to attempt to save the swamp from destruction.

Naturalists have roamed over Bergen Swamp for at least a century. Some of the rarest plants in New York State have been known from there since its early exploration; others have been discovered there in more recent years. For some plants Bergen Swamp is the only known habitat in New York State.

The part of Bergen Swamp that is best known to naturalists consists of an open marl bog area surrounded by a belt of forest and swampy thickets. While the marl bog is an extensive and interesting feature of the swamp it represents not a static but a dynamic area, the uniqueness and persistence of which are highly dependent upon the surrounding physiographic features and the types of plants that these support.

A distinctive element in the vegetation encircling the open marl bog is the dense white-cedar or arbor-vitae thicket. The durable wood of the trunks of these trees is so highly prized for posts that, unless their ex-

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[1] The G in Bergen is pronounced with a J sound.

[2] Incorporated under and chartered by the Board of Regents of New York State, the aim of the Bergen Swamp Preservation Society, Inc. is "to preserve inviolate for all time in their natural state the lands known as Bergen Swamp; to conserve the flora and fauna of the lands owned by or under the control of the Society; to offer to schools and colleges and other properly accredited students or groups of persons access to the swamps and forests of the Society for the purpose of observation and study; to publish from time to time scientific and cultural information covering the biology and wild life of the areas controlled by the Society."

At this time, February 1950, the Society has an active membership of about 110, has obtained title to about 360 acres of swamp land and has aims of acquiring about 1,200 to 1,500 additional acres.

Anyone interested in the conservation of Bergen Swamp may write to Dr. Babette I. Brown, Corresponding Secretary of the Society, Prince Street Campus, University of Rochester, Rochester 7, New York, requesting the leaflet entitled "Bergen Swamp — Some Questions and Answers."

The Varied Moods of Bergen Swamp

WITH crows cawing ominously in the distance and turkey buzzards circling overhead, the densely wooded acres of Bergen Swamp that are visible from the south present an eerie aspect. But once the swamp itself is gained and you stumble through a wall of burgeoning gray dogwood into a slough encircled by new green and russet fronds of cinnamon fern, the evil spell is broken. One enchanting sight after another lures you to proceed, through myriad white trilliums and carpets of wild ginger, to dim, moss-covered deer trails bordered with violets, columbine and foam-flower.

Look closer at the oozing path to see the mosaic of a dozen different leaves of springtime green. Look up to catch the brilliant flash of a scarlet tanager. Look ahead, and pinkster flower holds the eye, then, caught in patches of sunlight filtering down through the hemlocks, a magenta mass of fringed polygala.

Walk off the path to the left in the direction of an oven-bird's call, and a cluster of large downy yellow lady-slippers, just beginning to open, will unexpectedly burst into view. Try to retrace your steps, get lost, and find your reward in a glimpse of pink lady-slippers in an open spot.

To climax all, swing back among the cedars and suddenly before you, in another clearing, dozens of the tiniest of lady-slippers stand against the blue-berried boughs of creeping juniper. Their small white waxy pouches glistening in the sun provide a rarer, yes, and fairer, sight than Wordsworth's daffodils.

Less than five square miles in extent, Bergen Swamp seems but a drop in the bucket compared to the 49,000 square miles of New York State, yet this region offers more of beauty, interest, and diversity than many a natural area of greater size. It is of such infinite variety that no matter what the man or his mood, he can find something among its treasures to which he responds.

Let him come weary with mental exertion to Bergen Swamp in spring, when the paths are running rivulets, traverse its breadth in apparent search of something never seen before, and he'll be granted sound sleep that night from the sheer physical exertion put forth to meet his goal.

Later, in the hot summer, cool shade and colorful fungi await one's advent to the deep woods of the swamp. For complete solitude, you may wander into a "marl room" carpeted with creeping juniper and walled by dense white cedars. If you would explore, but with a minimum of physical effort, the fund of cryptogamic plants on almost any fallen tree will hold you wrapt for hours.

Be the world cold and lonely in November, you will find warmth and friendliness among the hemlocks of the swamp with their companionable chickadees.

Professor Walter C. Muenscher of Cornell, who probably knows more about this cherished swamp than any other person, and who for more than thirty years has found it a fascinating place to visit during every month and in all kinds of weather, in the following pages reports some of its highlights.

BABETTE I. BROWN.

CEDAR POSTS FROM BERGEN SWAMP

The exploitation of arbor-vitae (locally called cedar) is the greatest single danger to the preservation of this important natural area of western New York State.

ploitation can be halted, the most characteristic regions of the swamp are in serious danger of destruction.

In order to give you a little idea of what can be seen in Bergen Swamp I will take you on an imaginary trip entering from the south side and following a very zig-zag route, really not a path at all, and leaving it by the north side.

Bergen Swamp is readily accessible from the slightly higher ground on the south, where a car can be driven to within 100 yards of its margin. Through an old abandoned woods trail the rim of hardwood forest of birch, maple and elm is easily crossed to the edge of the arbor-vitae belt which varies from scattered trees, shading a cool moss-carpeted floor, to a dense, almost impenetrable thicket of small trees of various sizes depending upon how much time has elapsed since the area has been disturbed by wood cutters. After the arbor-vitae belt has been crossed by walking, crawling, or wading, we approach the most interesting part of the swamp, the open marl bog areas.

Frequently covered with several inches of water, these open marl areas are dominated by several kinds of sedges, bulrushes, and twig-rush, among which the fragrant arrow-grasses, the false asphodel, the club-rush and spike-rush [3] and also *Zygadenus chloranthus,* are common.

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[3] Botanical names of all plants mentioned are listed at the end of the article.

In the shrubby border of the marl and on the higher, better drained, secondary marl, mats of creeping juniper form a background in May for the small white lady's slipper, which is represented here better than anywhere else in New York State. On still higher areas, in late summer, the tall, flat-topped Ohio goldenrod is abundant and Houghton's goldenrod, smallest of them all, is found in the best stand known in New York State. Dwarfed tamaracks, 100 years old but only a few feet high, present a pleasing landscape with clumps of low-growing autumn willow and shrubby cinquefoil.

On the moist moss-covered turf in the shade of arbor-vitae, large masses of blue and white violets abound, the dwarf dewberry and star-flower are everywhere, and the miterwort thrives along moist stream borders. In open glades, where the sun penetrates among the arbor-vitae trees, several shrubs including swamp honeysuckle, bayberry, and swamp buckthorn, form a border around little copses, protecting clusters of yellow lady's slippers. A little later the showy lady's slipper rears its regal blossoms in boggy glades protected by shade part of each day. A wild valerian closely resembling garden heliotrope forms a showy border with grass-of-Parnassus along the edges of pools in partial shade.

Scattered among the open marl areas occur many hummocks, often only a few yards in diameter, areas raised about a foot or two above the surrounding marl, and covered with a dense mat of sphagnum mosses. These moss beds form the bases for beautiful arrangements and designs of color, form and texture. Several shrubby creepers contributing to these little natural plantings include the small cranberry, twin-flower, the creeping snowberry, bunchberry, and wintergreen. There are also the higher bushes, Labrador tea, huckleberry, and several blueberries.

Among the evergreen creepers, sometimes not without considerable competition, the shy little sundew thrives in abundance and the pitcher plant adds color by its reddish and persistent spreading leaves. Scattered individuals of orchids contribute their color in season. The showy white clusters of cotton grass and the flowers of the false asphodel, followed by their reddish capsules, and the dwarf species of false Solomon's seal always add interest.

After this introduction to the middle of the swamp, we shall leave it by the north side, but first we cross some forested knolls on which white pine and hemlock are the dominant trees interspersed with hardwoods. Here the hobble-bush and azalea appear to be making a last stand among other shrubs such as mountain maple and fly honeysuckle. Of the herbaceous species, the painted trillium occurs among a profuse growth of Indian cucumber-root, clintonia, goldthread, and others. In one rather moist area of about one acre thrive scattered clumps of the one-flowered

A SMALL AREA IN THE OPEN MARL BOG

In this December view the surrounding forest is seen to consist of white pine, tamarack, and arbor-vitae.

pyrola. Nearby the forest floor is carpeted with the pink of fringed polygala, with occasional white-flowered forms.

As we approach Black Creek near the north edge of the swamp, the alluvial soil, subject to inundations, supports a quite different type of vegetation. The silt deposited near the bank of the meandering stream has built a natural levee. The trees here consist mainly of silver maple and red ash with scattered individuals of shagbark hickory, bur oak, and sycamore. Near the water's edge abounds the sandbar willow. Thickets of wahoo and prickly-ash are found among the scattered trees farther back. Under the shade of the trees the aroid called green dragon, and extensive stands of ostrich fern, are among the largest herbs in an almost continuous cover of vegetation.

As the alluvial bank gradually slopes away from the stream towards the swamp, large areas of sloughs support a sedge swamp of *Carex riparia* interspersed with beds of giant bur-reeds and sweet-flag. Among the margins of the sloughs the buttonbush makes dense masses to the apparent exclusion of everything else.

In several depressions, areas appearing like open ponds in the spring and early summer, can be found five members of the duckweed family

and many kinds of algae. Later in the summer these same areas, after the water has receded, are filled with many emersed aquatics and marsh plants.

Black Creek itself appears uninteresting in early spring but by early summer the lake cress and several pondweeds begin to appear at the water surface. What earlier appeared to be barren mud flats become covered with dense strips of the lizard's tail, with their continuity interrupted here and there by colonies of cardinal flower, arrowhead or duck-potato, and narrow irregular bands covered with water cress marking the course of small lateral rivulets draining the shallow ponds into Black Creek.

For a single trip we have had enough tramping even if we have seen only a small part of Bergen Swamp. If we can find a fallen tree to use as a bridge to cross over Black Creek we shall soon be out of the swamp.

From this imaginary field excursion I do not wish to leave the impression that we have seen nearly all there is to be seen in Bergen Swamp. We have mentioned only a few of the more striking and unusual flowering herbs, shrubs and trees. Although I have taken many trips during the last 33 years, sometimes in every month during a year, I still find some new plants each time I go there. To introduce you to the algae, fungi, liverworts and mosses would require additional excursions, in different seasons or to different habitats.

In our hurried trip time did not permit a search for the coal skink, Muhlenberg's turtle, the massasauga rattler, and other interesting denizens of the swamp. An inventory of the animals in many of the groups, even in an approximate form, is still waiting further field activities by the zoologists, ornithologists and entomologists.

The plant world of Bergen Swamp consists of species representing the following groups:

Spermatophytes, 820, including 10 conifers and 810 flowering plants;
Pteridophytes, 37, including ferns, club mosses, and horsetails;
Bryophytes, 165, including 41 liverworts and 124 mosses;
Thallophytes, 1302, including 345 algae, 240 diatoms, 600 fungi, 67 slime molds and 50 lichens.

This makes a total of 2,324 known species from an area of less than five square miles and represents approximately 7/10 of one per cent of all species of plants known from the whole world.[4]

No matter what you find, see, or remember when you revisit Bergen Swamp in fact or fancy may it always recall to you:

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[4] Anyone interested in the kinds of plants that have been found in Bergen Swamp is referred to *The Vegetation of Bergen Swamp*—Parts I to VII, in Volume 9, Proceedings, Rochester Academy of Science, 1946-1950. The groups of plants covered in sequence are the vascular plants, epiphytes, myxomycetes, algae, diatoms, fungi, liverworts and mosses.

A place where one may still see Nature at work and learn some of her lessons and secrets.

A small wilderness of quiet recesses, copses and canopies where one may sojourn in undisturbed solitude for inspiration and stimulus for the future.

A heritage from the past with the possibility of linking the present with the future until both shall have become a part of the dim past.

FLOWERING PLANTS OF BERGEN SWAMP

A partial list

ARBOR VITAE (locally called cedar or white cedar)	*Thuja occidentalis*
ARROW-GRASS	*Triglochin maritima* and *T. palustris*
ARROWHEAD (duck-potato)	*Sagittaria latifolia*
ASH, RED	*Fraxinus pennsylvanica*
AZALEA (pinkster flower)	*Rhododendron nudiflorum*
BAYBERRY	*Myrica pennsylvanica*
BIRCH	*Betula lutea*
BLUEBERRY	*Vaccinium corymbosum*
BUCKTHORN, SWAMP	*Rhamnus alnifolia*
BULRUSH	*Juncus*
BUNCHBERRY	*Cornus canadensis*
BUTTONBUSH	*Cephalanthus occidentalis*
CARDINAL FLOWER	*Lobelia cardinalis*
CINQUEFOIL, SHRUBBY	*Potentilla fruticosa*
CLINTONIA	*Clintonia borealis*
CLUB-RUSH	*Scirpus caespitosus*
COTTON GRASS	*Eriophorum viride-carinatum*
CRANRERRY	*Vaccinium oxycoccus*
CREEPING SNOWBERRY	*Chiogenes hispidula*

LADY-SLIPPER RESIDENTS OF BERGEN SWAMP

It is seldom that these four species of *Cypripedium* are all found growing in the same small area. Left to right are shown the small white lady-slipper (*C. candidum*), the large yellow (*C. pubescens*), the stemless (*C. acaule*), and the showy lady-slipper (*C. reginae*).

LIZARD'S TAIL ALONG BLACK CREEK

Only beside occasional streams and in marshes is this little-known plant found in the eastern half of the United States. It is common in the northern border of Bergen Swamp.

DUCKWEED	*Lemna* and *Spirodela* species
DEWBERRY, DWARF	*Rubus pubescens*
ELM	*Ulmus americana*
FALSE ASPHODEL	*Tofieldia glutinosa*
FALSE SOLOMON'S SEAL	*Smilacina trifolia*
GIANT BUR-REED	*Sparganium eurycarpum*
GOLDENROD, HOUGHTON'S	*Solidago Houghtonii*
GOLDENROD, OHIO	*Solidago ohioense*
GOLDTHREAD	*Coptis trifolia*
GRASS-OF-PARNASSUS	*Parnassia caroliniana*
GREEN DRAGON	*Arisaema dracontium*
HEMLOCK	*Tsuga canadensis*
HICKORY, SHAGBARK	*Carya ovata*
HOBBLE-BUSH	*Viburnum alnifolium*
HONEYSUCKLE, FLY OR SWAMP	*Lonicera oblongifolia*
HUCKLEBERRY	*Gaylussacia baccata*
INDIAN CUCUMBER-ROOT	*Medeola virginica*
JUNIPER, CREEPING	*Juniperus horizontalis*
LABRADOR TEA	*Ledum groenlandicum*
LADY'S SLIPPER, SHOWY	*Cypripedium reginae*
LADY'S SLIPPER, STEMLESS	*Cypripedium acaule*

LADY'S SLIPPER, WHITE	*Cypripedium candidum*
LADY'S SLIPPER, YELLOW	*Cypripedium pubescens*
LAKE CRESS	*Armoracia aquatica*
LIZARD'S TAIL	*Saururus cernua*
MAPLE	*Acer saccharum*
MAPLE, MOUNTAIN	*Acer spicatum*
MAPLE, SILVER	*Acer saccharinum*
MITERWORT	*Mitella nuda*
OAK, BUR	*Quercus macrocarpa*
ORCHIDS (See also LADY'S SLIPPER)	*Arethusa bulbosa*
	Pogonia ophioglossoides
	Calopogon pulchellus
POLYGALA, FRINGED	*Polygala paucifolia*
PINE, WHITE	*Pinus Strobus*
PITCHER PLANT	*Sarracenia purpurea*
PONDWEED	*Potamogeton amplifolius* and *P Berchtoldii*
PRICKLY-ASH	*Zanthoxylum americanum*
PYROLA	*Moneses uniflora*
SEDGE	*Carex* species
SEDGE	*Carex riparia* var. *lacustris*
SPIKE-RUSH	*Eleocharis rostellata*
STARFLOWER	*Trientalis borealis*
SUNDEW	*Drosera rotundifolia*
SWEET-FLAG	*Acorus Calamus*
SYCAMORE	*Platanus occidentalis*
TAMARACK	*Larix laricina*
TRILLIUM, PAINTED	*Trillium undulatum*
TWIG-RUSH	*Cladium mariscoides*
TWIN-FLOWER	*Linnaea borealis*
VALERIAN, WILD	*Valeriana uliginosa*
VIOLETS	*Viola* species
WAHOO	*Evonymus atropurpureus*
WATER CRESS	*Nasturtium officinale*
WILLOW, AUTUMN	*Salix serissima*
WILLOW, SANDBAR	*Salix interior*
WINTERGREEN	*Gaultheria procumbens*
ZYGADENUS	*Zygadenus chloranthus*

Afoot and Afloat for Blister-Rust

By Walter H. Snell

THE seriousness and danger of the blister-rust of white pine began to be appreciated just about the time that I was starting out my scientific career in the mid 'twenties and I happened to be available for assistance in the early investigations. I continued my contact with and study of this important disease for parts of the following twenty-five years, either with the Office of Forest Pathology of the United States Department of Agriculture, from Maine to Minnesota, or with the Conservation Department of the State of New York.

BOTANICAL problems are sometimes attacked amid the test-tubes and petri-dishes of a laboratory, sometimes among piles of herbarium sheets or boxes containing dried specimens of fungi. Some are approached in a library, but some require vast open spaces for their solution. How one botanist began a quarter-century of work on white pine blister-rust is told here. The author, a plant pathologist and mycologist, is Professor of Botany at Brown University, Providence, R. I. In a subsequent article he will describe some further significant aspects of his work, which has had the dual purpose of advancing botanical research and helping to save the native white pine from destruction by a vicious fungus—C. H. W.

One of the interesting investigations with which I was connected was the distance of spread of this disease—the distances to which spores of the fungus could be carried, the distances at which the various spores were dangerous as a source of infection. The following points will be recalled concerning the blister-rust fungus. It is an obligate parasite. That is, it can grow only when obtaining its sustenance from some other living matter. It is heteroecious in that it has two dwelling-places in its life cycle. That is, it alternates between white or five-needled pines and wild and cultivated currants and gooseberries (all currants and gooseberries hereinafter referred to by their common generic name of *Ribes,* pronounced with two syllables and with both vowels long). Also, the fungus has five spore-stages, two on the pines, one of which infects the ribes, and three on the ribes, the last of which reinfects white pines. One of the two types of reproductive body formed on the pines is called an aeciospore. Since aeciospores can infect only ribes and certain of the spores formed on the ribes can infect only the pines again, a convenient method for control of the disease is obvious: eradicate all ribes up to a proper distance from pines and keep them away.

When control work first was undertaken, not only was it necessary to know the proper distance for elimination of ribes, for purposes of local control, but it was also desirable to find out how far the various types of spores were carried.

In those early days it was believed that the three types of disseminable spores of the rust-fungus—aeciospores from pine to ribes in the spring, urediospores from ribes to ribes during the summer and sporidia from ribes to pine in the fall—were each capable of being carried (by the wind, for the most part) to a distance of a few hundred feet to infect the proper host. I had begun to wonder why the distance was said to be so short, especially when out in Wisconsin I heard about the occasional great dust-storms and also heard for the first time the intimate details of how twisters carried tin roofs from county to county or picked up a heavy iron bar and drove it into a tree across the street. Now, of course, the violent phenomena are one thing and the mild winds something quite different; but, on the

other hand, when one kicked or struck a heavily infected or blistered tree and saw a conspicuous cloud of spores arise and hover or drift away, it was natural to wonder why such dust-like material would be carried only a few hundred feet.

Accordingly, I was allowed to attack this problem of distances of dissemination of the spores in my summer work with the Office of Forest Pathology. I began with the aeciospores from the pine. To myself, at least, I made the guess that they could infect ribes after a single hop of at least 25 miles, but I began small in the hope of obtaining any distance over a thousand feet. While others were trapping spores with various ingenious devices over flat country and on mountain tops, I made the attack on the problem by observation of natural infections under the proper conditions. If I could find an infected ribes bush at the time of the first "jump" of the aeciospores from the pine in the spring, with no infected pines or no pines whatsoever within a certain radius, I could conclude with certainty that the wind had carried the spore or spores that distance in a viable condition. I say "with certainty," although it has been objected to me that birds, insects, cows and humans cannot be ruled out with certainty.

I therefore set out to find what I got to calling "centers"—ribes bushes with first-generation spring infections—in areas where pines were conspicuous by their absence. I would then be compelled to examine carefully the largest circular area possible around this center up to the nearest pine or pines, perhaps going over an interloping or straggling pine within the circle to determine that there was not a single possible blister-rust canker within that radius.

Now, there arose unforeseen difficulties. The first one of these was to find pine-free areas that appeared to be likely prospects for my centers. As one goes over a piece of northeastern countryside casually, there appear to be many wide-open spaces where there is not a pine in sight, but upon close investigation there are pines aplenty. The second difficulty was to make sure that, when pines did occur, there was not a canker within the circle of the determined radius.

This meant not only great care but it meant a lot of trudging over all sorts of ground and through all sorts of vegetation. It meant being a pedestrian for certain. With a radius of 1/4 mile, only 1/5 square mile had to be covered and there was only 2 miles of pacing in the four directions. With a radius of 1/2 mile, there was only 3/4 square mile to be covered back and forth and only 4 miles of pacing. With a radius of 3/4 mile, however, 1 3/4 square miles had to be covered with at least 6 miles of pacing; with a mile radius, the area was over 3 square miles and the pacing at least 8 miles; and with a radius of 1 1/2 miles, the area was 7 square miles and the pacing alone 12 miles.

I started out in Maine, which, in spite of its proud title of *The Pine-Tree*

State, is obviously not blanketed with pines and was not 25 years ago. I found centers at various places but I could find no place in which, as I started out from the infected ribes bush, I did not run into pines galore within a few hundred feet. I next tried the Adirondacks and found a few places where I could get pine-free distances of 1/4 to 1/2 mile. Finally, a native of the village where I was staying told me that he knew of an area where there were no pines for miles and he took me, like Moses, up to a hill overlooking some country in the Essex-Whallonsburg section west of Lake Champlain. There before me lay quite an expanse of fields and pastures in a dairy country, without a pine in view. I found some infected ribes in the right location and after a lot of pacing I got a circle of about 3/4 mile radius, with the outlying pines much closer than they appeared from a casual inspection of the terrain. Then began the tramping over the circle, back and forth and up and down, covering fencerows, swales, swamps, small patches of woods, etc. I found a few small pines in the circle, which seemed to pop up from nowhere when I had my eyes to the ground and not just looking around in general. These were uninfected. And when all was done and I was going away, I found one more pine about 6 inches in diameter, right by the side of a road that I had traversed several times. This had to be examined twig by twig and fortunately for my results was found to be likewise disease-free.

With this distance of 3/4 mile established, I set out for Wisconsin and Minnesota and there after some criss-crossing of the country east of the St. Croix River, I found a likely region. I finally found some infected ribes in a favorable location that had a circle with a radius of 1 1/4 miles. It took me quite a while to examine the 4 square miles or so (a little of it water) but everything was rosy until the very end, when I found an 18-inch-diameter pine in a spot that would materially reduce my 1 1/4 miles. I had to obtain permission from the owner of the property to cut this tree down and then I had a laborious task inspecting every single inch of living twig, branch and trunk. Fortunately again, the tree was canker-free.

This Rush Lake center was very valuable for me. I not only had a distance of dissemination of aeciospores from pine to ribes of over a mile but the general situation set me thinking. Not being a pedestrian by heredity, natural capacity, training or predilection, why should I not use my head and the seat of my trousers instead of my heels and try to find a satisfactory aqueous area in place of a piece of terra firma which demanded the expenditure of such a quantity of perspiration, calories and shoe-leather? Besides, having spent a great deal of my youth on Cape Cod and the Maine coast, I was something of a sea-faring man in a modest way. Therefore, I set sail (if the reader will pardon the metaphor and forget the intervening 1,000-odd miles of dry land) for the New England waters, fresh or salt. I thought of Lake Winnipesaukee first—in white-pine country, of

good size and with islands (and, need I add, in vacation country?). I spent part of a good summer going over the lake in a motor boat, looking for islands that might have infected ribes a sufficient distance from any pine on the mainland or on other islands. The best I could do for distance, however, was about a half a mile.

My next inspiration was the Isles of Shoals off Portsmouth, New Hampshire, and Kittery Point, Maine—surely with as pine-free a stretch in between as one could ask for. My one worry was concerning the presence of any ribes bushes at all on those almost bare, wind-swept, fog-soaked rocks and my ability to find what must be rather measly bushes if there were any. I learned later that someone else had had the same thought before me and had found some bushes, but I did not know of this at the time. I traipsed over several of the islands, especially the larger ones first, and had no luck; I found a few scrubby poplars in the hollows, as tall as the hollows were deep, but nothing else shrubby or woody, as I recall. I tried the northernmost and most inaccessible island, Duck Island, last, with no feelings of confidence. Here, however, carefully avoiding nests and young of herring gulls at every step, I found two rather windbeaten bushes and I was certainly as excited as I am ever likely to become as I turned over leaf after leaf, looking for blister-rust infection-spots. I finally found a few—enough. I was assured that no human being had visited Duck Island since the last duck-hunting season, and the possibility of birds carrying the spores appeared to be very remote. Here then was something of the sort I had been looking for—miles of spread by the aeciospores instead of hundreds of feet. The Isles are 5 1/2 miles from the nearest mainland and about 7 miles from the location of the old, severe, blister-rust infestation at Kittery Point.

This figure soon became a puny one because in the far West, infected ribes were found 125 miles from the nearest known white pine, but at the time it was the triumph of an idea and a soul-satisfying conclusion to a lot of work that was not overly encouraging on many an occasion.

Growing Hardy Primulas

Experiences of a New Jersey Amateur

By Edward O. Birch

OVER and over again, we hear and read that it is easy to grow primulas on the Pacific Coast, but difficult to grow them here in the East. Thus many gardeners, discouraged from the start, never attempt to ascertain what the really hardy primroses will do for them. What follows

is written with the hope that it may help to interest those who have not as yet tried primulas, or who have tried and failed.

I have seen vigorous plants growing on their own in abandoned gardens of old homes and vacant estates, large clumps sometimes taking possession of open ground around them. Therefore, I think that, despite what is heard and read, we should put out of our minds the idea that primulas are difficult to grow in the East, and at least have the satisfaction of finding out for ourselves.

Here is my experience in Short Hills, N. J., with various forms and varieties of *P acaulis* and *P. polyanthus.*

The First Plant

Some years ago I was given a single plant; a yellow hose-in-hose, or duplex type. In two years this developed into a nice clump. The soil in which it grew was a good friable loam to which peatmoss and manure had been added a year or so before. Under pressure of hand the soil felt spongy; it would absorb and hold water well; drainage was good and the soil never soggy; it would not bake hard when dried by the sun. Under foot it felt similar to soil you would find at the edge of a woodland or in good turf. That is, the soil was solid but *not hard;* rain would not wash it away, but instead would be absorbed.

Anyone can have such a soil with the aid of peatmoss or leaf-mold, if available. It is soil of a texture in which azaleas, mountain laurel, and rhododendrons grow best. One need not worry about chemical analysis, or pH, but only about texture. Then when the plants are established all that will be necessary is an annual, early spring sprinkling of dry manure or perhaps cottonseed meal.

Hundreds of Plants From One

The clump previously referred to was, at the end of its bloom, separated into eight or ten divisions, and the top half of the foliage was cut off before replanting. Dividing at this time enabled young plants to become established before winter set in. By continual division of the older clumps, I have had hundreds of plants from this one original yellow hose-in-hose. I used them to edge three borders, facing south, east and west, the one facing south being in full sun all day. In August, when the plants all withered somewhat before starting fall growth, those facing south withered more than those facing east and west, but outside of that they were identical with the others at all times of the year.

The ruggedness of this yellow hose-in-hose stirred my interest in primroses. I began raising other varieties, including *P polyanthus,* from seed, and had equal success. Now my plants are in all possible locations; naturally in the partial shade of shrubs or filtered shade of trees the foliage holds up better during summer months.

Winter and Summer Care

While writing this in November the foliage is full. I will soon cover the ground between plants with about one-half inch of peatmoss, which will be allowed to remain in spring. Young plants going through their first winter will, in addition to peatmoss, receive a light covering of salt hay, about three inches, *not packed,* but loose enough so that a bit of green shows through here and there. This will keep young roots from heaving with the thaws. Hay is removed early in spring. Peat, when allowed to remain, will act as a mulch in spring, assist in keeping down weeds, help conserve moisture, and in addition be a top dressing as an aid to new crown growth. It will also make artificial watering safer as mulch will prevent the soil from being washed away from roots.

During the hot weather of June, July and August, the soil must not be allowed to dry out. If rains do not occur at this time of year, soil of the texture described should be watered about once a week. At least, that is my experience, but in other sections conditions will vary and one's own judgment will have to be used.

Seed Sown in Soil

When propagating from seed, I sow in soil, and think it the best medium for a

Primulas used as an edging for a border of *Azalea Schlippenbachii.*

home gardener or amateur growing for his own requirements. Sphagnum moss, vermiculite, etc., are all right for professionals who are prepared to fertilize properly at all stages, but if the seed's natural medium (soil) is used it will carry seedlings to the time of transplanting without fertilization, which is always a danger to young plants.

Seed is sown in flats, or preferably wide, shallow pots. If the depth from the bottom of the container to the top of the soil is about three and one-half inches, I use one-half inch of drainage material. Equal parts of peatmoss and coarse sand or gravel will drain the soil and also hold moisture. For the soil itself I use equal parts of good loam, leafmold, and sand, thoroughly mixed and screened. If leafmold is not obtainable, pulverized peatmoss can be substituted. I tamp it down gently, without letting it pack, then water it thoroughly by setting the container in water that comes to within an inch of top, leaving it there until moisture shows at the top of the soil. Then I scatter seed thinly on the surface so that seedlings will have circulation of air when they show up, and barely cover the seed with sand or fine dustlike soil. The pane of glass with which I cover the container is removed as soon as the seedlings show. As they shoot up, I carefully sift a light covering of sand or soft, fine soil between them, being careful not to cover leaves. This is important; the seed was sown on top of the soil and this light covering will give added support until the roots really get down.

Handling the Seedlings

I generally transplant after the second leaves appear in order to get more plants, and place them about an inch apart in similar soil and containers where they remain until placed in a nursery bed in open ground.

If one does not have facilities for additional flats or pots, the seedlings can merely be thinned to about one inch apart. Transplanting is easy. I formerly used a knife or match stick to prick out seedlings, but finally made a gadget which works to perfection; roots are not damaged and soil does not stick to it. I take an old tooth brush; cut off the brush end and grind a point to that end about twice the length of a pencil point. This readily lifts the seedling and also makes a hole to receive it. The rounded end of the handle is used to tamp soil around the transplant. A small bulb spray such as is used in the laundry is good for watering the seedlings after transplanting. They must not be beaten down. Seedlings in containers outdoors should be protected from late morning and afternoon sun, also from heavy rains.

When to Sow Seed

Fresh seed of the current spring will germinate faster if sown in late July than if sown in late winter inside or early next spring outside. Also, all work can be done outside, a factor which will possibly avoid setting out some weak plants. Water used before germination should be tepid; after seedlings are up it may be cool. As soon as the plants are large enough, they may be set in a nursery bed where they will be mulched at once with peatmoss and at the beginning of winter mulched with salt hay as previously outlined.

If seed is sown indoors in late winter, or outdoors in early spring, it helps germination if the soil is made wet with hot water, but not hot enough to burn the hands — say 120°. Next day, water of the same temperature should be applied again. If further watering is necessary before germination, it should be tepid. After seedlings are up, cool water may be used, as for the July sowing. If plants are in a room of a house where heat is on, they should be under glass at all times. When the glass shows moisture, it should be opened slightly until the moisture disappears, then closed again. Plants should be set in the nursery bed in spring as soon as conditions warrant moving them.

When seedlings have been taken from the first container, the soil should not be further disturbed; germination is irregular and more plants may appear.

Not all the seeds will reproduce true to the color of the parent. If this is desired 100 percent, all propagation must be by division.

From Seed to Border

From the foregoing it will be seen there are really three plantings before a permanent location is reached for the primulas: first, for sowing, second, the transfer to similar containers for proper spacing; third, to the nursery bed; then finally into the border.

All that has been written is from experience in the climate of northern New Jersey. There are variations one will learn from his own experience. For instance, in much colder regions it may be desirable to use salt hay as a covering every winter. But no matter where he is located, I want to tell the grower not to over-fertilize, or he will get foliage at the expense of flowers. As long as growth is good, he should let well enough alone.

David D. Keck Appointed Head Curator Succeeding Dr. Gleason Jan. 1

DR. David D. Keck of the Carnegie Institution of Washington at Stanford University has accepted an appointment as Head Curator of the New York Botanical Garden. He will succeed Dr. H. A. Gleason in that post on January 1, 1951.

Graduated from Pomona College in 1925, Dr. Keck received a master's degree from there the following year, and a Ph.D. from the University of California at Berkeley in 1930. Meanwhile, in 1926, he joined the Carnegie Institution of Washington at Berkeley as assistant to H. M. Hall, and three years later moved to Stanford to continue their experimental project in a new laboratory building. Since 1934 he has been a member of the institution's staff on the Stanford campus.

By that time he had already been working for two years in collaboration with Jens C. Clausen and William M. Hiesey as a research team in experimental taxonomy. At the meetings of the American Association for the Advancement of Science in New York in December 1949, this team was awarded the Mary Soper Pope medal of the Cranbrook Institute of Science.

Dr. Keck's many published papers, dating from 1925, reflect his interests in taxonomy, genetics, and cytology of the flowering plants, as well as in the natural sciences as a whole. His principal studies have been in the genera *Penstemon, Poa, Artemisia, Potentilla,* and in *Madia* and its relatives. He has also published notes on *Orthocarpus* and *Haplopappus,* among other groups. In addition to his purely taxonomic studies, in combination with the research team he has contributed such subjects as "Experimental Studies on the Nature of Species" to the publications of the Carnegie Institution of Washington in 1940, 1945, and 1948; "Regional Differentiation in Plant Species" to *American Naturalist*; also "Relations between Climate and Intraspecific Variation in Plants" and "Heredity of Geographically and Ecologically Isolated Races" to *American Naturalist.*

With Dr. P. A. Munz, Director of the Rancho Santa Ana Botanic Garden, Dr. Keck has been working on the preparation of a new manual of the plants of California, on the basis of his experimental studies.

Dr. Keck is a member of the A.A.A.S., American Society of Naturalists, Society for the Study of Evolution, American Society of Plant Taxonomists, Botanical Society of America, Torrey Botanical Club, Western Society of Naturalists, and the California Botanical Society, of which he was treasurer from 1931 to 1940 and vice-president in 1945 and 1947. He is an honorary life member of the California Academy of Sciences.

At the New York Botanical Garden he will be the fourth Head Curator in the history of the institution, Dr. John K. Small in 1906 having been the first to assume the title, which he retained until his death in 1932. Dr. F. J. Seaver served from 1942 until his retirement in 1948, with Dr. Gleason filling the post both before and after this period.

Dr. Keck will be in New York in May on his way to Europe, where, after touring a large portion of the continent by car, he will present a paper at the Seventh International Botanical Congress in Stockholm in July. Returning from Europe he will complete his year's work at the Carnegie Institution before assuming his new position at the New York Botanical Garden.

Notes, News, and Comment

Book Service Department. A new book service department has been opened by the New York Botanical Garden in the Museum Building. For the first time, the Garden will handle books of outside publishers, instead of only its own. Some of these are books written by members of the staff, others are recommended books on botany, gardening, and related subjects. The volumes are on display in cases near the entrance to the Museum Building and are on sale at the Information Booth on the main floor.

For books that are ordered by mail, there will be a mailing charge of 10¢ a volume.

Postcards. Colored postcards showing five scenes of the New York Botanical Garden are now on sale in the Museum Building at 5¢ each. The pictures, which have been made from kodachrome views, show (1) forsythia in spring beneath the bare branches of the trees, (2) daffodils on the slope with evergreens and flowering cherries in the background, (3) azaleas in a woodland planting, (4) a waterlily, and (5) chrysanthemums in front of the central dome of the Conservatory. Individual cards or sets will be sent by mail without extra charge.

The Garden also has on sale eleven year-round views in high quality photographs on postcards. These show the Museum Building, Conservatory dome, tropical rain forest, a flowering cherry tree, *Cattleya* orchids in greenhouse, the Montgomery Conifer Collection, rose garden, perennial border, daffodils, iris, and the rock garden. The price of these has been reduced to 3 for 10¢, and they too will be sent by mail without extra charge.

Tapestry Booklet. The Garden's booklet "Flora of the Unicorn Tapestries" by E. J. Alexander and Carol H. Woodward has been reissued in an edition of 3,000 copies. Two illustrations have been added to this printing, showing a detail of the second tapestry in the series and the entire seventh, the concluding scene, showing the unicorn in captivity.

Honorary Curator. The title of Honorary Curator of Economic Botany, which has been held by B. A. Krukoff since 1940, was eliminated by the Board of

Managers at a meeting of the Executive Committee March 27.

For many years Mr. Krukoff has been interested in medicinal plants. He has done extensive exploring in the interior of South America, and has deposited his herbarium specimens with the Garden. Since his direct association with the institution, he has published papers on the American members of *Erythrina, Strychnos,* and the Menispermaceae, and on the botanical components of curare. Mr. Krukoff is associated with Merck & Co. For the past year or more, he has been away from New York the greater part of the time, continuing his work in Guatemala and elsewhere.

Garden Design Exhibit. Mrs. Helen M. Fox has been chairman of an exhibit of photographs, drawings, blueprints, books and prints illustrating garden design, which is being held at the New York Public Library from March 17 to May 19. Several photographs from the New York Botanical Garden are included in the exhibit, which emphasizes garden designs suitable for the northeastern states. Mrs. Fox is also the compiler of a selected list of books appearing in a booklet, "Planning & Planting Your Garden," which is available by mail from the New York Public Library, Fifth Avenue and 42nd Street, New York 18, N. Y., for 50¢.

Members' Day. Orchids were displayed through the courtesy of Thomas Young, Inc., of which C. R. Beckert is President, at the Members' Day program of the New York Botanical Garden in the auditorium of the New York Genealogical Society April 13. The speaker was C. Leslie Erickson, who has been working with orchids since the age of 14 and who, with his father, is now employed by Thomas Young, Inc., at Bound Brook, N. J.

Staff Conference. John J. Wurdack, Technical Assistant at the New York Botanical Garden, spoke on "The Sand Dune Flora of Brazil" at the monthly staff conference held Wednesday, April 12, in the Members' Room. His talk was illustrated with kodachromes he took and specimens he collected in Brazil during the war, also with vegetational and rainfall maps and with books contributing to the subject.

Spring Tours. The Volunteer Associates of the New York Botanical Garden have arranged two separate garden tours this spring. On May 2 members of the New York Botanical Garden and garden clubs were invited to visit the gardens of Mr. Pierre S. Du Pont and Mr. & Mrs. Henry F. Du Pont at Wilmington, Delaware. On May 23 a trip will be made to Millbrook, New York, to visit the gardens of Mrs. Oakleigh Thorne and Mr. & Mrs. Walter Beck.

Booklets. The downtown office of the New York Botanical Garden has prepared three booklets which are obtainable at 801 Madison Avenue, New York 21, and also in the Garden's new Book Service Department in the Museum Building. Two of them have appeared as articles in the magazine issued by the downtown office, *The Garden.* These are "A Garden for Gourmets" by Albert C. Burrage, 25¢, and "Our Rose Varieties and Their Malmaison Heritage" by Edwin De T. Bechtel, $1. A third booklet is a cook book of favorite recipes of members of the Volunteer Associates, $1.

Visitors. Dorothy Fensholt, graduate student at Northwestern University, spent ten days at the Garden in April studying algae. Clark T. Rogerson of Cornell worked on Ascomycetes in the herbarium the last of April. Clara S. Hires, head of the Mistaire Laboratories, Millburn, N. J., with two of her assistants, Beverly Heller and Mrs. Charles W. Cram made investigations on mosses in the herbarium Mar. 29.

Among other recent visitors have been John A. Stevenson of the Plant Industry Station, Beltsville, Md.; John T. Middleton, University of California at Riverside; Carl L. Withner, Brooklyn College; M. A. Johnson, Rutgers; Eula Whitehouse of Southern Methodist University, Dallas; H. K. Svenson, American Museum of Natural History; Howard E. Brossman, Superintendent of the Mitchell Park Conservatory, Milwaukee; and Mr. & Mrs. B. F. Miller, of Laramie, Wyoming. Mrs. Miller is the daughter of Aven Nelson.

Douglas H. Allen of New York, international industrialist and author of "History of the Operations of the Rubber Development Corporation," was a luncheon guest at the Garden April 11. W. A.

Sexton of Imperial Chemical Industries, Ltd., Manchester, England, Dr. G. Morel of Harvard University, Dr. N. F. Stanley of Sydney, Australia, and Dr. Hasan M. Yusef, on his way back to Fouad I. University, Egypt, were among other visitors of early spring.

Chobei Takida, head of Japan's leading pharmaceutical house, at Osaka, spent the day at the Garden Feb. 24.

Dr. E. B. Hirshberg of the Schering Corporation, Bloomfield, N. J. made investigations of *Dioscorea* at the Garden recently.

Advisory Council. Eight new members were elected to the Advisory Council of the Garden at the meeting of the Board of Managers Feb. 23. They are Mrs. Warren R. Austin, Mrs. Neville Jay Booker, Mrs. Harry T. Peters, Mrs. Wallace S. Whittaker, and Mrs. Robert C. Hill, of New York City, Mrs. Raymond Gunnison of Pawling, N. Y., Mrs. Langdon Simmons of Greenwich, Conn., and Mrs. John Senior of Lenox, Mass.

Mrs. James Russell Parsons, who was elected to the Advisory Council in February 1931, resigned in February 1950. She had also been a member of the Corporation since 1933.

Board of Managers. Dr. Thomas Lewis of S. B. Penick & Co., has been elected to the Board of Managers in the class of 1950.

Consultant. Dr. A. B. Stout, who retired from the staff of the New York Botanical Garden in 1947, left his home at Pleasantville, New York, in early April to spend the summer as consultant to the W. Atlee Burpee Co., Floradale Farms, Lompoc, California.

Floral Flyer. Members of the New York Botanical Garden will be granted ten free rides a year on The Floral Flyer. The membership card will be used as a ticket, to be punched by the conductor on the tractor train.

NOTICES AND REVIEWS OF RECENT BOOKS

North of the Golden Gate

MARIN FLORA. J. T. Howell. 320 pages, 2 maps. 24 photographs (by Charles T. Townsend). University of California Press, Berkeley and Los Angeles, 1949. $4.50.

Probably few visitors to San Francisco have failed to see, rising above the waters of the bay, the gentle silhouette of Mount Tamalpais, landmark of the Marin country which lies just to the north of the Golden Gate Bridge. They may also have visited the miniature redwood forest in Mill Valley, the sandy Pacific beaches, and perhaps even the picturesque, lighthouse-crowned headland of Point Reyes. If they have done any of these things, they cannot help but enjoy Mr. Townsend's beautiful photographs of Marin scenes.

The plants of this Marin County are the subject of Mr. Howell's attractive, lovingly written book. Within an area of only 529 square miles, he has recorded the occurrence of some 1,313 species, which he estimates to be nearly twenty-five percent of the total flora of the state. This remarkable abundance is at least partly due to the varied habitats and geological backgrounds comprised within this small area. The existence of serpentine outcrops on Mount Tamalpais and Tiburon Peninsula, for example, is responsible for many highly localized distributions. He finds the Golden Gate, however, to have been of very little significance, at least in the past, as a barrier to the migration of species.

There are provocative and informative discussions of the physiographic features, geological structures, soils, climate, plant associations, floristics, and botanical exploration. The keys are full and apparently readily workable. Although there are no taxonomic descriptions, there are

abundant citations of localities, and numerous critical taxonomic and other notes.

In a state, most of whose inhabitants originated "somewhere else," it is scarcely surprising that some 300 of the plants should also be immigrants. Since this is a larger number of aliens than Jepson's Manual of 1925 included for the entire state, it is perhaps symptomatic of what is happening to California's vegetation. It is all the more fortunate, therefore, that Mr. Howell has so thoroughly documented the present flora of this accessible region before it has been thoroughly engulfed in the onslaught of ever-expanding Suburbia.

LINCOLN CONSTANCE
University of California, Berkeley.

Clements, Condensed

DYNAMICS OF VEGETATION. Frederic E. Clements. Compiled and edited by B. W. Allred and Edith S. Clements. 296 pages, illustrations, glossary, index. H. W. Wilson, New York. 1949. $3.75.

Dr. Clements was a very interesting man, to whom the writer of this notice is greatly indebted for encouragement and material help at a time when these were greatly needed. Some of the ideas basic to Clements' system of vegetation-units and their developmental relations are very different from those held by most field botanists. Professor A. G. Tansley characterized him as an "uncompromising idealist." Yet his awareness of the observable facts was very similar to that of the realists; it was in interpretation of facts and in application of terms that most of the differences arose. Much of his writing is taken too literally by students.

The present volume is a reprinting in somewhat shortened form of articles and essays covering these chapter headings: The nature and role of plant succession; Competition in plant societies; Plant indicators; Nature and structure of the climax; The relict method in dynamic ecology; Climaxes, succession, and conservation; Climatic cycles and human populations in the Great Plains; and Ecology in the public service. The photographs are numerous and excellent.

The same general criticisms and commendations could be made for this work as for the publications which it summarizes. Some of the too-strong statements are perhaps more discernible in the condensation.

The book is well edited, beautifully printed and bound, moderately priced. It succeeds admirably in its objective, to bring together, in more generally available form, the writings of Dr. Clements in this field of his principal interest.

ARTHUR G. VESTAL
University of Illinois

Fungi Infecting Man

BIOLOGY OF PATHOGENIC FUNGI. Edited by Walter J. Nickerson. 236 pages, illustrated, indexed. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York, N. Y. 1947. $5.

The short title given this book by the publisher may mislead some of its readers to expect to see that the biology of plant pathogens will also be considered. However, the editor points out in his preface that the aim was to discuss some of the aspects of the biology of some of those fungi pathogenic for man. The foreword by J. Gardner Hopkins, the internationally known dermatologist, further emphasizes this limitation of scope. He points out some of the important deficiencies that have heretofore hampered the understanding of fungus infections of human beings. He urges that the commotion over terminology and attempts to follow rules of nomenclature should not obscure the fact that much information on the biology of fungi pathogenic to man has been provided by botanists, chemists and physicians. One has but to read the twelve chapters contributed by persons of wide reputation to see what has been done in recent years and to realize the great need for further research along these lines.

The editor, W. J. Nickerson, has written an interesting introduction as well as chapters on respiration and fermentation including metabolic products; and with J. W. Williams a chapter on fungus nutrition and metabolism. Additional chapters by authors known internationally include results of their own researches and bibliographies covering some aspects of their fields. These contributors are J. Lodder, A. de Minjer, A. L. Carrion, Margarita Silva, Rhoda W. Benham, C. W. Emmons, R. Ciferri, P. Redaelli, F. T. Wolf, D. S. Martin and R. L. Peck.

It would, of course, be impossible to cover the whole field of pathogens thoroughly in a volume of some 250 pages, but considering these limitations one will find in this book much valuable information, as well as sources of further information indicated in the various bibliographies.

B. O. DODGE

Heredity and Breeding

ADVANCES IN GENETICS. Edited by M. Demerec. 440 pages, index, illustrations. Academic Press, New York. 1947. $7.50.

This volume presents critical reviews of research on ten specific genetic problems. Those dealing with plants include: cytogenetics and breeding of forage crops, by Sanford S. Atwood; cytogenetics and speciation in *Crepis* by Ernest B. Babcock; origins and evolution of maize by Paul C. Mangelsdorf; types of polyploids, by G. Ledyard Stebbins, Jr.; and cytogenetics of *Gossypium* and the problem of the origin of the New World cottons, by S. G. Stephens.

This is the first of a proposed series, the purpose of which, as stated in the preface, is to have critical summaries of outstanding genetic problems, written by competent geneticists, appear in a single publication and to be written in such form that they will be useful as reference material for geneticists and also as a source of information to nongeneticists. As to scope, the articles are expected to deal with both theoretical and practical problems of breeding, heredity, and related fields.

A. B. STOUT.

Highest Power Magnification

ELECTRON MICROSCOPY. Technique and Application. Ralph W. G. Wyckoff. 248 pages, illustrations, bibliography, index. Interscience Publishers, New York and London. 1949. $5.

This is a beautifully illustrated, simple introduction to the opening field of electron microscopy. The text is easy to read. The biologist who has not yet seen such forms as diatoms under the electron microscope has a poor concept of their essential architecture.

VIRGENE KAVANAGH.

Relations of Plants With Water

WATER IN THE PHYSIOLOGY OF PLANTS. A. S. Crafts, H. B. Currier, & C. R. Stocking. 240 pages, illustrations, tables, bibliography, index. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, New York. 1949. $6.

The unique feature of this book is the large amount of material on the physical chemistry of water in relation to plant processes and conditions. This is treated in such a manner as to be intelligible to readers with only a limited knowledge of that field.

While the book is of particular value to instructors and investigators in the field of plant physiology, it will be useful to every plant scientist who is interested in water relations. The chapters dealing with the structure of water, the properties of solutions, and water as a plant component bring together material never before summarized satisfactorily for plant physiologists. These chapters alone would justify publication of the book. The discussion of osmosis and osmotic quantities of plant cells is very thorough and fortunately uses the terminology of

Meyer, which is familiar to most readers. The varied and conflicting evidence concerning the occurrence of non-osmotic or "active" water intake by plant cells and tissues has also been carefully summarized. Water relations of the plant as a whole are discussed in terms of absorption, translocation, and water loss. The book is documented by about 800 references and illustrated by many tables, figures, and graphs.

PAUL J. KRAMER,
Duke University.

For Gardeners From Coast to Coast

IRIS FOR EVERY GARDEN. Sydney B. Mitchell. 224 pages, photographs, index, drawings by Tom Craig. M. Barrows, New York. 1949. $3.

This is a much needed book for Americans, as recent popular publications on iris have been confined to England and, while valuable to the expert, are not suited for the general gardener in this country. It is a clearly written and practical book, well illustrated, and easy to use. Culture, propagation, breeding, treatment of seed and seedlings, pollen, diseases, and other subjects are well covered. The many gardeners who think there are nothing but the old "dooryard" varieties of iris should be encouraged to try their hand on a newer species or horticultural variety.

Such a book is necessarily limited, but Dr. Mitchell has given the essentials. My only adverse criticism is that in his history of American breeding he has neglected to mention such an important person as the late E. B. Williamson of Indiana, who made the first crosses here between the regelia and dwarf beared groups. There are many splendid varieties still available, descendants of those that Williamson and Paul Cook raised. In fact, many of the better irises in the United States exist because of Mr. Williamson and also Grace Sturtevant. Present-day breeders are too much given to concentrating on the huge-flowered, tall sorts.

I do not agree that William Mohr was the "outstanding American breeder" because I am familiar with the work of others who are barely mentioned or completely neglected in the book.

It has to be a limited book, of course, and it should be to make it easy to handle and of a reasonable price. Therefore I feel that, with these exceptions, it is really well carried out, and that it is, at the same time, an attractive, readable book.

ETHEL ANSON S. PECKHAM

Three New Textbooks Of General Botany

COLLEGE BOTANY. Clarence J. Hylander & Oran B. Stanley. 638 pages, illustrated, indexed. Macmillan, New York. 1949. $5.

In this new text, Drs. Hylander and Stanley of Colgate University have stated admirably the reasons for such a book and, in general outline, have fulfilled their intentions. The line drawings are calculated to sustain the interest of the general college student; the text is not "stuffy"; presentation is ideal for students in educational curricula planning to teach biology or botany; and the text material is well-balanced, with sections on general morphological considerations, classification, ecology and geography, heredity and evolution, and paleobotany.

In several respects, however, serious students may question the material presented. The drawings are perhaps too diagrammatic; use of common names throughout may be criticized (although an appendix of scientific names is included); and the portrayal of classification by "trees" certainly oversimplifies and confuses systematics and phylogeny. Other minor disputable points include (p. 347) the sketch of *Amanita* without an annulus; the discussion of distinctions between "monocots" and "dicots" and their phylogeny (for example, the disputed primitiveness of hydrophytes and the "absence of endosperm" in dicots); illustration of *Equisetum arvense* with yellowish fertile shoots as typical (albeit familiar) of horsetails; and the selection of so many illustrations from the same few genera of the Liliaceae.

Still, the text may well be used for the presentation of a semi-cultural botanical course in a general college curriculum.

COLLEGE BOTANY. Harry J. Fuller & Oswald Tippo. 993 pages, illustrated, indexed. Henry Holt, New York. 1949. $5.75.

Drs. Fuller and Tippo of the University of Illinois have written a standard introductory botany, suitable for the general college course or, with use of supple-

mentary material from other sources, for an intensive course for students majoring in the field of botany. The five major sections of the text include: introductory remarks; structure, physiology, and reproduction; a survey of the plant kingdom; evolution and ecology; and economic significance of plants. Features to be commended are: presentation of a more modern classification of the plant kingdom, rather than the traditional "four-division" scheme; an excellent time scale correlating animals, plants, and geologic events; and concise summaries of chapter contents.

INTRODUCTORY BOTANY. Alexander Nelson. 479 pages, illustrated, indexed. Chronica Botanica Co., Waltham, Mass. 1949. $3.75.

Dr. Nelson of the University of Edinburgh has written this text as the first of two books; in this volume biological concepts are presented, and the projected companion volume will include the applications of plant science to human and animal medicine. The presentation is not in the stereotyped order of traditional introductory texts; in the systematic section, for instance, the flowering plants are first discussed, and subsequently the "lower" plants, with the bacteria and fungi bringing up the rear. Genetical aspects of botany are emphasized throughout.

Only rarely in an elementary textbook are such items as phosphorylation, the Traube cell, heteroploidy, crossing-over, incompatibility, and xenia included. The use of such terms as imbalance, manurial salts, mycodomatia, and sink may at first be strange to American botanists, and the lack of the typical lavish illustration of U. S. textbooks might be a drawback to the general student.

However, for anyone planning a career in any field of biology, the book is to be recommended highly, both for the logical scientific approach to complex ideas and for the extremely reasonable cost.

J. J. WURDACK.

Horticulture, Agriculture, Forestry

HORTICULTURE ENTERPRISES. Revised. Walter B. Balch, A. S. Colby, and T. J. Talbert. Edited by R. W. Gregory. 480 pages, illustrated, indexed. J. B. Lippincott Co., Philadelphia. 1949. $3.

This, the seventh, is a newly revised edition of a text originally published under the title of "Horticulture" in 1919. The new title was adopted in 1929. The book is a text essentially for learning the culture of fruit and vegetable crops, but also includes a number of ornamentals.

SOUTHERN HORTICULTURE MANAGEMENT. E. W. Garris & H. S. Wolfe. Edited by R. W. Gregory. 564 pages, illustrated, indexed. J. B. Lippincott Co., Philadelphia. 1949. $3.

Culture of fruit and vegetable crops in the states from Arkansas across to Virginia and from Texas across the Gulf Coast and into southern Florida is described in this volume. Instructions are given for truck farms and small home gardens. At the end of each chapter there are suggestions for study and practice and a list of practical references.

FIELD CROPS MANAGEMENT. Revised. E. N. Fergus & Carsie Hammonds. Edited by R. W. Gregory. 600 pages, illustrated, indexed. J. B. Lippincott Co., Philadelphia. 1949. $3.

This is part of a series of books on agricultural management being published by Lippincott. Tobacco, corn, small grains, and hay are the principal crops treated, soybeans and other legumes being included in a long chapter on hay crops.

FORAGE CROPS. Gilbert H. Ahlgren. 418 pages, indexed. McGraw-Hill Book Co., New York. 1949. $5.

The name of Gilbert H. Ahlgren of Rutgers University is already familiar to Journal readers. As head of the Farm Crops Department at the New Jersey State College of Agriculture, where extensive experimentation as well as standard practice is always under way, he has a wide opportunity to become familiar with many aspects of the culture of farm crops. It is disappointing to find that he has not included the recent Rutgers experiments on the use of weed killers on the soil before the corn is planted in order to avoid the labor and expense of cultivating it during the season. Perhaps this will appear in a later volume.

SOUTHERN FORESTRY. Charles N. Elliott & M. D. Mobley. 494 pages, illustrations, glossary, index. Turner E. Smith Co., Atlanta, Ga. 1949. $3.

Industries, occupations, recreation, and wild life which are dependent upon the forests of the south are given broad consideration in this book. The purpose

has been to appeal to young people. The authors have both been instructors in summer camps where forestry was being taught.

New Editions

THE GARDENER'S TRAVEL BOOK. E. I. Farrington. 278 pages, illustrated. Oxford University Press, New York. Revised edition 1949. $4.

Wherever one journeys there are gardens, parks and splendid trees to be seen, and with the help of "The Gardener's Travel Book" one need miss very little. The new edition is more compact than the one of 1938, yet more complete. There are still slight mistakes and omissions (as there are almost bound to be in a book of this nature), such as the reference in both editions to the "Westchester Parkway," a non-existent entity. Rancho Santa Ana Botanic Garden in California has been unfortunately omitted this time but other places of horticultural interest have been added. Rockland County's Dutch garden at New City, N. Y., remains an undiscovered gem. But the wonder is, not that a few errors have persisted but that so much has been included to make the book a worthwhile companion for the traveler.

APPLIED SILVICULTURE IN THE UNITED STATES. R. H. Westveld. 590 pages, illustrated, indexed. John Wiley & Sons, Inc., New York. Second edition 1949. $6.

When Stanley A. Cain reviewed the first edition in this Journal ten years ago he wrote that this book "will undoubtedly become a standard handbook for foresters. It will be almost as useful to ecologists and other students of forest vegetation." The new edition retains the form of the old — that of dividing the United States into forest types and treating the history, ecology, and management problems of each separately — and brings the reader up to date in forestry literature and practice.

COMMON BRITISH GRASSES & LEGUMES. J. O. Thomas and L. J. Davies. 120 pages, illustrations, glossary, index. Longmans, Green, New York. Third edition 1949. $2.25.

Designed for school and farm use in Great Britain, this book, now in its third edition since 1938, has value in the United States, for about half of the plants illustrated and described are well known here.

FUNDAMENTALS OF BACTERIOLOGY. Martin Frobisher. 936 pages, illustrated, indexed. W. B. Saunders Co., Philadelphia. Fourth edition 1949. $5.50.

Only five years have passed since the third edition of this text, which was reviewed in this Journal in September 1945. New features include extensive material on microbiology, new information on viruses and on numerous common diseases, and the inclusion of the latest views on many topics.

BACTERIOLOGY. William Burrows. 981 pages, illustrated, indexed. W. B. Saunders Co., Philadelphia. Fifteenth edition 1949. $9.

The fifteenth edition in 41 years indicates a continuous bringing up to date of information in a field that is at present undergoing many changes both in point of view and in practice. Several parts have been rewritten and a number of electron micrographs have been added.

HUNGER SIGNS IN CROPS. 390 pages, illustrated, indexed. National Fertilizer Assn., Washington, D. C. Second revised edition 1949. $4.50.

The progress in the science of soil nutrition has necessitated a revised edition of "Hunger Signs in Crops," which was first issued in 1941. The abundance of illustrations in color, in addition to exceptionally clear halftones, makes this book of value to farmers as well as research workers in many fields concerned with plant growth.

Fibers Under the Microscope

TEXTILE FIBER ATLAS. Werner von Bergen & Walter Krauss. 50 pages, plus 27 plates; bibliography. Textile Book Publishers, Inc. New York. Revised edition, 1949. $4.50.

This collection of excellent photomicrographs of the principal textile fibers of natural origins, and also man-made, is in its third printing, having had a broad distribution as a reference book in technical laboratories, among libraries, and as a school text book.

In addition to the photomicrographs which depict the outer surface of fibers and their internal structure by means of cross and longitudinal sections, fiber types and their characteristics are discussed. Considerable data concerned with fineness measurement and variation in fibers of a given type are presented in tabular form. Factors affecting the identification of fibers, such as damage to

wool by physical and chemical treatments and by bacteria and insects, are discussed. Included is a bibliography of some 300 references.

The 1949 edition has been brought up to date by including some of the newer fibers such as Orlon and alginate rayon.

JULIAN S. JACOBS, *Editor, Textile Research Journal.*

Broad Study of Yeast

THE YEAST CELL, ITS GENETICS AND CYTOLOGY. Carl C. Lindegren. Illustrations, tables, bibliography. Educational Publishers, Inc., St. Louis, Mo. 1949. $7.

Yeast, an ever-fertile source of experimental material for students of nutrition, enzymes and metabolism, now, in the words of the author, ". . . has graduated . . from a promising organism for experimental breeding to a full-fledged membership in the Drosophila-maize-Neurospora hierarchy." To some this may seem to be an over-statement but to this reader it appears more like a careful judgment spiced with optimism.

The book which Dr. Lindegren has written is a highly personal one; virtually all of the material presented is the result of first-hand observations in his own laboratory. Thus it is not an historical review nor a detailed survey of the literature but is rather like a series of laboratory note books. The coverage is wide, however, and anyone dealing with yeast or interested in genetics or cytology will profit by reading the book.

Dr. Lindegren is undoubtedly the foremost authority on yeast genetics and cytology in this country and is responsible for much of the progress made in this field in recent years.

LAWRENCE ATKIN, *Fleischmann Laboratories.*

Yearbooks on Vegetables

AMERICAN POTATO YEARBOOK. John C. Campbell, editor. 84 pages. American Potato Yearbook, 289 Fourth Avenue, New York. 1949. $2.

The Potato Association of America has provided a handbook containing short articles of interest to growers and also numerous reference lists, such as associations for the improvement of the potato industry, agencies for seed certification, recent literature on potato culture, periodicals, a buyer's guide, and numerous tables dealing with potato production.

AMERICAN TOMATO YEARBOOK. John W. Carncross, editor. 40 pages. American Tomato Yearbook, 289 Fourth Avenue, New York. 1949. $2.

Graphs and tables illustrate the past year's situation in the growing and canning of tomatoes in the United States. Seed production is included, and lists of varieties grown in different parts of the country are provided. There is a list of references dating from 1940 and a buyer's guide.

Food Production Text

VEGETABLE CROPS. Homer C. Thompson. 611 pages, illustrated, indexed. McGraw-Hill, New York, 4th edition. 1949. $6.

Mr. Thompson has made an extensive revision of his already successful book, integrating the latest research and experimental data, with the general subject matter remaining the same. The text may be somewhat technical as it was written primarily for college use. However, the layman who has an interest in the subject will find it quite practical in its presentation of vegetable gardening. The new material includes statistics on per capita consumption, new knowledge of nutritional value of vegetables, new information on plant nutrition, the placement of fertilizer, weed control, and the latest chemicals used as pesticides. Prepackaging and other new methods of handling vegetables for market are discussed in the chapter on marketing.

This is an excellent edition, dealing with the production and handling of vegetable crops, and should still be considered the most accurate and scientific textbook available on the subject.

JOSEPH M. LENT, *University of Connecticut.*

Results of Frost

BIBLIOGRAPHY ON FROST ACTION IN SOILS, ANNOTATED. 57 pages. Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. 1948. 45¢.

Nearly 300 references are given in this annotated bibliography, which is the third in a series issued by the Highway Research Board. Several lines of comment are given on each reference.

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PUBLICATIONS OF THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

An Illustrated Flora of the Northern United States and Canada, by Nathaniel Lord Britton and Addison Brown. Three volumes, giving descriptions and illustrations of 4,666 species. Second edition, reprinted. $15.

Flora of the Prairies and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex by K. K. Mackenzie. From Vol. 19, Part 1, of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marion A. & G. L. Wittrock in the Journal for March 1942. 15 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal, 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 15 cents.

The Flora of the Unicorn Tapestries by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second edition 1947; reprinted 1950. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at the New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts by E. J. Alexander. 64 pages, indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. 50 cents.

Review of Juniperus chinensis, et al by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.

Periodicals

Journal of The New York Botanical Garden, monthly, containing news, book reviews, and non-technical articles on botany, exploration, and horticulture. $1.50 a year; single copies 15 cents. Free to members of the Garden. Now in its 51st volume.

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Brittonia. A series of botanical papers published in co-operation with the American Society of Plant Taxonomists. Subscription price of volumes 1 through 5, $5 a volume ($4 to members of the Society). Now in its seventh volume. Price, $7.50 ($5 to members of the Society).

