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The "mighty" collectors on the slope of Fremont Mt., Burroughs Mt., in the center across the valley and impressive Mt. Rainier in the distance.

Collecting Western Alpines by Air*

Warren C. Wilson

The How, Where, and Why Of It

An unusual method you say, this plant collecting by airplane. Well, perhaps, but then it is practical for those of us who cannot spend months at a time away on a trip. It does have its advantages, you know, in rushing the plants from mountain to garden. Dangerous! Trains do have accidents, too. And expensive? Not particularly, when every additional hour in the mountains means that many more treasures collected and that much more pleasure.

And so it was that my aunt and I took our first big collecting trip by air. She suggested the trip in the first place, and then made it possible for me to go. Together we worked out the plans which entailed much letter-writing and subsequent decisions mostly as to the regions to visit. Although to many the plans seemed wild, there were reasons for our planning such a hop and skip type of trip. We wished to gain some knowledge of native American alpines as they grow in the wild and how they react to cultivation. This was the general idea behind the trip. In detail it meant observing the plants in the field and taking copious notes, photographing them, collecting living plants and making pressed herbarium specimens, also visiting nurseries and professional collectors to get their opinions and hear their experiences. There was not the time available to study well the plants of any one region, so it seemed wise not to attempt this, but rather to cover a greater area by spending less time at each place. Hence, we decided to travel by plane wherever possible to cover the great distances between collecting areas in a relatively short time.

Briefly our itinerary was: New York to Denver, Colorado, by airplane (via Chicago and Cheyenne); a week's collecting in the Rocky Mountains; Denver to Portland, Oregon, by plane by way of Salt Lake City and Boise; two days at Portland and then by air to Seattle, Washington; a brief stay at Seattle, and, following this, by car to Mt. Rainier National Park; back to Seattle and on north to Mt. Baker National Forest; from Seattle by plane to Vancouver, British Columbia; the train from there (because there was no air service) to Jasper National Park, Alberta; a week of collecting in the Canadian Rockies; then by train to Winnipeg, Manitoba; and finally back to New York by airplane via Minneapolis and Chicago.

In all we covered about 8,000 miles in 31 days. This included some 5,000 miles travelled by plane, 2,000 miles by train, and 1,000 miles by auto. The trip was not taken as a stunt or to set up any speed records. The objectives have already been stated. Perhaps our experiences may be of interest to those who grow, but rarely, if ever, have the opportunity of travelling, particularly to observe and collect alpines in the field.

*The word "alpine" as applied to plants is, unfortunately, very loosely used by various horticultural writers. Personally, I feel that it should mean those plants which, in a given region, are found only in the Alpine Zone (that is, above treeline) and those kinds which reach their greatest abundance there. This brief definition classifies most of those stragglers which go down into the Sub-alpine Zone or lower. It also takes care of those which range upward into the alpine regions from the lower zones.

The Trip to the Rockies

We're off, and it's quite literally in a cloud of dust. It was Friday, the tenth of July, 1936, and one of those swelteringly torrid afternoons with the temperature and humidity both close to one hundred. We had had to drive for over an hour in this furnace, mostly with the windows on the windward side of the car closed to keep out the scorching (and odoriferous) wind that swept across the Hackensack meadows. Newark Airport was hotter, if possible, and the air at times was filled with dust churned up by the propellers of the arriving and departing planes.

Shortly after four-thirty we said good-bye to the family, climbed into the plane, which was delightfully air-cooled, and soon were rushing down the field and into the air. Over northern Jersey and many places familiar to us and then we were in a thunder shower over the mountains of Pennsylvania. It was rather exciting riding through the storm clouds at a hundred and ninety miles an hour with the lightning slashing about us. At that speed we quickly left the storm behind.

The plane's hostess served our first air supper as we flew over the wooded hills of Pennsylvania. After a short stop at Cleveland to receive passengers, we crossed the lower end of Lake Michigan in the dusk. Chicago and its miles of suburbs formed intricate patterns beneath us with their thousands of street lamps and patches of multicolored neon signs. The plane flew straight to the airport on its radio beam through this confusion of lights. Planes were changed at this busy airport, the hub of many airlines. In a surprisingly short time our plane for the West rolled up to the loading gate, the passengers went aboard, and it took off. As we rode the invisible radio beam, we watched the many airway beacons ahead of us across the plains, marveled at this new, almost miraculous method of transportation, and wondered, too, what plants would be collected the next day in the Rockies.

Even my aunt and I, air novices that we were, found sleeping easy and hardly remembered stopping at Omaha and North Platte, Nebraska, during the night. Out bag and baggage at Cheyenne, Wyoming, where we had to wait for a short while to catch a plane on a branch airline to Denver. The airport was in darkness with a faint glow in the eastern sky, but as the plane rose higher and higher, the sky became lighter and finally the sun appeared over the horizon. This on our left; on the right in the far distance a few of the taller snow-capped peaks of the Rockies appeared, bathed in the rosy glow of the sunrise. Beneath us the land seemed remote indeed with its still dark, haphazard checkerboard of farms, and its few small ponds and many erosion gullies between the cultivated areas. It took less than an hour to reach the Denver airport, which was still rather dark. As the plane dropped down for the landing, the sun sank out of sight and there was an appreciable period after landing before it rose again. Thus we had two sunrises and one sunset within a short time.

Above Treeline in Colorado

After a few winks of sleep at a Denver hotel, much unpacking and repacking, breakfast, hiring a "Drive-Your-Self" car and loading it, we were ready to hit the trail.

In the afternoon we had an interesting visit with Darwin M. Andrews at Boulder. Because of ill health he has not been able to do much collecting of late, but in years past he searched the mountains of Colorado

and turned up many interesting and valuable plants. While driving that day we had the unusual honor (according to the Coloradans) of being thoroughly pelted by a heavy thunder shower. I popped out two or three times in the rain to collect seeds of some Delphiniums and Lupines growing along the road in the dry (?) foothills country. During the late afternoon it cleared and we had the pleasure of driving through the mountains with a bright sun streaming down. We caught glimpses of the higher peaks ahead covered by a fresh fall of snow, no doubt from the same thunder storm.

Part of the way we followed St. Vrain Creek through both open and wooded areas. There were many interesting and new, to us, plants growing beside the road. Upon rounding a sharp curve, we came on one of the most intensely colored flowers I have ever had the pleasure of seeing. A patch of about a dozen plants were growing in the dry, gravelly material at the base of a rock outcrop in full sun. Its typical pea-like flowers placed it in the Leguminosae, but beyond that it was just a beautiful flower to me. It turned out to be a Loco, *Oxytropis sericea,* when finally identified.

The purple flowers were held some eight inches above the extremely silver-hairy, pinnately-divided leaves. Plants were carefully collected, but I felt that they would rot during transportation East due to their hairy leaves. This expectation was, unfortunately, fulfilled. Since, I have had some success in growing this and other similar legumes from seed. Besides the difficulties in shipping, these plants have a poor root system for easy transplanting. Then, too, there is always the trouble of getting the plants established on account of the symbiotic relation between their roots and certain nitrogen-fixing bacteria. I feel that this latter factor is the most important and difficult to solve problem of them all. Perhaps some day we shall be able to grow many of the showy and really fine Lupines, Locos, and Vetches found in our West.

Another stop gave us *Townsendia exscapa* with its stemless (and then dried) flower heads almost hidden by the numerous, needle-like, grey-green leaves. These tiny tufts grew among the rocks of a dry, sunny slope. A short distance away near and often under the pine trees which dotted the hillside, *Eriogonum umbellatum* and *E. Bakeri* formed mats here and there. The two were similar with woody, prostrate stems and rather dark green leaves mostly covered by dense hair, particularly on the undersides. The flower stems and heads stood up like small umbrellas over the mats. The flowers were yellow, some having a reddish tinge. Again I express a wish —that these plants come into more general rock garden use. There are a great many species of Eriogonums in the West which are most desirable and, as yet, unknown horticulturally.

Farther along, as the road followed the Little Thompson River, a patch of scarlet caused us to stop. It was one of the western Paint-brushes (*Castilleja lineariaefolia*) which are noted for their brilliant colors. The plants, about two feet tall, were growing amongst the grasses of a rather moist, sunny glade. In a drier part of the same open area were large colonies of that delightful little Pussytoes, *Antennaria rosea.* It is much like our common eastern species, but the flowers are pink. It should make a good ground cover in the drier places of our gardens. *Erigeron flagellaris* with many, small, whitish flowers on bushy plants a foot and a half high were abundant

in spots. This plant has been a disappointment in my garden, as it has turned weedy.

A few hundred feet down the road were some cliffs which looked interesting. Of course, we investigated! In the more sunny parts were tufts of a small fern which we did not recognize. It looked like a Woodsia, somewhat akin to a small *W. obtusa,* and it proved to be *W. oregana.* The crevices of the shaded sections of the cliff were filled with *Heuchera bracteata.* It was not in bloom, but I was later told that the flowers are not very showy, being small, greenish bells on six-inch stems. The foliage was definitely interesting with the crowded tufts of bright green, rounded, toothed leaves (said to turn reddish in the Fall). Another small fern, *Polypodium hesperium,* was seen in a few of the cracks. It looked a great deal like our eastern Rock Polypody.

It was a pleasant drive along the stream (dignified by the name "river"). As we neared our destination, the forests gave way to open country with fields and meadows. Two-foot spikes of blue *Pentstemon unilateralis* caught our eye in the dry fields. This Beardtongue is a beautiful member of that generally showy and abundant American genus. It has glossy, rather narrow leaves and is common in that region. Plants grow easily and vigorously in the garden. In fact, the only fault that I can find with this plant is its too great height under cultivation.

The Rocky Mountain National Park headquarters are in the village of Estes Park. We visited the Superintendent's office upon arriving and were courteously received by the rangers. A permit to collect plants in the Park was given us, as had been arranged in advance by correspondence. Superintendent Allen was kind enough to assign Mr. Donald J. Obie, acting Park Naturalist, as guide for our trip up the Trail Ridge Road the next day.

Collecting on Trail Ridge was not so successful because of the snow of the day before. The ground was covered several inches deep from treeline to the top, which is some 12,200 feet in elevation. About all that was showing above the snow were the long-stemmed (two-foot) white flowers of *Polygonum bistortoides* and the tremendous (sometimes four inches in diameter) yellow heads of *Actinea grandiflora,* a striking, six-inch, alpine member of the Compositae. I collected a few plants which were not covered, but it was so cold and windy that we finally had to give up. We photographed some young pipits in their ground nest almost buried in the snow. We also got some striking scenic pictures of the snow covered mountain ranges and the low-hanging tumbled masses of black storm clouds which seemed to look particularly threatening that afternoon. Several parties of tourists were enjoying their first summer snow experience by snowballing each other and accompanying it with much merriment.

That night, as every night while collecting in the field, my aunt washed and pressed herbarium specimens and I carefully packed my plants in moss and heavy wax paper. This was a very tedious and uninteresting task for both of us but one necessary to make the trip of permanent value. Our collecting equipment, by the way, consisted mainly of vasculums, a trowel, notebooks and pencils, cameras, a telescoping metal tripod, knife (used to dig plants from rock crevices), and a large pick which I carried. This was used for almost everything, particularly for digging plants and climbing steep slopes and cliffs. The pick is much like an ordinary botanist's pick

Saxifraga austromontana amongst granite boulders of the Bear Lake region, Rocky Mountain National Park, Colorado.

but about twice as large. It is now an indispensable companion on all trips. Of course, there were the blotters, wooden pressing racks, leather straps, and so forth for pressing the plants, too. Drying blotters is always a problem on such trips that we did not escape. At night our rooms looked confused, indeed, with all sorts of paraphernalia standing about and drying blotters occupying every available space.

The next day, July thirteenth, a bright, sunny day despite its supposedly unlucky number, we decided to look over a little of the Bear Lake region in the Park. This section proved interesting and several plants, new to us, were found. There were so many plants on the cliffs, rocks, and dry, partly-shaded, stony slope above the west side of the lake, we never went above treeline. A few, faded, pink flowers of *Dodecatheon philoscia* were still showing from a moist pocket in the cliff; *Saxifraga austromontana* with dense, Kabschia-Saxifrage-like, green cushions and six-inch sprays of flowers (white dotted red) and *Arenaria Fendleri* with five-inch tufts of grass-like leaves and white flowers were in full bloom on the dry slope and in rock outcrops; an especially large patch of the beautiful little *Erigeron compositus,* having light lavender or white flowers (daisy-like), covered the chip strewn mountainside in one spot. This Fleabane is unusual in having threadlike leaves three-forked at the apex and in being only three inches high. There are many fine Erigerons in the West, and this is one of the best. Luckily, it does well in the rock garden in rather dry, well-drained, rocky soil (beware rich soil or it will become too tall and lose its charm). The taller, up to ten inches, and more common *Erigeron salsuginosus* dotted the slope with its lavender flowers. We found a whole colony of the unusual Moonwort (Fern), *Botrychium Lunaria,* and a single plant of *B. lanceolatum* in another location. The Parsley Fern, *Cryptogramma acrostichoides,* in which the sterile and fruiting fronds are different, grew abundantly on and near the shaded rocks close to the lake. It has a noticeable yellow-green color and grows in large clumps when undisturbed. There were innumerable other plants, many in bloom. We were reluctant to leave this spot.

It was time for us to move along to the next collecting area. We packed our belongings and plants, leaving the next morning. Again we drove up the beautiful Trail Ridge Road, this time on a clear, warm day. The snow had almost entirely melted, giving us our first good look at the alplands. A description of the Colorado alpine country, as we saw it, might be of interest and also might help rock gardeners determine the cultural requirements of the plants native to that region.

My first impression that day, and the one that has remained in my memory, was of driving up a steep slope on a winding, twisting road and reaching a comparatively smooth, undulating, dome-like summit. Treeline was distinct and the change to alpine vegetation very noticeable. Although the Colorado Rockies are high, with many mountains over 14,000 feet, there are no snow-capped peaks that I know of. Snow persists in relatively small patches throughout the summer, and the alpine parts of the mountains present a brownish appearance from the distance. So it was on Trail Ridge. In places there were streams and moist areas mostly supplied with water from melting snowbanks. They had a somewhat different type of flora from the more common and characteristic kind

of habitat found above treeline in the Park.

The soil in the moist places contained much gritty material and some humus. Despite the fact that it was porous, it was often *saturated* with water. But note—this water was constantly *moving, percolating* through the soil. In that, I think, we have an answer to many of our alpine plant failures in the garden. In their natural habitat the plants are accustomed to abundant moisture *and root aeration.* We in the garden, however, are caught between the Devil and the Deep—if we give the plants plenty of water, the oxygen supply of the roots is cut off and the plants die; if we keep them dry to remedy this, they dry out and die anyway. So, we shall go in circles until someone does a little scientific experimenting and solves the problem. A properly constructed moraine might work wonders for some of these "miffs."

The usual type of alpine habitat found on Trail Ridge is not at all mysterious, or very complicated. Above the relatively solid bedrock (often partly shattered by frost action, et cetera), which often appears above the surface of the ground as small outcrops or cliffs, is the soil mantle. It is composed of the materials derived from the complete and the partial breaking down of the bedrock (a mixture of "soil" and rock fragments of various sizes), plus a greater or less amount of decomposing organic matter provided mostly by the plant cover. The resulting soil mixture is porous and has good drainage because of the underlying rocky material, but it also has a high water holding capacity due to the organic (humus) material.

With the heavy rainfall and snowfall experienced by the mountains in that region, I cannot conceive of this soil ever becoming very dry. Whenever I had occasion to handle it, there was considerable moisture present. This, too, is an important fact to keep in mind. The tops of the plants are protected from drying by the constant evaporation of moisture from the soil and the roots are never subjected to drought. I have found by experience that in a soil of this nature the roots of most alpines do not penetrate to great depths (popular opinion among rock gardeners, notwithstanding). They are confined almost entirely to the soil mantle, which ranges from six inches to a foot or more in depth.

Collecting, photographing, and observing the alpines on Trail Ridge is really pleasant (in clear weather!). The vegetation might almost be called lush. It grows in nearly solid mats, forming a dense turf in all but the most exposed places. Frost and wind leave gravelly scars which are constantly being healed by the encroaching growth of the plants. A few species apparently need more moist conditions, others a drier, more exposed habitat, and some rock crevices. *But the great majority are not particular!* They grow in profusion among the numerous, scattered rocks. At treeline the distribution and abundance of the alpines is somewhat different. Their occurrence is influenced by the severe competition of the vigorous sub-alpine plants and other factors of their environment.

When one is in the Alpine Zone, which is so difficult to describe but so easily recognized in the field, he soon notices the widespread distribution of most of the alpines. We found this to be true in all the regions visited. This was a revelation to us and probably will prove the same to all those who have not studied alpines in the field.

The plants seen on our second trip

up Trail Ridge were in fine shape after their recent ice bath. There were so many wonderful alpines growing practically in the road that I could not keep my mind on the driving and my eyes from wandering. Several stops showed us the wealth of material that had been hidden by the snow. The dense, inch high, green cushions of *Arenaria sajenensis* were sprinkled with white flowers; the dwarf (six-inch), red, yellow, and brown-hued Castillejas (*C. occidentalis* and *C. lauta*) were prominent; a few light blue flowers were still showing on that dwarfest of dwarfs, *Phlox caespitosa* var. *condensata* ("condensed" is literally true, with its tiny bristle-like leaves closely appressed to the trailing stems); *Sedum rhodanthum* (sometimes as tall as two feet) and *S. integrifolium* (usually about ten inches in height), the former, with pink, and the latter with most striking deep plum-colored flowers, were growing in several moist places; *Sedum stenopetalum*, a two-inch, yellow-flowered, cosmopolitan fellow which seemed equally at home in the Alpine and Montane Zones, was growing everywhere in the rocky places; the tiny, delicate, lacy-leaved Snow Buttercup, *Ranunculus adoneus*, was in full bloom in its usual place, beside the melting snowbanks (the large, golden-yellow blooms are sometimes pushed through the snow); and the most abundant alpine of them all growing by the thousands over the alplands—*Geum turbinatum* with yellow, Buttercup-like blossoms are carried some eight inches above the dark green, pinnately-divided leaves. Our previous acquaintances, the Alpine Bistort (*Polygonum bistortoides*) and the Little Old Man of the Mountains (*Actinea grandiflora*), were much in evidence, the latter having a forlorn, bedraggled look after its battle with the storm. The few plants of *Saxifraga chrysantha* and *S. flagellaris* were nearly overlooked because of their wee size. We were attracted to each by its relatively large, yellow flowers. *S. chrysantha* grew in minute, earth-hugging cushions of shiny leaves; *S. flagellaris* seemed to be more of an individualist with fewer and larger rosettes (appearing much as an "unencrusted" encrusted saxifrage). *Trifolium dasyphyllum* formed large mats with numerous heads of pinkish flowers raised above them. Perhaps the most unusual and interesting was *Pedicularis groenlandica*. It is a moisture-loving plant some eight inches high, with dense heads of reddish-purple flowers, and ferny foliage having a purple cast. Each flower is a miniature but nearly perfect elephant's head with broad ears extended and trunk curled upwards in front. And finally to my mind the most beautiful of them all, the incomparable *Eritrichium elongatum* var. *argenteum*. This tiny plant has had pages written about it, but still one must see it to really appreciate its beauty. The intensely bright blue flowers with their yellow eyes set on silver cushions seem to charm even the most casual observer. We found only a few plants in bloom and these almost hidden in their bed of chips. Countless other kinds of plants gave us pleasure as we discovered them growing in the bare, rocky soil beside lichen-covered boulders, or in the alpine turf. Both vasculums were full to overflowing, but we had to drive on anyway as time pressed. Neither of us will ever forget that day!

After driving through pleasant pine forests and across open stretches of dry land covered with sage brush, we reached Empire, a small mining town in the Colorado gold region. We arrived too late for plant packing and pressing that night, so it was necessary

to stay until after lunch on the following day to take care of these duties. I found by experience that it was easier to take notes on the plants collected after one region had been covered, instead of at the end of each day's collecting. These notes are now one of my most valued possessions. They contain information about each kind of plant collected—whether it is evergreen or not, its habit of growth, height, color and showiness of the flowers, habitat, relative rarity, and many other pertinent facts. Notes on the photographs were taken in the field, of course, and include the name and location of the subject, weather conditions, date, time of day, and camera settings.

