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SAM CALDWELL

Lycoris sanguinea is smaller than most species
Orange colored flowers open early—usually in July

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APRIL COVER ILLUSTRATION

[SAM CALDWELL]

A bird's-eye view of *Lycoris houdysheli* umbel suggests the intricate details of a snowflake pattern.

[The Lycorises are reviewed on Pages 61-93]

Lycorises—A Progress Report

SAM CALDWELL

Say "lycoris" to a gardener in the North and he'll think at once of "magic lilies" shooting mysteriously from the ground in midsummer with umbels of lavender-pink flowers crowning tall stalks. To a southerner the same word suggests "red spiderlilies" appearing with spectacular suddenness in September. And one from the Deep South might visualize golden "hurricane lilies"—autumn glories famous in the quaint old city of St. Augustine, Florida.

Respectively, these go under more formal titles of *Lycoris squamigera*, *L. radiata* and *L. aurea*. They have been the "big three" of lycorises cultivated in the United States.

Members of this genus may never rank in importance as garden favorites with daffodils or the true lilies but they are strangely fascinating bulb flowers, meriting more attention than they've been getting. If the general public were aware of different kinds now available and others that will be as soon as stocks increase, I think there might be a modest boom in lycoris interest.

Growth habits alone set these bulbs apart from the average run of garden subjects. With foliage showing up at one season and flowers at another, plus in some cases an intervening period of bare ground, they can be problems to garden designers, who may also consider the tall, leafless bloom stalks "leggy" and top heavy. But the avid plantsman finds these features interesting, and all can agree that lycorises are valuable for brightening the late summer and fall seasons with colorful, beautiful flowers in varied and novel forms.

Not the least of attractions for adventurous gardeners is the fact that they are a relatively unworked field. There is still much for botanists to do in clearing up problems of nomenclature and identification. Likely there are still unknown kinds in East Asia for plant explorers to discover. As a matter of fact, new species and variants of old ones have thrilled amateur plantsmen in recent years by appearing in plantings of imported bulbs.

Cultural problems are far from solved. Hardly any hybridizing has been done, but enough has been accomplished only in the past decade to indicate that here is a wonderfully rewarding activity for any patient gardener to try.

It is true, of course, that not many lycorises are hardy in the North, and that is an obstacle to their widespread use. A number of moderately hardy kinds are still practically unknown, however, in areas where they will thrive outdoors, and with the use of coldframes and ground beds in cool greenhouses, their range can be extended northward. Since they make exceedingly beautiful cut flowers, the use of special equipment for growing them is justified.

Classification

Lycorises are members of the Amaryllis Family and are native to Japan, China and adjacent territories and islands. Many of the bulbs handled commercially in this country are imported from Japan. In the trade there is considerable confusion of nomenclature, with dealers using one name and botanists another to designate the same flower. There are even conflicts over pronunciation. The English, with considerable weight of authority behind them, say "LIKE-o-riss," but I believe the prevailing American fashion is to make it "lye-KOE-riss."

Botanists have separated the genus into two subgenera, based on differences in form and relative measurements of floral parts. One division contains the species with flowers of more or less regular or plain pattern, as in *L. squamigera*; the other has the fancy "spiderlily" blooms typified by *L. radiata*, with segments usually reflexed and crisped along the edges, and long extending stamens and pistils.

The gardener who grows any number of them is likely to separate them in his own mind into "fall foliage" and "spring foliage" types. The first group, of which *L. radiata* is typical, starts leaf growth in September or October, often

while scapes of fading flowers are still standing. Blades push up into more or less robust clumps which remain alive and green all winter and well up into the next spring, when they gradually yellow and die away. The other type, exemplified by *L. squamigera*, blooms in summer out of bare ground, but when the flowers are gone, another period of dormancy ensues. No foliage appears until the next year—usually in February or March. Then strap-shaped leaves grow to maturity and they, too, die away with the coming of warm weather.

This break-down by growth habit may have little botanical significance but it is important to the gardener, who finds that spring foliage lycorises can be grown farther north than the others. Their bulbs rest underground through the worst of the winter, while fall foliage species have exposed green blades that may be damaged and even killed by bitter cold.

It is of interest to note that in the Lower South where winter temperatures are mild, the difference between these two groups is less marked. There the spring foliage kinds will venture out of the ground with leaves weeks or even months ahead of the dates at which they emerge farther north.

The Species

Various species perform differently in different geographic areas of the country, so it should be borne in mind that the observations following are based, except where noted, on my experience in growing lycorises for something over thirty years at Nashville, Tennessee. Winter temperatures near zero and a few degrees below are not unusual. I believe our winters average somewhat more severe than those experienced around Washington, D. C.; there are periods of snow and ice and frozen ground off and on, mainly during January and February, but we do not have deep, hard, all-winter freezing of the ground. Summers are inclined to be hot and dry.

Unless otherwise indicated the accompanying photographs were made in my Nashville garden.

General cultural suggestions are given later, but any special needs or preferences of the different species that I have noticed are included with their descriptions.

My "lycoris parade" gets under way inauspiciously as a rule with the July flowering of some little bulbs that I have as *L. sanguinea*. They may reach peak bloom as early as July 15 or as late as August 5, but most years are at their best in the July 20 to 30 period. And their best is not very good. Scapes averaging 12 to 14 inches tall bear mostly three or four small, very plain flowers, reddish orange in color. These fade quickly and badly in sunlight.

After reading that this species grows "in and around forests in relatively low hills" in Japan, I moved some into moist soil and fairly heavy shade under a dogwood tree. There they have been blooming freely and a little later on somewhat taller scapes; the color is paler but still orange, and flowers last much better. I consider this the least attractive lycoris I grow, yet some visitors like it.

It evidently is hardy; in fact, an old note in Bailey's *Cyclopedia* lists it along with *L. squamigera* as "perfectly hardy." The narrow leaf blades—which come from small one-inch bulbs—start up in late February or early March. Surprisingly short-lived, they die away in May. I should say that although my best sanguineas are now in the shady location, they get sun during much of their foliage cycle, which starts well before the dogwood leafs out. This may be essential for bloom production.

In addition to hardiness, this lycoris has the advantage of being fertile. It has seeded freely to its own pollen and to several others I've tried, so it may prove valuable in a hybridizing program.

My bulbs have all come under the *L. sanguinea* label in small lots from various American dealers as far back as 1951, and all have proved identical. Relatively inexpensive, they have all been imported Japanese bulbs, I believe. But I wonder if they are the true species. In Traub and Moldenke's *Amaryllidaceae: Tribe Amaryllaeae* the description of *L. sanguinea* says, "... leaves produced in mid-October . . . flowers . . . blood-red-scarlet . . .," and these details certainly don't fit the lycoris I have. The same authorities list under *L. sanguinea* a variety *cyrtanthiflora* with "flowers apricot-colored, bleaching in the sun to a gray color"—a description that conceivably could be applied to mine. However, Prof. Tetsuo Koyama, writing on "The Japanese Species of Lycoris" (*Baileya*,

March 1959), has typical *L. sanguinea* with "flowers yellowish red" and "Leaves present only between spring and summer,"—terms that describe mine very well.

A white-flowered *L. sanguinea* (variety *alba*) is reported in botanical literature, but I have never found a source for bulbs.

For several years dealers have been offering a "*L. cinnabarina*" described as having "mandarin orange" flowers. As nearly as I've been able to determine, this is strictly a catalog name with no standing in botanical circles. I acquired bulbs in 1959 which have not flowered thus far, but in appearance and growth habit they have been exactly like my sanguineas. I presume they are a variant of that species.

In 1960 I got three bulbs of *L. kiusiana* through the kindness of B. Y. Morrison, Pass Christian, Mississippi, who had them direct from Japan. They were a little larger than *L. sanguinea* bulbs and have been a little more robust in growth, but otherwise have closely resembled that species. Indeed, some authorities simply list it as variety *kiusiana* of *L. sanguinea*. My bulbs have not bloomed but Mr. Morrison's have. He says they have a general similarity to *L. sanguinea*, but that pedicels holding the flowers are longer, making a looser umbel, and the individual segments are narrower and stand apart, so the garden effect of the bloom is different.

L. koreana is reported as another closely allied species; it does not seem to be in commerce. Said to have "clear brick-red" flowers, it is also reduced to varietal status under *L. sanguinea* by some botanists.

An Old Favorite

Around July 25 most summers and running for weeks into August I can count on a fine display from numerous plantings of *L. squamigera*. There is so much variation, in fact, in the blooming dates of various groups of these bulbs that for a time I thought there might be different strains of them. Now I am convinced that varying soils and situations with regard to light and moisture account for flowering differences. Actually it is a fortunate situation, enabling me to enjoy them over a longer season.

This is a really big lycoris, with bulbs up to three inches in diameter and stout scapes sometimes a yard high. Umbels contain five or six or even seven lavender-pink or rosy lilac flowers. Visitors from the North often remark that mine appear paler in color than others they've seen. This seems to be purely a matter of their bleaching or fading in the southern heat and sunlight. When we happen to have a period of cool, rainy weather during "magic lily" time, the blooms are noticeably deeper and richer in color.

The flowers are sterile, never setting seed in spite of my attempts to make them do so by hand pollination. An interesting angle is that cut blooms, kept in a nutrient solution, appear for a while to be developing well-filled seed capsules, but they never live up to the promise.

Leaves of *L. squamigera* commonly push out of the ground in early February; in mild winters I've seen them in January. Growing slowly at first, because nights are cold at this time, they endure constantly recurring freezing temperatures without damage. By March and April they could be mistaken at a glance for husky clumps of non-blooming daffodils. They ripen off and disappear completely in May or June.

While *L. squamigera* is a reliable bloomer in Tennessee, it becomes less so as one moves into the Lower South. At Mr. John Heist's, in St. Augustine, Florida, I once saw hundreds of bulbs that grew leaves profusely every year but never had a bloom. One might suppose that, like peach trees, they need a definite period of low temperatures in order to flower normally. A baffling circumstance is that some blooms are produced in the Lower South. Mr. Morrison gets a few at his Gulf Coast location, but reasons for the poor performance there remain mostly a mystery.

Northward the story is more cheerful, for this is a popular bulb and the only lycoris known to most gardeners in the Middle West, the Eastern states and milder parts of New England. True, there is a reputation in some localities for erratic behaviour, but I have an idea this is based mainly on the fact that newly planted bulbs may delay a couple of years before settling down to start blooming. Once established, they usually do well under average garden conditions. I was therefore surprised to read



SAM CALDWELL

Lycoris squamigera is the old favorite "Magic Lily"

that in Japan they grow wild in the wet soil of lowlands.

There are two perfectly plausible stories about how this plant was introduced into America. One involves plant collector Dr. George R. Hall, Bristol, Rhode Island, who brought a number of fine ornamentals from Japan to this country. The other names a Mr. I. D. Hall, of New Bedford, Massachusetts, who said the bulb "was given to him by the captain of a vessel from East India." I have no idea which version is correct. In both stories bulbs passed into possession of the Massachusetts firm, Hovey & Company, where they were named *Amaryllis halli* (for one of the Messrs. Hall), and catalogued and distributed in the 1880's.

The name, "Hall's hardy amaryllis," or just "hardy amaryllis" has persisted in some areas. "Magic lily," however, is probably the most widely accepted common name today. Most gardeners who know the plant is now classified as a lycoris and attempt to pronounce the name, come out with something like "skwa-mi-JEER-a," but dictionaries give preference to "skwa-MIJ-e-ra." The term means "scaly," evidently referring to the bulbs.

There is an unfortunate confusion of this with the South African "belladonna lily" which is much grown in California. (This plant was being called *Brunsvigia rosea* when I checked last, but it has had three "correct" botanical names in my lifetime and could be bearing another now.) Writers in usually reliable garden magazines sometimes get them mixed up, for they both share the peculiarity of blooming suddenly in summer on leafless stalks that shoot up out of bare ground, and the flowers look a good deal alike; however, the "belladonna lily," a much less hardy bulb than *L. squamigera*, starts foliage in the fall months ahead of the lycoris.

Something of a mystery to me is *L. squamigera* var. *purpurea*, reported to have "lilac and bright purple" flowers. In many years of perusing rare bulb lists I have seen it offered only once, and a purchase at that time brought bulbs that proved to be *L. incarnata*. Of course it is not difficult to find in current lists an alleged species, "*L. purpurea*." Again, this seems to be a catalog term rather than a valid botanical name. I've had

bulbs so labeled from several different sources and up to now they've invariably turned out to be *L. sprengeri*. Perhaps some reader of this report may know where the real *L. squamigera* var. *purpurea* is available.

The late E. O. Orpet, of California, wrote in the 1937 *Herbertia* of the American Amaryllis Society of having a form of *L. squamigera* "with narrower foliage and much narrower petals to the flowers." He did not regard it as desirable as the type, but it would be interesting to know if any West Coast gardeners still have this form.