North American Flora. Descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 97 parts now issued. Not offered in exchange. Prices of the separate parts on request.

Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

Memoirs of The New York Botanical Garden. A collection of scientific papers, 1900-1927. Contents and prices on request.

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

JUNE

1950

IN THIS ISSUE:

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VOL. 51 No. 606

NTS $1.50 A YEAR

"BROCADE OF YEZO"

JAPANESE IRIS PRINT

ROSE-GROWERS' DAY

at

The New York Botanical Garden

In co-operation with the American Rose Society

JUNE 15, 1950

10:00 a.m. Tour of the Rose Garden led by *Lambertus C. Bobbink*

Talks in the Museum Building on

THE AMATEUR'S ROSE GARDEN

11:00 a.m. ***Greeting to Rose Growers*** — *William J. Robbins*, Director

11:05 a.m. ***"An' I Learned About Roses from THEM"*** — *F. F. Eldred*, Old Greenwich, Conn.

11:35 a.m. Question period

11:45 a.m. ***Experiences in a Hillside Garden*** — *C. G. King*, Scarsdale, N. Y.

12:15 p.m. Question period

12:30 p.m. Lunch (each person bringing his own)
Hot and cold drinks will be served by the Garden

2:00 p.m. ***Rose Varieties for the Small Home Garden*** — *Harry L. Erdman*, Superintendent, Hershey, Pa., Rose Garden

2:30 p.m. Question period

2:40 p.m. ***Water Relations of Plants***
And Factors Affecting Conservation of Moisture — *P. W. Zimmerman*, Boyce Thompson Institute

3:10 p.m. Question period

Specimen roses from commercial growers will be exhibited in the rotunda of the Museum Building. *James G. Esson* is in charge.

Floyd F. Eldred of Old Greenwich, Conn., is an amateur grower who several times has used the services of the New York Botanical Garden to good advantage. *Dr. Charles Glen King,* who is Professor of Chemistry at Columbia and the Scientific Director of The Nutrition Foundation, Inc., has a rose garden of 340 plants of 52 varieties on the eastern slope of a half-acre lot in Scarsdale. *Harry L. Erdman* has long been known as Superintendent of the Rose Garden at Hershey, Pa., one of the largest and finest rose gardens in the country. Few growers have had the opportunity to become more closely acquainted with large numbers of rose varieties. *Dr. P. W. Zimmerman* has done research on the physiology of plants at the Boyce Thompson Institute for more than 20 years. He is best known for his work on plant hormones, having been the first to publish on most of the hormones in use today, such as 2,4-D, the root-inducing hormones, and the naphthalene types which inhibit buds.

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JOURNAL
of
THE NEW YORK BOTANICAL GARDEN

CAROL H. WOODWARD, Editor

VOL. 51 JUNE 1950 NO. 606

Sawdust as a Mulch for Roses

By Loren D. Flood

WHETHER sawdust mulches on perennial plants in the garden are beneficial or detrimental is a question much discussed between the practitioners and the theorists, those who use them claiming satisfactory results, while those who merely talk about them pointing to the fact that the decay of wood or any similar material uses up the available nitrogen and thus deprives the plants instead of benefiting them. Loren D. Flood, an accomplished amateur gardener of Vineland, N. J., has solved the problem for both sides by supplying additional nitrogen with his heaps of sawdust.

Using his rose garden of 200 plants as an example, he describes his complete procedure here. It is a method of culture which gives him long-stemmed roses in abundance all summer long, even during weeks of drought.—C. H. W.

FOR four years we have been using an annual sawdust mulch for protecting and fertilizing our roses (and other woody plants as well), and it has given the best results of any treatment that we have ever tried—and with less rodent trouble during the winter.

Fall and Winter Treatment

When applying a sawdust mulch to our roses, we wait until after the first heavy freeze. Then when the ground is frozen to a depth of an inch or so, it is carefully raked to remove all old leaves that might be diseased. A heavy application of an organic fertilizer (about a pound to each rose bush) is then spread around on the top of the ground about four inches from the stalk of the bush to about a foot and a half out.

Next, enough cedar and pine sawdust (old dust if possible) is heaped around each bush until it is about a foot high and tapered down to cover all of the fertilizer a couple of inches deep to the edge.

The rose bushes are cut back to about two feet so that they will not whip around in the wind, and are watched all winter to correct any disturbance of the sawdust.

Spring Procedure

The last of March starts the important part of the sawdust treatment and with an eye to the weather and an ear to the radio we decide on how much of the sawdust can be pulled away from the top of the heap around the bush and spread towards the edge of mulch. This is continued slowly until the leaves are of full size and the danger of a freeze is over. The sawdust is then flat on the ground and is left there all summer. Except for walking on it, it is not disturbed, and by fall it has become quite decayed.

If we can procure fresh cow manure during early spring, we fill up the spaces between the rose bushes and dig this in with bonemeal and superphosphate. If we can not get cow manure, we use a very heavy application of organic fertilizer and dig this in several inches.

Summer Practices

As decaying sawdust will use up most of the nitrogen around the bush, when the foliage indicates its need by looking yellowish we have given liquid nitrate of soda to the plants. In addition, we drench the foliage with iron sulphate a number of times during the summer.

To combat blackspot we dust during the early evening with one of three materials. When there are many flowers we use Triogen or bordeaux mixture; at other times we use Fermate.

Results

Any one can have roses during early spring and summer but the test comes when July and August have arrived and the temperature is 90 or more day and night, and there is no rain for weeks on end. Then and only then will the use of a sawdust mulch pay big returns for the labor expended, with Hybrid Teas eight or more feet high and flowers that can be cut with stems a foot or more long, and, from the use of iron sulphate, a more brilliant flower.

A word of caution is that the bushes must be watched to note any mistake that you may have made. This is easily detected by watching the foliage and the bark.

We have used oak sawdust also on our Thea and Japanese persimmons with wonderful results.

The Training of Truffle-Dogs

By Donald P. Rogers

IN America the mycophagists—that solemn name for those connoisseurs of mushrooms who prefer to see them on a dinner plate rather than under a microscope—have quite generally neglected one of the greatest delicacies offered by the fungus world, the truffle. There are, however, truffles in America, many kinds on the West Coast, probably fewer in the East. Some of them have the same ineffable savor as the justly praised European ones, but they are rarely found and more rarely tasted.

The principal reason for this neglect is the manner of collection. In Europe truffles are hunted by pigs and dogs; in America chiefly by men; and of the three, the last is the least effective. (To do full justice, it should be added that the most successful collector and greatest student of truffles in America is a woman.*) When dogs have been used, truffles can be found in this country where men (leaving the woman out of account) would never have uncovered them. This has been shown by Mr. Lorenzo Robba of New York City, a man who, familiar with the use of truffle-dogs in Italy, has imported trained dogs who have repeatedly gathered native truffles for him in southern New York and New Jersey. The account here presented of the management of the dogs is taken from his notes.

Small Dogs Best

The truffle-dog, he points out, is not a breed, any more than a sheep-dog is a breed, but is a properly trained individual. Large dogs, like the German shepherd, which are apt to run, are not likely to be suitable subjects for training, but any small dog, like a beagle, Scotch terrier, spaniel, or the types included by those who do not own them under the generic term of mutt, may make a good truffle-dog. The important thing is not his rating by bench-show standards, but his health, sense of smell, and obedience (some dogs, like some people, being too stubborn to be educable). Training should not be attempted before a dog is six months old, and is most apt to be successful before the age of two years.

To train a dog to hunt truffles one must of course introduce him to a truffle. Either a canned or a fresh one will do, and one can procure it by purchase or by laborious search. Since the provision of truffles for the pupil is apt to be expensive, either in money or time, it is probably better, in all but the last stages of training, to substitute a piece of Gorgonzola cheese. The trainer should wrap the truffle (or cheese) in a piece of cheese-

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*Dr. Helen M. Gilkey of Oregon State College.

cloth, allow the dog to smell it and occasionally to eat a piece, and thus commence the training of his sense of smell and his desire.

Then the wrapped truffle (for which read "cheese" where required) is buried, in the sight of the dog, and the place marked so that the trainer can recognize it. Next day, after the odor has permeated the soil, the dog is led over the spot. This procedure should be repeated two or three times a week. When the dog finds the truffle and digs it out he is rewarded with a biscuit (*not* a truffle). He will not at once be able to find every planted truffle, but in time, says Mr. Robba, he should learn to do so. If training is commenced in June, the pup should be a graduate truffle-dog by September, when truffles may be expected to appear in the woods. It is of course considerably easier to train a second dog, who can be worked with the first.

Patience and Punishment

As in other forms of education, patience in the trainer is of great importance. Correction of the dog will be necessary at times, but pointing at the dog while looking sternly at him will contribute to the desired result more than will mistreatment. The chief requirement in working the dog, Mr. Robba emphasizes, is that he must always be under orders. He will show an understandable preference for anything that moves—a rabbit, pheasant, or squirrel -over a hidden truffle, and must be lightly punished if he runs a rabbit.

Until he has learned his work the dog is best kept on a fifteen-foot leash; later he may be unleashed but kept within about thirty feet of the hunter. The dog's tendency to seek meat-on-the-hoof may be reduced by omitting raw meat and raw bones from his everyday diet; and his zeal for truffle-hunting can be increased by feeding him only at night, except for the snacks which must always be given as a reward for locating truffles.

Where and When to Hunt

The place to hunt truffles is in the woods; in Europe oak, poplar, and willow all have truffles associated with them, and in eastern United States oak trees probably serve best as an indication of suitable truffle land. But in the West any sort of forest may have its truffles; and it is certain that not enough is known of the habitats of American truffles to rule out any forest type. The most favorable season in the East is probably from September first to the middle of December (unless the soil is hard-frozen earlier).

What does one do when the dog finds a truffle? Dig it up, indicate one's appreciation of the dog, and retain the truffle, which may be agreeably dealt with later.

Butterworts and Bladderworts

By R. Eliot Stauffer

WHEN a dog bites a man that is barely news; but if a man should bite a dog, that would get a banner headline. Likewise, that animals feed upon plants seems familiar and normal, but that some plants should feed upon animals has for years caused comment upon the part of naturalists.

Actually, carnivory is not a unique property in the plant world, even when the meaning of the term is restricted to plants utilizing various mechanical snares or traps to assist in obtaining some of their nutrients. Carnivorous species are to be found among the members of two subclasses of the dicotyledons as well as among the fungi. It would seem, therefore, that the carnivorous habit has probably arisen at more than one point in the evolutionary development of plants, and certain similarities of apparatus in widely separated families have come about through parallel evolution.

Numerous articles have appeared in the popular and scientific press on carnivory among plants. Much of the popular material has contained erroneous statements, and in general more attention has been devoted to the species represented by the pitcher plants (*Sarracenia*), sundews (*Drosera*), or Venus' flytrap (*Dionaea*). Undoubtedly this is partly true because the larger size of the functioning parts of the members of these groups facilitates observation or detection. By contrast, a good deal less of a popular nature has been written about one of the most interesting groups of carnivorous plants. This is the family Lentibulariaceae, which appears to contain only carnivorous genera. From our point of view two of the most important of these are *Pinguicula,* the butterwort, and *Utricularia,* the bladderwort, since both of these are native to the North American continent and the second, at least, is widely distributed there.

Habitats and Habits of Pinguicula

The butterwort belongs to a genus of small terrestial herbs of moist or boggy spots. The various species exhibit snares of a simple type in which the mechanical action is very sluggish. *Pinguicula vulgaris,* which is found in North America largely in the boreal regions, and is also known in Europe, may be considered typical. It grows in a variety of situations, such as along marly shores, embayments or in interdunal bogs along Lake Huron or other of the upper Great Lakes. Another likely place for it is on rock ledges or talus slopes kept moist by seepage or by spray from waterfalls. Early records show that butterwort grew in such a

location in the Genesee River gorge in Rochester, but this station has long since disappeared because of excessive collecting, or perhaps because of the changes in environment wrought by man.

According to St. John [1], *P. vulgaris* is a limestone or calciphilic species which is found on ledges or wet limestone sea-cliffs along the north shore of the St. Lawrence, the "côte nord." Along the north shore of Gaspé from Tourelle to Cap des Rosiers are lofty headlands with steep cliffs overlooking the St. Lawrence. Portions of these cliffs seem to rest in perpetual shade, while from the heights above there trickle rivulets and streams which combine with the sea fogs to keep the talus slopes and the ledges constantly moist in places. In such situations colonies of butterwort are often found associated with other characteristic Canadian plants, including the mealy primrose (*Primula farinosa*) and the alpine bistort (*Polygonum viviparum*). Occasionally, as at the foot of Mount St. Anne behind Percé, butterwort is seen growing in mossy banks along a stream or runnel arising from a nearby spring. One such stream was observed to run through an adjacent pasture, and the butterwort was traced along its course. Light grazing did not seem to be endangering the colonies.

The common butterwort, which is sometimes called bog-violet because of its purple flower, has a compact rosette of ovate leaves arising from a short rootless vertical stem. The leaves vary in color from a glistening or greasy pale yellow (hence the common name) to a light greenish shade depending apparently on edaphic, or soil, factors and conditions of illumination. Especially striking is the lustrous, almost beaded appearance of the upper leaf surfaces, which make a first-class subject for examination with a 10- or 14-power magnifier or a low-power stereobinocular microscope. If a leaf is examined in this fashion, it will be seen that the texture of the upper surface is caused by numerous stalked, pin-headed glands, and by other sessile glands lying nearly flush with the surface. The stalked glands secrete globules of a stiff mucilaginous fluid which serves to trap the plant's victims in much the same manner as the leaf-gland secretions of the sundews trap their prey.

Observations of specimens of butterwort in their native habitat, as well as plants removed to a moist spring-fed bank in the author's yard, indicate that midges and aphids are the chief prey. In fact, potted specimens of the yellow-flowered *P. lutea* from the coastal plain of southeastern United States were found to be so attractive to aphids in a small greenhouse as to eliminate them as pests on other plants in the same house. Large numbers of the victims were even caught on the flower stems, which also bear prominent glands. In the field it is to be noticed that pollen as well as other

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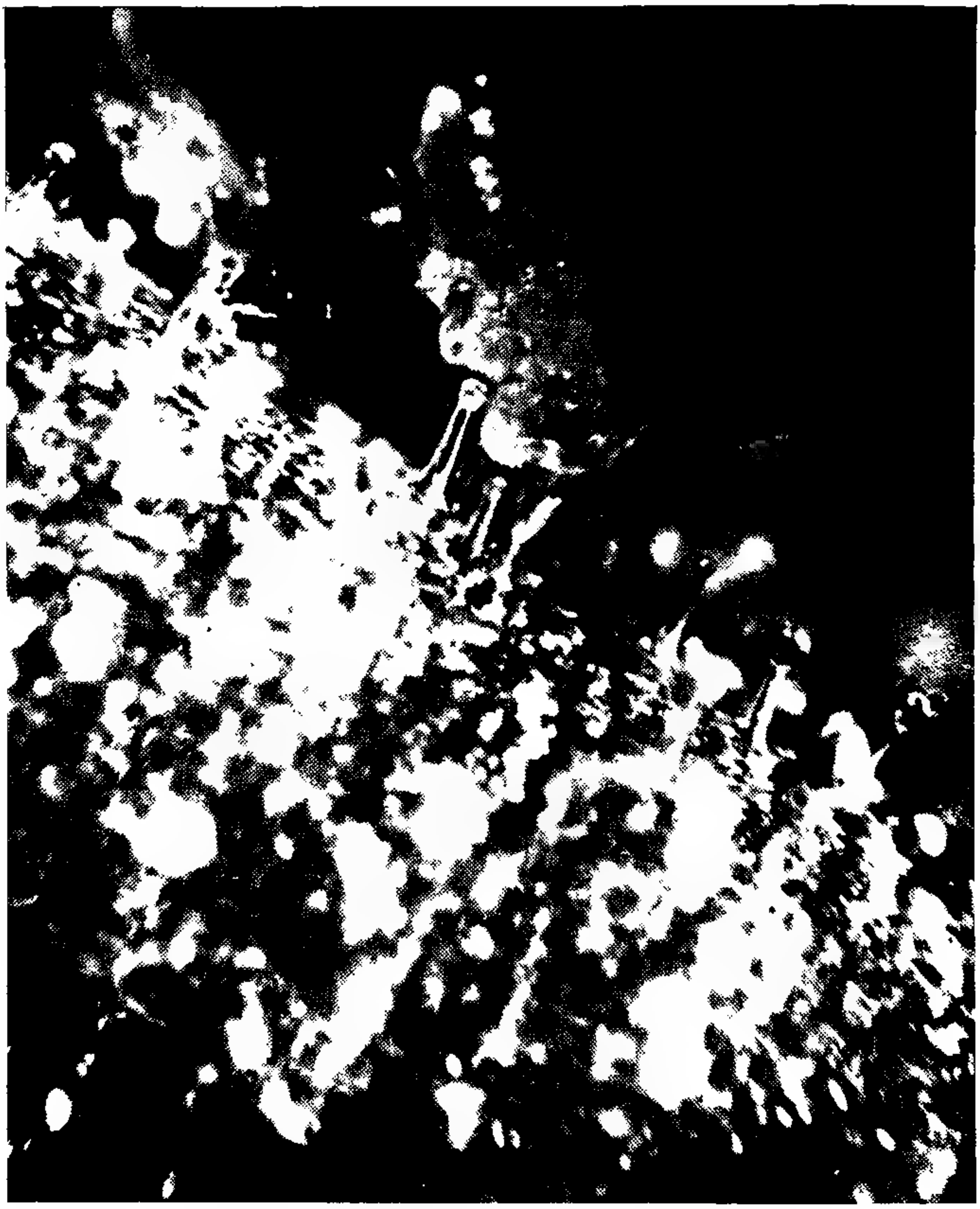
[1] Harold St. John, "A Botanical Exploration of the North Shore of the Gulf of St. Lawrence," Memoir 126, No. 4, Biological Series, Canada Department of Mines, Ottawa, 1922.

THE BUTTERWORT, PINGUICULA VULGARIS

This colony of insect-trapping plants, which was growing in an interdunal bog along Lake Huron, shows the characteristic yellow tones of the buttery-looking leaves. Photographed on Kodachrome, it is reproduced here in approximately natural size.

wind-blown organic debris is often caught on the leaves. If this material is in the form of large particles, the plants generally develop corroded or rotted leaves within a few days. Such damaged leaves are soon discarded



AN APHID ON A BUTTERWORT STEM

When placed in a greenhouse, butterwort plants were found to entrap all the aphids. One of these tiny pests, magnified 60 times, is shown among the gland-tipped hairs of the flower stem of *Pinguicula lutea.*

by a plant. Similar behavior is common in other species of carnivorous plants when an overdose of food materials is caught by a leaf.

Besides the sticky or "tanglefoot" character of butterwort leaves, these also show a certain degree of inward rolling of the leaf margins, which is probably of some assistance in the carnivorous economy of the plant. This action is very feeble and is far inferior to the action of the mechanical traps with which the butterworts' relatives, the bladderworts (*Utricularia*), are equipped.

Ubiquitous Utricularias

The bladderworts belong to a widely distributed genus of aquatic or terrestrial herbs containing about 250 species. According to Muenscher[2] there are at least 14 species in the United States, and of these *U. vulgaris* is found throughout the country, as well as across the Atlantic. This species can be considered typical of those types occurring in ponds, drainage ditches or sluggish streams. The common bladderwort is a robust plant which grows in a submersed floating position. At a quick glance the plant might be mistaken for one of the water milfoils, but closer examination shows that it consists of a much-branched leafy stem bearing peculiar organs, which resemble discoid pouches or bladders with a prominent beak. These bladders, which are actually modified leaves, repay careful study with magnifiers or as live mounts under a compound microscope at magnifications varying from 10 to 400 times.

Collecting Bladderwort Specimens

In order to study the bladders effectively, it is desirable to entertain certain refinements of technique in securing samples. If a specimen of *U. vulgaris* is pulled from its watery environment and placed in a vasculum or other container in order to carry it home, it will be found that most or all of the traps or bladders contain bubbles of air. This artificial condition, which caused some misunderstanding on the part of earlier students of the genus, can be circumvented by using small sample bottles to collect specimens. The plants are floated into the bottles, which should be filled completely with water so that no air bells are caught when the cap is put in place. In this way specimens can be secured in prime condition for microscopic study. Care should be taken not to derange the plant by crowding too much into the container. This can be accomplished by snipping off branches or terminal shoots which will afford good material for studying immature or young and active traps. For an examination of prey obtained by the plants, older traps on portions of a specimen farther removed from the growing points should be selected. On *U. vulgaris* or

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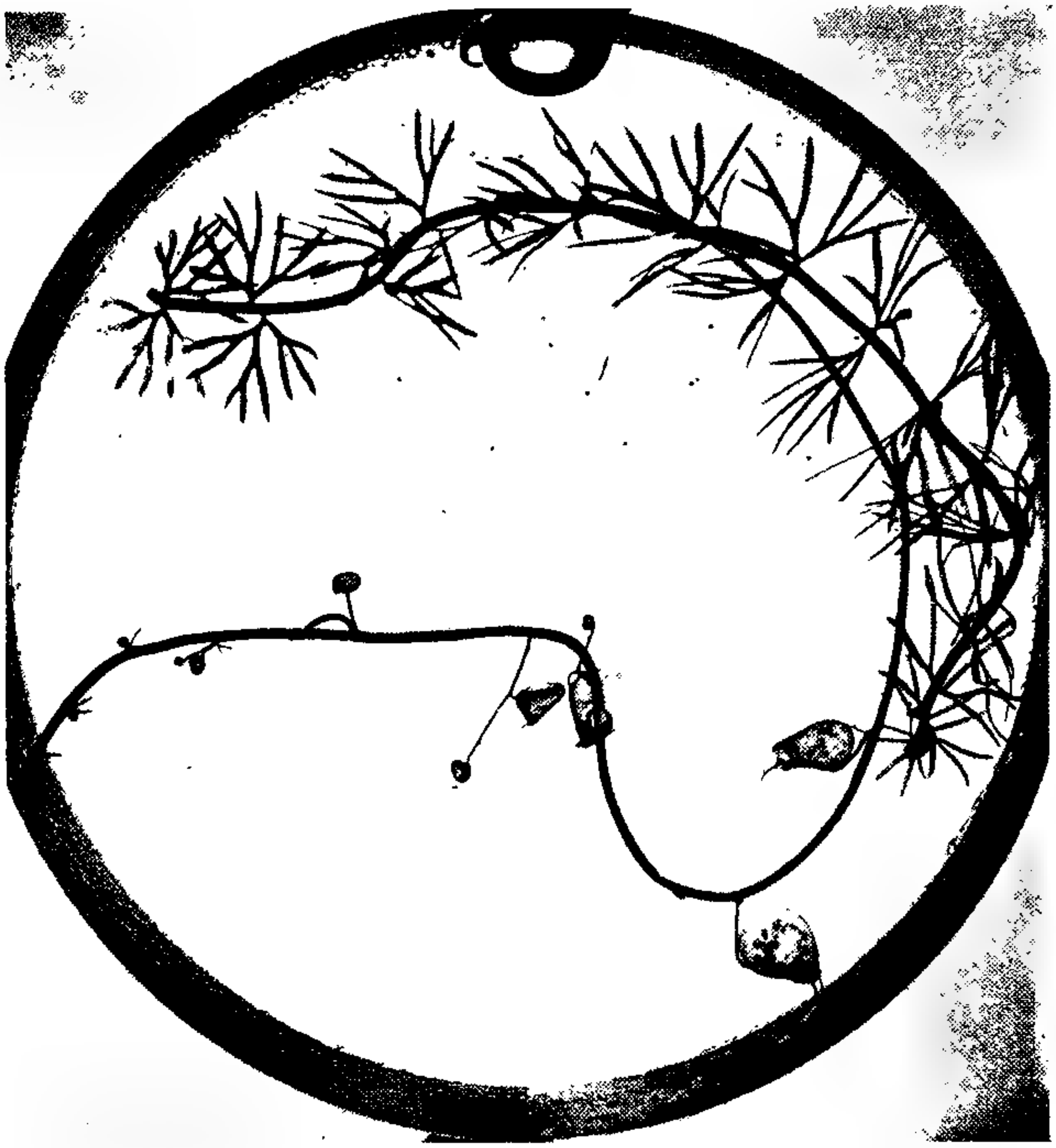
[2] W. C. Muenscher, "Aquatic Plants of the United States," Comstock Publishing Company, Inc., Ithaca, N. Y., 1944.



A BLADDERWORT PLANT IN A DISH FOR OBSERVATION

Traps at succeeding stages of maturity are shown on this small specimen of the flat-leaved bladderwort, *Utricularia intermedia,* which is magnified here three times.

U. intermedia such traps will often be found to be completely clogged with the remains of trapped victims.

Utricularias in the Pine Barrens

Visitors to the Pine Barren region of New Jersey during the summer months cannot fail to be impressed with the wealth of species of *Utricularia* to be seen there in every roadside ditch at the height of the flowering season. Each of these species has special characteristics which must largely be passed over here, but several types are worth some detailed consideration. For example, the swollen bladderwort, *U. inflata,* is an interesting plant, which is arrayed with a star-shaped rosette of swollen parts or

pontoon-like structures serving to support the floral stem above the water's surface. Attached below this rosette and submerged in the shallow water is a much branched stem bearing a multitude of the bladder like traps. From some observations made on Cape May in 1948, it seems likely that some of the pontoons slough off as the seeds reach maturity, so that the seed capsules are no longer held above water. These become submersed in preparation for germination of the seeds, which appears to take place rapidly. The resulting seedlings form winter buds which are characteristic of the genus and allow the wintering-over of the plants.

Thirty Minutes to a Victim

Another *Utricularia* common in shallow ponds or pools is the humped bladderwort (*U. gibba*). One of the finest colonies of this species ever seen by the author was growing in a small deep spring-fed hole which had been created in a bog in Oswego County, N. Y., by sphagnum removal operations. This species proved to be especially amenable to aquarium cultivation, and served as a very fine camera subject. The traps are vigorous and seem to be quite dangerous for mosquito larvae or wigglers. A count on a small plant showed 85 traps of which 46 were adult or mature traps. Fourteen of these, or 30 percent, contained freshly trapped mosquito

A MOSQUITO LARVA BEING ENGULFED

The trap of this specimen of the humped bladderwort, *Utricularia gibba,* magnified six times, has partially swallowed the larva of a mosquito.

larvae. One trap, which is illustrated here, was observed to capture a larva, become reset, and capture a second prey within thirty minutes. This second larva was engulfed tail first, but could not be totally encompassed, partly because of the space occupied by the still undigested first one. The reaction time noted for the resetting of this trap compares quite favorably with some data quoted by Lloyd [3] for another species, *U. flexuosa.*

Studying the Horned Bladderwort

Perhaps the easiest of all the bladderworts to study under magnification is the golden horned bladderwort (*U. cornuta*). This species, although aquatic, grows in the firmer substratum provided by well compacted decaying peat in sphagnum bogs with a very high water table. When these bogs reach such a stage of development that shrubs such as leatherleaf (*Chamaedaphne*) and blueberry (*Vaccinium*) begin to crowd in, the horned bladderwort retreats to the sunken or wet channels made by animals or other agencies between the sphagnum hummocks. *U. cornuta* has the showiest golden yellow saccate flowers of all our species, and in one of the bogs in western New York, where it is particularly plentiful, in favorable years it will be found by the thousands, its flowers forming patches of gold mixed with the occasional pink of the grass-pink (*Calopogon pulchellus*).

Because *U. cornuta* grows in wet peaty substrata, it should be noted that the subterranean parts are particularly delicate and can only be obtained undamaged by collecting budded or flowering specimens as small sods of peat, and then gradually washing away the fibrous, partially decomposed, plant remains. When this is done the plant will be found to consist of rhizoids with erect simple leaves and much-branched, root-like appendages carrying small bladders. These bladders are of a type differing from those of *U. vulgaris* in that they are not provided with antenna-like structures at the beak of the trap. Because of their small size (about 1.5 mm. maximum dimension) and lack of complex antennae, these traps can be placed readily in shallow live mounts on glass slides and examined under the microscope. At low powers, from 30 to 50 times magnification, the general arrangement and structure of the traps can be seen. For more details of the valve or door structure, of the trigger hairs, and of the alluring glands and the secreting cells which are called by Darwin "bifids" and "quadrifids," it is useful to employ higher powers giving magnifications from 100 to 600 times. (*U. cornuta* shows only "bifid" cells.) Because of the appreciable thickness of the traps it is not easy to get a clear picture of the structure and arrangement of the door and valve parts of the bladders except by careful observations on numerous specimens viewed from different positions.

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[3] F. E. Lloyd, "The Carnivorous Plants," Chronica Botanica Company, Waltham, Mass., 1942.

MAGNIFIED VIEWS OF THE GOLDEN HORNED BLADDERWORT

Upper left, a view showing the bifid processes inside the threshold of the trap. Upper right, bifids on the wall of the trap. Below, a smear on a microscope slide showing a diatom trapped among the bifids. These three photographs of *Utricularia cornuta* are magnified 170 times.

The photograph of the flat-leaved bladderwort (*U. intermedia*) on page 138, which was made of a plant growing in an observation cell, is magnified two times. This picture illustrates the normal leaf-bearing branches and those branches equipped with bladders. The bladder portion of this plant is young and actively growing, and shows traps in all stages of development. One trap near the center of the picture is well placed to display the concavity of the walls of a trap set to catch prey. The door on this trap is concealed from view by the beak or overhang and the two antennae, which probably act much in the capacity of weirs guiding the prey to its doom. The two traps to the right of the first have been accidentally discharged above the surface of the water, and each contains small air bubbles.

Action of the Trap

Although a detailed and well documented modern account of *Utricularia* has been published by Lloyd in his monograph "The Carnivorous Plants" [3], a short review of the more salient features of the trap action of members of this genus might well be reviewed here. The typical *Utricularia* trap is a discoid vesicle a few millimeters in diameter at the maximum. This capsule is attached at one side of its periphery to a main stem of the plant by a short stem studded with glands. At about 90° to 150° from this stem there is a funnel or tubular entrance formed by the re-entering walls of the trap, which thus act as a passage connecting with the interior. The disc-like walls of the bladder are either concave (bowed in toward the trap interior) or convex depending on whether the trap is in a set or recently discharged position. The entrance to the trap is blocked by a curtain or door which fits snugly against a threshold and a sealing doorjamb called by Lloyd the "velum." The door has a tripping mechanism consisting in some species of several tapering glandular hairs, which may be seen in the accompanying photographs of the flat-leaved bladderwort. In addition, the traps are provided on the outside with glandular, mucilage-secreting cells for attracting prey, and on the interior with the peculiar two-armed or four-armed cells called "bifids" or "quadrifids." The bifid structures are particularly well developed on the inner face of the threshold. As the accompanying color plate shows, anthocyanin sometimes occurs in the cells of the trap. This is, however, absent from young traps and its appearance is governed by incompletely known factors. The hue which is given by this pigment is apparently controlled by the acidity of the substrate in which the trap lies, since the color becomes more bluish when the trap is immersed in lime-bearing tap water.

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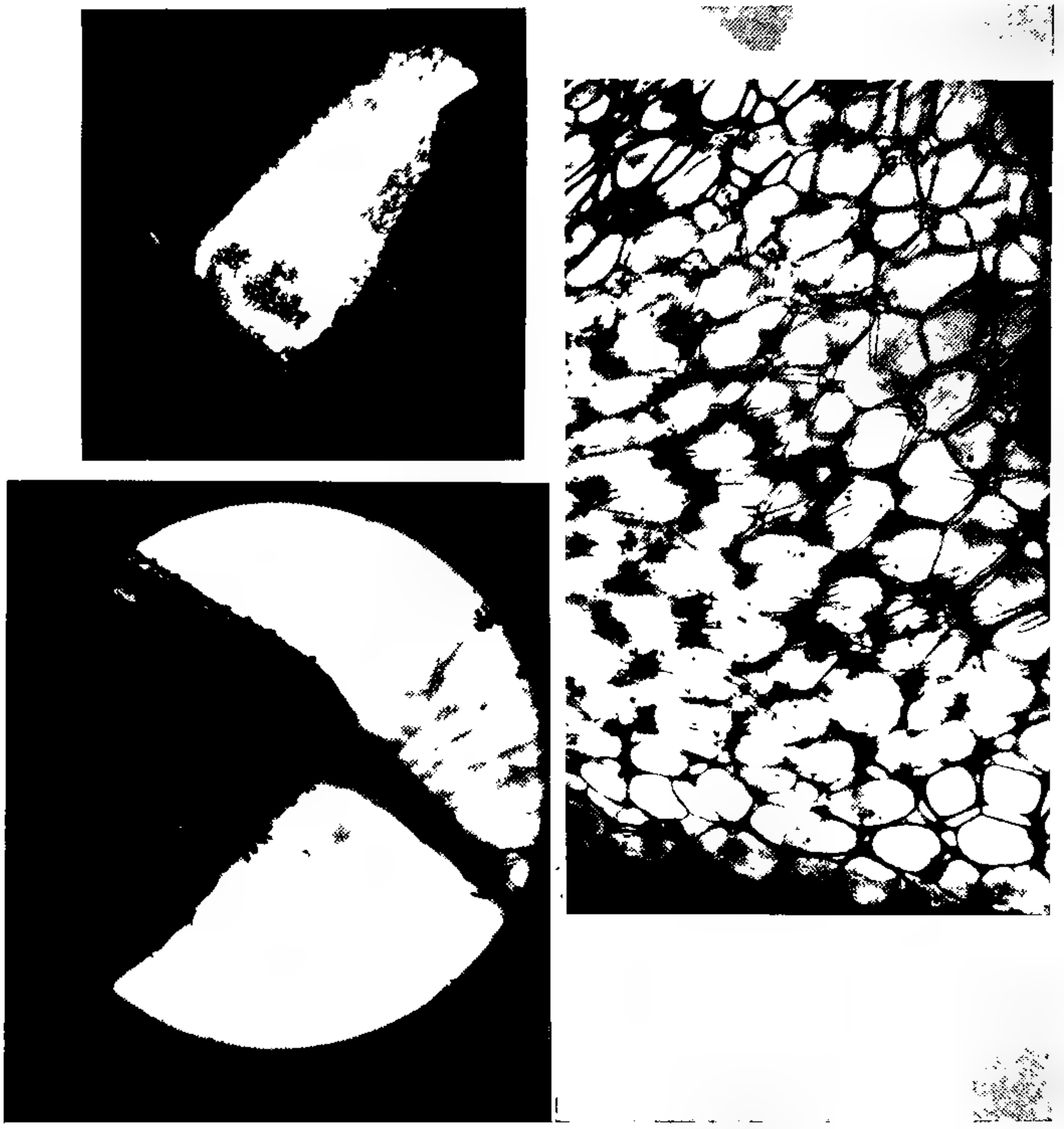
[3] F. E. Lloyd, "The Carnivorous Plants," Chronica Botanica Company, Waltham, Mass., 1942.

THE MATURE TRAP OF A BLADDERWORT

The anthocyanin pigment in the beak of the trap of the golden horned bladderwort, *Utricularia cornuta,* is revealed in this sectional view in Kodachrome, magnified 50 times. The blue is intensified when the trap is in water having a lime content. Only mature traps carry anthocyanin pigment.

The general action of the trap is as follows: Prey in the form of minute crustacea, protozoa, worms, insect larvae or even very young fish are attracted or stray to the vicinity of the traps. In this they are perhaps enticed by the secretions of the glands studding the door region. By chance they trip the trigger hairs. This upsets a delicate balance of forces in the trap, thereby resulting in the expansion of the trap, a swinging in of the door piece and an inrushing of water, which carries the victims into the trap. The door returns quickly to a closed but unset position, even clamping around an incompletely swallowed food morsel, and the trap proceeds to destroy the prey and absorb nutrients from it by some sort of enzymic action. During this time the trap eliminates water from the interior by a mechanism not yet clearly understood, and thereby re-establishes the delicate balance of forces of the set trap. The bifids and quadrifids appear to be associated with the digestion of the animal prey.



FLAT-LEAVED BLADDERWORT THROUGH A MICROSCOPE

Upper left, looking into the door of the trap from below, x 16.7. Below, a sectional view of the trap showing the trigger hairs, x 33. At the right, the interior wall of the trap showing the quadrifid processes, x 500.

The few illustrations and the limited account given here of the features of the butterworts and bladderworts cannot begin to describe the wealth of botanical lore which surrounds these plants. Lloyd considers *Utricularia* to be possessed of the most intricate trapping mechanism of any of the carnivorous plants. Certain it is that *Utricularia* is the equal of the famed but much rarer Venus' flytrap (*Dionaea muscipula*), and it is available for study and admiration by any who are willing to seek it in its watery haunts.

NOTICES AND REVIEWS OF RECENT BOOKS

Flowers of the English Countryside

INTRODUCTION TO WILDFLOWERS. Richard Morse. 266 pages, illustrated with color plates, photographs and drawings; indexed. Macmillan, London and New York. 1949. $3.75.

The arrangement of this work is novel. Part One, which occupies most of the book, provides "a simple account of the more interesting families of wildflowers." Chapter 1 begins without further ado with: "The buttercup family is a large one . . ." and seems to assume some acquaintance with the kinds of wildflowers, since the introductory paragraph refers freely to buttercups, marsh marigold, lesser celandine, monkshood, and other flowers, and nowhere gives anything like a key to species. This assumption, which would be risky in the United States, corresponds to a greater interest in such matters by the English public as a whole.

There are thirty chapters in the first part, offering interesting botanical information on some fifty families, well illustrated in color and in black and white, and practically devoid of technical terminology and botanical names.

Part Two supplements the foregoing with somewhat more technical matter, including a synopsis of families, distribution of wildflowers, a calendar of flowering, a color guide, a list of one hundred books "for further reading," and an index in which the Latin names take their places beside the English. Over 500 species are listed. The work is well written and attractively produced.

H. W. Rickett.

From the Heart of Asia

RHODODENDRONS. F. Kingdon-Ward. 128 pages; 1 color plate, 2 halftones. Latimer House, Ltd., London; Pellegrini & Cudahy, New York, 1950. $2.50.

A pleasant little book by the celebrated plant-hunter of Burma, Yunnan and the eastern Himalayas, this contains vivid descriptions, in Kingdon-Ward's inimitable style, of the Asiatic hinterlands where hundreds of species of *Rhododendron* occur. This is the book's most notable feature. The horticultural advice, although good, is inadequate for most American gardeners, having been written for the British amateur. Since few of the species which Kingdon-Ward encountered in the wild or has recommended in his book are growable in the eastern United States, this work can have little practical value here, except on our West Coast. Botanists will disagree with the author's proposal to split the genus into several new genera.

Clement Gray Bowers.
Maine, N. Y.

An Admittedly Hazardous Text

THE ELEMENTS OF GENETICS. C. D. Darlington & K. Mather. 446 pages, figures, tables, index. Macmillan, New York. 1949. $3.75.

It would be disastrous to put this stimulating and brilliantly written book into the hands of a student; it will be equally unfortunate if the prejudices which the volume is sure to arouse keep it from the close attention of scholars. In a short and delightful preface the authors frankly state, "There are two ways of attempting to describe a part of nature in scientific terms. One is to deal with the area which has been exactly mapped out by experiment. . . . The other is to go further and use our knowledge of the mapped area to fill in the empty spaces according to the most likely assumptions. The first method is evasive, the second hazardous. We prefer the second and have adopted it."

With this attitude the reviewer is enthusiastically in accord (though he hopes the authors have tougher skins than his if they persist in it!). If the book were to circulate only among those with some slight degree of competence in the fields it attempts to cover, it could do no possible harm and would irritate various moribund specialists into thought and eventually into experiment. The authors, however, have such a genius for exposition, the descriptions of complicated cytological phenomena are so crisply and simply written, some of the fundamental

facts of genetics are so tellingly diagrammed in original charts, that the book must inevitably fall into many innocent hands. Consider, for instance, the plight of an intelligent sociologist who must take at face value its dicta as to the chemical composition of the germplasm, the dynamics of mitosis, the genetic background of evolution and the role of genetics in world affairs. For such readers a new edition is badly needed with at least three kinds of type: ordinary type for statements likely to be concurred in by a substantial number of progressively minded biologists, italics for highly speculative and controversial attitudes, and bright red for statements generally recognized to be absolutely incorrect. The book bears internal evidence of having been rather long in coming off the press. This as well as the personalities of the authors has increased the wordage for which red type is already indicated.

EDGAR ANDERSON,
Missouri Botanical Garden.

Dr. Clements' Pikes Peak And Santa Barbara Work

ADAPTATION AND ORIGIN IN THE PLANT WORLD. Frederic E. Clements, Emmet V. Martin, and Francis L. Long. 332 pages, photographs and drawings by Edith S. Clements; glossary, index. Book Dept., Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York. 1950. $6.

This volume, which summarizes the results of a long-term project of Dr. Frederic E. Clements which was carried out mainly at the Pikes Peak and Santa Barbara field stations under the aegis of the Carnegie Institution of Washington, has been prepared for publication by Dr. Clements' wife, Edith S. Clements, since the death in 1945 of Dr. Clements and Dr. Long. Mrs. Clements was her husband's professional associate and photographer and artist for his studies. Previously published material based upon these investigations has consisted mostly of notes in a series of Dr. Clements' annual reports to the Carnegie Institution of Washington in which he claimed numerous species convergences and several species conversions as a result of transplant manipulations. The present book undoubtedly presents a fair accounting of the labors of these persons and their various assistants during the years as well as a record of Dr. Clements' philosophy of species and his belief in the capacity of environment to produce transmutations of some of them.

As an evolutionist, Dr. Clements will have to be placed in time somewhere between Lamarck and Lysenko with, however, a more competent ecological basis than either of them. Basically, Dr. Clements was either not conversant with the genetical thought of his time or was disdainful of it.

It is not within the province of this short book notice to enter into the problems raised by "Adaptation and Origin in the Plant World," nor is it within the desires and competence of the writer, but it would be negligence not to point out that the book is subtitled "The Role of Environment in Evolution," and that in the field of evolution the point of view represented by the book is largely anachronistic. Any field ecologist knows something of the power of environment to modify the look of a plant and the sometimes startling range in phenotypic plasticity inherited by some plants. Also, any student of plant systematics knows that the entities dignified by Latin binomials are of many different kinds, biologically and genetically. That some of these "specific" entities of the books may be mere habitat forms without the grace of a genetical basis is to be expected. In such cases the production of "specific" convergence or even conversion between closely "related" entities by transplant manipulations of clonal material has nothing to do with *species* or with evolution. To evaluate this book with respect to such matters would require a knowledge of the systematics of the species groups involved, as well as of their ecology and genetics. There will undoubtedly be reviewers aplenty who will take up this task.

I would not be one of those to criticize the Book Department of Chronica Botanica for publication of this controversial book. I think that Dr. Verdoorn is performing a service in offering these results for public scrutiny since most botanists in America have known for decades the path of this phase of Dr. Clements' stimulating professional life, as they have known, also, that the work of Clausen, Keck and Hiesey at Stanford University started by Hall as a schism

from Clements' approach to evolutionary problems among western American plants. If this book be Lysenkoism, let us debate it in the open on a basis of American materials. An honest man's life work deserves more than aspersions (of which Dr. Clements had his full share); if it has earned refutation, in part or in whole, it at least deserves a fair and open forum.

STANLEY A. CAIN,
Cranbrook Institute of Science.

Flower Details from the Masters

THE RENAISSANCE PAINTER'S GARDEN. Ruth Wedgwood Kennedy. Sixty folio illustrations, one in color. Oxford University Press, New York. 1948. $30.

The author of this luxury book is a Renaissance scholar. It was her original idea to give a new kind of lecture to garden club members at the Toledo Museum of Art. For this purpose she selected flower motifs from Italian paintings of the quatrocento—incidental details which museum visitors seldom notice. From these beginnings grew a work which should be of great interest to art and garden enthusiasts, and to those who appreciate a finely made book. The format is handsome and the large clear type was designed from contemporary pages by the renowned Bruce Rogers.

The text gives us a colorful account of the significance and symbolism of flowers, fruits and foliage, as understood in the period. Mrs. Kennedy tells us that the Italians of the Renaissance revived the Roman concept of gardens as additional rooms to their villas and town houses. Gardens were not made for floriculture, and flowers—excepting possibly the rose—received scant attention. Fruits, however, were given earnest cultivation. Hedges and lawns were in evidence and so were plants in pots.

The full-page illustrations give details from the paintings of a great many artists of the day, among whom are Veronese, Botticelli, Michelangelo, Raphael, Leonardo. The pictures chosen show the decorative use of plant materials in landscape, in costume, in hair-do's with chaplets of roses and jasmine. There are incidental close-ups of lilies, carnations, iris, daisies, many of them brushed in with "artist's license." Perhaps the most careful drawing is that of a lily by Leonardo. Mrs. Kennedy suggests that other botanical drawings by this master may have been among those of his lost works which were recklessly disbursed from Orazio Melzi's garret.

Since the photographs show details only, the curious minded might wish that the complete compositions had been somehow included, possibly in miniature. It is furthermore to be wondered why a work by an experienced writer, and one so erudite as Mrs. Kennedy, should be minus a bibliography, from which the reader might learn the author's sources and enjoy the pleasure of pursuing further this fascinating subject.

HARRIET K. MORSE.

Landscape Design For the Small Place

HOW TO BEAUTIFY AND IMPROVE YOUR HOME GROUND. Henry B. Aul. 316 pages, indexed. Plans and illustrations by author. Sheridan House, New York, 1950. $3.50.

In this book Mr. Aul, a well known designer of gardens and writer on horticultural subjects, presents with plans and sketches a series of garden designs demonstrating a complete layout for many types of small properties from city back-yards to larger suburban places.

The author believes that the home grounds should be an extension of the livable part of the house and that its architectural features should find complement in the garden. To that end he introduces as embellishments in his designs structural features such as arbors, shelters, tool houses, etc., and emphasizes the terraced or paved living-room with its fireplace.

Instruction is given as to the building of these and other facilities such as walls, paths, fences and pools, and suggestions are offered for plant material suitable for each situation.

While some plans seem too elaborate or complex for the average home gardener or rather costly to build and maintain, the book does contain many helpful ideas and suggestions that could be adapted to almost anyman's garden.

RUTH N. WETZEL,
Mt. Vernon, N. Y.

Indoor Hobby

ORCHIDS AND HOW TO GROW THEM. Adelaide Willoughby. 135 pages, illustrated, indexed. Oxford University Press, New York. 1950. $3.50.

Adelaide Willoughby knows her orchids and writes interestingly and with enthusiasm of them in her new book, "Orchids and How to Grow Them." She delves into the lore and background history as well as present-day technique for successfully growing and flowering them. It is always a great pleasure to discover an expert who gives time and space to the less known but equally easy to grow varieties aside from the more familiar cattleyas.

Mrs. Willoughby presents clearly and invitingly the "how to" involved in growing orchids from seed—potting, suitable housing, and many other angles as well. This volume, attractively illustrated with eight double pages of excellent photographs, will start you on a new hobby, and if you are already started will lead you along new paths in the world of orchid growing.

JEAN HERSEY,
Author of "Garden in Your Window."

Botanical Background For Commercial Resins

VEGETABLE GUMS AND RESINS. F. N. Howes. 188 pages, illustrated, indexed. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York, 1949. $5.

Half of this volume is devoted to the gums, half to resins and natural lacquers. The author has coordinated a tremendous amount of apparently divergent data in this small book. His viewpoint is very largely that of the plant scientist, rather than that of the industrial worker, and he has done much to straighten out some of the botanical confusion. His volume will therefore be of considerable help to workers in economic botany. Extensive bibliographies to the activities of others dealing with applications and the chemistry of the gums and resins is included in the volume.

Now the Principal Scientific Officer of the Royal Botanic Gardens at Kew, the author was formerly an economic botanist in Africa.

C. L. MANTELL,
Consulting Chemical Engineer.

Pacific Coast Saga

TRODDEN GLORY. Cameron Rogers. 130 pages, illustrated. Foreword by Stanley Walker. Wallace Hebberd, Santa Barbara, Cal. 1949. $2.50.

To the plantsman the cover picture and title suggest the story of the California poppy. Unfortunately, the poppy plays a minor role, a backdrop occasionally bringing a ray of light to the tragic happenings of the major role. This is the story of the bitter, long struggle for possession of the northern Pacific coast where amazing numbers of fur bearing animals were shamefully exterminated.

The poppy rather comes to its own when three outstanding botanists appear on the scene. Archibald Menzies discovered it in 1792. Adelbert von Chamisso studied the plant and named it *Eschscholzia californica,* to the rage of the author. David Douglas sent seeds and plants of the golden poppy far and wide.

The book is written in an individual

style which becomes delightful when the author explodes into wrath.

An index would be most helpful.

ANNE DORRANCE.

Rafinesque's 10,000 New Names

INDEX RAFINESQUIANUS. E. D. Merrill. 296 folio pages, indexed. The Arnold Arboretum, Jamaica Plain, Mass. 1949. $10.

Rafinesque (according to Merrill) published some 2,700 new generic names, 335 new subgeneric and sectional names, 6,700 new binomials, and 900 new varietal names—a grand total of 10,635. Of these about 330 names have never before been listed. The present work is designed to fill this gap. Doctor Merrill contributes an introduction of 64 large, finely printed pages, in which various biographic and bibliographic matters are discussed, besides miscellaneous nomenclatural controversies. The catalogue of names itself occupies 179 pages, arranged in the Englerian sequence; an index of 52 pages is provided.

H. W. RICKETT.

Fern Manual

FIELD BOOK OF COMMON FERNS. Herbert Durand. 223 pages, illustrated with photographs and drawings. G. P. Putnam's Sons, New York. Revised edition 1949. $3.50.

Both common and botanical names have been brought up to date in this useful handbook of ferns which was first published in 1928 and has since appeared in eight additional printings. The current volume is the first revised edition.

Sunday Horticulture

THE WEEKEND GARDENER. Dorothy H. Jenkins. 280 pages, indexed. Rinehart & Co. Inc., New York. 1950. $2.75.

It takes a clever, energetic person to do as many things in a garden as Dorothy Jenkins suggests in her latest book, written particularly for those who must confine their gardening to Saturdays and Sundays in the country. However, she does her own gardening this way, hence her book should provide practical advice and answers to the weekend gardener's problems.

For Budding Naturalists

HOW TO KNOW THE WILD FLOWERS. Alfred Stefferud. 143 pages, illustrated by Sidney H. Horn, indexed. New American Library of World Literature, Inc., New York. 1950. 35¢.

It never seems possible to make a book for beginners satisfactory to the more experienced people who study it. If it serves to arouse an interest in the subject which may lead to more extensive reading and observation of wild flowers, a beginner's book may be said to have fulfilled its purpose. Alfred Stefferud's small volume has this as its aim. There are places where the text is not closely enough tied in with the illustrations to make it clear which flower is being depicted.

SIX-LEGGED NEIGHBORS. Bertha Morris Parker. 36 pages, illustrations by Arnold W. Ryan. Row, Peterson Co., White Plains, N. Y. 1949. 48¢.

The excellent illustrations in color give this book an appeal to many besides the very young people for whom it was intended. A few lines of text accompany the picture on each page.

IN WOODS AND FIELDS. Margaret Waring Buck. 95 pages, illustrated, indexed. Abingdon-Cokesbury Press, Nashville, Tenn. 1950. $3 in cloth; $1.75 in paper.

Animals, birds, and insects, as well as wild flowers and trees are included in this entertaining primer, which is well arranged according to season and excellently indexed according to the type of wild life being sought. The illustrations are black and white wash drawings which give adequate and clear detail.

Gardening Books from England

EVERY DAY IN MY GARDEN. F. Hadfield Farthing. 336 pages, illustrated, indexed. George Allen & Unwin, Ltd., London; Macmillan Co., New York. Third edition reprinted 1948. $1.75.

Approximately 75,000 copies of Farthing's "Every Day in my Garden" have reached the hands of gardeners since 1929. This book combines readability with sound gardening practice. It is probably only in the section—the last 49 pages of the volume—entitled "Day by Day in the Garden" where adjustments have to be made for North American practice. For example, in the vicinity of

New York the corms of gladioli could scarcely be planted outdoors with safety on the 24th of March.

LILIES FOR GARDEN AND GREENHOUSE. D. T. Macfie. 151 pages, illustrated, indexed. Transatlantic Arts, Inc., Forest Hills, N. Y. Revised edition 1947. $2.75.

Half of this book on lilies, which was produced in England, is devoted to descriptions of a large number of species and varieties, with the parentage of each given where it is known. Other chapters take up planting, propagation, and culture of lilies outdoors and in the greenhouse.

Wildlife and Conservation

THE FARMER AND WILDLIFE. Durward L. Allen. 84 pages, illustrated. Drawings by Oscar Warbach. Wildlife Management Institute, Washington, D. C. Second printing 1949.

Cartoons and other drawings, also many photographs, enliven this excellent paper-covered volume for the farmer. There should be a way of putting a booklet of this nature into the hands of those who need it most, rather than those already interested, who are the ones most likely to acquire it.

PROBLEMS IN FOREST CONSERVATION AND DEVELOPMENT. 23 pages. **PROBLEMS IN LAND REHABILITATION AND SOIL CONSERVATION.** 17 pages. Emory University, Emory, Ga. 1949. Free.

The School of Business Administration of Emory University has issued reports on forest and soil conservation as Nos. 1 and 3 of its Studies in Business and Economics.

Notes, News, and Comment

Journal Editor Resigns. The current issue of the Journal of the New York Botanical Garden is the last to appear under the editorship of Carol H. Woodward, who has been associated with the magazine ever since she first became a member of the Botanical Garden's staff. She concluded her work at the Garden at the end of May, her resignation becoming effective June 30.

Miss Woodward came to the Garden on Feb. 1, 1931. For the first six years she edited the Journal in collaboration with Dr. Marshall A. Howe, assuming the sole editorship upon his death. Also with Dr. Howe she did the editing and proof-reading of Dr. P. A. Rydberg's "Flora of the Prairies and Plains of Central North America," and, with Dr. John Hendley Barnhart, of several parts of *North American Flora.*

In those years the institution was making little attempt to keep the press informed of its activities and services. Recognizing a need, in 1932 Miss Woodward organized a publicity program for the New York Botanical Garden. In 1938 she was given the management of the free Saturday afternoon lecture programs, which have since more than doubled in attendance. In 1943 she inaugurated a series of bi-weekly radio interviews for the Garden over station WNYC. These were continued for four years, with a different speaker for each program.

Throughout her years at the Garden, Miss Woodward also assisted in planning and carrying out such special events as Rose-Growers' Day, the annual Chrysanthemum program, the Herb Conference of 1941, and for some five years the Members' Day programs. She has also worked on the Garden's courses of study, helping to plan the curriculum and preparing the Educational Program booklet, which has been issued anew each year since August 1940.

An innovation in 1938 was the publication of a booklet from material which had appeared in the Journal. The success of this one, entitled "Hardy Azaleas," resulted in numerous other booklets: "Begonias" 1940; "Hardy Ferns and their Culture" 1940; "Daylilies" 1941; "The Flora of the Unicorn Tapestries" 1941, with new editions in 1947 and 1950; "Vegetables and Fruits for the Home Garden" 1942; "Succulent Plants of New and Old World Deserts" 1942, with new editions in 1944 and 1950; "The Victory Gardens of 1942 and 1943" 1943; and "Plants of the Holy Scriptures" 1948.

During these years Miss Woodward has also edited several books for publishers and has written for *House and Garden, House Beautiful, Flower Grower, Frontiers, Torreya, Natural History,* and *Nature Magazine*; also for the New

York *Times*, New York *Herald-Tribune*, and the *Christian Science Monitor*. Much of her writing has likewise appeared in the Journal. She originated the present extensive book-review section in the magazine in 1936.

About ten years ago she inaugurated the sale of flower postcards in the Museum Building. This project has now expanded into the Book Service department which opened last month.

After spending several months at her summer home at Hemlock Ridge, Brookfield, Conn., Miss Woodward plans to return to New York to carry on editorial work in botany and horticulture.

Guest Editor Appointed. Dorothy Ebel Hansell, Editor of the Bulletin of the American Rock Garden Society and the organization's secretary, has been appointed Guest Editor of the Journal of the New York Botanical Garden, to succeed Carol H. Woodward, who has resigned as Editor.

Mrs. Hansell has had a long career in horticultural editing. In November 1924, upon the death of Martin C. Ebel, she took her father's place as editor of the *Gardeners' Chronicle of America* and Secretary of the National Association of Gardeners, and continued in both these capacities through August 1942. At the time of her resignation the magazine was serving as the official organ of both the N.A.G. and the American Rock Garden Society.

She was one of the organizers of the American Rock Garden Society and its first secretary, holding that office from May 1934 through May 1942. Returning to the gardening field after being engaged in war work for four years, she was appointed secretary of the American Rock Garden Society in the fall of 1946 and later became Associate Editor of its Bulletin under Dr. Edgar T. Wherry, eventually succeeding him as Editor.

She has done extensive writing for various horticultural magazines.

Week-end Charge for Autos. On Saturdays, Sundays, and holidays, beginning May 6, automobiles are being charged a fee of 25 cents at the New York Botanical Garden. Members, however, may bring their cars in without cost, upon presentation of their membership card at the gate. Entrance to the grounds is free for all automobiles on week-days, and remains free to pedestrians at all times.

Club Service on Floral Flyer. Garden clubs and other groups wishing to use the Garden's tractor train, *The Floral Flyer*, on week-days may engage the train by making advance arrangements. The charge is $5 an hour with a minimum of $10 to cover the cost of the service.

Visitors. During May the Garden's special visitors included Elizabeth Ruth Dearden of the Mycological department of the University of Toronto, Michael Zohary of Hebrew University, Jerusalem, and J. E. Gunckel of Rutgers University, New Brunswick, N. J.

Board of Managers. Douglas H. Allen, 222 Eleventh Avenue, New York City, and Leonard J. Buck, 74 Trinity Place, New York City, have been elected to the Board of Managers.

At the same meeting, on May 10, ten new members were elected to the Corporation of the Garden. They are Mrs. Montgomery B. Angell, Mrs. Warren R. Austin, Mrs. Neville J. Booker, Mrs. Raymond M. Gunnison, Mrs. Robert C. Hill, Dr. Thomas Lewis, Mrs. Harry T. Peters, Mrs. John L. Senior, Mrs. Langdon S. Simons, and Mrs. Wallace S. Whittaker.

Prints on Display. Japanese iris in the form of hand-colored prints will be shown during the summer months in the Museum Building of the New York Botanical Garden. The collection, which is unsigned, represents the finest of Japanese work in flower painting of the turn of the century. Each print bears both the Japanese name of the variety and its English equivalent.

Acquired in Japan in 1909, the pictures were presented a year ago to the Cooper Union Museum for the Arts of Decoration by Mary Rutherford Jay. The Botanical Garden's exhibit, which is on loan from Cooper Union, is the first showing of these colored prints in America.

THE NEW YORK BOTANICAL GARDEN

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

THE CORPORATION OF THE NEW YORK BOTANICAL GARDEN

The New York Botanical Garden was incorporated by a special act of the Legislature of the State of New York in 1891. The Act of Incorporation provides, among other things, for a self-perpetuating body of incorporators, who meet annually to elect members of the Board of Managers. They also elect new members of their own body, the present roster of which is given below.

The Advisory Council consists of 12 or more women who are elected by the Board. By custom, they are also elected to the Corporation. Officers are: Mrs. Thomas D. Thacher, Chairman; Mrs. Guthrie Shaw, First Vice-Chairman; Mrs. James C. Mackenzie, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Hugh Peters, Corresponding Secretary; and Mrs. Junius A. Richards, Treasurer.

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THE CHINESE FRINGE TREE

in full bloom at The New York Botanical Garden

THE CHINESE FRINGE TREE

The magnificent specimen of the Chinese fringe tree, *Chionanthus retusa,* appearing as our cover illustration, was in full bloom at the New York Botanical Garden during the week of June 5, 1950. It is one of the most beautiful of all the small flowering trees. From a distance, the gently arching branches look like snowy white ostrich plumes, so dense are the lacy panicles of flowers. Closer examination reveals that each flower is composed of four ribbon-like petals.

Reliably hardy—the tree was planted at the Garden probably some thirty years ago—the Chinese fringe tree has a much more shapely form of growth and is more floriferous than its little known relative, the American fringe tree, *Chionanthus virginica.* The flowers of the latter are greenish white and, therefore, not as distinctly showy as those of *C. retusa.*

A REMINDER—that throughout the year the keen plantsman, amateur or professional, will always find something of interest at the New York Botanical Garden

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THE NEW YORK BOTANICAL GARDEN

DOROTHY EBEL HANSELL, Editor

VOL. 51 JULY 1950 No. 607

"A Tree Grows in Yonkers"

Davidia involucrata, which initiated E. H. Wilson in plant exploration, is represented by a superb specimen in Westchester County, New York

T. H. Everett

WHAT must surely be one of the largest and most perfect dove trees in the eastern United States is flourishing in Yonkers, N. Y. It measures fully thirty feet high and has a spread at least equalling its height. It is located on a piece of privately owned property just south of the spot where "Greystone", the mansion of the late Samuel Untermyer, stood on the same side of North Broadway and not many yards inside the wall that divides North Broadway from the property.

I came upon this tree by chance on Memorial Day. It was in full bloom. A light breeze caused the thousands of pure white "doves" that depended from its branches to flutter gaily — and the sight brought back memories.

I recalled the first time that I saw *Davidia involucrata* in bloom — at Kew in 1925. At Kew we knew this species as the "ladies' handkerchief tree", and in some ways I think this is a more descriptive name than "dove tree" for, from a little distance, it is not difficult to imagine the snowy bracts to be dainty bits of cambric. I have never been able to see that they bear any very strong resemblance to doves.

I thought also of another Memorial Day, twenty-two years ago, when the late E. H. Wilson first saw this tree in bloom in America and of it wrote, "It was a glorious sight and one for which I had waited twenty-eight years."

I reflected upon how much we owe indirectly to the dove tree and how much poorer our gardens might be today, were it not for it. Gardeners who have never seen the dove tree nor even heard of it likely have brighter and more satisfactory gardens because of its existence. For it was the dove tree that launched E. H. Wilson on his distinguished career as a plant collector—a mighty endeavor that gave us the regal lily, the

before and the trunk and branches formed the beams and posts of the house." Wilson further records simply, "I did not sleep during the night of April 25, 1900."

By the first of May Wilson was back in Ichang. He had made up his mind to set out the following winter to the region, a thousand miles away, where Father David had found his dove trees in 1869, and there start a fresh search. In the meantime he would collect what other plants he could in western Hupeh. Imagine his joy when botanizing some five days' journey from Ichang on May 19th, he unexpectedly came upon a fifty foot specimen of the dove tree in full flower. Later he found ten more in localities varying from fifty to a hundred miles apart. He watched these eleven trees anxiously through the summer of the Boxer rebellion and in November collected a great quantity of seeds which he sent promptly to England. In the following year Wilson discovered other *Davidia* trees until he knew of a hundred growing in various locations — but he says that from the entire hundred he was not able in 1901 to gather a hundred seeds, and that never in all his subsequent visits to China did he see the dove tree fruit as profusely as it did in 1900!

In considering the specimen of the dove tree thriving in Yonkers, I reflected upon the amazing adaptability of some plants under cultivation. Father David discovered *Davidia* near Moupine, in western China at elevations between 6,000 and 7,000 feet. William Bottling Hemsley in 1907 wrote, "Some of the Abbè David's notes respecting the climate of Moupine are worth repeating for the information of the cultivator. Moupine itself is at an elevation of 7,100 feet — it is surrounded by loftier peaks, the highest being nearly 17,000 feet and wooded up to 11,500 feet, with beautiful pastures above, without perpetual snows. A curious fact in the climate is that the snows and fogs of winter usually cease lower down in the forest zone, leaving the upper zone dry and severe. The climate of Moupine is very rigorous and unpleasant; the winter cold with much snow, which lies in the sheltered valleys till May or June. During the rest of the year there is almost daily rain and the atmosphere is always fully charged with moisture. *Davidia* grows in partial shade of larger trees." A position in full sun, near sea level, off North Broadway, Yonkers, N. Y., is strangely different from Moupine, China!