We left for Colorado Springs early in the afternoon. It was a brilliantly clear day, making the ride doubly enjoyable. The country through which we rode ranged from wide expanses of flat, arid and rather desolate areas to magnificent evergreen forests and alpine passes. The road was mostly unpaved but smooth nevertheless. We negotiated the steep slopes of Loveland and Hoosier Passes by much switchbacking. This drive is one that a person might truly call spectacular from both a driving and a scenic viewpoint. The dirt road is a one-way affair in places and has no guardrails. The turns are of the hairpin variety, if one modifies this conception so that the two ends of the hairpin almost touch.

Loveland Pass rises a few hundred feet above treeline and has many places of interest. Because of approaching darkness, we could stop for but a short while. Even at that we collected *Aconitum Bakeri,* which has dark blue flowers but is rather too tall (some two feet or more) for rock gardens; *Primula Parryi,* a showy species with large clusters of fragrant, rose-purple flowers borne on foot stems above the light green, oblong-spatulate basal leaves; and *Draba crassifolia,* small but possessing pretty yellow flowers. It was dark when we reached Hoosier Pass, which is not above treeline, so it was not possible to do any collecting.

Thursday, the sixteenth, saw the last of our collecting in the Colorado Rockies. Mrs. G. R. Marriage and her daughter had invited us to visit them at their nursery, Upton Gardens, in Colorado Springs. We drove out to the nursery, had a very pleasant chat, and then were taken up Pike's Peak on an all-day collecting trip. Although it rained and hailed at first, this did not bother the party particularly, as it stopped before our collecting got under way. Most of the plants seemed to be at their best, the more severe conditions at the greater height having held back the bloom until a period of warm weather brought out many kinds at once. In places the flowers really carpeted the ground.

The yellow of *Saxifraga chrysantha,* the blue of the Pike's Peak Forget-Me-Not (*Mertensia alpina,* a typical miniature bluebell with hairy leaves), the waxy pink of *Claytonia megarrhiza* with fleshy, spoon-shaped, dark green leaves), the white of *Thlaspi alpestre* (a tiny Cruciferae with shiny leaves and small flowers), the rose-purple of that midget, *Primula angustifolia* (only an inch or so tall, growing in pockets amongst the boulders, *the* blue of the Alpine Forget-Me-Not (*Eritrichium*), and the several other colors all blended to make that picture which is so familiar and unforgettable to alpine plant collectors. Conditions were ideal for photography. My aunt took some scenic pictures and I was able to get a few successful plant photos. So ended the collecting of the first part of our trip.

Most of the next day was spent in

Claytonia megarrhiza, Pike's Peak, Colorado.

taking notes, preparing herbarium specimens, and in packing and shipping the living plants. Mrs. Marriage kindly gave us the use of her cool packing rooms and helped us secure the certificates necessary to comply with quarantine regulations. In the evening we left the orange crate and the large tinned goods carton of our mountain gems at the express office, hoping that the hot weather would not kill too many en route across the plains.

The time had come to leave Colorado Springs, we said our regretful farewells to the Marriages, and drove back to Denver. The car was returned and final preparations made for leaving.

Flying to Portland

After flying back to Cheyenne early Saturday morning, July eighteenth, we boarded a transcontinental plane for Portland, Oregon. It was another clear day with many hundreds of miles of unexcelled scenery. The first stop was at Rock Springs, Wyoming, and the next at Salt Lake City. We came riding into this city through Emigrant Pass, the one Brigham Young used in bringing his band of followers to their "promised land." The plane flew below the tops of the mountains on each side of the wide pass. As we whizzed past, I saw several patches of flowers which looked rather interesting. One patch of yellow flowers in particular made me want to stop the ship for a few moments and get out for a little collecting. I suppose that I shall never know what those yellow flowers were!

Soaring high over Salt Lake with its unusual formations was one of our most pleasant experiences in the air.

The pilot was kind enough to snap some pictures of the lake for us from the nose of the ship. It is courtesies and services like these that help make air travel so enjoyable. The plane stopped only twice more, at Boise, Idaho, and Pendleton, Oregon. As we neared the Columbia River Gorge, the pilot came from his compartment up forward and spoke with each passenger. It was his custom, he explained, when flying in clear weather to show the passengers the Gorge from the air, if no one objected to arriving a little behind schedule at Portland. Luckily no one objected, and he certainly "showed us the Gorge." This included flying the big ship (at a safe height over the broad river, of course) down between the cliffs and mountains that rise abruptly on each side much of the way, and circling points of interest, such as the Federal Government's big Bonneville Dam project. At Crown Point, an observation point on top of the cliffs, the people actually waved *down* at us as we flew past. Again I noticed plants from the plane, this time growing on the rocks. Of course, I *knew* they must be some of those fine Lewisias and Pentstemons that have been found in the Gorge. Near the city the majestic snowcapped peaks of Mt. Hood, Mt. Jefferson, and Mt. Adams rose out of the sun-burnished haze which obscured the lesser mountains clustered at their bases.

Visiting Nurseries

Although we did not see the "City of Roses" during rose time, it was beautiful nevertheless. During our short stay we visited Mr. Ira N. Gabrielson's nursery, Oregon Gardens, and the Borschs' fine nursery at Maplewood, a few miles from the city. It was our pleasure to meet Mr. James Neeman, who has collected alpines in the Rockies and other ranges from the Canadian to the Mexican borders. Mr. Neeman has been unusually successful in growing Lewisias and has in his garden a very large collection of native species besides many fine hybrids which he has produced. On his trips Mr. Neeman has had the good fortune to find and see growing in their native habitats such rarities as *Aquilegia Jonesi* and *A. scopulorum,* and also *Kalmiopsis Leachianum,* to pick a few at random.

Monday evening, July twentieth, saw us moving on again after only two days at Portland. Without a doubt, we had the most spectacularly beautiful flight of our whole trip during that short run to Seattle. As the plane left the city behind, the isolated white cones of Mt. Hood behind us, Mt. St. Helens and Mt. Adams abreast of us, and Mt. Rainier ahead of us were bathed in the soft glow of the setting sun. The heavily forested lower ridges were almost hidden by a dense purplish ground haze. This tended to accentuate the height and splendor of the snow-capped peaks. It was a truly glorious sight, one which we shall remember always. I could not resist attempting a few photographs, so balanced on the arm of my seat, I snapped several. Much to my surprise a few turned out but, of course, without the clarity and beautiful colors of the original scenes.

Our stay in Seattle was made brief in order to leave more time for our collecting trip. The one day allowed was spent in getting another "Drive-Your-Self" car and in going about the city. We visited Mr. and Mrs. Carl English, Jr., at their home, where we had the pleasure of seeing their collection of plants and some lantern slides made from pictures taken on collecting trips. The nursery of Mrs. Else M. Frye is one of the most compact and attractive

little places that we have ever seen. Mrs. Frye was absent on a collecting trip in Montana, so we missed meeting her, but we enjoyed the courteous hospitality of Mr. Julius Anthon. We also drove through the Denny-Blaine residential section of the city along Lake Washington. It is delightful with its many fine homes and gardens, especially the extensive terraces used so frequently on the steep hillsides.

COLLECTING ON THE PUMICE FIELDS

At this point we decided to alter drastically our original plans. After talking with various people in Seattle, it seemed wise to reduce our scheduled trip to the Mt. Baker National Forest by half and include a trip to Mt. Rainier National Park. As the subsequent experience proved, this was an exceedingly wise move. Early Wednesday morning we stowed our duffle (junk, if one interpreted the hotel porters' looks) in "Chevie," and started for Sunrise Lodge in the Yakima Park section on the north side of Mt. Rainier. It was a disheartening ride for many miles, as the road went through land which had formerly been heavily forested. Part was now under cultivation with an occasional mammoth, fire-blackened stump showing just as a reminder, perhaps, to those who think about it, of the glorious forests that once existed there undisturbed. The rest was plain desolation, a cutover area which had burned once, more likely several times. It was a tangle of charred trees, upright and fallen, and a heavy undergrowth of weedy aggressive plants. Then the scene changed suddenly as we rounded a sharp curve —the forest primeval in all its glory! Seeing such a forest was a new experience for me and doubly impressive after riding through the waste land. The Douglas firs seemed huge indeed; the lush ground cover of mosses, ferns, and other plants like a tropical jungle.

It was noon when we arrived at the Lodge, which is about at treeline (elevation 6,500 feet) in a large, open meadow-like spot, Mr. Landes, the Ranger in charge of the Park offices there, kindly gave us our permit to collect immediately even though we had not communicated with him in advance. This was greatly appreciated, as it made possible many hours of intensely interesting field work.

With alpines growing practically at the doorstep of our cabin, it did not take us long to leave the beaten paths and find more plants new to us than we could conveniently handle that first afternoon. We discovered by checking with the maps that it was on the south slope of Fremont Mountain where the greatest quantity and variety of alpines seemed to grow. This mountain is almost at the foot of Mt. Rainier, which on that memorable day, was at first entirely free from clouds. One could see the wispy vaporous mists form near the summit as the hot sun melted the snow, and by late afternoon the upper part of the mountain was completely hidden in its usual cloak of clouds.

This country differed greatly from the alpine regions we had visited in Colorado. There were wide, sweeping valleys, treeless and covered by an alpine vegetation which was sparser on the upper slopes and summits than in the lower, more level places. Mt. Rainier with its perpetual snow towered above all the other mountains near it. Most of these lesser mountains had patches of snow here and there, and their upper parts were bare rocks or cliffs. The sloping sides of the valleys, in general, were dry with a porous soil, but the valley bottoms were more moist and had a soil high in organic matter. The dry soil, if one can truly

A typical association in the Mt. Rainier region. Erigeron aureus in center, Aster alpigenus right rear, Pentstemon procerus lower left, the white flowers of Arenaria capillaris here and there.

call it soil, was mostly pumice in various stages of disintegration. In some places the pieces were so large and loose that I could dig the plants by hand. In this region the plants were quite tall for alpines, some being a foot high, whereas in Colorado most of them were mats hugging the ground or only a few inches in height.

It was particularly noticeable that most of the plants had long roots, many tap roots, no doubt to reach a constant water supply. The roots of the mature plants of *Smelowskia ovalis,* a silvery-leaved plant which is found at great altitudes on Mt. Rainier, went down several feet, I should say, judging from the young plants that I dug. The plants collected here did not transplant well, many dying either in transit or shortly after they were planted.

As to kinds, well, they seemed numberless. Two plants stood above all others in beauty and numbers. Lyall's Lupine, *Lupinus Lyallii,* is by far the best alpine Lupine I have yet seen. It grows about five inches high and forms circular mats sometimes a yard across. The leaves are soft silvery-green due to the dense covering of hairs. Each plant has many large heads of blue, tipped white, flowers. The other outstanding plant was *Erigeron aureus.* This beautiful golden Erigeron should be more widely grown in rock gardens. It has greyish-green leaves and produces numerous golden-orange flowers on six inch stems. These two alpines were in full bloom, making a most enjoyable natural color combination sprinkled over the slopes together.

There were other beautiful plants,

Aster alpigenus
Growing in pumice fields, Mt. Rainier

Saxifraga Tolmiei, on Burrough's Mt., Mt. Rainier National Park, Washington

not quite so numerous as the Lupine and Erigeron. *Aster alpigenus,* having lavender (rarely white) flowers and unusual, dark green linear leaves, is a striking alpine of the Yakima Park region. If it will stand our eastern garden conditions, it certainly will be a welcome addition to the rock garden. *Agoseris glauca* var. *aspera* (a glorified dandelion) and *Hulsea nana* (possessing sticky, hairy foliage), both showy yellow composites, dotted the mountainside. The blue of *Pentstemon procerus,* an herbaceous, mat-forming Beardtongue of some six inches, added its touch of color. The dainty white flowers of slender *Arenaria capillaris* were frequently found mixed with the alpine grasses. The large, prostrate sheets of *Phlox Douglasii,* which reminds one of old-fashioned *P. subulata,* were often entirely hidden by the white or lavender-tinted blossoms. This phlox is one of the showiest plants in the Park.

Thursday, the next day, we hiked over Burrough's Mountain, at the very base of Rainier. Never had we seen (nor have we seen since) such a profusion of bloom. There were acres of flowers, not many kinds, but what a show! Lyall's Lupine and *Erigeron aureus* dominated, with patches of other flowers standing out here and there. We saw several kinds not found on the slope of Fremont Mountain. The tiny *Saxifraga Tolmiei* was noticed first beside a melting snowbank. This plant had no flower, so we were in doubt as to what it was. The succulent leaves, which are a shiny green and very sedum-like, fooled us. Later we saw hundreds of plants in full bloom, the white flowers setting them off as a saxifrage immediately.

An interesting series was observed which illustrates the various stages of growth of all plants as regulated by seasonal variation. However, Tolmie's saxifrage showed at a glance all these changes condensed into a single moment of time and the linear space of about a hundred feet. By walking in a straight line from the edge of a snowbank, one could see the dormant winter state represented by the plants frozen in the snow and ice, the spring by those in various stages of growth from tiny buds to full bloom, just recently thawed as the snowbank melted and receded, and the summer by plants which were setting seed. By digging down a few inches one could find the roots bathed in never-failing streams of ice water from the melting snows above. It is no wonder that many of these alpines, which in their native habitats must flower and form seed in a short time, do not take well to cultivation. Our lowland climate with its relatively warm winters and long hot and dry growing seasons subject these plants to the worst possible conditions.

In a small open place at treeline silhouetted against the groups of dwarf, wind-swept evergreens, a tall spike of creamy flowers stood up like a floral exclamation point. Upon investigation it proved to be a clump of Bear Grass, *Xerophyllum tenax. Polemonium elegans* (not in bloom) and *Saxifraga caespitosa* (much smaller than it is in the Gaspé, Canada) grew side by side in a protected hollow between some boulders. *Polystichum Lonchitis,* a northern relative of our Christmas fern, grew in crevices in a cliff slightly below treeline. The showy *Pentstemon rupicola* covered with rose-crimson flowers was hanging in sheets from the same cliff. *P. Menziesii,* however, is a true alpine. It formed mats which had fewer, but larger, flowers of dull reddish-purple, high up on the slopes. Both are evergreen and somewhat woody. *Cassiope stelleriana,* a rather

Phyllodoce glanduliflora
Yellow American Heather amongst the rocks of Burrough's Mt., Mt. Rainier National Park

rare little member of the *Ericaceae,* has inconspicuous flowers but interesting foliage. It was seen only once. The yellow American Heather, *Phyllodoce glanduliflora,* turned up occasionally but was not as attractive as its two close relatives, *P. empetriformis* (pink) and *Cassiope Mertensiana* (white). All are evergreen shrublets about half a foot tall. The last two, along with *Lutkea pectinata* (having fine, light green leaves and four-inch stems of cream flowers), are common and form a conspicuous part of the alpine flora, often completely covering acres of the alplands (the more moist parts with an organic soil).

Before the mists descended to blot out everything beyond a radius of a few feet, I managed to photograph several of the alpines we had found. The wind came up and drove the low-hanging clouds past us so rapidly that we felt as if we were walking through swiftly moving water. Those who collect in "high places" often have this eerie and sometimes unpleasant experience.

During the past few years on our rambles about the United States and Canada, we have been collecting lichens for Mr. Raymond H. Torrey, an enthusiastic collector of these peculiar little plants. Purely by accident—certainly not through any knowledge of lichens on our part—we have found a few rare kinds. We had the good fortune to find *Dactylina arctica* on Burrough's Mountain. According to the information at hand from Mr. Torrey, he sent some of the material we collected to Professor Bernt Lynge of

Cassiope Mertensiana
White American Heather in a rock crevice at Mt. Rainier

Oslo University, Norway, who identified it. This makes our station the southernmost known on this continent. It extends the range of *D. arctica* some three hundred miles south of its previous southern limit in the Canadian Rockies.

Friday found us packing plants, driving them back to Seattle, having the plants inspected and then shipping them East.

Visiting the Mt. Baker Region

The twenty-fifth, Saturday, we started out again, this time for Mt. Baker Lodge. Most of the drive to Bellingham is not very interesting, but an exception is the beautiful Chuckanut Drive along Puget Sound south of the city. We saw quantities of yellow flowers growing on the rocky ledges along the road there. Stopping to investigate, we found them to be *Sedum spathulifolium.*

The drive in to Mt. Baker is very beautiful and could not help but satisfy the most critical person, I am sure. In places, the forests have been cut off and the land burned over; this destroys the beauty close at hand, but by looking off to the ranges of snow-capped peaks, one can easily forget the immediate surroundings. Mt. Baker is a great pyramid of snow, while its companion to the east, Mt. Shuksan, is a tremendously steep-sided peak of bare rock with occasional snowfields. On the way in we stopped at the District Ranger's office and secured a permit to collect plants in the National Forest. The Lodge was reached late in the afternoon. After supper we drove to the end of the road at Austin Pass. The sun had already set but the alpine-

glow on Mt. Baker and the other snow-covered peaks was a glorious sight. We stood on snow patches with mosquitoes feasting on our ankles, as we caught in our cameras all that was possible of this evening grandeur.

Once more we found a different type of country and kinds of plants. There were a great many snowbanks in the Mt. Baker region, whereas at Mt. Rainier there were very few. These extended down to treeline and seemed to make even the air cooler. Water trickled everywhere under and over the ground. There appeared to be no definite treeline as in the other places we had visited. Rather tall trees grew at 4,500 feet elevation where open meadows began. These open places led to the entirely treeless slopes above. However, few true alpines seemed to grow there, the plants being almost all the larger, sub-alpine meadow types like *Saxifraga aestivalis* and *S. Bongardi, Petasites frigida, Heuchera glabra,* and *Leptarrhena pyrolifolia.*

We spent the first day collecting along Panorama Ridge, which extends from the Lodge nearly to the base of Mt. Shuksan. The plants were very disappointing, as there were few kinds and many of these would not be worth growing in a rock garden. Although the collecting was poor, we enjoyed the warm, clear day and the unsurpassed mountain scenery. Sometimes even an ardent alpine plant collector is able to enjoy things other than collecting.

Monday I took a day's trip to Barometer Mountain. Curiously enough at the time I thought that I was climbing Mt. Hermann, which has some rare and interesting plants growing on it. Due to my ignorance of the country and the absence of trails, I proceeded to visit the wrong place. Nevertheless, I found the plant life to be quite different from that we had already seen. The plant with the best horticultural possibilities, I believe, is an alpine form of *Eriogonum umbellatum.* It makes small mats of grey-green foliage, with the ball-like heads of bright yellow flowers held a few inches above. While I pried some plant of *Polystichum Lonchitis* and *Polypodium vulgare* var. *columbianum,* from crevices in the rocks, a grouse sat on a limb of a dead tree nearby and watched me with apparent interest. *Pentstemon diffusus,* having light blue flowers on stems a foot or longer, grew in patches on the extremely steep upper slopes.

Barometer Mountain rises only a hundred feet or so above treeline, yet the hike from the Chain Lakes is a stiff cross country walk. Since there is no trail, one must force his way through the dense underbrush and over (or under) the many fallen logs, which, by the way, often measure several feet in diameter. All of the mountains in the Mt. Baker area seem to have unusually precipitous sides. This, coupled with the vicious attacks of hundreds of mosquitoes and the heat, made me wonder at the time whether plant collectors were entirely normal, sane people. It was worth the effort, though, because I was able to get some of the best scenic photos of the trip from the top of the mountain, besides adding several new plants to my collection.

Our allotted time at the Mt. Baker National Forest had elapsed. We went through the now familiar routine of plant and luggage packing, drove during the late afternoon through the beautiful country to Bellingham and then down to Seattle along the shore, returned the automobile, and sent the plants and some herbarium specimens East. The second major division of our trip had been completed, but what a pitifully brief stay it had seemed!

Arctic Alpines in the Canadian Rockies

Although we regretted leaving the state of Washington, our anticipation of the pleasures to come in the Canadian Rockies made us anxious to reach Jasper Park. Mt. Rainier was behind us, and Mt. Baker ahead of us as we started. Both were very beautiful in the afternoon sunlight. The Olympics, in the hazy distance across Puget Sound, made us long to dash over there, if only for a moment, to see some of their treasures such as *Campanula Piperi* and *Viola Flettii.*

An hour's flight brought us to Vancouver, B. C. One of the passengers lived in the city and asked if the plane would fly over a certain section. Ordinarily it does not fly near the city because the landing field is a few miles south on the edge of the heavily populated area. Since no one objected, the pilot decided to show us the city from the air. He took us over the mountains to the north and then dropped the plane down into a wide valley that leads straight to the heart of the city. We flew down this valley and out over the business section at a relatively low altitude. The pilot then banked slowly but steeply first on one side and then the other, so that we could look almost straight down. I believe this sightseeing was enjoyed more by the native of the city than the rest of us!