A New One

Blooming at about the same time as my "magic lilies" is *L. haywardi*, a newly named species that might be regarded as a sort of junior size *L. squamigera*. Scapes run mostly in a 16- to 20-inch height range, carrying three to five flowers with smoothly tailored, flaring "petals." It is not really a small lycoris for umbels are a respectable six to seven inches across, but they are dwarfed in the company of *squamigera*. The coloring is delicate and variable according to light intensity, but basically pale orchid or lilac-pink, with deep pinkish lines radiating from flower throats outward along the centers of segments, which are blue tipped. Coloring is best in part shade.

This lycoris was in a shipment of bulbs that Florida horticulturist Wyndham Hayward received out of Shanghai, China, in 1948, before Communists lowered the "bamboo curtain." It was a remarkable shipment, yielding three lycorises previously unknown in cultivation. This one was named in 1957 for its importer, Hayward, by Dr. Hamilton Traub.

It is very close in appearance to the long known but still rare *L. sprengeri*. *L. haywardi* blooms a couple of weeks ahead of *L. sprengeri*, however, is not quite so deeply colored and, though dependably hardy here in Tennessee, has given indications that it will not stand quite as much cold as *L. sprengeri*. Its leaves grow at about the same time as those on *L. squamigera*, but are distinguishable by being more blue-green and narrower.

On the basis of experience to date, this is a free blooming species, even in the Lower South and Florida where



Newly named Lycoris haywardi—a half-sized L. squamigera

Vivid blue-tipped segments distinguish Lycoris sprengeri



neither *L. squamigera* nor *L. sprengeri* has been particularly generous with flowers. It is fertile, too, and can be used in breeding hybrids. Unfortunately, it is still in such short supply that no dealers list it regularly.

In the lycoris literature there is described a *L. argentea* from Upper Burma, which I believe has never been in commerce. I judge from the description that it must be very much like *L. haywardi*.

Blue Beauty

One of the truly fine lycoris species which amaryllid connoisseurs should know better is *L. sprengeri*, originally out of the mountains of Hupeh province in central China but grown by at least a few fanciers in this country for more than a quarter of a century. In form and habit it, too, bears a general resemblance to *L. squamigera*, but it is smaller, much deeper colored and blooms three or four weeks later—in late August and into September for me. Scapes vary a few inches each way from an average foot-and-a-half height, and most of mine have five, six or seven flowers. Color, however, is the chief attraction of *L. sprengeri*—rosy wine shades in the funnel-like throat blending into most vivid blue patches toward the segment tips. Anthers of yellow pollen contrast beautifully with this blue background. Always notable, the blue coloring is really rich and wonderful when we have cool, cloudy days during the *L. sprengeri* season.

This species and previously mentioned *L. haywardi* are similar enough to cause inevitable confusion. Main differences, as I see them, are that *sprengeri* blooms later—just a few days later, but I have never had flowers of both at the same time—has segments that overlap along the edges more and are more rolled back or reflexed at the ends, and has overall deeper coloring than in *L. haywardi*.

Other than by their blooms it is difficult to separate them; both have relatively narrow (as compared with *L. squamigera*) bluish green leaves, possibly a little darker green on *L. sprengeri*, and both start foliage growth toward the end of January or in early February. This is long persisting, into June as a rule. Both have bloomed for me from bulbs an inch and a half in diameter, though they get a bit larger.

Valuable characteristics of *L. sprengeri*, in addition to its sheer beauty, are hardiness—it is said to stand 20 degrees below zero—and a habit of free seeding, to its own and other lycoris pollens. I have found it a profuse and dependable bloomer, but strangely, as in the case of *L. squamigera*, it is a reluctant performer in more southern areas. On seeing a mass of healthy *L. sprengeri* foliage at the home of expert gardener Elizabeth Lawrence in Charlotte, North Carolina, I remarked that she must enjoy many flowers. No, she responded, there were very few. Similar reports have come from other growers in the Middle and Deep South.

For what it may be worth I pass along an old tip from C. Sprenger, who grew this lycoris with great success in his garden near Naples, Italy, and for whom it is named. Give it all possible sun, he advised, and no moisture during the summer, especially in July and August. Some of my clumps that do exceedingly well get ample sun, I presume, but in the summer they also get dappled high shade from nearby deciduous trees through at least a third of the daytime. They are usually dry, too, in July and early August, but it has seemed to me that soaking the ground around them in mid-August helps bring on an extra fine flush of bloom stalks.

L. sprengeri bulbs have never been plentiful enough to be really cheap, but it is usually possible to find them on the market. Checking records I find that I have had bulbs at various times from five different sources, and only once did they come correctly named. That was a small lot from the Van Tubergen firm in Holland more than a dozen years ago. Four bulbs came from a West Coast importer in 1952 under the intriguing label, "New Species." It was not until 1955 that they bloomed and I recognized them as *L. sprengeri*. All the others came as "*L. purpurea*," including a fine bulb from Fisher's Nurseries, Seneca Falls, New York, with a note that the stock was originally from the W. E. Marshall Co., New York City, in 1935. That offering of Marshall's may have been one of the first distributions of the species in this country.

It is purely surmise, but I think the mix-up of names must start in Japan. Wholesalers there who ship out lycoris



SAM CALDWELL

"Peppermint" striped buds identify Lycoris incarnata

bulbs clearly are not well posted on the botanical names. *L. sprengeri* is not a Japanese native, but dealers there either grow or acquire bulbs somehow. They do indeed have rosy purplish shadings in the flowers, and so are offered under the descriptive name, "L. *purpurea*." Few American retailers who re-sell these bulbs have ever seen them bloom; they simply pass on in catalogs such names and information as they have from suppliers. From time to time I continue to get "L. *purpurea*" bulbs, always hoping they will be something different—perhaps the long-sought *L. squamigera* var. *purpurea*.

A Candy-Striped Species

Caroline Dormon, Louisiana botanist, artist and writer, once said to me, "I have a lycoris with candy-striped buds. I think the buds may be prettier than the open flowers. Now what could that be?"

That could be and is another attractive lycoris out of China, *L. incarnata*. I've had this one more than twenty years now and so have it in fair quantity. It blooms with reasonable consistency at some time from the end of July until mid-August—some years a little later. Bloom stalks are sturdy, 18 to 20 inches high, more or less, bearing usually six to nine flowers held jauntily at a somewhat upward tilt. Before unfolding, the large slender buds are distinguished, as Miss Dormon indicated, by their "peppermint candy" color scheme of longitudinal red and near-white stripes. After the opening the red stripes soften to still conspicuous pinkish purple lines along the mid-ribs of segments which are blush colored or almost white. Somehow one is reminded of the milk-and-wine type crinums fairly common in southern gardens, though, of course, there is no close resemblance.

L. incarnata makes long-necked, rather large bulbs, up to two and a half inches in diameter; foliage from them usually is showing up by the end of January and grows on in general resemblance to that of *L. sprengeri* and *L. haywardi*. While hardy in Tennessee, this species probably will not take winters very much colder than ours, because the spring freezes not infrequently "burn" its leaf tips.

I have never considered this one of the more beautiful lycorises; still, it's worth having. At least it is easy to identify, as no other lycoris—to my knowledge—looks very much like it.

It is hard to forget that I had this species six long years before it ever started blooming. There were nice big bulbs, too, just a few feet from a clump of *L. squamigera* that flowered profusely every summer. The *incarnatas* grew and grew, making more leaves and a bigger clump of bulbs every spring but never a flower. After six years, at the time of a change of residence, I dug my bulbs and gave away most of the *L. incarnata* bulbs in disgust. Then the few that were brought along to my present home grounds surprised me by blooming the very next year as well as most years since.

Looking back with a little more knowledge, I've worked out an explanation for the extended flowerless period. Those bulbs were growing in a long perennial border, which for the sake of many plants was kept well watered all summer. I know now that *L. incarnata* comes from sunny grassland areas of central China where winters are rainy and summers, hot and dry. That summertime drought, which mine get naturally now, evidently is important to several—but not all—lycoris species. It seems to trigger some kind of mechanism in the bulbs and result in normal development and emergence of bloom stalks.

One thing I have not been able to figure out—why mine never make seeds. This species, according to "the books," is supposed to mature seeds rapidly after flowers fade. My bulbs never do, nor have I ever had a successful "take" when using *L. incarnata* pollen to fertilize free-seeding lycoris flowers.

The "Spiderlilies"

Lycorises previously described all belong to the botanical subgenus of "plain flowered" kinds; there now remains the other subdivision comprising species with flowers of the fancy "spider" form. By far best known of these is *L. radiata*, the famous "red spiderlily" of southern gardens. Something of a horticultural mystery, it is present by the millions in yards and gardens of all southern states, the Southwest and mild areas of the West Coast, and now is getting attention in

fringe areas above the supposed northern limits for its cultivation. Nobody knows when, how or where bulbs were first brought into the South, but it must have been many generations ago. And the introducer must have called them *Nerine sarniensis*, for that was the name used without question for years. This is not so surprising, as all the "spiderlily" lycorises look a good deal like the genus of related South African bulb flowers named *Nerine*.

By 1937 Wyndham Hayward and others had discovered and publicized the *Nerine sarniensis* error. Today that name is never heard, but the common term, "Guernsey lily"—which should apply only to true *Nerine sarniensis*—is still used by many southern gardeners.

No matter what it is called, this is a truly beautiful flower. Globular, short-necked bulbs, mostly about an inch and a quarter in diameter but occasionally up to two inches, "sleep" all summer while other kinds of plants are growing, and then enliven the September garden with delicate appearing but actually quite durable "spidery" red flowers on scapes a foot to a foot and a half high. Immediately following the flower season, foliage starts, with long, narrow, dark green leaf ribbons, channeled up their middles by a gray-green line.

L. radiata, common as a native bulb of both China and Japan, has made itself perfectly at home in our Middle South, growing in poor, sandy or clay soils and many situations—often through heavy Bermuda grass turf—, blooming freely and increasing prodigiously. During three years of army duty in north Florida, I saw many sizable plantings, but they did not appear to be quite as floriferous as those a hundred miles or so farther north. Possibly the almost daily summer showers in Florida are not entirely to their liking.

In Tennessee, of course, I am toward the northern limit for outdoor cultivation of *L. radiata*, and the main hazard is winter damage to foliage. In tribute to the tough little leaves, I must say that they can take short periods of zero weather. They collapse and look limp and frozen on the cold, hard ground, but when milder days come they lift up again, showing whitening or "burn" from the cruel experience. A light mulch of red-cedar, pine or other evergreen branches

helps protect them through the winter from both sun and drying winds, but no heavy covering can be used as the leaves must have light.

We need to explore fully the matter of different forms of *L. radiata* now in cultivation. Traub and Moldenke list a variety *terracciani*, with "flowers large, becoming marginally white before fading," and a dwarf variety *pumila*. Probably no one knows where there are authentic living stocks of these varieties, though it is not uncommon to find some on which aging flowers develop white margins.

Anyone who acquires *L. radiata* bulbs from a number of different sources notices eventually that they are not uniform in appearance and behavior. For one thing, most of those grown are sterile, and for years it was thought that the only fertile type was a wild one known to occur in China. Actually, for a long time there have been fertile strains of *L. radiata* in gardens scattered from Washington, D. C., to New Orleans—mostly without the owners knowing they had anything unusual.

Mr. W. L. Hunt, Chapel Hill, North Carolina lycoris fancier, has two fertile clones of *L. radiata*, one starting to bloom in late July, the other in August. With the recent addition of a seed-bearing *L. radiata* that Mr. Morrison has had for forty-odd years, I also have two fertile forms now, my other one having come out of a northeast Georgia garden in 1950. Whether these are exactly the same as Mr. Hunt's, I don't know but hope to find out.

Aside from the possibilities these fertile clones offer hybridizers, their habit of coming into bloom sometimes a full month before the common "red spiderlily" season makes them valuable. Too, I've noticed that the fertile clones are rather more reliable in bloom production than the common form.

The fertile strain I've had usually starts flowering between August 12 and 20. All the blooms are gone before the common ones start in September, so I've never been able to make direct comparison. But scapes of the fertile type average a little shorter and I believe the flower umbels are a bit smaller and the color a stronger red than in the September bloomers. It may be that cool September weather favors the later flowers;

SAM CALDWELL



Lycoris radiata is the well known "Red Spiderlily" of Southern gardens. The common sterile form is shown above; an earlier flowering, slightly smaller and deeper red colored fertile strain is shown below



SAM CALDWELL



Lycoris elsiae—a blend of delicate pastel tints in the cream, salmon, and pink range

"White No. 1"—a very pale yellow selection with broad segments, crisped and reflexed



all of them are pretty but I've long felt that the September ones are most beautiful. Their coral-red "squiggles," like something squeezed from a tube of fancy cake icing, are marvelous when gold dusted by afternoon sunlight.