Although the dove tree has bloomed in Massachusetts and at other places north of New York, even in this region it needs a sheltered spot to ensure its satisfactory development, and shelter is particularly necessary during its early years. It apparently is not exacting as to soil, provided it is drained, deep, and reasonably fertile, but it is important that the soil does not dry out excessively during the summer. Propagation has been effected by means of seeds, cuttings and layers, with seeds probably producing the most satisfactory trees.

Botanically the dove tree is related to our native tupelo and to the dogwoods, but in its general landscape value it has much more the quality of a linden. It is rather too regular and soft in appearance to have strong character — except by way of contrast. Its best use is as a lone-standing specimen in a cultivated landscape rather than as an associate of the woodlanders in a natural landscape. One factor to keep in mind, however, is that the foliage, especially when young, and particularly after rain, gives off an offensive odor — not an odor that spreads any great distance — but nevertheless it is not a tree to set close to the dining room window or near the sitting out terrace or porch.

As can be clearly seen in the photograph, the showy part of the "flower", like that of our native flowering dogwood, consists of bracts. In the case

Davidia involucrata, fully thirty feet high and with equal spread, as it appeared on Memorial Day, May 30, 1950, in Yonkers, New York.

of the dove tree, these number two (or occasionally three) and are of unequal size. The larger may measure nearly six inches long and half as wide and the smaller bract is about half as big as the larger.

From 1869 to 1950 is but a long lifetime. Yet within that span our entire knowledge of this curious native of mountainous western China has been gained. As living specimens our gardens have known the dove tree but a little over half a century and in busy Yonkers a specimen, that is undoubtedly one of the finest in the country, flourishes. It is a fine memorial to the famous men who played a part in its introduction — the good Abbè David, Pere Farges, Vilmorin, Augustine Henry, Veitch and Wilson. And in a way it commemorates also an era that has passed with the men. An era when men, not afraid of hardship and sometimes danger, could roam the world with comparative freedom, seeking new plants to adorn our gardens. Who would hazard a guess when next it will be possible to travel through western China on such peaceable missions?

The New York Botanical Garden *

William J. Robbins, Director

THE Act of Incorporation of the New York Botanical Garden originally passed by the Legislature of the State of New York in 1891 created a body corporate, by name, The New York Botanical Garden, to be located in the City of New York for the purpose of establishing and maintaining a Garden and Museum and Arboretum therein and elsewhere, within or without the State of New York, for the collection and culture of plants, flowers, shrubs and trees, the advancement of botanical science and knowledge, and the prosecution of original researches therein, and in kindred subjects, for affording instruction in the same, for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation and instruction of the people.

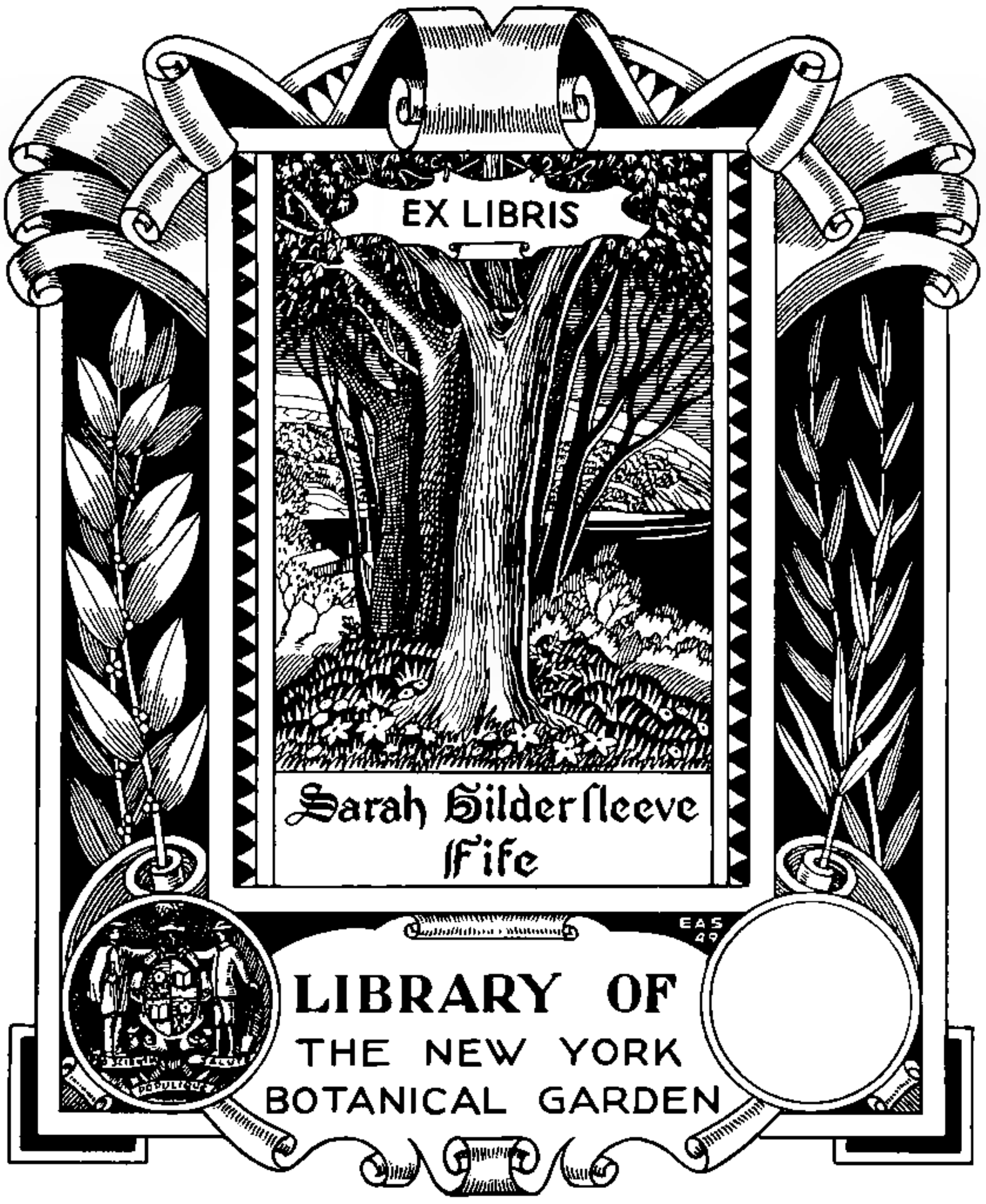
The late Colonel J. E. Spingarn, notable horticulturist and public figure, and for many years a member of the Board of Managers, once said that he believed no better statement of the purposes of a botanical garden could be devised than the one I have just quoted from our Act of Incorporation.

You will note that the purposes of the Garden may be classified into two general major objectives. One purpose is that the Garden should be a place of pleasant resort for the entertainment, recreation and instruction of the

*Excerpts from the talk Dr. Robbins made at the Annual Meeting of the Board of Managers and Members of the Corporation on May 10, 1950.

general public. The other states that it should be an institution to preserve, disseminate and extend our knowledge about plants, and our ability to grow them and make use of them.

Most visitors to the New York Botanical Garden, and perhaps many of you, too, think only of the first of these. This is not surprising, for we



Bookplate especially designed for the bequest of approximately 300 books from Mrs. Robert H. Fife, incorporating Mrs. Fife's own bookplate as the center and border from the bookplate of the Library of the New York Botanical Garden.

have here, in 230 acres, one of the most lovely sections of New York City. More than 12,000 species of plants grow in our greenhouses and on our grounds.

The second of the major purposes of the New York Botanical Garden is equally our concern. The New York Botanical Garden is a scientific and educational institution and has been since its origin, though its activities in

this direction are less generally known than its function as a place of public resort.

The New York Botanical Garden has one of the best and most effective libraries devoted to botany and horticulture. It includes nearly 56,000 bound volumes and many thousand unbound volumes and pamphlets.

During the last year there have been added to the library, by bequest, the botanical and horticultural books from the library of Mrs. Robert H. Fife, and that of Mrs. Sarah V Coombs, and from the library of Mrs. Eleanor C. Marquand. In addition, notable gifts have been received from Mrs. Helen M. Fox, Mrs. Amy Spingarn, Mrs. T. A. Havemeyer, Miss Mabel Choate, Miss Harriet Louise Britton.

By your association with the New York Botanical Garden, you are participating in a program of research which is concerned with the study of the fundamentals of abnormal growth, with special reference to the general problem of cancer. Dr. R. S. de Ropp, supported in part by the American Cancer Society, is occupied with a study of plant tumors which in many of their characteristics resemble cancer in animals.

Dr. Asheshov and several assistants are involved in an extensive project, supported by the National Infantile Paralysis Foundation, on a study of virus inhibitors. Diseases caused by viruses are common and serious for plants and animals. The viruses with which Dr. Asheshov and his associates are working are those which attack bacteria; they are known technically as bacteriophages.

Dr. Asheshov has discovered chemical substances which prevent the bacterial viruses from overcoming and destroying the bacteria. Of course, we recognize that it is a long way from the virus diseases of bacteria to the virus disease of infantile paralysis, and we are not so foolhardy as to believe that our research will turn up the substance effective in controlling poliomyelitis. We think it is possible that our study may disclose new knowledge of viruses which may open fresh information aiding in understanding the polio virus and other virus diseases. We hope that out of these efforts, and those of many others in other institutions, there may eventually come a discovery by someone which will block the activity of the polio virus.

For some years we have had a program aided by the financial assistance of various foundations and individuals, and directed toward the discovery and study of antibacterial agents, substances similar to but different from penicillin. This program, conducted with the assistance of Dr. Frederick Kavanagh, Dr. Annette Hervey, Dr. Marjorie Anchel and others, has resulted in the discovery, isolation and study of ten new antibacterial substances.

Up to date, none of these shows therapeutic promise. They are active in a test tube but inactive in an animal, or too poisonous to be used in an

animal. Nevertheless, our studies have contributed to this important field and we hope to be able to continue our investigations on new substances of this type.

We also conduct investigations on nutrition, not the nutrition of animals but the nutrition of lower plants. We investigate substances which are not only important for the growth of these simple creatures but which are important for us, too. At the moment, for example, we are concerned with the anti-anemia vitamin, vitamin B_{12} which is required by higher animals for the production of their red blood corpuscles. Strange as it may seem, there are simple plants which will not grow unless they are supplied with minute quantities of this anti-anemia vitamin.

One of the miscroscopic primitive plants which requires vitamin B_{12} is called *Euglena gracilis. Euglena* was first observed by the great Dutchman Leuwenhoek in 1674 in water which he collected from an inland lake in Holland, called the Berklese Meer. Leuwenhoek described *Euglena* in a letter he wrote to Henry Odenberg, Secretary of the Royal Society of London.

Others, including Harris of England in 1696 and later Joseph Priestly, observed this microscopic plant but it was not named until 1830 when the German botanist Ehrenberg described and named two species of *Euglena.* In 1838 Ehrenberg described and illustrated in a folio volume, which is in our library, eleven species of *Euglena.* In 1883 Klebs, one of the greatest of German botanists, recognized thirteen species and eleven varieties. At present about fifty species of this microscopic plant and many varieties are known to occur.

Euglena grows in hog wallows, ponds and other quiet bits of more or less fresh water. In such locations, innumerable numbers of this microscopic plant may form in the late summer a greenish coating over the water, often called water-bloom. One species, in addition to the green pigment, develops a reddish one and makes the water reddish. This has been said to have been the cause for the red color of the Nile as reported in *Moses,* Book II, Chapter 7.

In the 250 years since Leuwenhoek saw *Euglena* under his microscope, a good many men have spent a good deal of time and effort accumulating information about a small group of plants which were of no apparent importance.

One can never predict, however, when information which is apparently useless may become of value, because within the last year it was found that *Euglena gracilis* will not grow unless it is supplied with a minute amount of the anti-anemia vitamin, vitamin B_{12}.

Euglena serves as a tool for detecting and measuring the amount of this important vitamin. By the growth of this minute plant, we can learn

where this vitamin originates in nature, what other living things besides *Euglena* at one end of the evolutionary sequence and man at the other require it, how it really functions in the body, and much more important information.

The New York Botanical Garden from the very beginning of its organization has been concerned with learning as much as possible about the earth's plant resources, especially of Pan-America, North America, South America and the Caribbean. Many members of this staff, beginning with Dr. Britton, the first director, have explored tropical America, studied the plants there and reported their results for the information and guidance of others. Dr. H. A. Gleason, Head Curator, of the New York Botanical Garden, will tell you something about the past and the present interests of the New York Botanical Garden in tropical America.

The New York Botanical Garden and The Plants of Tropical America

H. A. Gleason

I SHOULD not be exaggerating if I told you that the first inspiration for the New York Botanical Garden arose from a botanical expedition to South America. This is how it happened. Through most of the nineteenth century scarcely any botanists from the United States had visited the tropics. They had learned a great deal about the plants of North America and that task had been enough to keep them busy. In 1885 Dr. Henry H. Rusby, later curator of our economic collections, made his first trip into the mountains of Bolivia. He brought back many botanical specimens, which he handed to Dr. N. L. Britton for study. Dr. Britton was then Professor of Botany at Columbia College down on Forty-ninth street. Britton could not name those plants from Bolivia. He had no personal knowledge of tropical plants; he had very few specimens in the herbarium at Columbia with which he might compare them; he had very few books in the libraries from which he might learn about them. All previous work on the plants of South America had been done in Europe, and all Britton could do was to take the specimens and go to Europe.

While working on them at the Royal Botanic Gardens at Kew, just outside of London, he and Mrs. Britton decided that there should be a similar

scientific institution in the United States. In due time their dream came true, the New York Botanical Garden was organized, Britton became its first director, and we are all part of it today.

Britton chose as a task for the new Garden the thorough investigation of the plant life of North America, including Mexico, Central America, and the West Indies. For his own personal share in the program he took the West Indies and devoted himself to it, with all his remarkable energy, for some thirty years. More than forty expeditions from this Garden covered nearly all parts of the islands, from Jamaica and Cuba at the west through Puerto Rico and Haiti and all the smaller islands as far as Trinidad. Year by year our collections grew, until he had built up the largest, the finest, the most comprehensive collection of West Indian plants in the world.

Accumulation of knowledge and botanical material is not our only function, however. We must make our knowledge easily available to others by publication. Our West Indian work resulted, during the thirty years of Britton's activity, in the printing of the Flora of the Bahamas, the Flora of Bermuda and the Flora of Puerto Rico. A monumental Flora of Cuba was almost completed before Britton retired in 1930, and a Flora of Trinidad, in cooperation with the British, had been started. All of this work ceased in 1930 and for the last twenty years we have done very little more on the plant life of the West Indies.

Britton had his troubles, of course, in studying the plants of the West Indies. These plants are often closely similar to those of tropical South America, and it was often difficult to decide whether or not a West Indian plant, growing in Grenada or St. Kitts or some other island, was the same as one growing in Surinam or Venezuela. It became necessary for us to add northern South America to our field of activity. It was far too much for us to undertake alone, and in 1917 Britton organized a cooperative effort with the National Herbarium at Washington and the Gray Herbarium of Harvard University.

The same problems faced us as had faced Britton in 1886. American institutions still had very few plants from tropical South America in their collections. Only a few American botanists had ever collected plants there. The great majority of the collections were in Europe. We Americans had to start at the bottom and work up, just as Britton had done twenty years before in the West Indies. I came to the Botanical Garden in 1919 and the South American work was immediately assigned to me. I was appalled. It was a task for a Hercules, not for a poor botanist who had never even seen tropical America. But I pitched in and for twenty years all my research was done on South American plants.

The work obviously consisted of two parts, the first to accumulate large collections of plants, the second to develop men with knowledge about the plants, and the two had to go on simultaneously. Collecting began in 1917,

when Pennell, of our staff, and the veteran Rusby spent several months in Colombia. It has continued ever since.

With every expedition into South America, our collections grew in size and scope and now are far better than those of Europe. We lack only the earliest collections, made a century or so ago by European botanists and preserved in European institutions only, and these are often of great historical value. We have even been able to pick up some of these by lucky bargains. In 1930 we secured from Cambridge University in England more than three thousand plants collected by Richard Spruce, one of the pioneer botanists along the upper Amazon and its tributaries. Just last week we received from Switzerland more than seven thousand specimens, representing one of the basic collections in Paraguay.

I do not mean to convey the idea that our Botanical Garden is ahead of every one else in the study of Latin American botany. South America is too large and the funds of every American institution are too limited to get a monopoly. But I am proud to say that we at this Garden have in our collections a representation of the plants of French Guiana second only to that at Paris; of the Dutch colony of Surinam second only to that at Utrecht in Holland; of Venezuela and Colombia second only to that of the National Herbarium at Washington; of Bolivia, Ecuador, British Guiana, and those strange mountains of southern Venezuela probably second to none; of Amazonian Brazil we have a splendid collection but I can not say how it ranks comparatively.

In this connection, I must speak very briefly about those unexplored mountains in southern Venezuela, to which we have recently been giving much attention. They stretch more than four hundred miles east and west across Venezuela and re-appear to the east in British Guiana and even in Surinam, while other outliers rise above the plains of eastern Colombia. They are poorly known geographically, geologically, and botanically. In fact, they are the least known part of all the western hemisphere. It is the area in which Conan Doyle located his story, "*The Lost World*", and he could not have chosen a better place.

The first two or three contacts with these mountains were at the famous Mount Roraima, and we have some of the plants collected then. Roraima has since been visited by the German Ule, and we have many of his collections, and still later by Tate and Pinkus and we have all those plants. Next came the ascent of the fabulous Mount Duida by Tate, and we have all of his collections. A few years later Tate ascended Auyan-tepui, famous for the highest waterfall in the world, dropping from its flat top over the vertical sides, and we have that collection. Lastly came Maguire's expedition to Sipapo and Marahuaca and, of course, we have those plants. You should see some of the beautiful orchids of those mountains which bloom

(*Continued on page* 169)

"An' I Learned About Roses From Them"

By Floyd F. Eldred

THRIVING roses mean a continuous battle against disease and pests — some much more serious than others — and this battle involves spraying or dusting, according to whichever school you belong. The pros and cons of the two methods of application are many. I prefer spraying on the theory that spray, with a good spreader in it, gives more thorough protection to the surface of the leaves than particles of dust.

Spraying then is probably the most important single factor of rose culture. I shall admit that in my neophite years, I was inclined to think its importance was over emphasized and that so much spraying or dusting was the "perfectionist's ideal" rather than a matter of practical operation. However, when I learned from American Rose Society articles and other sources that foliage wet for six hours or more supplied favorable conditions for the spread of black spot, I took the job more seriously.

Now I spray on an average of every ten days to two weeks. When the leaves are growing fast and the weather is rainy — even more often. In midsummer dry spells — less often. I do try to get it in ahead of rain, if possible, in order to give the foliage protection during the coming wet period.

Certainly nothing is more unsightly, takes the strength of a bush more quickly, and nullifies the value of one's other efforts more completely, than a good dose of black spot! And in this climate with high humidity much of the season (often from mid-June to mid-September), black spot, as far as I am concerned, is Public Enemy Number One! However, the spray program which I have followed has kept my garden virtually free from black spot for the last few years.

Souv. de Jean Soupert is rated among the "finest". This very fragrant yellow rose was one of the outstanding varieties given to the rose garden of the New York Botanical Garden this year by Bobbink & Atkins, Rutherford, New Jersey.

The clean healthy foliage and beautiful flower of rose Pink Satin testify to the excellent conditions under which it grows in the rose garden of the New York Botanical Garden.

I mix my own spray. This is, of course, somewhat less expensive, but mainly it allows me to modify the formula to meet varying conditions. For example, when no aphids are present, I omit nicotine sulphate. During the very hot weather, I cut down on sulphur which tends to burn foliage at high temperatures. After using DDT for two or three times in the spring, I skip it until the Japanese beetles arrive. After three applications of DDT, I use Hexatox once or twice as a protection against red spider mite which often increases after using DDT.

My basis spray follows:

Two Gallons General Spray
(sufficient for fifty to sixty bushes)

Fermate	2 tablespoons — level	mix dry
Sulphur	3 tablespoons — rounded	mix dry
DDT (75%)	2 tablespoons — level	
Nicotine sulphate	2 teaspoons (only when aphids are present)	
Dupont spreader	10 to 15 drops (add last while stirring)	

If you use Fermate, you know that it goes into solution very slowly. Watching me one day, my wife said, "Why don't you mix it with the wettable sulphur? That's the sort of thing I do, when I'm cooking." I took her advice and it worked like a charm!

I must admit that I have had little success against Japanese beetles. "They" say that DDT is effective, but I am unable to confirm this and can see little difference in the number of beetles before and after spraying. Whether new ones fly in to replace those killed, I don't know.

My reason for using DDT is primarily to counteract what I believe to be midge, though I am not sure this diagnosis is correct. In fact, I am not positive that I have ever seen a midge. The damage fits the description of their damage, namely, a "blasting" of the terminal or "bud" shoot

when it is very small. When the tip of the shoot, which will produce the bud is anywhere from ⅛ to ½ inch long, it turns brown and shrivels. This means that the plant has to produce another lateral before that bud can be replaced. If there is a great deal of such damage, the bush will appear thick with foliage but have very few buds. However, upon close examination, it will be found that this thick foliage consists of a large number of short shoots which have been "blasted" - with the result that many new laterals are started.

I have submitted samples of this damage to several of "them" without, for various reasons, securing positive identification of the cause. I use DDT on the assumption that if it is not midge, then it must be some other pest. Whatever it is, the DDT seems to hold it in check, although I have never succeeded in eradicating it completely.

I have had another serious problem the last few years. Again through ignorance, it was well established before I realized that I had a problem. I refer to brown or "stem" canker which is a fungus disease of the canes and is most prevalent and active in damp weather, especially in spring. It occurs as a brown or purplish brown blotch of irregular shape, often, in the beginning, on only one side of the cane. At first the foliage above it seems unaffected. However, as the canker spreads, the growth slows down, the color fades and the foliage finally wilts and dies.

Again I took my problem to "them" — this time to my friend, Dr. P. P. Pirone who has always been more than helpful and generous. He quickly diagnosed the trouble and prescribed an amazingly simple remedy. "Just cut out all the infected canes, at least an inch below the infection." Simple! But — for many of my bushes, pretty brutal treatment because it left hardly any bush at all! Usually, I cut the canes back until the center is green and alive. The pith of infected canes is a brownish color. The diseased canes which are cut out should be completely disposed of.

I'd like to be able to report that I eliminated all signs of canker with that one surgical job. But the fact remains that I still had quite a little of it this spring. Last year it was much less serious and, by midseason, only a few of the bushes showed the effects of the severe pruning. I hope the effects will be still less this year for the necessity to cut out strong, heavy canes does take its toll of growth and bloom.

When the last rose has finally come and gone and Thanksgiving Day rolls around, it's time to put the rose garden away for the winter. I have read much about winter protection — the need to bring in soil from outside the garden for hilling up around the bushes — then to get salt hay or marsh grass, to cover up the canes. "They" all warned against the use of leaves which hold moisture and invite moles. Some advocated enclosures for each bush, such as peach baskets with bottoms out, or low chicken wire around each bush or bed, to retain the winter covering. One

of "them" even reported digging up all of his 200 or 300 bushes each fall, burying them in a trench over the winter and replanting them in the spring!

Well, this is where I parted company with some of "them." I had no soil to bring into the garden, I didn't even know what salt hay or marsh grass was and had no place to keep it — and even if I had had the energy, time and money for that last operation, I wouldn't have done it. It seemed to me that uprooting bushes every fall could not help but be a serious setback. So, I hill up all I can with the soil from between the rows, and then partly fill this trench with well rotted cow manure. Next I shorten the taller canes, or any damaged and diseased ones, but otherwise do not prune until spring.

For several years, when the garden was smaller, I covered the beds with Christmas trees which my neighbors donated. Then, for a couple of years after that, I got a truck load of trees from dealers who had them left over after Christmas. However, it was a chore to locate the trees, get them delivered, put them on the beds and, in the spring, take them off and dispose of them. Also, I could not help wondering whether there was any relation between these trees and my canker troubles, despite the assurance from tree experts that this was unlikely.

Last year I omitted trees or any other form of covering. Probably I ought to knock on wood, but I didn't lose a single rose over the past winter! It should be remembered that in my section (I live within a couple of hundred yards of Long Island Sound, probably about twenty feet above high tide) we have relatively few days where the temperature goes below 15° above zero, with the coldest days of the winter being an occasional zero to 5° below.

Well, this is the story of my rose growing! Perhaps I should end it the way Kipling does his poem:

> "So be warned by my lot, which I know you will not,
> An' learn about roses from them."

The above is based upon Mr. Eldred's experiences and practices in his rose garden at Old Greenwich, Conn., as related to the members of the New York Botanical Garden, of the American Rose Society and other visitors attending Rose-Growers' Day at the Garden on June 15.

The report of Rose-Growers' Day and excerpts from the talks by Dr. Charles Glen King, Professor of Chemistry at Columbia University, and Dr. P. W. Zimmerman, of Boyce Thompson Institute, will appear in the August issue of the Journal of the New York Botanical Garden.

The New York Botanical Garden and the Plants of Tropical America

(*Continued from page* 164)

for us from time to time, most of them without names, unknown to science, and all sent back by Dr. Bassett Maguire from his expeditions.

A hundred and fifty years ago, European botanists knew more about the plants of the United States than we did. A hundred years ago, they knew more about the plants of Canada than the Canadians. Fifty years ago, they knew more about the plants of Latin America than we Americans knew. Now that is all changed. Americans, North Americans and South Americans, are fully capable of handling their own botanical problems.

During the past thirty years or less, we have developed in the United States a dozen or twenty persons who are now the international authorities on particular groups of plants. Three, possibly four, of them are at our Botanical Garden. The botanists and the botanical institutions of the world turn to these men for accurate information about these plants from all parts of tropical America. Because of the reputation of these men, the most important existing collections of half a dozen groups of plants are housed in this building.

We need still more such concentrated knowledge in this country. We should have a great body of knowledge constantly on tap, constantly ready for use whenever an emergency arises. And if we do plan for such an increase in knowledge, the New York Botanical Garden must be included in the plan.

Dr. Robinson, for many years a director of the Gray Herbarium at Harvard University, had a favorite motto which I have often heard him repeat: "Strengthen the strong." To strengthen ourselves in the strong position which we now occupy and have occupied for fifty years in the investigation of the plant life of Latin America, we need more money for exploration, more money for trained botanists to evaluate the results of the exploration, more money to publish the results of their study for the ultimate benefit of mankind.

Spring Festival — May 1950

THOUSANDS of spectators milled around the New York Botanical Garden during the five days of the Spring Festival, May 10 14, entranced by the unusual fruits and exotic plants flown in from Pan-American countries, the rare and fascinating plants in the conservatory, the beautiful rock garden, the gay and colorful tulip plantings. They were keenly interested in the events which had been carefully planned for their enjoyment and pleasure.

Mr. Charles B. Harding, President, stated at the annual meeting of the Board of Managers and Members of the Corporation, held on the afternoon of May 10, that the New York Botanical Garden exists for three reasons, one of them being to give pleasure and enjoyment to people — millions of them — from New York and surrounding communities. The things for the enjoyment of the public are, he said, largely physical — the greenhouses, the rock garden, the hemlock grove, the plantings of perennials, annuals, bulbs and the notable plant collections, such as the azaleas from Mrs. Harold I. Pratt, the conifers from Col. Robert H. Montgomery, the lilacs from Mrs. Theodore A. Havemeyer. Also *The Floral Flyer* presented by Mrs. Pratt, the shelter house in the rose garden, presented by Mrs. Elon Huntington Hooker, and the sitting area in the same garden presented by Mr. Henry F. du Pont.

The other two reasons for the existence of the Botanical Garden are to explore and search for knowledge in the plant kingdom and to spread that knowledge through education. In both these spheres of action, Mr. Harding reported that satisfactory progress had been made.

Lest anyone labor under the slightest misapprehension that the Botanical Garden, while operating under a balanced budget and financially solvent, does not need money, Mr. Harding made known that the Garden very definitely needs money. Speaking for himself, he listed the objectives for which money is needed in the following order of priority:

To put the salaries of that portion of the staff not paid by the city on a basis comparable to that paid by similar institutions; to reestablish curatorships which have been abandoned for lack of money; to provide for additional curatorships and fellowships; to construct a laboratory for the scientific staff, making the space now occupied in the basement of the museum building available for a restaurant; to complete the azalea collection, rebuild the perennial border, improve the annual plantings, hold more exhibitions in the greenhouse.

Mr. Harding ended his report with the announcement that in cooperation with the City of New York some very necessary repairs will be made to the museum building and the library will undergo a general modernization.

The remarks of Dr. William J. Robbins, Director, appear in part on page 158 of this issue of the *Journal of the New York Botanical Garden*. The talk which Dr. H. A. Gleason, Head Curator, gave on the "New York Botanical Garden and the Plants of Tropical America", is also published, in part, in this issue.

May 11th was Garden Club Day and representatives of the federated garden clubs from the states of New York, New Jersey and Connecticut, the Garden Club of America, and the Men's Garden Club attended. Mrs. Hermann G. Place, President of the Garden Club of America, was honored at luncheon.

Dr. Robbins, in addressing the garden clubs, said in part: "In October, 1948, a capital fund was established by the Board of Managers known as the Special Garden Club Fund, the income of which is to be used to aid in supporting the program of scientific research, to furnish financial aid for botanical and horticultural exploration and plant introduction, and to provide for lectures and instruction in the field of botany and horticulture.

"The income from this fund was used in the first year to support a student who cooperated in our program of antibiotic research. The second year the income was devoted to supporting an expedition by Kingdon Ward along the Burma-India border. This year we are utilizing the income to assist in a study of the genus *Strophanthus,** the plant from which a precursor of that important substance cortisone has been obtained."

In appreciation of the gift of tulips from the Associated Bulb Growers of Holland in 1949, May 12 was designated as Netherlands Day. The National Tulip Society arranged an exhibit of specimen tulips in the museum building.

That afternoon, Dr. Willem Cnoop-Koopmans, Consul General of the Netherlands, presented to the Garden, on behalf of the Associated Bulb Growers of Holland, *"Drie Eeuwen Bloembollenexport; De Geschiedenis van den Bloembollenhandel en der Hollandsche Bloembollen tot* 1938" by E. H. Krelage, published in S'-Gravenhage in 1946. This is a comprehensive and profusely illustrated work on the history and literature of the Dutch flower bulb trade, written by the Honorary Chairman of the Algemeene Vereeniging voor Bloembollencultuur.

The morning of May 12 was given over to the school children, 1000 strong from twenty-five of the City's public schools. Their keen interest and their behavior was a pleasant surprise to the Garden staff.

Four trains, borrowed from the New York Zoological Garden, conveyed them to the greenhouses and around the Garden, after which G. L. Wittrock, Assistant Curator of Education, introduced Dr. Marvin M. Brooks, of the Nature Department of the Board of Education of the City of New York, and T. H. Everett, Horticulturist of the Garden. Mr. Everett delighted his young listeners with a humorous talk on how to plant a tulip bulb. Mr. Wittrock explained to the audience what happens to plant hunters who are lost in the woods, presenting Dr. Donald P. Rogers, Dr. Harold N. Moldenke, and Mr. E. J. Alexander of the Garden staff, as typical plant hunters.

Two representatives from each school received certificates, to be redeemed at a specified date, for two potsful of tulips in flower for their classrooms. This arrangement was made possible by the generosity of the Associated Bulb Growers of Holland.

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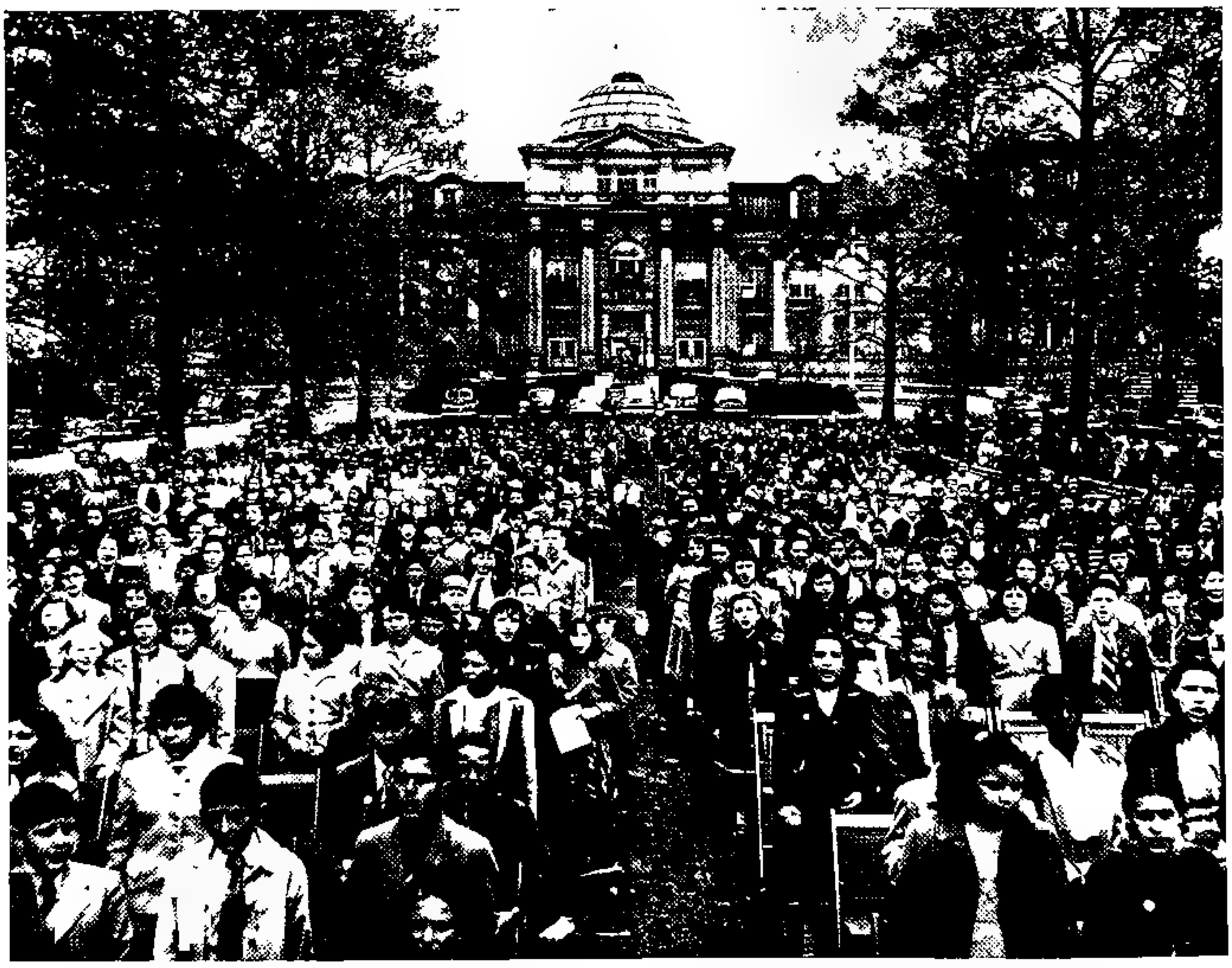
*See the Journal of the New York Botanical Garden for February 1950.

Thus, in a way in which they could understand and appreciate, were the children shown all that the Botanical Garden has to offer them now and as they advance in years and knowledge.

In the words of a student of Public School 73, the Bronx: "Not only did we enjoy the trip to the New York Botanical Garden because we had a holiday from school, but because we have never before seen such strange and fascinating kinds of plants and flowers. Speeches, which we usually find boring, were made exceptionally interesting. We are all greatly indebted to those who made the magnificent tour of our Botanical Garden possible."

"While the Earth Remaineth", a motion picture in color, and square dancing brought many residents from the Bronx and neighboring boroughs together on Neighborhood Day, May 13. The program on the last day of the Spring Festival, Sunday, May 14, provided special ceremonies with music and a delightful talk by John Kieran on the historical aspects of botany.



1,000 school children sang "The Star Spangled Banner" in front of the Administration Building of the New York Botanical Garden during the Spring Festival.

John Hendley Barnhart

. . . An Appreciation

By H. A. Gleason

OF the present staff at the New York Botanical Garden, no one had known John Hendley Barnhart, former Bibliographer, as long as Dr. Gleason, who has composed the following tribute to his career.

An earlier note and appreciation of Dr. Barnhart's 39 years at the Garden appeared in the Journal for February 1942, one month after he retired with the title of Bibliographer Emeritus.

Dr. Barnhart died at his home at Southampton, N. Y., Nov. 11, 1949, at the age of 78.

A complete account of Dr. Barnhart's career, with a list of his publications, has been prepared by his successor as Bibliographer of the New York Botanical Garden, Dr. H. W. Rickett, for the May-June issue of the Bulletin of the Torrey Botanical Club.—*C. H. W.*

THE hundreds of botanists who from time to time turned to Dr. John Hendley Barnhart for botanical information appreciate that he was a man of remarkable ability in unusual directions, but none has had a better opportunity to understand the fact than his colleagues at the New York Botanical Garden.

Dr. Barnhart started his career with a medical degree from Columbia, but he never practiced medicine. He was from early manhood interested in plants; first in the local flora about New York City and later in the one small family of the bladderworts. From these he gradually passed into a deep interest in botanists and botanical writings. With his photographic memory he never forgot a bladderwort, but he gave less and less time to the group and more time to his biographic and bibliographic work.

He knew what was in the large library of the New York Botanical Garden as thoroughly as did the catalog itself and, what was often more important, what was *not* in it. In the latter case he knew just where the book could be consulted in some other library. Actual dates of publication are often important in taxonomic research and scores of our books bear a note by Barnhart rectifying in some way the date on the title page. This information could be committed to writing, but in addition he often knew all the circumstances connected with the publication through which the date was incorrectly stated. How he learned them will never be known.

His catalog of botanists is another remarkable achievement. From books and magazines of all sorts, from membership lists in societies, from various other sources, he secured the name of every botanist possible, and from all sorts of bibliographies, histories, obituaries, and the like and from extensive personal correspondence, he added the dates of birth and death. In later years this catalog became almost an obsession. He was never satisfied

until he had dates, places, and full names for every botanist, and he went to any length to get them, even resorting to wiles and strategy with some of the coyer members of the profession. Up to possibly twenty years ago his list was practically complete for the Americas and for much of Europe, including not only those who had written on plants but also those who had merely collected them. Needless to say, such a catalog is invaluable to anyone concerned with botanists or the history of botany.

In his later years, Barnhart was never interested in identifying a plant unless it was one which had already baffled every member of the staff. Such a plant was an immediate challenge to him. All other work was dropped; he plunged into the task with extraordinary zeal and energy, and he eventually named the plant.

The American Code of Nomenclature was another of Barnhart's interests, and it may not be generally known that he, more than any other person, was chiefly responsible for it. Although this Code was bitterly opposed by many, even its staunchest enemies had to admit its precision. It left nothing to chance, to personal opinion, to "usage." It was based on a rigid application of the fundamental principle of priority. It invalidated all homonyms and stabilized the fixity of application of botanical names to a degree far superior to the current International Code. Several of its most important provisions were in 1930 incorporated into the International Code, to its great improvement. The development of the type method in determining the application of botanical names now used by every conscientious taxonomist, was also largely the product of Barnhart's fertile brain.

By the inactivation of Dr. Barnhart (first due to failing health and later to retirement), and recently by his death, botany has lost a man of unusual talents and great usefulness.

Report from Czechoslovakia

THE trend of science in some parts of central Europe is shown in a long-delayed volume of *Preslia,* publication of the Czechoslovak Botanical Society, which has reached the desk of Dr. H. A. Gleason at the New York Botanical Garden. The volume, published in Prague in 1948, is numbered XXII - XXIII, 1943 - 1947.

After the book was prepared, events in Czechoslovakia, and with them official opinions, took a left-about-face. Accordingly, some formerly respected members of the society were expelled, and a statement to that effect was made on a separate page inserted in the front of the volume. A photograph of this page appears opposite. Meanwhile, however, the wartime records of these men were in print. For example:

Prof. Dr. Vladimír Krajina was during the occupation the head of the Underground Czech Patriotic Movement; at first he lived in Prague and when Gestapo persecuted his colleagues . . he escaped into the region of Cesky Ráj, where he was arrested and then put in prison. After the revolution in May 1945 he was elected a Member of Parliament of the Czechoslovakian Republic.

In the list of Czechoslovak botanists, Dr. Vladimír Krajina is designated as Professor and Chief of the Department for Geobotany of the Botanical Institute of Charles University, with an interest in taxonomy, especially the flora of Czechoslovakia and of the Sandwich Islands (by which is meant Hawaii).

Miroslav Pulchart, a teacher who had one or more botanical publications to his credit during each of the war years, is listed as especially interested in the plants of Czechoslovakia, in the protection of

Czechoslovak Botanical Society,
Benátská 2, Praha II, ČSR.

During the printing of our yearbook »PRESLIA« (vol. XXII.—XXIII.), it took place some changing, which are in connection with the text of this book.

I[st.] Dr Vladimír K r a j i n a, formely professor of botany of the Charles University, according to the investigation of the government office, was during the German occupation the traitor to the country, to associate with organs of German »Geheimniss Staatspolizei« (Gestapo), and was giving to the German office the informations about the National revolt of Czechoslovaks against Germans. By this treason many Czechoslovak patriots were decapitated or hanged by German occupants. After the Czechoslovak deliberation Mr Krajina entered into the communication of the spy-head-quater of foreinger government and gave some important informations. Therefore, he was condemn in absency to the forced labour, degraded from the degree of professor of Charles University and expelled from the Czechoslovak Botanical Society.

II[d.] Dr Karel D o m i n, formely professor of botany of the Charles University was expelled from the Czechoslovak Botanical Society and by the common consent by all the professors of a faculty he was degraded from the degree of professor of Charles University, because Mr Domin was the leader of the Czech fascistic students and propagated the fascistic ideas before the occupation.

III[d.] Mr Miroslav P u l c h a r t was expelled from the Czechoslovak Botanical Society, because he is in close contact with Mr K. Domin.

Rudolf V a n ě k m. p.
President of the Action Committee
of the Czechoslovak Botanical Society.

Praha, November 1948.

nature, and in systematic botany, especially *Rubus*.

Dr. Karel Domin, who was once Director of the Botanic Garden at Prague, was at the time of his expulsion Professor at Charles University, interested in systematic botany, geobotany, and pharmacobotany. Dr. Domin, who is now 68 years old, had 185 papers published between 1940 and 1946. Many of these, however, were not botanical treatises, but were obituaries of his colleagues.

REVIEWS OF RECENT BOOKS

We shall continue to publish authoritative book reviews in the Journal of the New York Botanical Garden

Soil Systematics

THE PRINCIPLES OF SOIL SCIENCE. Alexius A. J. de Sigmond. 362 pages, illustrated, indexed. Translated from the Hungarian by Arthur B. Yolland. Macmillan, New York. 1948. $5.50.

The main value of this book lies in its third part, comprising about 200 pages and dealing with soil systematics: the characterization and classification of soil types. On this subject, the author is a recognized authority, and his rather original ideas are highly interesting and very significant. Not only is the author's soil system based on geological formation and physical composition, but the dynamic forces acting in the soil are likewise fully considered. The three main groups: organic soils, soils of mixed origin and purely mineral soils, as well as the various subgroups, were established through leaching experiments (soil analysis) and, therefore, take chemical soil properties into full account. Since methods of soil analysis vary considerably not only in different countries but even from laboratory to laboratory, while different methods give very different results, it would have been of great interest to know what methods the author has employed. The fact that the zonal, azonal and intrazonal soils are included in the book's dynamic soil system, the author emphasizes as of particular advantage.

He points out furthermore that even the great soil groups are complex in that the main soil types are generally accompanied by others. Soil maps, therefore, must be based soley and exclusively on soil surveys and can not be simply compiled from climatic and phenological charts.

There can be no doubt that this third part of the book is extremely worth reading for anyone interested in soil mapping. The translator deserves our thanks for having made these highly stimulating ideas available to English readers.

The first two parts of the book dealing with the formation of soil and the chemical properties of soil should in this reviewer's opinion have been greatly shortened and used merely as an introduction. As they stand, they are quite unsatisfactory, because no conclusions have been drawn from the various statements which are made. In consequence the practical value of the first two parts of the book (together 146 pages) appears to be rather doubtful.

HENRY TEUSCHER,
Montreal Botanical Garden.

Evaluation of Goethe

GOETHE ON NATURE AND ON SCIENCE. Sir Charles Sherrington. 54 pages. Cambridge University Press, New York. 2nd edition 1949. 75¢.

This little book by Sir Charles Sherrington, Nobel Laureate in medicine, should be read by everybody interested in arriving at an accurate evaluation of Goethe as a scientist, for it represents the extreme in the steady stream of accounts beginning with Haeckel and persisting to the present day. Sherrington analyzes the philosophical-religious aspects of Goethe's Nature—for ". . . with him . . . Nature was usually Nature with a capital N." Much emphasis is placed on Goethe's studies on optics, or more properly, on light in relation to color, admitted by all to be Goethe's one great misinterpretation and the least of his contributions; but all of Goethe's contributions to natural science are accounted for and rather quickly disposed of on the basis that "those who want can read the facts." To botanists it may be somewhat of a revelation to learn that the doctrine of homology — that cotyledons, foliage leaves, stamens, pistils, and petals are homologous organs, and, fundamentally leaves (coming directly from Goethe's *Metamorphosis of Plants*)—has, as a result of botanical progress been found untenable, and has therefore, in Sherrington's words, fallen . . . "into the doleful category of unlucky guesses." All in all, Sherrington's essay is a lesson

in critical analysis; but the non-European reader will have difficulty in divorcing the date of the original lecture (1942) from the general demeanor of the treatment.

CHARLES J. ENGARD,
University of Hawaii.

Science With a Touch of Humor

BIOPHYSICAL RESEARCH METHODS. Edited by Fred M. Uber. 667 pages, illustrations, subject index Interscience Publishers, London and New York, 1950. $9.50.

In this book of 17 chapters by 16 authors are discussed a number of physical procedures of value to the physiological biologist. The topics covered are indicated by the chapter titles: Avoid fruitless experiments, Osmotic pressure measurements. . . In many ways, the first chapter is the most interesting if only for the humor, not usually associated with such serious works, expressed in it. If the good advice given in chapter one were taken by many scientists, the quantity of their output would reduce with, perhaps, an improvement in quality.

FREDERICK KAVANAGH.

Potatoes in World History

THE HISTORY AND SOCIAL INFLUENCE OF THE POTATO. Redcliffe N. Salaman. 685 pages, illustrations, index, bibliography; with a chapter on industrial uses by W. G. Burton. Cambridge University Press, New York. 1949. $12.50.

In this book, which is the result of nine years of exhaustive research and study, Dr. Salaman traces the history of the potato, its uses and its effect on the people, the economy, the wealth or lack of it and, last but not least, the politics of each country where it has been introduced.

He tells how it was first the means of preventing starvation in Ireland and later the cause of a severe famine there. The chapters covering the history of Ireland should interest anyone, whether or not he is interested in potatoes.

The author flounders somewhat in endeavoring to show how the potato first came to be grown in the Peruvian highlands and how it was brought to Europe, but from that time on, he has done a superb job.

The cultural practices followed in various areas through the last four hundred years, including the present time, should make good reading for anyone who loves the land.

The worse scourge facing the future of potato growing throughout the world today, namely, the golden nematode, is only briefly mentioned. Perhaps Dr. Salaman does not consider it as great a pest as the nematologists who are trying to combat this minute but persistent organism.

The chapters covering the part potatoes played in helping to win the last two World Wars contain much food for thought.

One finishes the book with the feeling that his education has been vastly enriched.

GEORGE C. STRONG,
Water Mill, L. I., N. Y.

When to Plant

THE VEGETABLE CALENDAR. William H. Eyster. 96 pages, illustrations; decorations by Karl Manahan; maps, tables. Rodale Press, Emmaus, Pa. 1949. $1.

The information for planting and growing given in this paper-covered volume is reasonably correct for the areas known to me, yet I do not consider it practical for an amateur. The book has too many charts and tables. It becomes confusing.

Weather maps shown are only approximate for, after all, temperatures within the same zone vary considerably — as for instance Rye and Mount Kisco, or my place in a cold valley and someone else's on a high spot that does not get the frost I do. Within that small area there can be a difference of as much as six weeks as far as killing frosts are concerned.

JAMES S. JACK,
Brookside, Rye, N. Y.

For Old-Timers and Beginners

DAHLIA CULTIVATION. N. Gerard Smith. 96 pages, illustrated, indexed. Pellegrini & Cudahy, New York. 1949. $3.50.

Here is a book which can be just as interesting and educational to the old-time amateur as it would be to the beginner. The amateur needs a little guid-

ance and enough encouragement to show him that, after a few years' experience, he will be able to delve deeper into the phases of raising dahlias, and in that way the book will broaden his knowledge as he goes along. The information given will be found useful to anyone growing dahlias for home decoration or exhibition purposes. Mr. Smith's illustrations are very helpful to the beginner.

ALEXANDER EDGAR NASH,
Verona, N. J.

To Whet the Appetite

SIMPLE ROCK GARDENING. A. J. Macself. 120 pages, illustrated, indexed. Transatlantic Arts, Inc., Forest Hills, N. Y. First American edition 1949. $1.80.

This elementary treatise on rock gardening is intended for the beginner who is about to explore this extensive phase of horticulture. Although a small volume, its scope is rather broad, covering various types of rock gardens, their construction, planting and maintenance, as well as plant propagation. Consequently, most of the subjects are rather superficially covered and serve only to whet the appetite of an enthusiastic amateur for more detailed information.

Inasmuch as this British publication was originally written for English gardeners, it is necessary to caution those, particularly in New York and New England region, from applying literally all the information in this climate, which is so different from that in England.

HAROLD EPSTEIN
American Rock Garden Society

Prize Flowers Lithographed

ROCK PLANTS. SPRING FLOWERS. (2 books). Arlette Davids. 32 full-color lithograph plates in each. Macmillan, New York. 1950. $3.50 each.

The folio volumes containing magnificent full-color plates by the French botanical artist Arlette Davids, are now being distributed by the Macmillan Company. The "Spring Flowers," incidentally, consist of tulips, hyacinths, and narcissi, according to the title, but also include various lilies, cyclamens, amaryllis, tuberous begonias and gloxinia — in all a collection of 32 exciting color plates. The title of "Rock Plants," from the American point of view, is a misnomer, for this book consists of 32 paintings of cacti and other succulent species.

The artist, who became a war casualty in France, did this work in the late 1930's, selecting prize-winning exhibition material from the Bagatelle Flower Shows of that period in Paris.

Cultivating and Using Herbs

THE HERB GROWER'S COMPLETE GUIDE. A. M. Mathieu. 88 pages, bibliography. Published by author, 3744 Section Road, Cincinnati 36, Ohio. 1949. $2.

Among the features of this new herb book, which has been reproduced by offset from typewritten copy, are historical notes on the various herbs treated, methods of culture and means of preparing and using them. There is an extra section for recipes and for the use of herbs for their fragrance alone. A list of herb nurseries is given as well as a list of books and pamphlets, magazine articles and cook books on herbs. Another section treats the commercial growing of herbs and a table gives concise information on herbs under cultivation. For an additional dollar one may obtain with the book a packet containing a manual, five packets of seeds to sow, five varieties of herbs with which to experiment in the kitchen, and an envelope with interesting commercial literature.

Notes, News and Comment

Appointment to Garden: J. Mark Kerans, of Glen Ridge, N. J., assumed the position of Administrator at the New York Botanical Garden on June 1, 1950. Mr. Kerans came from Rockefeller Center, Inc., where he served as a Management Consultant. Before joining the latter staff, he was Executive Vice-President and Treasurer of Protexall Chemicals, a chemical manufacturing concern in Miami, Fla. Prior to that he was Executive Assistant with the Rockefeller Inter-American organization, operating in the trade promotion and development fields.

For approximately five years, Mr. Kerans was in the U. S. Government service on the staffs of the Interior and Commerce Departments, respectively. He

also practiced law for several years in Washington, D. C., and has been a Management Consultant to various organizations.

Gold Medal: Leonard J. Buck, newly appointed member of the New York Botanical Garden's Board of Managers, is the recipient of the gold medal of the National Association of Gardeners for his outstanding contribution to horticulture. Mr. Buck, who has a very beautiful rock garden, among other plantings on his estate, "Allwood," at Far Hills, N. J., is the sixth person to be awarded this honor since the first medal was awarded in 1926.

Herb Society: The annual meeting of the New York Unit, Herb Society, was held in the Members' Room of the New York Botanical Garden on June 16. Preceding the business session, an auction was held, the proceeds of which will support four new herb borders at the Garden.

Meetings: On May 5, Dr. William J. Robbins attended the meeting of the Advisory Council, Dept. of Biology, Princeton University, and on the 24th of the month, the annual meeting of the Boyce Thompson Institute. On June 2, Dr. Robbins attended the meeting of the Research Committee of the American Philosophical Association in Philadelphia. F. W. Kavanagh attended the 50th anniversary meeting of the Society of American Bacteriologists in Baltimore during the third week in May.

Field Trips: Dr. H. N. Moldenke led a field trip for the Torrey Botanical Club and for the John Burroughs Memorial Association to "Slabsides", rustic retreat of John Burroughs, at West Park, N. Y., on May 6; and on May 28 another field trip of the Torrey Botanical Club to Springdale, N. J., to see the rare *Trollius laxa,* three species of *Cypripedium,* etc. Dr. Moldenke was also guest leader of the New York Biology Teachers' Association at its annual field trip at Belmont State Park, N. Y., on June 3.

Lectures: G. L. Wittrock showed the film, "Activities and Scenes of the New York Botanical Garden" to the Garden Club of Cresskill, N. Y., on June 8. On May 8, E. J. Alexander lectured at the Garden Club of New Haven, Inc., an affiliate of the New York Botanical Garden, on "Wild Flowers for our Gardens". On June 7, Frank C. MacKeever lectured at the Phillipstown Garden Club, another affiliate, on "Plant Propagation."

Visitors: Dr. Asger F. Langlykke, Director of the Research and Development Laboratories of E. R. Squibb & Sons, New Brunswick, N. J., visited Dr. William J. Robbins early in May and toured the laboratories of the New York Botanical Garden. James F. Bell of Minneapolis, Minn., and Joseph R. Swan, Chairman of the Board of Managers, also lunched with Dr. Robbins and toured the laboratories in May. On June 5, Dr. Rupert J. Best, of the Waite Agricultural Research Institute, Adelaide, South Australia, called on Dr. Robbins and was shown through the laboratories. Dr. David D. Keck and Mrs. Keck, their daughter Carol, and Dr. Keck's assistant, Robert Vickery, visited the New York Botanical Garden en route to Europe. Other visitors to the Garden included William Randolph Taylor, University of Michigan; Robert T. Clausen, Cornell University; and Lyman Benson, Pomona College.

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

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Membership in
THE NEW YORK BOTANICAL GARDEN
and what it means

TO THE INSTITUTION, **membership means support of a program that reaches several hundreds of thousands of persons annually.**

Briefly, this program comprises (1) horticultural display, (2) education, (3) scientific research, and (4) botanical exploration. To further this work and to disseminate useful information about plant life to the public, the Garden issues books and periodicals, both scientific and popular, and presents lectures, programs, radio broadcasts, and courses of study in gardening and botany. The laboratories and large herbarium and library serve the staff in its research and educational work, while the extensive plantings at the Garden give the public vistas of beauty to enjoy the year around. The public is also free to use the Botanical Garden's library, and, under direction, to consult the herbarium.

TO THE INDIVIDUAL, **membership means, beyond the personal gratification of aiding such a program, these privileges:**

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Personal conferences with staff members, upon request, on problems related to botany and horticulture.

Free announcements of special displays, lectures, broadcasts, programs, and other events.

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* * * *

Garden clubs may become Affiliate Members of the New York Botanical Garden, and thus receive certain privileges for the club as a unit and others for individual members. Information on Garden Club Affiliation will be sent upon request.

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* * * ▪

Classes of membership in the New York Botanical Garden in addition to Industrial Memberships are:

	Annual Fee		*Single Contribution*
Annual Member	$ 10	Member for Life	$ 250
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A legally approved form of bequest is as follows:

I hereby bequeath to The New York Botanical Garden, incorporated under the Laws of New York, Chapter 285 ***of*** 1891, ***the sum of*** _____.

Gifts may be made subject to a reservation of income from the gift property for the benefit of the donor or any designated beneficiary during his or her lifetime.

All requests for further information should be addressed to The New York Botanical Garden, Bronx Park, New York 58, ***N. Y.***

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HARDY WATER-LILIES

in the pool at the New York Botanical Garden

THE ROYAL WATER-LILY

Victoria regia is a member of the extensive aquatic family, Nymphaeaceae, to which the hardy water-lily, *Nymphaea marliacea rosea,* illustrated on the front cover, belongs. But the former is many times the size of the latter.

The flower of the royal water-lily, similar in shape to that of the hardy water-lily, is one or more feet in diameter. The leaves are gigantic, some measuring six to seven feet in diameter, but their texture is delicate. It is the peculiar structure of the under side which makes the leaves so strong and bouyant, sufficiently bouyant to support more than one hundred pounds—provided that the weight is evenly distributed. The lower surface is ribbed from the point at which the stalk is attached to the circumference, and also cross-ribbed, parallel to the circumference. These stout ribs are made up of hollow, air-filled compartments.

Victoria regia is now being grown again at the New York Botanical Garden and may be seen in house No. 9 of the Conservatory.

A REMINDER—that throughout the year the keen plantsman, amateur or professional, will always find something of interest at the New York Botanical Garden

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DOROTHY EBEL HANSELL, Editor

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The Rose as a Motif in the Decorative Arts

John Kent Tilton, Director
Scalamandré Museum of Textiles

THOUGH little is known of the very early history of the rose and who were the first people to cultivate it, it is generally accepted that the rose is one of the oldest of all plants to have been held in high esteem and to have been given symbolic significance.

France and England fell under the enchantment of the rose when crusaders brought it from Asia during the middle ages. It was grown in royal gardens for its beauty and fragrance and in the monastery gardens for its medicinal and culinary properties. It attained importance in sacred and secular ceremonies becoming, for instance, the ecclesiastical emblem of perfection and being worn as a cherished ornament by women on festive occasions.

The rose also achieved fame as the heraldic bearings of opposing armies in a civil war that nearly rent a nation asunder. During the Wars of The Roses in the 15th century, when the House of York with its insignia of a white rose fought with the House of Lancaster which carried the red rose on its shield, the flower became firmly established in English heraldry. The succeeding House of Tudor consolidated the two colors by adopting both for its coat-of-arms, and it became known as the "Tudor Rose". It was made the national flower of England.

When the early Christians appropriated it as one of the symbols of their faith, the rose was assured an everlasting place in the decorative arts. The followers of Christianity, in order to escape persecution and death, hid themselves in the labyrinth catacombs of Rome. There on the stone walls they expressed in crude mural decoration, carving or painting, the symbolic emblems of their religion. They did not dare actually to depict in realistic forms their teachings. Instead, they adopted a secret code in which the rose was a featured symbol, signifying charity and Christian love among fellow men as well as being the symbol of the Garden of Heaven and God's Heavenly Grace.

Throughout the Gothic era, the rose flourished in both ecclesiastical and secular art as a highly stylized floral motif. The Italians preferred the trefoil or quatrefoil rose in both carved and painted ornament, while the English selected the cinquefoil. This discrimination in the usage of the number of petals is a point well worth remembering. The very name, "rose window", in Gothic church architecture is significant of the deriva-

Flowers are realistically portrayed in this lampas, with brocaded satin insert, which was woven by Philippe de la Salle in France in the third quarter of the 18th century. (From the collection of Scalamandré Museum of Textiles).

Wallpaper "Les Deux Pigeons" was made by Jean Baptiste Réveillon and printed from woodblocks in France, circa 1785. (Courtesy of the Cooper Union Museum of Arts and Decoration).

"Courtiers with Roses" — a tapestry presumably woven for Charles VII of France. The rose was his emblem and the red, white and green of the striped background, his colors. Franco-Flemish (Tournai), 15th century. (Courtesy of the Metropolitan Museum of Art.)

tion of the term, because of its circular form in which the intricate mullions simulate floral petals radiating out to the perimeter.

The "rosette" was another popular treatment of the rose as a motif in which it was stylized in geometric formations of circles, squares and octagons. The "rosette" first appeared in the weaving of Chinese silk textiles during the Yüan or Mongol dynasty of the 14th century.

Roses were among the multitude of flowers represented in the "mille fleurs" tapestries of the Middle Ages. They were woven in the far-famed Unicorn tapestries, made for Anne of Brittany to celebrate her marriage to Louis XII of France in 1499. The Aubusson and Gobelins tapestries of the 18th century were profusely embellished with roses.

Artists during the long period of the Italian Renaissance broke away from the traditional symbolism of the Gothic, and their floral motifs assumed naturalistic forms. We find in their treatment of design in tex-

tiles a symmetrical and triple arrangement of roses in classic urns. The great artists of the period, Botticelli and Leonardo da Vinci among others, often portrayed the rose in their paintings. When the Renaissance evolved into the Baroque of the 17th century, the floral motifs assumed forms considerably larger than found in nature.

In France, the 18th century produced designers, painters and weavers who have never been surpassed. Such famous men as LeBrun, Berain, Marot, Boucher and Meissonier created designs for furniture, textiles, wall decoration and the accessories in art. Watteau and Fragonard depicted romantic garden scenes in their paintings. Revel and La Salle excelled in textile designing and weaving. In all the decorative arts created by these talented men, roses were predominant. The religious significance of the rose had long been discarded and the poets and painters acclaimed it as the symbol of romance, wisdom and beauty.

The floral designs were woven in textiles in a naturalistic manner that had not previously been achieved. The polychrome brocades and lampases gave the semblance of having the flowers painted upon their surfaces rather than woven into them. The era, while elaborate in its decoration, was always graceful.

Wallpaper came into fashion during the latter part of the 18th century, and it is to France that the credit is largely due, although the English printed excellent wallpaper in the same period. As far back as the end of the 17th century, Jean Papillon Père was printing paper. He was the first to make the patterns, printed from carved wood-blocks, match in repeating units when the sheets of paper were joined. Jean Baptiste Réveillon, however, excelled him. It was he who first joined his sheets in one continuous length before printing his designs. This he accomplished just prior to the French Revolution. Paper was not

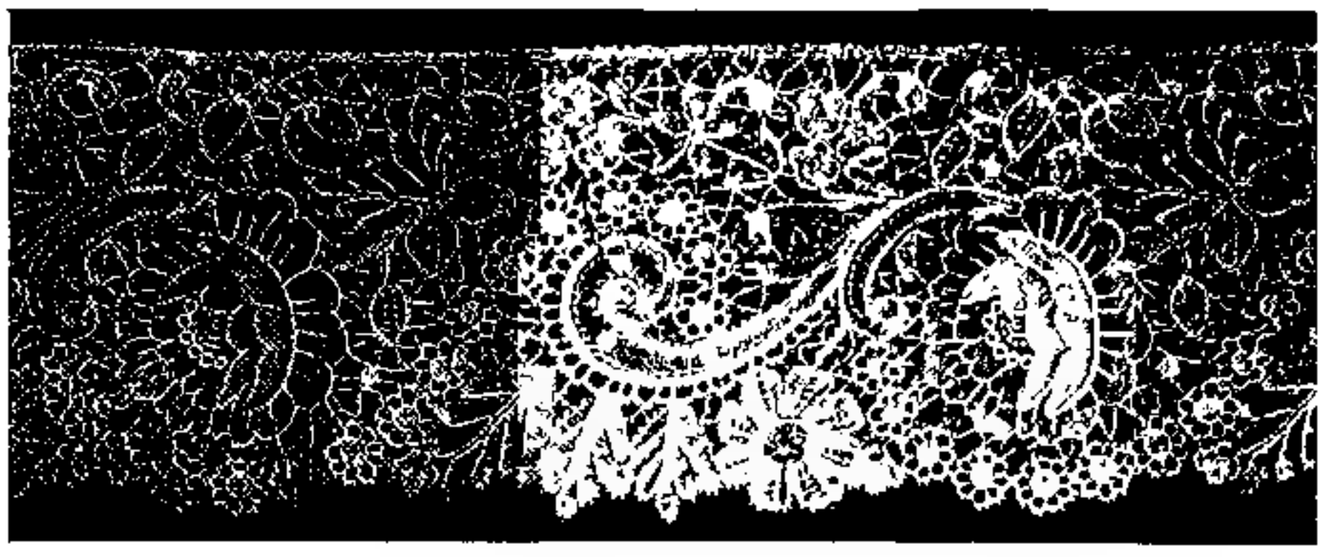
A monochrome rose design printed in red on chintz from wood blocks, in England during the third quarter of the 18th century. (From the collection of Scalamandré Museum of Textiles.)