After waiting a few hours, we boarded a transcontinental train which stopped at Jasper, Alberta, a small town in Jasper National Park. The Park, to locate it for those not acquainted with that area, adjoins and lies north of Banff National Park. It is an uninteresting ride from Vancouver through desolate mountainous country, desolate because of lumbering and fire. The train arrived at noon on Thursday, July thirtieth. Soon after arriving the many unfinished details of our trail trip were straightened out. A guide and cook had already been sent to Shovel Pass, where we had decided to collect, to establish a base camp. Major Fred Brewster, our friend and outfitter, who had treated us so well in 1930 on our first visit to Jasper, again arranged the details of our trip. He spent a great deal of time seeing that everything went off smoothly. We certainly appreciate his many kindnesses.

Upon visiting the Park headquarters in the town we had the pleasure of meeting Mr. Withers, who took care of our needs in the absence of Superintendent Wright. He gave us some valuable information and saw that we received maps of the Park and the necessary plant collecting permit (which, as in the other places, had been requested in advance).

Nick, our guide, met us the next morning with saddle horses and two pack horses to carry supplies and duffle. The trail was the same one we had traveled six years previously, but this time it was a plant collecting trip instead of just a vacation. It had been dry for weeks in the Jasper region, so riding was made rather unpleasant by the heat and dust. The atmosphere was clear, that sparkling clearness that only rarified mountain air seems to possess, and the scenery at its summer best.

The trail led up the wide Athabasca Valley for nearly fifteen miles before it turned off to the east up one of the lateral valleys which culminates in Shovel Pass at an elevation of over 8,000 feet. This side valley enters the Athabasca Valley some 2,000 feet above the river level. It was a steep trail and a hard climb for the horses, making it necessary to stop several times to rest them. One stopping place was a dry

stream bed which is a rushing torrent in the spring when the snow melts. There were mats of *Dryas Drummondii,* many square yards in area, growing in the gravel. While we waited, the horses contentedly munched plants that at home often cost a dollar or more apiece and are considered choice rock garden subjects. The hundreds of tan dandelion-like seed heads which covered the mats caused an unusual and beautiful effect. Of course, we collected several packages of seed.

Our camp was located almost at treeline in a grassy open space among the firs. A clear, ice cold brook, from the melting snows at the head of the pass, rushed past the camp in the floodplain a short distance away. This plain was a large, flat, treeless area, composed mostly of gravel which had washed down from the pass and was overlaid by an organic soil in places. It was swampy in many parts and traversed by the main stream and numerous streamlets. The vegetation was very interesting and different from that of the alpine slopes. An Alpine Fireweed, *Epilobium latifolium,* made a spectacular display with its acres of reddish-purple flowers. I have heard this plant becomes weedy under cultivation, I have not even had the pleasure of growing it yet. Finding *Salix nivalis* on the hummocks beside the stream was a real thrill. This extraordinary willow is a mat only three-quarters of an inch high and bears its catkins about an inch above the minute, shiny, oblong leaves. It should make an excellent carpeter for small moist areas in a rock garden.

Saturday, the first of August, 1936, will always remain outstanding in my memory as the "lasiocarpa-delphinifolium day." This, when explained more sensibly, means that we rode to the summit of Shovel Pass and found growing there *Campanula lasiocarpa* and *Aconitum delphinifolium.* To me these are two of the best plants found on the whole trip. The Arctic Bluebell (or Bellflower, if you prefer) with its tiny, toothed leaves and unbelievably huge, single, upturned flowers of bright blue is my idea of a typical alpine, if there is such a plant. The leaves form small mats of irregular rosettes about a half inch high, the flower stems are perhaps an inch in length, *and the flowers are at least an inch and a half long,* making the entire plant approximately three inches high. *C. lasiocarpa* was one of the most numerous plants on exposed, clayey slopes and in the alpine turf too.

The aconite has rather finely divided leaves and those very dark blue flowers so characteristic of many of our garden monkshoods. The plants have only a few leaves and the blooms are usually borne singly on six inch stems. We found just one patch of these uncommon plants and it contained only about seventy-five specimens. This colony was located on the east slope of the pass near the summit in a dense, grassy area (with dark, organic soil) and at an elevation of nearly 8,000 feet.

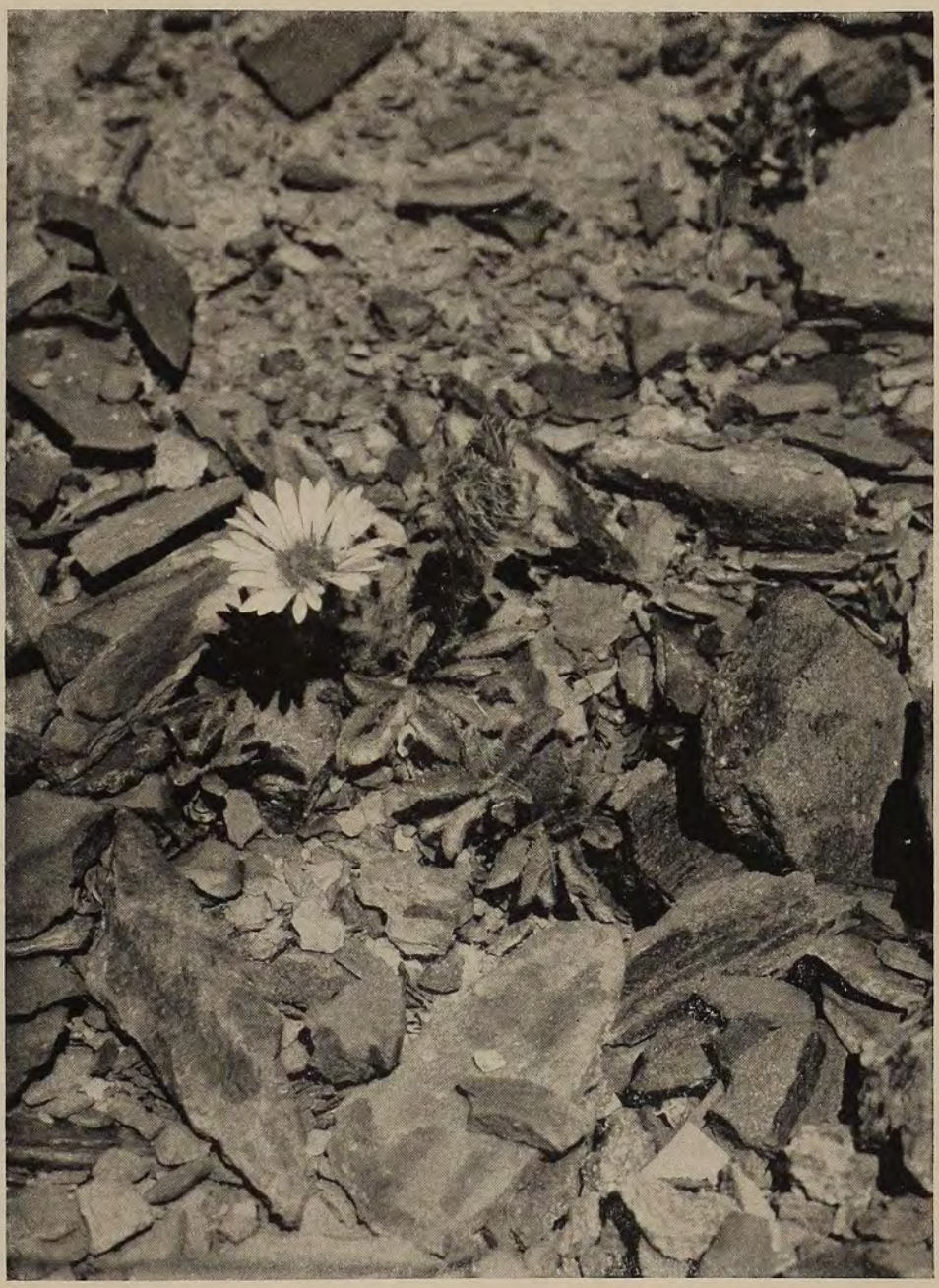
We found so many new plants that day I could not begin to mention them all. The common but beautiful lavender *Erigeron salsuginosus* grew in the more moist, grassy places. That "devil" to grow, *Gentiana glauca,* occurred frequently high up on the sides of the pass and occasionally in the valley lower down too. We both remembered seeing this greenish-flowered gentian and the white and pink American heathers on our first trip to the Canadian Rockies, although at that time we did not know what they were. The peculiar four-angled rosettes that make up the tightly compressed mats of *Saxifraga oppositifolia* attracted me even though the plants had finished

Campanula lasiocarpa, the arctic bluebell, a true alpine gem, Jasper National Park

blooming some weeks before we had arrived. Three inch *Draba incerta,* a yellow Cruciferae, found high on the sides of the pass, seemed to prefer narrow rock crevices; *Anemone multifida* produced a few creamy white flowers with a slight bluish reverse. It grew in small colonies here and there between the scattered rocks.

Nick, the guide, became interested when he saw me crawling around on the dense alpine turf. At first he thought I was crazy, but soon he too was down peering here and there for the tiny plants. All this excitement was over rare *Botrychium Lunaria var. minganense.* I accidently found the first plant (the usual experience, it seems, with Botrychia) while photographing *Aconitum delphinifolium.* This plant hunting was a novelty for Nick, but he discovered it to be a great game pawing through the grass looking for the "doo-flickers," as he called them. We located thirty plants or more, ranging from a half inch to three inches in height and all bearing sporangia.

The following day we rode up a non-existent trail to the Skyline Saddle on



The unnamed Erigeron (near E. uniflorus) almost hidden in its bed of chips, Skyline Saddle, Shovel Pass area, Jasper National Park

the north side of Shovel Pass. The horses had a difficult time of it as the jagged rocks gave them practically no footing and, in other places, the sliding shale caused trouble. According to the guide we were the second party to reach the Saddle by horse from the pass. The weather was very clear and the views exceptionally fine. Mt. Robson, the highest mountain in the Canadian Rockies, stood out in the distance, distinguishable because of its great height and entirely snow covered sides.

On Skyline Saddle grew many species that we did not find anywhere else in the region. An *Eriogonum* (perhaps a new species of the *E. caespitosa* group), much like the *E. umbellatum* from Barometer Mountain, only larger, formed mats beside the trail to the saddle; the Arctic Poppy, six inch *Papaver radicatum,* had a few greenish-yellow blooms remaining but, what was more important, supplied all the ripe seeds we wanted; and the leaves of an *Erigeron sp.,* much like *E. uniflorus,* but probably a new species, were barely discernible amongst the stone chips covering the ground. The occasional, showy, white-rayed flowers of this plant are followed by large brown seedheads covered with long hair. Dwarf *Aster apricus* had deep green leaves and dark lavender flowers, which made it conspicuous in the few places where it grew. Its spreading system of underground stems and roots made it difficult to dig and transplant. In places *Campanula lasiocarpa* grew by the hundred and was in full bloom.

August third, a Monday, I spent collecting and photographing on foot within a few miles of our camp. I was fortunate in getting several good photos of *C. lasiocarpa* and other plants. Still more new plants turned up. *Potentilla villosa,* which has silvery leaves and yellow flowers on half foot stems, grew abundantly in cracks in a cliff. *Oxytropis podocarpa* was scattered over the lower slopes of the pass. This prostrate-growing member of the Leguminosae has ferny foliage and large shiny green pods tinged with red where the sun strikes them on the upper side. *Parnassia fimbriata* grew in the wet spots at and below treeline. The white flowers on tall stems have a delicate, ragged appearance.

My notebook contains some brief information about nearly two dozen more interesting plants, besides the ones already mentioned, that were collected at Shovel Pass and brought East with us. These include a *Vaccinium, Aquilegia,* several *Saxifragas, Anemones, Arenarias,* also a *Sedum, Salix, Veronica, Caltha,* and others. Lack of correct names (as yet) and definite knowledge prohibits mentioning each in detail, but no doubt some day rock and alpine plant gardeners will be growing and enjoying these and the many other worth while plants native to the Canadian Rockies.

The soil in the Shovel Pass region deserves some mention. It is one of the heaviest clays that I have ever encountered. Much of the bedrock on the east side of the pass, at least, is a shaley material that disintegrates readily. The soil on the rounded exposed ridges that results from the weathering of this material is a dense clay, as one might expect. It is an unusual soil in which to find alpines. One usually thinks of porous, gritty soils or mixtures of humus and rock chips when visualizing alpines in their native habitats.

Most of the latter part of the afternoon and long evening (it stays light until around nine o'clock at that latitude in August) were spent in wrapping plants, pressing specimens, and taking detailed notes. That night at

The home of Papaver radicatum and an Erigeron that is probably a new species. Athabasca Valley from the clay slopes of Skyline Saddle, Shovel Pass Area, Jasper National Park, Alberta, Canada

eleven o'clock I could not resist taking a picture by moonlight because it seemed almost "as light as day." Much to my surprise the five minute exposure gave some results.

Tuesday morning we had to say good-bye to all collecting and the mountains and start our several thousand mile trip homeward. The plants were stowed in two wooden panniers, one on each side of the horse, our baggage tied on top, and we started towards Jasper. It was a hotter and dustier trip than the one up. I did jump off to collect *Primula incana* (small, pinkish flowers on foot and a half stems) which grew at the edge of a swamp in the Athabasca Valley. A Woodsia and a Sedum were picked up en route also. These were the last plants collected on our big "expedition" to the West.

Returning East by Train and Airplane

August fifth, Wednesday, we packed the plants in readiness to take them East, worked over field notes, and rested up. Field equipment and some other luggage were sent home and we boarded the train for Winnipeg, Manitoba, early Thursday afternoon, arriving there Friday evening. It seemed terrifically hot after having lived outdoors in the mountain air and having traveled in an air-conditioned train.

Saturday morning I sent my suitcase home by express, minus bare necessities, and kept the box of plants to

take with us in the airplane instead. It was not possible to take both due to the regulations concerning weight. There's no telling what a collector will do for his plants! We had the plants examined by a Dominion Inspector stationed in the city and secured the certificates required by our government. I enjoyed a short visit with Mrs. Harold Fowler, who has done some collecting in the West and is an enthusiastic rock gardener. We had an interesting talk and traded a few plants.

The plane left at three o'clock for Chicago via Pembina and Fargo, N. D., and Minneapolis, Minn. The U. S. Customs Inspector at Pembina was perplexed as to the procedure to follow in admitting plants. As is usually the case, he had not had any previous experience with plant quarantine regulations. Our certificates of origin and inspection from the Canadian official and the permit to import plants from our own government finally convinced him that everything was in proper order, so he let the plants pass after delaying the plane a short time.

We had the pleasant experience of flying over the "Bread Basket of the World," that famous wheat growing region in North Dakota. One can hardly realize the tremendous amount of land under cultivation on this continent until he has flown over some of it. We saw some beautiful cloud effects on the way. There is nothing more emotionally inspiring than seeing the exquisitely beautiful cloud formations from a plane on a clear summer day. Their beauty must be seen to be appreciated, it is beyond written description.

Instead of going straight through to New York, we spent the night at Chicago and left at seven o'clock Sunday morning. After a stop at Detroit and Buffalo (the pilot took us directly over Niagara Falls), the plane flew near Elmira, N. Y. This city is on the edge of an area which I know well from my many collecting trips taken from Ithaca. As the picturesque hills of central New York and northern Pennsylvania rolled beneath us, I thought of the numerous interesting plants they have growing in them that are as yet mostly unknown to the gardeners who live a mere one hundred miles distant. Finally we sighted the airport and knew that our big trip was about to end. We landed at noon, and it was all over. The family greeted us joyfully, glad to see us safe and sound after several thousand miles of travel.

In Conclusion

I might add that we were collecting the living plants and seeds for the Department of Floriculture and Ornamental Horticulture, Cornell University, and for my own use. These plants are being used in experimental work, particularly in attempting to solve the many problems involving their culture and propagation. The pressed specimens were given to the L. H. Bailey Hortorium, at Ithaca, N. Y., where they are now deposited. Dr. R. T. Clausen kindly identified them and deserves an expression of thanks for making the determinations, some of which were very difficult.

No doubt, from time to time, the results of the experimental work will be published. Thus, I hope, this trip will prove of value to others by having secured the plants and information that make this work possible.

List of Plants Mentioned in the Article

Only showy or otherwise desirable species with horticultural possibilities are included in this list. The plants are all alpines, unless otherwise stated.

The region and locality in which the plants were seen and their usual habitat, as we saw them growing, are given. Most of these plants are rather common and have widespread ranges. They are, by no means, restricted to only the area in which we found them.

Colorado

Montane Zone—St. Vrain Creek and Little Thompson River. Habitat (1) Dry, gravelly soil (or rock outcrops) with little or no shade.

Eriogonum Bakeri
E. umbellatum
Oxytropis sericea
Townsendia exscapa

(2) Richer soil with more organic matter, little or no shade, average moisture. (Exceptions noted).

Antennaria rosea
Castilleja linearíaefolia
Erigeron flagellaris
Heuchera bracteata (shaded rocks)
Pentstemon unilateralis
Polypodium hesperium (shaded rocks)
Woodsia oregana (rocks)

Alpine Zone—Trail Ridge, Bear Lake, Loveland Pass, and Pike's Peak. Habitat—Well-drained soil with large amounts of gritty material and organic matter, average moisture. (Exceptions noted).

Aconitum Bakeri
Actinea grandiflora
Arenaria Fendleri (sub-alpine)
A. sajenensis
Castilleja lauta
C. occidentalis
Claytonia megarrhiza
Cryptogramma acrostichoides (sub-alpine)
Dodecatheon philoscia (moist, sub-alpine)
Draba crassifolia
Erigeron compositus (sub-alpine)
E. salsuginosus (sub-alpine)
Eritrichium elongatum var. *argenteum*
Geum turbinatum
Mertensia alpina
Pedicularis groenlandica (moist)
Phlox caespitosa var. *condensata*
Polygonum bistortoides
Primula angustifolia
P. Parryi (moist)
Ranunculus adoneus (moist)
Saxifraga austromontana (sub-alpine)
S. chrysantha
S. flagellaris
Sedum integrifolium (moist)
S. *rhodanthum* (moist, sub-alpine)
S. stenopetalum (alpine and sub-alpine)
Thlaspi alpestre
Trifolium dasyphyllum

Washington

Alpine Zone—Fremont Mountain and Burrough's Mountain. Habitat—(1) Dry, porous, pumice soil.

Agoseris glauca var. *aspera*
Arenaria capillaris
Aster alpigenus
Erigeron aureus
Hulsea nana
Lupinus Lyallii
Pentstemon Menziesii
P. procerus
Phlox Douglasii
Smelowskia ovalis

(2) More moist soil containing considerable organic matter. (Exceptions noted.)

Cassiope Mertensiana
C. Stelleriana
Lutkea pectinata
Pentstemon rupicola (rocks)
Phyllodoce empetriformis

P. glandulifiora
Polemonium elegans
Polystichum Lonchitis
Saxifraga caespitosa
S. Tolmiei (very moist)
Xerophyllum tenax

Jasper National Park, Alberta, Canada

Alpine Zone—Shovel Pass and Skyline Saddle. Habitat—(1) Rather moist, heavy clay soil with some gritty material. (Not tested, but very likely neutral or alkaline in reaction.)

Anemone multifida
Aster apricus
Campanula lasiocarpa
Erigeron sp.
Eriogonum sp.
Gentiana glauca
Oxytropis podocarpa
Papaver radicatum

(2) Soil with a great deal of organic matter, some gritty material, average moisture. (Exceptions noted.)

Aconitum delphinifolium
Draba incerta (rocks)
Dryas Drummondii (very gravelly soil, sub-alpine)
Epilobium latifolium
Parnassia fimbriata
Potentilla villosa (rocks)
Salix nivalis (moist)
Saxifraga oppositifolia (rocks)

NOTE—This list of seventy-seven plants is appended merely for easy reference. It is intended as a general culture guide but not to tell a complete story about the plants included on it.

Stewartias

Mary G. Henry

The stewartias, deciduous, upright growing little trees of the Theaceae, are an exceedingly attractive group, any one of which is capable of embellishing handsomely the small piece of ground allotted to it.