I think my plantings of the sterile radiatas contain three and possibly more forms or strains that are not exactly alike. Most numerous are those that bloom around mid-September; they came from Georgia years ago and are what I have always thought to be the form prevalent in the Southeast. Considering the quantity of bulbs I have, there is a disappointingly low percentage of blooms, though the flowers themselves are nice enough.

Then there are some "dime store" bulbs, undoubtedly imported from Japan. They make narrower leaves than the others, with a very conspicuous gray line; also they bloom later. Finally are some bulbs secured a year ago from a local nursery, where for two years I've been watching a block of fully a thousand of them. In 1960 they were at peak bloom on October 6; in 1961—a year when all lycorises ran a little late—peak bloom was about October 12. Not only was this the latest bloom I've ever seen on *L. radiata*; it was exceptionally fine bloom on taller and stronger than average scapes. And when we dug into the clumps we found that nearly every bulb was blooming.

As of now, this looks like a "find." These bulbs, however, are well situated on a south slope, with no competition from other plants or tree roots. It may be that all the variations are due simply to soil, location and other cultural factors. A project for the near future is a test plot in which I can line out perhaps twenty-five bulbs of a kind in adjacent rows, grow them along under uniform conditions for a number of years and watch results. Something good could come from this. Weak strains may be weeded out and possibly extra hardy ones found that will be worth garden space in southern Ohio and milder parts of Pennsylvania and New Jersey where already there have been some trials of *L. radiata*.

Meanwhile, anyone starting a new planting of "red spiderlilies" in locations where they are not fool-proof, might well get bulbs from several different sources. They are cheap enough—real

bargains as a rule—and it is entirely possible that one lot of bulbs may succeed where others fail.

There is a *L. rosea* recorded as having flowered at Kew Gardens in London in October, 1895. Evidently somewhat like *L. radiata*, it is described as having wider leaves and large pink flowers. I can find no indication of its ever having been introduced in this country.

"Whites" That Aren't White

In the botanies there is a *L. albiflora*, a Japanese species "Similar to *Lycoris radiata* but differing in having smaller, white flowers . . ."

In catalogs and bulb lists there is often also a "L. albiflora." Order it and one is likely to get a bulb that produces in late summer a luscious "spidery" flower, taller and larger than most flowers of *L. radiata*. Difficult to paint with words, the color is a soft, illusive pastel blend of cream, buff, yellow, salmon and pink tints, with deepest pinkish shading along the center of each segment. It is strongest when the blossom first opens, varies from day to day and in different lights, and finally fades almost away leaving a flesh colored or nearly white flower.

During the past dozen years this same lycoris—or others so similar I can't tell them apart—has been available under different names. I have bought it under all of these labels: "L. alba," "L. albiflora," "L. albiflora carnea," "L. radiata alba," "L. radiata carnea," and "White Spiderlily."

Because this did not conform to true *L. albiflora* nor to any other known species, Dr. Traub in 1958 named it *L. elsiae*, for Dr. Elsie Quarterman, Vanderbilt University botanist, who has pressed and preserved many lycoris specimens in the effort to clear up nomenclature confusion.

My plantings of these bulbs have been small lots—singles, threes and half-dozens at the most. Friends in Louisiana and Mississippi who buy them by the hundreds have written me about finding all sorts of exciting variations among them in addition to the usual *L. elsiae* type. Mr. Morrison, at Pass Christian, has proved the point by sending samples of selections he has made. These are growing under such tags as "Small Deep Pink," "Salmon," "New Light Yellow,"

"Yellow and Copper," and a numbered series of "Whites," none of which are really white, at least on opening.

Best of the lot is "White No. 1," a beautiful large lycoris with broad segments, crisped and reflexed, of a fine soft yellow. Mr. Morrison advised me after the 1961 season that this is identical with the original *L. albiflora* he secured from Japan during the 1940's while in Washington with the Plant Introduction and Exploration Division of the Bureau of Plant Industry. He has been able to check it against bulbs of the Japanese stock maintained through the years by Cecil Houdyshel, at La Verne, California.

All bulbs of this group currently on the market, I believe, are imported from Japan. No American dealer, to my knowledge, has started listing them as *L. elsiae*, and yet that name undoubtedly covers most of them. As for the variants, they'll furnish plenty of work for taxonomists. Perhaps one will find among them the missing *L. straminea*, supposedly a valid species from China, "pale straw-colored with a pink line along the middle, and a few scattered red dots." It apparently has never been seen in this country.

However named in catalogs, these bulbs make happy hunting for gardeners. The *elsiae* type, the one most frequently met, is a lovely thing, and any of the variants could become prized possessions.

One unfortunate limitation on the wider use of *L. elsiae* and related forms is that they are not very hardy. They make fall foliage in the manner of *L. radiata*; the blades are twice as broad as in that species, longer and less prominently lined, and are much more susceptible to cold damage. I struggled along with them in outdoor plantings for years, losing a few bulbs and getting few flowers, due to leaves freezing off in the winters. Finally I moved all of this type into a four-by-eight-foot ground bed for which I have a wooden board enclosure and plastic sash cover to put on in winter, making a sort of coldframe. This protection has proved adequate, and now I get dozens of flower scapes annually. These are good garden lycorises for the Middle and Lower South, where it is only in exceptionally cold winters that they are appreciably hurt.

I have never been able to get a single seed on typical *L. elsiae*, but the "White No. 1" variant has seeded sparingly.

A True White Lycoris

In collecting lycorises through the years I followed every path that beckoned toward a truly white-flowered species, but for a long time with no success. During the search I met a Louisiana lady who said, "Sure, I have white spiderlilies—pure white, too." And when she sent me a bulb I knew she was right. It was a native swamp hymenocallis, however—not a lycoris at all!

In his now noted Shanghai shipment of 1948, Wyndham Hayward received some bulbs labeled "*L. alba*," that by their size and appearance could have been *L. radiata*. He sent me three to check for hardiness. From the first emergence of leaves, this plant was distinctive. It is a fall foliage type, like *L. radiata*, but leaves are much wider, not so noticeably channeled, bluntly rounded at the ends, and of a dark green—actually a blue-green—color. Flowers came in 1951, and with them, the end of my search. This was it—a white lycoris. Dr. Traub named it *L. houdysheli* in 1957 for Cecil Houdyshel, who is one of our pioneer rare bulb fanciers and dealers.

It is a large lycoris, with scapes shooting up 20 inches tall or more sometime around mid-August. The umbels of six to eight flowers are models of symmetry and perfection. Flowers are cream white when first opened, then in sunshine become clear dazzling white. When grown in half shade—which really seems to be a better situation for them—the blossoms retain their creamy, warm white tint. Examining closely, one can sometimes find what looks like a thin hairline of red ink traced along a segment, lengthwise, but at almost any location on the segment. It is not present at all in some flowers and not noticeable in any, but it is one of the identification marks of the species.

An interesting fact is that when the blooms are three or four days old they begin to acquire color, becoming flushed irregularly with patches of rosy pink; this is exactly opposite from behavior of *L.*



SAM CALDWELL

Lycoris houdysheli is a rare and beautiful white-flowered species of comparatively large size—umbels up to eight inches



SAM CALDWELL

Pale yellow Lycoris caldwellii is one of several new species from China

elsiae flowers, which have their strongest color upon opening and with age become near-white.

I rate *L. houdysheli* "hardy" for outdoor culture here in Tennessee but not for a much colder climate. It seems about on a par with *L. radiata* for resistance to cold. At this writing (Feb. 10) leaves show moderate to severe damage from a recent cold spell with three successive nightly temperatures of minus 2, minus 2 and zero degrees. Likely bloom will be a little "off" next August. I have never had it to set seeds, though a Texas grower has reported them.

It is a great pity that this species is almost unobtainable at this time, and may remain so for many years unless a source of imported bulbs in some quantity can be found.

Model of Inconsistency

Another of the recently named lycorises is August blooming *L. caldwellii*. It also was among the bulbs Hayward

had from China in the fall of 1948, at which time he sent me several for trial. The "L. aurea" label under which they had been imported was clearly erroneous, because they made no foliage until January, and then it looked like leaves of *L. squamigera*. Bulbs were in bad shape when received and it was not until five years later, in the summer of 1953, that bloom came. Meanwhile, the "spring foliage" habit, in general resemblance to *L. squamigera*—but not quite so wide in leaf—had proved to be characteristic. Leaves start in January or February and die away in May.

Once established, this is a relatively large and robust lycoris, with bulbs up to two and a half inches in diameter, scapes more than 20 inches tall, and rather loose umbels, mostly five-flowered, measuring as much as eight and a half inches across. "Peachy" colored, pinkish salmon buds suggest that the flowers will be highly colored, but actually they open out with a soft yellow tint that fades to off-white in just a few days. Like *L.*

sanguinea, this species seems to be adapted for about two-thirds shade, where the color holds best.

In a family of bulbs known for inconsistent performance, this one has been particularly erratic for me. Foliage grows nicely just about every spring, yet there have been years with no bloom at all and most years with only one or two scapes. I had relegated it to the "shy bloomer" class, when in 1961 it came across with seventeen scapes—one for nearly every bulb I have.

Then some years the flower umbels are most handsome, as they were when I made the accompanying photograph. In other seasons the flowers do not open simultaneously so as to make a pretty head of bloom but are "staggered"; the first flower is shriveled and dying before the last bud unfolds, resulting in a less attractive appearance.

I'd like to be more enthusiastic about a namesake (Dr. Traub named this one for me in 1957), but the best I can say at this time is that the pale yellow color is very nice, while it lasts. Hardiness of this species is still in question; it is seemingly thriving and increasing under outdoor culture for me, but appears to bloom better farther south. Whether this is due to its liking for milder winters or to some other factor, only additional experience will reveal. It has never seeded in my garden.

Dr. Traub puts *L. caldwelli* in the second subgenus, with the "spidery" type lycorises. It is not of typical "spiderlily" form but is closer to that than to species in the plainer patterned first subdivision.

Pure Gold

For as long as anyone can remember there have been golden "spiderlilies" to herald the autumn season in our oldest city, St. Augustine, Florida. Legend has it that ancient seafaring men brought bulbs from China into this New World port. They liked the new home. Each September, when gale winds were wont to whirl in from the Atlantic, leafless stalks would rocket up from bulbs in the sand, coquina and coral rock soil, and unfold their spectacular flowers at the top. So they became "hurricane lilies."

In 1819 the description of yellow-flowered *L. aurea*, from China, was pub-

lished in London. Until the last decade, *L. aurea* remained the only yellow lycoris recognized by botanists, and for generations the Florida "hurricane lily"—which spread gradually around the Gulf Coast—was the only yellow lycoris known in cultivation, at least in this country. So it had to be *L. aurea*; no one questioned the fact. We use that name for it to this day, and yet I have the uneasy feeling that some enterprising taxonomist will eventually tell us that is all wrong.

L. aurea is the most "tender" species I know; it is hopeless out of doors in Tennessee but is very good in large pots or wooden boxes winterized in a cool but frost-proof greenhouse. Blooming size bulbs that I have are long-necked, about one and a half to two inches in diameter and flower in late September and October. While some stalks are shorter, many of them run to two and a half feet high, with an average of about seven large yellow flowers with crinkled segments to the umbel.

This species makes the largest leaves of any lycoris I've seen. They start in fall while flowers are still standing and grow up to an inch and a half wide and two to nearly three feet long. The color is a light grayish green, especially on the under side. There is no surface gloss. This foliage will tolerate a little frost but not much. I have seldom seen *L. aurea* growing outdoors except in Florida, Gulf Coast country and Southern California, and would judge that it might not do well where winter temperatures consistently drop as low as 20 degrees.

One definite requirement of this lycoris is water, right through the summer dormant period, as it comes from areas of China that get 100 inches of rainfall a year. It looks a little absurd to keep watering pots and boxes of bare dirt, but I do this all summer and am amply rewarded when my "golden spiderlilies" bloom in fall.

Mr. Hayward tells me that he has never seen seed on *L. aurea* in central Florida. However, I've noted a few sound seeds on plants at St. Augustine, also by hand pollination have had seeds on my greenhouse-grown bulbs, and Dr. Traub has sent me hybrid seeds he produced on *L. aurea* at La Jolla, California. Clearly it is a fertile species.



SAM CALDWELL

Lycoris aurea, a famous "Golden Spiderlily," is one species recommended by the author for container culture
These blooms are in mid-October



SAM CALDWELL

Lycoris aurea is exquisite in close-up detail

Confusion from Japan

The yellow lycoris situation is much confused currently because since World War II—and perhaps before that time—American bulb dealers have been importing out of Japan thousands of “*L. aurea*” which are not *L. aurea*—at least, not the St. Augustine type. They are similar enough for both to fall under the description, “autumn-blooming, yellow-flowered, spider-like lycoris.” But in several ways the Japanese bulbs are different from and better than *L. aurea*. They are considerably hardier, standing winters in the Mid-South and milder fringes of the Upper South, though they do not survive long in my Nashville area. Scapes are somewhat shorter and sturdier, and individual flowers face out more or less horizontally around the umbel, rather than with an upward tilt as in *L. aurea*. Flower segments of saffron yellow are wider than in *L. aurea*. Leaves of this Japanese import are different, too, being dark green and glossy on the upper surface, and while of good size are not as large as those of *L. aurea*.