Roses and other flowers decorate a tôle tray. Hand painted in England, circa 1820. (Courtesy of the Cooper Union Museum of Arts and Decoration.)

manufactured in continuous length until the 19th century. Réveillon was as important in printing "papier peints" as Oberkampf was in printing "toiles du Jouy". Only the most talented artists were employed. In fact, Huet designed for both. The wallpapers resembled paintings of still life, and roses were the prime favorites of the flowers delineated.

Roses lavishly adorned the gay English chintzes and the French toiles of the 18th and 19th centuries. Every conceivable variety of flower was utilized in the design.

The highly decorative japanned metalware, better known by its French name, "tôle", was another medium for floral decoration. Thomas Allgood who lived in Pontypool, England, in the second half of the 17th century, conceived the idea of molding thin metal plates into such useful and ornamental household utensils as trays, tea and coffee urns, vases and cache-pôts. The decorations were all hand painted with an enamel made from coal by-products which, when fired, became impervious to heat and moisture. The artists were often those who had worked in porcelain potteries and this accounts for the similarity of the tôle decoration to that of chinaware. Nosegays and delicate swags of roses were the motifs most copied. Tôle ware was introduced in France during the Directoire period, when it was substituted for their silverware which had been melted down in the Revolution. The vogue reached America in the early 19th century.



The rose motifs are needlepoint in this piece of Belgium lace, probably Bruges, 19th century. It is a combination of needlepoint and bobbin. (Courtesy of the Metropolitan Museum of Art.)

Stencil-work, while popular in Europe, was especially so in America, because of its inexpensiveness and the little skill required in cutting the stencils and applying the colors. Housewives and their daughters stenciled tables, chairs, boxes and trays. Itinerant artists traveled about the countryside. For their board and a nominal fee, they would stencil the walls of the parlour and, perhaps, the master bedroom. The decoration was usually in the form of borders in which the rose was entwined with other garden flowers or stylized in rosettes.

Lambert Hitchcock, New England's rush bottom chair manufacturer, opened his factory in 1826 at what is now Riverton, Connecticut. His family applied the paint, usually black, and stenciled gold decoration on the splats. Swags, festoons and cornucopias of flowers abundant with roses were the preferred figures of ornamentation. When spring came, Hitchcock would set out with a wagon load of "fancy chairs" to sell to the farmers' wives. At that time, they were considered inexpensive, but today an original Hitchcock chair brings a good price in the antique shops.

The making of delicate needlepoint or bobbin laces required skill and infinite patience. Each country developed various types of lace distinctive to itself. The name "rosepoint" has always been misleading, since originally the patterns contained no roses. However, among the lace authorities of today, there is a tendency to include the 19th century Brussel laces, in which the rose is featured, with the "rosepoint". The French call it "point de gaze".

Wrought iron is another medium in which infinite skill is required in modeling the delicate tracery of its designs. The elaborate wrought iron grills and gates of the 18th century were frequently ornamented with floral motifs, and the rose was represented by a naturalistic portrayal.

Good huswifes in sommer will save their owne seedes,
against the next yeere, as occasion needes.
One seede for another, to make an exchange,
with fellowlie neighbourhood seemeth not strange.

In harvest time, harvest folke, servants and all,
should make all togither good cheere in the hall:
And fill out the black boule of bleith to their song,
and let them be merie all harvest time long.

Now looke up to Godward, let tong never cease
in thanking of him for his mightie encrease:
Accept my good will, for a proofe go and trie:
the better thou thrivest, the gladder am I.

August Husbandrie, from *"Five Hundred Points of Good Husbandry"* by Thomas Tusser

Garden Red Currants and White Pine Blister-Rust

Spare cultivated red currants—they are sufficiently resistant to this fungus

By Walter H. Snell

COMPARED with the chestnut blight, the control of the blister-rust of white pine is a simple matter because the fungus causing the disease of pine cannot be spread from pine to pine but must pass a part of its life history upon currants and gooseberries (*Ribes*) before reinfecting the pine. As demonstrated in an earlier article by the writer*, the spores formed on the pine can be carried by the wind at least 300 miles to *Ribes*, but the spores on the *Ribes* which reinfect the pine are the weak link in the chain in that they can be carried only relatively short distances. Therefore, the removal of *Ribes* from the vicinity of white pines provides a comparatively simple means of control of the disease.

Paying no attention to precise biological details, it may be said that the different kinds of *Ribes* vary in their infectability or what has been called the "hitting power" with regard to the pine. From the very beginning, it has been recognized that cultivated English black currants are dangerous to pine at least up to a mile and a quarter and consequently they have been removed from gardens in all the eastern states where white pine is grown. All other species of currants and gooseberries, wild or cultivated, have for the most part been considered able to jeopardize pines only at distances inside of 1,000 feet, except under unusual conditions of terrain, etc. Over the past 35 years, the public has cooperated willingly in the protection of the pine by the removal of the cultivated black currants and the wild *Ribes* of all sorts, but it has never become reconciled to the compulsory removal of even a small row of measley, uncared for, garden red currants.

This writer has never believed that cultivated currants and gooseberries were a source of danger to white pine. Here's how. One day, in my earliest blister-rust work in 1916, ahead of me up a road in Swansea, Mass., I saw a blotch of foliage decidedly bright orange in color. It was a half-acre of English black currants with the leaves completely infected with the blister-rust fungus from diseased pines across the road. Next to this patch was a half-acre of cultivated red currants, upon which I could find only scattered blister-rust infection spots—a violent contrast with the condition of the English blacks, bright green against orange. Next to these was a half-acre of cultivated gooseberries, upon which I could find no blister-rust infection at all. Therefore, even considering the known varia-

*See May 1950 issue of the Journal of the New York Botanical Garden.

bility within certain limits of the susceptibility of garden red currants to the blister-rust fungus, I have always insisted that these currants constituted no danger to white pine, at any distance from them. It was not, however, until a third eradication of red currants in the Lake George area of New York about 1935 raised a violent storm of protest that I was able to attempt to prove my thesis.

My first approach was to try to find pines that could be considered infected by spores from cultivated red currants. I looked up every situation of which I could learn in the Adirondack region, where there were red currants within a reasonable distance of the pines. I located 29 cases, in most of which the red currants were within 200 feet. In 28 of these cases, pines were infected. Red currants were nearby but so were wild gooseberries—the red currants, therefore, clearly not with certainty culpable. In one case, I found red currants within 100 feet of cankered pines and no wild *Ribes* upon which I could place the blame.

Of the 29 cases, one was shown me definitely for the purpose of confounding me. Upon casual inspection, it certainly appeared able to blow my ideas sky high! This was Case 47, the old "Ab Wrisley Place" near Lewis in Essex County, New York, an abandoned farm with 7½ acres of planted pines surrounding an old row of 12 large red currant bushes. These pines were certainly heavily infected, nearly 45% out of the total of about 8,000 trees. It looked as if the red currants had me. Careful analysis of the situation proved interesting, however.

Studying the infection conditions by 15-foot quadrats, I found a strange situation—that the percentage of infection was lowest near the red currants and became increasingly higher as one proceeded in any direction to the periphery of the plantation. Conversely, the percentage of infection of the pines was highest in the northern corner of the plot and decreased regularly from that point to the other portions of the plot. I then noticed a few small wild gooseberries about 6 inches high right at the edge of this northern corner. By digging around in the ground, I found that these small bushes were sprouts from roots many years old and then later learned, from the blister-rust personnel in the county, that large bushes had been removed from this precise spot two or three years before. I was happy, again!

My next approach was to study similar white pine-red currant associations in the hardwood region of western New York, where the pines were planted ones and not native. In 9 of the 38 cases studied, the red currants were within 6 inches to 100 feet and the pines were not infected. In one case, a planting of 1,000 trees 350 feet to 800 feet from a block of over 2,700 red currants was entirely uninfected. In 12 more cases, blocks of pine, mostly of 500 to 2,000 trees 50 to 900 feet from red currants, were entirely uninfected. The remaining cases of this group were similar but not quite so spectacular.

In many of the 72 cases of pines near red currants, 5 cases studied in the

southern New England states and 67 cases in New York State, the pines were not infected at all. In all but one case where the pines were infected, wild gooseberries were found to be as near as or nearer than the currants. As mentioned previously, in this one case where the pines were infected, no wild gooseberries could be found anywhere around. It should be added that a few cases have been reported by others in various parts of the country, in which the infection of the pines was supposed to have come from red currants, but if these few infestations were as reported, it is an exceedingly small number out of the hundreds of thousands of associations of white pine and red currants that have existed over the eastern United States during the past 40 years. Consequently, it has long been the writer's contention that red currants constitute no threat to white pine and that there is no need of eradicating them to any distance from white pine.

Over the entire period of study of the white pine blister-rust, there has been the question as to why cultivated black currants threaten pine from a distance of a mile and a quarter, wild gooseberries up to less than 1,000 feet in most circumstances, and garden currants not at all. With the idea that it might possibly be the volume of the spores produced on the *Ribes* that infect the pine and a question of a minimum volume of spores to bring about one canker on pine, a series of rather intricate studies was made along these lines and on three groups of *Ribes*: (1) the generally heavily-infected cultivated black currants; (2) wild gooseberries; (3) cultivated red currants.

On hundreds of bushes of each kind, the total number of leaves was counted, the areas measured, and the total leaf-area per bush calculated. While it was found that large red and black currant bushes would have 20,000 leaves and wild gooseberries 50,000 leaves, a good average for all of them would be 4,000 or 5,000. The figures obtained were calculated for the common unit of a row of 6 cultivated red currants and a comparable pasture grouping of wild gooseberries.

A study was then made of the pathological conditions of the three kinds of *Ribes* in order to get a representative situation. This involved the measurement of the areas of thousands and thousands of infection spots. For future calculations, a figure of 77%, which is low, was taken for the black currants, 20% as a good average for a wild gooseberry bush, and 2.3% for the red currants, the highest found in any case and much higher than the average infection of any red currant.

Next, in a long and laborious study of infected leaves under low-power microscopes, the numerical production of telia and sporidia on the three kinds of *Ribes* was obtained. Then, using all the data of total areas of leaves on the three groups of *Ribes*, the percentages of infection, and the number of sporidia typically produced per unit of infection, a possible total number of sporidia for the various lots of *Ribes* was obtained. These figures came out approximately as follows: over two million millions for

the black currants, over 260 thousand millions for the wild gooseberries, and over 33 thousand millions for the red currants—a ratio of roughly 70:8:1.

Whether or not these figures are a valid basis of judgment, it just so happens that if black currants are dangerous to white pine up to a distance of 6,600 feet, and wild gooseberries are dangerous to a distance of 750 feet, then these figures and this ratio suggest a dangerous distance for cultivated red currants of something under 100 feet. And all this, mind you, with the entire series of calculations "loaded" in favor of the red currants, because of the low percentage of infection assigned for the black currants and a much higher percentage of infection used for the red currants than I ever found to be the case.

The final study made of the relation of red currants to the blister-rust of pine was to attempt to obtain a threshold or what I called the "quantum" relationship between the spore production on the red currants and the infection of the pine—in other words, some idea of the number of sporidia produced to result in a single canker on a pine tree. Fortunately, from my earliest studies of a large number of infested pine stands in the Adirondacks, I had data for every area upon the *Ribes* population—kinds, number and sizes of bushes within and without the plots—as well as data upon the pathological conditions of the pine. By combining these quantitative *Ribes* data with the figures and calculations of the study just discussed, I was able to make approximations of a threshold or quantum relationship. As would be expected from the normal variability of conditions in nature, there was a wide range in the threshold figures obtained. They ran from a low of 580 million to a maximum of 79 billion sporidia to effectuate a single canker on pine. It can be seen by the simplest sort of mathematics that even if one chooses to disregard the highest figures obtained, there is not much latitude to allow for infection of pines in any area from the really meagre production of pine-infecting spores on the red currants. It would appear that red currants cannot be considered dangerous to white pines for the simple reason that they are so resistant to the blister-rust fungus that they cannot produce a sufficient number of spores under any conditions.

I started out young with the idea that red currants are never sufficiently heavily infected to need to be pulled out of gardens. For 20 years more, my casual observations only strengthened this conclusion. And these studies discussed here, whatever may be said of their completeness of coverage, their finality or their scientific validity, certainly substantiate my contentions in the direction of sparing the cultivated red currants.

Water Relation of Plants

And Factors Affecting Conservation of Moisture

By P. W. Zimmerman
Boyce Thompson Institute of Plant Research, Inc.

SOIL moisture is probably the most important single factor which regulates the growth of plants. There are many other factors which may cause failures—insect pests, diseases, frost damage, and fertilizers. From the personal standpoint, there is no substitute for experience; from the standpoint of the plant, there is no substitute for water.

The amount of water available for plants is regulated by soil type, depth of soil, soil management and rainfall or artificial watering.

Sandy soils have low water-holding capacity. Such soils are adapted for rose growing only where rainfall is plentiful or can be supplemented by watering.

Soils which contain clay are relatively retentive to moisture. This may, under certain conditions, work to the disadvantage of the plants. Sandy soil can give up more than 80 per cent of its moisture to growing plants, whereas clay may hold back as much as 40 per cent of its total moisture. That is, plants may wilt in clay soil while considerable moisture is present.

The ideal type of soil for most plants is loam, which is a mixture containing sufficient sand to provide good drainage, sufficient clay to insure adequate water-holding capacity, organic matter and ample reserve supplies of nutrient elements. We should not ignore the importance of organic matter within the soil. This material plays an important role in plant nutrition, increases water-holding capacity of the soil and improves the physical condition of all types of soil. In farm practice, organic matter resulting from cover crops helps to prevent erosion.

Approximately one inch of rainfall a week is necessary to satisfy shallow-rooted crops. Shrubs and trees can get along on slightly less. This rainfall is most beneficial if it comes between May and September. In 1949 we experienced a near drought during those months. In fact, the drought was serious enough to restrict the use of water in the New York City area throughout the winter.

That brings us to the question of how to conserve moisture in the garden. Mulching of the soil is one of the most effective means for holding moisture, and it can be accomplished in a number of ways. Perhaps the simplest method is to maintain a well cultivated, loose layer of soil on the surface of the ground. This layer can be repeatedly renewed by cultivation after each rain. If the soil is well supplied with organic matter, a loose layer will be particularly effective for preventing evaporation of moisture.

There are many mulching materials available, for example, sawdust,

ground coconut shells, buckwheat hulls, straw, and coffee grounds. In recent years, I have had a number of favorable reports from the use of sawdust for mulching purposes. It must be remembered, however, that when cellulose material is added to the soil, bacteria working thereon will rob the plants of nitrates. It is advisable to use additional fertilizer when straw, sawdust or buckwheat hulls are worked into the soil. As soon as the mulching material begins to decay, it adds to the organic matter in the soil and eventually improves the fertility and water-holding power.

Plants absorb and then transpire water. Transpiration is essentially evaporation of water from leaves and other organs and is the most generally recognized of all processes in plants. Many common practices are based on this recognition as, for example, watering of house plants, use of irrigation systems, wrapping of cut flowers and waxing or placing nursery stock in wet sphagnum moss.

Transpiration is by no means limited to leaves but may occur from the surface of any organ. Loss of water from fruit, tubers and roots is due to transpiration. The leaves, however, have the largest evaporating surface and from them occurs the greatest amount of transpiration in the growing plant.

Water composes the bulk of growing plants. Young tissues may contain 95 per cent or more of water by weight. Older tissues usually contain 60 to 75 per cent water. Transpiration rates also vary with the species. On record we find that a sunflower plant four feet high lost one quart of water on a hot day. The same plant lost 123 gallons for the growing season. A ragweed lost 140 gallons for the season. One acre of corn (6,000 plants) lost 324,000 gallons for the season.

The rate of transpiration is influenced by both internal and external factors. The principal internal factors are: (1) the opening and closing of stomates; (2) the concentration of water vapor in the internal air spaces in comparison with that of the atmosphere; (3) the temperature of the leaf; (4) the water content of plant tissue; (5 the occurrence of colloidal gels which have high water-holding capacity; and (6) the cutinized epidermal walls in some plants.

Some of the most important external factors influencing the rate of transpiration are: (1) the energy of the sunlight as it affects the internal temperature of the leaf in relation to external temperature and also the opening and closing of stomates; (2) the temperature of the atmosphere and the soil; (3) the relative humidity of the atmosphere; (4) the water conditions in the soil; and (5) the wind or movement of air. Wind prevents the accumulation of moist air around the surface of the leaf.

Evaporation of moisture from the leaf exerts a pull on the water column in the veins of the leaves, stems and roots. It tends to create a partial vacuum and that, together with root pressure, aids the plant in taking water from the soil.

Excessive transpiration causes wilting, if the water lost exceeds that taken in by the roots. This frequently occurs when the aerial parts of the plant are out of balance with the root system. Top pruning of transplants is practiced in order to bring about a balance with the reduced root system.

Tissue development in the growing regions of plants depends on an adequate water supply in the cells. Enlargement of cells ceases when transpiration exceeds the water supply. Wilted plants either cannot manufacture food or the rate of photosynthesis is greatly reduced. If such retardation of processes takes place during the early life of many species of annual plants, they may not fully recover when subsequently supplied with an abundance of water. Similar results may be expected also with roses, though the effects may not be so pronounced. Therefore, a sufficient supply of water to prevent wilting is essential in the management of rose gardens.

Progress in Horticultural Techniques

R. R. Fenska

JUST how much the early horticulturists of Asia Minor knew about the technique of hybridization and cross-breeding of plants, we do not know. Early man kept much of his knowledge secret. Botanists were linked with the medicine-man! Linnaeus, the Swedish scientist, was of the opinion that the different kinds of plants never changed. It was not until the latter half of the 19th century that Charles Darwin (1809-82) and Gregor Mendel (1822-84) gave us the doctrine respecting the origin of species from more primitive forms and the Mendelian law of heredity in plants. Both men supported their theories with a great mass of facts from nature.

While these investigators gave us some fundamental principles of plant development, they did not complete the job. For instance, the well known MacIntosh apple first appeared on a single seedling in Alberta, Canada, and had little resemblance to the fruit from the parent tree of the seedling. The Dutch botanist, Hugo DeVries (1848-1935) called this mutation, or the sudden appearance of startling new properties or functions in the offspring from the parent plant. He changed the study of evolution from observation to experimental work. The true explanation of the origin and development of new varieties of plants lies possibly in some combination of facts of these different theories. Man has not reached the peak of development in this field.

Luther Burbank (1849-1926) carried on extensive experiments in plant breeding by selection, crossing and grafting and produced among other new and desirable varieties the spineless cactus, the Shasta daisy and the seedless apple. Right now scientists are trying to develop, through cross-breeding, plants which are immune to certain insects and plant diseases.

They want to rid the world of inferior species and develop a superior and better plant kingdom. It may be the beginning of "plant eugenics".

Experiments with poplar hybrids have demonstrated that certain strains vary from practical immunity to complete susceptibility of defoliation by Japanese beetle. This has justified experiments to hybridize spruce species in the hope that they may produce strains resistant to budworm attacks. Also, successful hybridization between maple species and crosses between species of ash have recently been reported by the United States Forest Service. The rapid dying off of our native paper birch throughout its range, due to a combination of factors known as "die-back", has led to cross-breeding of our white or paper birch with gray birch in the hope of producing an improved birch resistant to "die-back". The hybrids produced so far are intermediate in growth rate, that is, faster than paper birch but not as fast as gray birch. It is interesting to note that hybrids often show more sustained growth than parent species. The production of fast growing, as well as insect immune and disease resistant varieties, is not only of great importance to the forest industries but also to the arborist and the horticulturist as well.

The greatest problem facing the gardener, arborist and horticulturist today is the control of insects and diseases on crops and desirable shade and orchard trees. During the past seven or eight years, many new spray materials have been developed for the control of our insect pests and plant diseases. Some were hailed as miracle bug-killers. Unfortunately, most of them were placed on the market faster than experimental results warranted. Too much was expected of them. When the so-called DDT (dichloro-diphenyl-trichloro-ethane) insecticide became available for civilian use after World War II, it brought a new concept of insect control to the gardener and horticulturist. They were told that one spraying would last for weeks, or even months, and would eliminate practically all pests. The insect merely had to walk over foliage sprayed with this material and in a matter of minutes it would be paralyzed!

It was soon discovered, however, that while it would kill insects that were undesirable, it would also eliminate some predatory varieties that were desirable. In other words, it had the tendency to upset the "balance in nature" with disastrous results. Today, we are leaning more to the opinion that we shall have specific sprays for each insect pest or plant disease rather than an all-purpose spray material. We must learn to control our ever increasing insect problem or, as one prominent entomologist once predicted, "The bugs will inherit the earth".

This is a real challenge and involves the work of the entomologist, the chemist and the botanist. The entomologist must determine the most vulnerable link in the life cycle of each insect, the chemist must find a suitable compound that will destroy the insect, and the botanist must experiment with foliage and plant tissues to find the insecticide that will not injure the

plant. Thus, it is apparent that the "dream spray" of every amateur, one that will do the job for all insects and different plants, will always be just that—a dream.

Hormone compounds have been developed for use in the garden or orchard to assure a satisfactory fruit-set, to prevent premature drop of the fruit or, in the case of transplanting, to hasten the re-establishment of the plant by stimulation of root growth. When these materials have been perfected, they will be a boon to gardeners and horticulturists.

On the other hand, there are instances where suppression or regulation of abnormal growth is desirable. For example, when nursery stock has been held in cold storage for a long period and then exposed to high temperatures the following spring, it may readily develop undesirable soft shoots. Recent experiments have indicated that this can be avoided, if the plants are kept dormant by spraying them in the fall or early spring with maleic-hydrazide.

Another current development is the application of a nutrient element in the form of a spray solution directly to the foliage of the plant. This is revolutionary. If present experiments prove feasible, it will be possible to invigorate an ailing plant with a "shot in the air" instead of the ground. However, the cost of supplying nutrients to plants by this method will, doubtless, limit to special treatment under certain conditions rather than make it a substitute for the accepted practice of fertilization of the soil.

The development of tree surgery is also noteworthy. In 1790, William Forsyth (1737-1804), gardener to King George III, published his treatise of the treatment of wounds in fruit and forest trees. It was, indeed, a crude method compared with our present-day materials and technique. The so-called "Bartlett heal collar" has been one of the most important factors in the success of our modern treatment of cavities in trees. This "heal collar" serves to seal the cavity against air and moisture and protects the cambium cells from drying out, and thus promotes continuous callous growth at the edge of the wound.

The new technique, or chemotherapy, for control of certain tree diseases is probably the most fascinating recent development. By this method, special chemicals are injected into the sap stream of a tree to counteract the toxic agents produced by such diseases as "bleeding canker", which attacks some of our most desirable shade trees. Experiments in chemotherapy for the control of the Dutch elm disease indicate that it is possible to condition trees to resist the disease by employing certain chemical combinations. The future development of this method of treating plants holds great possibilities.

It is for the future scientists to give us the final answer to many of our present horticultural problems, if there is a final answer. You are on the first rung of the ladder. As you climb higher up, you will find many frontiers in the basic sciences still waiting to be explored. We still, for

instance, do not have the answer to the greatest mystery of all, namely, what is the nature and character of the green chlorophyl in plants. All living matter depends on it. What makes it "tick"? If you can find the answer to that question, you will have solved the age old riddle of life itself. There are those who say it is beyond the ken of man. Nevertheless, our best known amateur botanist, Charles Kettering, Director of Research for General Motors, who calls himself a "monkey wrench scientist", is working on this problem. He does not agree with those who claim this mystery cannot be solved by mortal man.

Mr. Fenska, who is Secretary-Treasurer of the Westchester County Tree Protective Association, delivered the above address at the graduation exercises, on June 22, 1950, for students in the Two-Year Courses at the New York Botanical Garden.

Rose-Growers' Day — June 1950

IN spite of disagreeable weather, more than three hundred visitors attended Rose-Growers' Day, June 15, 1950, at the New York Botanical Garden. This was the eighth annual event of such nature, arranged in co-operation with the American Rose Society. The theme of the day's program was the amateur's rose garden.

While not everyone risked a drenching, a surprising number inspected the rose garden under the guidance of Lambertus C. Bobbink, of Rutherford, N. J. All were favorably impressed with the attractive layout and excellent condition of the plants.

Among the notable varieties given to the rose garden this year by Bobbink & Atkins, Rutherford, N. J., were Mission Bells, Souv. de Jean Soupert, Golden Scepter, Golden Jubilee, and two weeping tree roses, Sanders' White and Minnehaha. The number of bushes now totals approximately 7,000.

Dr. William J. Robbins, Director, welcomed the visitors when they gathered in the lecture hall for the morning session. Dr. P. P. Pirone, Plant Pathologist, then assumed the duties of presiding officer, introducing Floyd F. Eldred*, of Old Greenwich, Conn., and Dr. Charles Glen King, of Scarsdale, N. Y.

Experiences in a Hillside Garden

Dr. King gave a delightful talk about growing roses in his hillside garden. He said, in part: "In 1942, we moved to Scarsdale, N. Y., and found a new home to our liking, but the half acre lot had not been improved. Among the rather hurriedly planted trees and shrubs, we bought a few roses just as an experiment. Good luck with a dozen hybrid teas started us on our hobby which, apparently, has no limit.

*See the July number of the Journal of the New York Botanical Garden for Mr. Eldred's talk on "An' I Learned about Roses from Them".

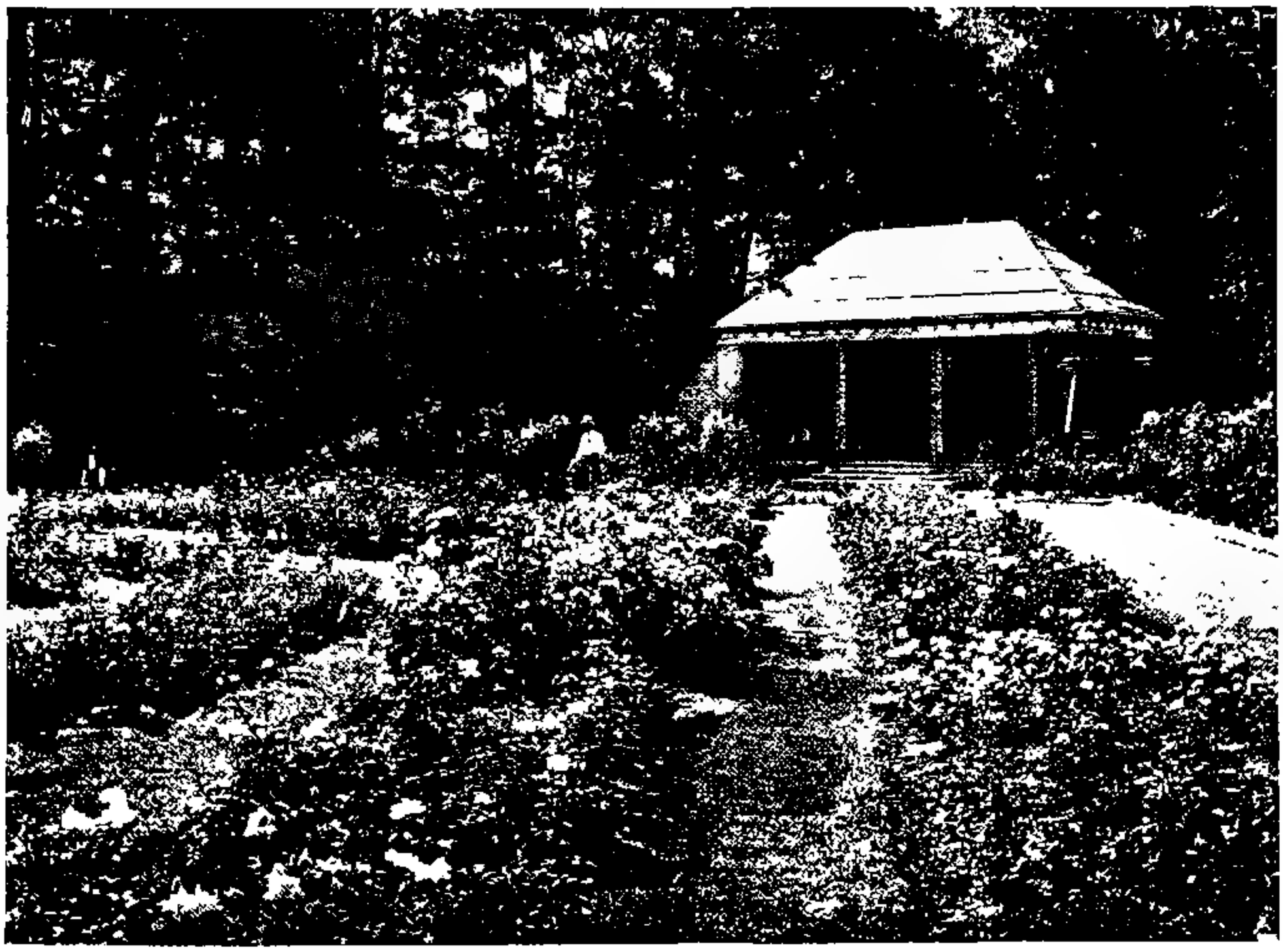
"Our rose garden now contains about 345 roses, in 52 varieties, most of which are hybrid teas. There are a few polyanthas and floribundas with only one rugosa and seven climbers on columns.

"The roses which have given the most gratifying results are not always in the same relative position each year, but the following have been consistently exhilarating for a rank amateur.

"Peace is right at the top of the list, for it does everything to perfection. It blooms continuously and generously, has richness of color both in foliage and flower, is vigorous in growth. Crimson Glory stands second in line as an all-round garden rose; a heavy bloomer in a velvety, rich, deep red. Eclipse is also a vigorous grower, a profuse bloomer, and has golden buds of striking form.

"Other teas which we rate highly for their garden performance are Hector Deane, Lowell Thomas, Neige Parfum (an exquisite white with a delightful perfume), Mme. Chiang Kai-shek (of almost classic beauty as it opens), Charlotte Armstrong, Mary Margaret McBride, Betty Uprichard, Pedralbes and Sunset Glory.

"Donald Prior we find one of the most satisfactory of the polyanthas



A section of the extensive rose garden at the New York Botanical Garden, showing the shelter house under construction.

for background material, for it bears its deep red flowers against clean, healthy leaves over a long period. Pinocchio is charming—the blooms profuse and dainty in form and color. The climber, New Dawn, produces its delicate pink flowers almost continuously, grows lustily and resists winterkill.

"Just a word or two about mulching which is an important phase of growing good roses. My experience indicates that buckwheat hulls are the most satisfactory medium for this purpose. They are heavy enough to stay in place; furnish a uniformly soft, aesthetic background; provide complete protection against weeds, if applied an inch to an inch and a half thick; reduce the loss of ground moisture, for rain penetrates them; and prevent baking of the soil. Also, buckwheat hulls may be hilled up around the base of the rose bushes in winter and in spring raked level again."

Rose Varieties for the Small Home Garden

At the afternoon session, Roderick N. Crocket, of Hartford, Conn., President of the National Association of Gardeners, presided. Harry L. Erdman, Superintendent of the rose garden at Hershey, Pa., discussed "Rose Varieties for the Small Home Garden." Mr. Erdman stated that his subject was a controversial one in that personal likes and dislikes, different locations, different layouts and other conditions naturally affected the selection of varieties. Using "The Guide for Buying Rose Plants", distributed by the American Rose Society, Mr. Erdman named leading varieties in the various color groups for gardens small, medium and large. He ended his remarks with the recommendation that anyone contemplating a new rose garden –or even revising a present one—should visit the rose garden of the New York Botanical Garden and carefully study the different varieties, noting the habit of growth, the foliage, the shape and color of the flower. If three visits are made, said Mr. Erdman, in June, midseason and September, then by the process of elimination one will be able to select the varieties of roses appealing most to him and most suitable to the conditions on his own place.

Dr. P. W. Zimmerman, of the Boyce Thompson Institute, concluded the day's program with a very interesting talk on "Water Relations of Plants and Factors Affecting Conservation of Moisture", an abstract of which appears on page 191 of this issue.

Conard-Pyle Co., West Grove, Pa., displayed the new miniature roses Pixie, Tom Thumb, Sweet Fairy, Red Elf, Bo-Peep and Midget. These tiny, hardy roses may be used in rock gardens, for edgings and for novelty display. They grow only six inches high and bloom all season.

Bobbink & Atkins exhibited Autumn Bouquet (new everblooming shrub rose), Baroness Rothschild and Felbergs Rosa Druschki (hybrid perpetuals), Oskar Cordel (hybrid perpetual, remontant) and Reichpräsident von Hindenberg (pillar shrub, remontant).

REVIEWS OF RECENT BOOKS

An Aid to the Understanding Of Plant Life

BOTANY. An inrtoduction to Plant Science. W. W. Robbins & T. E. Weier. 480 pages, illustrated, indexed. John Wiley & Sons, Inc., New York. 1950. $5.00.

"Botany" by W. W. Robbins and T. E. Weier is more than an elementary text book for college students. It is a novel, stimulating and most interesting introduction to plant life. Over 500 illustrations aid in interpreting the descriptions and functions of tissues and organs of the plant body.

The use of Phyllum in place of Division for the major classes of the plant kingdom is arbitrary and acceptable by some authorities. However, to designate the slime molds or Phyllum 9. Myxomycophyta as higher than the green, brown and red algae is subject to serious criticism. The tendency today is to class the slime molds as primitive forms of animal life. If accepted as plants the slime molds are usually placed after Phyllum 1. Schizophyta (fission plants). Mycologists would hesitate to consider slime molds as primitive forms of fungi.

Under Chapter 4, headed: "The Plant Body of Seed Plants", there appear illustrations of blue-green algae; these are certainly misplaced under a chapter on seed plants.

The text book, however, is excellent and recommended as good and easy reading for anyone interested in obtaining a clear and comprehensive understanding of the phenomena of plant life.

G. L. WITTROCK.

Well Known Scientists Capably Handle a Complex Subject

AGRICULTURAL CHEMISTRY—Vol. 1: Principles of Agricultural Chemistry. Edited by Donald E. H. Frear. 812 pages, indexed. D. Van Nostrand Co. Inc., New York, 1950. $9.

Principles of Agricultural Chemistry is the first of two volumes planned to meet the needs of those interested in agricultural chemistry. This book is designed as a text book for the advanced student and as a general reference text for that host of workers in the field of agricultural chemistry and its closely related fields.

In this volume the field of agricultural chemistry is divided into five parts and treated in twenty-four chapters. Each chapter is written by a specialist on that particular subject. Although there are many specialists in the various phases of agricultural chemistry, the editor has selected a group of exceedingly capable and well known scientists in the preparation of the volume. Despite the seemingly unrelated nature of many phases of agricultural chemistry, the authors have grouped their material into an orderly fashion under these five major divisions. For those individuals who are interested in going beyond the text book, each Chapter is well documented with references to the literature.

Doubtless the specialists will find fault with certain portions of this book; however, as a general reference and text it will find wide use. The style of writing in several chapters is invigorating.

STACY B. RANDLE,
State Chemist
N. J. Agricultural Experiment Sta.
New Brunswick, N. J.

Antibiotics Adequately Covered In This Volume

ADVANCES IN ENZYMOLOGY, and Related Subjects of Biochemistry. Vol. X. Edited by F. F. Nord. 533 pages, indexed. Interscience Publishers, Inc., New York, London, 1950. $7.50.

The tenth volume maintains the usual fine standards of this series. The enzyme chapters are uniformly written in a flowing, readable style, without sacrifice of ample bibliographic reference. The subjects covered are "Blood Clotting and Related Processes" by Tage Astrup "Tryptophanase-Tryptophan Reaction" by Frank C. Happold, "Phosphatase Alcaline" by Jean Roche and Nguyen-Van

Thoai, "Synthesis of Disaccharides with Bacterial Enzymes" by W. Z. Hassid and M. Doudoroff, "Probleme des Citronensaurecyklus" by C. Martius and F. Lynen, "die Phytochemie des Schefels" by Theodor Bersin, and "Chemical Changes in the Harvested Tobacco Leaf," Part II. Chemical and Enzymic Conversion during Fermentation and Aging" by Walter G. Frankenburg. One of the "related subjects" is "Some Aspects of Streptomycin and Other Streptomyces Antibiotics", by Norman Brink and Karl Folkers, written as a compact summary of the chemistry of streptomycin, with only brief mention of chloromycetin, aureomycin, and neomycin. The last chapter, by Claude Zobell, deals with assimilation of hydrocarbons by microorganisms.

MARJORIE ANCHEL.

Anthropocentric Emphasis in a Biological Textbook

BIOLOGY. ITS HUMAN IMPLICATIONS. Garrett Hardin. 635 pages, illustrations, index. W. H. Freeman and Company, San Francisco, 1950. $5.00.

Designed for the college student who will "never again be exposed to formal instruction" in biology, this text frankly stresses man rather than the amoeba. The section on *The Measure of Man,* a detailed treatment of anatomy and physiology, covers more than twice as much space as the following section on *The Variety of Living Things* in which all other forms, plant and animal, are crowded. The remainder of the book is given over to processes and characteristics integrating all life. This makes for a rather unconventional but nonetheless effective arrangement, particularly for the general student.

The clear open style, humor rare in a textbook, and the almost cartoon-like illustrations make the work "readable" despite its high concentration of facts. The uninitiated student will be glad to find key technical terms clearly defined, with their derivations. But he may also find occasional rough going, if he has no more than an elementary knowledge of chemistry. Some biologists might object to the anthropocentric tenor of the entire book but, in view of its stated purpose, the emphasis seems justified. That there is no lack of humility is evident from the author's final statement: "The magnitude and immediacy of the problems facing us make an admiring backward glance at our progress seem indecent. In this uncertain world, the only honest glory we may hope to gain is that which may be ours if we attack our problems with clarity and high spirit."

MARJORIE E. SWIFT,
Heyden Chemical Corporation,
Princeton, N. J.

Histological Technique

PRACTICAL SECTION CUTTING AND STAINING. E. C. Clayden. 129 pages, illustrated, indexed. Chemical Publishing Co., Inc., Brooklyn, N. Y. 1948. $2.75.

Essentially a manual of methods for the hospital technician, this concisely written volume is divided into three parts: paraffin sections, frozen sections, and celloidin sections. Under each heading the author outlines the details of fixation, embedding and cutting, followed by schedules of staining procedures appropriate to each technique. The various steps are explained, so that a beginner may have some idea of why each step is necessary and how to avoid mistakes.

VIRGINIA C. LITTAU.

For Neophyte Foresters

FOREST PRODUCTS. A. J. Panshin, E. S. Harrar, W. J. Baker & P. B. Proctor. 549 pages, illustrated, indexed. McGraw-Hill Book Co., New York. 1950. $6.

The preface of "Forest Products" states: "A textbook may be likened to a pair of crutches; it assists the tyro until he can walk alone in his chosen field".

Thus the authors have tacitly stated their objective and in compiling and condensing the subject matter of this broad field, they have adhered admirably to their goal. "Forest Products" should prove a valuable addition to the book shelf of all neophyte foresters. As a textbook it is unexcelled in its field.

Coverage of the economics of forest utilization is adequate for a book of this type which introduces such a multiplicity of topics. Few, if any, important products of the forest are neglected.

Throughout the book basic concepts are developed without indulging in detailed statistical studies. This fact makes

the book very desirable for classroom use.

It is the reviewer's opinion that the maximum amount of pertinent information has been crammed into the five hundred and twenty-six pages of "Forest Products". The excellent reference list at the end of each chapter facilitates complete pursuit of any selected field.

DAVID P. THOMAS,
University of Washington.

Of Interest to Entomologists

A CENTURY OF ENTOMOLOGY IN THE PACIFIC NORTHWEST. Melville H. Hatch. 43 pages. Illustrated, indexed. University of Washington Press. Seattle, Wash. 1949. $1.50.

This short treatise on the rise and growth of Entomology in the Pacific Northwest includes a description of the outstanding men and the more important books and insect collections prepared by them. Of greatest interest to most entomologists, perhaps, is the chapter dealing with the present status of entomology in the region comprising British Columbia, Washington, Oregon and Idaho.

P. P. PIRONE,

Floriculture Brought Up To Date

FLORICULTURE. Alex Laurie & Victor H. Ries. 525 pages, illustrated, indexed. McGraw-Hill Book Co., New York. 2nd edition 1950. $5.

The second edition of Floriculture—Principles and Practices, by Laurie and Ries, is essentially the first edition with a few revisions. The largest revisions occur in the sections on insect and fungus pest control, which have been rewritten to include newer control measures with organic pesticides such as benzenehexachloride, chlordane, DDT, Parathion, Fermate, Parzate, Ceresan, and others. There have been some additions to the chapter on soils to include newer methods of watering and the use of corn cob mulches. The discussion of green manures has also been completely revised.

Information on vermiculite, chemical control of lawn weeds and pests, propagation by leaf bud cuttings, starting annuals, propagation and use of perennials, and gravel culture has also been added. Also, to bring the first edition up to date, some minor changes have been made in the sections on chrysanthemums, broad leafed evergreens, hardiness, pH, African violets, and soil preparation.

This book is general in its coverage and is, therefore, less subject to the general revisions necessary in a more technical book that goes deeper into a specific field.

ARTHUR BING,
N. Y. State College of Agriculture.

A First-Class Reference On Annuals

ANNUALS. Roy Hay. 240 pages, illustrated, indexed. Macmillan, New York. Revised edition 1950. $2.50.

"Annuals" by Roy Hay is an interesting book, being a revision of the author's first published edition of 1937. It is divided into two sections.

The first chapter is devoted to "definitions, distribution and development". Mr. Roy here points out that many of the plants described in his book are biennial or perennial in nature but are recommended to be grown as annuals.

Another chapter is devoted to annuals that have been lost to cultivation and apparently there are many of merit. Methods of growing and the many ways in which these garden favorites may be put to use complete part one of this work.

Part two comprises a comprehensive list of all the worthwhile kinds. It gives the common names of all those described, the botanical names and their derivation. Useful information of a cultural character is also included.

The book is well illustrated with numerous black and white and colored plates. I consider "Annuals" an excellent reference work.

EDWIN BECKETT,
Berkshire Garden Center,
Stockbridge, Mass.

Conventional Text

PLANT ECOLOGY. W. B. McDougall. 234 pages, 118 illustrations. Indexed. Lea & Febiger, Philadelphia. Fourth edition, 1949. $4.

As a fourth edition, this volume, even though stated on the title page to be "thoroughly revised," contains no significant improvements over the third edition. In addition, there are no fundamental differences in organization or content, other than literature references, from the first edition of two decades ago.

As a textbook of university plant ecology, this work will probably hold its place in conventional courses where a relatively brief text is needed.

Notes, News and Comment

Dr. Merrill Honored. At a special ceremony in Paris, on May 7, the Société Nationale d' Acclimatation de France conferred its Geoffroy Saint Hilaire medal on Dr. E. D. Merrill, member of the Board of Managers of the New York Botanical Garden.

Graduation Excercises. Graduation exercises for students in the Two-Year Courses at the New York Botanical Garden were held on Thursday evening, June 22, 1950, with G. L. Wittrock, Assistant Curator of Education, in charge of the program. Henry De la Montagne, Assistant Director of the Garden, presented certificates in the Science Course to Ferdinand A. Czwaczka, Clifford H. Howell, Frank M. Wright, Edna May Wright, Dominic Ziccardi; in the Practical Gardening Course to John J. Blum, Howard L. Campion, Walter Jamroga, also to Mr. Czwaczka and Mr. & Mrs. Wright. R. R. Fenska, Secretary-Treasurer of the Westchester County Tree Protective Association, delivered the address of the evening. It appears elsewhere on page 193 of this issue of the Journal of the New York Botanical Garden.

T. H. Everett Continues as Horticulturist, Louis Politi Named Head Gardener. To expand the horticultural activities of the New York Botanical Garden and render greater horticultural service to members, students and the general public, it was found expedient to create again two distinct positions, that of Horticulturist and that of Head Gardener. Acccordingly, on July 1, 1950, T. H. Everett was relieved of his responsibilities as Head Gardener, these being assumed by Louis P. Politi. Mr. Everett continues as Horticulturist.

Under the new arrangement, Mr. Everett is responsible for the planning of the general landscape effects and for the scope and character of the living plant collections. He will interpret horticulture to the general public and will develop the horticultural displays and activities of the New York Botanical Garden. Mr. Everett will also supervise the student gardeners' program which has recently been resumed at the New York Botanical Garden.

Mr. Politi has full charge of the propagation and cultivation of the living plant collections and the supervision of the work of all the gardeners.

Lectures. On June 13, Dr. P. P. Pirone lectured on "Tree Care" before the members of the Garden Club of Great Barrington, Mass., at the home of William Felton Barrett. On June 19th, Mr. E. J. Alexander spoke to the Gardeners of New Canaan, an affiliate garden club, on "Wild Flowers for our Gardens" Dr. Bassett Maguire presented the film, "Rediscovery of Arundinaria Schomburghii" to the guests of Mr. H. R. Kunhardt, Jr., at the Indian Harbor Yacht Club, Greenwich, Conn., on June 29.

Meetings. Dr. William J. Robbins lectured on "Hybrid Nutritional Requirements" before the Conference on Heerosis at Iowa State College, Ames, Iowa, on the 19th of the month. Dr. P. P. Pirone attended the Arboricultural Field Day held at Rutgers University, New Brunswick, N. J. on June 21.

Representation at VII International Botanical Congress: Dr. Donald P. Rogers represented the New York Botanical Garden and Oberlin College and served as alternate of the Mycological Society of America. Dr. H. W. Rickett represented the Torrey Botanical Club, American Society of Plant Taxonomists, served as alternate for the Dept. of Botany, University of Pennsylvania, and Sociedad Botanica de Mexico, and cast the votes of the Botanical Society of America. Dr. H. N. Moldenke, in addition to being the official delegate of the American Plant Life Society and the New York Academy of Science, represented fourteen institutions and special groups from Mexico, Central and South American countries. These included Jardin Botanico de Rio de Janeiro, Brazil; Institute de Biologia, both of Mexico City, Mexico, and Concepcion, Chile; Estacion Experimental Agronomica, Santiago de las Vegas, and Ministerio de Agricultura, Cuba; Instituto de Ciencias Naturales, Ecuador; Universidad de Narino, Columbia; and Museo Botanico de la Faculta de Ciencias Naturales, Universidad Nacional de Cordoba, Argentina.

Just as the August issue was going to press, air mail from Stockholm brought word that Dr. Rogers was made Secretary of the Special Committee for Fungi, and that Dr. Rickett served as a member of the General Committee on Nomenclature, of the Editorial Committee of the International Rules, and of the Special Committee for Nomenclature of Plants in Cultivation.

Dr. W. H. Camp, until recently a member of the Garden's staff, was made Secretary of the last named committee. Modernization of the parts of the rules dealing with hybrid plants and with plants in cultivation are among the real accomplishments of the Section in Nomenclature of the Seventh International Botanical Congress.

Visitors. Dr. H. B. Woodruff and Dr. Dale Harris, of Merck & Company, Rahway, N. J., and Dr. H. M. McGuire of the Lily Research Laboratories visited Dr. Robbins and toured the laboratories on June 14. The following week Dr. Ismael Velez, professor of botany of Polytechnic Institute, San German, Puerto Rico, paid his respects to Dr. Robbins. On June 27, Dr. E. C. T. Holsinger, botanist, of Columbo, Ceylon, called on Dr. Robbins and visited the laboratories. The same day, Mr. Edwin T. de Bechtel, Mrs. J. Henry Harper, Mrs. Ira Haupt and Mrs. Frederick S. Moseley, Jr, had luncheon with Dr. Robbins.

Other visitors to the New York Botanical Garden during June included: Leonard Buck and C. Austin Buck, Far Hills, N. J.; W. E. Th. Ingwerson, East Grinsted, Sussex, England; R. E. Bottomley, Milford, Conn.; G. F. Woerner, Stumpp & Walter Co., New York City; Marguerite Palmer, Garden Editor, Houston Press, Houston, Texas; J. E. Gunckel, Rutgers University, New Brunswick, N. J.; B. Schwartz, Library of Congress Washington, D. C.; Florence E. Day, Metropolitan Museum; Monroe Bricker, University of Miami; Werner & Lillie Fayet Hunsche, Porto Alegre, Brazil; Marguerite Ste. Marie and Louise Allard of the Jardin Botanique, Montreal; Marie Helenè Goutreau, Canadian Horticultural Society; A. C. Smith, Smithsonian Institute; L. R. Freese, University of Houston; Herman Silva, Michigan State College; Dr. Margaret Fulford, University of Cincinnati; Maxwell S. Doty, Woods Hole, Mass.

Thirty-two members of the Maplewood Garden Club, of which Mrs. Hugh T. Morgan is president, were conducted through the greenhouse and rock garden by Mr. G. L. Wittrock.

Population and Plants

The population of the United States has already reached the figure of 150,000,000 that had been expected by demographers about 25 years later, according to Joseph S. Davis, Director of the Research Staff of the Food Research Institute at Stanford University. His statistics showing how all predictions and theories of the earlier part of the century have been upset are given in the Institute's War-Peace Pamphlet No. 12, "The Population Upsurge in the United States" ($1). By ignoring the actual trend, the nation is not prepared to take care of a continuing increase of this magnitude, he contends. Since all food is derived ultimately from plants, the food alone for the unpredicted extra millions is a problem of concern to botanists as well as producers.

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LOUIS P. POLITI	*Head Gardener*

To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

tanical Garden station, or the Webster Avenue

PUBLICATIONS OF THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

An Illustrated Flora of the Northern United States and Canada, by Nathaniel Lord Britton and Addison Brown. Three volumes, giving descriptions and illustrations of 4,666 species. Second edition, reprinted. $15.

Flora of the Prairies and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex by K. K. Mackenzie. From Vol. 19, Part 1, of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marion A. & G. L. Wittrock in the Journal for March 1942. 15 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal, 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 15 cents.

The Flora of the Unicorn Tapestries by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second edition 1947, reprinted. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at the New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts by E. J. Alexander. 64 pages, indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. Third edition 1950. 50 cents.

Review of Juniperus chinensis, et al by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.

Periodicals

Journal of The New York Botanical Garden, monthly, containing news, book reviews, and non-technical articles on botany, exploration, and horticulture. $1.50 a year; single copies 15 cents. Free to members of the Garden. Now in its 51st volume.

The Garden, a quarterly, designed to stimulate the laymen's interest in the world of plants and the science of plant life through articles written in popular vein. $2 a year in the United States; all other countries, $2.50. Published by the Garden's Manhattan office at 801 Madison Avenue, New York 21, N. Y. Now in its second volume.

Addisonia, devoted exclusively to colored plates accompanied by popular descriptions of flowering plants; eight plates in each number, thirty-two in each volume. Now in its twenty-second volume. Published irregularly. Subscription price, $10 a volume. Not offered in exchange. Free to members of the Garden.

Mycologia, bimonthly, illustrated in color and otherwise; devoted to fungi, including lichens, containing technical articles and news and notes of general interest. $7 a year; single copies $1.50 each. Now in its forty-second volume.

Brittonia. A series of botanical papers published in co-operation with the American Society of Plant Taxonomists. Subscription price of volumes 1 through 5, $5 a volume ($4 to members of the Society). Now in its seventh volume. Price, $7.50 ($5 to members of the Society).

North American Flora. Descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 97 parts now issued. Not offered in exchange. Prices of the separate parts on request.

Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

Memoirs of The New York Botanical Garden. A collection of scientific papers, 1900-1927. Contents and prices on request.

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CENTS $1.50 A YEAR

A NEW DIEFFENBACHIA

OUR COVER ILLUSTRATION

A NEW DIEFFENBACHIA

The dieffenbachias or dumb-canes are highly interesting plants because of the decorative qualities of their handsome foliage and because they are well adapted for use as house plants. They are all natives of the American tropics. They thrive in high temperatures and in rich, reasonably porous soils that are kept fairly moist at all times. Shade from strong direct sunshine is needed.

The variety pictured on the cover is new, and is here described and named for the first time. In applying to it the varietal name "Roehrs Superba" recognition is taken of the fact that it arose as a mutant of *Dieffenbachia picta* in the greenhouses of Julius Roehrs Company at Rutherford, N. J. The new variety differs conspicuously from *Dieffenbachia picta* in the higher degree of variegation that its leaves manifest. The white or paler portions of its leaf surfaces actually cover a greater area than do the green portions. It is more compact in growth than its parent and has thicker, and, therefore, more durable leaves. *Dieffenbachia picta* "Roehrs Superba" is being propagated in quantity and will undoubtedly soon become a familiar subject in florists' stores.

T. H. EVERETT

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JOURNAL

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THE NEW YORK BOTANICAL GARDEN

DOROTHY EBEL HANSELL, Editor

VOL. 51 SEPTEMBER 1950 No. 609

Cornus Kousa— A Summer-Flowering Flowering Dogwood

T. H. Everett

IN late June or in July — a month or even two after the native flowering dogwood has shed its "flowers" and clothed its branches with summer greenery — one may chance upon a tree of obvious relationship, a tree bearing four-bracted inflorescences that are grossly typical of the "flowers" of the flowering dogwood. True, the bracts (the white or creamy-white petal-like parts) differ in shape from those of our native tree, and true, the flowers appear when the tree is in full leaf rather than upon naked branches — nevertheless it is clearly a dogwood — and a dogwood of the type that we call flowering.

If you happen upon such a specimen and its identity is unknown to you, be sure that you have become acquainted with *Cornus Kousa*. This acquaintance is worth cultivating.

Here is a small tree, well suited for planting in the garden landscape, that provides a floral display over a longer period than almost any other — and that in high summer. I observed specimens this year which were attractive for more than five weeks. A full month's flowering is normal. Nor is this all. In fall *Cornus Kousa* adds to the painted landscape a welcome contribution of purple or purple-brown.

Cornus Kousa is not exactly rare in gardens nor is it plentiful. In the vicinity of New York City one sees it in public places occasionally — on the banks of the Bronx River near Mount Vernon railroad station, fringing Route 22 where it skirts Kensico Lake, and elsewhere. At The New York Botanical Garden, a large specimen grows near the herb garden. A planting of younger trees was recently established in a glade that dips to the Bronx River, west of the walled experimental nursery. This site was selected because it permits observers to look down upon the trees — a vantage point that does full justice to *Cornus Kousa*. A fairly moist, neutral or somewhat acid soil suits this species best. It thrives in full sun, yet will tolerate light

shade. At Pleasantville, N. Y., I recently observed trees in an abandoned planting competing successfully with vigorous young forest undergrowth and blooming with great freedom in the dappled shade of higher trees.

Cornus Kousa is a native of Japan and China. For its introduction to American gardens, we are indebted to one of the original forty-eight members of the Corporation of The New York Botanical Garden, Thomas Hogg.

Thomas Hogg, an outstanding horticulturist of the nineteenth century, was raised among plants. His father, of like name, superintended the greenhouses of William Kent, of London, England, who at that time cultivated the largest privately owned collection of plants in England. And there, on the sixth day of February in 1820, the younger Thomas Hogg was born. Less than a year later the family moved to New York and in 1822 Thomas Hogg senior acquired a piece of ground some distance outside the city and established a nursery and florist business. The nursery was located where Broadway and Twenty-third Street now meet. In 1840 it was moved to Seventy-ninth Street and the East River. Thomas Hogg junior and his brother James were brought up in the business and on the death of their father in 1855 assumed control of what was a "very flourishing establishment"

Seven years after his father's death, Thomas Hogg was appointed a United States Marshall by President Lincoln and in this capacity he served in Japan for eight years until he resigned in 1870. Late in 1873 he returned to Japan, this time in the service of the Japanese Government. He retained this appointment for two years and it was during this period that he sent home *Cornus Kousa*. The fact that he did so, a fact which seems to have been overlooked by most writers who have dealt with the introduction of this plant, is recorded in "The American Garden" vol. ix, p. 329 (1888). There under the synonym *Benthamia japonica, Cornus Kousa* is illustrated and described and we read:— "This plant, which bloomed for the first time in this country during the latter part of June of this year, was sent from Japan to the Parsons nursery at Flushing, by Mr. Thomas Hogg, in 1875" All other references I have seen merely state that the plant was introduced by the grand old nursery firm of Parsons and Co. of Flushing.

In this country, as in Europe, a great interest in Japanese plants developed in the years that followed the opening of the islands to Occidentals. Parsons and Co. were very actively engaged in importing and promoting the distribution of such plants and Thomas Hogg was one of the most assiduous collectors located in Japan. His close relations with the Japanese authorities made it possible for him to explore the country more thoroughly than could most foreigners. He took full advantage of this.

Most of the seeds and plants that Thomas Hogg sent home went to his brother and were grown in his garden located at the foot of Eighty-fourth Street in New York City. This was the garden where "most of these treas-

The decorative bracts of Cornus Kousa differ somewhat in shape from those of the native dogwood, Cornus florida.

ures were cultivated for the first time in America", and which "was, for many years, the most interesting spot in the United States to lovers of Japanese plants. Many of the very best trees, shrubs, and herbaceous plants which have come to us from Japanese gardens, were thus brought to America before they were sent to Europe, and not a few of them are now among the most familiar inhabitants of our gardens." So wrote a contributor to "Garden and Forest" in 1893.

Most of the seeds and plants that Thomas Hogg sent home went to his brother — but not all. *Cornus Kousa* he sent to Parsons and Co. of Flushing. And in this way two famous personalities in New York horticultural circles, Thomas Hogg and Samuel B. Parsons, were associated in making available to American gardens the finest of the Asiatic dogwoods.

In commending *Cornus Kousa* to your attention, I must warn that it is a variable tree. From a decorative point of view, some individuals are more desirable than others. Seek these. If possible, mark the trees you intend to purchase when they are in bloom. The better types have broad bracts and flower heads that span five inches or even more. In poorer forms the flower heads from bract tip to bract tip may measure no more than two inches and the bracts themselves are often narrow. Varieties of *Cornus Kousa* have been described and named. The one called *chinensis* has received considerable recommendation as being superior for garden purposes. I have long suspected, and examination of herbarium specimens seems to confirm, that this is not a distinct variety and most surely it possesses no constant advantages over the type as far as characters of garden importance are concerned. The best plants for the garden are to be obtained only by selecting seedlings when they are in bloom, or by increasing vegetatively trees of proved accomplishment.

Cornus Kousa is of rather ample spread at maturity, although when young it is somewhat strict in its manner of growth. It attains an eventual height of twenty feet or so. Lacking the stiff horizontal branching habit of our native flowering dogwood, it is without the picturesque character which that habit gives. A magnificent tree in bloom, this Japanese dogwood is also of interest in fruit, for its masses of seeds resemble strawberries rather than the clusters of separate bright red seeds that we are accustomed to see on our native flowering dogwood. And they are edible or at least are reported to be so. I have never eaten them myself. *Cornus Kousa* is hardy in climates considerably harsher than that of New York City. This summer I was delighted to see a flourishing young specimen in full bloom in the garden of Mrs. John L. Senior, at Lenox, Massachusetts.

A hundred and thirty years ago, an English gardener left a substantial position and his home in London to come to America. His family included a nine-months' old baby. The baby grew into the boy who worked for his father in his nursery gardens at Broadway and Twenty-third Street and

Thomas Hogg, vice president of the Torrey Botanical Club, 1885-1892. This photograph was presented by him to Elizabeth G. Britton, November 1887, and is now in the collection of portraits in the library of The New York Botanical Garden.

at Seventy-ninth Street on the East River, and in time, together with his brother, he inherited the thriving business that his father established. But greater things by far were in store for that English-born baby. One of America's greatest presidents appointed him to serve the United States in Japan –in a Japan which Perry had recently opened to westerners and which even then was stirring to throw off the restrictions of feudalism. He served his country well in his official capacity, as he later served the newly constituted Japanese Government. But over and above his official duties he busied himself collecting seeds of the strange plants he saw in

Japan, which he believed would add beauty to American gardens. And he sent those seeds home to be nurtured in his brother's garden at Eighty-fourth Street and in the Flushing nursery.

In later life he traveled widely. His biographer notes that after retirement "he devoted his leisure to his favorite studies. His investigations took a wide range, and he was recognized as an authority in many branches of horticultural science and practice". In 1882 he was admitted to membership in the Torrey Botanical Club and four years later became its vice president. He became chairman of the committee of the Torrey Botanical Club that was appointed to consider the establishment of a botanical garden in the City of New York — the committee whose efforts resulted in the birth of The New York Botanical Garden—and later his name appeared as one of the distinguished forty-eight who comprised the original Corporation of this Garden.

As I write, I have before me a carefully dried specimen of *Cornus Kousa* from the herbarium of The New York Botanical Garden that was collected by Thomas Hogg in Japan. I have also in front of me his photograph, which he himself presented to Mrs. N. L. Britton in November 1897 and which is now in the Garden's portrait collection. It shows a man of distinguished features and supports his biographer's description, "In person Mr. Hogg was tall and spare, but well knit and muscular, with a strong but refined face and great dignity and gravity of manner. He was almost shrinkingly modest, but in congenial company he was one of the most agreeable of companions. He was never married but was singularly devoted to his sister and brother and the members of their families."

In Bronx Park in the present City of New York are two flourishing evidences of the interests and work of Thomas Hogg, one is the planting of *Cornus Kousa,* the other is The New York Botanical Garden.

Hardiness Records of Woody Plants at Rochester, New York

Bernard Harkness
Rochester Bureau of Parks

IN an article on the geographical distribution and the cold-resisting character of certain herbaceous perennials and woody plant groups, Dr. Orland E. White once asked the question if it were not possible that many species of plants might harbor within their population individuals of a genetic constitution enabling them to live in a considerably colder climate than represented by their present geographic limits of range. Some years later, Dr. White put this theory to test at the University of Virginia and subsequently made a report in which families and genera were tabulated as cold resistant, cold susceptible and mixed. Numerous species were classified as to cold resistant characteristics.

At Highland Park, Rochester, New York, an arboretum was begun in 1890 with, as a generous nucleus, a complete collection of all the ornamental shrubs in the nursery of Ellwanger and Barry. This firm had earlier given the land which started the park. In 1892 and succeeding years until plant quarantines prevented, nursery lists from France, England, Germany, Russia and Japan were combed for additions to the collections. Nurseries and collectors in the United States supplied their specialties.

Highland Park has a hilly terrain, a morainic deposit of lime-bearing sands and gravels. The lowest temperature officially recorded in 73 years at Rochester is a —22° F., while the average of the mean monthly temperature over a period of 115 years is 47.5° F.

This article is intended to record such woody plants as would seem to have exhibited a slightly more generous cooperation in surviving the years than their geographic origin would indicate. In some cases, their limits of cultivation assigned by the authorities are considerably exceeded. This survey would not be possible except for the records kept by Mr. Richard E. Horsey who, throughout his forty-five years with the park system, was interested in the problem of hardiness of plants in cultivation and early (1919) published data on it.

The classic example of a plant of the lower South in the United States, which is able to survive a climate far north of its natural range, is Florida corkwood, *Leitneria floridana*. Southern Missouri is the northern limit recorded for it, yet *L. floridana* has been well established for years in the rhododendron beds at Highland Park where the existing soil was replaced with acid peat. Its growth and increase by rootspread is even more noticeable in the neutral soil of Durand-Eastman Park. Casual park visitors, who are not interested in botanical science, are impressed by the extreme lightness of the wood, which can be demonstrated by pushing the trunks of the living plant.

The southern waxmyrtle, *Myrica cerifera,* brought in at various times—the earliest 1890 and the latest from Cape May, New Jersey, in 1925—has been frozen down to the ground level in cold winters but it grows back quickly. In mild winters, it retains its leaves for several weeks after the bayberry twigs are bare.