There are about 9 species of Stewartias. Two of them are natives to our eastern states. The others come from China and Japan.

These beautiful small trees are so adaptable and easily grown, it is rather surprising they are so seldom seen. They thrive in almost any good soil, providing it contains no lime, and is not too dry, and they are not averse to a little shade.

All these stewartias are perfectly hardy and have stood out during sub zero temperatures, with once a drop to 20 below. They have had no protection of any sort whatever.

In the many years I have grown them they have never lost a twig or a bud by winter killing.

Sometimes they are rather slow growers. They are usually handled in small sizes, and for this reason spring planting is preferable.

Some of the stewartias are procurable in high class nurseries. They should always be moved with a ball of earth covering their roots and then they quickly make themselves at home. If they are very small, however, I plant them where they can conveniently be watered and kept free from weeds, until they are large enough to fend for themselves. All are compact growers and require no trimming or pruning at any season.

So far as my knowledge goes, the only insects that trouble them are those wickedly voracious pests, Japanese beetles.

Stewartias, first cousins of camellias, bear flowers closely resembling single blooms of the latter. Their large handsome flowers, often 3 or 4 inches in diameter, are slightly cupped and are composed of about 5 almost circular pearly white petals with a wonderful satiny finish and with long silky hairs on the outside surface. The edges are often crinkled and slightly toothed, in a most attractive fashion. The center is invariably a showy mass of fluffy stamens that add immensely to the appearance of the flowers. They flower in June and bloom with unfailing regularity when happily situated. The blossoms are usually short lived, the flowers of some species falling at the end of one day; but their exquisite beauty, while they last, more than compensates for this defect. The alternate ovate leaves are about 3 to 5 inches long, and slightly toothed along the margins. In the autumn they color up well, taking on various shades of reds and yellows. The smooth gray bark flakes off in an interesting way, making them conspicuous trees, especially in winter.

Stewartia pentagyna is the Stewartia most commonly seen, not only because it is the easiest one to procure, but also because it is one of the handsomest. This beautiful little tree is native to the Blue Ridge Mountains, and grows naturally in rich woods. It is a slender, upright grower, reaching about 20 feet in height, in its native home. The flowers of Stewartia pentagyna remain open for two days.

Josephine Henry

Stewartia pentagyna

Josephine Henry

Stewartia pseudocamellia

Josephine Henry

Stewartia Koreana at Gladwyne

Stewartia pentagyna grandiflora is a fine variety of the type which bears larger flowers. Instead of the usual bunch of yellow stamens, the flowers of this variety contain purple stamens, which give a very sprightly appearance to the flower. My tree is about 10½ feet tall and has been growing here for about 9 years.

Stewartia malocodendron is another native species. It seems equally as hardy here as *Stewartia pentagyna,* surviving the recent cold winters in good shape. However, as this species comes from the woods of the Coastal Plain in a more southerly latitude than *Stewartia pentagyna,* it would probably not survive as far north as that species.

Stewartia malocodendron was first cultivated in 1752, and it does seem surprising that although a native, it is still a rare tree!

Stewartia pseudo-camellia, from Japan, is a robust growing tree, reaching a height of 60 feet in its home. Probably in our part of the country with fairly severe winters, it would not reach that height. For the more southerly states this should, indeed, grow into a noble tree, in time. The largest specimen here is about 20 feet tall. It has been in my possession for over 20 years and has been moved twice.

Stewartia monadelphia, another member of this handsome family, was brought from Japan in 1916. This stewartia is the giant of the family and attains the surprising height of 80 feet in its native land.

The blooms, about 1½ inches in diameter, are, however, just as beautiful and the dainty little leaves are only about half the size of those of *S. pentagyna.*

It seems strange that this, the largest member of the family, bears the smallest flowers and foliage.

My plant was given to me about five years ago. It was just an infant then, but without any especial care it is now over 6 feet tall.

Stewartia koreana is the newest of the above Stewartias. It was brought into cultivation in 1918. As its name denotes its home is in Korea. The maximum height of this tree is about 50 feet. It bears flowers that are perhaps larger than those of any other Stewartia.

My plant of this, too, was a most appreciated gift that came to me six years ago. It is now over 12 feet tall and this summer it bore 27 of its handsome flowers.

Stewartias are precious trees of inestimable value for either small plot or large estate. They should be planted more frequently, and being long lived will be enjoyed by generations for years to come.

Notes on a Western Manitoba Garden

Robert C. Moncure

Last year during the final week in August I had the opportunity of making a very brief stop at the farm and garden of Mr. F. L. Skinner in remote Dropmore, Manitoba. This brief visit served to disrupt many previously conceived theories of mine as to plant hardiness and drought resistance. This farm and nursery is situated about 200 miles northwest of Winnipeg and some 140 miles north of the Canadian border. It is considerably north of usual automobile tourist travel, within a few miles of the Saskatchewan and climatically and botanically belongs to central Saskatchewan and the drought conditions there prevailing. At the time of my visit there had been slightly in excess of four inches of rainfall since April 1st. The country is gently rolling, the soil is friable, very fertile and black and second growth poplars, balm of gileads and birches are fairly protective to the soil. The winters are very severe, the temperature last winter reaching a low of 56 degrees below zero and for two months hovering between 30 degrees and 40 degrees below zero, and in a normal winter the range for months is between one and thirty degrees below zero. During the last few years the summer temperatures have been very high.

Surrounding the buildings and most of his plantings Mr. Skinner has planted dense copses of native deciduous and evergreen trees, as well as flowering shrubs, as a protection against the severe cold and winds of winter and drying winds of summer. It has been a salvation to the place during the drought years, as there is no means of irrigation. This place well illustrates the efficacy of shelter belts where suitable native materials are employed and good culture given. Special efforts are being made by Mr. Skinner to develop plants, trees and shrubs which will withstand the extremes of temperature and will be suitable for dry land culture. As a consequence there has been gathered here plant life from many parts of the world, especially from those areas having similar climate, and Mr. Skinner is constantly trying new materials and keeping in close touch with those engaged in similar experiments elsewhere. I had read sketchy accounts of the work with lilies and roses being done here, but was totally unprepared for the wide variety of plant life and diversity of hybridizing efforts to be found, making it a veritable botanical garden for dry land plant life under extremes of heat and cold. Some of the work being done here might well be compared to that of Michurin in Soviet Russia and Professor Hansen in South Dakota, especially in the development of hardy fruits.

Quantities of lilies were in bloom, some of them of course being late plants from storage. Among them I saw many of Mr. Skinner's crosses, and some of Miss Preston's originations, notably her strain of *Lilium tigrinum*. *L. martagon* and *L. Hansoni* and hybrids were in bloom and are hardy here. A large planting of *L. auratum* was in bloom but Mr. Skinner could not speak for its hardiness as this is the first year effort had been made to grow them outside in winter. As a result of crosses between *L. dauricum* and the local form of *L. Philadel-*

phicum last year a half a pod of seed resulted and it will be interesting to hear the results of this hybridizing effort. As an illustration of difficulties of gardening in this climate, on June 8th a severe frost caused great damage to the early lilies, even freezing those in bud.

An attractive and vigorous clematis hybrid with pale blue flowers was in full bloom and was the result of a cross by Mr. Skinner between an unknown large flowered variety (probably a modern hybrid) and *C. integrifolia,* the latter being listed in Bailey as a three-foot shrub with blue flowers and a native of Asia. Likewise *C. Texensis* seemed thoroughly acclimatized. I also saw *C. Sibirica* and an interesting hybrid between C. ligustifolia and C. seratifolia, the former according to Bailey a native from British Columbia to New Mexico and the latter an August and September flowering native of Korea with yellow flowers and purple stamens.

Another surprise was the flourishing growth of numerous forms of Daphnes in the rock garden, including hybrids of Mr. Skinner's own selection. *D. cneorum* and several forms of *D. alpina, D. tangutica,* and hybrids between the latter and *D. cneorum* seemed thoroughly at home in spite of the apparent dryness of the soil. Despite outward appearances of drought the soil evidently has excellent moisture retentive qualities.

Gentiana Andrewsi was in full bloom and *Campanula Bulleyance* seemed thoroughly at home. *Incarvillea grandiflora* and *I. Olgae,* the latter a very hardy semi-shrub reaching a height of three feet, have also proved themselves thoroughly adaptable. Previously I had always thought the Hardy Gloxiniasto be only semi-hardy and requiring more moisture, but losses where the winters are mild are probably due to frequent thawing and freezing. There is also in the garden an unknown strain of Russian primulas grown from seed. *Vinca herbacea,* a native of eastern Europe and Asia Minor, has proved hardy. Excellent lilacs resulting from a cross between *S. vulgaris* and *S. dilatata* formed a hedge some twelve feet in height and a distinguishing feature was that there were no suckers. Among bulbous subjects grown are *Crocus alativicus* from Turkestan (Ali-Tau Mountains) and a form of *Narcissus poeticus* collected from near the snow line in Switzerland. The crocus mentioned is quite hardy but increases slowly. Various Hemerocallis varieties have proved hardy also.

Incidentally Mr. Skinner says that the Scots Pine from northern Sweden and Finland is one of the most reliable conifers and a much superior type for conditions there than the earlier imported types from western Europe.

The large rock garden is situated in a slight depression and thoroughly protected by shrubs and trees. It contains many native plants with which I am not generally familiar and which time did not permit me to examine closely. There were the ordinary rock plants from all parts of the world suitable to a dry rock garden, as well as many unusual ones. Many of the natives were collected from the wild by Mr. Skinner in the Canadian Rockies and elsewhere. There were a number of attractive dwarf junipers, some of them being from seed from Japan. I noticed a particularly promising dwarf evergreen barberry collected in the Canadian Rockies (it resembled a dwarf Mahonia), and there were a number of cactus and pentstemons as well.

The roses were growing in an open field only partially protected by wind-

breaks. Fortunately some of Mr. Skinner's hybrids were in bloom and I was particularly impressed by the intense fragrance, retained even in the dried specimens, an inherited trait from one of the parents, *R. acicularis,* a large single fragrant rose which grows throughout that part of Canada. The flowers are double and remind me strongly of moss and rugosa roses. Mr. Skinner has used chiefly Gruss an Teplitz, *R. rugosa* and hybrids and *R. acicularis* in his crosses. The foliage and growth of these roses is very similar to that of rugosa, although not so rampant in growth as Agnes and some of other rugosa hybrids. To my surprise I found that that old favorite, Harison's Yellow, is hardy here. However, I have seen a hedge of it in northwestern Minnesota on a southern slope where it withstood 40 degrees below zero with only a straw covering for the roots, and in the same garden Gruss and Teplitz came through unscathed with an overcoat of straw.

There were many other things on the place which time and lack of daylight did not permit me to see and which whetted my horticultural appetite to such an extent that I hope to return again and make a closer study.

Walter Beebe Wilder

Crataegus crus-galli

Some Native White Flowering Shrubs

Helen M. Fox

There is no point whatever in growing ugly plants because they are rare, unless a botanical collection is being assembled and even then a label explaining the reason for omitting the plant would be far better. Most gardeners are limited for space and every plant before being admitted into the garden has to pass a strict scrutiny. The ideal shrubs are those having the four-fold attributes of a good looking form, handsome flowers, ornamental fruits, and brilliant autumnal coloring. Very few possess all of these but sometimes one or two of the qualifications are so outstanding that the shrub is grown even if lacking the others.

In politics we seem to have become nationalistic with astonishing rapidity and it is only natural to extend our conversion to the garden where it takes the form of growing as many attractive native plants as can be gathered together. Any selection out of the vast number of shrubs available for the garden unless chosen according to a scientific classification or for seasonal sequence is entirely arbitrary. But it is amusing to pick out some one group such as the ones having white flowers and native to North America and it is surprising to find how many good looking ones there are amongst them.

Shrubs have to be watched and kept down. In pruning them the gardener must be something of a sculptor and keep his eye on the proportions and the outlines. The old wood has to be cut to the ground in most shrubs and ever so often they should be dug up and divided. A shrubbery planting is more permanent than the perennial border. Nevertheless since a crowded shrubbery is the exact opposite of a thing of beauty the plants have to be moved as they grow to give them sufficient space. Moreover if left alone they would choke their neighbors as well as themselves.

Some of the native shrubs are so lovely they belong in every garden where there is sufficient space for them. On the whole they are not any hardier than many of the Chinese and European immigrants. However, when planted in masses they carry the character of the landscape into the garden and make the two appear homogeneous.

The earliest native white flowering shrub is the *Prunus americana* at home from Maine to Manitoba. It grows in my woods along the near side of a pathway bordering a stream and announces its presence by the sweet fruity fragrance it exhales above the violets and erythroniums. The trunk and stems are black while the little white flowers veil them as with a mist. Brought into the garden which is situated on a hill five hundred feet high and where the soil is clayey loam, it died. Perhaps the location was not to its liking whereas a more sandy soil and partial shade would have been.

The first week in May the fothergillas flower. They belong to the Witch Hazel family and grow wild from Virginia through to South Carolina. They were named for Dr. John Fothergill, the English friend of Benjamin Franklin and John Bartram, who championed the cause of the colonies during the Revolution and had a garden on Stratford-le-Bow, where he cultivated a collection of American plants.

The *Fothergilla major* is popularly

called Bottle Brush, Granny-Grey-Beard and Grant's Grey-Beard. It grows to ten feet high and the stems are grey brown, thickly clustered and form a rounded shrub. When it flowers the shrub is covered with creamy fluffy inflorescences two inches long which resemble fat dish mops more than the Bottle Brush of its name. The flowers have no corollas but only a calyx composed of two bracts, the long white stamens are tipped with pale gold. Sometimes five flowers are clustered together and the stamens form a fluffy bunch. The green pistil also tubular is down lower than the stamens.

The young leaves as they unfold are tinged with brown and catch the light on their deeply grooved surfaces. When they mature they are similar to the leaves of their relatives the Witch Hazels. They are roundish, oval from 2-4 inches long and about the same in width and are coarsely toothed above the middle. They turn pure yellow overlaid with crimson or orange according to accounts, but here, surrounded by far more brilliant autumnal tints, somehow they have been unnoticed.

The first time I tried to analyze their fragrance I wrote down "Strawy, musty, mixed with a delicate flowery quality" and the next time "bitter, of grass and Spring." Perhaps the difference in fragrance was due to a greater or less degree of moisture or sunshine but each time it was decidedly pleasant.

Fothergilla Gardeni flowers a week later and is also native to Southeastern United States. It was discovered by Dr. Garden of Charleston and introduced in 1765. The shrub is low, from 2-3 feet high. The inflorescences are smaller than those of *F. major,* being 1¼ inch long and the same across. They look almost round and the cream colored stamens are tipped by very pale tinted gold anthers. The flowers smell faintly of tea.

The fothergillas are doing well in my garden and are planted on a slope. However, they are said to prefer a somewhat moist soil and one composed of a mixture of peat and sandy loam.

The amelanchiers of the Rosaceae flower the first week in May. One of their popular names is Shadbush, because the flowers open when the shad are swimming up the rivers to lay their spawn. Some of them are low trees and others form thicket like growths, and all are exceedingly hardy and thrive in well drained situations. There are amelanchiers native to Europe and Asia but a greater number are to be found in North America. The *A. alnifolia* grows from Saskatchewan to Colorado, while others grow throughout the countryside and down to Florida where *A. florida* is at home. Many species are carried by nurserymen in the United States as a search through the catalogues will reveal. As with most members of the rose family they can be grown from seeds allowed to freeze in flats or pots over the winter.

The drawback to the amelanchiers as garden plants, lovely as they are, is that their flowering is too evanescent. Their feathery inflorescence settles like a delicate white cloud amongst the pale rose, green, brown and yellow of the new leaves opening on the trees covering the hillsides, but it vanishes almost before it can be savored. Except for *Amelanchier asiatica* the gem of the lot, but since it comes from Asia not to be included in this article, it is questionable whether or not the plants take up too much space to recompense for the fleeting quality of their bloom especially in countries where the *Cornus florida* and the *Cornus kousa* flower.

Walter Beebe Wilder

Fothergilla major

These two give a weightier more snowy whiteness, last far longer in flower and are also handsome in the autumn, especially *A. florida* with its red berries. Except for the *A. asiatica,* which paints its leaves bright orange, charming against the grey of the bark, the leaves of the other amelanchiers turn an uninteresting yellow. Most of the berries although very pretty are so well liked by the birds that they are eaten as soon as they ripen and consequently can not be relied upon for landscape effects. However, when the amelanchiers with their fluttery blossoms stand against the blue of a lake or over drifts of blue and white *Phlox subulata,* ajuga, mertensias or forget-me-nots intermingled with a few roseate bleeding heart, they make such an exquisite picture that it seems very worth while to give up the space to them.

The second week in May brings the halesias with bell-like blossoms of white tinged buff and the *Cornus florida* and right after them comes the *Aronia arbutifolia* of the Rosaceae, flowering from mid-May into June, also with white blossoms. By now the last tulips, the lilacs, the *Rosa Ecae,* the azaleas and spiraeas are flowering over drifts of *Aquilegia canadensis, Iris florentina* and *Phlox canadensis,* and with them are the double white narcissus, the last of the lot to flower. A charming combination under the aronias are the American woodland plants of *Iris cristata* and *Trillium grandiflorum.* The aronia is somewhat elm-shaped and grows to twelve feet high but by cutting it back the height can be kept down a little and the shrub prevented from getting too leggy. The leaves moreover are grey-green below and softly hairy, but on the upper surfaces there are few hairs. Along the midrib on the upper surface are dark glands which stand up like little pappillae.

The flowers grow in loose corymbs of seven, ten or fifteen. The five sepal lobes rise from a cup-like wooly green calyx and are tipped red. The five oval petals narrow into a claw and are separated from each other. The numerous stamens have pale green filaments and magenta red anthers which give the flower a roseate centre. The pistil is five parted and pale green. The flowers smell of sweetness and hawthorne which they resemble. The foliage colors a dark rich red in the autumn and the fruits come in September and stay on all winter. Their dark red flat-topped oval shapes look cheery when partly covered with snow.

After all the lilacs except the tree lilacs have gone, during the last week in May, the Philadelphus begin to flower and continue on into the middle of June. The Philadelphus smells of orange blossoms and as they bloom with the multiflora roses scented of almond and rose the two are mingled and pervade the whole air of the place deliciously. Many of the Philadelphus are native to America but the sight of one tumbling its fragrant blooms along the Southern slopes of the Appalachians is a thrill not yet experienced by me. The "common name," although why the word "common" should be used for this purpose seems strange, is Mock Orange. Through a mistake they were first called Syringa, the generic name of the lilacs.

The Philadelphus are closely related to the Deutzias and belong to the Saxifragaceae and like their little rock-plant sisters their blossoms are creamy white. With the exception of a few low growing species they are straggly plants and their only time of beauty is when they are in bloom. The shrubs grow from 6 to 15 feet high, according

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Aronia arbutifolia

to species, and make thick clumps of stems which have to be thinned rigorously. The stems are generally striated and peeling. The leaves are pointed at the apex and base, have short stalks and are either three or five nerved. The branches are covered with blossoms, either solitary, in racemes or panicles and always terminal. Generally they have four petals occasionally blotched with yellow at the base. There are four calyx lobes and twenty to forty pale gold stamens. Sometimes the white calyces are tinged purplish or yellow-green. The shrubs require a sunny position and a loamy soil.

According to Dr. Alfred Rehder there are forty species. Dr. Rehder's book, "Manual of Cultivated Trees and Shrubs," with W. J. Bean's "Trees and Shrubs Hardy in the British Isles," are the Bibles of shrub growers. However, the list is more than doubled by the numerous hybrids. Some of the scentless Philadelphus such as Banniere, a hybrid, have huge cup-shaped white blossoms borne thickly on the branches and are the Frau Karl Drushkis of the genus. There are double ones with fragrant and large blossoms which flower scatteringly all summer. The single, small-flowered and highly fragrant species and hybrids when they hang their boughs laden with blossoms over a planting of deep blue aquilegias, or stand in fountains of frothy bloom beside tall campanulas or digitalis with *Nepeta mussini* in drifts at their feet make an unforgettable picture.