Recognizing its distinctive features, Mr. Hayward in 1957 named this lycoris as a new species, *L. traubi*, for Dr. Hamilton Traub. As in the case of *L. elsiae*, few dealers are adopting and using the new name. Hundreds of gardeners in the South who think they have *L. aurea* actually are growing *L. traubi*. It continues to be sold as “*L. aurea*” by most mail order dealers. Bulbs are inexpensive and are sometimes stocked in the plant departments of variety stores as “Yellow Lycoris” or “Yellow Spiderlily.” In fact, anyone buying “*L. aurea*” now from almost any source is likely to get *L. traubi*, unless he specifies home grown Florida bulbs, since the Japanese bulbs are cheaper and more easily available in quantity.

Incidentally, Mid-South gardeners who might have failed with “yellow spiderlilies” years ago when only Florida bulbs were known, should try again now with these new ones from Japan. Their extra hardiness enlarges considerably the range for outdoor culture of a yellow lycoris. Nevertheless, superiority of *L. traubi* does not extend everywhere. In central Florida it is proving a less thrifty grower than the old St. Augustine stock, and I am finding that equally so with bulbs under pot culture.

In fairness to dealers I should say that even the Japanese botanists apparently think the bulbs now being sent over are true *L. aurea*. Until taxonomists clear up the confusion, those of us who just garden and enjoy the flowers will have to call them something. For the present it seems most sensible to continue regarding the old, long-known St. Augustine type as *L. aurea* and actually to start using *L. traubi* as the name of the later introduction.

Handled as a pot bulb, as I must grow it, *L. traubi* has never bloomed very freely; thus I've seen only a few scapes. They were fine flowers and ran absolutely uniform in habit and color. Several growers in Louisiana and Texas, however, have told me of finding among the *L. traubi* bulbs individuals producing flowers that vary in size, form and intensity of color, including some desirable light yellows. I gather that this happens only with occasional lots of the bulbs, but it adds an element of excitement to acquiring them.

L. traubi is fertile and has been used with apparent success in hybridizing. Altogether it is a beautiful and valuable lycoris for gardeners in moderately mild climates.

Hardy Yellows

Most important in the lycoris field in recent years is the “discovery” of not one but two yellow kinds, similar in flower to the mild-climate species but having a different foliage habit and sufficient hardiness to win places in some northern gardens. Neither is obtainable commercially at this time, but it is good news just to know they exist.

First is *L. chinensis*. It has been growing at Glenn Dale, Maryland in the U. S. D. A. Plant Introduction Garden since 1948, when bulbs were secured from the Nanking, China, Botanic Garden. To add another confusing detail, I must say that these also were received and grown as “*L. aurea*.” While not a particularly vigorous grower in the Glenn Dale garden, this lycoris has maintained itself, increased somewhat, and flowered, usually in late July or early August. Leaves are produced, not in fall, as in *L. aurea*, but in March, more in the manner of *L. squamigera*.

The name *L. chinensis* was given by Dr. Traub in the 1958 *Herbertia*, year-

book of the American Plant Life Society. I was fortunate in receiving in March, 1958 a bulb of it from Mr. Frederic P. Lee, Bethesda, Maryland. Planted immediately, it made good foliage each spring but did not bloom until three years later, on July 17, 1961. The 14-inch scape carried a six-flowered umbel, surprisingly large—just a little less than ten inches across from tip to tip of the outward extending flower parts. The color is stronger—more orange-yellow—than in *L. aurea* and *L. traubi*. It is really a beautiful lycoris.

By mid-September the scape had matured eight large, shiny black seeds, about three-eighths of an inch in diameter.

The other hardy yellow was "found" here in Nashville, Tennessee only five years ago. Actually it was brought here in 1925 by Mrs. Henry Sperry, a Nashville woman whose daughter was a Methodist missionary, then stationed in Huchow, China. Returning from a visit to her daughter in autumn of that year, Mrs. Sperry brought home bulbs of the "orange spiderlily" that were wild in the hills between Huchow and Hangchow, in Chekiang Province, some 100 miles from Shanghai.

In Nashville they grew and bloomed but never increased much and never spread beyond gardens of the Sperry family connections and a few close friends. Though they were greatly admired as pretty flowers, during more than thirty years no one ever suspected their rarity or that they might have any name other than "orange spiderlily."

It brought the thrill of a gardening lifetime when in 1957 I was told about these bulbs and the next year saw the bloom in the accompanying photograph. I felt at once that nothing like it was in cultivation, unless it might be the then unnamed hardy yellow lycoris I had heard of at Glenn Dale, Maryland. Because of their histories it seems reasonable that they might be the same.

Dr. Traub had been helping me for a long time in identifying lycorises, so I sent to him in La Jolla a bulb and pressed scapes of the new find. I was able to get three bulbs for myself and planted them in December, 1957; then when Mr. Lee sent one of the Glenn Dale bulbs three months later, I set it just a foot away from the "Sperry" planting.

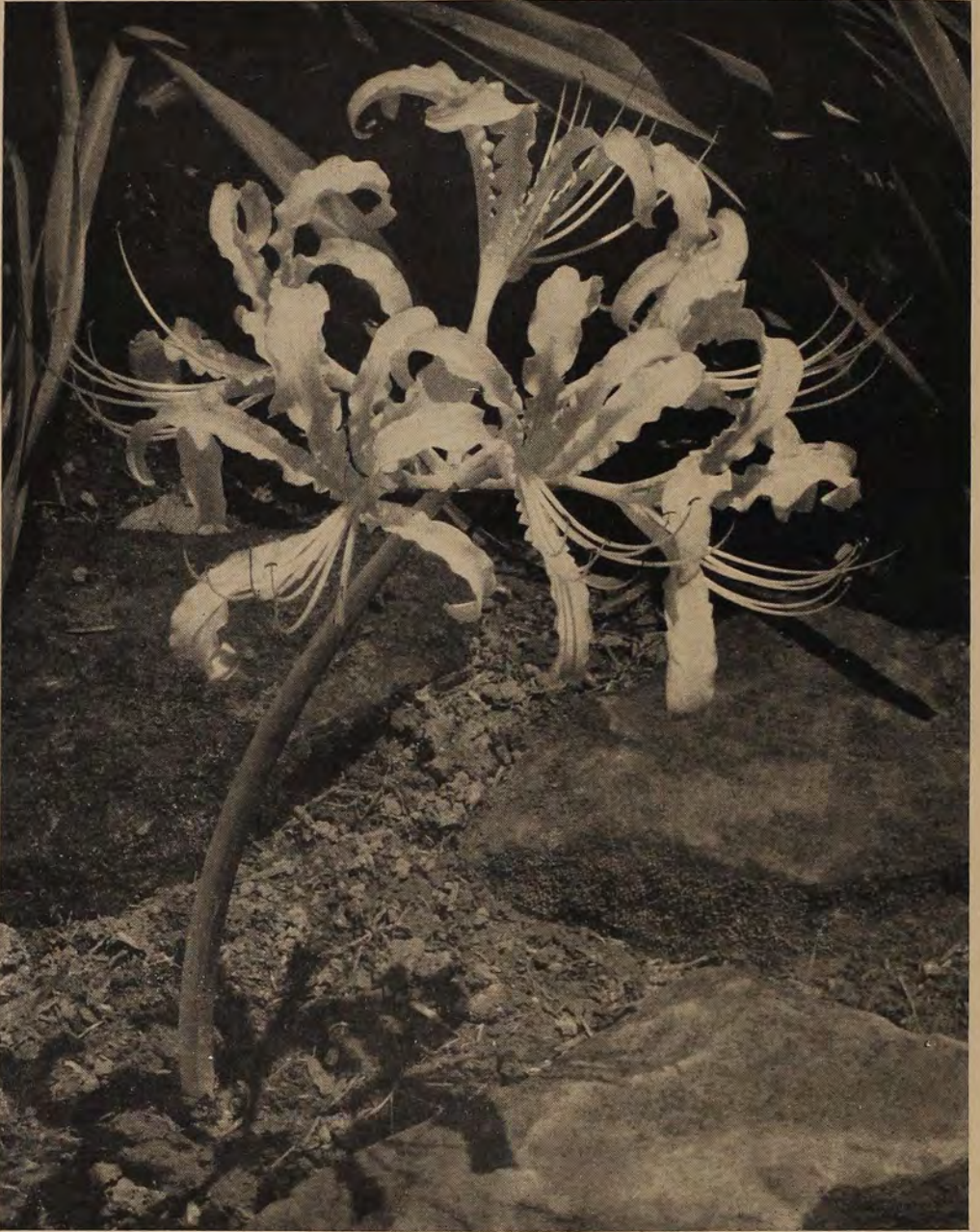
From the first it was possible to tell the bulbs apart by the different shades of green of their leaves; otherwise the foliage was alike in general appearance and in that it came up in early March on both and died later in spring.

All four bulbs bloomed in 1961. To a gardener the flower heads look almost identical. The "Sperry" lycoris, however, bloomed during the first and second weeks of August—two to three weeks later than the Glenn Dale bulb (now named *L. chinensis*). Also the "Sperry" scapes average about twice as tall as the *L. chinensis* stalk. Dr. Traub has advised me that there are other differences, too, evident to a trained botanist. I understand that this Nashville lycoris will get the "Sperry" name officially—we now use it for convenience—in time, but whether as a separate species or as a variety of *L. chinensis*, I do not know.

It is a very fine thing, probably hardy to Philadelphia and possibly even as hardy as *L. squamigera*. The area in China where the bulbs were collected is about in the latitude of Jacksonville, Florida, but according to Mrs. Sperry's daughter the winters were short and very cold, with snow and ice and canals freezing over thick enough to be walked on. During the thirty-odd years the bulbs have grown in Nashville they have endured record overnight winter temperatures of 13 and 15 degrees below zero.

After observing the Nashville bulbs closely through four blooming seasons, I would say that there are two clones among them. One has scapes consistently around 22 to 24 inches tall, with flowers having unusually broad segments—up to a half inch across. The other grows taller—scapes 30 and 31 inches—with slightly narrower segments, and those at the back of the flower tend to flare upward in a nearly vertical position. The clones bloom together and both have the same orange-yellow color of *L. chinensis*. This lycoris seems to be a dependable bloomer when once established.

The natural increase is appallingly slow. One clump I was allowed to dig in the Nashville garden of Miss Aileen Bishop in 1958 had six bulbs in it from a single bulb planted in 1942—not much gain for sixteen years! Fortunately they do seed well, especially when hand pollinated, and almost every one of the large



SAM CALDWELL

Lycoris chinensis—a recently named, relatively hardy,
orange-yellow species



SAM CALDWELL

Not officially named as yet, the "Sperry" lycoris is a magnificent orange-yellow Chinese species

black seeds germinates. No blooming size bulbs are available for distribution, even for test purposes, at this time, but I have a modest quantity of seedlings coming along.

Since this lycoris is—or at least, used to be—plentiful in its native habitat in China, I am hopeful that it may be known also in Japan, and that a source of imported bulbs can be found. Only recently Mrs. U. B. Evans, bulb fancier and collector of Ferriday, Louisiana, has told me that Japanese dealers are offering unnamed lycorises simply under the “Yellow” label, and that she thinks there may be a half dozen strains among them. Likely most of these will prove to be *L. traubi*, but I am hoping some of the hardy *L. chinensis* and “Sperry” types will show up too. At any rate, the prospect for more of these golden flowered beauties in more gardens is good.

Culture

Gardeners who are used to sure-fire “plant-in-fall—bloom-in-spring” Dutch bulbs may be dismayed by lycorises. Occasionally, of course, one will get plump, firm bulbs in summer with live flower buds inside, and these may bloom out within a few weeks after planting. At least a couple of years are then likely to elapse before more flowers are produced. I’ve waited as long as six years for a bulb to flower and have learned not to be disturbed by a mere two- or three-year delay. Lest this sound discouraging, I should add that once started, some species bloom dependably for many years with little attention.

Actually, lycoris culture is simple. They seem to be tolerant of many soil types and light exposures. For my own bulbs I favor a woody situation with high moving sunlight and shadow, and I’ve worked peat moss and sand into an already well drained and mellow loam. But there must be millions of *L. radiata* thriving in full sunshine in Georgia’s sandy red clay. I’ve seen *L. aurea* growing in what looked like dirty sand in Florida and *L. squamigera* in dark corn land in Iowa.

A nice thing about the bulbs is that they are relatively disease and pest free. I don’t think I’ve ever lost one except from cold damage—trying to grow species that can’t take the winters in my

locality. It is a joy to find that, like narcissi, they appear immune to injury by field mice, chipmunks and moles, which are a fearful nuisance in some of my other bulb plantings. Grasshoppers are something of a problem at flowering time—and a much greater one in the Lower South—but chlordane controls them reasonably well. A California friend has told me of having lycoris bulbs ruined by narcissus bulb flies, a pest we have thus far escaped.