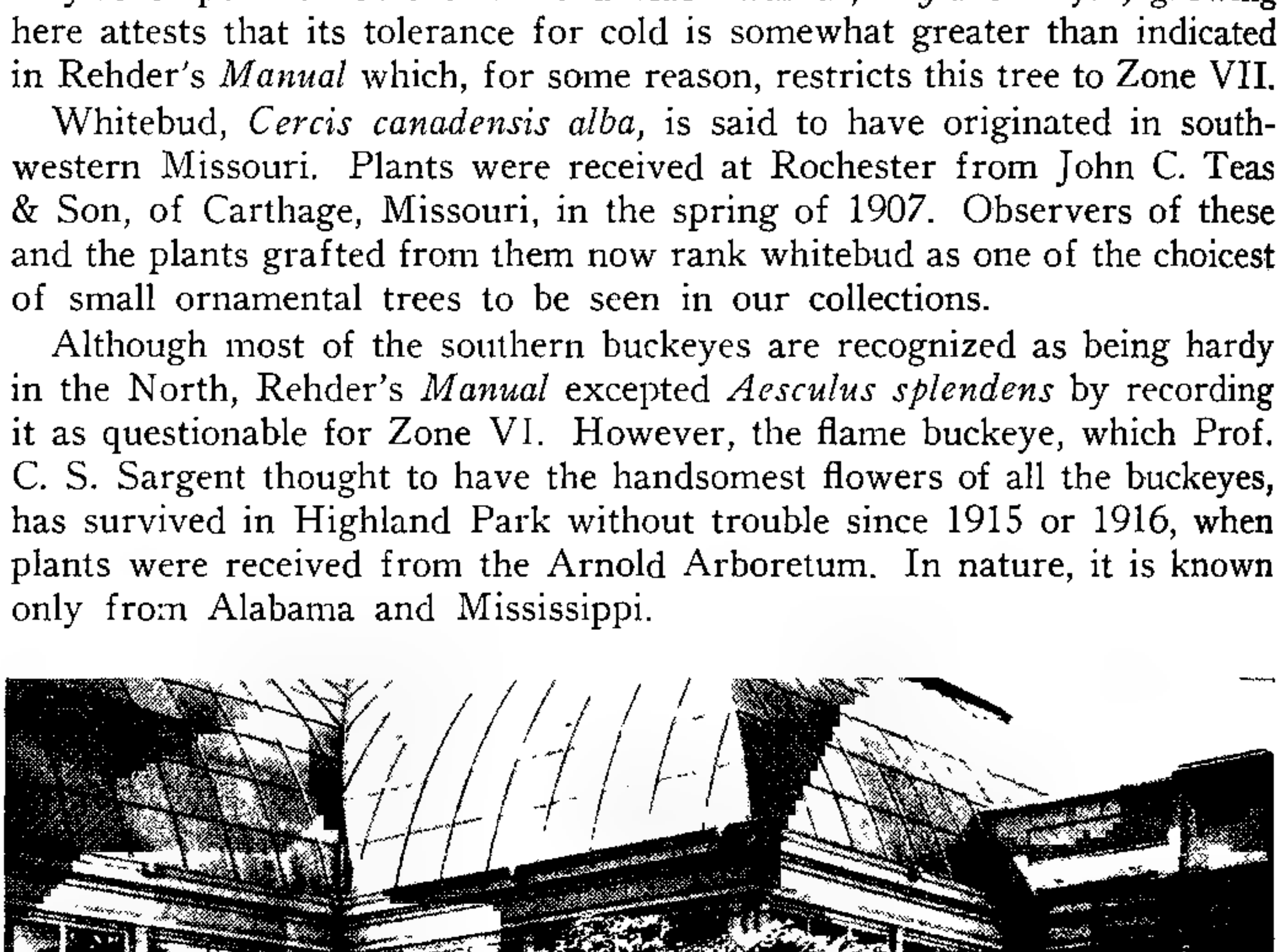
Reported as a plant of swamps from Virginia and Missouri southwards, *Cornus foemina* is represented in Highland Park by a plant fifteen feet high and with somewhat more spread from several trunks. *Hortus* II considers it not hardy far north; Rehder's *Manual* states it is questionable for Zone VI.

Being a plant of some ornamental value, the snow-wreath, *Neviusia alabamensis,* has long been grown far north of its restricted native habitat in Alabama. Thomas Meehan & Sons' nursery supplied ten plants to Highland Park back in 1899. Petalless, its flower effect comes from an abundance of fluffy stamens.

Two southwestern walnuts have experienced no setbacks from our northern winters. *Juglans rupestris,* the Texas black walnut, is a decorative small tree with marble-size fruits, freely borne, that are mostly shell. A plant in Highland Park stands twelve feet high with a crown spread of twenty feet. Mr. B. H. Slavin, of the Rochester Parks, collected the seed in the Wichita Mountains north of Cache, Oklahoma, in 1917. A fifty-foot specimen of the Arizona black walnut, *Juglans major,* growing here attests that its tolerance for cold is somewhat greater than indicated in Rehder's *Manual* which, for some reason, restricts this tree to Zone VII.

Whitebud, *Cercis canadensis alba,* is said to have originated in southwestern Missouri. Plants were received at Rochester from John C. Teas & Son, of Carthage, Missouri, in the spring of 1907. Observers of these .... and the plants grafted from them now rank whitebud as one of the choicest of small ornamental trees to be seen in our collections.

Although most of the southern buckeyes are recognized as being hardy in the North, Rehder's *Manual* excepted *Aesculus splendens* by recording it as questionable for Zone VI. However, the flame buckeye, which Prof. C. S. Sargent thought to have the handsomest flowers of all the buckeyes, has survived in Highland Park without trouble since 1915 or 1916, when plants were received from the Arnold Arboretum. In nature, it is known only from Alabama and Mississippi.



Several plants of *Clerodendrum trichotomum,* grouped against House 13 of the Main Conservatory of The New York Botanical Garden. This shrub is hardy here—in severe winters only do the tips winter-kill.

Close-up of *Clerodendrum trichotomum* as the flowers were beginning to open on August 7, 1950, at The New York Botanical Garden.

Chittamwood, *Bumelia lanuginosa,* came here in 1906 from the Arnold Arboretum; its range is from Virginia to Kansas and southward. It has made a dense shrubby growth about twenty feet high, flowering abundantly but with the fruits ripening very late in the season. Its leaves hang on until late in the year.

Another tropical family, the soapberry, has a northern representative in *Sapindus Drummondii* which grows from Mexico to Missouri. Our plants were grown from a seed collection made south of Oklahoma City, Oklahoma, in 1914. They reach about half their optimum height of fifty feet and after cold winters some injury has been noted. Flowers and seeds are produced by our plants.

A large number of Asiatic plants have been tested in Rochester. Highland Park was one of the locations chosen by Prof. Sargent principally for its soil alkalinity as differing sufficiently from the Arnold Arboretum to be of value in determining the ornamental worth of the new things coming from China and Japan in the seed collections of Wilson, Hers, Purdom and other plant explorers.

The Chinese Toon, *Cedrela sinensis,* is a quick-growing tree with ailanthus-like foliage but without the disagreeable flowering and seeding characteristics of the Tree-of-Heaven. Our plants from the western Szechuan

seed collection by E. H. Wilson in 1908 were killed to the ground level in the spring of 1934, but have since grown up from the roots to flowering and fruiting size. There may be hardier strains in the country, which merit the Zone V designation by Rehder.

Though first received from Thomas Meehan in 1899, harlequin glory-bower, *Clerodendrum trichotomum,* was later, in 1911, reinforced with plantings from the Seoul, Korea, collections by Prof. Jack of the Arnold Arboretum. Ordinarily freely flowering and very ornamental in fruit in late summer and fall, it has been cut to the ground by cold winters. However, it seems completely root hardy and even somewhat rampant in its root spread. Rehder's assignment to Zone VI, and questionable there, would seem unduly conservative.

The records indicate it was rather a struggle to get Japanese coriaria, *Coriaria japonica,* established. Thirteen plants were received, beginning in 1899 with plants from the English firm of Thomas Smith to 1919 with plants from the Arnold Arboretum. One plant remains apparently well established. After the mild winters of the past two years, year-old branches have flowered and produced the showy, coral-red, immature fruits which later turn dark purple. *Hortus* II states it is hardy south of Washington, which may be its limits for good garden effect. However, our plant justifies the Zone V rating given in Rehder's *Manual.*

The dove tree, *Davidia involucrata Vilmoriniana,* here since 1907 from the Veitch nursery, has not flowered. It appears more susceptible to winter freezing than most plants given the Zone V rating. In the case of the dove tree, it seems likely there are hardier strains in cultivation than we have had in Rochester.

Our plant of *Eucommia ulmoides* was a seedling of the 1907 seed collection by E. H. Wilson in western Hupeh, where it is a cultivated tree. There were several plants here before 1934, but after freezing to the ground only one sprouted up again. *Eucommia* yields rubber, although difficult to extract, so it came into some notice during World War II when the U. S. Department of Agriculture conducted rubber investigations. Incidentally, an interesting demonstration may be made — by pulling a leaf apart about a quarter of an inch, the two halves will remain attached by numerous strands of rubbery fibres.

The shrubby relative of the Lindens, *Grewia biloba parviflora,* from northern China and Korea has persisted here since 1905 by retreating underground in extreme winters. After a few favorable seasons, it regains height to eight feet which equals that reported from its native habitat.

The coldest recent winter did some damage to the raisin tree, *Hovenia dulcis,* but in most cases did not cut it down to ground level. First obtained from Thomas Meehan in 1899, the raisin tree produces not raisins but flower stalks which between flowering and fruiting swell into fleshy,

(*Continued on page* 219)

Plant Tumors and Cancer

Robert S. de Ropp

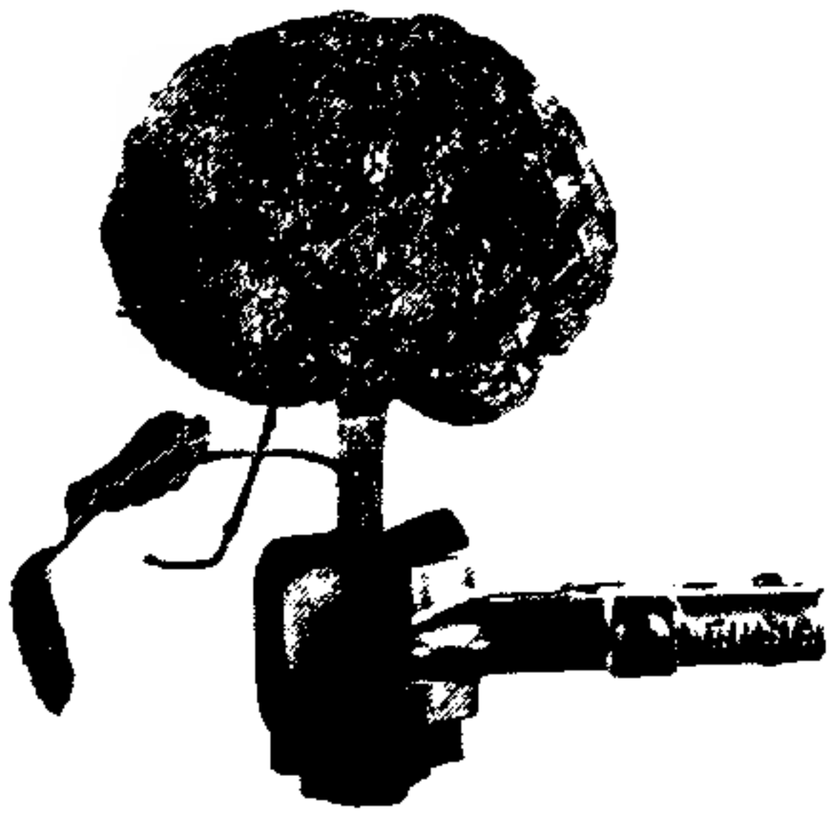


Figure 1—A naturally occurring tumor on Euonymus caused by crown gall bacterium.

PLANTS are perhaps the most tumor-ridden organisms on earth. Galls of every shape and size, from huge woody masses several inches across to barely visible outgrowths are found on hundreds of species of plants both wild and cultivated. They may be caused by viruses, bacteria, fungi, insects, nematodes, chemical substances or genetic peculiarities. Some are of vast economic value, e.g., the bacterial nodules on the roots of legumes which fix nitrogen in the soil. Some represent serious threats to cultivated crops, for instance, clubroot of cabbage, potato wart and crown gall.

Students of plant diseases have naturally interested themselves in the resemblances existing between some of these plant tumors and the destructive

Figure 2—Carrots experimentally inoculated with crown gall bacteria, showing distribution of the tumors which result.

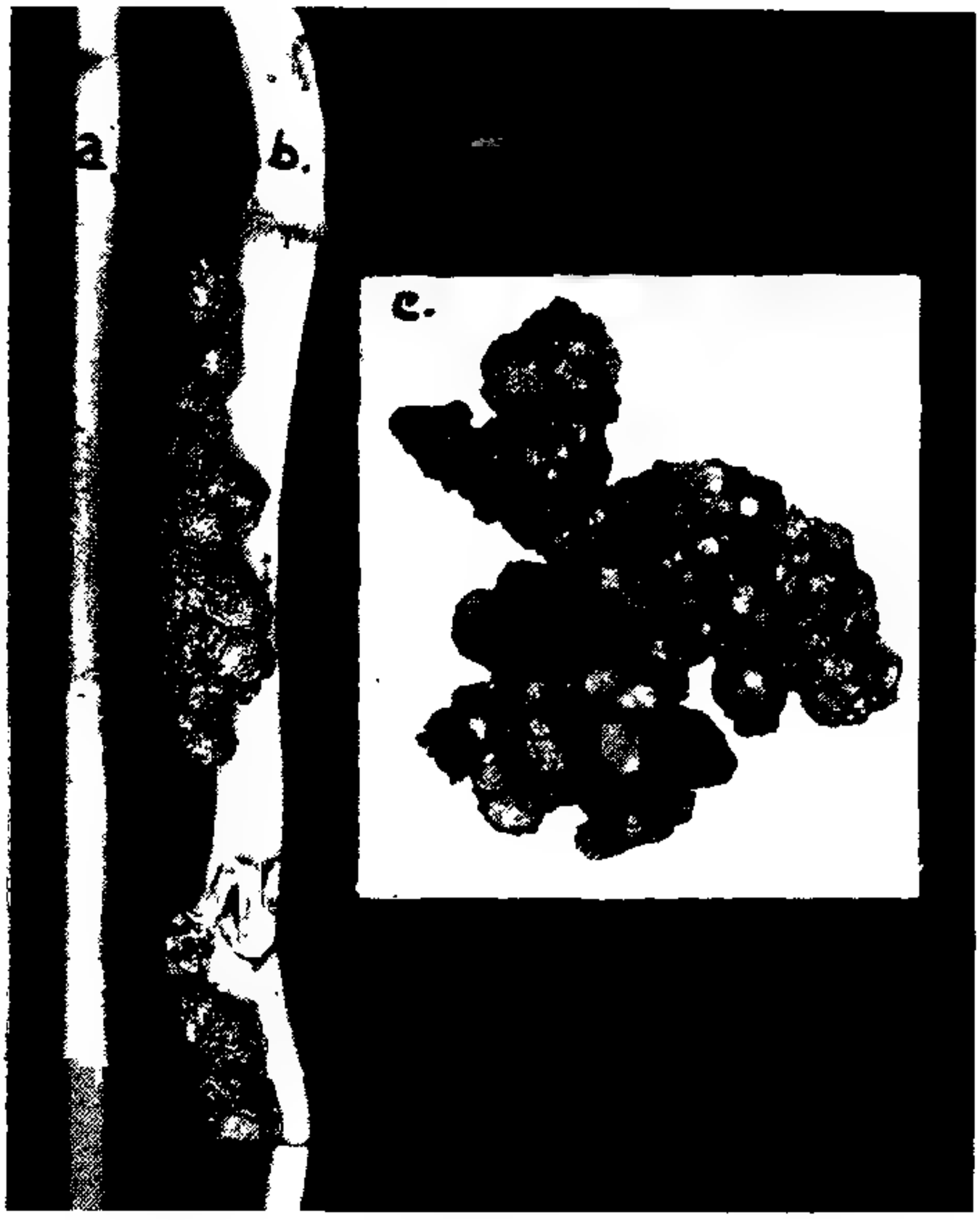


Figure 3

PRODUCTION OF BACTERIA-FREE CROWN GALL TUMOR TISSUE

a. Healthy sunflower stem.

b. Tumors on stem developed after inoculation with crown gall bacteria.

c. Tumor tissue free from bacteria after four years' culture in test tube.

growths in humans and animals which we call cancers. The plant tumors which have been examined most thoroughly from this standpoint are those caused by the crown-gall bacterium, *Agrobacterium tumefaciens,* discovered in 1907, by two American plant pathologists, Erwin F. Smith and C. O. Townsend. This bacterium occurs in the soil in many regions throughout the world and is capable of causing tumors on a great variety of plants whenever it gains access to the tissues through wounds. Fig. 1 shows such a naturally occurring tumor which was found by the writer in a hedge of Euonymus. Its diameter (2.2 inches) was about ten times that of the stem on which it grew.

The tumors can be produced very easily in the laboratory on the fleshy storage organs of such plants as beet, jerusalem artichoke and carrot (fig. 2). It is necessary only to spread the bacteria over the freshly cut surface of such an organ to obtain, within ten to fourteen days, a fine crop of tumors of many colors. On carrot, the tumors vary from green to purple; on beet, they range from deep crimson through orange to white. Readers will notice that the tumors on carrot root are not distributed at random over the whole cut surface but are concentrated along the line of the cambium. Cells in this region seem to react more readily to the stimulus supplied by the crown-gall organism.

Erwin F. Smith maintained that the tumors formed on plants by the crown-gall organism were genuine plant cancers. He even made detailed comparisons between different forms of crown-gall and various types of cancer. Many students of cancer objected to these comparisons. Crown-gall, they declared, is a disease of bacterial origin but no reliable evidence has been obtained which suggests that bacteria are responsible for the development of cancer in animals. It has, however, been shown, by the very important studies of Dr. A. C. Braun and P. R. White at the Rockefeller Institute, that once the crown-gall bacteria have changed normal plant cells into tumor cells, these tumor cells will go on growing as tumor cells *after all the bacteria have been eliminated.* Bacteria can be eliminated by heat treatment or may disappear from the tumor spontaneously. In this way bacteria-free crown-gall tumor tissue can be obtained which can be grown indefinitely in test tubes on a very simple medium containing sugar, mineral salts and thiamine. The stages by which such bacteria-free tumor tissue is obtained are shown in fig. 3.

This discovery made the resemblance between crown-gall tumors and animal cancers seem closer than had previously been thought. Bacteria-free crown-gall tissue, like many animal cancers, can be grown for years in test tubes, removed and grafted into healthy individuals and still produce tumors. The plant cells are changed permanently during the first

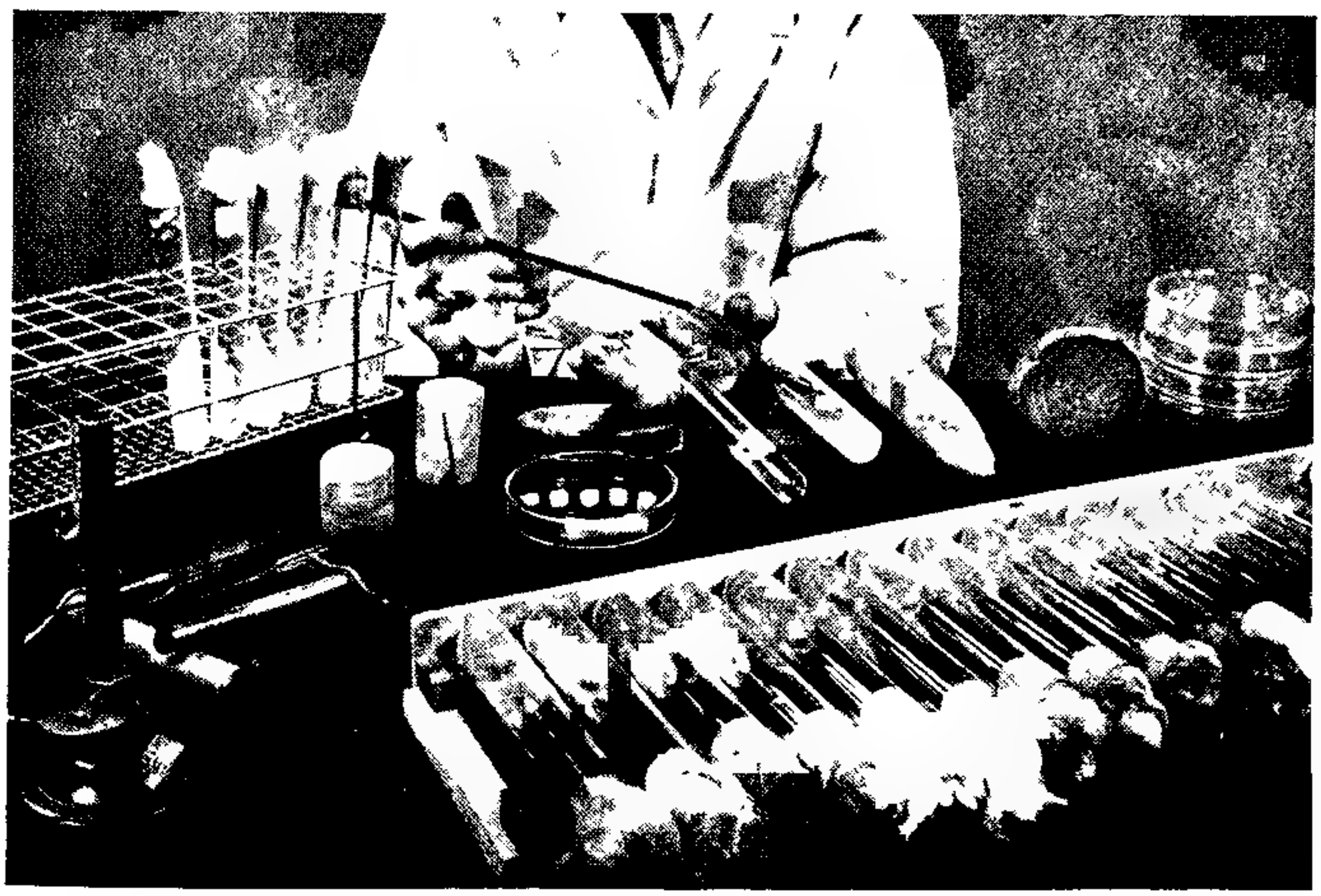


Figure 4—Discs of carrot and beet tissue are being inoculated with crown gall bacteria. These fragments will later be treated with chemical substances to determine their tumor inhibiting capacities.

Figure 5—THE DESTRUCTION OF CROWN GALL TUMORS ON SUNFLOWER BY A-METHOPTERIN

a-b. Fully effective concentration. c. Ineffective concentration. d. Not treated

four days after the bacteria are applied. No one knows as yet what the bacteria do to transform normal plant cells to tumor cells, but it is generally thought that they produce a "transforming principle", perhaps a protein, which initiates the change. It has also been suggested that the bacteria may carry a virus which is the real causal agent of the disease. Several viruses which cause animal cancer are already known.

Bacteria-free crown-gall tumor tissue grows on a very simple medium containing agar, mineral salts, sugar and thiamine. This medium will not support the growth of the healthy tissue from which the tumor tissue has been derived. We also know that such potent growth hormones as indole-3-acetic acid which will stimulate the growth of normal sunflower tissue in concentrations as low as 1 part in a billion have no action on the growth of sunflower tumor tissue. It seems likely that the tumor tissue produces in itself an excess of some growth hormone and that this hormone is in part responsible for its abnormal growth. Several students of cancer have guessed that cancerous tissue also produces an excess of some growth hormone but so far no one has succeeded in isolating such a hormone from animal cancer tissue. Nutrition of plant tissues can be more easily studied than that of animals because of their simpler requirements and, in this respect, our understanding of the differences between the nutrition of normal and tumor tissue is much more complete for plants than it is for animals.

Research on the growth of crown-gall tumor tissue has been in progress since 1946 at the New York Botanical Garden, supported in part by grants

from the American Cancer Society. Many aspects of the problem have been considered, most interesting of which is the testing of chemical substances for their inhibiting action on tumor growth. The quest for a chemical substance which will inhibit the growth of tumors without affecting normal tissues is one of the main lines of modern cancer research. Here at the Garden, nearly sixty substances have been tested on fragments of carrot or chrysanthemum tissue on which tumors have begun to grow following inoculation with crown-gall organisms (fig. 4).

Many of the compounds which have been used in the treatment of animal cancer have been tested, including nitrogen mustards, folic acid analogues, guanazolo and cortisone. Most promising results have so far been obtained with such folic acid analogues as A. methopterin. Young tumors on sunflower stems can be completely destroyed by a single application of this substance (fig. 5). It has proved, however, to be one of the most potent known inhibitors of the growth of both normal and tumor tissue, being active in 1 part in a billion. It acts by interfering with the multiplication of the cells and unfortunately appears to affect healthy dividing cells just as seriously as it does tumor cells. Guanazolo, various nitrogen mustards, and cortisone will also stop the growth of the plant tumors but all these agents have an inhibitory effect on the growth of healthy tissue also. Although hopeful indications have been obtained, the "silver bullet" which will hit the tumor cell and miss the normal cell has not, as yet, been discovered either for plants or animals.

Hardiness Records of Woody Plants

(*Continued from page* 214)

reddish and sweet lumpy masses. These, as Bean states, "are chewed by the Japanese and Chinese" but no one else gets very excited about them.

Each year a shrubby member of the Asclepiadaceae, *Marsdenia erecta,* which has proven root hardy here since 1907, makes a three-foot mound of foliage. The leaves are a pale, glaucous green, which give a curious effect as of sun-scald. The flowers are freely produced though, to a great extent, hidden in the leaf mass, in axillary clusters of many white, narrowly five-segmented lobes.

In 1916, the Arnold Arboretum sent us a plant of jujube, *Zizyphus Jujuba,* which has grown to eighteen feet in height. Last year's hot dry summer, followed by an exceptionally warm and long fall season, permitted fruits to ripen and Rochester-grown jujubes were tasted — a dry, mealy, date-sugar sweet pulp — perhaps for the first time. This is a highly developed horticultural plant in the Orient and many varieties are grown; in this country, it is better adapted to the Southwest. This hardy strain is recognized in both Rehder's *Manual* and *Hortus* II.

Impressions of a Mycologist in Sweden

By Donald P. Rogers

"IN the Anglican church in Stockholm there is an inscription: 'Hospites in terra hospiti.'" With these words Dr. E. D. Merrill, of Harvard, the former director of The New York Botanical Garden, opened a graceful address in which, on behalf of all the foreign members of the Seventh International Botanical Congress, he presented a wreath to be laid on the tomb of Linnaeus. From the moment they touched Swedish soil, the visiting botanists found good reason, in the arrangements for their housing and feeding, in the carefully planned excursions, in the provisions for the innumerable meetings of the Congress and its sections and committees, and in the cheerful helpfulness of the Swede-in-the-street, for considering themselves "guests in a friendly land".

Survival Training

All of us who are not accustomed to European travel must have looked forward to the stay in Stockholm with some apprehension. French and German—that is, botanical French and German—are a part of the normal equipment of a botanist; but even the Swedish dictionary which sees us through the reading of plant descriptions is no great source of comfort in the everyday business of catching street cars and ordering meals. But we soon learned that we could always find a Swede whose knowledge of our language was greater than our knowledge of his; and a moderate amount of courage in ordering blindly from a Swedish menu and in trusting hunches about buses, directions, and what-not served as well as surer information.

The first week in Stockholm proved our ability to survive under novel conditions. In Sweden all traffic, foot and wheel, goes to the left. The American neck is so arranged that it rotates to the left when the owner is about to cross a street, and to the right after he passes the middle. It matters not at all that the head knows that in Sweden such movements are suicidal; the rotating muscles are not under voluntary control. The best an American can do, after a few near misses, is to compel himself to stop at the curb and, after the inevitable glance to the left, force himself to look to the right. It's a hard trick to learn; but it saved a whole population of foreign botanists from extinction.

The necessity of such a procedure is heightened by the circumstances that apparently every resident of Stockholm above the age of ten rides a bicycle (provided with a gear-shift and so capable of furious acceleration), that automobiles are forbidden by law to sound their horns except in case of dire emergency (such as never arose within my hearing), and that there is no speed limit (but, it would seem, an injunction to double speed when

turning corners). Some of our colleagues expressed the fervent desire that when they were killed it should not be by a bicycle; others simply prayed to survive. There appear to have been no traffic deaths among botanists in Stockholm; only time will tell what survival value attaches to the hard-won look-to-the-right habit when it is manifested on American streets.

Food and Similar Trivialities

The deadly traffic of Stockholm, which makes Forty-second Street seem as safe as a football field in February, had its compensations; when we had crossed the street we might find ourselves near a konditori. The dictionary translates that word as "confectioner's"; but a konditori offers neither ice-cream sodas nor jelly beans. It is apt to have a window and a show case full of pastry and cakes, running from unpretentious but delicious dry cookies to confections (here used in the millinery sense) of whipped cream, custard and preserved fruits. One may order "kaffe och bakelse", in which event he will receive a little pot of coffee and two cakes; or he may say "one" (holding up a finger) "of this" (pointing) "and this, and this," thereby obtaining as many pastries as he thinks he can eat, and a bill (for coffee and, say, three cakes) for a quarter.

During five weeks in Sweden I never encountered the word smörgasbord; whether it is foreign to the language or merely temporarily displaced because of rationing I did not learn. Smörgaser were frequent; we learned that they are not the same thing, but open-faced sandwiches, eaten in Stockholm with knife and fork, but outside that city, without tools; either way they were good. The elements of a smörgasbord appear on the menu as assietter; Swedish preserved fish, cheese and rich salads are acceptable in any quantity and under any name. Strawberries, cherries and red raspberries were abundant and good; bananas (which looked more like *Musa Cavendishii* than like the Gros Michel sold in our markets) and pineapples (for which the Swedish word, ananas, is familiar to all botanists) were in the fruit stores.

Cliff Dwellings in Sweden

At least as far north as Stockholm, Swedish towns from the air appear uniformly burnt-orange in color, from the universality of bright tiled roofs. From the ground the prevalence of masonry buildings is, to one accustomed to American architecture, equally striking. For small dwellings, or office buildings, or castles, the normal structure seems to be the same—heavy walls of solid brick overlaid by plaster or smooth stucco and painted. The colors—mostly ocher, occasionally gray or sage green—are as little variable as the structure. Only in the country did we see frame houses, often with vertical siding and battens, and nearly always painted barn red with white trim. There are stone buildings, but they are very rare. Upsala Cathedral, which inside has the same glorious vista of stone arches as our St. John

the Divine, and the Stockholm City Hall, which has been called, not unjustly, the most beautiful building of modern times, have brick walls.

Another noticeable and, to an American, distressing character of the larger towns is the great rarity of the single-family house. In Stockholm and Upsala, at least, all recent building seems to have been of apartment houses. These nowhere show the congestion characterizing apartment areas in our cities, and are, if the few we saw can be taken as samples, very comfortable. Nevertheless, to us who accept the possession of a house, a lawn and a garden as both the norm and the ideal, the fact that Stockholm has not a hundredth as many such places as an American city of comparable size is hard to believe.

Nevertheless, Stockholm is a lovely city. Its site, on a group of islands, and the accompanying multitude of waterways and bridges contribute much to its beauty. The harbor is not clogged and concealed by piers as is that of New York, and there seem to be boats tied up everywhere along the waterfront –power boats, small sailing craft, schooners, square riggers, white passenger boats looking like smaller versions of the Hudson River steamers, cargo craft, small naval vessels. The bridges are so placed that there is no need of arrangements for the passage of ships, and so they are built at street level and without swings or draws. Again because of the lack of obstruction, the parks and walks along the water are as pleasant, and the vistas as beautiful, at night as during the day.

Stockholm seems to have been built around parks as much as around the water. They are everywhere—from small squares of lawn and flowers and trees, which one encounters whichever street he takes, to the vast Skansen with its zoo, its old Swedish village, its concert terrace and its wooded hills. Where there are not parks, there are flower shops, with magnificent displays. One can understand the superiority of their stocks—the stock (*Matthiola*) likes a cool climate; but why African violets should be so much more thrifty and floriferous in Sweden than here is an unsolved mystery.

Professional Palaver

The meetings of the Congress sections were held in the buildings of the Högskola—which is not a high school, but the Stockholm University. There we found a temporary bank, a post office, a newsstand with local and foreign papers, a botanical bookstore, and the Congress offices. There also we found admirable meeting and lecture rooms.

The meetings of the Section on Nomenclature opened a week before the Congress proper and continued until its end. There had been word that they would be one long "dog-fight." Certainly there were periods, during which two opposed groups were simultaneously vindicating the exclusive righteousness of their respective positions, when there was enough excitement for everyone. Probably the tensest debate arose over the proposal for

conservation of specific names—the principle that a list (potentially limitless) of plant names known to be incorrect should be placed outside the operation of the Rules and retained in the face of everything. One of the most vigorous spokesman for the proposal solemnly informed us that if we did not vote for his proposal, all the horticulturists would abandon the International Rules and set up their own system of nomenclature. Therefore the opposition demonstrated, by documents and direct testimony, that many horticulturists opposed such an authoritarian and arbitrary proposal. The motion was then snowed under by two successive written votes. One of its defenders warned us, in a radio-pundit voice, that we didn't know what we were doing, and tranquility was restored. There were plenty of such exchanges; but the Rules survived them all, and on a number of points were even improved.

One of the most encouraging aspects of the nomenclatorial debates was the apparent absence of regional or national blocs. Some of our American Cassandras (not members of the genus of flowering plants) had assured us that the voting would be on continental lines—American versus European—and that American members of the nomenclatorial section must vote together, in accordance with the dictates of one of our societies, if we did not wish to lose everything they stood for. We did not do so. As it turned out, the differences were between representatives of factions or of special limited fields of botany, and we were more likely than not to find our most determined opponents among our own countrymen and our surest allies among botanists from elsewhere whose judgment, erudition and firmness in the right we had been prevented by geography from appreciating earlier.

The meetings of the Section on Nomenclature lasted only about seven hours a day, and so we had plenty of time during lunch hour and in the evenings for special committee meetings. These rarely lasted beyond ten-thirty, and the writing of notes and arrangement of further business never required more than an additional four hours. The rest of the time was our own—for sightseeing or whatever other recreation we might fancy. Sleep was the usual choice.

Unprofessional Levity

There were, however, certain periods set aside for excursions, when we were supposed to forget both botany and nomenclature. One afternoon, all the members of the Congress were invited to attend a reception at Drottningholm Palace. The building and its grounds, set beside one of the lovely forest-bordered waterways of eastern Sweden, were magnificent; the refreshments were most gratefully received; and since each of the foreign botanists was confident that he had concealed from his fellows his belief that the first distinguished gentleman who shook his hand was the Crown Prince (we all learned better when we reached another room and veritable royalty), we were all completely happy about the excursion.

On another day, there was a steamboat trip among the islands of the Stockholm archipelago. Since the absence of meetings did not in itself reduce the accumulation of paper-work, some of us had to be content with glowing reports of the good botany and equally good food we had missed.

One day the meetings were completed by eleven and we were taken by bus to the Bergius garden in the outskirts of Stockholm. There we saw handsome plantings, from an aquatic garden to an artificial alp, arranged for scenic effect, as well as geographic, systematic and ecological groupings. Some of the most interesting plants were American west-coast species, said to be too tender for New York gardens, flourishing above 69° N. lat. The garden derives a part of its income from the sale of horticultural stock, and it was noticeable here, as everywhere we went, that floribunda roses seem to be even more popular in Sweden than in the United States, the Poulsen family in particular being as handsome there as here. One planting less than completely successful by American standards was a small plot of *Zea Mays*—a dozen plants, less than a foot high. We were tempted to mention the proper glory of the Iowa prairie, but resisted; as scientists we all have a reputation for veracity to maintain.

The most memorable of the excursions was one which occupied all of a Sunday (and a bit of Monday) and took us to Upsala. We left early in the morning by one of the miniature but fast electric trains and reached Upsala about ten. All of us knew of the town as the seat of an ancient university. For the students of vascular plants, it is the home of Linnaeus; for mycologists and lichenologists, its principal glory is Elias Fries; for those not systematically inclined, it has admirable laboratories; and for all botanists, there are the gardens. Of these we visited two—the Linnaean garden, laid out beside his town house, and the much larger university garden, surrounding the botanical buildings. Like the Bergius garden, the latter had excellent specimens of American plants, easily the most notable of which was a thriving bushy clump labeled *"Rhus Toxicodendron,"* with an accessory note in Swedish which we did not need to have translated.

From Upsala we were taken, a bus-load at a time, to Linnaeus's country estate at Hammarby, where the buildings with their furniture, the woodland, and the view are carefully preserved with a reverence not commonly shown elsewhere to botanists. The hilly woodland, strewn with moss-covered rocks, had much the aspect of some of the wooded valleys of our own Northwest; except for the difference in species, one might have thought himself among the alders beside an Oregon trout stream. The house had the by now familiar red-and-white-painted walls; one of the outbuildings had a deep sod roof, ornamented by its own garden.

From Hammarby we returned to Upsala, where each was free to seek out his own particular place of worship until dinner-time, when botanists from all over town converged on the central hill and its great round-towered castle. We dined in the principal hall; and then, after the tables had been

removed, an orchestra played, alternating Swedish and American tunes, for dancing. No information is available on the return journey of all of the botanists; but in one bus, from the castle to the railway station, and one car, from Upsala to Stockholm, two or three cryptogamic botanists, abetted by one plant pathologist, passed the time in song and were enthusiastically joined by other voices in English, French and German. We finished Auld Lang Syne just as the train rolled into the station, at a little after two.

A luncheon to surpass all luncheons was given for some of the delegates in the town hall, in surely the most beautiful room ever so occupied, by the City of Stockholm. (The New York Botanical Garden was represented. Editor) Afterward we inspected the building—and then scurried back to nomenclature.

Work, Too

There were also two plenary meetings of the Congress in the Stockholm concert hall, which most of us already knew for Milles's great sculpture group of Orpheus placed at the foot of its steps. Besides business, there was a lecture of universal interest at each of these sessions. It was at the latter meeting that Dr. Merrill presented the wreath on behalf of the foreign botanists. Later in the same session Mr. Five-by-Five, the principal Russian delegate, brought to the Congress a "greeting" from the U.S.S.R., composed of political haranguing, a long quotation from that great scientist J. Stalin, a plug for the Michurin genetical theory, and the promise of a wreath for the tomb of Linnaeus from the Russian delegation—wreath number two. After the final Congress session, the American botanists were well entertained by the American chargè d'affaires; and after that, all Congress members went to a farewell party in the town hall—refreshments, a beautiful program by an â capella chorus, Swedish folk-dancing, and then general dancing.

After the close of the Congress, we had the choice of a number of botanical excursions into the north of Sweden, each arranged and led for workers in a particular phase of botany, or of enjoying the hospitality of Swedish herbaria. The mycological collections of the Riksmuseet, on the edge of Stockholm, include the herbarium of Lars Rowell, the chief student of Swedish larger fungi during the interregnum between Fries's death and the present period of great activity, and that of Bresadola, the greatest of Italian mycological taxonomists. They are well housed and ordered and for a mycologist their value is beyond estimate. The fungi at Upsala include, of course, the herbarium of Elias Fries and are therefore the foundation and primary source of knowledge for all workers in most groups of fungi. There are also large numbers of specimens, excellently prepared and authoritatively studied, brought together by the group of distinguished

(Continued on page 232)

REVIEWS OF RECENT BOOKS

The Impact of Evolution on Civilization

CHARLES DARWIN. Paul B. Sears. The Naturalist as a Cultural Force. 124 pages, bibliography, index. Charles Scribner's Sons, New York, 1950. $2.

Sears has done a masterly job in showing the impact of evolution upon our civilization in a brief 124 pages.

Such a treatise obviously is not a repetition of the details of Darwin's work but a statement of the effect of biological research upon our thinking today. Mild mannered, shy, plagued with ill health, not accepted in any official contacts or commitments, Darwin was as surprised as anyone when both his "Voyage of the Beagle" and his "Origin of Species" sold out their first editions almost as soon as issued. The storm of bitter argument which arose left Darwin almost untouched, since the few who appreciated his views were among the ablest scientific minds of the time. Their encouragement meant more than the wrathful shouting of the many. Darwin lived quietly while the inspiration of his works produced the world's most fertile hundred years of cultural advance. That, briefly, is the story. Let us see how Sears has developed it.

The background of Darwin and the scientific advance of his times are compressed, but not unintelligibly so, into four introductory chapters. Evolution without specific application to organisms had begun with the ancients and is a part of the written archives from many lands and times. But as science had moved to philosophical and mathematical exactitudes so the idea of living forms demanded exact description. The doctrine of species fixity, organisms created once and for all time, was the inevitable outcome. Darwin's South American voyage furnished the evidence that all others had failed to grasp. Species change.

It is one thing, however, to say that plants, insects, birds, fish and the rest are different from their ancestors and quite another to say that man shows the oneness of life and joins in the procession of advance from primitive life. "Darwin", says Sears, "characteristically is more concerned that his evidence be accurate than with any pride in his views". And he quotes Darwin, "False facts are highly injurious . . . fake views, if supported by some evidence, do little harm, for everyone takes a salutary pleasure in proving their falseness." Again, "The understanding revolts" at seeing anything but the operation of universal law in a grand sequence of events." With calm understanding Sears adds, "The probability that man might be akin to the ape was perhaps less completely a surprise than most people pretended. The kinship of all races of mankind, regardless of color or culture was a solid part of the Hebrew-Christian tradition, although the traditional basis of racial separation was neither scientific nor eddifying. So far as the human body is concerned, if we except the usually misunderstood saying that man is the image of God, the new view of man's animal origin was all gain and no loss."

It is in lining up evolution and modern ecology that Sears made his best contribution. The chapters entitled "A New Mirror" and "A Social Being" are the heart of the book. It was not Darwin's view but the work of the followers of Darwin that threw so many into confusion. The struggle for existence falsely interpreted for grim and selfish ends is not nature's way. Man alone in fits of greed and lust habitually exploits, enslaves and degrades his own kind.

Nowhere is Sears guilty of confusion between the old, much badgered symbols of environment and heredity. However, this reviewer would like to have seen a more explicit statement of the inwardness of evolutionary process. Darwin and Lucretius are admirably counterpoised. The living landscape is interpreted. The principle of dynamic equilibrium is given its place in the landscape's development and beyond that, wisely and modestly, Sears does not carry his reader. In a technological age with facts arising every day, we are facing man's greatest challenge and the responsibility of decision.

The brief bibliography in a work of

this character consists more of books interpreting Darwin than by Darwin. In fact the reader will have to go elsewhere for a list of Darwin's own works. Only the one commonly abbreviated as "The Voyage of the Beagle" is cited.

The dedication to Professors Frederick O. Grover and to Edward L. Rice is not only a tribute to two of Sears' mentors but a recognition of two of Ohio's sages of science.

A. E. WALLER,
Dept. of Botany,
Ohio State University.

A Digest of an Expert's Wide Experience

PLANT DISEASE HANDBOOK. Cynthia Westcott. 746 pages, illustrations, bibliography, index. D. Van Nostrand Co., Inc., New York, 1950. $7.50.

Pests abound around the world and gardeners have their share—bugs, blasts, and blights. Two views of pests prevail. Some gardeners enjoy fighting the enemies that attack their plants. Others die early from high blood pressure.

Dr. Cynthia Westcott belongs in the first category. Ever since I knew her in the graduate school, she has labored indefatigably to understand the ways of plant pests so that she could defeat them more readily. She has studied them on her hands and knees in the garden, with microscope and test tube in her private laboratory, and she has seen how they act across the face of the nation from the "shores of Gitche Gumee to the shining big sea water". In short, Dr. Westcott is an expert.

Dr. Westcott has done all gardeners and all plant pathology a real service in setting down a digest of her wide experience. She has produced a book of over 700 pages, beautifully printed on smooth paper. Her illustrations are a pleasure to see.

The book covers five chapters, two of which are huge. In the first chapter she undertakes to define what a plant disease is, how it performs, how serious it is in the aggregate in the United States.

When a writer makes a definition, he opens himself to spears and arrows from his colleagues. I have no especial criticism of her definition of disease. She differentiates disease from injury in terms of the time of irritation. A cow injures grass by eating the leaves. This is transient, she says. Disease involves "continued irritation" This is fine, but she then excludes the action of red mites, aphids, *et al* from the class of "causal agents".

This is unfortunate. Gardeners make no such distinction. Her book loses much of its practical value on account of this omission.

With this limitation in mind, one proceeds to the other chapters. Chapter two deals with chemicals for the control of plant diseases, the pharmacopoeia of plant doctors. It gives a very brief characterization of the commonly useful materials. Chapter three condenses many text books on mycology to fourteen brief pages on the classification of the fungi, bacteria, and viruses that cause plant diseases.

Chapters four and five contain the meat of the book. Chapter four is called "Plant Diseases and Their Pathogenes". Chapter five is called "Host Plants and Their Diseases".

Dr. Westcott encountered serious pedagogical difficulties in these two chapters. There are dozens of plants, hundreds of pathogenes. The proper organization of the combinations and permutations of these is difficult, as I can testify from my own attempts to organize data in limited areas of plant pathology.

Chapter four contains the actual information to be used in the practical control of disease, but the author admits that it is difficult to use in the raw. She uses Chapter six on hosts and the index as signposts.

A purist might use one of two approaches to Chapter five — break it down by causal organism (the classical approach) or by symptoms. Neither is very practical. Dr. Westcott uses a practical hybrid of both. She has, for example, a section on damping off and one on leaf spots. These are gross symptoms. She also has sections on downy mildew and nematodes.

Gardeners and advisory plant pathologists must give room on the quick reference shelf for this volume.

JAMES G. HORSFALL, *Director,*
Conn. Agric. Exp. Station.

Goethe's Scientific Contributions

GOETHE AS A SCIENTIST. Rudolph Magnus. (Translated by Heinz Norden.) 259 pages, indexed. Henry Schuman, Inc., New York, 1949. $3.50.

The translation of this famous introductory treatment encompassing all of

Goethe's work in science still serves rather well, despite the original German publication date of 1906, in presenting a rapid and sympathetic survey of the broad scientific scope of his interests. Goethe's life; work in botany; research in osteology and comparative anatomy; studies in the theory of color; and minor excursions into mineralogy, geology, and meteorology are discussed. A final section of the book is devoted to an interpretative summary of the scientific hypotheses of the philosopher. While Goethe's work in the individual sciences has been much belabored by specialists in recent years, an introductory review along the lines delimited by Magnus, including an evaluation of the place and effect of Goethe's ideas in present-day science as a whole, is much to be desired.

J. J. WURDACK

Economic Crops and Products

SUGAR. Facts and Figures. 159 pages, illustrated, indexed. U. S. Cuban Sugar Council, New York. 1948. Free.

This is an economic study of sugar production in Cuba in relation to United States and world trade.

BANANAS. Chemistry, Physiology, Technology. Harry W. Von Loesecke. 189 pages, illustrated, indexed. Interscience Publishers, New York. 1949. $4.50.

Botany, production, methods of processing, transportation, products, and uses of bananas are among the subjects treated in this comprehensive study.

CITRUS PRODUCTS. Chemical composition and chemical technology. J. B. S. Braverman. 424 pages, illustrated, indexed. Interscience Publishers, Inc., New York. 1949. $9.

The grower of citrus fruits and the manufacturer of products from them should find the answers to all their questions in this volume, which covers botanical and cultural aspects, including diseases, chemical composition, and many technological considerations.

RAYON. The First Man-Made Fiber. Joseph Leeming. 203 pages, illustrations, glossary, bibliography. Chemical Publishing Co., Brooklyn, N. Y. 1950. $5.75.

The history of rayon manufacture, even before the day when Chardonnet in 1884 was granted a patent in France for an artificial textile material, is told, and the story is brought down to the present day of world rayon production.

Of Taxonomic Interest

THE NATURAL VEGETATION OF THE WINDWARD AND LEEWARD ISLANDS. J. S. Beard. 192 pages, illustrated. Oxford University Press, London and New York. 1949. $6.50.

Environmental factors are thoroughly described before the flora itself is given consideration in the extensive studies made by Dr. Beard. Much of the material presented here will be familiar to readers of the Journal who followed his series of seven articles between May 1944 and August 1947.

FLORE DE LA GUADELOUPE ET DEPENDANCES ET DE LA MARTINIQUE. Tome II. Catalogue des Phanérogames et Fougères. H. & M. Stehlé and L. Quentin. 138 pages, illustrated. Clement Brunel, Montpellier. 1948.

Another contributor to the Journal, in articles which appeared in 1940 and '41, is represented in a new technical paper in French—a catalog of the flowering plants and ferus of certain French dependencies, including French Guiana. Co-authors with Henri Stehlé are Madame Stehlé and L. Quentin.

FOSSIL FLORA OF THE MICHIGAN COAL BASIN. Chester A. Arnold. Pages 131-269, illustrated. Vol. VII, No. 9, Contributions from the Museum of Paleontology. University of Michigan Press, Ann Arbor. 1949. $3.

Around 150 offset photographs, reproduced on 34 plates, provide excellent illustrations for Dr. Arnold's descriptive text.

Williamsburg in Photographs

COLONIAL WILLIAMSBURG. Lawrence A. Kocher and Howard Dearstyne. 104 pages, illustrated, indexed. Colonial Williamsburg, Williamsburg, Va. 1949. $2.75.

Illustrations occupy part or all of every page in this elaborate account of the Virginia town which has been restored to its colonial aspect to such a degree of perfection. Reproductions of the old and new alike are shown and the several chapters give some of the history of the place and explain briefly how the restoration has been accomplished.

Sentiment Foremost

AMERICAN HEARTWOOD. Donald Culross Peattie. 307 pages, decorations by David Hendrickson. Houghton Mifflin Co., Boston, Mass. 1949. $3.50.

In this book Mr. Peattie looks upon most of American natural history as romantic, good, and beautiful.

FOREVER THE LAND. Edited and illustrated by Russell & Kate Lord. 394 pages, illustrated, indexed. Harper & Bros., New York. 1950. $5.

Many writings have been gathered to gether in this anthology inspired by the organization called "Friends of the Land" of which Russell Lord was one of the founders. Photographs of people who are active in this and similar movements for the salvation of the land and its resources add emphasis. The line drawings by Kate Lord are an attractive feature.

Textbooks Revised

PRINCIPLES OF GENETICS. Edmund Sinnott, L. C. Dunn and Th. Dobzhansky. 505 pages, illustrated, indexed. McGraw-Hill Book Co., New York. 4th edition 1950. $5.

Emphasis is placed upon the principles and ideas underlying all applications of genetics and examples are given in actual problems enabling the student to reason genetically. Chief changes in the text occur in the chapters dealing with the physical basis of heredity in chromosomes. New material has been added on population genetics. Considerable space has been devoted to the use of fungi and microorganisms such as bacteria, protozoa and viruses, opening up possibilities for understanding gene action.

A TEXT-BOOK OF PHARMACOGNOSY. George Edward Trease. 5th edition. Revised to conform with U.S.P. XIII, 1947 and B.P. 1948. 811 pages, glossary, index, illustrations. Williams & Wilkins, Baltimore, 1949. $8.00.

By curtailing space on drugs becoming obsolete, more attention has been devoted to the important ones. Names are now given in Spanish, as well as French and German of all the more important drugs.

Toxic Vegetation

POISONOUS PLANTS OF GEORGIA. Wilbur H. Duncan & Thomas J. Jones. 46 pages, illustrated, indexed. School of Veterinary Medicine. Bull. Vol. 49, No. 13. University of Georgia, Athens. 1949.

Plants that are poisonous to livestock are the chief concern of this bulletin, but such subjects as poison ivy, poison sumac and the water hemlock also are included with suitable descriptions, warnings, and recommendations for first-aid treatment.

Succulent Plants of New and Old World Deserts

The third edition of this booklet, comprising a series of illustrated articles by E. J. Alexander reprinted from the Journal of the New York Botanical Garden, is now available. Two illustrations have been added—one of the flower of the sahuaro (or saguaro) and another showing a characteristic specimen of the desert denizen of the southwest. Price 50¢.

Natural Area in Ohio

THE GLEN GUIDE. A Guide to Glen Helen. 68 pages, illustrations, bibliography, map. Antioch College, Yellow Springs, Ohio. 1949. 50¢.

Students at Antioch College prepared this guide to Glen Helen, an extensive natural area which is used by this Ohio school as an outdoor laboratory and research center, as well as a spot for recreation.

Notes, News and Comment

Strophanthus Exhibit. An exhibit of various species of the genus *Strophanthus,* a possible source of cortisone, has been on display for the summer months on the mezzanine in the Museum and Administration Building. Most of the material was obtained through the "Strophanthus Expedition" to the West Coast of Africa, sponsored by Merck Research Laboratories.

Free Saturday Lectures. The first program in the Autumn 1950 series falls on September 30 at 3:30 p.m. This will be a motion picture in color by Alfred E. Runk of Ramsey, N. J., entitled, "Plants and Birds for the Summer Garden." Thereafter, a lecture will be given on each successive Saturday afternoon through December 2. The winter series will commence January 6, 1951.

Educational Program. Complete details of all the courses being offered by The New York Botanical Garden are covered in the Educational Program 1950-52 (isued August 1950). A copy will be mailed on request.

Chrysanthemum Display and Program. The Sixth Annual Chrysanthemum Display and Program at The New York Botanical Garden will be held at the Garden, October 27, 28, 29. The outdoor display of chrysanthemums and the trial plantings of many new varieties will be on view daily. At the same time, the National Chrysanthemum Society will stage a flower show in the Museum Building, with horticultural and flower arrangement classes and special gardens.

On Friday afternoon, October 27, Dr. W. E. Blauvelt, of the department of entomology of Cornell University, will talk on insect control. On Saturday afternoon, October 28, Mrs. Ernest L. Scott will discuss "Culture and Varieties of Chrysanthemums." These lectures are open to the public and will be held in the lecture hall.

Children from public schools of the City of New York will compete in flower arrangements Saturday morning. The show is arranged by The Volunteer Associates of The New York Botanical Garden in cooperation with the School Garden Department of the Board of Education of The City of New York.

Wild Flowers Come to the Table. This is the theme of an exhibit of table setting using wild flowers, old porcelain and Belgian glass, by Elinor Merrill. It will be held at 18 E. 69th St., September 18 and 19, from 5 to 7 p.m. The public is cordially invited to attend this exhibit, in which The New York Botanical Garden is keenly interested.

T. H. Everett on Television. T. H. Everett, horticulturist of The New York Botanical Garden, appeared on Ruth and Philip Alampi's Home Gardeners' Program on July 7 and again on August 18. The subject of his first appearance was "Planting Iris", of his second, "Propagating House Plants". If readers turn the dial to channel 7, station WJZ, on September 15, they may watch Mr. Everett give instructions on "Planting Bulbs".

Meetings. Dr. William J. Robbins attended the meeting of the Committee on Chemicals, Advisory Board on Quartermaster Research and Development, held at Philadelphia on July 14. On July 31 - August 4, Dr. Robbins attended the Microbiological Deterioration of Materials Conference, at New Hampton, New Hampshire, presiding as moderator at the first session.

Lectures. Dr. P. P. Pirone addressed the Lake George Garden Club on "Maintenance of Shade and Ornamental Trees" on July 20.

Appointment. Mr. T. H. Everett has been appointed a member of the Horticultural Advisory Committe at the Berkshire Garden Center, Stockbridge, Mass.

Visitors. Among those visiting the Garden during the month were: Roy N. Jervis, University of Michigan Botanical Garden; Conrad Hamerman, Cornell University; M. A. Johnson, Rutgers University; Jeanne Vian and Georgette Cartier, University of Montreal; Madeleine Gervais of the Montreal Botanical Garden; and W. Pinto of Rio de Janeiro, Brazil. Dr. Maxwell S. Doty stopped at the Garden enroute from Woods Hole, Mass., to Hawaii where he will join the botany department of the University of Hawaii.

A Notable Event. The Connecticut Agricultural Experiment Station, the oldest institution of its kind in America, will celebrate its 75th anniversary September 27, 28, 29. Dr. Detlev W. Bronk, President of Johns Hopkins University and internationally known biophysicist, will deliver the principal address of the three-day program in the auditorium of the Law School, Yale University, on September 28.

Maud Richey Seabury

Mrs. Samuel Seabury passed away at her summer home, Wyandanch Farm, East Hampton, Long Island, on July 21, 1950. Mrs. Seabury had been a member of the Corporation of The New York Botanical Garden since January 13, 1936, and served as a member of the Advisory Council from May 19, 1936 until her resignation on September 19, 1942.

Mrs. Seabury was identified with horticultural organizations and events for many years. She played a prominent part in the affairs of the Garden Club of America, having been a member of the flower show, policy and judging committees. She was chairman of the Library Committee and that was her greatest interest. She served as recording secretary from 1931-1936 and as its president 1938-1941. While holding that office, she presented, on behalf of the Garden Club of America, the Sarah Tod Bulkley award to The New York Botanical Garden for its begonia exhibit at the International Flower Show. The presentation was made at the luncheon of the Garden Club of America at the Waldorf-Astoria on March 15, 1939.

In May 1935, Mrs. Seabury represented the Garden Club of America at the Flower Festival in Holland and subsequently wrote a very interesting account. Another delightful piece of writing for the Bulletin of the Garden Club of America was based on her visit to The Barbados, entitled "Etched in Sunlight".

Mrs. Seabury was also a member of the Board of Directors of the Horticultural Society of New York from 1933-45 and active in the City Gardens Club for many years.

During World War II, the British Government conferred upon Mrs. Seabury the King's Medal for Service in the Cause of Freedom, for her work in the English-Speaking Union of which she was a very active member.

Joseph W. Smith

Mr. Smith, who at the time of his retirement from The New York Botanical Garden in May 1948 was the oldest employee in point of service, died on July 31, 1950 at the age of 75. He started to work at the Garden on March 21, 1896, and on that same date fifty years later was presented with a purse, in honor of his long term of faithful service. This represented contributions from all the employees of The New York Botanical Garden.

Impressions of a Mycologist in Sweden

(Continued from page 225)

mycologists now working in the institution. The building housing these collections dates from before Fries's time, is comfortable, convenient and sound as a rock, and has recently been equipped with tight new cases in which the specimens are safely filed and so arranged and annotated that work with them is greatly facilitated. In both institutions, we found the generous hospitality that made the entire visit to Sweden as pleasant as it was botanically profitable.

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OF

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OCTOBER
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NEW WORLD SUCCULENT HOUSE NO. 8—
CONSERVATORY OF
THE NEW YORK BOTANICAL GARDEN

School children of New York City are fascinated by the plants in Cactus House No. 7.

Every month from now on through spring, the Conservatory of The New York Botanical Garden will attract visitors from near and distant points. On November 9, the Indoor Chrysanthemum Show will open. House No. 4 will be transformed into a Chinese garden and the floral display will consist chiefly of chrysanthemums and other appropriate seasonal material.

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DOROTHY EBEL HANSELL, Editor

VOL. 51 OCTOBER 1950 NO. 610

Recent Developments in Strophanthus as a Precursor of Cortisone

By Joseph Monachino

ON the very day that my article on *Strophanthus* appeared in the February 1950 issue of the Journal of The New York Botanical Garden, I received one of the most important publications that has been written on this subject to date (July 29th). This was a paper* by Professor T. Reichstein and his Swiss group of scientists. Since 1946 they have prepared twenty-three papers** in all, totaling some 300 pages, dealing with glucosides and aglucones found in *Strophanthus* and other plants.

Professor Reichstein, together with J. von Euw, A. Katz and J. Schmutz, concluded—after studying seeds of *S. sarmentosus* from eight different sources—that the species yields only traces of sarmentocymarin. Their findings were the first of a series of blows at *Strophanthus* as a precursor of cortisone. All the elaborate steps taken to procure large seed samples and to commence cultivation have apparently been directed at the wrong species! The true species which had yielded sarmentocymarin, from which cortisone can be synthesized, still remains in the dark. I stated, in my previous article, that there was considerable doubt whether the seeds from which sarmentogenin had been isolated were seeds of *S. sarmentosus*. One doubted, but hoped otherwise. Now the chemical evidence seems conclusive—and one of the most common species of the genus *Strophanthus* is eliminated as a source of sarmentogenin.

Unlike the material used by many previous workers, the material investigated by Professor Reichstein in this particular instance was botanically authenticated. I have examined the flowering and fruiting specimens

*Die Glykoside der Samen von Strophanthus sarmentosus P.DC. 1. Mitteilung. Glykoside und Aglykone, 50. Mitteilung. Festschrift Prof. Paul Casparis, p. 178-183. 1949.

**In Pharmacentica Acta Helvetiae, vol. 21-24, Helvetica chimica Acta, vol. 31-33, and Chimia, vol. 4. A list of these papers will be sent upon request.

at The New York Botanical Garden, and the beautiful colored photographs of *S. sarmentosus,* shown in the aforementioned paper, alone are enough to identify the species.

Is it possible that a variety of the species, or material from some removed area, or seeds collected under different conditions of growth or hybridization, may still reveal *S. sarmentosus* as the promising plant? It does not seem likely. The species extends across the continent of Africa (it is rare in the eastern areas), whilst Reichstein's material originated only from the west coast. However, although variable in local forms the species has no well characterized varieties in the numerous collections which I have examined. The material tested was collected under different growing conditions, eight of the samples being of 150 grams or more, and nonetheless the amount of sarmentocymarin detected was negligible.

The Original Sarmentogenin Seeds

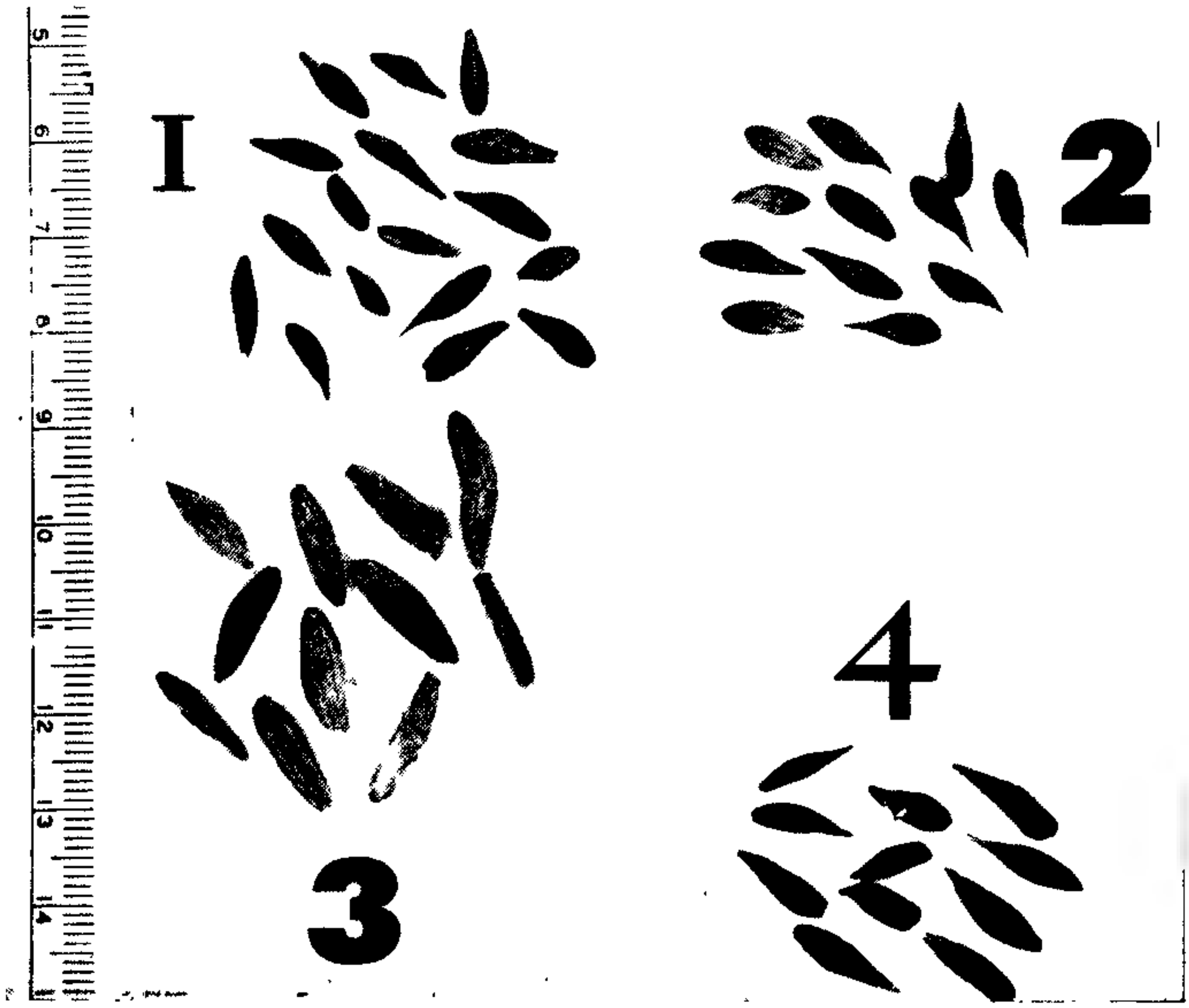
The second disappointment followed immediately after a happy occasion. A sample of the original seeds, which Dr. James C. Munch furnished to Jacobs and Heidelberger for their classical isolation of sarmentogenin in 1929, was given by Dr. Walter A. Jacobs to The New York Botanical Garden. At last actual specimens of the mysterious seeds were in hand! They appeared definitely of *Strophanthus,* but could be a form of any one of numerous species. Their average size was slightly smaller than that of *S. sarmentosus,* and they did not match precisely any of the seeds available in the vast herbaria presently on loan at the Garden.