Amongst the native Philadelphus are *P. microphyllus* from Colorado, New Mexico and Arizona, a small plant with small leaves and flowers and unfortunately not hardy in the Northeast. Lemoine, the great hybridizer, crossed this plant with the highly fragrant European *P. coronarius* and produced a host of lovely hybrids. The *P. coronarius* was one of the first shrubs brought to Massachusetts Bay Colony by the English. Lemoine again crossed *P. Lemoinei,* an offspring of his first set of parents, with *P. insignis,* a hybrid, and produced another fine batch of shrubs. Besides *P. microphyllus,* other outstanding natives are the *P. pubescens, P. laxus* and *P. inodorus* from the Appalachian mountains. The last two are listed in the Arnold Arboretum Bulletin as amongst the best of the group. Bean names seven best Philadelphus and amongst this limited number are three Americans: the *P. microphyllus, P. latifolius* and *P. grandiflorus,* the last two from the Southeastern States.

The viburnums flower from the end of May into mid-June and have creamy blossoms and many lovely species are American, but they would require a whole article to do them justice. They possess all the charms a shrub can have except an agreeable fragrance. They have conspicuous blossoms, fine autumn foliage, attractive fruits and when allowed to spread out to their full growth make beautifully formed shrubs.

The loniceras or Bush honeysuckles are a fine family for shrubs but only two of the natives have white flowers, *Lonicera albiflora,* a semi-vine growing wild in Arkansas and Texas, and *L. oblongifolia,* the Swamp Fly Honeysuckle at home from New Brunswick to Pennsylvania and Missouri.

The hawthorns come a little ahead of the viburnums, opening their first blossoms the third week in May for me. They are low trees and are legion. Professor Sargeant divided up the genus until he had up to 654 species and many more varieties. He planted a whole hill with them at the Arnold Arboretum. The botanists tell a story of how a friend sent Professor Sar-

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Itea virginica

geant two branches from the same shrub and he sent back two specific names for them. They vary considerably in leaf form. The hawthorns carry their branches horizontally and their flowers form flat umbels. The red fruits of some of the species persist a long time and in winter the trees covered with bright red berries stand out against the snow. An American plant, the Cockspur Thorn, *Crataegus crus-galli,* is as handsome as any of the group and has glossy foliage, large flowers and brilliant red fruits, evidently highly pleasing to the birds because they are eaten very quickly.

Itea virginica flowers from the first week in June and belongs to the Saxifragaceae. It comes from the Southeastern States and its popular name is Sweetspire. The iteas are somewhat like the clethras except that the flower spikes are slenderer and the shrubs not as coarse looking, perhaps because the leaves are more elegantly shaped. The itea grows ten feet high and the stems stand straight up perpendicularly. They are round, smooth, pliable and brown green. The leaves are opposite, long, narrow, widest above the centre and pointed at apex and base. They feel silky to the touch and have tiny hairs on the upper surface and fewer longer ones on the under. Along the margins are thorn-like teeth fairly far apart. The leaf stalks are ¼ inch long and the leaves 2⅝ inches long and 1⅝ inch across at the widest part but some are smaller and others larger than this. The flower spikes are creamy and curve up and out, and grow at the termination of the stems. They are 3 to 3½ inches long. The flower stalks are tinged reddish. The little flowers are faintly and pleasantly fragrant and grow thickly around the spike. The blossoms measure ¼ inch long and the corolla is united at the base and spreads into five wide-apart slender petals. The calyx is yellow-white with five very narrow sepals rising from a cup-like base. The stamens encircle the pistil which is a bit higher and the five white filaments are topped with pale yellow anthers. In Autumn the leaves turn a brilliant crimson. The Itea is said to prefer a good soil with abundant moisture but grows well for me. It can be propagated by division.

Rhododendron carolinianum has a variety with white blossoms as has *Rhododendron maximum. R. carolinianum* flowers the third week in May and *R. maximum* the latter half of June. They prefer acid soil and partial shade. Another native evergreen with white flowers is the *Leucothoe catesbaei* from the Southeast. It has pendulous racemes of white bloom in mid-May. The leucothoes like to be planted on sloping banks, in acid soil and partial shade. *Leucothoe racemosa* is similar but deciduous. The leucothoes are handsomest in late fall when their glossy foliage is overlaid with a metallic bronze.

The *Andromeda glaucophylla,* called Bog Rosemary, is not as graceful as the leucothoes but also has racemes of tiny white flowers in spring.

A particularly lovely subevergreen is the *Zenobia pulverulenta.* It flowers for me in the second week in June and the young leaves are pale green on pale green stems, in pleasing contrast to the darker green of the old stems. The inflorescences are racemes of pendant bells. The shrubs grow to six feet high and as with the evergreens it thrives in a half shaded situation and acid soil. It grows profusely in the swamps of North Carolina.

The stewartias and *Gordonia alatamaha,* both from the Southeast, carry their white blossoms in late summer.

During the second week in June

when the campanulas, the verbascums, pentstemons and *Primula florindae,* the thalicturms and the aquilegias are in flower, in the shrubbery, *Rhododendron viscosum,* the White Swamp Honeysuckle, opens its fragrant blossoms. According to Dr. Rehder the shrub grows to fifteen feet high and it must be a grand sight when in bloom, in swamps from Maine to South Carolina. The *Rhododendron viscosum* has brown stems spreading through suckers and forming a thick clump. Long stretches of branches are bare and then come the clustered leaves on very light green branches growing up around the flower clusters which in turn are borne at the termination of the old brown stems. The leaves are alternate oblanceolate, wider above the center, smooth, light green and hairy only along the central vein of the under surface. The flowers grow seven to ten in clusters. The flower stalks and buds are furry, and sticky to the touch, and 5/6-inch long, green tinged reddish and having a dried brown scale adhering to their base. The buds are cream colored with a long tube which swells and twists sideways. The flower starts with a long white tube green at the base and having white purple-tipped hairs all along it. Then the tube flares into five lobes, one much larger than the other four. The lobes curve out and are revolute. The five stamens and the pistil all project beyond the corolla and curve up at their tips. The flowers are 1½ inch long and 1 inch across and are sweetly fragrant of carnation and something heavier, perhaps a dash of vanilla. It is always difficult to analyse and identify smells. The plants are charming and ought to be planted with *Campanula persiscifolia,* which blooms at the same time and shares the *R. viscosum's* preference for a slightly acid soil and partial shade. On some of the bushes the flowers are white suffused with pink.

In mid-June the *Hydrangea arborescens* blooms and keeps on flowering until early August. *Hydrangea arborescens* var. *grandiflora* is called Hills of Snow and with the type and *var. cordata,* all produce large rounded flower heads, like a succession of snow covered hills. The leaves are almost round except for a point at the apex and are widest at the center being 3 inches across and 3½ inches long. The leaves have a prominent central vein and are toothed and each tooth is wide, terminating in a point. The shrubs grow to six feet high. The inflorescences at first form little green balls and as they ripen they grow larger and when fully expanded the balls become cream colored roundish umbels or corymbs, domed at the top. The flowers are sterile, four-petalled and have a nob in the center of the corymb. The petals are shaped like the leaves but with entire margins. In autumn the flowers turn a gauzey grey and remain like ghosts of their former selves all winter long. These handsome plants grow wild from New York to Florida and westward to Iowa and were introduced in 1736. They thrive in our clayey soil and in partial shade but like a sunny situation, too. The hydrangeas form thick twiggy clumps and are increased by division. In our garden they are planted on a slope back of tenuifolium lilies, closely followed by *Lilium concolor* and *Lilium amabile* and intermingled with campanulas. Their creaminess holds down the strong reds and purples of the flowers. *Nepeta grandiflora,* erigerons and Gloria Mundi roses, with the orange lilies and the snowy hydrangeas make a gorgeous combination for the mid-June garden as they all flower at the same time.

Hydrangea quercifolia is also a handsome native shrub although much coarser than *H. arborescens*. The flowers form creamy spikes 12 inches long and 8 inches across in mid-July and fade pinkish. The leaves, as is indicated by the name, are oak shaped. In autumn they turn a rich dark red and remain on for a long time even after the snow has fallen, when they look like red flags flapping from their branches. This hydrangea needs plenty of space and is effective but it is too coarse and of too spreading a habit for any but a very large garden. According to Dr. Bailey it can be increased by suckers or "root pips." The shrub does equally well in sun or partial shade but Dr. Bailey recommends a somewhat moist soil. However, on our place it is thriving in a dry half-shaded situation.

Shrubs blooming in mid-summer are twice as much appreciated as those flowering in May and June when there is no time to admire and enjoy them for there are too many rivals to distract from concentration on the charms of any one plant. The garden can be made handsome in mid-July with *Hypericum Moserianum* the *Lilium Willomottiae,* day lilies in yellow and orange and the pale yellow *Potentilla fruticosa* planted close to the spreading shrub of *Aesculus parviflora,* called Buckeye, or Shrubby Pavia and less elegantly, Bottle Brush. The *A. parviflora* comes from the Southeast and was introduced by John Fraser. On the grounds of a boys' school in Connecticut, the Buckeyes are planted as specimens and have spread to form great flat masses and when they are in flower and covered with their creamy spikes of bloom they are stunning.

The *A. parviflora* grows from 8-12 inches high and spreads much wider. The branches are a grey-brown and have tiny raised dots on them of reddish brown. The leaves are huge, 12 inches long and 10 inches across and are palmately divided into five, each wider above the center and terminating in a long drawn-out point at the apex. The central leaflet is larger than the others; the margins are finely, evenly and roundedly toothed. And the whole leaf dangles from the stalk. The cylindrical flowering spike is 11 inches high. The flowers, always two together, are fragrant of honeysuckle with a dash of fruit and are set all around the stalk which is yellow with green dots on it. The calyx is cream tinted faintly with green and tubular with somewhat rounded, hairy lobes tinged reddish. The corolla has four thin white petals with narrow stem-like bases going down into the calyx. Two of the petals are longer and all broaden above, are unevenly margined and have bumpy surfaces. The flowers are ⅝ inch long and the stamens extend 1 inch beyond the corolla and resemble the feelers of an insect and are its principal beauty for they give an airiness and grace to the inflorescence. When the flowers first open, the white filaments are short and tipped with flesh colored anthers but as the flowers age the filaments stretch out, and the anthers drop off. The pistil looks like an antherless filament.

The first time I saw *Clethra alnifolia,* called Sweet Pepper Bush and also for some strange reason, White Alder, in flower it was growing around the rocks on the coast of Massachusetts. The shrubs covered the shore and the air was sweet with their fragrance like a faint echo of tuberoses. The clethra is native all the way South to Florida and is said to like an acid soil, but in our garden they make shrubs 10 feet in width and 7 feet high. They bloom from the end of July and keep on way

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Hydrangea quercifolia

into August looking cool with their lush green leaves and quantities of creamy spires on the hot days of mid-Summer. They come with the *Phlox paniculata* and make a good background to set off the gamut of white through pink, and red to purple of the phloxes. Planted far away from the phlox the clethras combined well with Tiger lilies and zinnias. The stems make thick woody clumps and in time one shrub can be divided into a whole hillside of offspring. The stems are brown irregularly striated, very leafy and much branched. The alternate leaves are spatulate, cuspidate at the tips and a rich dark green above. They are 4 inches long and 1¼ inch across and smooth above and below. The flowers grow in terminal spikes 7-8 inches long and are creamy white and have dark gold anthers on numerous stamens which project beyond the corolla and give the flowers a deeper cream color from the distance. The blossoms grow thickly around the spikes and are subtended by leafy bracts and each has a short white stalk. The calyx is white, at first cup-like and then separated into five ovate sepals. The five petals of the corolla are crepey textured and white and turn in along the margins. There are ten stamens of uneven length and they stand up straight in the corolla and project beyond it. The pistil is white, with a three parted stigma and extends a little beyond the stamens.

After the clethras fade there are many other shrubs to flower but not any native Americans with white flowers, at least not any known to me.

The grand Sequoia tree, General Sherman, perhaps the oldest and largest organic monument on the globe. Located in Sequoia National Park this tree is visited annually by thousands of people, not only by those from the United States but also by many tourists from foreign countries. Its significance and charm grows upon one with continual observation and reflection so that an ever increasing number of tree lovers are inspired to visit it repeatedly.

The Patriarch of Trees

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In connection with a study of the size and other characteristics of El Tule, the giant Montezuma Bald Cypress tree, *Taxodium mucronatum* Ten., located near the city of Oaxaca, Mexico, the writer recently revisited over a week-end the Giant Forest in Sequoia National Park, California, in order to refresh his memory as to the size and appearance of some of the noble Big Trees, *Sequoia gigantea* Decne. Our observations made at that time, as well as information obtained from officials of the Sequoia National Park, are recorded here for the benefit of those who may be interested in those trees, particularly the General Sherman tree.

Historic Notes

The Big Trees and the related Coast Redwoods, *S. sempervirens* Endl. had a wide distribution over North America many years ago as shown in the discovery of Sequoia fossils in New Jersey, Connecticut, North Dakota, Montana, Arizona and Alaska. The

Ice Age and other radical changes in the topography and climate of the earth, resulted in the Sequoias becoming more and more limited in their range. However, Father Crespi, one of the Spanish explorers with the Portola expedition, noted in his diary under the date of October 10, 1769, a description of what are now commonly known as Coast Redwoods, accompanied with these words, "as we know not the names of the trees we gave them the color of the wood, Palo Colorado." This is the first record of the name Redwood as applied to these splendid trees. In 1823 an English botanist classified them as *Taxodium sempervirens,* in the genus to which the Bald Cypress trees belong. Later, in 1874, an Austrian botanist, Endlicher, gave the name *Sequoia sempervirens* to this species, and it has been universally adopted. The generic name, Sequoia, which is of Indian origin, is also applied to the Big Trees.

The Big Trees seem to have been first noted in 1839 by Joseph R. Walker, and in 1852 A. T. Dowd, a hunter, discovered the Calaveras grove while tracking a wounded grizzly bear. The General Sherman tree, perhaps the largest and oldest living thing, was discovered by James Wolverton, a hunter and trapper, on August 7, 1879, at which time he named the tree General Sherman for the officer under whom he had served during the Civil War as a first lieutenant in the Ninth Indiana Cavalry.

John Muir's name will always be associated with his beloved Big Trees. It is said that a report reached him concerning claims that certain of the Eucalyptus trees in Australia were larger than his Sierra Sequoias. He promptly sailed to Australia in order to investigate the validity of those claims. He returned to California satisfied that his Sequoias were undoubtedly larger and nothing to the contrary has developed since Muir's passing.

Some Big Tree Characteristics

No attempt will be made here to describe the characteristics of the Big Trees in detail. However, a few facts will be given in order to make more understandable the subsequent statements concerning certain of the outstanding characteristics which were of particular interest to the writer.

A total of 76 groves of Big Trees are now known in the California Sierra located between elevations of 4,500 to 8,000 feet and extending from Placer County on the North to Tulare County on the south with 59 of them in Tulare County. During the winter season the Big Trees survive very low temperatures and snow that covers the soil to a depth of many feet for long periods. On the other hand recent experience has proved that they grow well in the lowlands of the San Joaquin and other inland California valleys.

The Big Trees are said to grow to an average height of about 270 feet and with an average trunk diameter of about 25 feet. Their roots spread out laterally in the soil to a distance about equalling the height of the trees but do not penetrate the ground to a depth of much more than 6 or 8 feet. The stability of these huge trees during the violent windstorms that occasionally sweep over the high Sierras is remarkable in view of their relatively shallow root systems. The bark of the Big Trees, from 2 to 24 inches in thickness is richly colored with a brownish red tint, and is of a soft, fibrous texture. This fibrous nature of the bark, a lack of resins and a high tannin content, are said to account for its resistance to fire and insect attack.

The wood of the Big Trees is soft

and brittle but resists decay to a remarkable degrees as is shown by the fallen trees, some of which have lain prostrate for hundreds of years and yet show hardly a trace of decay.

The foliage and cones of the Big Trees resemble in appearance those of the Montezuma Bald Cypress trees. The abundant cones are peculiarly insignificant in size in comparison with the huge bulk of the trees that bear them. Two years are required for maturing of seed, and fruiting begins after the parent trees have reached an age of about 75 years. The trees are monecious, the pollen is windborne and is very abundant.

At the present time the Big Trees are being extensively propagated not only in California but in other countries as well, especially New Zealand. Some trees in the city of Riverside, California, that are less than 20 years old have reached a height of from 15 to 20 feet and are now beautiful and valuable ornamental additions to the gardens in which they are located.

The General Sherman Tree

The writer first saw the General Sherman tree during the fall of 1909. The profound impression that it made on his mind at that time has remained clear and undefiled during the intervening years. From time to time since that first view he has had opportunities to renew the joy of that experience. The majesty, grandeur and the significance of this tree has increased with each succeeding visit. During that period it has been possible for him to see some others of the noblest of the Big Trees, not only in the Sequoia National Park but also in the General Grant, Yosemite and Calaveras parks. All are deeply impressive, particularly the General Grant and the Grizzly Giant. However, the General Sherman tree has continued through the years to typify in the writer's mind the spirit of the Sequoias as no other single tree has done. The beautiful groups of these trees such as the Congress Group in the Giant Forest have left indelible impressions; and some of the individual specimens with scars from fire, lightning and storms which have occurred during the ages that have elapsed since their first leaves trapped the sun's rays, have a particular interest to us. They have withstood the battering of time during their lifetime almost unscathed and it has remained for men with saws and axes to destroy what nature has wrought through a period almost as old as civilization is, to lay them low and split them up into grape stakes. This seems an ignominious end indeed for one of the noblest examples of nature's handiwork, and makes us thankful that under our National Park system some of the finest of these otherwise defenseless Big Trees are being saved for our enjoyment and benefit as well as for that of the generations to come. It is pleasant to contemplate the fact that in this day of exploitation certain of our leaders have had the foresight to preserve some of our Big Trees and to protect them against vandalism and destruction from climatic, human and other causes.

The size of the General Sherman Sequoia is usually expressed by the term "the largest of all living things." Many rivals for this honor have been championed from time to time including other trees of the same species, individual specimens of the Coast Redwoods, Eucalyptus trees in Australia, Baobab trees in Africa, Banyan trees in India and others. These claims, so far as the writer is aware, have failed of substantiation upon investigation. While it is true that some of the Coast Redwoods are taller than any of the

Big Trees and that some of the Baobab trees have larger trunk circumference, they all fail, so far as available records show, to excel the General Sherman tree in volume, and probably in age.

Some reports that a gigantic old Cypress tree located in Southern Mexico is larger and older than the General Sherman tree led the writer to visit it during the first week of October, 1936. This tree, El Tule, as it is commonly known in Mexico, is a Montezuma Bald Cypress, *Taxodium mucronatum* Ten., located in the village of Santa Maria del Tule, a short distance southeast of the city of Oaxaca in the State of Oaxaca, Mexico.

It stands in a churchyard which is surrounded by a high wall. The church and grounds were open to worshipers and visitors at the time of our visit and several groups of Mexicans, Americans and others were present there during our stay. El Tule stands in front of the church building while on its south side is located a somewhat smaller and younger tree of the same species. The location of El Tule in the churchyard has aided in protecting it from injury by vandals or other causes in times past, and recently stringent laws were enacted to preserve this great tree.

The writer measured the circumference of El Tule on October 4, 1936, at 5 feet from the ground and found it to 113 feet and 4 inches. Its average diameter at that point was 36 feet 7 inches, its height 118 feet 7 inches, and the spread of the branches was more than 100 feet.

A similar measurement of the circumference of the trunk of the General Sherman tree on July 31, 1937, at 5 feet from the ground showed it to be 84 feet and 9 inches with an average diameter at that point of 26 feet and 11 inches. Its height as given by the National Park Service is 272 feet 5 inches, so that while it does not have as large a circumference at 5 feet from the ground as El Tule, it is about 2¼ times as tall.

The opinion has been sometimes expressed that El Tule is a group of trees grown together to form a common trunk. Careful examination left no doubt in the mind of the writer that El Tule is a single tree. Other old Cypress trees that were examined in the state of Oaxaca, as well as in Chapultepec Park in Mexico City, showed irregularities in the growth of the trunk similar to those of El Tule and this condition seems to be characteristic of old trees of that species.

The age of the General Sherman tree is estimated as being between 3,000 and 4,000 years. The age of El Tule has been variously estimated at from 4,000 to 10,000 years but the writer will hazard a guess based upon the comparative size of El Tule with others of known age, that this tree is probably not more than 2,000 or 2,500 years old. In any event, the writer is convinced that the General Sherman tree has a larger volume and is probably somewhat older than El Tule.