Planting Time

If there is an ideal planting time for these bulbs it is probably in spring, right after the mature foliage has ripened off and died down. As a practical matter, bulbs from commercial sources are not usually available until later in the summer. Imported bulbs are nearly always dry and hard and without roots. This may be the reason it usually takes them two years or more to become reestablished well enough to bloom again. I have dug lycorises at every season of the year and have never found them without firm, fleshy, live white roots. Apparently they do not have a yearly cycle of root growth which dies off completely during a dormant period as in the case of narcissi.

In planting or transplanting, I think it is well to try to preserve such live roots as the bulbs may have. Years ago I was given a quantity of *L. squamigera* from an old garden but had to move them at once. It was March and they were in full leaf—logically the very worst time to disturb them. When I forked deep and lifted clumps the crumbly dirt fell away, exposing the roots. I went ahead and separated the bulbs but handled the roots carefully, kept them moistened and managed to get them back into the ground the same day. Leaf blades looked weak and floppy for a while, but they remained green and persisted about as long as usual.

It was a pleasant surprise when several of the bulbs bloomed in August, and the next year they all grew and bloomed as though long settled. Since then I have never hesitated to move lycorises in full leaf, though it certainly must be better to do this work during the summer or fall dormant season.

It is true that dried imported bulbs

usually root promptly after being set out in moist soil, so I could be wrong in supposing that it helps to save roots when digging. Perhaps it is the overall drying and deterioration of tissue during storage and shipment that gives the imported bulbs a set-back.

I hope that eventually we will have dealers who grow representative stocks of various lycoris species in this country and will supply fresh-dug, live-root bulbs on order, just as some of the lily specialists do. This probably would shorten some of the long waits that customers now endure before seeing blooms.

Planting Depth

Planting depth may not be of critical importance, and yet I suspect that too deep planting is one of the factors sometimes responsible for bloom failure. Checking lycoris groups that flower dependably, I have noticed that during dormant periods I can scratch into the soil near label stakes and find the tips of bulbs right at the surface or not much over an inch or so below it. This means that species like *L. squamigera*, with long-necked bulbs, may be sitting six inches or more in the earth, while short-necked, globe shaped *L. radiata* is just a little underground. Whether this is true in other localities with colder or warmer climates, I cannot say. It is not in line with what I have read of lycorises in the wild, for a Japanese authority writes that they grow "rather deeply in humus-rich soil." Nevertheless, in planting I dig and pulverize the ground deeply, but bulbs are actually set so that the tips of their necks come almost to the surface.

Once rooted, they seem to be capable of pulling themselves deeper, so I take it that if uncomfortable where I place them, they can gradually adjust to the desired depth. On the other hand, they have more trouble coming up from a too deep position. When set too deep, *L. radiata* bulbs—and perhaps other species—have the peculiar way of "climbing upstairs" shown in an accompanying photograph. A strong, solid projection, much like a flower scape, grows upward from the original bulb's base; then two or three inches higher, and thus shallower in the ground, a new bulb develops as the lower old portion deteriorates.

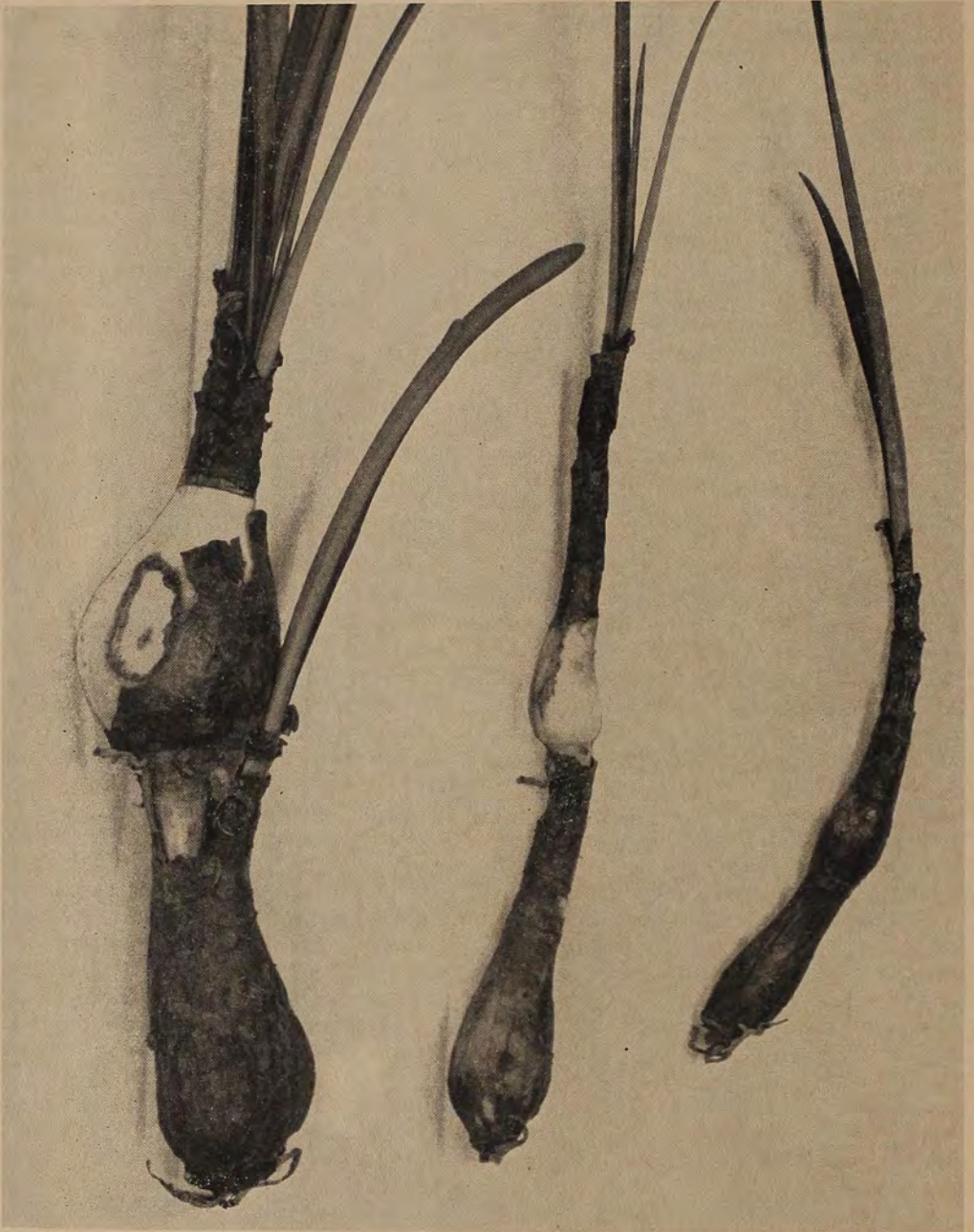
I do not pretend to understand fully this phenomenon. Anyone who grows *L. radiata* in quantity and digs into old clumps will probably unearth bulbs in the stage shown in the photograph. I doubt that this is always merely a means of attaining a shallower level in the ground. It occurs mostly in long established, crowded plantings, and may be that old bulbs use this method to change position and get into newer, less exhausted soil—a sort of "self-transplanting" device.

Foliage Means Flowers

However and wherever lycoris bulbs are planted, the chief aim is to have them produce abundant foliage at the normal time and maintain it in a healthy condition throughout the normal season. With other factors favorable, quantity and quality of bloom in any year will be directly related to the last preceding foliage cycle. Just by watching my lycoris leaves I can usually predict a good or a poor year of bloom. When a winter is unusually cold and the *L. radiata* blades are badly burned and whitened, I count on few "red spiderlilies" the next fall.

Spring foliage species are less often hurt, but a disastrous late freeze in 1955 taught a lesson. Part of February and nearly all of March was unusually balmy. Gardens were green all over. *L. squamigera*, *L. incarnata*, *L. sprengeri* and others had lush fountains of foliage. Suddenly on the night of March 27 the temperature dropped to 16 degrees. Had the spring vegetation grown slower and been hardened by light frosts earlier, damage might not have been so severe. As it was, five-year-old crabapple trees, in bloom and partly leafed out, were killed. Leaf clumps on the spring foliage lycorises became a blackened mess. That year there were two lonely bloom stalks on perhaps 200 bulbs of *L. squamigera* and not a single flower on others of this type.

Not too surprisingly, the fall foliage species were not particularly affected. Their leaves had started the previous September and had endured temperatures much lower than 16 degrees during the winter. Probably flower buds were already formed inside the bulbs by March. At any rate, they bloomed about as well as usual that year.



SAM CALDWELL.

Lycoris radiata bulbs planted too deep renew themselves at a shallower level

Incidentally, a good project for some horticultural institution to sponsor would be a planting of lycorises from which bulbs would be dug at regular intervals, sliced open and examined and developments recorded. Details on flower bud initiation in the various species would be helpful. It might be possible to learn whether bulbs of certain species are naturally alternate year bloomers, as is sometimes thought. I have an idea that flower buds start within the bulbs in some definite ratio to leaf production. Possibly under ideal conditions flowers may come every year from thriving bulbs. In less favorable situations the growth may be slower and spacing of flowers could be every other year. All this could be determined by controlled experimental plantings. Data of this nature have been recorded for some of the amaryllids but not, to my knowledge, for any lycoris.

With the purpose of producing and protecting good foliage growth on lycoris bulbs, a judicious selection of planting sites in the garden is in order. Wind-swept locations are particularly bad. Species making broad leaf straps are susceptible to mechanical injury from having their blades whipped about. And in cold weather winds cause faster transpiration of moisture from leaf surfaces than it can be replaced through the circulatory system, resulting in a damaging "burn." Often groups of bulbs can be set against walls or evergreens so as to be sheltered. And, because late spring freezes are a hazard in my locality, I keep several old sheets and empty bushel hampers ready at that season. When the weather man predicts dangerously low night temperatures, I cover the leaf clumps of at least my rare species.

Blessed with pretty good soil, I have never done much in the way of feeding my bulbs. Nor, as a rule, do I water. Foliage grows at a time when rains are usually abundant, but as we are often in the middle of a summer drought when the bloom season should be starting, I like to flood the ground around lycorises a couple of weeks before scapes are due. And watering is then continued, if necessary, to keep the flowers in good condition. Also, as previously mentioned, in the special case of container-grown *L. aurea*, water is given the year 'round.

Renewal Planting

Eventually there comes the problem with old plantings of digging, dividing and resetting. I follow an old fashioned policy of leaving things alone as long as they perform reasonably well. Thus there are *L. squamigera* clumps now sixteen years old, still going strong. Some of these in season have more than twenty scapes at a time. The mass of delicate color is beautiful and impressive, and I enjoy walking among them several times a day as shafts of sun rays filter down through nearby beech trees and spotlight them from different angles. One might wish that the umbels were produced at a less uniform height for there is a considerable tangling together of flowers and loss of individual grace in these crowded clumps.

I lift and separate some of these from year to year as time and my energy permit. The work is done in late spring as the mature foliage yellows or in summer after blooms are gone, because at these times the dying leaves or scapes furnish good "digging guides." Without them it would be hard to find the bulbs.

L. radiata multiplies faster and the crowded bulbs evidently starve themselves. A twelve-year-old drift of some hundreds of them has been deteriorating slowly for four or five years, though it still gives some flowers each autumn. Probably I could keep these in thrifty condition longer with a feeding program.

L. aurea bulbs also are rather prolific with increase. Grown in ten-inch flower pots or deep wooden boxes they definitely need separating and resetting in new soil every five or six years; else there will be under-size leaves and no flowers at all.

Thus the matter of lifting and replanting lycoris bulbs can best be resolved by a close observation of their apparent needs. Garden conditions vary so, as do the habits of the several species, that no schedule of periodic digging and dividing could be recommended that would be widely applicable. Again I suggest that "Let well enough alone" is a good policy. Even with most careful handling, lycorises seem to resent disturbance. There is nearly always a falling off in bloom production the next year after bulbs are transplanted.

Beginners in lycoris culture are prone to dig up a bulb after it has been in the



SAM CALDWELL

Ground bed, with removable wooden frame and plastic sash cover for winter use, enables the author to grow half-hardy kinds successfully
Photograph made in January

ground a year or two without blooming; they think it must need another location, when all it needs is more time. Digging will likely set it back another year.

Growing in Containers

My impression is that some of the bulb books and catalogs take a too optimistic view of pot or container cultivation of lycorises indoors. With the single exception of *L. aurea*, I've found the relatively few flowers produced by potted bulbs hardly worth the space, time and effort they require. Certainly they can not be expected to do much good on a windowsill. Even with *L. aurea* a cool greenhouse or sunny plant window is needed. When favorably situated, nearly every one of the *L. aurea* bulbs will bloom every autumn—enough to make a worth while show. I've had a few scapes on potted bulbs of *L. caldwelli*, *L. elsiae*, *L. incarnata* and *L. sprengeri*, and no doubt others can be flowered. But most years the bulbs just make leaves—nothing more.