Morphologically, they were an exact match with seeds of *"S. hispidus",* deposited by Dr. Henry Hurd Rusby* in the Economic Museum of the Garden. The two were also found to be similar anatomically by Dr. Heber W. Youngken, one of the foremost pharmacognosists. These seeds are not supported by botanical vouchers and, consequently, are as difficult to identify as are Jacobs'. Through the kindness of Dean Ballard and Prof. F. J. Pokorny, I was privileged to examine the *Strophanthus* seed collection deposited in the museum of the College of Pharmacy, Columbia University. Over a dozen other specimens, called *"S. hispidus",* deposited by Dr. Rusby, compared closely with the Jacobs seeds as far as could be ascertained by external observation.

Did Rusby Collect the Seeds in South America?

In a letter written to Dr. William J. Robbins, Dr. Munch disclosed the source of the seeds used by Jacobs & Heidelberger. They were ob-

*Dr. Rusby was Professor of Pharmacognosy and Materia Medica and Dean of the New York College of Pharmacy at Columbia University. He held the position of Honorary Curator of Economic Botany at The New York Botanical Garden from 1898 to 1940 and was intimately connected with the scientific work of this institution for 42 years.



(1) Seeds sent by Thomas Christy to Kew Gardens, England, in 1888. They were named *"Strophanthus minor"*, a name of uncertain botanical identity. These seeds are practically identical with the classic Jacobs seeds. (2) Collected by Father Gerstner shortly before his death, a lot of these fresh *Strophanthus* seeds yielded sarmentogenin. Since they are not supported by botanical vouchers, samples have been planted so that the species can eventually be identified. (3) Seeds of *S. Emini* obtained from Dr. Wigg, Tanganyika Territory, and (4) *S. sarmentosus* from Father Callens, Belgian Congo, are shown for comparison.

tained from Dr. Rusby. The impression was that Rusby had collected this material in South America!

It is fantastic, however, to believe that the sarmentogenin seeds were collected on that continent. *Strophanthus* is not native to the New World; it is sparsely cultivated here and has rarely fruited. (The collection of over five pounds of seeds is usually a major undertaking, even in Africa.)

If Rusby, who as a pharmacologist was familiar with African *Strophanthus,* had found any member of the genus in the new continent, he certainly would have collected botanical material and would have published such a remarkable discovery. Rusby's field-notes, I am informed, make no mention of *Strophanthus.*

Nevertheless, the Rusby seeds have not been the only ones to yield sarmentogenin. Jacobs and Heidelberger had previously analyzed, with positive results, twenty pounds of *Strophanthus* seeds purchased from a commercial source as *"S. hispidus"*. Another firm, AG. vormals B. Siegfried, furnished *"semen strophanthi hispidi"*, from which Dr. A. Katz isolated sarmentocymarin. The compound isolated by Kohn and Kulisch in Europe in 1898 was probably sarmentogenin, according to Dr. Jacobs. Obviously, these had no connection with South America.

The Identification of Jacobs' Seeds

With a sample of the Jacobs sarmentogenin seeds available, steps were taken to exhaust all possible means for their identification.

Several experiments have demonstrated that they cannot be germinated, so no more need be said on this score.

In order to enable Dr. Youngken properly to evaluate histological characters in *S. sarmentosus* seeds, The New York Botanical Garden sent him specimens of seven different collections of the species, more or less authenticated. In addition, twelve other samples of different species were sent to him, so that he could feel confidently oriented in the group.

Dr. Youngken compared histologically the classic seeds with those of known *S. sarmentosus*. He found crystal aggregates in the cotyledons of both samples. At first, he reported the Jacobs seeds were not identical with the latter, but after further examination, he concluded they were of *S. sarmentosus* or a form or variety of that species. It need not be pointed out that this conclusion, derived from anatomical studies, conflicts somewhat with the chemical results obtained by Prof. Reichstein. Dr. Youngken based his concept of *S. sarmentosus* principally on seeds collected by Father Callens in the Belgian Congo, an area* removed from that in which the material was obtained for chemical investigation.

Prof. Pokorny found the Jacobs and Callens seeds differed in the character of the epidermal trichomes and the lengths of the epidermal cells.

Strophanthus minor of Thomas Christy

I have recently examined seeds labeled *"Strophanthus minor"*, sent by Thomas Christy to the Royal Botanical Gardens at Kew in May, 1888. Although the country of origin or any further data is not given, these appear morphologically identical with the forementioned seeds used by Jacobs and Heidelberger for the isolation of sarmentogenin.

Is Strophanthus the Source of the Sarmentogenin Seeds?

It has been suggested that possibly the sarmentogenin seeds are of an apocynaceous genus other than *Strophanthus*.

A. Chevalier has stated that in West Africa there are many Apocynaceae and even Asclepiadaceae with follicles and seeds resembling those of *S. sarmentosus*. This venerable botanist has had rich experience in the collection of *Strophanthus* and other material in French West Africa. As seen from the published results of his seven expeditions, dating from 1899 to 1912, he collected 64 numbers of *Strophanthus*, and 26 other genera of Apocynaceae.

However, I have never seen any seeds which, on careful examination, I could confuse with *Strophanthus*. Some members of this genus have seeds of a very unusual form, which, examined casually, might be thought to be other than *Strophanthus* seeds. But a seed closely resembling that of *S. sarmentosus*, for example, is of *Strophanthus* and not any other genus, in my opinion. What the species may be is an altogether different matter.

The Jacobs seeds are of the type with manifest indumentum, the epidermal trichomes varying from 320 to 592 microns in length. Therefore, they cannot belong to any oriental species, as all Asiatic *Strophanthus* examined have glabrous seeds of the *S. gratus* type.

In the previous article, I reviewed the possible identity of Jacobs' seeds with various *Strophanthus* species. The arguments and doubts still hold for the greater part. The results of chemical assays of *S. Preussii* are not yet known, but the Jacobs seeds do not exactly match seeds of *S. Preussii* that have been examined.

*Plants believed to be botanically the same but coming from different geographical areas sometimes show dissimilarity in chemical composition. I had an experience of this nature during World War II, while involved in the investigation of antimalarial plants. The chemists reported great interest in material of *Dichroa febrifuga* from China. As that country was cut off by the war, plants of the same species from India were imported for continued chemical research. These were found so low in content of the desirable principle that further study was deemed impracticable.

The opinion expressed in the February issue of the Journal regarding *S. Preussii* was based on several weak suppositions, as follows: 1) The seeds used by Jacobs and Heidelberger originated from West Africa. 2) They were of a not too rare species. 3) They were not of *S. sarmentosus* or *S. hispidus*. 4) They resembled *S. sarmentosus* in general aspect. Good evidence now supports suppositions 3 and 4, and the argument for 2 is strong. Supposition 1 is weak. Commercial seeds may have come from almost any of the areas in Africa where the genus is found.

The fact that so much of the sarmentogenin material has appeared under the name of *S. hispidus* may suggest the species was one at least superficially resembling *S. hispidus* or, clearly, *S. Bullenianus* of the West African flora. *S. Bullenianus*, however, seems least likely to be the elusive plant.

Vegetatively and in fruit, *S. congoensis* bears a remarkable similarity to *S. sarmentosus*. This is an interesting plant and it is fortunate that ample material has been collected for chemical work. However, its seeds do not resemble the Jacobs seeds as much as do the seeds of *S. sarmentosus*.

The Work of Dr. T. Reichstein

The chemical studies on *Strophanthus* conducted by Dr. Reichstein and his collaborators, particularly on the glucosides and aglucones found in various species, are continuing at a speedy pace.

The results of recent chemical investigation of the following species have already appeared in print: *S. hypoleucus, Kombe, Nicholsoni, Emini, sarmentosus, Gerrardii, Courmonti,* and *speciosus*. Papers dealing with about a dozen other species may be expected in the near future.

Dr. Reichstein has not confined himself to the investigation of *Strophanthus*. He has published papers on other genera of the Apocynaceae and also on various other groups.

He has shown deep interest in the general chemical problem of the adrenal cortex hormone.

His research is highly significant in laying the foundation for the

(1) Seeds obtained from Dr. Walter A. Jacobs, of the Rockefeller Institute for Medical Research. These are from the original lot which yielded the precious sarmentogenin in 1929, a material that can be synthesized to cortisone, the "miracle" drug. The true botanical identity of these seeds has remained a mystery. (2) Seeds deposited by Dr. H. H. Rusby in the Economic Museum of The New York Botanical Garden. Not only in external appearance, but also anatomically, these are similar to the Jacobs seeds.

1 2

use of plant sources, particularly of *Strophanthus*, in the synthesis of cortisone. Reichstein was omitted from the bibliography of recent literature on cortisone and ACTH prepared by the staff of the library of the New York Academy of Medicine — an omission due, apparently, to the mechanical selection of only those titles in which reference to cortisone or ACTH appeared.

Seeds of seven species are reported to be in the hands of an American drug house for chemical investigation, and it is fairly certain that the seeds of at least six other species are in the same hands.

Species of Strophanthus Yielding Sarmentocymarin

As a result of the above studies by Reichstein, several species of *Strophanthus* have been demonstrated to yield an appreciable amount of sarmentocymarin. *S. Gerrardii* yielded 0.134 per cent and *S. Courmonti* 0.26 per cent. Professor Youngken found authentic seeds of *S. Courmonti* to be different anatomically from those of the original sarmentogenin sample.

The most interesting seeds of recent collection that have come to my attention were from an unidentified species collected by the Catholic missionary, Father Jacob Gerstner. Although these fresh seeds did not yield too great a percentage of sarmentocymarin, the yield was pure in the monoglucoside fraction, whereas the sarmentocymarin in both *S. Courmonti* and *S. Gerrardii* was associated with sarverosid.

The Gerstner seeds resemble those of Jacobs in external appearance. Professor Youngken found them to differ in some details histologically, but to be very similar anatomically.

Death of Father Gerstner a Great Loss

Fate appears to block repeatedly the clarification of the sarmentogenin problem. Before Father Gerstner was able to send the botanical

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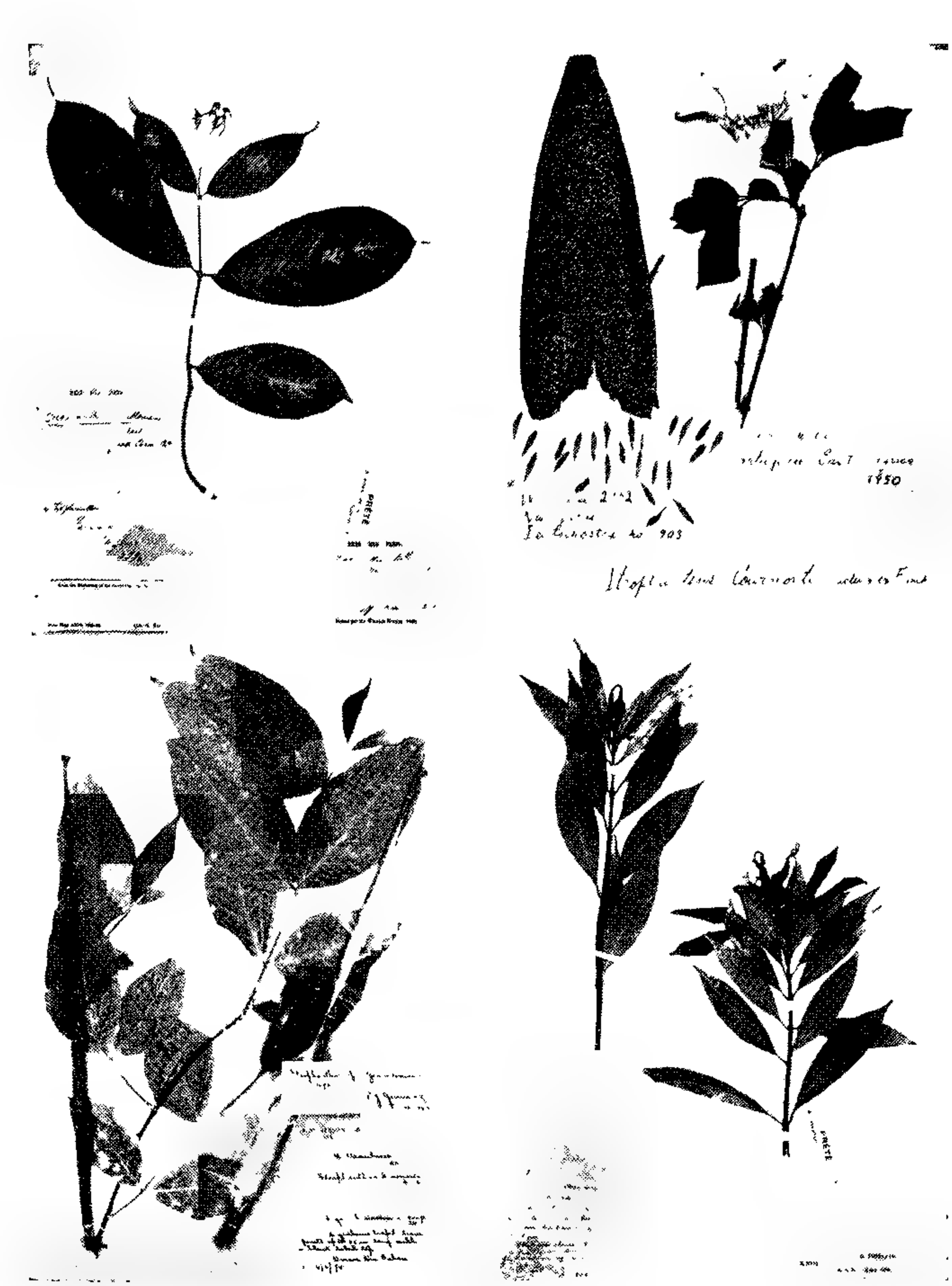
Upper right: A flowering branch, a mericarp and seeds of *S. Courmonti*, a species which Dr. Reichstein found to yield sarmentocymarin. Seedlings of this species are now growing in America. The flowers, as in many other species of *Strophanthus*, are highly ornamental, over three inches long, exquisitely marked and shaded with pink, mauve, violet, brown and yellow.

Upper left: *Strophanthus Bullenianus* is one of the rare species of West Tropical Africa—its fruits and seeds hardly known to science. Is it possible that this species provided over twenty-five pounds of seeds, already known to have yielded sarmentogenin?

Lower right: A new variety of *S. sarmentosus* from French Guiana. Can it be that the original sarmentogenin species was merely a variety of the common *S. sarmentosus?* This question and many others have not yet been definitely answered.

Lower left: A new species of *Strophanthus* from the Tanganyika Territory, with very narrow follicles. Obtaining quantities of seeds from such a species would be extremely difficult. There are probably other unknown species of *Strophanthus*. Can it be that the original sarmentogenin species is still not known botanically?



FOUR SPECIES OF STROPHANTHUS

(for description, see opposite page)

specimen, to accompany the seeds he had collected, to Dr. Reichstein, he died from pneumonia in a hospital at Lusaka. However, as the seeds are viable, samples have been planted in Africa and in America, and eventually the identity of the species will be known. Probably before the plants flower, the sarmentogenin problem will be resolved one way or the other. If the subject still has interest, the living plants will be very valuable in breeding experiments.

The death of Father Gerstner toward the end of September 1949, as he was starting a new expedition, meant the loss of one of the most informed students of *Strophanthus* and the foremost collector of South African seed material for Reichstein.

Promise in Strophanthus as a Precursor of Cortisone

Toxic principles have been found in the vegetative parts of *Strophanthus*. Wells and Garcia, using a modified Hatcher's cat method of assay, found the root-bark of *S. Cumingii* to possess 1/20 the strength of ouabain.

Preliminary experiments were undertaken in the attempt to obtain promising glucosides from vegetative parts of *Strophanthus,* but results were so poor that further tests were discontinued. Sarmentogenin is a rare principle, even in the seeds. There is no reason to believe it is found in the root, but even if so, it would probably be present in such minute quantity as to be uneconomical to isolate. Research has been conducted for a long time on the chemistry of strophanthin, yet only seeds have been employed for its preparation.

On the other hand, glucosides in *Strophanthus* other than sarmentogenin may be found amenable to the synthesis of cortisone. Reichstein has found, and is continuing to discover, a number of new compounds of unknown value in the genus. These will, of course, be thoroughly investigated.

When the desirable species are identified — and this should be relatively soon — they will be cultivated. The seeds germinate readily and the plants are very easily grown. However, plants in the New World have borne few fruits or failed to fruit entirely. The flower has a complicated structure, and it has been suggested that the proper insects for fertilization may be lacking here. While a man with a little experience and a pollinating brush can do as well as any insect, hand-pollination has thus far been unsuccessful. The hypothesis of self sterility should be tested. It is unfortunate that much of the material cultivated in America is of the same stock, but I have few doubts about the eventual development of successful cultural techniques which will assure fruiting specimens. I might add that experiments have shown that vegetative propagation is a simple matter.

Ascendency of Dioscorea in the Search for Precursors

The investigation of other plant sources has naturally continued at a hectic rate. For instance, work has proceeded on the soybean. Stigmasterol, the principal steroid of the soybean, furnishes a starting material for testosterone, a male sex hormone, for the progestational hormone, and also for desoxycorticosterone. Although in basic chemical structure stigmasterol and cortisone are similar, the former lacks the essential oxygen atom at C-11 position. Hector and co-workers at the Worcester Foundation for Biological Research have demonstrated that perfusion of certain steroids through isolated adrenal gland leads to the introduction of this important oxygen function. Dr. L. H. Sarett stated, in Chemurgic Digest, May 1950, that further research will show whether this process for effecting the transformation from plant sterols to adrenal hormone precursors will prove practical.

Dr. Sarett also makes mention of jervine, a steroidal alkaloid found in *Veratrum viride,* as a possible starting material for cortisone. It should be noted that *V. Eschscholtzianum* may prove a better source for jervine than *V. viride.*

Dioscorea is one of the most interesting possibilities in the cortisone problem. A genus of over 600 species, world-wide (mostly tropical) in distribution, it has attracted the attention of several groups of investigators. Some of them have relegated *Strophanthus* to the background in favor of *Dioscorea.* Already, there is a small market for *D. macrostachya* of Mexico.

It is very probable that there will be a decided simplification in the manufacture of cortisone from ox-bile, which at present requires some forty highly complicated chemical steps. This improvement will not, however, nullify the rarity of the present starting substance. The chemical shortcuts will be adaptable to other precursors, perhaps to some common basic plant material, if such be discovered.

A Picture of Light and Shadow for Strophanthus

With the best source of sarmentogenin still unidentified and *S. sarmentosus* and other common species eliminated, and in view of the rarity of seeds in bulk, the difficulty of fruit production in cultivation, the unsuccessful expedition for material, the death of Father Gerstner, the loss of interest by some investigators — the future of *Strophanthus* appears dark, indeed.

As a source of sarmentogenin it may well be so, although the case is not hopeless. It is certain, however, that with the interest the genus has commanded, the brilliant chemical research that has been done with it, and the valuable products which inevitably will be realized from this study, *Strophanthus* will hold a high place among the important drug plants of the world.

The Origin of Corn Belt Maize

William L. Brown

OUR most important cereal, the cylindrical eared, yellow maize of the United States Corn Belt, has frequently been said to have been handed down to the white man by his American Indian predecessors. Actually, this particular type of maize was unknown to the American Indian. As will be shown below, it is of much more recent origin, having been developed during the nineteenth century by agriculturally alert American farmers. It has provided the basis for modern hybrid corn, the phenomenal success of which is in part a great, though seldom quoted, tribute to the maize breeding ability of the corn farmers of the period between 1800 and 1900.

The common yellow dents, which preceded hybrid corn in the eastern and middle western United States, were highly variable, open pollinated varieties. Although certain varietal characteristics were persistently present, there was much variation from plant to plant of the same variety and extreme differences frequently existed between varieties. Yet when compared with maize from Latin America or from other parts of the world, there was always evident in Corn Belt corn a series of characteristics which set it apart as a definite type. The more important of these were to be found in the ear, the shape, size and conformation of which had through selection been fashioned for pleasing appearance and high productivity.

In contrast to maize in many parts of the world, that of the Corn Belt tended to have but one well-developed ear per plant, with a small ear or nubbin at the node below it. The usually golden-yellow kernels, well dented at the crown, were set in from fourteen to twenty-two straight rows. Although there was some tendency to taper from midear to the apex, most Corn Belt varieties were conspicuously cylindrical in ear shape. The plant itself had few, if any, tillers. The stem was enclosed in tight sheaths which were without the brilliant epidermal colors so characteristic of many Latin American corns.

There is little doubt that Corn Belt maize came, in large part, from crosses between late, white, many-rowed Southern Dents, mostly of Mexican origin, and the early, long, slender, eight to ten-rowed Northern Flints which dominated eastern United States for centuries prior to the discovery of America. (Fig. 1)

As yet we are not sure where these flints came from or how they reached eastern North America. They are strikingly unlike most Mexican maize, but are very similar in ear type to certain varieties of highland

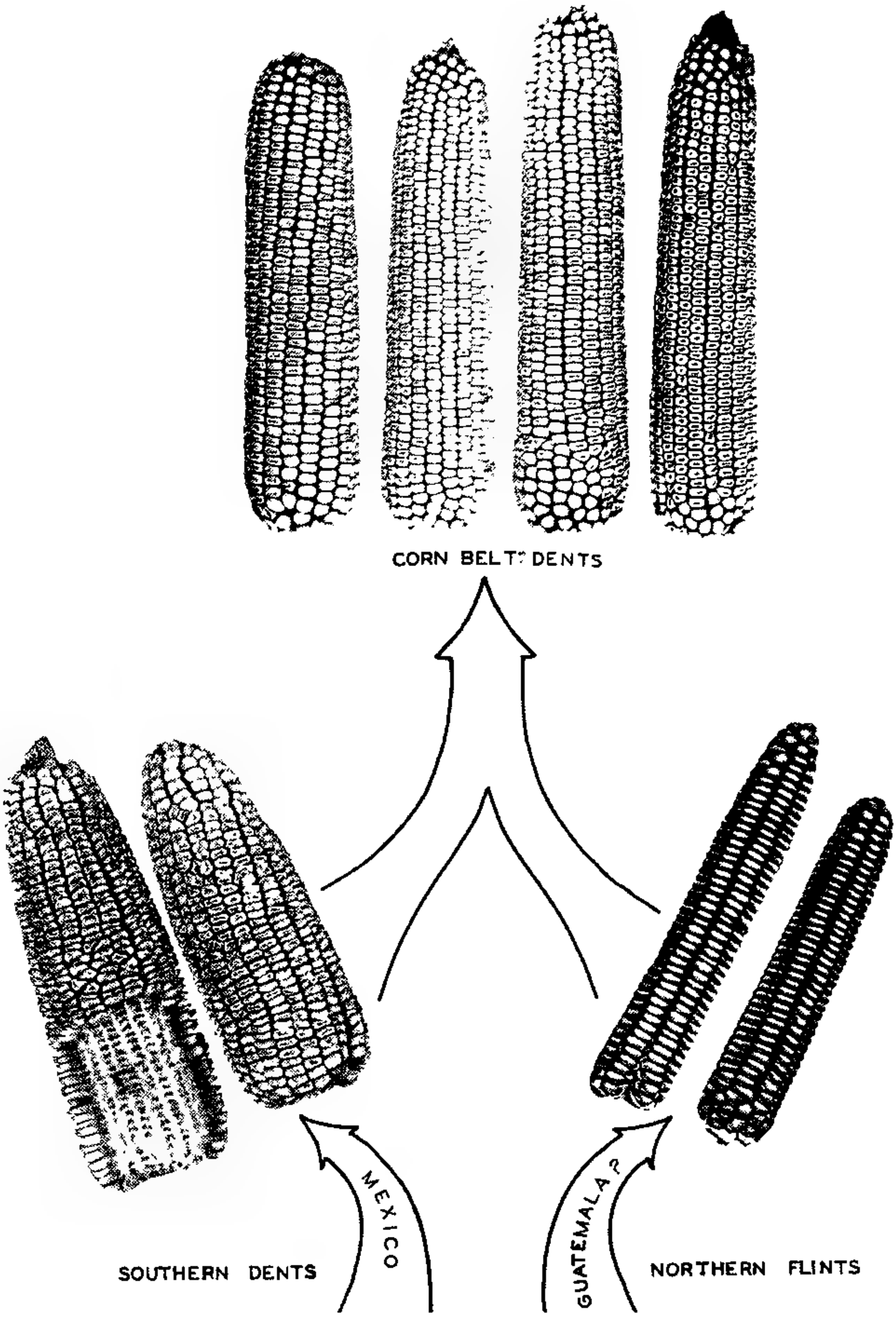


Fig. 1. Northern Flint corn (lower right) represents the common type of maize grown by the North American Indian and early settlers of eastern North America prior to 1800. A very different type of corn, the Southern Dents (lower left), were introduced into southern U. S. from Mexico at a yet unknown but probably relatively recent date. Hybridization of these two corns, followed by many generations of back-crossing and selection, resulted in the creation in the early 19th century of the highly productive maize of the United States Corn Belt (shown at top of diagram).

Guatemala. It is thought, therefore, that they might have spread from the Mayan area to eastern United States without leaving any clear record of the route or routes by which they came. Wherever they might have had their origin, it is now definitely established that they were once the prevailing type of maize throughout eastern United States. Their archaeological record goes back to at least 1000 A.D. and there is, as yet, no archaeological evidence for their having been preceded in most of that area by any other type of corn. Futhermore, it is upon this type of maize that the North American Indian agriculture was largely based.

The Southern Dents, on the contrary, are not known archaeologically in eastern United States. Neither are they represented in the collections of the early Indian varieties of that region. Yet that they came directly to southeastern United States from Mexico, there seems little doubt since certain of them, such as "Gourdseed" and "Shoepeg", have their counterparts in Mexico even today.

Early agricultural history indicates that by 1700 they were being grown as far north as Louisiana and Virginia. As to how and when they spread north from Mexico, we have no evidence other than the negative facts that they are unkown archaeologically in eastern North America. It would seem, therefore, that they might have been brought from Mexico to southern United States in relatively recent times.

By 1800, the benefits to be gained from hybridizing the Northern Flints with the Southern Dents was appreciated by some agriculturalists; by 1850, the process was actively under way from the middle Atlantic States to Iowa and south to the Gulf Coast. By the late '70's, a new type of corn had emerged from this controlled blending, although intercrossing of strains and varieties continued up to the advent of hybrid corn. Perhaps some of the cross breeding of flints and dents may have been accidental. The replanting with an early variety of those fields of Southern Dents, in which poor stands had been obtained, was undoubtedly practiced by pioneer farmers just as it is in some areas today. The early varieties chosen for replanting would most likely have been flint corns and intercrossing between the late and early varieties under those conditions would certainly have been expected. However, much of the crossing was directed and purposeful.

The benefits to be gained from hybridization of flints and dents and the effects of continued mixing and backcrossing appeared in print as early as 1813. The program of blending continued until the resulting yellow dent corns became so common that their very origin was largely forgotten. This neglect of historical fact is unfortunate, not only for theoretical reasons, but also from the standpoint of its effects on modern corn improvement. Any breeding program is enhanced by a knowledge

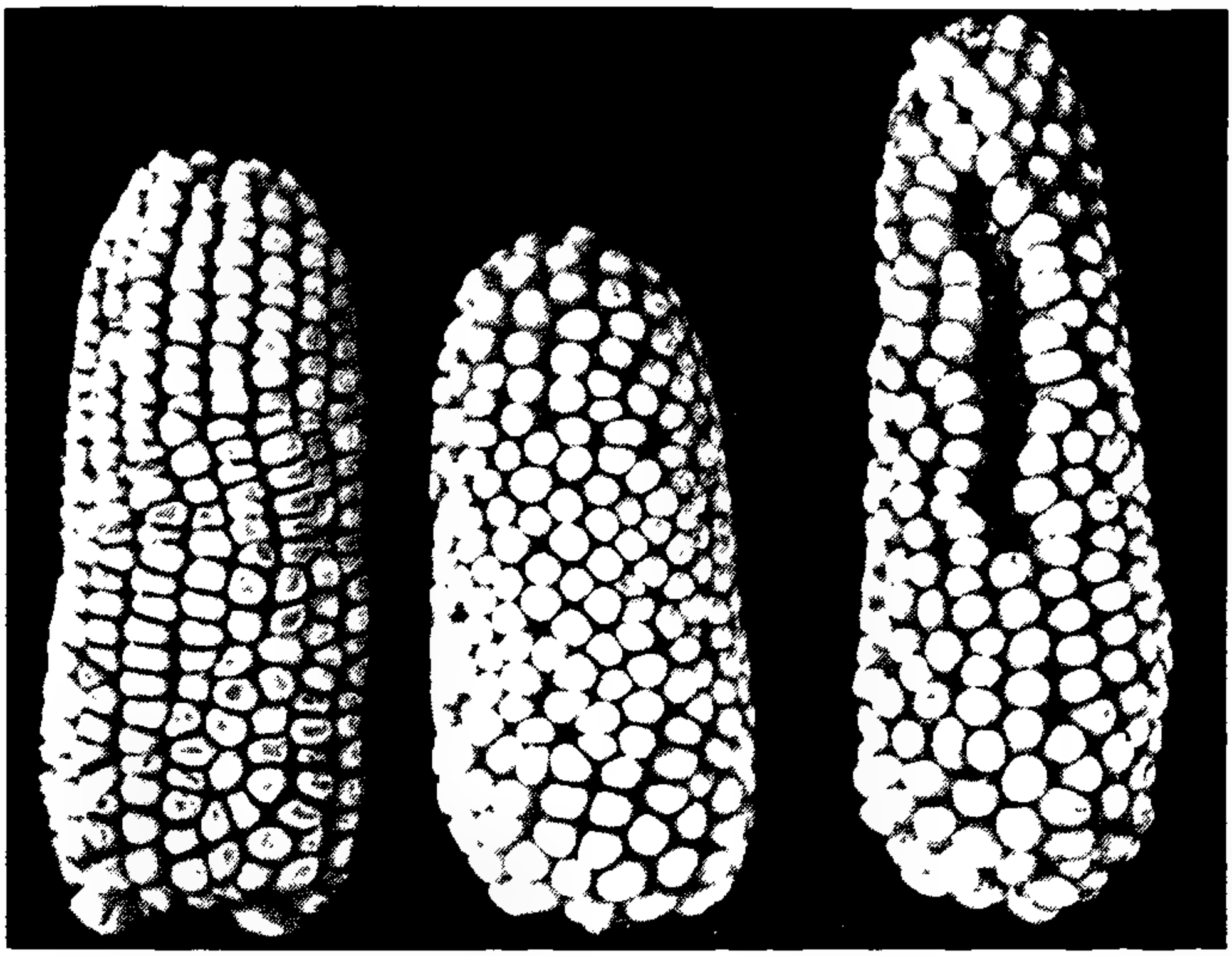


Fig. 2. Ears of three Southern Dent like inbreds of the Corn Belt.

of the ancestry and relationships of the breeding materials with which one is working. A breeding program designed to improve United States maize known to have been derived from the intermingling of Northern Flints and Southern Dents would likely proceed along different lines from a program involving the use of materials of obscure or unknown origin. It is not unlikely, therefore, that had the history of Corn Belt maize been better known and appreciated during the past two or three decades, a more intelligent use would have been made of the then plentiful and diverse varieties of flints, dents and their various blends. Unfortunately for the modern breeder, many of these potential sources of superior germ plasm have long since passed out of existence.

The foregoing remarks have emphasized historical and archaeological facts pointing to a hybrid origin of Corn Belt maize in which the two principal parental types were Northern Flint corns and Southern Dent corns. If further proof for such an origin is needed, it may be found in the results of recent genetic and cytological studies.

The genetical evidence for the origin of Corn Belt maize from mixtures of Northern Flints and Southern Dents is various kinds. In the first place, it has been shown by repeating the cross, that it is possible

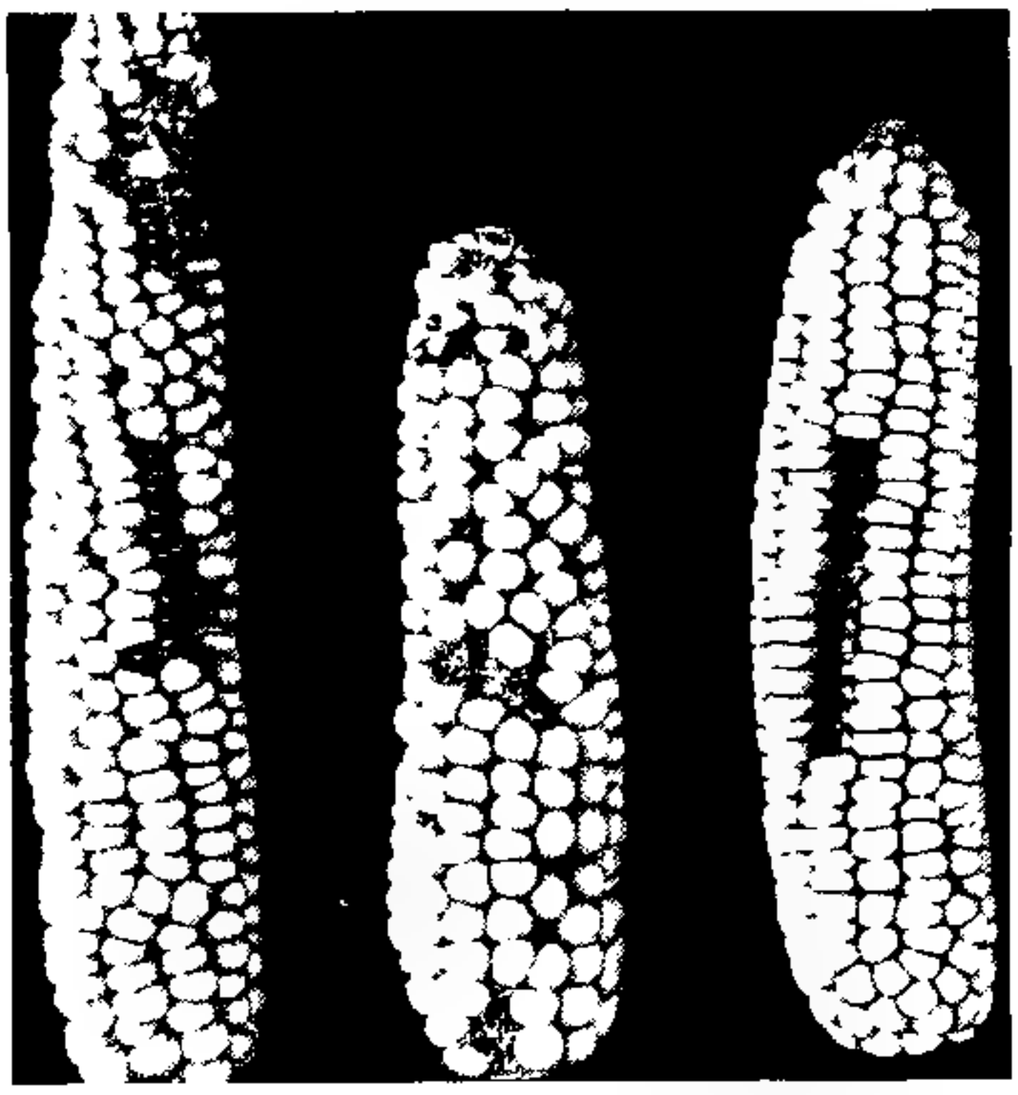


Fig. 3. Ears of three Northern Flint like inbreds of the Corn Belt.

to synthesize Corn Belt dents from hybrids between Southern Dent and Northern Flint varieties. Experiments in crossing a typical white "Gourdseed" from the South with a typical eight-rowed yellow flint from New York State have progressed to the third generation, and it is already evident that many of the segregates from this cross are well within the range of variation of Corn Belt corn. A second kind of genetical evidence is derived from a study of inbred strains of dent corn produced from open pollinated varieties by many generations of self fertilization. During the past three decades, several hundred such strains have been developed by corn breeders of this country and in spite of the effects of strong and continued selection for certain plant and ear peculiarities, these lines still reflect the types of germ plasm contained in the original open pollinated varieties. Thus it is not too difficult to find today among Corn Belt inbreds, strains that resemble Northern Flints and others that are very similar to Southern Dents (Figs. 2 & 3).

It seems clear, therefore, that all the evidence, that from archaeology, history, and genetics points in the same direction — that the common dent corns of the United States Corn Belt originated mainly from the purposeful mixing of the Northern Flints and the Southern Dents. Since, however, there are in the United States at least two other commonly recognized races of corn (the Caribbean-like flints of the Gulf Coast and the southwestern Indian varieties), one might rightfully ask what role, if any, these have played in the evolution of Corn Belt maize. The final answer to this question must await the results of additional work with these particular corns, although all available information suggests that their influence on midwestern varieties has been relatively slight compared to the major role of the Northern Flints and Southern Dents.

Purely aside from their historical value, these facts should be of some significance both to maize breeding and maize genetics. The Northern Flints and Southern Dents belong to races of maize so different that were they wild grasses, they would likely be assigned to different species. It follows, therefore, that Corn Belt varieties that have been

(Continued on page 255)

Bringing the "Blue Amaryllis" to Flower

T. H. Everett

"THIS plant is recognized as the most difficult to induce to flower of all the Amaryllids." So wrote Major Albert Pam, distinguished British cultivator of rare bulbous plants, in The Journal of the Royal Horticultural Society in 1943. He referred to the famous "blue amaryllis", *Hippeastrum procerum,* the so-called "Empress of Brazil."

During the present year, two specimens of this rare species bloomed well at The New York Botanical Garden, one in March and the other in August. What is more noteworthy is that neither were newly imported bulbs that merely developed flowers latent within them at the time of their receipt. Each had been in cultivation for two years and each bloomed in response to the cultural conditions provided in our greenhouses. In one case, the plant that flowered this year also bloomed with us last year. In view of this modest success I am impelled to record the cultural methods employed, particularly as they differ somewhat from those recommended by Major Pam and from those recommended by that other great English student and successful cultivator of this species, A. Worsley.

But first let me tell something of this remarkable species and of its home. The blue amaryllis is localized in nature in a small area of the Organ Mountains of Brazil. There, not far as the crow flies, from Rio de Janeiro, it persists in the crevices and on the ledges of difficult-to-reach, precipitous cliffs of soft, porous granite, at elevations of about 4,000 feet.

Of the mountains in which it grows Worsley wrote, "that the lower reaches are clothed with secondary forest, above which great pillars of bare rock rise to about 4,000 feet or more . . . When one reaches the rock above the forest lands one looks down over a maze of countless valleys running in the wildest confusion in every direction . . The intricate nature of the terrain paralyses the eye." Describing his ascent of these mountains he says, "the native seeks to save time and labor by approaching the mountain on its steepest side and cutting the pathway up the steepest incline he can find. It would be base flattery to suggest that his scheme assists the explorer to reach the summit of his ambitions for the way is arduous and precipitous beyond measure. Moreover, the Indian native makes his passage high enough and wide enough for himself, but not for any fully-grown person. As a result, one has to crouch down, hands on knees, the whole time, and walk sideways as well. The foundation upon which one is supported, although it is invisible, is formed of rough boulders of rock with huge crevices and holes between

them. On the top of this is a mattress, some feet in thickness, composed of various ariel roots, vines and trailing plants, the whole of which mattress sinks under foot every few seconds, so that the art of walking cannot be exercised, but one must jump or run so as not to sink in. The ascent must therefore be made mostly by crawling in monkey fashion and by clinging on and by pulling oneself up by boughs and tree stems."

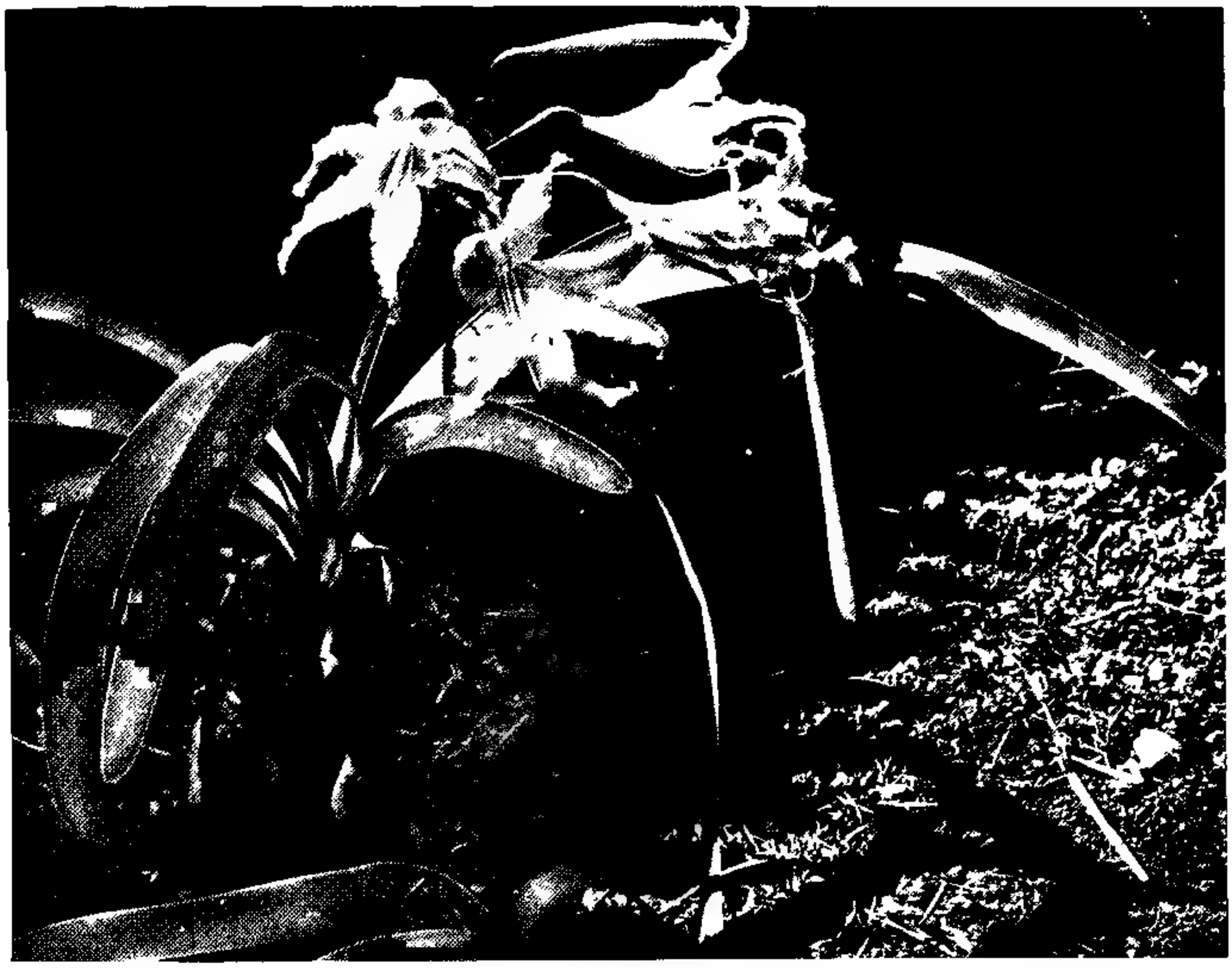
In 1938 and 1939, Harry Blossfeld of Brazil visited the mountainous home of the blue amaryllis and collected a quantity of bulbs, many of which were sent to the United States and some of which, in 1940, came to The New York Botanical Garden. Of these bulbs three bloomed in our Conservatories less than a year after their arrival from Brazil; despite our best care they never bloomed afterwards and, although they survived for many years, they gradually deteriorated.

In reviewing "our best care" and considering the successes of ourselves and others since, I am inclined to believe that we harmed our bulbs by misplaced kindness, and that in particular we afforded them higher temperatures and more humid atmospheric conditions than they need. We grew them at all times in a warm, moist, sunny greenhouse. Under these conditions they failed to thrive and it seemed to me that they exhibited particular distress during the warm months of the year.

In 1946, Major Pam visited The New York Botanical Garden. He saw our bulbs and was distressed about their condition. He kindly furnished us with definite and precise instructions regarding their cultivation, stressing the need for very sharp drainage — wide pans to accommodate the spreading roots and so forth. He volunteered to obtain for us, through the courtesy of Sir Henry Lynch of Rio de Janeiro, some new bulbs to give us a fresh start, and this he did.

Attempts to follow Major Pam's suggestions failed to bring improved results and I came to the conclusion that, as with many other plants, methods of growing that prove successful in England are not necessarily productive of results here. Shortly after the consignment of bulbs from Sir Henry Lynch arrived in 1948, I determined to try some under rather different conditions than those we had been affording. One bulb was potted in a regular flower pot in a well-drained but rather ordinary garden soil and three were planted directly in a ground bed in a similar medium. These were all accommodated in a cool conservatory where the night temperature is kept as near 45° or 50° as outside conditions permit. The house is well ventilated and airy — it is a house in which such plants as oranges, eucalyptuses and camellias thrive. The position is sunny.

The other bulbs we had, perhaps a dozen or so, were all grown under much warmer and decidedly more humid conditions — a minimum



Hippeastrum procerum, the famous "blue amaryllis" of Brazil, which flowered at The New York Botanical Garden this August, was planted in a ground bed in a cool conservatory in 1948.

temperature of 60° together with frequent syringing was provided. They were planted in well-drained pots and pans containing a specially prepared, extremely well-drained potting mixture based on osmunda fiber, charcoal, the fiber from well-shaken, partly rotted turf, etc. In short, they were accorded the treatment that the gardener in charge interpreted as being that advocated by Major Pam.

In the fall of 1949, we were again favored with a visit from Major Pam and once again (and not without reason) he was disappointed with the condition of the bulbs he saw in our warm houses. (I do not recall whether he inspected the plants in the cool conservatory). Once more he stressed the importance of the cultural details which had proved fruitful in England and which had brought him success with this difficult-to-bloom species. The gardener was instructed to follow Major Pam's recommendations and to the best of his ability did so. The fact remains that the two bulbs that flowered with us this year and the one (one of the same two) that bloomed last year all received cool conservatory treatment and those grown under warm conditions look as uncomfortable as ever.

Lord Aberconway, who saw at our special Members' Day meeting in March the potted blue amaryllis which was blooming with us for its second year, said that it was the finest example he had ever seen of this rarity. The blue amaryllis that flowered here in August was one of those which were planted in a ground bed in the cool conservatory in 1948.

A check of the experiences of others in the United States, who received bulbs of the Blossfeld collection, indicates that in most cases the bulbs either did not bloom or bloomed once shortly after arrival and then not again. The outstanding exception is furnished by published reports of bulbs at Las Positas Nursery, Santa Barbara, California. In 1942 A. B. Lytel reports, "In August 1939, Las Positas Nursery received from Brazil bulbs of this beautiful Amaryllid. They were planted in a bed raised about five inches from the ground, made of decomposed granite shale with full exposure, getting all the morning sun and part shade in the afternoon. One bulb flowered for the first time this year — the first bud appeared fully developed about the twelfth of August, and opened wide about two days later." In the following year these bulbs flowered and set seeds, and in 1944 the report is made that the bulbs "bloomed very nicely at Las Positas Nursery again this year." Certainly this is the most encouraging record of repeated flowering of the same bulbs that I have found, and certainly the conditions at Santa Barbara more nearly approach those of a cool conservatory in the East than they do that of one of our warm, moist greenhouses.

May I be permitted a speculation? Major Pam says, in his 1943 article, "I have been growing this Amaryllid for fourteen years, and tried every kind of treatment and of compost without success." The bulb Major Pam succeeded in blooming in 1943 he had had since 1937 — I wonder if it could be that the exigences of war brought cooler conditions to the "warm pit" in which Major Pam plants were kept and that this, at least in part, favored the flowering of his blue amaryllis.

Much has been written in the past decade or so about the flowering of the blue amaryllis and both Major Pam in The Journal of the Royal Horticultural Society for 1943 (page 331), and Hamilton P. Traub in Herbertia for 1943 (page 85) list instances known to them of this happening in cultivation. Major Pam states that he can trace no reports of this species blooming away from its native home other than those he gives, the earliest of which is in 1929 in England. Mr. Traub lists no earlier instances.

Other recorded instances of this plant blooming in cultivation that I have found are:

In France in 1863 (Rev. Hort. N.S. *7*:57. 1907)
In England in 1870 (Bot. Mag. 5883)
At Kew in 1893 (Gdn. 4 S:350. 1894)
At Kew in 1911 (Gard. Chron. L11:73.1912).

In American Gardening (vol. 21:697) for 1900 is a good illustration of the blue amaryllis, and the statement that "It was first introduced many years ago, but was not much known in cultivation and lately has received an added interest by being re-introduced in fair quantity and is already generally distributed in this country."

Incidentally, some of these earlier references indicate that the gardeners favored the ground-bed-in-a-cool-house manner of cultivation.

A Trip into the Mountains of Colorado

Helen M. Fox

IT is not often that an event anticipated for many years comes to pass. However, this past summer, at last, I was able to go west and into the mountains with my friend Kathleen Marriage. She lives in Colorado Springs and knows all about the wild flowers of the state and where each is to be found.

Mrs. Marriage greeted me with the news that it had been an exceptionally dry season and the flowers on the eastern slopes of the Rockies would not be as plentiful as they would on the western slopes, where the rainfall is much heavier. Moreover, in words reminiscent of Ruth Draper's monologue about the "Lady Showing her Garden", this would be a very poor year in comparison with others. I had made similar speeches so often in showing my own garden that I paid little attention to her remarks. Maybe the flowers were not growing as thickly as usual—but after we climbed up the mountains, they looked superlative to me.

After three days spent in town—so I could get accustomed to the altitude—on the fifteenth of July, the height of the flowering season there, we were off in her station wagon, loaded with presses, cameras, suitcases, thermos bottles and sandwiches, for ten days to be spent in and around Aspen.

Our first stop was at Divide to see Mrs. Marriage's ranch. Along the way, the steep mountain sides were clothed at times with drifts of Indian paint brush, again with blue lupines, blue penstemons and *Linum perenne* which had the largest and bluest flowers I've ever seen on that plant. Masses of these plants hung seemingly by their toes on the rocky hillsides, where it would appear they could obtain only the minimum of nourishment and moisture. The most stunning effect were banks vivid with *Gilia aggregata* which I had treated as an annual, not too effectively at home, and now found was a biennial. It grows two feet and more high and bears a long spike of flowers, which range in color from salmon-pink to almost scarlet.

The author, Mrs. Helen M. Fox, rests after a stiff climb in the Rockies among *Penstemon Hallii.*

The noteworthy sight at Mrs. Marriage's ranch is her hillside where there is an aspen grove. The trees have been thinned to grow sparsely and cast a tempered shade. Their gray-green slender trunks rise from a groundcover of grass amid which grow *Geranium Richardsonii* with dainty white flowers and above these rise hundreds and hundreds of *Aquilegia caerulea.* The flowers are large and well formed, having been selected over many years by Mrs. Marriage. I have never seen a more poetic treatment of a wood, for the exquisite blue flowers have a perfect setting and stand out against the slender grasses, the tree trunks and the groundcover. Later in the season, I was told, the Aquilegias are replaced by *Calochortus Gunnisonii.*

From Divide we went over high plains and higher passes to Aspen, stopping on the way every time we saw anything unusual. Here and there on the mountain slopes are three to four-foot high *Holodiscus discolor,* which grows well in eastern gardens but is a bit weedy. A prettier shrub, to my taste, is *Rubus deliciosus* which I have grown, too, and find charming with its white rose-like flowers and currant-like foliage.

Eventually we reached Independence Pass 12,226 feet high, but decided to come back another day, when we walked to the rim of the melting snow where tiny treasures were in bloom. They grew in low patches. There was the famous *Eritichium argenteum,* similar to a tiny forget-me-not, also *Sedum rhodanthum* with very dark red flowers. I put my

Eritrichium argenteum resembles a tiny forget-me-not.

fingers under these plants and found the soil to be as cold as ice. The air, too, was bleak and cold. There were saxifrages, of course, among them *austromontana,* a tiny violet, *Viola bellidifolia,* erigerons and penstemons, *Antennaria rosea* and *Dryas octopetala.* Other plants I saw were the creeping willows, so low as to be like ground-covers. I believe one was called *Salix subcaerulea* and another *S. reticulata.*

Ten days later we went through the pass again—this time it was being pastured by sheep, the shepherd on horseback accompanied by his dog. His trailer was just below the top of the pass. We were glad we had seen the summits before the sheep had come to eat the alpine treasures.

Lower down we found *Caltha rotundifolia,* also clumps of *Trollius albiflorus.* The mountain slopes were speckled with *Zygadenus subalpina,* quite effective with its creamy heads of bloom. I was delighted to have

Rubus deliciosus is a delightful Rocky Mountain flowering raspberry.

the experience of seeing *Aconitum columbianum* and *Delphinium Menziesii* growing "wild", both a very dark blue. Mrs. Marriage said these plants require certain mycorrhizas in the soil as does *Castilleja californica.* This explains why they are so difficult to domesticate. There were wild roses in the gorges, some of them a deep rose, almost red, and now and then *Polemonium confertum* and *P. pulcherrimum.* In some of the valleys, where tiny streams descended through grassy meadows, plants grew tall and lush along the banks. There were *Mimulus Lewisii, Mertensia ciliata,* which is a bush with blue flowers, and *Mertensia Bakeri,* and furnishing lush clumps of frothy white was *Cardamine cordifolia.*

At about eight thousand feet in the valleys around Aspen, meadows were pink with *Geranium Parryi.* Occasionally there would be an orange spot, furnished by the fairly large daisy-like flowers of *Helenium Hoopesii,* which ought to be a lovely member of the perennial border. On some of the shaded hillsides grew *Rubus parviflora,* with very large leaves and white flowers. It was interesting to find *Arctostaphylos Uva-Ursi* up here and to see whole forests of blue spruces, which are grown as specimens at home. Other garden friends seen "wild" for the first time were gaillardias, *Erysimum elatum,* the low *Oenothera missouriensis,* and a shrubby potentilla with pale yellow flowers over an inch across. Being particularly fond of campanulas, it was a thrill to see *C. uniflor*a cropping up now and then. Some of the erigerons were stunning, in handsome blue and violet colors. Outstanding were *Coulteri, speciosus* with tiny ray florets and a fine hairy involucre, and var. *macranthus* and *elatior.* I've had them all in my garden but they never were as prettily colored.

Of course, the penstemons were stars of the trip. Some of these, too, I had grown but whether it was my acid soil, wet winters or absence of mycorrhizas, except for *unilateralis,* they were tinged purplish and not the wonderful blues they sport at home. We saw *strictus, Hallii, secundiflorus* and *alpinus.*

It is striking how many flowers in Colorado are a clear "sky blue". One of these is *Iris missouriensis.* However my authority, Mrs. Marriage, told me it is variable and sometimes quite dark. The fairly large flowers in proportion to the height of the stem make this a particularly lovely, beardless Iris.

Mrs. Marriage's injured knee did not prevent her from scampering over rocks, using a spade as a cane, but it did prevent long hikes, so I walked alone. One walk up to ten thousand feet altitude followed a trail so steep that, when I looked down, it was on an almost perpendicular mountain side, with only the blue sky overhead. These trails are kept open by national foresters and teem with wild animals—black snakes, rabbits, deer and every imaginable kind of squirrel. It seemed to me that

hordes of woodchucks stood on the tops of rocks and squealed at passersby while their young, a lovely shade of yellow-tan, frisked below them. Birds, as also animals, were tame and without fear of man. After climbing for some time on this particular walk, I came to a fairly level place strewn with boulders. In the background were higher blue hills and close at hand —in every crevice, nook and cranny where they could get a foothold— rose, blue and white columbines. Up there, they are delicately fragrant and, being so high, are a pale blue and sometimes all white tinged with pink. It was absolutely still, except for the sound of falling waters. Altogether, to be there was a wonderful experience.

The Origin of Corn Belt Maize

(Continued from page 246)

used for fundamental genetic investigations are frequently grossly atypical of germ plasms in general. This fact, it would seem, may place definite limitations on the breadth of conclusions that can be safely drawn from genetic data involving maize of the Corn Belt.

Secondly, it appears likely that at least some of the much sought after hybrid vigor of the hybrid corn of commerce is in some way closely associated with the mingling of germ plasms of the Northern Flints and Southern Dents. If this proves to be generally true, any information that will aid in the recognition of flint and dent tendencies in modern varieties may assume added significance.

Finally, for the many workers who are using maize as a tool in the pursuit of theoretical genetics or whose interests are in the further improvement of corn varieties, a knowledge of the origin and history of Corn Belt maize provides them with a background for detecting, organizing and understanding the amazing variability of the material with which they work.

The preceding material is a much condensed, popular summary of a series of investigations that Dr. William L. Brown and his colleagues have conducted during the past several years. Much of the material has been published in detail in various technical journals, and the reader who may be interested in a more detailed account, will find the following references useful:

Anderson, Edgar and William L. Brown. 1950. The History of the Common Maize Varieties of the U. S. Cornbelt. Agric. Hist. (In press.)

Brown, William L. 1949. Numbers of Distribution of Chromosome Knobs in United States Maize. Genetics **34**: 524-536.

Brown, William L. and Edgar Anderson. 1947. The Northern Flint Corns. Ann. Mo. Bot. Gard. **34**: 1-28.

—— 1948. Southern Dent Corn. Ann. Mo. Bot. Gard. **35**: 255-268.

REVIEWS OF RECENT BOOKS

Chinese Influence on European Gardens

CHINA AND GARDENS OF EUROPE OF THE EIGHTEENTH CENTURY. Osvald Sirén. 223 pages, illustrations, bibliography, index; 192 plates. Ronald Press, New York. 1950. $30.

A handsome octavo volume, a companion in size and shape to Professor Sirén's book on Chinese gardens, has appeared. This time the subject is first, the influence of China on eighteenth century gardens and then, and at much greater length, descriptions and pictures of other eighteenth century gardens in England, France and Sweden.

The author is an authority on Chinese gardens and, perhaps, is inclined to give more credit to the influence of this style on European interior decorations and gardens than it deserves. To prove his point, he gives many examples from and full mention of the writings on China of the time. It has been the opinion of this reviewer, perhaps mistakenly, that people in the eighteenth century did not understand the symbolism of Chinese art. Being romanticists, they were charmed by the exoticism and strangeness of the designs, regardless of their inappropriateness, and being fond of untrammelled expressions in design, they adapted features of Chinese gardens which, though they appeared free and natural to them, are contrariwise highly styled and symbolical, and an expression of Buddhist philosophy.

Professor Sirén's book is learned, extremely well documented, and valuable as research material on the subject. He includes many explanations for the origin of the romantic style of eighteenth century gardening, in addition to the Chinese influence. One explanation favored by the reviewer is that the people of the day were imbued with the revolutionary spirit of the time, that along with political changes were changes affecting their way of life, from a highly disciplined living to one that was freer and more individual. Sirén does not say that the English, who excelled in naturalistic designs, had always been inclined to a freer expression in the arts than the French who had perfected formal designs.

Each of the great English designers, Brown, Repton and Kent, as also literary authorities on gardens, Walpole, Pope and Bridgeman, are treated at length in the book.

The book is profusely illustrated with old plates, prints and modern photographs. Somehow, many grotesque examples have been chosen, indicating that there was a great deal of ugly and inappropriate ornamentation in these gardens. Moreover, it would seem that many of the photographs of these old places were taken recently and when the gardens were run down and, with notable exceptions, do not do justice to the beautifully graded lawns, the well grown shrubs and trees which combine to create man-made reproductions of natural scenery, so lovely in their effect that they are like paintings.

HELEN M. FOX,
Bedford, N. Y.

Horticulture in the Making

A HISTORY OF HORTICULTURE IN AMERICA TO 1860. U. P. Hedrick. 551 pages, illustrations, bibliography, index. Oxford University Press, New York. 1950. $7.50.

In his book, "History of Horticulture in America to 1860", Dr. Hedrick has rendered outstanding service not only to those interested in the development of horticulture in this country but also to those concerned with the economic and cultural development of America.

The practical horticulturists, scientists in the fields of horticultural research, and teachers of horticultural subjects will find the book useful because it brings together in one volume the story of the essential facts of the development of every phase of horticulture in this country. The material is logically presented and the authenticity of data is substantiated by careful documentation. However, the book is not an encyclopedia, as easily could be the case, for Dr. Hedrick,

through his many years of experience in practical and scientific horticulture and his extraordinary ability to weave cold facts into interesting narrative, has given us a book that is not only valuable for its contribution as a source of facts but which also is intensely interesting reading. It is a most desirable and welcome addition to the bookshelf of horticultural literature.

FRANK G. HELYAR,
Director of Resident Instruction,
College of Agriculture,
Rutgers University.

A Concise Treatise on Anatomical Data

ANATOMY OF THE DICOTYLEDONS. C. R. Metcalfe and L. Chalk. Two vols., 1500 pages, illustrated with plates and figures. Oxford University Press, London and New York. 1950. $25.

These two volumes are designed to replace Solereder's *Systematic Anatomy of the Dicotyledons*. As in the latter, the "main object . . . has been to make anatomical data of taxonomic interest generally available." The authors have accomplished this monumental task in a concisely worded treatise that is better organized, better illustrated, and more painlessly presented than its predecessor.

The 263 families are arranged primarily according to the system of Bentham and Hooker. Each family is described, wherever the literature (2535 titles since 1908) or personal studies have made it feasible, under a summary (general and wood), followed by more details concerning the leaf and axis (stem, wood, root, and anomalous structure). Then follow in turn taxonomic notes, economic uses, genera described, and the literature. Ecological anatomy is also reviewed.

Following the last family description, among other informative tabulations are lists of families in which certain diagnostic features occur, e.g. those of hairs, crystals, and wood.

An introduction provides both a summary of anatomic characters of taxonomic importance and a discussion of anatomy and phylogeny, in which some previously unpublished xylary correlations are presented.

The generally excellent job of editing (although reference to Fig. 175A is incorrect), the use of numerous figures, and the success in integrating scattered information and personal observations make criticisms appear venturesome. Yet the following will disappoint some individuals. The significance of vessel specialization has been largely ignored in the long discussion of the controversy concerning the origin of herbs. Outmoded notions are thus preserved in an otherwise scholarly publication. Likewise, various untenable suggestions concerning possible relationships of certain herbaceous dicotyledons to monocotyledons are incongruously found in these volumes. The authors have accentuated the paucity of reliable information on phloem by failure to make full use of the literature (e.g. MacDaniels, Amer. Jour. Bot. 5: 347-378, 1918). The term "medullary rays" is indiscriminately used.

There are other possible adverse criticisms, but all are likely to be considered minor by the students in various disciplines who will find this compendium a rich source of information.

VERNON I. CHEADLE,
University of California.

Notes, News and Comment

American Institute of Biological Science. The meetings of the American Institute of Biological Science, held in Columbus, Ohio, September 11, 12, and 13, was attended by the Director, Dr. William J. Robbins and several members of the staff of The New York Botanical Garden. Dr. Robbins presented a paper on *Euglena,* prepared with the assistance of Dr. Annette Hervey and Miss Mary Elizabeth Stebbins before the Microbiological Section of the Botanical Society.

Dr. H. W. Rickett gave a report on the Nomenclature Sessions of the International Botanical Congress at Stockholm. Dr. Rickett also participated in a forum on the problems of scientific publications. Dr. Donald P. Rogers summarized the work on basidiomycetes as reported at the Congress and also reported on the changes in the Rules of Nomenclature as they affect fungi.