A few days previous to the writer's recent visit to the General Sherman tree, a newspaper dispatch reported that a visitor to the Giant Forest had carved his initials on the tree trunk. This act of vandalism was performed by a man past 60 years of age, a tourist from Missouri. Fortunately, the man was caught red-handed by one of the employees of the park service, was arrested and brought before United States Commissioner Walter Fry for trial. After hearing the evidence, Judge Fry, to whom these trees are sacred, sentenced the miscreant to pay a fine of $25.00 or spend 25 days in jail.

El Tule, a magnificent Montezuma Bald Cypress tree in Mexico. It is located at Santa Maria del Tule, near Oaxaca, in southern Mexico, within a churchyard where it has escaped the effects of vandalism that mar so many of the unprotected and defenseless of our natural wonders. An ever increasing number of tourists from the United States and from foreign lands visit this tree, one of nature's marvels and a most interesting specimen of tree growth that has endured through the centuries.

After explaining to the culprit the serious nature of his actions, the judge asked him if he was sorry. He replied "Oh, I suppose so," whereupon the judge said "Your sentence is now a fine of $25.00 and 25 days in jail and you are to remove your initials under the supervision of a park official." This desecration of what is probably the largest and oldest living tree, which belongs to everyone and for generations to come, illustrates the necessity for the protection and constant care of these great monuments, which are exposed to and defenseless against vandalism by thoughtless or vicious persons.

A story told to the writer by Judge Fry who has made a lifelong study of the Big Trees in Giant Forest, is worthy of repeating. He said that he camped there in 1902 with John Muir. One evening he asked Mr. Muir what he had done that day and Muir replied "I have named a tree." Asked as to its location and name, Muir said "It is located near Moro Rock and I have named it Roosevelt." It will be remembered that upon President McKinley's death in 1901, Vice-President Theodore Roosevelt had become President of the United States. The Judge asked, "Why have you named this tree Roosevelt?" Muir answered "Because it is in the prime of its life and hasn't a blemish on it." It has been known as the Roosevelt tree ever since and is commonly

regarded as the most perfect individual specimen in the Giant Forest. The name "Giant Forest" was suggested by John Muir.

The General Sherman tree and other magnificent specimens of this species in the California groves of Big Trees, and El Tule as well as other great Montezuma Bald Cypress trees in the state of Oaxaca and other states of Mexico, are all plant immortals and worthy of visits by tree lovers. They inspire admiration and awe on the part of all beholders. The fact that they have survived for thousands of years and have stood the test of time over a period reaching back beyond the beginning of the Christian era must make a profound impression on thoughtful minds.

Rhododendron Notes

EXPERIENCES WITH HYBRIDS OF RHODODENDRON SMIRNOWII IN GERMANY

By T. J. Hermann Seidel
Grüngräbchen, Saxony

Except for those hybrids of *Rhododendron Smirnowii* originating here in Grüngräbchen which have been introduced and are found in culture, I can find in all the literature available to me the names of only the following three additional *Smirnowii* hybrids:

x *Rhododendron* var. Cirrus (*Smirnowii* ♀ x *arboreum* ♂)
x *Rhododendron* var. *Kesselringii* (*Smirnowii* ♀ x *ponticum* ♂)
x *Rhododendron* var. *Elisabetae* (*Caucasicum* ♀ x *Smirnowii* ♂).

Since I am not well acquainted with these three varieties as plants, I shall omit them from this discussion.

Meanwhile, here in Grüngräbchen *Rhododendron Smirnowii* has been hybridized very much, since the winter hardiness of a hybrid here is rated as a most worthwhile achievement and *R. Smirnowii,* coming from the rugged Caucasus, was very promising in this respect. Moreover, the beautiful rose color of the flowers in large and somewhat alluring trusses, and, furthermore, the habit of the plant—of upright but rather compact growth—with the silvery felted indumentum beneath the leaves, all entice a plant breeder very much. All in all, it was presumably an ideal subject for crossing.

Rhododendron catawbiense (the Catawba rhododendron) is here regarded as one of the best partners in crosses for the parental (P_1) generation. It is ideal in such characters as hardiness, habit, leaf form, flower form (close, pyramidal inflorescence) and vigor. In order to make way for numerous combinations directly in the beginning, at least three hereditary factors are needed: hardiness, flower color and leafage, so for the time being apart from a crossing with a hybrid in the P_1 generation and only true species are crossed with one another. The P_1 generation (*R. Smirnowii* ♀ x *catawbiense* ♂) produced in the F_1 generation:

Flowers and color—
- About ¼ rose, *Smirnowii* dominant
- About ½ lilac-rose, also intermediate
- About ¼ bright lilac
- Truss mostly close

Foliage—
- About ¼ sparsely felted
- About ½ brown-felted, but sparser than *Smirnowii*

About ¼ scarcely felted at all
Form mostly similar to *Smirnowii*
Habit of growth—
About ¼ like *Smirnowii*
About ½ intermediate
About ¼ fuller and more compact
Winter hardiness—
Almost 100 per cent hardy.

In the reciprocal cross (*R. catawbiense* ♀ x *Smirnowii* ♂), *catawbiense* dominates more and there are fewer beautiful colors, foliage fair to good. Out of the whole generation, only the following remains:

x *Rhododendron* var. Rebe (No. 3616)
Delicate rose-lilac with olive green markings. Foliage similar to *Smirnowii;* leaves 15 cm. long. Habit of growth compact. Winter hardiness (AA).

In a backcross to *R. Smirnowii,* as well as when an F_2 generation is attempted, no improvement is to be expected in color, which, like winter hardiness, comes separately.

The hybrids, as well as the yet undiluted crosses, pleased the breeder quite well, but the color was not satisfactory. A beautiful dark red sort was now sought as a partner in crossing with *R. Smirnowii* and was effectively found in the varieties Mrs. Milner and Jay Gould: that is, the red color turned out to be dominant to *Smirnowii* in very many instances. On the other hand, *Smirnowii* was partially dominant in the foliage characters.

The blooming dates of these plants, on the average, are:

R. catawbiense	May 30th
R. Smirnowii	May 20th
Mrs. Milner	May 20th
Jay Gould	May 24th

The following named varieties have originated from these crosses:

1. *R. Smirnowii* ♀ x *Mrs. Milner* ♂ = Erna (No. 2411)
Color: Shining dark carmine-rose, with reddish markings.
Truss: 13 cm. high, 17 cm. across; close, pyramidal.
Blooming date: May 20th.
Foliage: Leaves oblong, up to 20 cm. long (without stalk), somewhat drooping; bright green on upper surface, lightly felted below.
Habit: Like Smirnowii.
Winter hardiness: (AA).
A good commercial sort.
2. *R. Smirnowii* ♀ x *Mrs. Milner* ♂ = Ella (No. 2412)
Color: crimson red; otherwise like Erna.
A fair commercial sort.
3. *R. Smirnowii* ♀ x Mrs. Milner ♂ = Daisy (No. 2242), see illustration.
Color: Shining dark crimson-rose, markings somewhat yellow ochre.
Truss: 13 cm. high, 17 cm. across; close, pyramidal; very pleasing.
Blooming date: May 21st.
Foliage: Similar to Mrs. Milner.
Leaves: Elliptical to 11 cm. long; straight. Rather bright green above, smooth below.
Habit: Like Mrs. Milner.
Winter hardiness: (AA).
Very good commercial sort.
4. Mrs. Milner ♀ x *R. Smirnowii* ♂ = Darius (No. 2253).
Color: Crimson red with ochre markings.
Truss: 12 cm. high, 15 cm. across; round, close.
Blooming date: May 23d.
Foliage: Similar to Mrs. Milner.
Leaves: Elliptical, 14 cm. long, somewhat drooping. Bright green above, smooth below.
Habit: Like *Smirnowii.*
Winter hardiness: (A).
No particular commercial sort.
5. Mrs. Milner ♀ x *R. Smirnowii* ♂ = Delila (No. 2238).

Color: Crimson red with somewhat darker markings.
Truss: 10 cm. high, 11 cm. across; small, close, pyramidal, margins frilled.
Time of bloom: May 21st.
Foliage: Leaves elliptical, 12 cm. long, straight. Green above, smooth below.
Habit of growth: Like Mrs. Milner, compact.
Winter hardiness: (AA).
Good commercial sort.

6. Mrs. Milner ♀ x *R. Smirnowii* ♂ =Desiderius (No. 2254).
Color: Pure dark crimson rose with greenish markings.
Truss: 12 cm. high, 15 cm. across; close, pyramidal.
Time of bloom: May 21st.
Foliage: Leaves between oblong and elliptical, 12 cm. long. Rather pale above, smooth below.
Habit of growth: Rather loose, similar to *Smirnowii.*
Winter hardiness: (A).
Mediocre as a commercial sort.

7. Mrs. Milner ♀ x *R. Smirnowii* ♂ = Dietrich (No. 2226), see illustration.
Color: Shining dark rose with weak yellow-green markings.
Truss: 13 cm. high, 17 cm. across; beautifully close, pyramidal
Time of bloom: May 23d.
Foliage: Elliptical, straight, to 15 cm. long.
Habit of growth: Upright like Caractacus.
Winter hardiness: (AA).
Good commercial variety.

8. Jay Gould ♀ x *R. Smirnowii* ♂ = Donar (No. 2305), see illustration.
Color: Crimson with strong markings on lighter ground; frilled margins.
Truss: 11 cm. high, 12 cm. across; close, pyramidal.
Time of bloom: May 25th.
Foliage: Elliptical leaves, to 13 cm. long. Green above, smooth below.
Winter hardiness: (A).
Very worthy commercial variety.

The hybrid varieties, listed above as numbers 1 to 8, are good standard sorts which are annually being grafted in greater numbers. Here I might mention that typical *Smirnowii* representatives, like the varieties Erna and Ella, do not work well when grafted on the stock of Cunningham's White, but break off easily after a few years. Such sorts are grafted and grown well here on *Smirnowii* seedlings as grafting stock. All the other kinds maintain themselves on understock of Cunningham's white, which is propagated from cuttings.

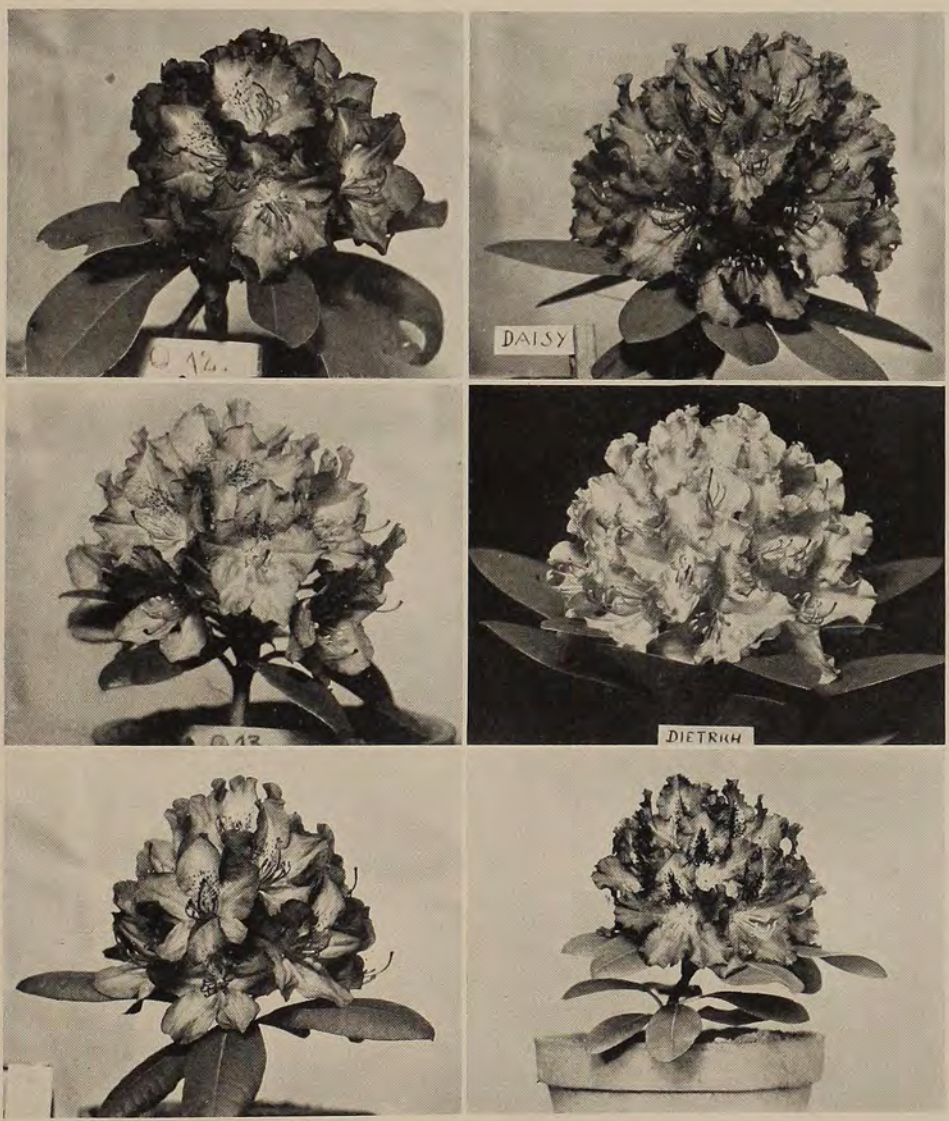
Some of the newer crosses should be mentioned. These are very promising, but are still under observation and have not yet been multiplied:

Erna (s. No. 1) ♀ x Marshall James Brooks ♂.
Erna (s. No. 1) ♀ x Caractacus ♂.

From these crosses, the following noteworthy individuals have matured:

1. No. 4507.
Color: Shining carmine red, frilled margins, lighter in the throat. Very beautiful.
Truss: Circular and flat, 12 cm. high, 17 cm. across, close.
Time of bloom: May 22nd.
Foliage: Similar to *Smirnowii.*
Leaves: 13 cm. long, oblong. Green above, slightly felted with removable tomentum below.

2. No. 4512, see illustration.
Color: Shining carmine red, with weak brown markings on a light ground.
Truss: Like Caractacus.
Blooming time: May 20th.



Cut Trusses of Smirnowii Hybrids

No. 4512 *Daisy*
No. 4513 *Dietrich*
No. 4516 *Donar*

Foliage: Similar to *R. Smirnowii.* Leaves 14 cm. long, green above, smooth below.

3. No. 4513.
   Color: Uniformly plain rose with brownish markings.
   Truss: 13 cm. high, 15 cm. across; close.
   Time of bloom: May 20th.
   Foliage: Similar to *R. Smirnowii.* Leaves 14 cm. long, green above, slightly felted below.
4. No. 4516, see illustration.
   Color: Sprightly rose, with brown markings on lighter ground.
   Truss: 14 cm. high, 17 cm. across; close, pyramidal.
   Time of bloom: May 22nd.
   Foliage: Similar to *R. Smirnowii;* Leaves 14 cm. long, green above, smooth below.

I might summarize concerning *Rhododendron Smirnowii* as follows: The species is good in winter hardiness and is mostly dominant in this characteristic, which is very essential in the breeding of hardy rhododendrons. *R. Smirnowii* does splendidly in half-shade and in moist, moorlike surroundings. The leaves are then always dark green and glossy and the silvery felted upright young shoots are also particularly attractive. One may also plant *R. Smirnowii* in brilliant sunlight, and it sets somewhat better buds that way, which scarcely happens in the shade, but the foliage becomes drooping and unattractive. These vices have, unfortunately, been transmitted to many of its progeny. Since large drooping leaves are not very much esteemed here, particularly when not always dark green, the *Smirnowii* hybrids here do not always represent the most greatly desired ideal, so that one might wish to fall back again on other material for crossing purposes. According to the culture books, some six hundred varieties have originated here in Grűngrăbchen, among which are many that come very near to the type that is considered the breeding ideal of this place. That is no trifle, for if a hybrid is to be distinguished by a name here, a great deal is demanded: complete winter hardiness by long endurance to frost in bud and leaf; a handsome inflorescence, upright, close and pyramidal, in purest color; a short-stalked, rounded leaf; a structure that endures strong winds; and compact habit of growth.

This is about all that I can report concerning my experiences with *Rhododendron Smirnowii* and its hybrids.

Azaleas on Long Island

Long Island conditions for Rhododendrons and Azaleas have been ideal this year up to January 1938, a major factor being moisture.

In suitable locations in this climate and with properly selected species and hybrids, Rhododendron gardens may be established here which can rival any in this country.

R. Fortunei and many of its extremely beautiful hybrids (page Mr. Charles O. Dexter) do well in chosen locations, preferably on a northern slope exposure to avoid the hot March sun. These plants, in my own experience, are perfectly hardy as to foliage, and bloom is safe provided the winter temperature does not go below zero or one or two degrees lower. The rare 10 degrees below will destroy practically all the bloom.

Species rhododendrons should be tried. Apparently no general rule as to hardiness is yet established.

Enough experimental data are not now available.

In a very limited experience in Long Island conditions it is a gratifying surprise to see *R. Setchuense* burst into

bloom in late March. *R. Fargesi* in April also is a good introduction to Spring; and the beautiful *R. racemosum* is entirely hardy; an early dwarf.

R. pentaphyllum seems to be rare. This is a beautiful rose (no, magenta) azalea blooming here about April 15 and naturally sometimes burned by frost when in full bloom; but so is *Magnolia stellata.*

The emphasis of this paragraph is to plant species, many of them (when available).

Plant species experimentally.

Many of these seem to be eminently worth-while for their beautiful foliage alone and the hoped-for bloom is an extra dividend of expanding value.

R. Schlippenbachii grows in my valley like a dwarf willow. It is extremely hardy and when planted in mass it may be argued that it holds a top place in the bracket of the most beautiful azaleas. The variation in color is great.

A desirable method of establishing a large planting would be to select plants of good color while in bloom.

S. A. Everitt,
Huntington, N. Y.

Mycorrhiza in Rhododendron

In the Annals of Botany (New Ser. Vol. I, No. 4—Oct., 1937) there is a paper of this title by Dr. H. D. Gordon of the Department of Mycology, University of Edinburgh. The author makes a review of the work of other writers who had investigated the problem confirming the findings of the investigators who had been most critical of the dicta of the first research. The major part of his paper is given over to the discussion of his problem and the outline of his procedure and findings.

His conclusions:

"1. The endophyte is confined to the roots, and does not penetrate the subaerial parts of the plant. * * * *

"2. As implied by 1, the endophyte is not seed-borne. * * * *

"3. Infection by the endophyte is not an obligate condition of development of the higher plant, which in fact can form roots and establish itself in the total absence of any micro-organisms. * * * *"

For the horticulturist this would appear to settle any question as to the necessity of the micro-organism for the health of the plants.

One of the more interesting details in the paper which the reviewer hopes to follow was the use of calcium hypochlorite as a disinfectant of the seeds. It was also found that the solution could be prepared easily enough "by shaking distilled water in a test-tube with an excess of calcium hypochlorite for at least five minutes, and filtering," a procedure well within the powers of any gardener. Since valuable seeds from a distance are sometimes injured by fungus growths before they have any chance of germination, this detail is of value.

Rhododendrons of Golden Gate Park No. 2

If we should be constrained to select a single one of the Park Rhododendrons for mention, the distinction would have to fall upon *Rhododendron Falconeri.* Not only is this species one of the most striking and spectacular of plants, but among rhododendrons, too, it stands out as a novel and unique departure from the norm of the genus. To the uninitiated, seeing it when out of flower, it may be mistaken for a Loquat by reason of the large, loquat-like leaves, a resemblance borne out by the felt-covering of the underside of its large, deeply veined blades, which often reach a length of one foot. In its native haunts, the Himalayas of Nepal

Eric Walther

Rhodendron Falconeri Hook f.

and Bhutan, the species occurs at about 10,000 feet elevation and there attains a height of 40 to 50 feet. Here in the Park our largest specimen has now attained 20 feet and is still growing. Its introduction is traceable to the famous Sir J. D. Hooker, dean of British Botanists, who visited California in the 80's, a visit commemorated by the well-known Hooker Oak at Chico, the largest oak in California, if not in the world. Between Sir Joseph and Mr. McLaren, the suitability of San Francisco's climate for Rhododendron cultivation was recognized and the gift of several plants, including the one here discussed, resulted. At its annual flowering this never fails to attract attention, numerous connoisseurs making long trips to see it; and it is indeed a remarkable sight in full flower, its trusses often numbering over 200.