When new, little known species are received, I not infrequently try them in pots at first to learn about their foliage habits and to get an idea as to whether they will be able to "take it" outdoors. Eight-inch pots or larger are used, for though the bulbs are set shallow, their roots tend to shoot downward more than sideways. I fill the pots with the same equal parts mixture of sand, garden soil and peat moss that I use for many other container-grown plants. For *L. aurea* a generous addition is made of crushed oyster shell—the kind sold at poultry feed stores. This is prompted by memories of St. Augustine and its sandy soil containing countless chalky fragments of sea shells.

Where a cool greenhouse is available, modified forms of container culture are more rewarding. Lycorises planted in ground beds, deep benches, redwood tubs or other boxes or large clay pots usually do well. Incidentally, ordinary pine boxes treated with copper naphthenate wood preservative—which doesn't hurt plants—last a long time. Winter sun is good, but a definitely cool house,

such as one used for growing camellias in the North, is best. After all, only enough shelter is required to protect winter foliage from cold damage. If containers are portable they can be taken outside the greenhouse in summer. At flowering time they become focal points of interest on a patio or terrace.

With the advent of inexpensive plastic sheeting, all sorts of semi-permanent or removable winter shelters for outdoor beds of questionably hardy plants have been devised. Lycoris fanciers in the North can take advantage of such materials.

Propagation

For the most part gardeners have been content to let lycorises increase by their natural production of offset bulbs, which is fairly generous in several species. Unfortunately, some of the choicest ones—notably *L. houdysheli* and the “Sperry” species—are slow to multiply.

At least a few attempts have been made in Florida to increase lycorises by the “bulb cuttage” method used in propagating selected clones of hybrid amaryllis. This involves slicing bulbs up into pie-shaped pieces through their basal plates and planting the sections in flats of sand. In experiments I believe this has worked but I know of no quantity production from it.

A related but less radical cuttage system is described by Prof. John V. Watkins in one of his University of Florida bulletins on plant propagation: “. . . several longitudinal *upward* cuts (are made through the center of the base) of the bulb, about three-fourths of the way to the neck. This bulb, intact but with many longitudinal cuts, is planted in a box of peat moss and sand to about three-fourths of its depth. Numerous young plants should arise from the mutilated stem area . . .”

I tried this in September, 1959, with one large bulb of *L. houdysheli*, but made only two upward slices, at right angles to each other, quartering the lower part of the bulb. Three bulblets were produced which at this time, two and a half years later, have not quite reached blooming size. This may not be typical. Probably more cuts would have increased production.

Though slow, the propagation of certain species by seed has possibilities. On

the fertile kinds there is usually a good crop of seed from natural pollination by insects or wind, and this can be made much heavier if one takes the trouble during bloom season to brush ripe pollen anthers over the flower stigmas. My record harvest has been twenty-seven seeds on one strong stalk of a “Sperry” bulb.

Ripening seeds should be watched in September and October and gathered as soon as the capsules start splitting. They are attractive to grasshoppers at this time. Seeds should not be allowed to dry, or they will shrivel and lose viability. I make it a practice to plant them promptly or else to store them in pots of slightly moistened peat moss or vermiculite under a greenhouse bench.

While there are undoubtedly many good ways to handle seed, I plant them an inch deep in a sand-soil-peat-moss mix, mostly in seven-inch azalea pots which winter under the bench in my cool greenhouse. By the next March most of them will have germinated and made bulblets down in the pots, but no leaves show up on most species until the following fall, a year after planting. “Sperry” lycoris seeds are an exception; they are likely to send up grassy blades at any time, and not all of the seeds in one pot will act the same way. *L. sprengeri* also is a little odd—strictly a “spring foliage” type for me in blooming-size, outdoor-grown bulbs, its potted seedlings are profuse with little blue-green leaf straps in the autumn.

Currently I am leaving the seedlings two years in the pots, then transferring them in summer to a ground bed for growing on. There may be faster methods, because I have never had one to bloom in less than six years.

Hybridizing

One of the most exciting fields of activity open to any amateur plant breeder lies in hybridizing lycorises. It seems incredible but it is still possible for absolute beginners to make original crosses between some of the species that have never been cross bred before. The only requirement really is a great deal of patience, because it does take a number of years to bring seedlings into flower. Some of our best daffodils have been originated by amateur plantsmen, and insofar as cross-breeding is concerned, lycor-

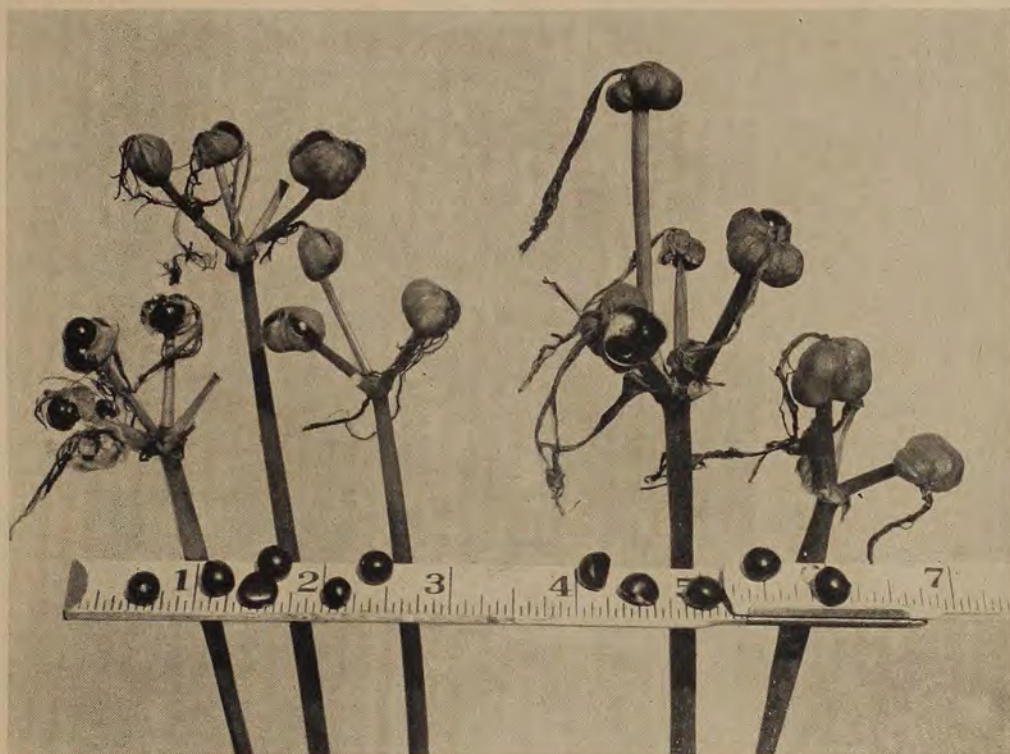


An important step in lycoris hybridizing is removal of anthers from buds (above) of selected female parent before pollen is released. This is to avoid self-pollination.

*The actual cross is effected (below) by touching pollen from male parent to the stigma of the female blossom. Flower shown is the fertile type *Lycoris radiata**



SAM CALDWELL



Lycoris seeds are large, black and shiny. Fertile *Lycoris radiata* on left, *L. sprengeri* at right. Seeds should be planted at this stage

ises are no more difficult to work with than narcissi.

Strangely, almost nobody has ever bothered even to try crossing them. No doubt in America this has been because in the past only sterile forms were widely available. The situation is different now and opportunity is actually shrieking at pollen spreaders.

In 1950 Dr. John L. Creech took pollen from the yellow lycoris (now *L. chinensis*) at Glenn Dale, Maryland, and fertilized flowers on the seed-bearing type of *L. radiata* in B. Y. Morrison's Washington, D. C., garden. Eventually a seedling flowered, "yellow with longitudinal reddish stripes." It is certainly possible that earlier successful crosses had been made; in fact, I have heard of a "*L. incarnata* hybrid" once catalogued in California. But Dr. Creech's is the first well authenticated lycoris hybrid I can locate.

I started making crosses between some of my lycorises in 1953 and then continued in '54 and '55. Results were so successful—at least in producing seed—that I thought something must be wrong. It couldn't be that easy—just putting pol-

len from one flower on the stigma of another—or dozens of people would have done it years before. So I concluded that my seedlings coming along were probably not hybrids at all but just duplicates of their female (seed-bearing) parent. Nevertheless, I kept them growing and even attempted additional crosses. The fact that some of them failed was actually encouraging—it made me feel that possibly the successful "takes" were going to result in hybrids, after all.

August, 1961 brought eventful days in my lycoris "nursery." Three scapes bloomed from a group of six- and seven-year-old *L. sprengeri* × *L. radiata* seedlings. They proved to be not only hybrids but very beautiful hybrids, combining traits from both parents in ways to give completely new lycorises unlike any previously known. Too, they differed from each other in both form and color, and as there are scores of other seedlings in the same cross yet to bloom, future years should bring plenty of thrills. Not named as yet, these for the present are just getting numbers and a convenience label, "Sprenrad Hybrids."



Flowers from the first recorded cross of *Lycoris sprengeri* and *L. radiata*. "Sprenrad 1" (above) is a strong purple-red self. "Sprenrad 3" (below) is purplish pink with deeper pink lines from flower throat outward along middle of segments. Violet markings at segment tips develop as flowers age. Both umbels are about six inches across.



Apparently any of the fertile lycoris species will cross with any of the other fertile ones. By the end of the 1961 season I had made successfully all the crosses listed below. There are from a few to a goodly number of seedlings coming along in the various lots, and while none have bloomed except in the *sprengeri-radiata* group, there seems no reason now to doubt that they will all be hybrids. They are:

- L. haywardi* × *L. sanguinea* and the reverse
- L. haywardi* × L. "Sperry" and the reverse
- L. haywardi* × L. "Sprehrad"
- L. radiata* × *L. haywardi*
- L. radiata* × L. "Sperry"
- L. radiata* × *L. sprengeri* and the reverse
- L. radiata* × L. "Sprehrad"
- L. radiata* × *L. traubi*
- L. sanguinea* × L. "Sperry" and the reverse
- L. sprengeri* × *L. haywardi*
- L. sprengeri* × L. "Sperry"
- L. sprengeri* × L. "Sprehrad"
- L. sprengeri* × *L. traubi*

In the crosses listing *L. radiata* it is only the fertile type that has been used successfully. I've tried to make crosses involving *L. squamigera*, *L. incarnata*, *L. caldwelli*, *L. houdysheli*, *L. elsiae* and the common sterile *L. radiata*, both as female (seed) and male (pollen) parent. These attempts have invariably failed, except in the case of a couple of questionable "takes" when *L. caldwelli* and *L. houdysheli* pollens were used on fertile *L. radiata*.

Dr. Traub crossed the two yellow species, *L. aurea* and *L. traubi*, in 1957, and has just advised me that he has had a seedling to bloom "better than either parent."

Hybridizing is easiest when the prospective lycoris breeder has fertile lycorises of two or more species blooming simultaneously; however, pollen can be stored dry in small plastic boxes in the refrigerator for two weeks and possibly longer. Also I get pollen through the mail from friends in other localities who have species blooming that are not flowering for me at the time.

After picking out the planned seed parent scape, one must de-anther all the

flowers in its umbel—and any others nearby—in the bud stage, before pollen is released. Otherwise there is almost sure to be self-pollination. The cross is made simply by touching pollen of the male parent to the stigma of the female flower. I usually do this two or three times on successive days, beginning when the buds first open. The cross is labeled and recorded, and if it takes successfully there follow the time-consuming but uncomplicated steps, seed harvesting, sowing and growing to flowering size bulbs.

Information, Please

As the newer lycorises are more widely disseminated we shall need reports from growers in many localities on the general performance and especially the hardiness of various kinds. Little up-to-date material on them is found in garden encyclopedias or even in the garden bulb books. Factual reports from observant growers can build up a fund of information from which we all may draw to our greater garden pleasure.

In candor I should say there is still much we do not know about lycorises. They can be inconsistent, temperamental, sulky and exasperating. And they can be wonderful. Perhaps, after all, this is part of their attraction.

NOTE: Many large mail order nurseries with a general offering of flower bulbs usually list *L. squamigera* and sometimes *L. radiata* and *L. aurea*. Dealers named below ordinarily can supply these species and whatever rare ones are available. Stocks of newest kinds are too short to permit catalog listings, and individual inquiries about them will be necessary.

There are probably other good sources unknown to me, but I have had bulbs from all of these:

Wyndham Hayward, Lakemont Gardens, 915 South Lakemont Avenue, Winter Park, Florida.

Cecil Houdyshel, 1412 Third Street, La Verne, California.

Oakhurst Gardens, P. O. Box 444, Arcadia, California.