Dr. Bernard O. Dodge, Plant Pathologist Emeritus, was an honored guest and delivered the first annual lecture before the Mycological Society and the Microbiological Section of the Botanical Society. His audience of one hundred twenty appreciated his subject—"The Fungi Come into Their Own".

Dr. F. W. Kavanagh, Dr. Robert S. de Ropp, and Dr. Annette Hervey also attended the meetings.

The New York Botanical Garden - H. R. Kunhardt Expedition to Venezuelan Guiana. Dr. Bassett Maguire left on Sept. 23, Richard Cowan and John Wurdack will leave on October 5, for another expedition to Venezuelan Guiana. This makes the tenth expedition to the Guayana Highlands, which The New York Botanical Garden has conducted directly or with which it has been associated. Our staff members will travel on tankers through the courtesy of the Sinclair Oil Co., and Mr. Kunhardt.

The Orinoco Mining Co., at Cuidad Boliva, Venezuela, has offered facilities of guest house and warehouse for the current and forthcoming expeditions.

Their explorations will be concentrated in the Orinoco headwaters, and they will visit particularly Huachamacari and Yapacana, two of the sandstone plateaus. Neither has been explored botanically and, as far as is known, the first has never been scaled.

Dr. Maguire and his companions will be in the field until the end of February. Mr. Cowan and Mr. Wurdack will then return to this country with the collections, and Dr. Maguire will go on to British Guiana to join the British Guiana Forest Department in an expedition to the easternmost end of the Pacaraima Range, terminating with Kaieteur Plateau.

Collaborator for Venezuelan Botany. Mrs. William Phelps, Jr., of Caracas, Venezuela, has been appointed a New York Botanical Garden collaborator for Venezuelan botany by the Director, Dr. William J. Robbins, in recognition not only of the assistance that she has given to The New York Botanical Garden program in the study of the Guayana Highlands, but also because of the quality and discrimination of her collecting. Mrs. Phelps' collections are among the most important that have come out of the area.

Mrs. Phelps is one of the world's outstanding women explorers of the present day. Of the thirteen Phelps expeditions into the tablelands of Venezuelan Guayana, she has been on the greater number. This is an extraordinary achievement, since exploration in this region is as difficult as any found in the tropical world.

Construction within the Grounds of The New York Botanical Garden. A cross path, eighteen feet wide and running the length of the perennial borders north of the Conservatory has been made this summer, and the court and all walks around the Conservatory given a permanent surface. The work, which was started in May and completed in September, was accomplished under the supervision of the Park Department of the City of New York. Attractive park benches were also installed.

Adjacent to the original Lorillard stable, which is now used as a carpenter's and plumber's shop, a modern brick storage building is being erected. The building will be 90 feet long and two stories high and trucks may be loaded on either level. Close by is the new manure shed, with asbestos roof and sidings.

Future projects include the renovation of the snuff mill, where the first snuff was ground in 1850 by the Lorillard family, and its transformation into a garden center.

Award to Dr. Stout. The Evaluation Committee of the Hemerocallis Society has decided upon three major awards to be presented annually. Dr. A. B. Stout, Curator Emeritus of The New York Botanical Garden, is the first recipient of the Bertrand Farr award for the broad scope of his work in *Hemerocallis* species and the great number of meritorious varieties he has produced. This award is to be granted annually to a hybridizer for outstanding achievement in the improvement of *Hemerocallis*.

"Modern Indoor Plants." This was the subject of the talk which T. H. Everett, Horticulturist of The New York Botanical Garden, gave on Wednesday afternoon Sept. 13, during the National Home Furnishing Show in Grand Central Palace. Mr. Everett selected plants whose habit of growth, shape, texture and color of foliage are in harmony with modern architecture and modern interior decoration. Through the courtesy of Julius Roehrs Company of Rutherford, N. J., he had many interesting plants on display. Among the more unusual and attractive were *Anthurium Andreanum*; *Fatsia japonica* (*Aralia Sieboldii*) and *Fatshedera Lizei*, a hybrid between *F. japonica* and *Hedera Helix*, the English Ivy; *Dieffenbachia picta* and *D.* "Roehrs Superba"; *Ficus Doescheri* and *F. pandurata*; *Monstera deliciosa*; *Philodendron hastata*, *P. Mandaianum* and *P. panduriforme*; *Schefflera actinophylla*.

The New York Botanical Garden, under the direction of Louis P. Politi, Head Gardener, furnished the floral decorations for the third floor of the Grand Central Palace where the American Institute of Decorators staged their exhibits. Under the sponsorship of the Volunteer Associates, a booth was maintained for the sale of garden merchandise, the dissemination of information about the Garden's activities, and the advantages of membership.

Lectures. On September 5 Dr. A. B. Stout, Curator Emeritus of The New York Botanical Garden, lectured on daylilies before the Southern California Horticultural Institute in Los Angeles. Several of the former student-gardeners of The New York Botanical Garden were present, among them Ronald B. Townsend and George H. Spaulding. Mr. Townsend is Superintendent of the Huntington Botanical Garden, and Mr. Spaulding is on the staff of the newly established Los Angeles State and County Arboretum, of which Dr. Russell J. Seibert is Superintendent.

Meetings. Dr. H. A. Gleason, Head Curator, represented The New York Botanical Garden at the 75th Anniversary of the founding of the Connecticut Agricultural Station on September 28 and 29.

Field Trips. On August 27, Dr. H. N. Moldenke led a field trip of the Torrey Botanical Club to Bethel, Conn., to see the fine stand there of American lotus. Earlier this year, Mr. and Mrs. Joseph Monachino were among the group of botanists, members of the Torrey Botanical Club, who explored North Jersey's Great Piece Swamp. They traveled in canoes through the marshland, which is an extensive national garden for botanists and a sanctuary for wild life, collecting and identifying specimens.

Flower Painting for Amateurs. An innovation in the autumn term of the 1950-51 Educational Program is the course on flower painting with Tabea Hofmann, one of America's leading flower painters, as the instructor. This course, strictly for amateurs, no previous experience in water coloring being required, will be held Thursday mornings from 10:30 a.m. to 12 noon. Commencing October 19, it will continue through December 14; but no session will be held on November 23.

Free Saturday Afternoon Lectures. Four interesting lectures have been arranged for the Saturdays in October: "Flower Arrangement" with kodachromes and comments, by Mrs. Herta Benjamin and Mrs. William Stickles; "Winter Protection of Your Garden" by Frank C. MacKeever, Custodian of the Herbarium; "A Horticulturist in the Venezuelan Jungles" by Louis P. Politi, Head Gardener; and "Culture and Varieties of Chrysanthemums" by Mrs. Ernest L. Scott of the National Chrysanthemum Society. A complete schedule of all the lectures in the Autumn 1950 series will be sent on request.

Sixth Annual

CHRYSANTHEMUM SHOW and PROGRAM

of The New York Botanical Garden

October 27, 28, 29, 1950

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

levated to the Botanical Garden or the 200th St

Membership in
THE NEW YORK BOTANICAL GARDEN
and what it means

TO THE INSTITUTION, membership means support of a program that reaches several hundreds of thousands of persons annually.

Briefly, this program comprises (1) horticultural display, (2) education, (3) scientific research, and (4) botanical exploration. To further this work and to disseminate useful information about plant life to the public, the Garden issues books and periodicals, both scientific and popular, and presents lectures, programs, radio broadcasts, and courses of study in gardening and botany. The laboratories and large herbarium and library serve the staff in its research and educational work, while the extensive plantings at the Garden give the public vistas of beauty to enjoy the year around. The public is also free to use the Botanical Garden's library, and, under direction, to consult the herbarium.

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Free enrollment in courses up to the amount of the annual membership fee paid.

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Free announcements of special displays, lectures, broadcasts, programs, and other events.

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* * * *

Garden clubs may become Affiliate Members of the New York Botanical Garden, and thus receive certain privileges for the club as a unit and others for individual members. Information on Garden Club Affiliation will be sent upon request.

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* * * *

Classes of membership in the New York Botanical Garden in addition to Industrial Memberships are:

	Annual Fee		*Single Contribution*
Annual Member	$ 10	Member for Life	$ 250
Sustaining Member	25	Fellow for Life	1,000
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Contributions to the Garden may be deducted from taxable incomes.

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I hereby bequeath to The New York Botanical Garden, incorporated under the Laws of New York, Chapter 285 *of* 1891, *the sum of*_____.

Gifts may be made subject to a reservation of income from the gift property for the benefit of the donor or any designated beneficiary during his or her lifetime.

All requests for further information should be addressed to The New York Botanical Garden, Bronx Park, New York 58, *N. Y.*

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CHRYSANTHEMUM CANARY P.R.R.

Canary P.R.R., illustrated on the front cover (courtesy of Jackson & Perkins) and Masquerade, illustrated above (courtesy of Bristol Nurseries, Inc.) are two of the many interesting varieties of chrysanthemums grown this year in the trial beds of The New York Botanical Garden.

The chrysanthemum has reigned as "Queen of the Autumn" at The New York Botanical Garden during October, the blooming period reaching its climax during the three-day Chrysanthemum Show and Program. The story of the Show will appear in the December issue. In the meantime, we report on "Chrysanthemums on Trial" and give a resume of Mrs. Ernest L. Scott's talk on "Chrysanthemum Aristocrats" in this issue.

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DOROTHY EBEL HANSELL, Editor

VOL. 51 NOVEMBER 1950 NO. 611

A Plea for the Cultivation of English Hollies

Mrs. Alfred B. Thacher

THE English holly, *Ilex aquifolium,* has the reputation of being very tender here in the East. Being happily ignorant of this, I planted two in 1910. Those baby trees were as unaware of their tenderness as I was. They prospered. Today, they are fine large specimens with branches that sweep the ground. Robins nest in them each spring. The trees suffered, though not too much, during those two bad winters in the thirties—but everything suffered then. Many plants died.

Hardiness is often a question of suitable soil, proper transplanting, proper air and water drainage. In other words, hardiness sometimes consists not as much upon temperature as upon reasonable care.

Both the physical and chemical composition of the soil seems to have considerable to do with hardiness. Hollies like an acid soil that contains a generous amount of humus. They like plenty of moisture, but they insist upon good drainage, not only water drainage, but air drainage also. They do not like rapid changes in temperature, nor the afternoon sun, often the cause of rapid changes. An eastern, a northern, even a northeastern exposure will keep them happy. Half shade, half sun is right.

April is the ideal time to transplant holly in this area. (February is better in the South). The roots should be firm, but not deeply covered. Even if advised to do so, do not strip your trees of leaves when transplanting. It is well to leave a little depression around the stem to catch water during the summer. Before winter sets in, this depression should be replaced by a small mound of sand. This will give winter drainage and prevent a damaging ice collar. Like all evergreens, a thorough soaking of the ground just before the first frost will compensate for much water loss during the winter. If given too early, the soaking will promote late, unwanted growth.

Cottonseed meal and tobacco dust, half and half, applied in early spring, make an excellent fertilizer. If used later than June first, it promotes a late growth that may winterkill. Rotted sawdust makes a fine mulch.

Hollies grow rather slowly at first. Once established, they grow rapidly,

but slow up again in old age. They grow more rapidly in a light soil than in a heavy one. The soft air, the mists, the sandy soil and the low altitude all make for ideal conditions near the sea.

If well grown, hollies have few pests and diseases. They are rather shabby for about six weeks in the spring, but beautiful the rest of the year. Not only do they make handsome specimen plants, but fine hedge plants as well. Also, they grow quite well in the city and can be successfully espaliered—with patience!

A few kinds of holly with pistillate flowers will set berries without being fertilized by pollen from a staminate flowered tree, but the seeds in such cases are not viable. Non-viable berries can be produced also by spraying pistillate trees with growth hormones when they are in bloom. To insure berries, one should plant at least one male tree for every eight or ten female trees. Grafting branches of staminate trees on pistillate trees has been successful. It is also helpful to hang on a female tree a bottle of water containing branches from a male tree that is in bloom. Bees will then attend to the pollination. American and English hollies, having a different chromosome count, do not cross naturally. Also, the aquifoliums bloom almost a month earlier than the opacas. Therefore, if one is growing both English and American hollies, one should plant male trees of both species. A well-grown male holly of a fine variety, even though it carries no berries, has great beauty in its own right.

If Christmas greens and cuttings are taken wisely, very little other pruning is necessary. Most hollies attend pretty well to their own figures.

As to propagation from cuttings, I have found that an adaptation of G. G. Nearing's method brings best results. Usually the cuttings root one hundred percent. In a wooden box, about ten inches deep, put two inches of peat moss and oakleaf-mold thoroughly mixed (one part oakleaf-mold to two parts of peatmoss). Press down firmly. Add two inches of a well-blended mixture of peatmoss and sand (half and half). Firm and add one inch of sand and firm again.

The top of the box should be sloped so that the sash, a sheet of glass, will shed rain. Plate glass cut to size is best. Sink the box in the ground to within two inches of its full depth, in a place where it will receive plenty of light but no direct sunlight. The north side of a building is an ideal place. Water with a fine spray until the water stands on the surface of the sand. After a similar watering the following day, the box is ready for cuttings.

Cuttings should be about five inches long. Cut directly across the stem, a little below a node (a slanting cut does not root as readily). Carefully remove the lower leaves and place cuttings in the damp rooting medium, almost horizontally, about two inches apart. This horizontal placing of the cuttings brings the undersides of the leaves, from which most water

escapes, near the moist medium. Do not firm. Pressing the soil about the stem is apt to injure the bark. The very wet rooting medium insures solidity about the stem with no air spaces. Put the glass cover on and do not ventilate. Water only when moisture seems necessary. Sometimes it will not be required for many weeks.

Cuttings made in the autumn are left in the propagating box for a year, at which time they are potted. The pots are sunk in a coldframe and the plants are planted outdoors the following April. I have not found the use of root-forming hormones desirable, even in very small quantities.

All that has been written so far, applies not only to the English, but to the American, Chinese and Japanese hollies and to those from the Canary Islands. They are all interesting, all beautiful, but it is to the English species, *Ilex aquifolium,* with its varieties and hybrids that I call your attention. Incidentally, we frequently read that the largest number of different species of *Ilex* in the world is to be found in South America, yet but one species, *I. paraguariensis,* is generally found in botanical books and I have yet to find that one in either a nursery catalog or a plant buyer's guide.

To return to the English hollies, the two planted by me so many years ago, are *I. aquifolium* var. *Marnocki.* From them, I have propagated perhaps five hundred plants, including three hedges and given away at least a thousand cuttings. As the flowers and berries of the aquifoliums are borne on wood of the previous year, many berries have been sacrificed through generosity. Flowers of the American holly, *I. opaca,* are borne on the season's growth, so it is easier to be generous with its cuttings. Like many varieties of *aquifolium, Marnocki* has several types of leaves on one tree. Some of the leaves have spines along the margins; others do not. Many have a peculiar twist about the middle.

Altogether I have grown thirty-five varieties and hybrids of English hollies—and they all look happy. *I. aquifolium ciliata major,* with its large, glossy, dark green leaves, is one of the loveliest. It is a vigorous grower, with dense foliage. In the autumn the leaves take on a beautiful reddish tint.

I. altaclarensis var. *camelliaefolia* is rather similar to *I. ciliata major,* but the leaves have fewer spines. It is difficult to choose between them. All in the *altaclarensis* group are hybrids between *I. aquifolium* and hollies from the Canary Islands—*I. Perado* or *I. Maderensis,* or *I. platyphylla. I. altaclarensis Wilsonii* is a cross between *I. aquifolium* and *I. platyphylla.* Like all the *platyphylla* hybrids, it bears large, handsome leaves of thick texture, sometimes five inches long, and berries of good size. Apparently the aquifoliums and *I. platyphylla* cross quite readily.

I. aquiperni, as its name implies, is a hybrid between *I. aquifolium* and *I. Pernyi,* which comes from China. The small, glossy, prickly leaves, crowded along the stems, make this an interesting holly to grow.

Among the many other aquifoliums are the gold and silver variegated varieties, *I. aurea regina* and *I. argentea regina.* Many branches of these are sent from Oregon and Washington each year for the holidays.

I. aquifolium var. *pendula,* the weeping holly, is handsome and interesting, but floppy and untidy unless trained. *I. aquifolium ferox,* the hedgehog holly, with spines all over its leaf surfaces, lives up to its name. *I. angustifolia* has tiny, pointed, shining leaves not over one and a half inches long. All three of these hollies have variegated as well as the green forms.

I. aquifolium var. *pyramidalis compacta* bears small, narrow leaves and many bright red berries. Some of the leaves have spines; others have none. *I. aquifolium* var. *fructu-luteo* has yellow berries. A white berried variety, *fructu-albo,* is often listed in old books, but never in a nursery catalog nor in a plant index, and I have never heard of anyone who has ever seen a holly with white berries. *I. aquifolium* var. *Lichtenthalli* has bright green leaves, very narrow compared with their length, and bears a good crop of berries year after year.

Plant experimentation can be very exciting. It is well to begin in a small way with vegetative offspring from trees of known hardiness—and then to give them sensible care. There are fine specimens of English hollies as far north as Massachusetts.

If, after what has been written, you are still timid about growing English hollies, try some of the others. From China come *I. cornuta* with its thick, glossy, five-spined leaves and its variation, the almost spineless *I. cornuta Burfordii*; also *I. Pernyi* which carries its tiny spiny leaves clustered thickly along the stems and bears berries whether or not a male tree is near.

I. pedunculosa, which looks less like a holly than like an evergreen pear tree bearing cherries, comes from Japan. So do all the crenatas which grow too easily to be very exciting.

If you are still cowardly about experimenting, plant the American holly, *I. opaca* var. "Old Heavy Berry" (sometimes listed as "Hookstraw"). Its large, broad, spiny leaves of thick leathery textures are among the most beautiful of all holly leaves and it bears a good crop of large, dark berries.

There has been an ever increasing interest in the growing of hollies during the last few years. There is even a young "Holly Society of America." Its autumn meeting in 1948 was held, very happily, at The New York Botanical Garden.

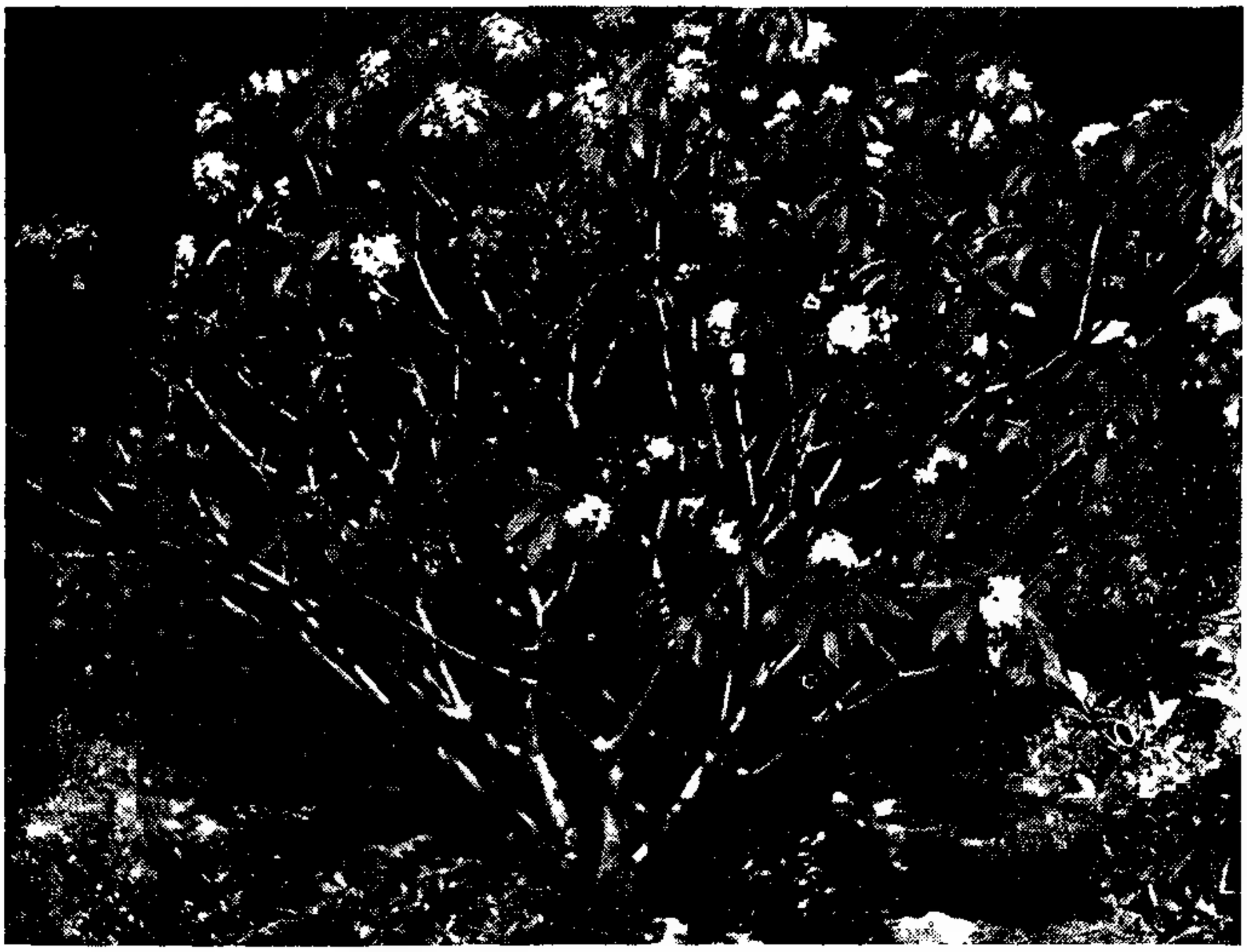
Holly specialists are observing, evaluating and selecting fine specimens from which they propagate by means of cuttings. In a lesser degree, they are creating fine new hollies through hybridization. What they desire most of all is hardiness. After that, dense growth, many large bright red berries and leaves of a good texture that are a deep, dark blue-green, without a trace of yellow. The leaves should glisten also, and spines are important, even though some of the most beautiful varieties do not have any prickles.

Frangipani, a Tree of Tropical America

Edwin A. Menninger

THE only tree representative of the periwinkle family, Apocynaceae, to find a common place in Florida gardens, is the frangipani. The gouty, soft-barked trunk and the gray, non-tapering branches that are more conspicuous than the foliage, make it the ugly duckling of the tropical garden, saved from oblivion only by the exquisite and often heavy fragrance of its waxy flowers which rival both the jasmines and the gardenias. Yet of all the ornamental tropical plants with large fragrant flowers, the frangipani is the easiest to grow. A branch stuck in the ground (in February) usually needs no further attention. As a result, this native of tropical America is extensively cultivated in every warm country around the globe.

The odd name frangipani is applied with abandon to any of the perhaps forty-five species of *Plumeria* (often incorrectly spelled *Plumiera* or *Plumieria*) which was named after a seventeenth century botanist, Charles Plumier. Some experts believe there are not more than ten species and



Plumeria acuminata, **with yellow-centered, waxy white flowers, is commonly encountered in Florida.**

everybody agrees that all of them are confused and inadequately understood.

The two kinds most commonly encountered in Florida are the Mexican frangipani *(P. acuminata)* with yellow-centered white flowers, and the nosegay frangipani *(P rubra)* which usually has pink or red blossoms. A red leaf stalk sometimes serves as an identification mark. But as Corner says, *P. rubra* "is a convenient name for the pink and red-flowered varieties of which there are many, differing in the size and shape of the leaves and the flower and the intensity of its color. It has yet to be discovered whether these varieties represent a species or a group of hybrids between other species." Neal points to the crossing of *P rubra* "resulting in plants bearing flowers with various combinations of white, rose and yellow." Britton reports that *P rubra* may be purple, while Bailey records the color as "more or less rosy" or a golden color with pink tips on the petals. To the layman the names simmer down to a grand confusion!

Everybody agrees to the common name frangipani (sometimes spelled frangipanni) but whether its origin was from the French word frangipanier, meaning sour milk, or whether the tree was "discovered by Frangipani, the botanist, when he landed in Antigua with the Columbus expedition," or whether it was to honor an Italian nobleman named Frangipani who compounded a perfume which the scent of these tropical flowers resembled, nobody knows or cares.

Many other common names are prevalent in tropical countries, for although native of tropical America, the trees are grown in many other lands where similar conditions prevail. They have been cultivated in Asia at least 200 years, probably not for ornament, however, as much as for the medicinal properties attributed by many to the sticky milk that pours from a wound on the tree. In Malaya they are planted in cemeteries more frequently than in gardens and hence are commonly called "graveyard flowers." In India the Mohammedan graveyards are filled with frangipani trees and in Ceylon it is called "The Life Tree." It is a favorite in Buddhist worship, being regarded as an emblem of immortality, because of its wonderful power of leafing and even blooming when out of the soil, if kept in the shade. In Hawaii the trees are called "Melia" (though not related to the botanical genus of that name). In Porto Rico, the common name is "Paucipan;" in India "Pogoda Tree" or Temple Tree."

Frangipani trees are prized exclusively for their flowers which come in crowded clusters at the tips of the branches, last a long time on the tree, continue to resist wilt after picking much longer than most tropical blossoms, and hence lend themselves for use in making leis in Hawaii, garlands for temple offerings in India, or bouquets in Florida. The exquisite fragrance persists even after the blossoms fall from the trees. The odor of the flowers is as strong in one color as another, is most

A close-up of the exquisite, sweetly-scented flower of the Mexican frangipani.

noticeable at evening, may be almost entirely absent in midday. "The beautiful sweet-scented flowers were a favorite among the ancient Mexican people who often plant them in their gardens and use the flowers for decorations, especially in churches. The Indians often wear them in their hair."

Frangipani trees are usually small, rarely exceeding twenty-five feet and often blooming when only two feet high, if the rooted cutting was a branch tip. Cuttings should be allowed to dry out for a week before being planted and are more satisfactory than propagation from seed. Most frangipani trees set seed in six-inch twin pods that are first green, then black, but much of it is infertile. In Florida, the trees are leafless when flowering begins in March. The flowering may continue for months; the new leaves gradually return as the blossoms drop away. In Singapore some species are evergreen or only partly deciduous. In Hawaii, the blooming continues nearly all the year.

They thrive in dry and rocky situations, resist salty seabreezes well and do not shatter in hurricane winds. If toppled over, they go right on growing and blooming when pushed back up again. Large trees to twenty feet, with practically no roots, can be moved to new locations without wilting or decline. The spreading habit of the crown can be checked by trimming away the out-reaching branches, leaving only those which go upwards.

Ida Colthurst, in her interesting book, *Familiar Flowering Trees in India* writes of the frangipani: "For all its fragrance, the frangipani is not exactly what one would consider an artistic tree, and time was when I vigorously excluded it from my garden, but one day I came upon Waterfield's eulogy of it in his 'Ballads,' and now, for the very beauty of his ideas and the music of the poem, it is one of my favorites."

Despite the confusion of botanical names and the variation in trees described by different authorities, the following outline may serve as a general guide to the species usually encountered:

P acuminata (syn. *P. acutifolia*) has white flowers with yellow centers. Gough says the blossoms are "slightly pink on the outer side." Corner

says there is a pinkish streak on the inside of each petal. The leaves are narrower than *P rubra.*

P. rubra has red or pink flowers as previously related. Both it and the preceding have long pointed leaves.

P. obtusa and *P. emarginata* from Cuba have blunt ends on the leaves and white flowers. These two species are closely allied and may prove identical. *P. obtusa* is more robust than *P acuminata* and has darker green leaves.

P sericifolia has less showy white flower clusters, and the under sides of the leaves are densely hairy.

P alba is a white-flowered "low tree," not as showy as some other species, but appears to be evergreen, at least in Hawaii. It has a distinctive leaf, narrow in relation to its length (often 1½ x 8 inches), the margins curled downward and the leaf crinkled as if being attacked by aphids, the tip sharp, and the characteristic marginal vein around the edge of the leaf absent or almost so. There are a few plants in Florida.

P. lutea has flowers similar to those of *P. acuminata* but larger, nearly four inches across and "very sweet smelling." There are a few specimens in cultivation in California.

P. tricolor has flowers that are pink and yellow within, and red and white without. This species is cultivated in Mexico and Singapore. It might easily be confused with some of the *P rubra* hybrids.

There are a good many shrubs and vines of the periwinkle family in North American gardens. Among these are allamanda, crape jasmine *(Ervatamia),* natal plum *(Carissa),* oleander *(Nerium)* and, of course, periwinkle *(Vinca).* There are other trees, too, besides frangipani, such as the "yellow Oleander" *(Thevetia), Ochrosia* and the scholar tree *(Alstonia)* but except for *Thevetia,* they are comparatively rare.

It's Closer Than You Think

Stephen Collins, Resident Naturalist
Palisades Nature Association

MANY people who live in New York City feel that the last bit of country has been pushed away from their giant metropolis. This is not true. A strip of wild land still remains on top of the Palisades only twenty minutes drive by automobile from New York City. In this strip of wilderness within sight of the New York skyline, deer pick their way through the understory of the oak forest.

Oddly enough, botanists have paid insufficient attention to this area. In their rush to find greener pastures, they have bypassed the Palisades to carry on their studies in more remote sections.

An alert observer must not be content with plant identification but seek

The flowers of Sweet Pepperbush, *Clethra alnifolia,* signal the death of summer.

to find out what the plants are actually doing. This may sound strange to the average person who thinks of plants as fixed, impersonal pawns of chance. A quick glance over rough field notes reveals noticeable differences in blooming periods of plants in different locales. At the top of the Palisades, bloodroot blooms earlier than at the base, apparently violating all the rules of vertical distribution. The clue to this enigma lies in the exposure to the sun's rays. The top of the Palisades enjoys the longer exposure, hastening the date of blooming of many plants. All things being equal, plants at a lower elevation are usually expected to bloom first. This is only one of the many interesting aspects of plant dynamics that may reveal itself to the close observer.

As the season progresses and one looks for the flowers that signal the

death of summer and the birth of fall, attention falls upon the cardinal flower, *Lobelia cardinalis,* one of the showiest plants of the Palisades. Before this plant has begun to bloom here, it has made an excellent start in some of the northern uplands of New Jersey. Because of the shorter growing season in the uplands, the cardinal flower needs a head start over some of the more southernly plants occurring at lower elevations.

In the past plants have disappeared from the Palisades region, due to wanton picking. In early times herb-gathering zealots wiped out the May-apple, while other plants with supposed medicinal values also suffered. Florists helped themselves freely to once-abundant stands of mountain-laurel. Fortunately the formation of the Interstate Park Commission put an end to that wanton destruction. In recent years, the Palisades Nature Association was formed and authorized by the Park Commission to develop part of the Park as a wildlife refuge. Within the last few years, this organization has reintroduced former native plants which were exterminated by early pickers. Greenbrook Sanctuary, the tract of land under development, embraces approximately 150 acres on top of the Palisades east of the Alpine-Tenafly town boundaries. Here laurel receives protection. Once again, the May-apple blooms along the north bank of Green Brook. In late summer the cardinal flower adds a dash of scarlet to the edge of the brook, where earlier in the season a visitor would have found yellow spikes of golden club thrusting themselves above the stream.

With the completion of the new Palisades Parkway and development of Greenbrook Sanctuary, the visitor will be greeted by a wealth of plants including the yellow lady-slipper, the pitcher plant, the sundew and azalea. Already over five and one-half miles of trails invite visitors to this area.

While the formation of the Interstate Park put an end to the destruction of the natural features of the Palisades, Greenbrook Sanctuary represents a pioneering move to restore a part of the Palisades to its original condition. It is planned to reintroduce all plants native to the Palisades area. The Palisades Nature Association has the unique and challenging task of developing and improving a public area, while at the same time educating the public to the increasing importance of practical backyard conservation. By arrangement, groups are welcome to see this area and hike through it. Individuals, as well as groups, may join the Palisades Nature Association and attend regular weekly outings conducted for members.

Just what would a visitor to Greenbrook Sanctuary see? Like the rest of the top of the Palisades, this area is predominantly a dry, oak forest, interrupted by wet areas where red maple, sugar maple and beech are found. The understory of the oak-forest is composed chiefly of

Oats have been sown to prevent erosion along the road cut to Greenbrook Sanctuary.

maple-leaf viburnum, an important wildlife food. A liberal sprinkling of mountain-laurel and dogwood is also part of the understory of the dry regions. The damper areas have an understory of spicebush and witch-hazel. Because of their attractiveness to migrating fall birds, the berries of the spicebush last but a short time. Similarly, dogwood fruit is rapidly consumed by a number of birds. Only the maple-leaf viburnum really carries its fruit well into the winter, but by late winter the birds have garnered most of its fruits, too. While birds do not feed upon this plant until later in the season, chipmunks eat the fruit before it has turned blue.

A short walk through the northern end of Greenbrook Sanctuary takes the visitor through a damper, hillier and cooler area. This is the region of hemlocks and tremendous tulip-trees, *Liriodendron Tulipifera,* approaching three feet in diameter. At the base of the hemlock the Canada Mayflower or "false-lily-of-the-valley" finds suitable habitat not found

so often in the oak forest. It is easier for this plant to push its way through the hemlock needles than it is to push through the denser oak litter.

A glance upward into the hemlock might reveal a blinking great-horned owl or a nervous black-throated green warbler. Later in the season, at the base of such a tree, Indian-pipe pushes its way through the forest floor in the shaded areas. Squaw-root, Turks-cap lilies and pink lady-slipper greet the visitor at different periods throughout the summer. After autumn rains, a rich yield of mushrooms may spring up so quickly that leaves and other litter do not have time to wash off. A bird such as the blue jay or a mammal such as the chipmunk may feed upon the crop of mushrooms. Even the box turtle may be observed feeding upon them. The poisonous Amanita mushrooms are not shunned by these animals who thrive on what would kill humans.

Plants are not scattered at random throughout the sanctuary, but show definite preferences for varying types of habitat. Some require moisture such as sphagnum moss, many species of which have been found in the Palisades area. Others, such as Indian-pipe, demand shaded locations. Gray birches, blackberry and huckleberries thrive only where there is an abundance of sunlight. Phragmites, the reed grass, dominates an area not damp enough for the cattail. As one goes beyond plant identification, he may see how vital plants are to the animal populations of the sanctuary. A stand of common milkweed may be the summer resort for a community of orange, longhorn, milkweed beetles or the food patch for the monarch butterfly larvae that will later leave the sanctuary and migrate southward in the fall with the birds. In the breaks in the forest canopy sunlight pours down in long shafts to encourage a tangle of fox-grape. The foxes roaming in Greenbrook Sanctuary contradict the ancient fable. Indeed, their droppings contain many grape seeds indicating a seasonal preference for the wild grapes. The shredded bark of the grape vine may become an important building material for the nest of a forest bird or deer mouse.

Breaks in the forest canopy relieve landscape monotony, vary plant composition and encourage wildlife plants. These breaks occur whenever a tree crashes over. The constant falling of trees in the Palisades reflects a definite stage in the evolution towards a more stable forest community.

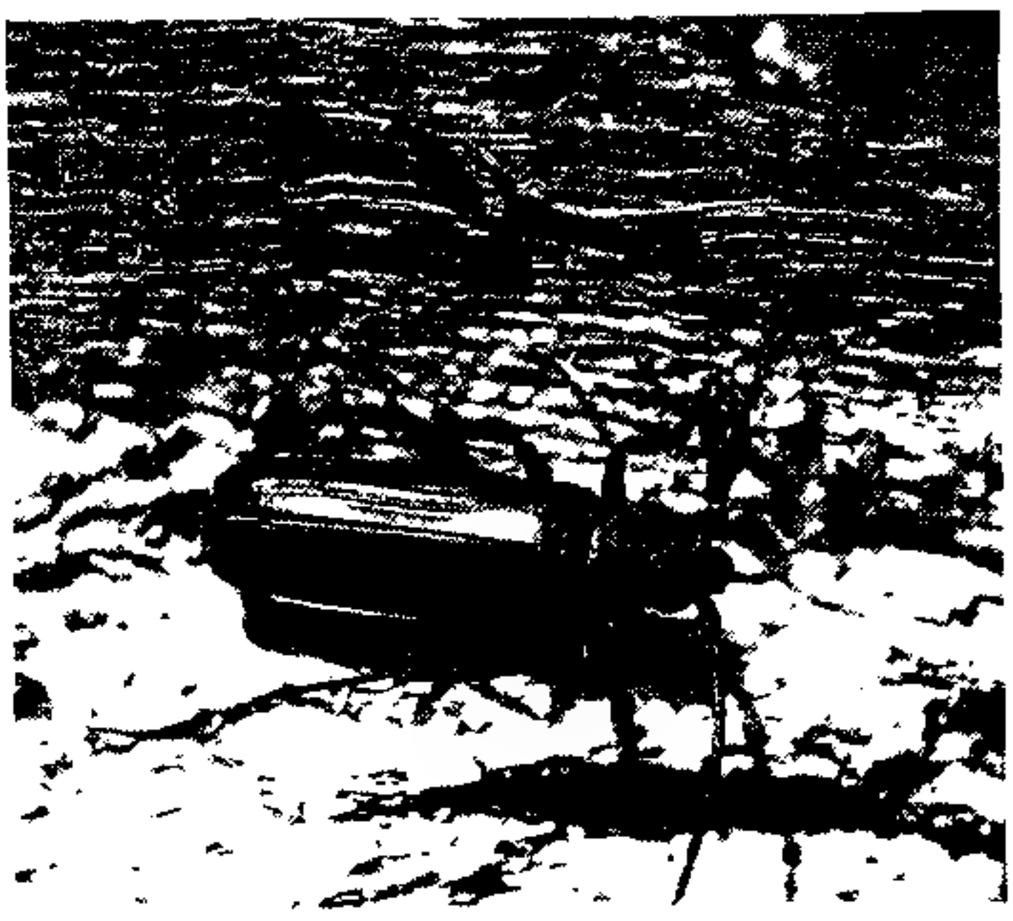
Full forest development has been retarded by several factors. Stone walls in present-day forests tell us of early farming which would have caused soil erosion on the sloping terrain of the Palisades. Fires have burned off the valuable organic soil elements and injured trees so that fungi and insects may enter the fire wounds. When large trees topple over, the support which they gave their fellows disappears and wind pushes the surrounding trees into the newly-formed openings. Hence a fallen tree is not always a dead tree. As they grow larger, many kinds of trees are

unable to find sufficient anchorage in the thin soil. Their roots, instead of pushing deep into the soil, encounter bed rock with a resultant shallow root system. High winds find it easy to uproot such trees as they become larger and heavier and more susceptible to the force of gravity. When such trees fall, they are broken down by various insect agents and fungi. The pileated woodpecker, giant of all northeastern woodpeckers, further helps this process by tearing four-inch chunks of wood out of dead or diseased trees to reach its insect food.

All this breakdown adds material to the thin soils of the Palisades. This thin soil is also a result of the decomposition of the Palisades diabase which weathers very slowly. Were it not for the extremely resistant rocks of the Palisades, there would be no famous cliff formations which represent one of the best and most evident sill formations in the world. Erosion would have leveled less resistant rocks and gentle hills would have replaced sheer cliffs.

As soon as the new Palisades Parkway is completed, Greenbrook Sanctuary will begin to develop new types of habitat in contrast to the predominant forest cover which clothes most of the Palisades. New species of plants and animals will invade the naturally landscaped border of the parkway. Already this invasion has started, as indicated by grain-eating birds foraging among the oats sown to prevent erosion on the road borders.

The completion of the Palisades Parkway will see the final stages of the development of a natural area and insure the importance of such tracts as Greenbrook Sanctuary, making it a permanent haven for a plant as rare as the yellow lady-slipper or for a bird as shy as the pileated woodpecker. A tired visitor will once again be able to refresh himself with a scene of natural and wild beauty. While he can not look down upon a tremendous, silvery run of fish migrating up the river to a vanished spawning ground as did the early redmen, he may gaze upon the Hudson and seek among the cliffs a shadbush that announces the return of spring to the Palisades—only twenty minutes away from New York City.



Fallen trees are broken down by various insect agents, such as the wood beetle.

Chrysanthemums On Trial

FOUR or five years ago, trials of new chrysanthemums were initiated at The New York Botanical Garden with chrysanthemum specialists from different sections of the country cooperating. This year the beds accommodated 110 varieties which were sent by such well known chrysanthemum growers as Totty's, Madison, N. J.; The Lehman Gardens, Faribault, Minn.; Jackson & Perkins, Newark, N. Y.; Bristol Nurseries, Inc., Bristol, Conn.; Wayside Gardens, Mentor, Ohio; Conard-Pyle Co., West Grove, Pa.; Styer's Nurseries, Concordville, Pa.; Yoder Bros., Barberton, O., and Vincent R. De Petris, Grosse Pointe Farms, Mich. Mr. De Petris was awarded the Bulkley medal of the Garden Club of America this past spring, for his work in hybridizing chrysanthemums.

These trial beds, as well as the extensive display borders of chrysanthemums near the conservatory, were visited by thousands of chrysanthemum enthusiasts and other interested spectators before and during the Sixth Annual Chrysanthemum Show and Program in October. This afforded a good opportunity to observe the particular characteristics of each variety — the form and color of the flower, the quality and texture of the foliage, the height and habit of growth of the plant.

1949 and 1950 varieties, as also several varieties to be introduced in the spring of 1951, have been on trial. Among the latter is a group that has been named after birds. Canary P.R.R., golden-yellow; Sea Gull P.R.R., white with creamy center; Grosbeak P.R.R., rose-pink with bronzy flush; Killdeer P.R.R., golden bronze; Swallow P.R.R., soft coral-pink opening into buff; and Tanager P.R.R., a cherry-red with very dark

Courtesy: The Lehman Gardens

Kathleen Lehman

Courtesy: Wayside Gardens

Bronze Cactus

green foliage. In breeding these new chrysanthemums, Jackson and Perkins have been especially interested in early blooming and frost resistance.

Other notable 1951 introductions are Nytoda, a single daisy type, and Totem of an unusual pink tone, by Vincent R. De Petris. Mr. De Petris is also the originator of Elizabeth Hood, a pink informal garden type which was named in honor of the chairman of the 1949 Chrysanthemum Show, Mrs. Vance R. Hood.

Fortune is new this year; it has flat-topped, bright yellow buds which develop into creamy white flowers with deep golden-yellow centers. Also worthy of note in the trial beds are Edith which bears a wealth of rose-purple blooms on a well-branched, sturdy plant; the bright Carmine Queen and Polaris, a buff-yellow; Frosty Morn, an early blooming, large-flowered, semi-double white; and October, a productive and vigorous plant with clear yellow flowers. This came into bloom on October 11.

Of the dozen or more new varieties introduced by Bristol Nurseries this spring, Masquerade, Moonbeams and Sincerity are definitely distinctive. Masquerade and Moonbeams both bloomed early in October; the first is silvery rose, the second a soft primrose-yellow. Sincerity is a white sport of Lavender Lady.

The orange-bronze Kathleen Lehman is one of Dr. E. J. Kraus' University of Chicago selections and introduced this year through The Lehman Gardens. This variety, along with Meditation, light jasper-red, Myrtle Walgreen, amaranth-purple, Patricia Lehman, geranium-pink, and the pure white Shalimar, all growing in the trial beds of The New York Botanical Garden, have performed well in eastern as well as midwestern states. Another good clean white chrysanthemum is Classic, originated by Yoder Bros.

Courtesy: The Conard-Pyle Co.

Edith

Courtesy: The Conard-Pyle Co.

Fortune

*Chrysanthemum Aristocrats**

Ernest and Aleita H. Scott

CHRYSANTHEMUMS have been our foremost hobby for eighteen years. We have complete records on about 500 varieties. Of these, a few, perhaps twenty-five, have been grown almost the entire period. Others have been grown continuously since their introduction, whereas most have been discarded after a few years' trial.

We do not like the expression "hardy chrysanthemum" A. F. Emberly, Ancaster, Ontario, writing in the June 1950 Bulletin of the National Chrysanthemum Society (American) puts this question well: "The hardiness of the chrysanthemum is a debatable question. This is not a matter of consequence, since the chrysanthemum planting is not permanent as in the case of the peony. For all practical purposes, the chrysanthemum should be treated as an annual" Experienced growers will agree. "Treating as an annual" means, of course, growing from top cuttings each spring, from stock wintered in coldframe or greenhouse.

With the elimination of the handicap of hardiness, any variety wanted for a special purpose may be grown if we meet its needs.

Nor must we forget that a very large portion of the country is not interested in hardiness. Varieties that thrive only under glass in the North do best outdoors in the South, Southwest and in California.

For continuous color in the perennial border, mums may be grown in a reserve plot and transplanted at blooming time. In such a reserve plot, any wanted variety may be forced into bloom by shading.

Few persons appreciate the great variety in size, form, and color of this most versatile of all flowers. The National Chrysanthemum Society recognizes fifteen main classes of chrysanthemums with respect to form and size. Other classes and subdivisions are possible.

A real enthusiast wants all types. Outdoor varieties are limited in our climate to singles, decoratives, pompons and spoons. The other types must be sought among the catalogs of the specialist chrysanthemum growers and among the commercial lists.

The beautiful odd-flowered types—the spiders, the quills, the threads—have been highly developed by the Japanese and by the West Coast breeders. These *must* be the favorites of the gardener, if they are to survive for they are poor shippers and unwanted by the trade. Some of the loveliest, all of which we grow outdoors, are: The Rayonnants, Peggy Hoover, the Witts, Albert and Bess, Paul Miller, and the pink spider, Marilyn.

Those who want only a few chrysanthemums in the fall are apt to be satisfied with the low, wide-spreading, colorful sorts. They are bred for border planting.

A section of the extensive trial beds of chrysanthemums at The New York Botanical Gardens. In the right-hand corner is the beautiful Snowfield, originated by A. E. Curtis.

Mrs. H. E. Kidder, a large yellow incurve, vigorous in growth and easy to winter over, introduced in 1930 by that greatest of all chrysanthemum breeders, the late Elmer D. Smith, Adrian, Mich., has been the favorite for two years in the poll of the National Chrysanthemum Society membership. Those who want Mrs. Kidder and later-blooming varieties of the same type will find a corner in the garden where a cel-o-glass or coldframe sash shelter may be erected for protection against rain, wind and early frosts. Here, with very little extra heat, late bloomers may be had until Christmas.

Too much emphasis is being placed upon newness of varieties. Any complete catalog lists many varieties that will serve a desired purpose. Let's explore these many wonderful varieties. Give them their requirements and be generous in their use, since their initial cost is so little compared to that of most other flowers.

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*Resume of the lecture given by Mrs. Scott at The New York Botanical Garden on October 28, 1950 during the Sixth Annual Chrysanthemum Show and Program.

Indoor Chrysanthemum Show at The New York Botanical Garden starts November 9, 1950, and continues for three weeks.

*Science in a Democracy**

Detlev W. Bronk, President
Johns Hopkins University

IN these times, when scientists are considered necessary for the preservation of our social order and the defense of our nation, it is essential that their objectives and the course of scientific progress be understood.

The primary and potent motive of a scientist is curiosity. Because of this, scientific inquiry is an intellectual adventure of individual scientists. This may seem obvious and undeserving of comment, but the free adventure of inquiring minds is considered by many to be a bothersome trait which has got us into much trouble from the days of the Garden of Eden to Hiroshima.

But scientific research will not, I think, flourish except in an atmosphere of intellectual freedom. No one directed Newton to discover the laws of gravitation nor restricted his freedom to think and speak about such matters. No group of social planners organized Faraday's discoveries of electro-magnetic induction to ease the labors of men. No one suggested to Roentgen that he discover X-rays for the diagnosis of human ills. No one instructed Willard Gibbs to pave the way for modern chemical industry. Great scientific discoveries will usually be suppressed by direction and restriction as would the creation of great music or poetry or sculpture and art. Scientific research is exploration of the unknown. It is not possible to direct the path of an explorer through unexplored territory.

We cannot emphasize too strongly the character and value of inquiring minds in these times, when fear goads many to intimidate those who are curious. We who value American ideals so highly need to do everything within our power to strengthen our security against the threats of totalitarian states whose ways we abhor. But I am persuaded that one of the vital elements of our national strength is freedom for intellectual inquiry and reasonable debate. The present danger to democratic freedom requires vigorous action rather than the paralysis of fear.

Because of these fundamental characteristics of the human mind and spirit, science will develop without regard for social consequence. But it would be unrealistic not to recognize that the course of science is profoundly influenced by its social consequences. Scientists are men and women who like other men and women are social creatures. They possess the natural, human instinct to achieve something of value for other individuals and for the improvement of the social system. If this is often not apparent, it is because scientists cannot predict the social value of adventures into the unknown realms of nature. But faith in the ultimate spiritual, intellectual and physical values of scientific investigation is a fundamental faith of scientists.

Some of the most important contributions of science to human welfare

have no obvious practical usefulness. By science we have been freed from the fear of natural forces that were mysterious and malevolent; we have been freed from slavery to ignorance and superstition. The pleasure which comes from an understanding of the beauties and forces of nature is a subtle value of science which extends the horizons of our intellect and enriches our lives. This will be, only if understanding of science, its meaning and its implications are better integrated with the humanities and social sciences in the pattern of our education and more widely disseminated through literature and the press. As President Conant emphasized before a New Haven audience some years ago, much of our education still deals with the results of science; there is little discussion of the methods and sequence of science. Until this defect is corrected, scientists may face popular demand that they mortgage their future usefulness by concentrating their efforts on the practical application of past discoveries. For the most manifest results of science are the changed material conditions of life. From the study of nature and the effects of natural forces, there has been derived the knowledge which now enables man to travel with undreamed-of speed in three dimensions; his range of speech has been extended to distant places; he has gained new powers over life for preservation and destruction.

Such changed relations of man to nature have profoundly altered the relations of man to man. Whether such changes, achieved or promised, will be translated into human welfare depends upon the integration of science in the total effort for the increase of man's well-being. The need for such a synthesis is accented by the rapid change of social structure induced by science. Science has made possible the production of new materials and new sources of power. But science has thus posed new problems regarding their distribution and utilization. Thus, there are raised new moral issues regarding human rights and human needs. The brilliant advances of medical science are clouded by economic doubts as to how they can be brought to benefit those who could be saved from pain and death. They raise new fears of over-population.

These are but instances you will readily multiply many fold which emphasize the new problems and conditions imposed on our social system by the progress of scientific knowledge. A primary social challenge of these times is the better utilization of scientific knowledge for the promotion of human welfare. We would be blind to the status of modern science, if we did not recognize its critics and opponents. Many are torn between fear of new horrors science may create and hope that science will build a better world.

Radio communication has become an instrument of propaganda and vicious power over the minds of men. But it is also an instrument for the free exchange of ideas which is the basis for mutual understanding; it is

a means for transmitting to many the best of music that could before be heard by few. The engines which drive planes and tanks for destruction carry people on peaceful missions and cultivate fields for the maintenance of life.

Science provides the building stones of a better world — but the world will be as we choose to make it. Accordingly, the closer union of the natural sciences with the social sciences and the humanities is a hopeful trend. For scientists are partners of many others who seek to improve man's well-being. Science liberates men from the fear of unknown natural forces, frees them from grinding toil for mere survival, subdues pain and cures sickness. Science thus enables men to enjoy art and music and literature and the beauties of nature and religious faith.

The effects of science and technology on the structure of civilization make difficult their integration into our culture. They pose new problems which must be solved, if we are to preserve basic democratic values.

A democracy is a government of the people by the people. If our technological civilization becomes so complex that few can understand the thoughts and actions of others, few will be able to fulfill their democratic function of intelligent self-government. If juries must pass on issues which involve scientific principles they do not comprehend, a traditional mechanism for the preservation of human rights will be endangered. If many delegate responsibilities without understanding the nature of the responsibilities they delegate, we will not have a true democracy.

But an understanding of science and its implications need not be restricted to a few, if scientists assume their responsibility as interpreters of science. This (Connecticut Agricultural Experiment) Station was a pioneer in the assumption of that function by the wide dissemination of scientific knowledge.

Francis Bacon foresaw that "Science can enlarge the bounds of human empire, to the effecting of all things possible, through a knowledge of the causes and secret motion of things". But scientists and science can give to those who would limit the bounds of human empire awful power over others. Because of this the progress and values of science are endangered by those who use scientists and science to achieve their selfish ends. To do so, they restrict the free statement of ideas and information. But science cannot flourish, if the discoveries and thoughts of scientists are the secret knowledge of a few. Science cannot increase the understanding and improve the welfare of all men and women, unless free access to knowledge is recognized as a fundamental human right. To deserve that right the peoples of the world must restore regard for truth and the democratic determination of individual and national action. The spirit of science will not long survive in a world half free to investigate, to speak and question;

(*Continued on page* 288)

An Experiment Station's 75th Anniversary

SCIENTISTS from many parts of the United States and from several European countries gathered together on September 28 and 29, 1950, to pay homage to the Connecticut Agricultural Experiment Station, which was celebrating its seventy-fifth anniversary. Celebrating the birthday of an idea—that science can be made useful to society, that science can be made practical and practice scientific—as Dr. James G. Horsfall, Director of the Station, said in his opening remarks at the afternoon session on the first day.

The steps which led to the founding of the Connecticut Agricultural Experiment Station began many years ago—back in 1855 when Samuel W. Johnson, a young chemist, was appointed to the Sheffield Scientific School. During his travels and studies in Germany, he had been impressed with the application of science to agriculture and the usefulness of the experiment stations. So he set to work, almost immediately upon his appointment, to enlist the interest of farmers individually and collectively, through their organizations, in an experiment station in Connecticut. Twenty years later, by act of the Connecticut General Assembly, the Connecticut Agricultural Station, the oldest in America and the forerunner of similar stations in practically every state in the Union, came into being as a corporate entity. The bill provided the sum of $700 per quarter to "carry on the appropriate work of an agricultural experiment station", which sum was increased two years later to $5,000 annually.

"Research is our business, discovery our product." In the intervening years, the scientists on its staff have lived up to this slogan of the Connecticut Agricultural Experiment Station. Among their many achievements, three have received national acclaim. In 1917, Dr. Donald F. Jones, geneticist, made the first double cross of corn plants. As a result of this method, enormous yields of America's No. 1 crop are now obtained on less acreage. Dr. George H. Shull, of the Carnegie Institute, Cold Spring Harbor, L. I., had already discovered the vigor of hybrid corn plants and his findings had been corroborated by Dr. E. N. East, of the Connecticut Station. However, their knowledge had not resulted in practical application, due to the fact that the inbred ears they had used as parent stock were expensive and impractical as seed sources. It remained for Dr. Jones to cross single hybrids, such as Dr. Shull and Dr. East had procured, and to obtain double cross hybrids high in quality and yield and economical as seed sources. 67,000,000 acres are grown annually in the United States alone by this method.

A project which Dr. Jones has well under way at this time is the development of male sterile inbred or "pollenless" corn, which does not

have to be detasseled in the crossing fields. Seed companies spend millions of dollars every year to detassel the seed parent rows in the crossing fields, where the hybrid corn is produced. The new male sterile inbred lines will reduce this expenditure materially, and at the same time will increase the yield, for in detasselling a blade may also be removed or injured—and that means the loss of an ear of corn. A factor for male sterility that is carried in the cytoplasm has been introduced into the seed parent inbreds, resulting in this "pollenless" corn. This factor for male sterility carried in the cytoplasm was discovered by Dr. Marcus M. Rhoades, a former member of the Board of Managers of The New York Botanical Garden. Early next year, we shall bring the story of Dr. Jones' application of Dr. Rhoades' theory to readers of the Journal of The New York Botanical Garden.

The Morgan method of "quick" soil testing, developed by Dr. M. F. Morgan in 1924, and the discovery of Vitamin A in 1913 are the other two outstanding contributions of the Connecticut Station. The discovery of Vitamin A evolved from an early protein research. Dr. Thomas B. Osborn of the Experiment Station and Prof. Lafayette B. Mendel, of Yale University, working together, discovered the existence of an unknown substance in butter fat without which animals refused to grow. This substance was later designated Vitamin A. Almost simultaneously, their former student, Dr. Elmer V. McCollum, working independently at the University of Wisconsin, discovered this same substance.

The publication known as the "Albany Cultivator" in the middle 1800's, later called "Country Gentleman", was a prime mover in arousing interest in and enlisting support for the establishment of the experiment station in Connecticut. Therefore, it was quite appropriate that the present editor of "Country Gentleman", Arnold Nicholson, should answer the question "Why an Agricultural Experiment Station?" Space permits the presentation in these pages of only three paragraphs from Mr. Nicholson's interesting address:

"It would be hard to find, in history's pages, a development as perfectly matched to the times as the flowering of the agricultural experiment station idea in the last quarter of the 19th century. That was when we built the foundation for the industrial might that makes this nation great today; and our complex of iron and steel, steam power and transportation grew on the release of manpower from the land. Science and mechanical invention were the means for that release.

"The year this station was established, 75 years ago, there were eight Americans employed directly in agriculture for every ten in other pursuits. That figure had not changed greatly from Colonial days, when 19 to 20 was the ratio. By 1917 only one in four owed a living to agriculture, and today the figure is one to fourteen and a half."

(*Continued on page* 288)

REVIEWS OF RECENT BOOKS

Grassland Farming—primarily for the South

PASTURES. Robert R. Lancaster; Edwin James; Richmond Y. Bailey; Roland Russell Harris. Edited by Paul W. Chapman. 500 pages, illustrated, indexed. Turner E. Smith, Atlanta, Ga. 1949. $2.96.

The wide variation in soils and climate, with the attendant effect on crop adaptations and general farming practices, makes it impossible to write an agricultural text that would embrace the entire United States. Leaving out the technical phases, a book of such scope would be a cumbersome vehicle of knowledge. However, it is possible to contain in one volume general basic principles and to include specific information regarding any one section of the country. "Pastures" is such a book, primarily for southern agriculture, written in simple understandable language.

It is basically a discussion of grassland farming. The general principles are sound, logical and generally applicable. Some of the crop plants are well known to northern agriculture. Many have significance only for the agriculture of southern United States or other areas having similar soil and climatic conditions.

The brief description of various forage plants is useful information to any student of agriculture. The principles involved in making high quality hay or grass silage are acceptable in any agricultural area. However, many practices described could not be applied in detail in areas other than the South.

Considerable space is given to discussion of winter pastures and grazing systems. Rotated pasture is a term used to designate pasture land as a part of the crop rotation. It is highly recommended. This practice would not have general application to sections of the country with an abundance of good permanent pastures and conditions favorable for growing cash crops. Rotation grazing is construed to mean the moving of grazing animals from one section of pasture to another, thus allowing a one or two months' rest period for each area grazed. The expressed conclusion that this system has no advantage over continuous grazing is not the experience of farmers in many other sections of the country.

There will not be universal agreement that "Agronomists have delighted in making alfalfa a hard plant to grow". The authors' attempt to correct some "false impressions" such as "It is difficult to get a good stand" does not make sense, except as it applies to land well suited to the crop. A greater proportion of the soils are less than favorable for good stands, so a word of caution is in order.

HOMER B. NEVILLE, *Senior Instructor, Long Island Agricultural Institute.*

Evolution in the Light of Modern Genetics

FACTORS OF EVOLUTION. I. I. Schmalhausen. 327 pages, illustrations, bibliography, index. Translated by Isador Dordick, edited by Theodosius Dobzhansky. The Blakiston Co., Philadelphia. 1949. $6.

The last decade has seen a whole series of stimulating books which discuss evolutionary problems in the light of modern genetics. Dobzhansky, Mayr and Simpson have been widely read by botanists as well as zoologists; Ledyard Stebbins' new book concentrates on the botanical evidence. To this group may now be added Schmalhausen, whose interesting and illuminating ideas have been limited to those few who could read his papers and books in the original Russian or Ukrainian. Though an occasional illustration is taken from plants (his father, we learn, was a professor of botany at Kiev), his illustrative material and his analytic discussion are largely limited to the animal kingdom. Nevertheless, the ideas advanced in his concluding chapter on Rates of Evolution should prove quite as stimulating to botanists as to zoologists.

The following isolated quotations present the skeleton of his theory. "The rate of evolution is determined always by the position of the organism in its environment, in other words by the condi-

tions of its struggle for existence." "The presence of a passive means of defense and especially a general passivity, such as a sedentary mode of life, does not aid progressive evolution." "Among the lower, more passive forms, when general elimination predominates, mutual competition chiefly raises fecundity, accelerates development, and increases the rate of reproduction; when the struggle for existence is more active the organization itself and its diverse reactions acquire greater importance."

All of which would serve to explain, among other things, the much greater rates of evolution in animals than in plants. The book has an interesting bibliography, author and subject indices, and a three-page explanatory foreword by Dr. Dobzhansky.

EDGAR ANDERSON,
Missouri Botanical Garden.

APPLES AND APPLE PRODUCTS. Vol. II, Economic Crop Series. R. M. Smock & A. M. Neubert. 486 pages, illustrated, indexed. Interscience Publishers, New York and London. 1950. $7.80.

This is the second of a series of monographs on the chemistry, physiology and technology of food and food products, the first having dealt with bananas. The series is edited by Dr. Z. E. Kertesz, of the New York State Agriculture Experiment Station, Geneva, New York.

The book is unique in its field and will fill a long felt need. It succeeds in bridging the gap between those interested in production and those interested in utilization It covers not only the chemistry, physiology and processing of the apple, but also such aspects of fruit behavior and treatments prior to harvest as may affect behavior after harvest.

The first 93 pages deal with the history and distribution of the apple, varieties, development and structure of the fruit, environmental and cultural factors affecting chemical composition and physiology, and chemical changes and physiology of apple fruits on the tree. The next 148 pages treat of chemical changes and physiology of the fruit after harvest, maturity and quality, pre-storage treatment, and storage. The remainder of the 450 pages of the text discuss manufacture of apple products, including drying, canning, freezing, juices, syrups and pomace.

The book is documented with 906 references, which are inserted as convenient footnotes to each page. Remarks on government regulations, a brief statistical appendix, and an adequate index complete the volume.

The publication should have a wide appeal as a text and as a reference.

H. B. TUKEY,
Michigan State College.

CALENDARS AND HANDBOOKS: The Flower Arrangement Calendar by Helen Van Pelt Wilson ($1.00—M. Barrows & Co.) and Flowers of America Calendar ($1.25 —Hastings House) are attractively gotten up, with covers in color and good black and white illustrations within their pages. Both provide space for recording engagements. The American Herb Calendar (50c—The Herb Grower Press) is pleasingly illustrated and presents delightful quotations—on herbs, of course.

"IT'S EASY TO GROW HERBS" (reprinted 1950, 50c, Herb Grower Press) is a reliable handbook on growing, drying and cooking with herbs.

"UNCOMMON WILD FLOWERS" by Dr. John P. Hutchinson (Allen Lane, Inc., Baltimore, 65c) will appeal to all who are seriously interested in wild flowers. Since his retirement as head of the Botanical Museums' Department at the Royal Botanic Gardens, Kew, Dr. Hutchinson has traveled widely through the British Isles, and he drew many of the more than 200 black and white illustrations from living plants. The little book, paper bound, also has 32 photographs by Robert Adam.

Notes, News and Comment

Meetings. Dr. William J. Robbins attended the annual meeting of the Editorial Committee of the Annual Review of Plant Physiology held in Columbus, Ohio, Sept. 10 - 13. On the 30th of the month Dr. Robbins attended a meeting of the National Academy of Sciences at Washington, D.C. T. H. Everett, Horticulturist, attended the dedication of the Berkshire Garden Center at Stockbridge, Mass., on Sept. 21.

Dr. William J. Robbins and Dr. B. O. Dodge attended the annual meeting of the National Academy of Sciences held at the General Electric Laboratory in Schenectady, N. Y., on October 10 - 12. Dr. Robbins presented a paper on "Studies on *Euglena* and Vitamin B_{12}", which he had prepared with the assistance of Dr. Annette Hervey and Miss Mary E. Stebbins.

Lectures. Mr. E. J. Alexander spoke before the Garden Club of Yorktown, an affiliate, on Sept. 20, on "Plant Collecting in Mexico." Another affiliate, the Riverdale-on-Hudson Garden Club, heard Dr. H. N. Moldenke speak on "Trees of New York City" in the Members' Room on Sept. 30. Dr. Donald P. Rogers lectured before two affiliates—The Little Gardens Club of New York City on Oct. 2, on "Mushroom Collecting as a Hobby" and the Litchfield Garden Club on Oct. 5, on "Fungi and Their Place in Nature." Dr. Moldenke was guest speaker at the annual dinner of the Wachung Nature Club on October 18—his topic was "In Search of Flowers".