Botanically the species is the type of a separate Series, the Series *Falconeri,* which is characterized by the mortar-shaped corolla with 7-10 lobes, the minute calyx, 12-18 stamens, and the exceptionally large leaves. In *R. falconeri* the leaves are covered with a rust-colored felt on the lower surface, where in the related *R. grande* this tomentum is silver-white and closely appressed; the corolla is a rich cream color with dark purple blotches within at the base.

Culturally, the species and its allies require shelter from the wind, not always easy to provide in San Francisco. Such a large plant of course needs much moisture as well as ample feeding.

The group is hardy here as far as frost is concerned but should scarcely be expected to survive the eastern winters at New York, Boston or Chicago.

While a few hybrids descended from *R. Falconeri* are recorded, including one, *"Koenigin Carola,"* raised in Germany by crossing with *R. ponticum,* none of these are known locally. The idea of working with *R. Falconeri* in deliberate hybridizing is too obvious to entitle the writer to any special credit, but resultant plants are very slow to reach flowering size. Only last year did a few of the crosses raised twelve years ago bear their first flowers, demonstrating that the results promise to be quite worth while. For seed-parent we used *R. "Cornubia,"* another Park specialty

Above—Base of trunk with 7⅜" hat. Below—Flowers and foliage x 0.07

Eric Walther

Rhododendron Falconeri appr. x 0.3

too tender for the colder parts of the United States. This hybrid, first exhibited by B. Fox in 1914, was brought to San Francisco at the time of our Exposition in 1915. It is descended from *R. arborcum, barbatum* and *thomsonii,* combining the merit of tall habit, bright red flowers, and earliness, usually flowering in San Francisco in February or even before.

The hybrids in question agree in having a fairly dense truss of glowing carmine to spectrum-red flowers. In foliage they show some trace of the pollen-parent, having leaves rather larger than in *R. Cornubia;* while in habit they vary from compact, low growing plants to others rivalling *R. falconeri* in height. Our photograph on page 151 pictures one of the better ones of these *Cornubia-falconeri* hybrids which we take the liberty of dedicating to Mr. John McLaren, veteran superintendent of Golden Gate Park, naming *R. x "John McLaren."*

ERIC WALTHER,
Park Botanist.

"Cornubia"

Cornubia Seedling

A Book or Two

The Small Alpine Garden. By Captain H. P. Leschallas, M. B. E. Pp. 79. 16 plates, mostly two pictures to the plate, and figures. 3s. 3d. from the author, Whitehill, Prestbury. Glos.

This excellent little book should disrupt preconceived ideas of many rock-gardeners, as well as stimulate greater interest in the cultivation of true alpine plants from high regions. The book is divided into two parts, with a foreword by the eminent alpine plantsman, Mr. Walter Ingwersen. The first part treats of construction detail of alpine rock gardens, soil mixtures of pharmaceutical accuracy, seeds, cuttings and answers to possible queries which might arise in the mind of the reader. The second part consists of an extensive list of plants grown by the author, chiefly true alpine plants from high regions, many of them previously thought to be very temperamental, with brief notes as to location, growth, description, soil proportions of grit, sand, peat, etc. No plants are included which are invasive, out of proportion or covering more than a foot in area. The photographs are excellent in every detail and form an excellent supplement to the text.

The author is Assistant Honorary Editor of the Alpine Garden Society of Great Britain and an enthusiastic amateur gardener of many years' experience. He does not pretend that it is a textbook exhaustive of the subject but is written for the keen gardener anxious to make his first acquaintance with growing real alpine plants. By means of photographs, simple drawings and text he shows in a most interesting and concise manner what can be done in growing alpines in true rock-crevices, in screes and in shallow depth of soil,

without coddling of glass cloches, alpine house and dismissing as expensive and unnecessary a system of underground watering, heretofore thought necessary. Captain Leschallas clearly demonstrates that a depth of eighteen inches is sufficient rooting medium for alpines, even goes so far as to say that he built one garden on sheets of galvanized iron to protect it from tree roots. Mr. Ingwersen in his foreword points out that the crevice planting advocated by the author is widely practiced in the Botanical Gardens at Sofia, Bulgaria, and in the private gardens of the King, where alpines survive the intense heat and winds of summer and the vagaries of severe but often open winters, a fact which should give fresh encouragement to those gardeners in America who have been trying to grow alpines under similar conditions.

This book should be read by all rock gardeners, especially those who have limited gardening time and space. Such a garden need only occupy a few yards in area and once properly constructed and established would require a minimum of maintenance, yet give countless hours of enjoyment. Experience would determine the adaptability of various plants to local climatic conditions and frequent watering would doubtless be required in dry and hot weather.

R. C. M.

Cacti. By Professor J. Borg. The Macmillan Company, New York, 1937. 419 pages, illustrated. $7.50.

This will undoubtedly become a very useful book for the amateur who is often balked by the large price needed for the purchase of some of the old standard works on cacti. It opens with the usual discussional chapters all of which should be read, understood and then modified to suit the needs of the reader as far as modification is needed and possible without upsetting the principles involved. The greater portion of the book is given over to the discussion of the species, particularly those most often met in cultivation. The texts are strengthened by many illustrations that are very explicit, so that one may turn book in hand to his own shelf of cacti and see what the infants will be like when fully grown.

Those more informed than the present reviewer have pointed out certain inconsistencies in the nomenclature. This is most unfortunate in the whole for there are troubles enough without any carelessness on this score. The average amateur, however, has come almost to the point where he expects a little inaccuracy from his superiors and even may find a little special pleasure in catching up with the learned. The book is not for the beginner, however, unless he belongs to the more studious groups since the general treatment leans toward the familiar taxonomic presentation rather than the horticultural treatment.

Our Ferns. By Willard Nelson Clute. The Frederick A. Stokes Company. New York, 1938. 388 pages, illustrated in color and black and white. $4.00.

This is a second edition of a book first printed in 1901. The preface for the second edition states that there is new matter but does not mention what. It does state definitely what the author means to do and the reason for his doing it, a practice that pleases this reviewer. The book is in a somewhat popular vein, with bits of poetry and folklore, illustrations that are decorations suggesting moods rather than botanical figures and all such matters. This too is the author's privilege. For that part of the dear public that

likes its information tempered with more than mercy, this should be a very useful and probably an enjoyable book.

Annuals. By Roy Hay. E. P. Dutton and Co., Inc., New York, 1937. 242 pages, illustrated in color and black and white. $2.00.

This book like many others on the same theme follows a familiar pattern, the greater portion (Part II) being given over to an alphabetical listing from *Abronia* to *Zinnia*. The shorter first portion makes more interesting reading. The first chapter, Definition, Distribution and Development, covers just the usual themes but is particularly interesting for having brought together all the suggestions of the plants that have come from specific areas. The second chapter, Annuals That Have Been Lost, is even more interesting reading; but the third and fourth chapters, Cultivation and The Uses of Annuals are merely expert records. The book is well written and compact, an excellent example of this sort of reference book. One might wish that the illustrations had been chosen from genera that are not represented in all other similar compilations.

Garden Bulbs in Color. By J. Horace McFarland, R. Marion Hatton and Daniel G. Foley. The Macmillan Company, New York, 1938. $3.50.

Like the other Breeze Hill production, this is a pretty picture book. It should sell far better than the last for it is a rather better book. There are special sections on Tulips, Narcissi and Lilies, all else falling as other bulbs. The pictures run the usual Breeze Hill range from good to terrible and in this case include some examples of very doubtful taste, as for example the flower show picture on page 53 or the frightful rock garden on page 59 as well as others that need not be specified. One is glad, however, to have record pictures of various less commonly grown bulbs that are difficult to find elsewhere. Buy it if you like, it even has some poetry tucked in.

Florida Wild Flowers. By Mary Francis Baker. The Macmillan Company, New York, 1938. 245 pages, illustrated, $3.50.

This is a popular handbook, written in not too technical language in a style that falls half-way between the purely popular text and the botanical. It is illustrated with many pictures that will whet the imagination of the stranger to the Florida flora. One could wish that some of the illustrations had not been of plants that have a range that takes them farther north and west than the confines of the state. One begrudges a full page for *Ilex glabra* or *Amorpha fruticosa* or even *Sabbatia grandiflora*. It takes no particular search, however, to discover many plants that one wishes he might try farther north in the hope that they too would prove amenable to colder gardens. Because of the great number of species included many of the descriptions are reduced so that one does not read the text with the same wistful eagerness that overcomes one with a spring catalogue, but even so one feels the urge to make a botanizing trip or better still a collecting trip into these parts and what other things could one wish for first before this?

Forty Years of Gardening. By Anna Gilman Hill. The Frederick A. Stokes Company, New York, 1938. 301 pages, illustrated. $4.00.

This is a very personal book, the sort of book that one either likes or

detests. This reviewer likes this book immensely. Its main divisions are: Garden Craft, Plant Material, Garden Hobbies. There may be sections in each that you will skip quickly but for the most part one is carried along on the enthusiasm of the reporter. There are times, as for example on page 143, when the two-thirds page given over to hyacinths is mostly wasted in objecting to hyacinths in the maximum sizes with never a word to be said for some of the delectable colors that are available, even in the "seconds" which will turn into thirds fast enough in most gardens. One regrets that there are so few species of autumn-flowering crocus mentioned and only one colchicum, but one delights even a little enviously on the reports on the primula records in their chapter. One delights in the vocabulary that produces, "the *vibrating* phlox, Rosenberg" and Mrs. F. "with a tyrian eye," but the gem of all is the quotation on pages 11, 12, "do lie down and decompose; you's getting *yo*'self all wore out!" What a motif for a gardener or a reviewer. we embrace it.

The Gardener's Pocketbook

Hippeastrum aulicum Herbert [See page 157]

During Christmas week when bright reds and greens are so much in demand, our plants of *Hippeastrum aulicum* obligingly produced their gorgeous red flowers. As the leaves, bright glossy green, accompany the flowers in this species, they were about the most attractive plants the writer saw during the Christmas season. In recognition of its stately habit, the common names, courtly amaryllis and lily-of-the-palace, have been applied very aptly.

First described as *Amaryllis aulica* Ker, this plant was illustrated in the Botanical Register, t. 444, Vol. 6, 1820. There it is said that Mr. Griffin imported it from Rio de Janeiro, and that it had flowered in his stove at South-Lambeth in December. Later, as *Amaryllis aulica* var. *stenopetala,* the courtly amaryllis, it appeared in the Botanical Magazine, t. 3311, Vol. 61, 1834. The variety *platysepala* Lindley was illustrated in the Botanical Register, t. 1038, Vol. 12, 1826. The common name of lily-of-the-palace is used by Bailey in the Cyclopedia of Horticulture.

In size, these flowers are among the largest of the hippeastrum species, due almost entirely to the immense upper segments. The flowers are distinctly irregular in shape, almost two-lipped; the three upper segments are nearly vertical, and the three lower nearly horizontal. The central upper segment is almost oblong, about an inch wide and six inches long. The two upper lateral segments, much larger, are obovate-oblong, moderately sharp-pointed, about six inches long and two inches wide at the widest part. The lower laterals are only half as long and less than half as wide, but are curved away from the upper ones. The lower central segment is between the two pairs of laterals in size.

The color is a rich scarlet (Ridgway, between Scarlet and Nopal Red) broken by the darker red of the veins (Ridgway, Maroon). As the veins become larger and closer together toward the center of the lower halves of the upper segments, a solid area of the same maroon is formed. This darker spot is not so pronounced on the three lower segments. At the very base of the segments, where they join to form the very short tube of the flower, the color is a bright green (Ridgway, Night Green) as is also the distinct corona which closes the throat of the tube. There is no appreciable difference in the color of the inner and outer surfaces of the flower. The filaments and the style are a bit lighter than the segments (Ridgway, between Rose Doree and Scarlet Red) and are about three-fourths as long as the segments. The anthers are rather large, a dusky dull violet before opening. The pollen is olive green.

Normally only two flowers are borne on the stout cylindrical peduncle. At the time of flowering, the stalk is about 12 inches long, but as the capsules mature, it lengthens to about 18 inches. The pedicels are about an inch long at flowering, but if seed is set, they eventually attain a length of about four inches. Both the peduncle and the pedicels bear a heavy bloom. The spathe valves are green, lanceolate, with strongly infolded edges.

The leaves on our plants started

growth in late fall and were about 12 inches long when the flowers opened. Their mature length is about 24 inches, and their width of two inches is uniform throughout. The sides of the leaves are strongly curved upward from the mid-rib, giving them a trough-like shape, but the margins are distinctly revolute. As the offsets are rather freely produced, and the flowering bulbs themselves produce six to nine leaves in well established plants, there is enough foliage accompanying the flowers to add materially to the attractiveness of the plants.

The bulb is globose, three to four inches in diameter, with a rather short neck. The thin outer tunics are light brown.

The cultural requirements are no different from the ordinary hippeastrum, but it may be suspected that this species does not need such a long dry resting period as is customary. The flower stalks on ours appeared in mid-November, but, due to the low temperature of the house in which they were growing, their development was rather slow. The flowers lasted a full three weeks.

Hippeastrum aulicum is a native of Brazil, clearly related to *H. calyptratum* and *H. psittacinum,* but it is much more attractive than either. It may be distinguished from the first very easily by the color of the flowers and the shorter stamens. From the latter, it may be separated by the color, by the more deeply divided perianth, and by the brighter green leaves.

It is occasionally cultivated in the variety *platysepala,* and possibly other forms may be purchased.

To many, this should prove a much more exciting plant than the florists' hybrids; probably few will deny that it is a plant of real merit among the amaryllids. Its regal splendor is truly deserving of the adjective "courtly," a common name to which the writer heartily subscribes.

CLAUDE HOPE.

Washington, D. C.

Some Nierembergias

Nierembergias are perennial subshrubs from South America but since they die during the winter in our climate and flower the first season from seed they are often classed as annuals.

One of the many charms of the nierembergias is that they are "easy," another their bluish coloring and a third their ability to stand transplanting in the hot weather without the turning down or curling up of a leaf or the fading of a blossom. They go right on blooming after having been dug up and moved in July, naturally with a goodly sized ball of earth, a dousing of water and a covering of newspapers for three days.

Nierembergia rivularis, also called White Cup, is about six inches high and has the characteristic companulate flowers growing out of long thin tubes. The flowers are creamy very faintly tinged blue, their throats are golden and the cup is broadly bell-shaped. This one comes from the Argentine.

Another nierembergia, *N. frutescens,* is tallish, eighteen inches high in my garden but Dr. Bailey says it grows three feet high in Chile where it is native. Its flowers are white tinged blue and have a yellow marking like a many-rayed star inside the cup which shows through, but very pale outside where the rays form ribs. The leaves are linear and dark green.

By far the handsomest of the three is *Nierembergia hippomanica.* It was described alluringly in Thompson and Morgan's 1937 catalogue amongst their novelties and received an award of merit from the R. H. S. in 1933. The plant grows eight inches high, is much

Lilian A. Guernsey

Hippeastrum aulicum

[*See page* 155]

branched and the leaves are light green linear and grow thickly around the stems. The flowers are one inch across and borne from 1-7 each on its own stem at the tips of the main branchlets. Their long calyx tubes are almost white and widen into violet saucers with five rounded corolla lobes. Inside the cup the stamens are united into a white tower topped by the yellow anthers. At the base of the tower on the corolla is a tiny yellow patch. The calyx of five pointed sepal lobes is united at the base, and marked with dark green lines and is hairy.

The flowers of *N. hippomanica* are bluer than those of *N. frutescens* and cover the whole plant which makes a blue mat. They flowered too late for the iris and peonies but made a charming front-of-the-border or edging plant for the pale pink and white *Phlox paniculata* in *var.* as also with the blue nepetas, *N. macrantha,* and *N. grandiflora* and with misty masses of *Gypsophila paniculata.* The nierembergias and *Asperula azurea setosa* are two border plants to which the Victorian adjective "elegant" can be applied.

The nierembergias were raised from seed; some was started in the hot bed February 22nd and another batch on April 10th. They were transplanted in early May and flowered from July to the end of August. Perhaps a later batch might have been raised to prolong the season of bloom.

HELEN M. FOX.
Peekskill, N. Y.

The Desert Lily [See page 161]

Hesperocallis undulata, "Western Beauty," is the object of special devotion among the homesteaders on the Mojave. When the brief desert storms come more often than usual we say, "it will be a good year for lilies." Sometimes five or six years go by without a single lily coming to flower; but for two seasons we have been made glad with an abundance of them.

Our homestead, on a ridge of volcanic pebbles near the Bullion Mountains, seems a favorite spot for them. At Easter this year every depression had its two or three rosettes of lovely pale green leaves with white-bordered, rippled edges; and the flower stalks varied from one to three feet in height, several of them with as many as a dozen blossoms. Two or three blossoms open at a time, as many as 40 in succession on a stalk and several stalks to a bulb in favorable years. They had all the beauty of the Easter lily of the garden and two glories that are all their own: —the exquisite bluish green veining in a band on the back of each segment, and such a translucency of the whole that at sunset each lovely blossom wears a star on its breast.

It has claimed for its own the Mojave Desert and parts of the Colorado Desert, especially near Mecca, and has wandered into Arizona, where the Spanish classed it among the wild onions and called it "ajo"; but I have never found one of the white bulbs with an onion odor. Those I have dug up for transplanting to a safer spot have smelled more like a chestnut; and the one that I nibbled had a creamy flavor.

ADELAIDE WILSON ARNOLD.
Hemet, Calif.

Psychotria nervosa [See page 163]

One of those neglected beauties of nature is *Psychotria nervosa,* the "Wild Coffee" of the Central Florida woods. It is a charming and attractive shrub, usually one to three feet tall, which adapts itself very effectively to a naturalistic or planned planting.

It belongs to the Rubiaceae or Madder family, and is a member of a large

Walter B. Wilder

[*See page* 156]

Nierembergia hippomanica

genus, according to the botanies, there being some 500 or so species listed in the tropics and sub-tropics. This particular species is not listed in Bailey's Cyclopedia. It is found principally in high hammock woods, with hickory and oak, growing in considerable shade.

The flowers are white and rather inconspicuous, and are followed by green berries which ripen to a flaming red in late October and November, forming the principal distinction of the plant. Inside the berries are two seeds resembling miniature coffee beans. These are flat on one side and the flat sides are found facing each other.

The berries remain on the plant through most of the winter, gradually darkening in color to a deep lake and dropping off. The writer has found that tender wood cuttings of *Psychotria nervosa* can be rooted easily in sand in the autumn, and these cuttings can be grown on into fruiting plants in the next season. The possibility exists that the species may prove a valuable addition to the list of "berried plants" for florist, conservatory and greenhouse use.

WYNDHAM HAYWARD.
Winter Park, Fla.

Moraea polystachya (Thunb.) Ker
[See page 165]

From that treasure land of the Iridaceae, Cape Colony, South Africa, comes a new immigrant to brighten our northern winters. Like so many other South African plants, *Moraea polystachya* enjoys and requires the short dull days of winter in a cool house, and in return rewards us with profuse numbers of cheery flowers, when so little else is available.

The genus *Moraea* is the Iris of the Southern Hemisphere. Indeed, the distinction between the two genera is not easily made, at least in some instances. The most reliable point of difference is in the perianth tube, which is always absent in Moraea and always present in Iris though in some, as *Iris sisyrinchium,* it is very short. In moraeas, too, the claw of the segments is usually much shorter and wider than in the irises. The perianth parts are analogous, and are described by the same terms in both genera.

It seems hopeless to attempt to convey in words the beauty and loveliness, the fragile charm, the cheery colors of this flower; only an artist's brush could do it justice. Like floating butterflies of bright lilac blue, decorated with yellow, the flowers rest lightly above the long, slender spathe valves, five, or even more, on each slender inflorescence. Reminiscent of some of the beardless irises, but more graceful, and more generous of flowers than most, a group of these plants is an exciting vision.

Fortunately, the illustration is natural size, and some of the tedious details of the flower parts may be omitted. It is necessary to say, however, that the standards which, here, are all reflexed or horizontal, are often erect. The flowers are rather variable in this respect, but for the first day or two after opening, the standards are likely to be erect. The color is described best, perhaps, as a bright lilac blue, but one is almost inclined to call it a delicate lilac blue. In a large group of plants, some small variation was noted in the amount of pink in the color. The style crests are perhaps a trifle lighter. At the base of each fall, there is a spot of clear yellow which varies a little in size. The pollen is likewise yellow.