Lineweaver Perennial Gardens, 117 West Marthonna Road, Madison, Tennessee (for August blooming, fertile strain *L. radiata*, only).

A Year of Plant Propagation

JAMES S. WELLS

Let us suppose that you are a horticultural graduate. By this I mean a person who has developed beyond the stage of planting the run-of-the-mill material and is now concerned with the finer points of horticultural varieties. If you are this kind of person, you may have found it difficult to obtain some of the better plants in which you are interested. Perhaps you have seen them growing in an arboretum, or the garden of a friend; but try and buy them, and you run against an endless frustration of negative results. If it is these special forms that interest you, there is a very sound argument for propagating your own; for apart from the fun and sense of satisfaction which comes from achieving success with a difficult subject, the plants you want can thus be had.

Equipment

This can be as simple or as complex as you care to make it. I am assuming that you have nothing; and therefore, the simplest and at the same time quite efficient beginning can be made with a well constructed, *tight* frame. By *tight*, I mean a structure which is relatively air tight. The structure can be made in any way you prefer—bricks, concrete blocks, or wood—and the method of construction need not be highly efficient, because a simple wood frame “knocked up” out of rough lumber can be rendered air tight by lining it with polyethylene film. The top of the frame need not be covered with glass, nor does it need to be any particular size. The standard nursery sash of three by six feet is perhaps a little awkward for it is impossible to reach to the back of a six-foot frame. Therefore, a light wooden framework, three feet wide and four feet long, also covered with polyethylene in two thicknesses to provide heat insulation, would undoubtedly be more satisfactory. The positioning of the frame in

the garden is of some importance for it should be set to receive the maximum amount of indirect light but without any direct sunlight falling on it. A northern aspect, therefore, would be best, such as close to the north wall of a garage, or the house itself.

The frame does not need to be very tall, probably not more than a foot at the most because large pieces of plant material will not be used. One refinement which would greatly assist your work of propagation would be a section heated with an electric heating cable. These cables come in lengths which, when laid on the floor of the frame at a distance of about four inches, will adequately cover the area of a standard sash. If these cables are covered with about six inches of medium, they will maintain the medium at a temperature of about 65 degrees without the need of using expensive electrical controls. A thermometer, just to be sure that the temperature is not getting too high, would be all that you would need, for if the temperature gets much above 70 degrees, the cable can be disconnected for a day.

Assuming a simple frame to be available, let us now consider some methods of propagation to use for certain plants during the next twelve months. Propagation, of course, is an endless procedure. There is no beginning or end to the propagation year, but I have chosen to arbitrarily commence our discussion with the month of March, for at this time you can carry out dormant grafting of a number of deciduous plants.

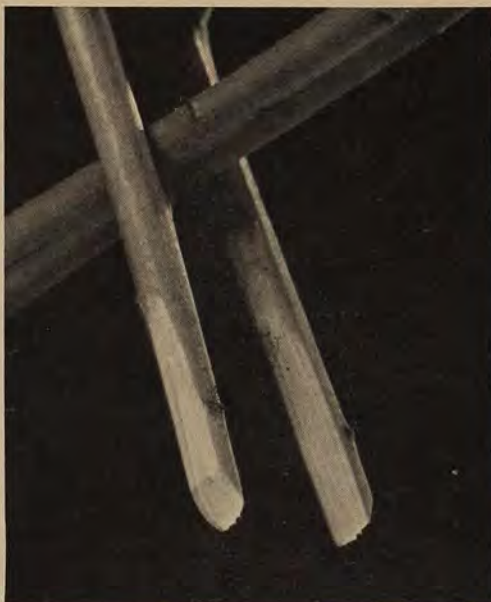
Grafting—March & April

Grafting is not nearly the complicated technique that many growers would have you believe. In all the plants in which I shall indicate grafting a simple side graft is entirely adequate. The illustrations will show you how this is carried out. Stock and scion should be approximately



SEABROOK FARMS

Cutting the understock in side grafting. Note that the flap is left attached at its base to the stem of the understock



SEABROOK FARMS

The prepared scion for a side graft. Scion is photographed with a mirror before it to show the required cuts on both sides



SEABROOK FARMS

The completed side graft. This type of grafting is best for propagating pines and spruces

the same size. A cut is made with a sharp knife on the side of the stock, not cutting too deeply, but certainly deep enough to cut lightly into the central woody tissue. The flap cut in this way from the side of the understock is left attached at its lowest point. The scion is then cut in a somewhat similar manner on both, but opposing, sides of the base of the stem and trimmed so that the length so cut approximately equals the length of the cut previously made on the understock. The scion is then inserted beneath the flap, the cut surfaces carefully aligned so that the cambium tissues are in direct contact, the flap is brought out over the scion and the graft is then carefully bound with waxed twine to hold the two pieces firmly together. Immediately after the completion of the graft, the twine and the whole area which has been cut is covered with ordinary molten paraffin wax to seal the cut surfaces from the air. The graft, if it is a bare root graft, is then packed into a suitable medium, usually lightly moistened peat moss so that the waxed area is buried beneath the peat. If the understocks are not bare root but have been preestablished in pots in readiness for grafting, as is to be preferred for some

conifers, then the pot must be plunged in peat in the frame, mounding up the peat so that the point of the union is again covered. A gentle bottom heat provided by the cables of 60 to 65 degrees will stimulate the rapid formation of callus between stock and scion which should be seen breaking through the wax cover in a matter of three to four weeks. When this is seen, additional air can be given and the bottom heat slowly reduced to harden off the plants. Once the two pieces have strongly united, they can be lifted from the peat bed, the wax twine carefully cut with a sharp knife or razor blade excepting only the top turn and the plant then set out in a well prepared bed under shade to grow on. The understock should not be removed from the graft until the plant is properly re-established in its new quarters. But, once new growth can be seen, then the top of the understock should be removed, cutting with a pair of sharp pruning shears at a point as close to the graft as possible.

This general method can be used in March for the dormant grafts of such plants as *Malus* (Fowering Crabapples) which would be grafted onto pieces of apple root and treated as described;



SEABROOK FARMS

Dipping lilac grafts into paraffin wax. The same method can apply to any dormant deciduous grafted plants, such as magnolias, maples, and apples

Syringa (Lilacs) which can be grafted onto roots of California Privet, and *Wisteria* which can be grafted onto pieces of its own roots. This, incidentally, is quite an acceptable method of propagating a few plants, for if you can obtain a twig or two and at the same time a handful of young roots about the same size and caliper with some fine roots attached, these can be grafted together and grown on to produce new plants.

While early March would be considered a good time for grafting of dormant deciduous material, late March and early April would be time to use the frame in a similar manner for grafting a much wider range of material. This period is particularly good for grafting many of the conifers such as *Picea pungens kosteri* (the Koster Blue Spruce) *Cedrus atlantica glauca*, *Tsuga canadensis* varieties, plus certain deciduous plants such as *Cornus florida*, *Acer palmatum*,

Magnolias and Rhododendrons. For most of the conifers it is desirable to have understocks of a suitable kind established in pots for at least a year, but it is not essential and if you are not prepared at the time you read this article, yet feel you would like to try some conifer grafts, by all means obtain some seedlings and try grafting as described above with a side graft at this time. One point of caution, the cuts made on the scion of all conifers should be as shallow as possible. Certainly the cuts should not be so deep as to cut into the central woody tissue. This is important for success. The cut made on the understock, however, can and should be somewhat deeper. The other plants mentioned, such as Magnolias and Maples can be successfully grafted onto bare root seedlings of a suitable variety but the percentage of take will probably be not more than fifty per cent, whereas, if you

A graft of a Koster Blue Spruce showing waxed point of union

JAMES S. WELLS





SEABROOK FARMS

A well rooted cutting of *Acer palmatum atropurpurea*

includes all the hardy Ghents and Mollis varieties, the double flowered *Rustica flora plena* types, the Knapp Hill and Exbury varieties, as well as the many deciduous native species. Cuttings of all of these should be taken in, what I term, a "butter soft" condition. This means taking shoots which are in active growth, early or late in the month, depending upon your location. But it is important to take the shoots while they are extremely soft and in active growth. The moment they begin to become a little firm and resistant to bending with the finger, it is too late.

Now cuttings of this kind obviously cannot be treated in a normal manner, for if placed in an ordinary bench or frame they will wilt and rooting will not follow. Two systems can be used. The first requires an intermittent mist system which maintains a thin film of water on the leaves of the cuttings at all times during the day; or alternatively, the cutting can be set into a frame or bench and then completely enclosed with a sheet of polyethylene. Either system works well, but for the average home gardener, the plastic is probably more practical.

Magnolia soulangeana showing effect of a heavy wound on root development

have established understocks, the percentage should be between eighty and ninety.

Rhododendrons are in a somewhat different category because the understocks can be lifted with a fibrous ball of roots. These can then be grafted and packed into the frame without difficulty. One final word of caution. Don't pack the grafts in too close together. Give them space so that you can watch developments and, of course, groom the plants regularly to remove dead leaves. Give air as soon as the development of callus indicates that the plants are moving.

Early Soft Wood Cuttings—May

I can imagine some of you saying that grafting is all very well, but you prefer to take cuttings, so here now at the beginning of May is your first chance; for only in a very brief period at this time of the year can one successfully take cuttings of the deciduous Azaleas. This

SEABROOK FARMS



A light wire frame is made to cover the cuttings and a sheet of plastic draped over the outside of the frame so that no moisture can escape. The percentage of rooting will vary with varieties but all varieties need a fairly strong hormone treatment. Hormodin No. 3 is the minimum that should be used and many varieties will respond to a treatment of a two per cent powder (20 mg/g) of indole-butyric acid. The best medium is nine parts peat and one part sharp sand; although, quite excellent rooting can be had in pure acid type Dutch or German peat. The cuttings are slow to root, requiring from two to three months, so do not be in a hurry and keep the plastic tightly enclosed around them excepting once a week when you examine the cuttings and damp them down.

The same procedure can be used for the rooting of soft cuttings of Lilac varieties, which also must be taken from soft new growths. Here again, fairly strong hormones are necessary; but the best medium is a half-and-half mixture of peat and sand. Timing—about the middle of May—is as critical as for the deciduous Azaleas.

Soft Cuttings of Deciduous Material—June

By the beginning of June, many plants will be ready to propagate and here again, the choice can be made between the use of a misting system and a close tight frame with additional plastic cover. With certain plants it may be an advantage to use a mist system inside the frame. For instance, cuttings of *Acer palmatum* varieties (Japanese Maples) root best if taken from vigorous shoots of current season's growth early in June and inserted in a frame or greenhouse in a medium of pure peat and with an intermittent mist application. These plants seem to enjoy the additional water from the mist. They also root more rapidly if the air temperature is allowed to build up inside the propagation chamber to a hundred or a hundred and five degrees Fahrenheit as long as this is combined with one hundred percent humidity plus some free water. Cuttings of the Japanese Maples should be taken from quite solid, fairly thick pieces of

wood. About half pencil thickness is ideal and the base of the cutting should receive a heavy wound. The cutting should then be treated with either Hormodin No. 3 or two per cent powder of indole-butyric acid and inserted rapidly into the medium. You must never allow the cuttings to become dry while they are being gathered and made. Rooting should be quite rapid—within two to three weeks.

Most of the deciduous *Magnolia* respond to similar treatment, although the medium should now be plain sharp sand. Easily rooted varieties like *Magnolia soulangeana* or *Magnolia soulangeana nigra* will root well with Hormodin No. 3, but *Magnolia denudata* and perhaps *Magnolia stellata* will require a two per cent powder indole-butyric acid.

If you have the opportunity to put up a small mist system for outdoor propagation of these plants, you may find it interesting and valuable. For this method, a small area is prepared in a sunny part of the garden with six inches of coarse sand and one jet fixed above the area, connected to a water supply. The mist can be controlled intermittently, or it can run continuously during daylight hours by connecting to a hose. The Asiatic Maples, most of the Dogwoods and other more easily rooted flowering shrubs such as Forsythia, Wygielia, Roses and similar plants will root with great ease. Some cuttings root best in the open as opposed to the greenhouse bench or frame. *Viburnum carlesii* is one of these and so is the Pink Dogwood, *Cornus florida rubra*. Cuttings taken in late June, treated with Hormodin No. 2 or No. 3 and inserted in a half-and-half mixture of peat and sand under a mist system should root strongly in six weeks.

There is a secondary problem of successfully over-wintering these cuttings, of which more later.

Soft cuttings of *Franklinia alatamaha* will root very well especially if wounded with a light wound. And, if you have had difficulty rooting cuttings of *Hydrangea petiolaris*, try taking very small cuttings, not more than one inch long, from the center of a growing shoot. These cuttings are small and extremely soft but treated with Hormodin No. 2 and inserted under plastic or mist they usually root readily.