Advisory Council. Dr. William J. Robbins addressed the members of the Advisory Council at their meeting on October 18. Miss Elizabeth Hall, Librarian, informed them about recent gifts and bequests to the library. After the meeting, the members of the Council toured the grounds and gardens in the tractor train, the *Floral Flyer*.

Luncheon. The Board of Directors of the Bronx Chamber of Commerce were guests at luncheon on October 23 at The New York Botanical Garden, following which they toured the buildings and grounds.

Chrysanthemum and Harvest Exhibit. The Pegasus Garden Club held a chrysanthemum and harvest exhibit at 26 Broadway, New York City, on October 16, with classes open to all employees and their families of Socony-Vacuum and Standard-Vacuum. F. E. Powell, Jr., member of the Board of Managers of The New York Botanical Garden was show chairman and T. H. Everett, Horticulturist, was one of the judges.

Conducted Tours. The Volunteer Associates of The New York Botanical Garden and the Volunteer Services of United Nations are cooperating in providing conducted tours of The New York Botanical Garden for members and guests of the U. N. The first of these tours occurred Sunday afternoon, October 29.

Dr. Stout Returns. Dr. A. B. Stout has returned from Lompoc, Calif., where he was consultant to W. Atlee Burpee Seed Company in its plant breeding work. He spent five weeks sightseeing on his return trip, visiting universities and botanical gardens. On October 5, Dr. Stout lectured to the staff and students of the biology department of the University of Chicago on "Types of Intraspecific Incompatibilities in Reproduction"

Radio. T. H. Everett, Horticulturist, and Irene Hayes, prominent florist of New York City, discussed flowers and art in a fifteen minute broadcast from 5:30 to 5:45 p.m. October 17, over station WNYC for the National Art Festival. The same week E. J. Alexander had a radio interview with Guy Roop, of Ballinger and Roop, interior decorators, on wild flowers and their use for table settings of old porcelain and glass. This broadcast was also in connection with the National Art Festival.

The Misses Eileen Kirkland, Bride McSweeney and Helen Flon were interviewed about their work at The New York Botanical Garden by Harry Marvel on the "Hits and Misses" program, WCBS, 5:30 - 6 P.M., October 16.

Television. T. H. Everett gave a talk on the Chrysanthemum Show and Program at The New York Botanical Garden, on Dorothy Daum's Vanity Fair hour, 4:30 o'clock, October 23, on Channel 2, CBS.

Field Trip. On October 9, Dr. H. N. Moldenke led a field trip for the Torrey Botanical Club and John Burroughs Memorial Association to "Slabsides," rustic retreat at West Park, along the Hudson, of the late John Burroughs.

Dr. P. P. Pirone viewed the crabgrass control experimental work conducted by Cornell University research men at Piping Rock Country Club, Long Island, on Sept. 22.

"Blue Amaryllis". Sir Henry Joseph Lynch of Rio de Janeiro called at The New York Botanical Garden on his return from England where he had visited Kew Gardens to see the "blue amaryllis," *Hippeastrum procerum.* He made a special trip from Washington, D.C., for the purpose of viewing the "blue amaryllis" here and is now on his way to Santa Barbara, Calif., to inspect those growing at La Positas Nursery.

Sir Henry successfully grows over 600 of this Amaryllid (using some for cutting), in a bed of broken granite debris, but said that the bulbs are accustomed to considerable winds and plenty of air circulation and will even stand some frost. He approved of the cool treatment accorded them here at The New York Botanical Garden as described in the article by T. H. Everett in the October issue of the Journal of The New York Botanical Garden.

It was through the generosity of Sir Henry that bulbs were received at Kew Gardens, La Positas Nursery and The New York Botanical Garden.

Visitors. During September, Dr. Erik Rennerfelt of the Forest Research Institute of Sweden, Dr. and Mrs. Brian O. Mulligan of the University of Washington, Seattle, and Dr. R. Bieter of the University of Minnesota, came to see Dr. Robbins and toured the laboratories.

Other recent visitors to The New York Botanical Garden have been: Dr. S. H. Hutner, of Haskins Laboratories; Dr. R. Brown of Yale University; Mr. Hideo Kubo, Chief of Streptomycin Production Plant, Scientific Research Institute, Ltd., of Tokyo, Japan; Dr. Aage Bohus-Jensen, Lyngby, Denmark; Dr. William Bridge Cooke, State College of Washington; Dr. Gladys E. Baker, Vassar College; Mrs. Inez M. Haring, Asst. Honorary Curator of Mosses; Dr. D. V. Baxter, University of Michigan, and Dr. G. W. Martin, University of Iowa, returning from Stockholm; Mary Elizabeth Hooper, Elmira College; Joseph Ewan, Tulane University; Ahmed Afifi, Royal Agricultural Society, Cairo, Egypt; R. Brown, University, Leeds, England; K. G. Coupland, University of Saskatchewan; M. Cristina de Mella and Renato Goncalvos, Nova Goa, India; George Gorin, New Brunswick, N. J.; Aubrey W. Taylor, Osborn Botanical Laboratory, Yale University; M. J. R. de Pinol, Guatemala; Rev. Ariya Dhamma, Thera, Burma; Norma and Gerald Braver, University of Missouri; Dorothy Braver, Brooklyn College; Clyde Eddy, Cobbs Creek, Mathews Co., Va.; D. R. Stevens, Holly Springs, Miss.; Mrs. M. R. Battersly, St. Andrews, Fife, Scotland; and Lindsey S. Olive, Columbia University.

Plant Explorer missing: F. Kingdon-Ward, British explorer, author and botanist, and his wife were reported to be trapped somewhere in Assam by the earthquake of August 15. Mr. Kingdon-Ward has made several trips into the interior of Tibet and a three-year expedition through West China and southeast Tibet.

Merritt L. Fernald

Professor Merritt L. Fernald, former curator and director of the Gray Herbarium at Harvard University and a leading authority on the flowering plants of the northeast, died on Sept. 22 at the age of 79.

Dr. Fernald retired as Fisher Professor of Natural History in 1947. His major recent work was rewriting and expanding Asa Gray's classic *Manual of Botany.*

Dr. Fernald was born at Orono, Me., and after being graduated from Harvard, joined the Gray Herbarium in 1891. He became its curator in 1935 and its director two years later. He retired from the directorship in 1947.

He was associate editor of "Rhodora", the journal of the North East Botanical Club, from 1898 to 1928, and became its editor-in-chief in 1929. In 1940, the Academy of Natural Sciences awarded him

the Leidy Medal for outstanding work in botanical studies of the northeastern United States. He wrote more than 750 articles and monographs on botanical subjects and was the author, with Alfred C. Kinsey, of *Edible Wild Plants of Eastern North America,* published in 1943, which was described by reviewers as "the most comprehensive and authoritative treatment of the subject."

Dr. Fernald was honorary president of the International Botanical Congress at Stockholm this past summer. He was a fellow of the American Academy of Arts and Sciences, a former president of the Botanical Society of America, a vice-president of the American Association for the Advancement of Science; also a former president of the American Society of Plant Taxonomists and the North East Botanical Club.

Science in a Democracy

(*Continued from page* 280)

half slave to prejudice and dictation. These are basic issues which our nation faces. The survival of undistorted science, uncontrolled except by experimental test and reason, depends upon victory for democratic freedoms in this great conflict of ideals.

Abraham Davenport, a graduate of Yale of the class of 1732, was a staunch patriot during the Revolution. A member of the council in Hartford on that dark day in 1780 when it was proposed to adjourn, as some thought the day of judgment was at hand, he objected, saying: "That day is either at hand or it is not; if it is not, there is no cause for adjournment; if it is, I choose to be found doing my duty. I wish therefore that candles may be brought."

With these words, Dr. Bronk closed his inspiring address, suggesting that we keep alight the candles of scientific investigations in whatever dark days may be ahead.

*From the address which Dr. Bronk delivered at the 75th anniversary of the Connecticut Agricultural Experiment Station.

An Experiment Station's 75th Anniversary

(*Continued from page* 282)

"This examination of the question 'Why An Agricultural Experiment Station?' in the light of present conditions could not conclude without looking beyond our borders. Whether we like it or not we are today a world power, and the fortress for free men everywhere. Authorities who should know have reiterated that one of the golden keys to democracy is an ample food supply. We, as a nation, cannot feed the world. But we can, and should, and already have begun, to export Professor Johnson's great idea and our technical help to aid free men in other lands. To quote him:

> 'Science is from its nature peculiarly adapted to flourish among, and to make flourish a free and aspiring people. Science is not necessarily an aristocracy of intellect that condescends to dole out the crumbs of knowledge to the common herd, but is an organization of all available forces for the pursuit of knowledge.'"

That evening, in the Yale Law School Auditorium, Dr. Detlev W. Bronk, President of Johns Hopkins University, also President of The National Academy of Sciences and chairman of the National Research Council, gave an address on "Science in a Democracy". Dr. Bronk's address is of such great significance to all interested in scientific pursuits that it is published, in part, elsewhere in this issue.

On the afternoon of September 29th, a symposium on "The Research Institute in Modern Society" was led by Dr. Edmund W. Sinnott, Director of Sheffield Scientific School and of the University Division of Sciences at Yale University, as moderator. Dr. Sinnott, one of the nation's outstanding botanists, served on the Board of Managers of The New York Botanical Garden from 1933 to 1940. Mr. George O. Curme, Jr., Vice-president in charge of chemical research of the Union Carbide and Carbon Corporation, presented "Industrial Research"; Dr. Selman A. Waksman, Chairman of the Microbiology Department of New Jersey Agricultural Experiment Station, "Governmental Institutes"; Dr. Alexander Wetmore, Secretary of Smithsonian Institute, "Endowed Institutions"; Dr. Sinnott, "Universities".

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evated to the Botanical Garden or the 200th St

PUBLICATIONS OF THE NEW YORK BOTANICAL GARDEN

Books, Booklets, and Special Numbers of the Journal

An Illustrated Flora of the Northern United States and Canada, by Nathaniel Lord Britton and Addison Brown. Three volumes, giving descriptions and illustrations of 4,666 species. Second edition, reprinted. $15.

Flora of the Prairies and Plains of Central North America, by P. A. Rydberg. 969 pages and 601 figures. 1932. $6.

Plants of the Vicinity of New York, by H. A. Gleason. 284 pages, illustrated. A handbook especially compiled for the beginner. 1935. Second edition 1947. $2.

The Bahama Flora, by Nathaniel Lord Britton and Charles Frederick Millspaugh. 695 pages. Descriptions of the spermatophytes, pteridophytes, bryophytes, and thallophytes of the Bahamas, with keys, notes on explorations and collections, bibliography, and index. 1920. $6.25.

North American Cariceae, by Kenneth K. Mackenzie, containing 539 plates of *Carex* and related plants by Harry C. Creutzburg, with a description of each species. Indexed. 1940. Two volumes, 10¾ x 13½ inches; bound $17.50. Foreign postage extra.

Keys to the North American Species of Carex by K. K. Mackenzie. From Vol. 19, Part 1, of *North American Flora.* $1.25.

Plants of the Holy Scriptures, by Eleanor King, with a check-list of plants that are mentioned in the Bible, each one accompanied by a quotation. Revised from the Journal of March 1941. 23 pages, illustrated. 1948. 25 cents.

Food and Drug Plants of the North American Indian. Two illustrated articles by Marion A. & G. L. Wittrock in the Journal for March 1942. 15 cents.

Vegetables and Fruits for the Home Garden. Four authoritative articles reprinted from the Journal, 21 pages, illustrated. Edited by Carol H. Woodward. 1941. 15 cents.

The Flora of the Unicorn Tapestries by E. J. Alexander and Carol H. Woodward. 28 pages, illustrated with photographs and drawings; bound with paper. 1941. Second edition 1947, reprinted. 25 cents.

Catalog of Hardy Trees and Shrubs. A list of the woody plants being grown outdoors at the New York Botanical Garden in 1942, in 127 pages with notes, a map, and 20 illustrations. 75 cents.

Succulent Plants of New and Old World Deserts by E. J. Alexander. 64 pages. indexed. 350 species treated, 100 illustrated. Bound in paper. 1942. Second edition 1944. Third edition 1950. 50 cents.

Review of Juniperus chinensis, et al by P. J. van Melle. A study of the many varieties and forms of *Juniperus* which have been commonly included in the concept of *J. chinensis.* 108 pages, illustrated, bound in paper. 1947. $2.

Periodicals

The Garden Journal of The New York Botanical Garden, designed to stimulate interest in the world of plants and the science of plant life, will contain non-technical articles on botanical, horticultural and kindred subjects: also special departments—book reviews, questions and answers, news and comments. $2.00 a year, 35c single copy. First issue, January-February 1951.

Addisonia, devoted exclusively to colored plates accompanied by popular descriptions of flowering plants; eight plates in each number, thirty-two in each volume. Now in its twenty-second volume. Published irregularly. Subscription price, $10 a volume. Not offered in exchange. Free to members of the Garden.

Mycologia, bimonthly, illustrated in color and otherwise; devoted to fungi, including lichens, containing technical articles and news and notes of general interest. $7 a year; single copies $1.50 each. Now in its forty-second volume.

Brittonia. A series of botanical papers published in co-operation with the American Society of Plant Taxonomists. Subscription price of volumes 1 through 5, $5 a volume ($4 to members of the Society). Now in its seventh volume. Price, $7.50 ($5 to members of the Society).

North American Flora. Descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 97 parts now issued. Not offered in exchange. Prices of the separate parts on request.

Contributions from The New York Botanical Garden. A series of technical papers reprinted from journals other than the above, 1899-1933. 25 cents each, $5 a volume. List of separate titles on request.

Memoirs of The New York Botanical Garden. A collection of scientific papers, 1900-1927. Contents and prices on request.

JOURNAL

OF

THE NEW YORK BOTANICAL GARDEN

DECEMBER

1950

IN THIS ISSUE:

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THE NATIVITY

This issue closes Volume 51 of the Journal and marks the end of its publication. We are proud of its traditions and accomplishments.

In January 1951, ***The Garden Journal** of the New York Botanical Garden* will make its initial appearance. This new publication, different in style and format, will retain the policy and best features of the Journal; at the same time, it will attempt to interpret botany and horticulture in the modern trend —simply, authentically, interestingly.

CHRISTMAS SHOW IN THE CONSERVATORY

Starts December 22, 1950

House No. 6—A replica of the courtyard of the inn at Bethlehem at the time of the Nativity, with part of the inn and stable in evidence. The plant material will include plants specifically referred to in the Bible.

House No. 4—A colorful display of Christmas plants.

FRONT COVER ILLUSTRATION

The Nativity by Sandro Botticelli (1444-1510); the original is hanging in The National Gallery, London.

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DOROTHY EBEL HANSELL, Editor

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Plants that Figure in Christmas Tradition and Decoration

Helen M. Fox

A FEW days before Christmas, when the housewife in present-day United States ties a wreath of holly on her front door, drapes garlands of ivy or sprays of pine around her mantlepiece and decorates her tree, she is continuing a practice that started before the days of written history. For Christmas is the latest version of the festival of the lengthening day, at the winter solstice, a festival that existed long before the coming of Christianity.

The day or week or twelve days were observed in the Near East by sun worshippers whose god was Mithra and by the Jews at their Hannukah; in Italy and North Africa by the Romans at their Saturnalia and also at the festival to celebrate the Kalends; in France and England by the Druids; and by the people of northern Europe, to mention only a few. Lights were lit because the festival was originally in honor of the sun-god who was being born anew after the long winter night. Plants were made into wreaths and bouquets for their beauty and association, presents were exchanged, and there was feasting and drinking.

When people who believed in primitive religions were converted to more spiritual beliefs, since they continued to live in the same villages, situated on the same seacoast or valleys and surrounded by the same plants, moreover since they continued to follow the same ways of life, whether it was to pasture their sheep, cultivate the soil or sail the sea in ships for foreign trade, they naturally continued to celebrate the changing phases of the moon and sun, the bringing in of the harvest or sowing of crops with the customary ceremonies. The very buildings in which they worshipped were erected on sites of previous holy buildings. Today sailors worship the Virgin in a church in Marseilles which stands on the spot where sailors of ancient Greece worshipped Diana in her temple. The cathedral at Cordoba was originally a mosque, built on a site that had been a Roman temple and a Visigothic church.

Under these circumstances, it was difficult for the priests of a new religion to prevent the practices of the old. The Old Testament is full of this struggle, written in the very first of the ten commandments, "Thou shalt have no other gods before me". Some of the priests accepted this following of folkways as natural and inevitable; St. Augustine exorted the Christians of his day not to celebrate the Christmas as a festival of the sun, but like Christians in honor of Him who had made the sun. Others tried to stem the old observances and there were many edicts of early church councils on the subject. One edict condemned the use of holly, ivy and other evergreens at Christmas for decorations, because they had been used by heathens. To this day in parts of England, ivy is kept for decorating the outer passages and doorways of homes and churches; and it is not considered suitable to put mistletoe inside a church.

James Fraser, in the *Golden Bough*, says in the Julian calendar the twenty-fifth of December was the winter solstice and the birth of the sun: That this nativity was celebrated in Syria and Egypt, where the new born sun was represented by the image of an infant: That the Gospel says nothing about the day of Christ's birth and the early church did not celebrate it. In time, however, the Christians of Egypt came to regard the sixth of January as the date of the nativity and commemorated the birth on that day. This custom continued in the East until the fourth century; but in the West, December twenty-fifth had been adopted as the true date at the end of the third and beginning of the fourth century and in due time this date was accepted by the eastern church as well.

The most important decoration in the church at Christmas is the creche, with its representation of the birth of Christ. At Bethlehem the manger is said to have had a mattress of bedstraw, *Galium verum*, a fragrant herb with yellow flowers, which yields a dye, used at one time to color butter and cheese. In some parts of Italy it was customary to deck the manger with moss, broom, or sowthistle, *Sonchus oleraceus*, the last a coarse weed eaten in a salad or cooked as a green and having decided medicinal virtues, among them being a cure for the opium habit. Cypress and prickly holly were also used and the boughs of Juniper, *Juniperus communis*. This plant grows to twenty feet high and was reputed to have sheltered the Virgin and her Child when she was fleeing to Egypt pursued by Herod's soldiers.

The juniper had an important place in magic of earlier people but was taken over by the Christians, as were flowers sacred to Juno, Venus and Diana, and the Scandinavian Bertha and Freja which were bestowed upon the Madonna. Today, in Italy, stables are protected from demons and thunderbolts by hanging up a sprig of juniper. In Italy, too, children lay gifts of chestnuts, apples, tomatoes and other fruits at the creche, a survival of sacrificial gifts. Mrs. Rosetta Clarkson in *Magic Gardens,*

Adoration of the Shepherds by Andrea Mantegna (1431-1506). Courtesy of The Metropolitan Museum of Art.

says of the creche, Sicilian children placed penny royal among the evergreens there and believed that exactly at midnight of Christmas Eve its flowers opened.

The most striking plants at Christmas are the Christmas trees. Nowadays they stand in the main squares of most of our cities lit with colored electric lights; while in every home where there are children, there is a tree either indoors or out, large or small, and decorated with lights, ornaments and gifts.

The tree, the most superb plant in nature, was worshipped by primitive people. In Indian mythology, according to the Angelo de Gubernatis in *Mythologie des Plantes* the sun god is the generator of the anthropological tree. The feminine element is represented by water and the masculine by fire; the moon and the lunar tree preside over water and govern women; the sun and solar trees preside at fires and give birth to heroes. The solar tree of Christmas gives birth to Christ, the Savior. This Christian legend developed from the pagan myth.

There were beliefs in northern countries that every Christmas Eve apples and other trees blossomed and bore fruit and again that on Christmas Eve all the trees in the forest bloomed. Because of these beliefs,

perhaps, cherry and hawthorne trees were cut and forced indoors in pots to bloom at Christmas. Since they worshipped trees, primitive people decorated them. Arabians hung objects on date palms; in northern countries the May pole, representing a tree was garlanded, and at Christmas evergreen trees were ornamented with candles, flowers and ribbons. In southern England, farmers salute the apple tree on Christmas Eve, while German peasants tie fruit trees together with straw ropes to make them bear fruit, saying the trees are married.

The tree most frequently used for Christmas in modern United States is the spruce. In olden days it was the pine which, oddly enough, was sacred to Bacchus. The pine, too, was one of several woods reputed to have been part of the cross on which Christ was crucified.

In olden days, the Yule-log figured in Christmas celebrations, especially in continental Europe and Great Britain, where Christmas was known as Yule-tide, Yule-log and Christmas-log. The feast of Yule, or of mid-winter, was sacred to Odin and lasted twelve days. The Yule-log was a heavy block, generally of oak but sometimes of ash, and was fitted into the floor of the hearth where, though it glowed under the fire, it was hardly reduced to ashes within a year. When the new log was to be laid, the remains of the old one were ground to a powder and strewn over the fields during the Yule time. Sometimes the log was tied in a sheaf of grain cut at harvest time; again the log was drawn from the fire as soon as it had been slightly charred and put back again whenever a thunder-storm broke, because it was thought lightening would not strike the house while the Yule-log was smoldering.

In Italy, the log was called "ceppo" and in France "trefoir", where it was kept under the bed for a year. Besides protecting the house from fire and thunder, it was thought in this position it prevented the inmates from having chilblains on their heels in winter.

One record of greens used at Christmas in Tudor and Stewart England is a verse from a poem by Robert Herrick:

"Down with Rosemary and Bays
Down with the Mistletoe
Instead Holly now upraise
The greener Box for show.
Wherewith ye dressed the Christmas hall,
That so the superstitious
No one least branch left behind;
For look, how many leaves there be
Neglected there, maids, trust to me,
So many goblins you shall see."

Other greens associated with Christmas were laurel, ivy, broom, the Rowan tree and elder.

Rosemary is a low shrub, its twiggy branches thickly covered with short linear leaves, grey underneath, and giving forth a distinctive pleasant fragrance. It is native to the Mediterranean but hardy in countries where winters are not too severe. The pale blue flowers appear in January and February. It is said the flowers were originally white but the Virgin spread her mantle to dry over the bush and they turned blue. In Spain it is believed the rosemary is one of the bushes which gave shelter to the Virgin Mary on her flight into Egypt. Another belief, there, is that the plant is potent against witches.

Rosemary has been valuable as an herb since early days when it was described by Pliny and Dioscorides. Its flavor improves certain dishes in cooking, while its fragrance adds to the pleasure of perfumes, toilet waters and pot pourris. Because it is supposed to strengthen the memory, it has become the emblem of fidelity for lovers and has been employed as a decoration at weddings and funerals and, undoubtedly because of its fragrance, has been chosen to decorate churches and banqueting halls.

A gilded rosemary branch, together with an orange stuck full of cloves, was a new year's gift according to Mrs. Grieve in the *Modern Herbal*. At Christmas, writes Eleanour Rhode, houses and churches were lavishly decorated with rosemary and in churches not only were columns garlanded with it but the floor was commonly strewn with small twigs of the herb. Miss Rhode also says it was customary for the boys of Ripon cathedral to bring gifts at Christmas of red apples stuck with sprigs of rosemary.

The poet Thomas Brown wrote

"Where Bays still grow (by thunder not struck down)
The Victor's garland and the Poet's crown."

Two plants might be meant when the word "bay" is mentioned. These could be either *Myrtus communis* or *Laurus nobilis*, neither of which is hardy in cold climates. Myrtus is a leafy green shrub to ten feet high; its leaves, one to two inches long, have a strong scent. It comes in several forms and is native to southern and eastern Europe. Myrtus was considered sacred to the Goddess of love.

Laurus is called *communis* by W. J. Bean in *Trees and Shrubs Hardy in the British Isles* and *nobilis* by Alfred Rehder in *Manual of Cultivated Trees and Shrubs*. The plant is sometimes called laurel. It is a tree from twenty to forty and even to sixty feet high, sometimes pyramidal in shape and lends itself to shaping in topiary. Leaves, three or more inches long, are fragrant when crushed and used to flavor cooking. The oil gives fragrance to perfumery. The branches were gilded, along with rosemary, for wedding decorations.

Jupiter had a special regard for bay and hence its potency against thunder. It adorned the statues of Aesculapius because of its medicinal

virtues. The leaves made crowns for triumphant heroes. Bean says this is the true laurel of the ancients and mentions the term "bachelier", given to recipients of degrees in France similarly as "bachelor" in the United States, comes from *bacca laureus* which means laurel berry.

Reams of paper have been covered about the mistletoe, *Viscum album,* the yellowish green, evergreen and parasitic shrub with greenish white or yellowish berries. The plant was sacred to the Druids and, according to Pliny, when it grew on an oak it was a sign that God had chosen the tree. The Druids thought the mistletoe a charm against witches and sorcerers and endowed with the power of revealing treasures in the earth. They decorated their dwellings with it as with holly, so that the beneficent spirits of the forest might find shelter there during cold winters. They also attributed curative properties to the mistletoe, which they distributed to the worshippers. A potion prepared from the plant was thought to render barren animals fertile and to be a remedy against poison. In this regard, modern chemists say the glutinous substance prepared from the berries produces vomiting and purging when taken in large doses.

It was also believed that mistletoe must not touch the earth or a national disaster would occur. Perhaps that is why it is suspended from some high object in decorations. The Druid priests cut it with a golden knife and caught it in a white cloth. Balder, the Norse God, was killed by mistletoe being shot at him. James Frazer identified mistletoe with the "Golden Bough."

The holly, *Ilex aquifolium,* is also called Holy tree, Christ's Thorn, Hulver Bush and Hulm. The boughs have figured in Christmas decorations in homes and churches since the earliest days. In certain places it was customary to set up a long pole at Christmas and decorate it with holly and ivy, similarly to the May pole in summer.

Ivy is associated with Bacchus and in England the "tavern bush" is decorated with it. There is a story that Ino hid Bacchus from Juno when he was in his cradle by covering him with ivy leaves. Crowns of ivy were given at Spartan festivals in honor of Hyacinthus. It was a decoration at the Bacchanalia and one of the plants forbidden as Christmas decorations, because of its pagan associations. Prynne, probably William, in the seventeenth century is quoted as having written not too elegantly

"At Christmas men do always Ivy get
And in each corner of the house it set;
But why do they use that Bacchus-weed?
Because they men, then, Bacchus-like to feed."

The ivy used is *Hedera helix* native in Europe, Asia and North Africa and coming in many attractive variations from the type. Both leaves and berries are poisonous to eat.

(Continued on page 297)

Winter Interest in the Garden

DeEtte B. Jacobs

WHEN the high tides of summer bloom and fall foliage have ebbed, there is still much of beauty in the garden—beauty that is sometimes unappreciated at other seasons of the year. If there is no blanket of snow, the evergreen groundcovers prove their value in winter. There are myrtle which shines in the sun as if each leaf had been individually polished, sturdy pachysandra, ivy with classic beauty of form, mounds of perennial candytuft, tough mats of the long, narrow green leaves of liriope, and drifts of the tiny-leaved *Sedum album* which serves as blanket for the snowdrops and crocus asleep beneath it. Foliage of Christmas rose has interesting form and texture, and always one searches the clumps in hope of finding blossoms. Usually the plant has its most abundant bloom in November or December, but it is very temperamental and a bud hidden deep among the leaves may expand into a lovely, waxy white flower on any winter day.

In the wild garden there is arbutus, untroubled by any degree of cold, and it is difficult to walk past without stooping to lift gently a few of its leathery green leaves in order to catch a glimpse of blossom buds sheltered

The waxy white flowers of the Christmas Rose, *Helleborus niger,* glisten in the sunshine on a cold winter day.

beneath. Wintergreen lives up to its name, and the foliage of partridge-berry and of shortia is as beautiful in winter as in summer, the latter sometimes a uniform dark green and sometimes tinged with red. Galax in this northern climate almost always turns a beautiful dark red.

Usually one does not think of herbs as evergreen, but some do retain green leaves in winter, and certainly many are evergray. Santolina and lavender are beautiful examples of the gray herbs. Both have the reputation of being somewhat tender, but santolina has withstood many winters in our garden without special care. Lavender we almost lost before we moved it to its present home, a protected sunny spot against the house. There its spikes of small gray aromatic leaves make a little winter garden in themselves, in addition to being a much appreciated source of small bouquets for the house. I almost always choose a few sprays of gray lavender to arrange with the first pale yellow jasmine that comes into bloom.

Among shrubs one is inclined to take the evergreens as a matter of course, missing by that attitude of closed-mind much of their value as individuals. There are, for instance, the dignity of rhododendron, the junior dignity of laurel, the somberness of yew, the sparkle of sunlight on box, and the promise of spring bloom in the showy buds which Japanese andromeda wears for decoration all winter. One of the evergreen barberries (*Berberis verruculosa*) has contrasting gray lining for its spiny leaves, and grace in every curving stem. Our native holly is usually given due appreciation for its evergreen leaves and red berries, but a discerning eye will find added interest in noting the variety of size, form and texture of leaves on different specimens of this one species.

For a wide range of variation, however, leucóthoë is the shrub which holds highest place in almost any winter garden. Where evergreen trees afford it shade and protection from winds, it stays a deep green all winter. Where deciduous trees have recently shaded it, it gradually takes on varying reds and bronzes. Where it has full sun continuously, it assumes these colors early in the fall. It is one of the most versatile of shrubs, a delight to the eye when viewed from the window or on a winter walk through the garden, and a long-lasting pleasure when brought indoors. It is not beautiful, however, unless its chief demand is met—a well-drained acid soil which contains sufficient leafmold to give it just the right moisture-holding texture. Also, it asks protection from the wind. One of the nicest winter pictures in our garden is made by a group of leucóthoës and a nearby mat of galax. Although contrasting sharply in height and in size and form of leaf, they are almost identical in their deep bronzy red color.

Deciduous shrubs and trees also tell a winter's tale. Native dogwoods are knotted with round gray flower buds, the long pointed buds on the beech are encased in shiny rain-proof covering, and magnolia buds wear fur coats to keep them warm. Lilac buds swell into premature leaflets,

Trailing Arbutus, *Epigaea repens,* is untroubled by any degree of cold.

tempted by a few warm days and then get frozen for their precociousness. Forsythia espaliered against a wall puts forth a few blossoms on the slightest encouragement from the weather. Jasmine blooms on even less provocation, its bright green stems holding buds touched with red and dainty yellow flowers. This early bloom is sufficient compensation to the gardener for any disappointment he suffers in those occasional severe winters when jasmine is frozen to the ground. Kerria stems are bright green all winter, too, and young growth on huckleberry has tight pinkish buds on delicate pale green branches.

Plants That Figure in Christmas Traditions and Decorations

(Continued from page 294)

Broom, *Cytisus scoparius,* went into the making of bridal wreaths along with rosemary. It is an emblem of humility and witches are said to like it. It was the badge of Geoffrey of Anjou and became the emblem of his descendents, the Plantagents. When a vessel is for sale in Plymouth, England, a bunch of broom is tied to the top of the mast. As mentioned earlier, it was used in decorating the creche.

Where the climate is severe and tall plants do not grow, as in Jutland and the Orkneys, the mountain-ash or Rowan tree, in Latin *Sorbus Aucuparia,* with its pinnately divided leaves and sprays of scarlet berries figured in folklore. At Modrufell on the coast of Iceland, there is a large Rowan tree and at Christmas Eve it is decorated with torches which no wind has ever extinguished. This is one of the plants placed over doors to keep out witches.

Another tree associated with the exorcism of witches is the elder, *Sambucus nigra,* which in some places grows to thirty feet high. It has delicately scented umbels of white flowers followed by black fruits which are used in making wine. The pith of the tree is cut in round flat shapes, dipped in oil and then floated in a glass of water. When lighted on Christmas Eve, it will reveal to the owners all the witches and sorcerers in the neighborhood.

In the short time and limited space, it has not been possible to more than approach the threshold of this vast subject. I have touched upon only a few of the many plants that figured in Christmas decorations and tradition. For example, material on American Indian customs adapted to the Christian festival of Christmas must be available in the Southwest, Mexico and South America. But all this will have to wait for another year. Meanwhile, Merry Christmas to all my readers.

Sixth Annual Chrysanthemum Show and Program at The New York Botanical Garden

THE Sixth Annual Chrysanthemum Show and Program at The New York Botanical Garden on October 27, 28, 29, 1950, in cooperation with the National Chrysanthemum Society, was a marked success from every angle. The quantity and quality of the exhibits surpassed those entered at previous shows and the general plan and staging were greatly improved. Fair weather was enjoyed throughout the three days, bringing out a fine attendance.

The first floor of the Museum and Administration Building was given over to the horticultural classes in the east and west wings and to the garden exhibits in the rotunda. The center garden, awarded a silver medal, represented the combined efforts of Don Roehrs, Wyckoff, N. J., who designed and planted it, of William Tricker, Inc., Saddle River, N. J., who furnished the water-lilies, water-hyacinths and gold fish, and of R. J. Bullington, St. Albans, L. I., who raised the chrysanthemums. First prize and silver medal were awarded the Westchester Chapter of the National Chrysanthemum Society for its border of chrysanthemums, while second

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Upper Left: This arrangement by Mrs. David Kirschenbaum, entitled "In the Beginning", won the blue ribbon in its class, gold medal certificate and the Emma Hodkinson Cyphers Cup.

Upper Right: Mrs. Ronald Yocum received a blue ribbon and silver medal certificate for her entry in the class, "On the Wings of Autumn".

Lower Left: Mrs. Frank S. Rathbone's interpretation of "Autumn Eventide" received the blue ribbon in this class.

Lower Right: Bronze medal certificate and first in the class, "When The Frost is on the Pumpkin", was awarded to Mrs. Raymond P. Reese for her arrangement of fruits and vegetables against a broom.

Flower Arrangements at The Sixth Annual Chrysanthemum Show.
For details, see page 298.

prize and bronze medal went to the North Jersey Chapter for its terrace planted with mums. Mr. and Mrs. Ernest L. Scott, Bogota, N. J., received a silver medal for their excellent groups of potted chrysanthemums. They also won the Carl Toepler Cup for the best pot plant, with variety Golden Glory. Bobbink and Atkins, Rutherford, N. J., received a silver medal for an exhibit of chrysanthemums in variety, including Yellow Spoon, Princess Pocohontas, Dubonnet, Ashes of Roses and Autumn Flash.

The judges had quite a difficult decision to make in awarding the Scott Cup for the best bloom or spray in the horticultural classes. This trophy was given to Fred Lindeman, Freeport, L. I., for the spider mum, Bess Witt, which was, indeed, a superb specimen. For the champion outdoor variety, grown naturally, Miss Marie J. Leary, Greenwich, Conn., with variety Princess Marie, received the Secretary's Cup. R. J. Bullington won the Selma J. Bischoff Cup for the best specimen of a chrysanthemum that had been named by the National Chrysanthemum Society at one of its former shows; the variety was Edith Roberts.

The broad stairway was banked with evergreens and chrysanthemums, making an attractive approach to the invitation flower arrangement classes on the mezzanine and to the exhibit of paintings by the Chinese artist, Wang Chi-Yuan.

The competitive flower arrangements filled the circular hall on the second floor. The Emma H. Cyphers award for distinctive originality and emotional content in arrangement was awarded to Mrs. David H. Kirschenbaum for her arrangement "Legend of Circe". This also won the gold medal. Mrs. Ronald Yocum, Chappaqua, N. Y., was awarded a silver medal for her arrangement in the class "Wings of Autumn" and Mrs. Raymond P. Reese, Larchmont, N. Y., a bronze medal in the class "When Frost is on the Pumpkin".

Special prizes were awarded to the four educational exhibits as follows: To the Palisades Nature Association for relief map of Greenbrook Sanctuary, a wildlife preserve being developed by the Association in cooperation with Palisades Interstate Park. To Mrs. Richard Diaz, Rowayton, Conn., for demonstration of the steps in the propagation of a chrysanthemum, from a cutting to the fully grown, flowering plant. To Mr. and Mrs. Ernest L. Scott for exhibit on making a book. To The New York Botanical Garden for display of books on chrysanthemums in the Library. In a case on the main floor, directing attention to the exhibit in the Library, was *Hortus Malabaricus* in which appeared the first illustration of a chrysanthemum ever published outside the Orient. This plate was figured by Hendrik Adrian Rheede in part 10 of *Hortus Malabaricus,* which was published in Amsterdam in 1690.

In the Lecture Hall, on Friday afternoon, Dr. W. E. Blauvelt spoke

to an enthusiastic group of mum growers on "Safeguarding Mums From Insects and Mites". The following afternoon, Mrs. Ernest L. Scott discussed "Culture and Varieties of Chrysanthemums".

Saturday morning, 120 pupils from the public schools of New York City arrived promptly for their flower show. They were given a talk and demonstration of flower arrangements by Mrs. Dwight S. Beebe, and then they raced from the Lecture Hall to the exhibition tables in their eagerness to prove what they could do with mums and fall foliage. Some showed quite a little artistic talent. Carole Bressler won the award for the girls, with an arrangement suggesting the spirit of the U.N., and Robert Catania won the award for the boys. This was a small rotted log covered with moss and adorned with fallen leaves and chrysanthemums—not a flower arrangement, but excellent in originality and composition. T. H. Everett, Horticulturist, had the pleasant task of presenting the prizes—pot plants—to Bobby and Carole and the other winning contestants.

The judges for this special event, which is sponsored by the Volunteer Associates of The New York Botanical Garden in cooperation with the School Garden Association of the Board of Education, were Mrs. Beebe, Mrs. William S. du Bois, Mrs. Ray Palmer Foote, Mrs. Stanwood Flitner and Mrs. William C. Miller, all of Englewood, N. J., and Mrs. William D. Embree, Tenafly. Mrs. Harold E. Anthony, Englewood, N. J., was Chairman of the Committee on Arrangements.

Mrs. Angel Diaz, Chairman of the Show Committee of the National Chrysanthemum Society, is being congratulated upon the success of the show by Mrs. Francis M. Archibald, Editor of the News Leaf of the Garden Club of New Jersey.

INDOOR CHRYSANTHEMUM SHOW

The largest indoor exhibit of chrysanthemums at The New York Botanical Garden since the early days of World War II was opened to the public on November 9. House No. 4 of the Conservatory was transformed into a Chinese garden. A bamboo bridge extending across a stream, a moonbeam gate (*opposite page*) and a charming tea house (*below*) lent an oriental atmosphere. There was even an authentic silk lantern hanging in the tea house, and a red dragon was suspended over one of the doorways leading from House No. 4. Nearby, on an appropriate sign, a brief history of the chrysanthemum was given.

550 plants were used in this Chinese garden display, in a number of different types and sizes, ranging from the tiny button varieties to the large, single-stemmed "show" mums, eight inches in diameter. The colors yellow, bronze and white predominated. Altogether, it was a very beautiful exhibit which delighted the many visitors who saw it during the two weeks it continued.

REVIEWS OF RECENT BOOKS

A Vast Assemblage of Flowering Plants and Ferns

GRAY'S MANUAL OF BOTANY. Merritt Lyndon Fernald. 1,632 pages, illustrated, indexed. American Book Co., New York. 8th (Centennial) edition, 1950. $9.50.

After forty years, the new edition (8th) of Gray's Manual has appeared. It is not as formidable a volume as some of us might have expected, knowing the tremendous amount of material which it was to encompass, for by using the thin fine paper of the 7th edition and increasing both length and breadth slightly the number of pages has been held down to a mere 1,632. Due largely to Professor Fernald's outstanding explorations in eastern Quebec Province and in Newfoundland, these two areas have been added to the geographical region represented in the previous edition (westward to the Great Plains, south to Kentucky and Virginia). But the actual number of additional species in this northeastern extension has not been relatively greater than the astonishing number of plants found in southeastern Virginia, plants hitherto believed to occur only on the coastal area from North Carolina southward.

There are about 8,000 species and varieties of plants treated in this Manual and over 1,800 illustrations, which are small inserts to go with descriptions of the species. Most of the illustrations of the previous edition have been used. In addition there are very fine drawings of such difficult groups as grasses and sedges, rushes, docks, vetches and many composites. Some of these illustrations have been done especially for the Manual; some have been taken from the pages of *Rhodora* (the Journal of the New England Botanical Club) which Professor Fernald edited for many years, or from other publications.

The terms *variety* and *form* are used for plants of rank below the species, though many of the present-day botanical publications are using the term *subspecies* to denote such variations. Much can be said on both sides, but it is interesting to note that the term *subspecies* was used by botanists before 1800 to designate plants which bred true to seeds but which were nevertheless variations within the species. Such "subspecies" were savoy cabbage and Brussels sprouts.

Of the 5,523 species treated in this book, of which about 1,000 are plants introduced from Europe and other continents, 703 belong to the Composite Family, by far the largest family represented. Next is the Rose Family with 551 species, largely represented by the blackberries and hawthorns. Third are the grasses with 487 species; then the sedges with 473; followed by the leguminous plants, 237; and the figworts, 152. The genus *Carex* alone has 267 species represented in this flora.

A departure from the previous editions lies in the keying out of subspecific variations after discussion of the species. This leads to clarity of presentation. Plants which are so obscure as not to have any common names do not receive any, the name of the genus being sufficiently inclusive, i.e. there are no manufactured common names. The activities of the late Brother Victorin and his students have added many interesting Canadian local names which are included.

In such a vast assemblage of material, and due to the fact that delimitation of individual species rests largely on the human equation, there will always be much controversy among botanists as to the number of species involved. Certainly no one in the past has had field experience with the northeastern flora in any way comparable to that of Professor Fernald's. It is not at all likely that anyone will ever have it in the future. The new Manual will, therefore, for a long time be one of the authoritative books dealing with our eastern plants, to be consulted intensively by the professional botanist and the able amateur; and used as a reliable reference by the horticulturist and the general public interested in flowering plants. Although full credit is given to those who have collaborated, it is remarkable that such a comprehensive and painstaking work could be com-

pleted by one man in a single lifetime. It will be of interest to know that about a month after this Manual was published, Professor Fernald died in Cambridge at the age of 79.

HENRY K. SVENSON,
American Museum of Natural History.

Trees Come Alive

A NATURAL HISTORY OF TREES OF EASTERN AND CENTRAL NORTH AMERICA. Donald Culross Peattie. 606 pages, illustrated, indexed. Houghton Mifflin Co., Boston, Mass. 1950. $5.

The first in a planned series on the trees of North America, this volume covers 57 genera in 183 species and 12 varieties of evergreen and deciduous trees that are native in the area from Hudson Bay to Georgia and west to the Mississippi.

It is a book that will stimulate the growing interest in trees that has been evident in recent years. Each tree is clearly described in everyday words under its botanical name and the one or more common names by which it may be popularly known. A key to species and genera is presented for those who like to "run down" plants in detail, also a glossary of certain botanical terms. The lovely detailed drawings of leaves, flowers or fruits that go with most of the trees described are fine visual aids to identification.

But this book offers much more than names and descriptive words and illustrations. There are personal stories relating to each of the trees. We see them living under natural conditions to attain their noblest dimensions. There are glimpses of American history and mention of some famous names in connection therewith. The various economic uses to which trees are put are described in a very enlightening manner. It is a most informative and entertaining book on a grand subject—TREES.

HENRY E. DOWNER,
Vassar College.

"Tree Crop Farming"

TREE CROPS. A Permanent Agriculture. J. Russell Smith. 408 pages, illustrated, indexed. Devin-Adair Co., New York. 1950. $6.

Tree Crops, A Permanent Agriculture by J. Russell Smith is written particularly for spreading the gospel of soil conservation in the world with special emphasis on the United States. One solution to the soil erosion problem seems to be the planting of trees or shrubs which, in addition to binding the soil and enriching it, can produce fruits of some economic value as food for man or animals. The author has done an excellent job of gathering information concerning the bright side of "tree crop farming" but has failed to present adequately the trials and difficulties attending such a venture in our modern civilization.

Although intended for popular consumption, the book will interest both the average reader and the technically trained man. The minor discrepancies which occur detract but little from the value of the book. Much of the value of the illustrations is lost due to the grouping of the plates without regard to the text discussions. Additional value could be obtained if illustrative plates for leaves, fruits, and forms of the plants described were included in appropriate position in the discussions so that the non-technical reader might identify the material under treatment.

DAVID H. CALDWELL,
N. Y. State College of Forestry.

American Forest Dendrology

TEXTBOOK OF DENDROLOGY. William M. Harlow and Ellwood S. Harrar. 555 pages, illustrated, indexed. McGraw-Hill, New York. 3rd edition 1950. $5.

This is an excellent textbook and will undoubtedly serve extremely well when used in conjunction with a college course on forest dendrology for which purpose it is primarily intended. The only serious criticism this reviewer can advance refers to the main title which should more properly read: "Textbook of American Forest Dendrology". To be sure, the subtitle states the limits of the range of the book very clearly, but it is the main title by which a book is generally quoted and that is definitely misleading.

The introductory chapters dealing with the principles of plant classification and nomenclature are very well written and are clear and concise. The main part of the book (459 pages of 532) presents taxonomically arranged individual descriptions of 180 major forest trees. The illustrations accompanying the description of the various species are very well chosen but the printing of many of them could surely be improved.

As to further possible improvements of this otherwise highly recommendable

book, it may be suggested that cross sections of the needles should be pictured not only of the pines, which are included, but also of the firs. Distinction between *Abies lasiocarpa* and *A. concolor Lowiana,* for instance, will then be made much simpler.

The comparative table on page 55 contains under "hard pines" the description: needles in fascicles of 2 to 3 (rarely 5 to 8). Since fascicles with more than 5 needles represent only occasional abnormalities without taxonomic significance, the "to 8" in the above statement should be deleted as being confusing.

The table on page 86 should state under *P. palustris* that individuals occur with needles in 5's, and the table on page 102 should mention under *P. ponderosa* that var. *arizonia* usually has its needles in 5's. However, these are all very minor points which do not detract from the general excellence of the book.

HENRY TEUSCHER,
Montreal Botanic Garden.

Causes, Diagnosis and Prevention

DECAY OF TIMBER AND ITS PREVENTION. K. St. G. Cartwright and W. P. K. Findlay. 294 pages, indexed, illustrated. Chemical Publishing Co., Brooklyn, N. Y. 1950. $7.50.

This book is largely devoted to the causes and diagnosis of decay in wood. Two chapters out of fourteen deal with the prevention of decay—one during storage and shipment and the other during use. Although the existence of a considerable amount of American literature on decay and its prevention is recognized, this, it is stated, refers primarily to conditions in the United States and by inference is not entirely applicable to European conditions. As an example, the lower relative humidities and higher temperatures which are normally maintained in American buildings render outbreaks in dry rot less likely to occur than in western Europe.

A large part of the text, however, has universal application. The chapters dealing with the causes of decay, techniques used in the examination of decayed wood, physiology of wood-destroying fungi, effects of decay, stains and discolorations in timbers, and wood preservation are, for the most part, applicable in the United States as well as in Europe. Particularly handy are diagnostic tables of fungi in living trees, fungi in felled and worked woods, fungi on timbers in buildings, and sapwood discolorations due to fungal and other causes.

ARTHUR KOEHLER,
Consulting Wood Technologist.

The Broad Aspects of Conservation and Management

CONSERVATION OF NATURAL RESOURCES. Guy-Harold Smith. 552 pages, illustrated, indexed. John Wiley & Sons, New York. 1950. $6.

This book is a major revision of a similar publication available under the title of "Natural Resources and Their Conservation," under the editorship of A. E. Parkin and J. R. Whittaker (1936). It endeavors to cover in one book the broad aspects of the conservation and management of both renewable and nonrenewable natural resources.

The book contains useful information and will unquestionably be used as widely as a reference book as its predecessor. However, it has the defects, common to books written by specialists with a wide variety of interests, of a lack of unity of concept and of balanced presentation of the subject matter. In one chapter, for example, Smith writes of a slight retardation of precipitation by forest cover, while Oliver Diller in discussing forests points out their importance in reducing flood damage. Smith's own recommendations for flood control follow closely the present Army Corps of Engineers' propaganda for dikes and dams; he completely subordinates the value of good watershed management to engineering construction.

The chapter on "Reclamation of Wet and Overflow Lands" gives little consideration to existing values of such lands and devotes most of the discussion to land drainage as an operation. The author states that cases of unwise drainage have occurred in which values for recreation, fur, timber, and grazing were destroyed which were of more value than the "reclaimed" land proved to be.

While this appears as a revision of the former book, some of the chapters contain little new material and have been modified little except by modernizing statistics. Others have been entirely discarded and replaced with new material, and some new chapters have been added. The chapter on "Wildlife Conservation" by Charles Dambach is a decided improvement over the material presented in

the earlier volume, and the chapter on soil conservation has also been brought up to date by William A. Rockie. One conspicuous omission is the small amount of discussion of recreational fishing, although it is probably followed by a greater number of citizens than any other outdoor recreation.

Despite these obvious inconsistencies and deficiencies, this book will, in the reviewer's opinion, continue to fill a place as a source of facts that are not otherwise so conveniently available.

IRA N. GABRIELSON,
President,
Wildlife Management Association.

A Guide to Weeds in Puerto Rico

PLANTAS INDESEABLES EN LOS CULTIVOS TROPICALES. Ismael Velez, Profesor de botanica y fitotaxonomia del Instituto Politecnico de Puerto Rico. Fotografias por Johannes van Overbeek, Ex-subdirector del Instituto de Agricultura Tropical. 497 pages. Published by University of Puerto Rico, unbound $4.00, bound $5.50. 1950.

This is a most excellent weed manual written by a man who is thoroughly familiar with the flora of Puerto Rico and is a valuable contribution to our knowledge of the flora of the island. It is well illustrated with 246 photographs representing 80 families, 225 genera and about 500 species, which is about 75% of the most undesirable plants and about 20% of the entire flora of the island. The descriptions and photographs are excellent and the work will prove a very useful guide for the study of undesirable plants in Puerto Rico and to some extent in other of the West Indies.

MELVILLE T. COOK.

A Survey of the Flora of Bikini

PLANTS OF BIKINI AND OTHER NORTHERN MARSHALL ISLANDS. William Randolph Taylor. 227 pages, illustrations, bibliography, index. University of Michigan Press, Ann Arbor, Mich. 1950. $5.50.

This book is intended to summarize the results of a survey of the flora of these islands before the Bikini bomb tests. It is divided into five principal parts: the first four parts are concerned with an account of previous exploration in the Marshall Islands, a description of the atolls and their marine flora, characteristics of the land flora and finally detailed botanical features of certain of the islands. The author presents in these chapters a very fine picture of the physical and biological features of these islands. He lays what may seem an overemphasis on the marine flora in these introductory chapters as well as in the annotated catalogue of plants which follows. However, when the extremely limited and monotonous character of the land flora is considered, one may readily comprehend the author's interest, aside from the fact that he is a highly respected algalogist. In the catalogue are to be found taxonomic revisions of a number of groups in the algae with quite a number of new entities described.

The photographs of the reefs at the end of the book are well reproduced and are very useful in attaining an understanding of these characteristic features; photographs of the new entities are also included here. Although the book is most valuable for the treatment of the algae, it is on the whole recommended for inclusion in the libraries of all tropical institutions as well as for the bookshelves of anyone with an interest in the Pacific.

RICHARD S. COWAN.

Notes, News and Comment

Watercolors of Herbs. On exhibit in the rotunda of the Museum Building of the New York Botanical Garden, starting November 2 and continuing into the holidays, are watercolor paintings of herbs by Ida H. Pemberton of Denver, Colo. They represent medicinal herbs of North America and of the Old World, and also include spices, condiments and herbs used in perfume. Accompanying the watercolors are antique apothecary jars from the collection of H. A. Casseker and antique perfume bottles of French and English origin from the collection of Mary Chess Perfumes. Also on display are herbals including *De Historia Stirpium* by Leonard Fuchs, Basle, 1542, and *Hortus Sanitatis,* Venice, 1541; and a group of modern horticultural books. Among the latter are *Gardening with Herbs* by Helen M. Fox (1933), *Herbs and Herb Gardening* by Eleanour S. Rohde, 1937, and *Herbs: Their Culture* by Rosetta Clarkson, 1946.

Art Exhibit. The Bronx Artists' Guild will hold its show from Sunday, January 14th, until Sunday, February 11th, inclusive, in the rotunda of The New York Botanical Garden.

Bromeliad Society Organized. The first international society devoted to the study, culture and conservation of the Bromeliaceae, or pineapple family, was organized September 17, 1950, at a meeting of fifty plant enthusiasts and horticulturists in Glendale, Calif. Mulford B. Foster, of Orlando, Fla., well known author, collector and plant explorer, was elected president. Mr. Foster is the owner of the world's largest collection of bromeliads, of which he has collected the greater part on his explorations into the jungles of Brazil, Colombia and other Latin American countries. Interested parties may write the Secretary, Miss Victoria Padilla, 647 South Saltair Ave., Los Angeles 49, Cal., for further information.

1950 ***Nobel Prize for Medicine Awarded for Research in Hormones.*** Two American and one Swiss scientist share equally in the 1950 Nobel Prize for Medicine. They are Dr. Phillip S. Hench and Dr. Edward C. Kendal, of Mayo Clinic, Rochester, Minn., and Prof. T. Reichstein, of Basle, Switzerland. They have been invited to go to Stockholm, Sweden, to be presented with the honors on December 10, 1950, the anniversary of the death of Alfred Nobel in Italy in 1896. This year is the fiftieth anniversary of the first Nobel awards.

Prof. Reichstein, who has done intensive research in the field of adrenal cortex hormones, is now concentrating his efforts to find a less expensive and more productive source of cortisone. His research on *Strophanthus,* as a precursor for cortisone, was described by Joseph Monachino in the October issue of the Journal of The New York Botanical Garden.

Strophanthus. The New York Botanical Garden has recently been visited by several distinguished scientists, who came to discuss *Strophanthus* with Joseph Monachino. Dr. Albert Wettstein, Associate Director of Research, Ciba Limited, Basle, Switzerland, accompanied by Dr. E. Oppenheimer, Vice-president in charge of the Research Department of Ciba Pharmaceutical Products, Inc., Summit, N. J., spent the afternoon of October 19 at the Garden, and Dr. A. Katz was here the afternoon of October 27. Dr. Katz has been, since early this year, at the National Institute of Health, Bethesda, Md., where he did the chemical work on the *Strophanthus* material collected by the United States Department of Agriculture and the Federal Security Agency. He is now returning to Basle to rejoin Prof. T. Reichstein.

Library Event. Dr. William J. Robbins, Director, and the Library Committee were hosts to twenty members of the Hroswitha Club (named in honor of a lady bibliophile of the 9th century), and Dr. Robert H. Fife, guest, on Tuesday afternoon, November 9. They came to see the libraries of Sarah Gildersleeve Fife and of Eleanour C. Marquand (each library containing approximately 400 volumes) which were bequeathed to The New York Botanical Garden. Dr. Robbins and Miss Hall briefly addressed the

gathering, and after tea, the group was escorted to the Conservatory to view the indoor chrysanthemum show.

Garden Club of America. The Horticultural Committee of the Garden Club of America enjoyed a box luncheon and meeting in the Members' Room of The New York Botanical Garden on November 14, after which they viewed the Marquand and Fife bequests to the library. T. H. Everett conducted the group on a tour of the Conservatory exhibits, particularly the indoor chyrsanthemum show.

Members' Day. The first meeting of the season, held on Thursday afternoon, November 2, at The New York Botanical Garden, was well attended. Dr. William J. Robbins gave an interesting account of the latest developments in the scientific research being conducted in the Garden's laboratories and T. H. Everett addressed the members on the Garden's extensive plant collections.

Staff Conference. A conference of the staff and students of The New York Botanical Garden was held on November 15. Dr. A. B. Stout, Curator Emeritus, gave an illustrated lecture on "Observations During a Trip to California"

Lectures. Dr. P. P. Pirone addressed the Passaic Valley (N. J.) Garden Club on October 16 and the Millbrook (N.Y.) Garden Club, a garden club affiliate, on the 19th, on the subject "Maintenance of Shade and Ornamental Trees." On October 31, Dr. Pirone addressed the Southeastern Turf School, sponsored by Cornell University, at White Plains, on the subject "Diseases of Turf Grasses and Their Control."

Dr. H. N. Moldenke lectured on October 11 before the Greenwich Woman's Club Gardeners, a garden club affiliate, on "Wild Flowers of North America"

On October 25, T. H. Everett gave a lecture and demonstration on the care of chrysanthemums for the Teachers' Nature Study Course. On Nov. 2, he gave a talk on "Water" before a group of enthusiastic gardeners in East Hartford, Conn. On Nov. 3 and 4, he attended the annual dealer get-together of Rototiller,, Inc., at Troy, N. Y., and was guest speaker at the banquet held at the Hotel Hendrick Hudson. His topic: "Modern Practice in Horticulture." On Nov. 13, Mr. Everett lectured on "Begonias" before the Garden Club of New Haven, a garden club affiliate.

Earlier this year, Joseph Monachino lectured and demonstrated botanical specimens on the subject of "New and Little Known Drug Plants" to four classes in pharmacognosy from Fordham University.

Meetings. Dr. William J. Robbins attended a meeting of the Bayard Cutting Trustees at Westbrook, Oakdale, L. I., on October 2, and on October 4, a meeting of the Advisory Board on Quartermaster Research at Washington, D. C. Later in the month, on the 20th and 27th, Dr. Robbins attended the autumn general meeting of the American Philosophical Society in Washington, D. C., and on October 31 and November 1, a meeting of the U. S. National Arboretum, also held in Washington.

Twenty-four members of the Green Fingers Garden Club, of Greenwich, Conn., a garden club affiliate, held their monthly meeting on October 24, in the Members' Room of The New York Botanical Garden, following which Dr. H. N. Moldenke guided the group to the chrysanthemum borders and trial plantings and through the Conservatory.

The Homewood Hobby Club of Yonkers, N Y., visited The New York Botanical Garden on October 19. The club was accompanied by G. L. Wittrock on a tour of the grounds in the tractor train, the *Floral Flyer,* and after lunch Frank C. MacKeever guided the group through the Thompson Memorial Rock Garden and the Conservatory.

Dr. R. R. Stewart. Dr. R. R. Stewart, President of Gordon College, Rawalpindi, Pakistan, is spending his sabbatical leave at The New York Botanical Garden working on his extensive India and Pakistan collections. Over 5,000 of the specimens Dr. Stewart personally collected, with the assistance of Mrs. Stewart, are deposited in the herbarium of The New York Botanical Garden.

Visitors. During October, Dr. Boroff of the Pasteur Institute, Paris, visited Dr. William J. Robbins, as did Dr. Charles Thom of Port Jefferson, N. Y. Dr. Kenneth B. Raper, of the Agricultural Research Administration, Peoria, Ill., and Dr. E. Oppenheimer, vice-presi-

dent of the Research Department of Ciba Pharmaceutical Products, Inc., Summit, N. J., also visited Dr. Robbins and toured the laboratories.

Other recent visitors at The New York Botanical Garden included: Dr. Ernest Hillmus, Copenhagen; Mrs. Fred J. Seaver, Winter Park, Fla.; Dr. Elva Lawton, Hunter College; Dr. L. S. Olive, Columbia University; T. C. Joseph, Travancore, India; Dr. Winifred M. Curtis, University of Tasmania; Rupert C. Barneby, Wappinger Falls, N. Y.

Saturday Afternoon Lectures. The winter series in the free Saturday afternoon Lectures at The New York Botanical Garden will commence on January 6, when Samuel H. Gottscho will give a talk on "Wild Flowers and Other Bits of Nature" The other lectures in the month of January are: Jan. 13, "June in the Swiss" by Alice Chauncey; Jan. 20, "Lichens of the New York Region"; Jan. 27, "What is Rock Gardening?" by Harold Epstein, President, The American Rock Gardening Society.

The New York Botanical-H. R. Kunhardt Expedition

Word has been received of the arrival of John Wurdack and Richard Cowan at Puerto Ayacucho, Venezuela, on October 21, where they awaited the return of Dr. Bassett Maguire from San Fernando de Atabapo. Dr. Maguire had gone there to put the boat, "Neuva York", in condition; it will carry the party into the interior of Venezuela.

Dr. Maguire left the New York Botanical Garden on September 23 to complete arrangements for The New York Botanical Garden - H. R. Kunhardt Expedition to Venezuelan Guiana. During his stay at Puerto La Cruez, he was guest of the Sinclair Oil Co., which was most cooperative in getting the supplies together and trucking them to Ciudad Bolivar.

While in Caracas, he paid official visits to the Embassy, the Rockefeller Foundation and was guest at dinner of both the William Phelps, Sr. and the William Phelps, Jr. Mr. Phelps, Jr., is the noted ornithologist and Mrs. Phelps is the collaborator in Venezuelan botany of The New York Botanical Garden.

Dr. Maguire was also guest speaker at a reception given by Mr. and Mrs. William Phelps, Jr., which was attended by a large and important gathering of dignitaries of the Venezuelan government, U. S. Embassy, Rockefeller Foundation, U. N., and Universidad Centralde Venezuela.

The side trip which Dr. Maguire made for about one hundred miles up the Atabapo to Yavita, one of the famous old collecting places, was very exciting. Yavita is the terminus of an overland connecting trail between the Upper Rio Negro and the Orinoco, in use for more than a hundred years. The trip was fruitful too — for Dr. Maguire collected a number of important plants from the locality, two of which have been known only by the fragmentary von Humboldt types collected nearly 150 years ago.

Mr. Cowan and Mr. Wurdack, who arrived at Puerto La Cruez on October 11, were also guests of the Sinclair Oil Co. Then they flew to Ciudad Bolivar where they stayed at the guest camp of the Orinoco Mining Co., until their supplies were loaded aboard a river boat for the trip upstream to Puerto Ayacucho, their trysting point with Dr. Maguire. The boat resembled a coal scow in shape, with square bow and stern, and was powered by a heavy motor. The accommodations could hardly be graced by the term "quarters", for hammocks were strung wherever there was room to do so. The "dining room" was spread from one end of the craft to the other at mealtime. To quote Mr. Cowan, "If you were sitting on a bag of potatoes or on a coil of rope or in your hammock, when your plate of food was brought, you were in the dining room."

While in the area of the guest camp of the Orinoco Mining Co., Mr. Cowan collected some fungi which he felt would be interesting to Dr. Donald P. Rogers.

On October 27, the expedition party started the last lap of the river trip to Calebra at the foot of Huachamacari and Duida, for two months' study of the plant cover. Dr. Maguire, Mr. Cowan and Mr. Wurdack have been joined by Ramon Urbano, who will collect birds for the Phelps Museum; this has the most complete collection of Venezuelan birds in existence. Two Maquiritare Indians, who worked with Dr. Maguire in Marahuaca, were also added to the party.

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O wild West Wind, thou breath of Autumn's being,
Thou, from whose unseen presence the leaves dead
Are driven, like ghosts from an enchanter fleeing,

Yellow and black, and pale, and hectic red,
Pestilence—stricken multitudes; O thou
Who chariotest to their dark wintry bed

The winged seeds, where they lie cold and low,
Each like a corpse within its grave, until
Thine azure sister of the Spring shall blow

Her clarion o'er the dreaming earth, and fill
(Driving sweet buds like flocks to feed in air)
With living hues and odors plain and hill;

Wild Spirit, which art moving everywhere;
Destroyer and preserver; hear, oh, hear!

The trumpet of a prophecy! O wind,
If Winter comes, can Spring be far behind?

Percy Bysshe Shelley

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A. C. PFANDER	*Superintendent of Buildings and Grounds*
LOUIS P. POLITI	*Head Gardener*

To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the Botanical Garden or the 200th Street station, the New York Central to the Botanical Garden station, or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

Elevated to the Botanical Garden station, or the Webster Av

THE CORPORATION OF THE NEW YORK BOTANICAL GARDEN

The New York Botanical Garden was incorporated by a special act of the Legislature of the State of New York in 1891. The Act of Incorporation provides, among other things, for a self-perpetuating body of incorporators, who meet annually to elect members of the Board of Managers. They also elect new members of their own body, the present roster of which is given below.

The Advisory Council consists of 12 or more women who are elected by the Board. By custom, they are also elected to the Corporation. Officers are: Mrs. Thomas D. Thacher, Chairman; Mrs. Guthrie Shaw, First Vice-Chairman; Mrs. James C. Mackenzie, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Hugh Peters, Corresponding Secretary; and Mrs. Junius A. Richards, Treasurer.

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