The anthers, as in the iris, are below the stigmas, and self pollination does not take place naturally. However, it is easily accomplished by hand. About three months are required for the seed

Hesperocallis undulata

to mature, and each cylindrical capsule, about one-half inch long, contains from 75 to 100 small, triangular, amber seeds.

The plant reaches a height of two or, sometimes, three feet. The leafless upper half consists of the inflorescence, which has a central stalk and five to seven short lateral, erect branches. These branches are about two inches long, and are spaced about three inches apart on the stem. Each branch is terminated by the bright-green, cylindrical, pointed, flowering spathes. From each spathe a continuous succession of flowers is produced, never more than one at a time on the spathe. However, it often happens that each spathe has an open flower the same day. In fact, when the plants are in groups, so many flowers are always present that the five or six long narrow leaves are scarcely noticed.

In the cool house, each flower lasts three or four days, and each is almost immediately succeeded by another. When cut stems are kept in a warm room, the flowers last only a day, but usually, again, a new one appears almost immediately. The flowers are very fragile, bruising easily when handled. Nearly always, those open at the time of cutting and wrapping fail to survive the treatment, but invariably a fine new crop opens the next day. One may expect a cut stem to continue flowering satisfactorily for a week or ten days, even in a warm dry room without particular care. The flowering season lasts from mid-October to late January, and is at its height in November and December. Doubtless, if a full seed crop were matured, the flowers would be reduced in number.

The leaves, with their bases sheathing the lower half of the stem, are about six in number. They are usually about two feet long, and not over one-half inch in width. In the greenhouse, they are not self-supporting, but Baker, in the "Iridaceae," says that they are rigid, firm, and strongly ribbed. In color, they are perhaps a shade lighter than the green of the spathes, but still a bright green.

The corm is about an inch in diameter and flattened-globose in shape. It is enclosed in light brownish-gray coats, made up of many rigid, fibrous strands. In one respect, it is peculiar: it forms along one side only, of the current year's stem, and along that stem, it is somewhat grooved.

If one grows them as he would freesias, he may be sure of success. Though they do very well as pot plants without being plunged in cinders or kept dark for a few weeks after planting, it appears likely that a stronger initial growth would result if this were practiced. Unless they are kept dormant by cold storage, they should be planted in early September. The dormant season begins about March 1, and storage in a cool, moderately dry atmosphere seems best. Night temperatures as low as 40 degrees Fahrenheit seem to have no retarding effect. Like freesias, they prefer all the light that winter affords. It is not known how much cold they will stand, but one may hazard a guess that they will be satisfactory out of doors in the mildest sections of California and the South.

Propagation, apparently, is very slow by natural processes, as practically no cormels have been produced on the plants under observation. When grown from seed, about three years are required to produce strong flowering corms.

CLAUDE HOPE.

Washington, D. C.

Leon A. Page

Psychotria nervosa

[*See page* 158]

Sedum Spectabile in Florida [See illustration opposite]

Sedum spectabile is known as the "Showy Sedum," in a genus that is more especially noted for its dainty and attractive miniature types.

It is a perennial with glaucous, rather spatulate leaves, which may attain a height of one and a half to two feet. It is reputedly hardy in the open border in the north, but personal experience over several years has been exclusively concerned with its treatment as a pot plant.

This Sedum seems to be one of the very few which are quite at home in a sub-tropical climate, as the plants retain their vigor in the open greenhouse in Florida when kept out of the worst of the summer rains. Cuttings may be taken from old plants at almost any time, and new growths sprout up in the early winter. This species is particularly adapted to greenhouse and conservatory, because of its easy pot culture.

The flower heads may be three or four inches or more across, and the blooms on the specimen in the accompanying photograph were a delicate light lavender in color. The texts indicate that the flowers vary in different types from white to purplish rose. Any good potting soil with careful precautions for drainage seems to suit it, and the better the mixture in plant food, the better the plants that result from it. When not in bloom the plants are an interesting addition to any succulent collection. Their fleshy grayish leaves attract attention from evry visitor.

Bailey's Standard Cyclopedia of Horticulture states that the species is supposed to be native of Japan, but a question mark in parentheses leads one to infer there is some doubt about it. In any case it is a plant worth adoption by American garden lovers who have the time and space for it, as one of the few outstanding and dependable flowering succulents.

Leon A. Page

Sedum Spectabile

WYNDHAM HAYWARD.

Winter Park, Florida.

Holodiscus discolor—A Fine Native Flowering Shrub

Early summer tourists in June find the whole countryside of eastern Washington and Idaho aglow with cascades of soft blooms that cover tall shrubs along rural roadsides. These cream-white flowers that greet the traveler's eye in such profusion are the drooping lilac-like panicles of *Holodiscus discolor*. Its various local names suggest the grace and softness of the flower-masses, —Ocean Spray, Sea Foam, and Idaho Plume are a few. Early use of the straight slender stems to make shafts for weapons is suggested by another common name—Indian Arrow.

Lilian A. Guernsey

Morea polystachya

[*See page* 160]

C. E. Artman

Holodiscus discolor

In full bloom the dainty rippling masses of flowers of this tall shrub are a lovely sight. Hanging airy panicles, often six to eight inches long and almost as broad at their base, suggest perfect freedom as they sway in the slightest breeze. The period of full bloom, coming after the spring riot of flowers, extends well into summer, and the fine floral effect of this shrub is continued much longer. Before the flowers open, the expanding buds have a dainty pinkish tint that gives a striking color contrast against the light green foliage. In full bloom it is showy for several weeks. And the dainty attraction of the flowers continues all through the summer as they turn gradually to yellow and light tan and finally soft brown. Even in winter patches of snow sit prettily on them to extend their season's display.

The shrub forms a stately bush with slender arching branches usually six to ten feet tall, but in rich sheltered canyons it sometimes reaches 20 feet. It is a lover of the sunlight, and there it blooms abundantly each year. But in shaded spots it wears an attractive dress of soft green foliage with less flowering. The leaves an inch and a half to two inches long are generally oval, widened at the base, and tend to be slightly lobed. It seems very tolerant of soil conditions, growing luxuriantly in both light and heavy soil. The plant grows rapidly, remains compact, and does not send out suckers. It is hardy in the coldest winters of eastern Washington, whose climate is certainly as severe as any in the eastern states. Growing native from the slopes of the Rocky Mountains westward to the Pacific Coast, *Holodiscus discolor* thrives from an elevation of 5,000 feet all the way to sea level.

It is surprising that so excellent a shrub should be so little known in the East. Like many other fine native shrubs and perennials of the Northwest, it is just now coming into attention for ornamental use. A number of

C. E. Artman

Holodiscus discolor

[*See page* 164]

recent plantings have been made in eastern and southern states; and now that young garden-grown plants are obtainable from its native region, we may expect soon to see this fine flowering shrub added to the decoration of lawns and borders throughout the country. One wonders how such a beautiful and versatile plant could so long have escaped the appraising eye of eastern landscapers.

C. E. ARTMAN.

Spokane, Washington.

Bomarea Caldesii Humb. and Kunth. [See page 169]

Family—Amaryllidaceae.

Habitat—Andes of Quito, Ecuador.

Literature—Curtis Bot. Mag., plate 5442; Baker, J. G., Handbook of the Amaryllideae; Killip, E. P.; National Hort. Magazine, April, 1936.

Description—A scandent vine whose shoots are able to twine over any available support to a height of 6 or more feet; annual growths arise from fleshy roots similar to those of the closely related *Alstroemeria,* leaves alternate, oblong, to 3 inches long, bright green, acute, shortly stalked. The terminal umbels each with 6 to 30 flowers, the latter's outer perianth-segments orange-yellow, the inner decidedly longer, bright yellow spotted with red; fruits to 1 inch diameter, on dehiscence displaying numerous coral red seeds. Flowers all summer.

Culture—Might possibly be increased by careful division of the fleshy roots, as is done with *Alstroemeria,* but is most readily grown from seeds, sown when ripe in light soil in any frost free greenhouse. Seedlings to be potted up when large enough in a light compost, care being taken to prevent rooting through the hole in the bottom. Select plants 2 or 3 years old for planting where shoots may scramble over another plant, or at base of a fence, trellis or post, providing a soil medium, neither too heavy nor too dry. During the growing season frequent watering is advisable, as are also a top dressing of well rotted manure and a deep mulch of old leaves, etc., during winter. If frozen down, the old shoots may be cut off close, otherwise only the oldest, weakest growths should be removed. Flowers are borne only on the new shoots, which need to be protected from snails and slugs.

Remarks—Easy culture, long blooming season and masses of colorful flowers contribute to the merit of this novelty, whose proper place in garden and floral decoration yet remains to be tested. No records are at hand on its original introduction to local gardens, but the Park plants were grown from seed gathered at Mrs. Bard's place at Hueneme, many of whose treasures originally hailed from Mr. Charles Abraham.

ERIC WALTHER.

San Francisco, Calif.

Hippeastrum psittacinum Herbert, the Parrot Hippeastrum [See page 171]

The splendid hybrid hippeastrums, so much admired by flower lovers throughout the world, easily rank among the best examples of the hybridists' skill and perseverence in synthesizing new forms and colors from several natural species. *Hippeastrum psittacinum* as one of these parent species serves, by contrast, to emphasize these achievements and, on that account, must be of considerable interest to all hippeastrum enthusiasts.

This species is placed by Baker (Handbook of the Amaryllideae) in the subgenus Omphalissa which is characterized by a short perianth tube closed in by a distinct neck or corona

Bomarea Caldisiana var. macrophylla

in the throat. Other botanical features worthy of mention are the three-parted stigma and the irregular form of the flower. *Hippeastrum psittacinum* was described by Herbert in 1817 from the first flowers of bulbs introduced from southern Brazil in 1814 by a Mr. Griffin of South-Lambeth, an importer of exotic ornamentals. A rather disappointing illustration may be found in Edward's Botanical Register, Vol. III (1817), t. 199.

As an ornamental subject, the parrot hippeastrum falls far short of the demands of the fancier, yet this writer admires the color of the flowers, even though it is an "outlaw" color. Should the presence of green in the hippeastrum flower always be objectionable? It is a particularly fine mosaic of pale apple green bound together with the crimson of the secondary veins. Thus, the midribs and the throat are entirely green, and around the edges and tips of the segments where the veins are denser, it is almost pure crimson. The irregular flower form, characteristic of this subgenus, and yet so different from anything now seen in hippeastrums, gives the species its name. As may be seen from the illustration, the three upper segments of the perianth are much larger than the lower ones, effectively dividing the flower into two parts. Each of these parts, in turn, is further divided; the uppermost and the lowest segments differ in size and shape from the lateral ones. The pedicels are very light green, and the two erect spathe valves have a ruddy tint. The peduncle is stout and little shorter than the leaves, which it matches in color. Often a second one is produced, flowering soon after the withering of the flowers of the first one. Parenthetically, it should be stated that the normal flowering season is in the spring, although ours flowered in late June.

The leaves, six to eight in number, are mature at the time of flowering. In spite of their length of two to three feet, they stand almost erect; perhaps this is explained by the strong keel, giving a broad V-shape to their cross section. They are light green in color and lightly glaucous. The bulb has little to distinguish it from others of the genus. It is globose, three or four

inches in diameter, and has a neck of about two inches, consisting of the light brown remains of the old leaf-sheaths.

It is a robust plant in character of growth and in its dimensions. After a comparison with the modern hippeastrum, one is likely to conclude that this constitutes its most valuable, if not its only, contribution to the hybridists' repertoire, even though the name is used for a horticultural section of hybrids. Most gardeners, no doubt, will dismiss it as a collector's or specialist's item.

CLAUDE HOPE.

Washington, D. C.

Houstonias

Everyone is familiar with the dainty little *Houstonia caerulea,* commonly called Bluets, Forget-me-nots, etc. Dr. Small in his Flora of the Southeastern United States, Second Edition, lists twenty species of Houstonia, annuals and perennials. To me only two other species have unusual merit.

H. serpyllifolia, the little creeping evergreen ground cover with its tiny leaves is of very easy culture. It likes either sun or shade if given moisture, but blooms more profusely in sun. Many of our high mountains are covered with it and it makes a lovely picture. *H. montana* is the least known of any of the species, being very local and found on our highest mountains. It grows in compact clumps, often sending up ten to twenty blossoms at a time. The plant is very neat in its habit, never getting more than four inches high; the thick waxy petals, as a rule, are a lavender-pink in color; however, they vary from white to purple. It is found growing in the sun in gravelly acid soil, but does better when brought down if given partial shade at mid-day.

ANNIE LEE R. CLEMENT.

Asheville, N. C.

Training in Landscape Design

Home landscaping plans, intelligently applied, will result in attractive changes and developments in the drab and unadorned home site. The purpose of the home-study course in Landscape Design offered by the Extension Division of the University of Wisconsin is to furnish such plans and to stimulate their application.

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Spring Bulbs

There was a time when every gardener who grew grape hyacinths, grew the variety Heavenly Blue, and thought well enough of it even if it did make a too prodigal growth of foliage in the autumn, that made a sorry mass before the spring. Then came the time when the lists offered in its place, *Muscari szovitzianum,* which was indeed a lovely blue and full of vigor

Lilian A. Guernsey

Hippeastrum psittacinum

[*See page* 168]

and alas just as much inclined to autumn luxuriance. Now in their stead one is urged to grow *M. armeniacum* which this year made its debut on the editor's hill, planted so late in the autumn that it did not have a chance to show if it would made an autumn leafage or not. Full of vigor and of a delightful blue lilac color with more emphasis on the blue than on the lilac it stood clear among all its fellows, a plant not to be despised in the least as the usurper of the older favorites. Beside it grew the lusty clump of *M. botryoides* which had not been grown for a year and which was failing in the older clumps on account of the shade that has come from too luxuriant trees and shrubs, a condition that no grape hyacinth seems to relish. Although its color is one or two degrees duller and a bit darker than that of *armenaicum* it is by no means a dull fellow and worth having in its own right.

Of the less commonly grown, the species that attracted the most comment is the vigorous *M. latifolium* with a darker blue purple color that suggests grapes far more than the color of some of the other species, although the longer flowers are by no means so fitting in the larger clusters. The really intriguing thing about the plant is the fact that each flower stalk rises from a single broad leaf. As these pierce through the earth one wonders if the bulbs are going to bloom if one is acquainted only with the luxuriance of leafage mentioned above. To be sure there are some leaves that do not produce their accompanying stalk of bloom, but most do.

Some species are not much grown because there is no need for them in the small garden and even the warmest advocate of grape hyacinths is forced to admit that the differences between some of the species are for the botanist and not for the gardener, but it has always seemed a matter of regret that more gardeners did not include some of the darker forms that may not be so gay in themselves but do serve to accentuate the colors of the livelier species. Of these *M. neglectum* and *M. poluanthum* are admirable examples. One might need only ten of them to the hundred of *armeniacum* but some should certainly be included.

The musk hyacinths have been mentioned time and again but one so rarely meets them that one is tempted to continue reiterating their delights, the chief of which is for the nose. *Moschatum* itself is so lovely and so nearly green that it might be passed by if it were not for the delicious scent that pervades the air and becomes stronger as evening falls. It has nearly faded when the color forms begin with their green overlaid with dull purple on the tips and clearing to an odd yellow as the flowers develop. They like their type are scented, and whether you buy the type of the varieties *flavum* or *major* makes little difference to the garden eye.

The feather hyacinths come later and will be reported on with pictures, we hope, in a later issue.

As the mascari leave the scene in company here with the sheets of narcissus, the forms of *Scilla hispanica* begin to fill the shrub masses with color. For years, a huge colony of the variety Excelsior has seemed enough to give the porcelain blue under color wanted for some orange and yellow azaleas, but last autumn the lure of the catalogue was too much and the whole alphabet was purchased. Only the earlier forms are in flower at this writing and they all happen to fall in the lighter hues. Vigour, at the end of the alphabet, is as robust in its way as Excelsior but is of a paler hue as if a lilac tint

were washed over white. Perle Brilliante is as pale but is a clearer grayer blue, a delightful color that in the garden line is enhanced by the color of Rose Queen, a delicate pink that I was predisposed to dislike, but which is very delightful. Blue King as one might guess from its hackneyed name is a darker blue lilac, in no way equal to the colors of the hyacinth that wears the same name. Of the other sorts more later.

On the other side of the same trial bed, the snowdrops that enlivened the winter and the earliest of the months that pass for spring, are making their fat seed pods some of which are already beginning to color with first pale yellow and then orange before spilling their contents. The foliage in every case is still green though longer lush, with the single exception of the foliage of the green-tipped form of *nivalis. Elwesii,* that flowered first, seems no nearer ripe than *byzantinus* and *cilicicus* and the pods of the forms of *nivalis* though smaller give every evidence of ripening in the same week. *Plicatus* which was an earlier form is a little slow and *latifolius* that seemed the most feeble of them all as it rushed through the soil has now a fair carpet of shiny green leaves, but not so many seed pods.

Of the green and white beauties of snow drops enough other persons have written with more expertness and enthusiasm but the little experiment can not pass wihout a mention of the form of nivalis known as *Scharlockii.* Although these bulbs, newly planted, seemed disposed to flower with rather short stems, one may believe that better establishment will rectify this if one may recall the excellent clumps in Mrs. Henry's garden at Gladwyne, Pennsylvania. Here in grass, the flower stalks overtopped the foliage and the well-developed green spathe-valves waved above the nodding blooms that wear green tips on all their white petals.

Having read all the wonders of snowdrops raised from seed and the delicate pleasures of choosing individual seedlings for some particular form of marking to be multiplied and sent into the world one is tempted between desire and the hope that some accident will carry them off.

In a frame a few bulbs of what proved to be a *Gagea* opened their not too charming flowers which looked a little undecided as to whether they should turn out to be yellow or green, and in a flat nearby some bulbs that had defied all identification turned out to be a variant on the familiar Star of Bethlehem but with whiter flowers and no tell-tale white stripe in the leaves. Whether they decide to be as invasive as *Ornithogalum umbellatum* remains to be seen. One might wish they were back in their native Turkey.

THE AMERICAN IRIS SOCIETY

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The American Iris Society, since its organization in 1920, has published 54 Bulletins which cover every phase of iris growing and should be useful to all gardeners. The Society has copies of all but three of these Bulletins for sale. A circular giving list of contents of each Bulletin, price, etc., may be secured from the Secretary, B. Y. Morrison, 821 Washington Loan & Trust Bldg., Washington, D. C. **In order to dispose of surplus stocks of some numbers we offer 6 Bulletins (our selection) for $1.00.**

Through an endowment given as a memorial to the late Bertrand H. Farr the American Iris Society is able to offer free to all Garden Clubs or Horticultural Societies the use of our traveling library. This library contains all books ever published on Iris and a complete file of the bulletins of this society and The English Iris Society, and miscellaneous pamphlets.

The library may be borrowed for one month without charge except the actual express charges. Organizations desiring it should communicate with the nearest of the following offices:

Horticultural Society of New York, 598 Madison Avenue, New York City

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The American Horticultural Society

INVITES to membership all persons who are interested in the development of a great national society that shall serve as an ever growing center for the dissemination of the common knowledge of the members. There is no requirement for membership other than this and no reward beyond a share in the development of the organization.

For its members the society publishes THE NATIONAL HORTICULTURAL MAGAZINE, at the present time a quarterly of increasing importance among the horticultural publications of the day and destined to fill an even larger role as the society grows. It is published during the months of January, April, July and October and is written by and for members. Under the present organization of the society with special committees appointed for the furthering of special plant projects the members will receive advance material on narcissus, tulips, lilies, rock garden plants, conifers, nuts, and rhododendrons. Membership in the society, therefore, brings one the advantages of membership in many societies. In addition to these special projects, the usual garden subjects are covered and particular attention is paid to new or little known plants that are not commonly described elsewhere.

The American Horticultural Society invites not only personal memberships but affiliations with horticultural societies and clubs. To such it offers some special inducements in memberships. Memberships are by the calendar year.

The Annual Meeting of the Society is held in Washington, D. C., and members are invited to attend the special lectures that are given at that time. These are announced to the membership at the time of balloting.

The annual dues are three dollars the year, payable in advance; life membership is one hundred dollars; inquiry as to affiliation should be addressed to the Secretary, 821 Washington Loan and Trust Building, Washington, D. C.