SEABROOK FARMS

A light wound is made by slitting the bark as illustrated



SEABROOK FARMS

A heavy wound is made by slicing off a small portion of the bark

Semi-Soft Cuttings—July

Most of the items mentioned in June can be rooted in July when slightly more mature, but July is essentially the month for the evergreen Azaleas which root beautifully under outdoor mist without hormone treatments. Certain varieties of *Rhododendron* can also be taken in late July, namely, those varieties which come into growth early in the spring such as *R. Boule de Neige*, *R. Cunningham's White*, *R. Lee's Dark Purple*. Most of the *Pieris* species and varieties can be treated in exactly the same way as Azaleas, but these are benefited by treatment with Hormodin No. 2 or No. 3.

Late Summer Grafting and Cuttings—August

This month brings us back once more to the possibility of grafting certain plants, particularly some of the conifers. Established understocks in pots are, of course, essential because one cannot lift a bare root plant at this time of the year.

Great care is necessary in handling the understock because they are soft and probably in active growth, but if the plants are in good condition, union between stock and scion is very rapid and the plant can be hardened off and overwintered out-of-doors in a normal manner. Use the methods as described under March and April, but see that the frame has frequent syringing three or four times daily, if the weather is hot. This is also the month to consider the propagation of *Rhododendrons* from cuttings, although this operation can and should be extended through the following three months, depending upon geographic location and the varieties of plants being rooted.

Most *Rhododendrons* are now rooted from stem cuttings and the methods used, while being precise, are not difficult to understand and apply. First, timing. The shoot to be taken as a cutting must be in the right condition to take. This will depend upon varieties and the season, but generally speaking, cuttings are



SEABROOK FARMS

The best type of shoot to take as
a cutting of Rhododendron

firm enough by the middle of August. If the season is unusually warm, as was 1961, then that same condition might not arrive until the middle of September; therefore, judgment is needed.

Second, type of cutting. The best type of cutting to use is a thin-stemmed cutting rather than a thick one. These thinner cuttings are usually to be found on the side of the large bushes or perhaps growing in partial shade. Strong, sturdy shoots which emerge from the top of vigorous plants should be avoided.

Third, the cutting must be twice wounded with a heavy wound as shown in the illustration. The cut should be made with a sharp knife to reveal the inner woody tissue, but not to cut into it.

Fourth, most varieties need to be treated with a strong hormone powder, generally, two per cent indole-butyric acid. Only those more easily rooted varieties such as *R. roseum elegans*, will respond to Hormodin No. 3.

Fifth, the cutting should be inserted into either pure peat or nine parts of peat and one part of perlite and covered with plastic or protected with an intermittent mist system. A bottom heat of seventy degrees should be maintained. Cuttings will begin to root in from eight

to ten weeks and once the ball of roots is as big as a golf ball, the cuttings can be moved and put into pots or flats. The terminal buds should be pinched from all rooted cuttings when they are potted to induce the first growth the following spring to branch.

Methods outlined here for Rhododendrons are equally satisfactory for most Camellia varieties, the only difference being that Camellias can very successfully be propagated by individual leaf bud cuttings. While this is also true of Rhododendrons, the one bud on the Camellia cutting seems to be able to grow out more readily than does the Rhododendron.

Autumn and Winter Propagation of Mature Wood—September

September sees the termination of the natural aids of summer heat and sunlight to our propagation efforts which means that we will have to revert to the use of bottom heat and a controlled environment in a frame or greenhouse. But, it also means that much material which we could not take because it was not mature can now be propagated.

This is an excellent time to take most varieties of *Ilex* using the method as

outlined above for Rhododendrons in terms of wounding, hormones, and etc., but using a medium of half sand and half peat. The Japanese holly, *Ilex crenata* and varieties will root best in plain sand. I realize that *Pyracantha* is normally considered an easy plant to root, but some of you may have experienced difficulty with the cuttings dying after insertion. A simple answer to this is to take the cuttings in late September and insert them in a flat of pure medium grade Perlite. No bottom heat is required but cuttings should be treated with Hormodin No. 2 and they can then be set on a bench in the greenhouse and given an intermittent watering and although rooting will be slow, it should be almost a hundred per cent. During the months of October through December is an ideal time to take cuttings of *Taxus*, *Arboretum* and other similar coniferous evergreens. These do not root too quickly and some of the varieties which root with difficulty such as *Taxus baccata repandens* should be treated with an extra strong hormone. Given twelve to fifteen weeks in a bed of plain sand and a treatment of 2 per cent indole-butyric acid, you should get good rooting.

The value of wounding on coniferous cuttings varies greatly with the plant in question. It is of no value on any *Taxus*



SEABROOK FARMS

Cuttings of *Ilex bullata* showing roots emerging from the side wounds. The wounds were made by stripping side branches

Light wounds on Pfitzer Juniper cutting showing root development

SEABROOK FARMS





SEABROOK FARMS

Cuttings of *Ilex opaca* taken in December and heavily wounded.
 Photograph was taken in April

varieties, but it does assist the rooting of the Arborvitae and Junipers.

One further point. At this time of the year and on most conifers do not over-do the watering. Keep the medium moist but do not apply too much excess water.

The period from January to March is excellent for most of the Junipers. They seem to root best after Christmas, but of course, if time presses, they can be rooted quite well in November and De-

cember; but wait for a good frost before taking these cuttings. Wound with a light wound and treat with Hormodin No. 3.

You might be interested in trying a combination of a cutting and a graft because this works very well on Junipers. To do this, you take a strong cutting, at least pencil thickness, of an easily rooted variety such as *Juniperus chinensis hetzi*. To the side of this unrooted cutting you

graft a piece of difficult rooting plant such as any of the *Juniperus virginiana* varieties, using a normal side graft, and binding the two together with a rubber strip. The cutting is then dipped in Hormodin No. 3 and inserted into the bench so that the point of the union of the graft is beneath the sand. The cutting will root and the graft will unite with the cutting at the same time. When the plant is lifted from the bench, the top of the cutting can be removed and the desired plant is then firmly attached to the borrowed root system.

Over-Wintering Young Material

Cuttings propagated by any of the methods mentioned above need some careful protection to bring them through the first winter. It is wise to bring the newly propagated plants back to a condition of normalcy as rapidly as possible and then encourage them to make late summer top growth because this movement towards top growth is essential for the survival of certain plants, i.e., Magnolia and Maples, but if you are in doubt, there is something else that you can do to insure the survival of the young material and that is to store it in a frame at a controlled temperature. This is necessary for the survival of many plants, but particularly important for the successful survival and development of the *Cornus florida rubra* cuttings. These root very readily but if the rooted cuttings are stored in a heated greenhouse, the cuttings cannot accumulate the necessary period of a thousand hours at low temperature (35 degrees F.) which they must have to insure their subsequent growth. Conversely, if the cuttings are set outside and they freeze, they will also die. So, you see, it is important that these cuttings be stored at a temperature from thirty-three to thirty-eight degrees. This is an excellent range in which to store anything and it is well worthwhile setting up a small amount of storage space with a modest supply of heat from an electric cable to insure these conditions.

A *Juniperus virginiana* scion was grafted onto an unrooted cutting of *Juniperus chinensis hetzi* and then inserted in the bench. Illustration shows cutting is now rooted and graft has taken.

One other point of interest. Some cuttings still do not come through the winter too well and *Viburnum carlesi* is one of these. The controlled temperature will help but the cuttings come through much better if they are potted into shredded sphagnum moss immediately after being removed from the propagation bench and maintained in a good condition with the help of a little liquid fertilizer, such as Rapid Gro. Store the re-established cuttings under controlled conditions and they will come through the winter without loss.

We have at our command today a wide range of aids to successful plant propagation which, if used intelligently to aid the natural forces of nature, can enable us to achieve remarkable results.

I would like to end by emphasizing that none of them, misting, hormones, mediums, wounding, can or should be used against the natural inclination of the plant. What the plant likes you should first learn and then judiciously apply these aids to successful propagation, which can then make your work both rewarding and successful.

JAMES S. WELLS





RUTH A. NELSON

A general view in the author's garden where native plants predominate. The Boulder Raspberry is shown in the foreground, Littleleaf Mockorange at the middle right, Aspens at the corner of the house, and Antennaria—the silvery ground cover—in the center

Horticultural Use of Native Rocky Mountain Plants

RUTH ASHTON NELSON

With the development of new subdivisions, which are spreading thousands of ranch and contemporary style homes over the foothills and mesas of the West, there has come a demand for a new type of landscape planting. Three factors must enter into consideration in planning gardens for these homes. First, much of this area is a land of "little rain"; water is expensive and sometimes available only in limited amounts. Second, much of the soil here is rocky or composed of gravel with very little water holding capacity. Third, the low, widespread houses demand informal plantings appropriate to the setting. These problems, together with the increasing expense and difficulty of obtaining trained labor for maintenance, put a premium on plant materials, which are

not only appropriate to the setting, but which do well in this semi-arid climate and which require a minimum of attention.

Over the past forty years a few gardeners and nurserymen have been experimenting with the use of native Rocky Mountain trees and shrubs in gardens of this region. Only a small number became popular in old-style gardens. But with the recent change in both architecture and methods of gardening there is a growing demand for these hardy shrubs. If you desire an oasis of lush greenness in a desolate land, some of the species described below are not suitable because many of them have small and often grayish leaves, but if you want to cooperate with the climate in order to achieve an effective and prac-

Rubus
deliciosus

Boulder raspberry



tical garden which will require a minimum of maintenance, these hardy natives will serve you well. There are two general rules which should be remembered in the use of most species which are natives of semi-arid regions. In the first place, they must have very good drainage; and, in the second, they require less water than we ordinarily give our lawns and gardens in such regions. Their appearance improves with slightly more moisture than they normally receive in their natural habitats, but they become overgrown and unattractive when they receive too much water. On this account it is sometimes difficult to combine the xerophytic species with conventional garden plants.

In this article some of those species which have proved themselves valuable

are described; others, which have not yet had a thorough trial, but which appear promising, are suggested. They fall into three groups: The flowering shrubs; the shrubs and small trees useful mainly because of their foliage; and the low-growing, evergreen ground covers or subshrubs.

Flowering Shrubs

Of this first group, three species belong to the Rose Family and two to the Saxifrage Family.

Boulder Raspberry, *Rubus deliciosus*. This is probably the best known and most generally useful of the whole group. In *My Garden in Spring*, E. A. Bowles commented that it was growing happily

in his English garden almost fifty years ago, and he says of it: "We must stop and wonder at the rose-like beauty of a large bush of *Rubus deliciosus*, that arches out . . . and bears its snow-white flowers all down the arching branches." It forms a clump of thornless canes 3 to 6 feet tall, festooned with flowers 2 to 3 inches broad. Its foliage is bright green; the leaves usually roundish in outline and 3- to 5-lobed. The vigorous young branches which appear after blooming have a reddish coloring. On old wood the bark is straw-colored and flaky. This shrub will stand more water than many of its fellows and so can be used in the same beds with plants requiring frequent watering, but under such conditions it requires severe pruning. Old wood should be cut out after flowering.

Apache Plume, *Fallugia paradoxa*. This shrub grows naturally in New Mexico and southern Colorado, but does well at least as far north as Cheyenne, Wyoming, and is reported to be hardy even in Canada. Its white barked stems are set with small 3- to 5-lobed, quite persistent leaves. The pure white flowers, about one inch in diameter, are held on slender 2- or 3-inch peduncles. It blooms profusely in June and scatteringly until late September. One of its most attractive features is the abundance of fluffy fruit heads which immediately follow the flowers. These clusters of plume-tailed achenes vary from a soft rose or copper shade to silver and an individual shrub in mid-summer is often covered with them and at the same time bears a sprinkling of the white blossoms. Apache



RUTH A. NELSON

*Fallugia
paradoxa*

Apache Plume



RUTH A. NELSON

Fendlerbush, Fendlera rupicola, in flower in the author's garden

Plume can be easily grown from seed or increased by layering. It requires full sun and is happy and useful on dry gravelly banks.

Cliffrose, *Cowania mexicana*, which occurs in the southern Rockies, bears an abundance of pale yellow, wild-rose-type flowers about $\frac{3}{4}$ inch broad, and small, resinous 3- to 5-lobed leaves. It has plumose achenes similar to those of Apache Plume but fewer in each head. This has not yet been grown to any great extent in the Denver area but is now being raised from seed at a nursery near Golden. It promises to be very valuable as it seems to be hardy, evergreen, and begins flowering when only a year old.

Little-leaf Mockorange, *Philadelphus microphyllus* of the Saxifrage Family, is native on stony banks and in washes of the mountain area from New Mexico and Utah to Wyoming. It is easily grown either with conventional garden shrubs or in dry-land plantings and is valuable because of its small size and fine texture. Its 4-petaled white blossoms are an inch or slightly less in diameter and it blooms

freely in early summer. The oppositely branched twigs give an interesting effect due to their brown and white streaked bark. The small, oblong leaves are a soft silvery green. If grown where it receives considerable water it will require pruning to maintain its naturally small size.

Fendlerbush, *Fendlera rupicola*, is a relative of the Mockorange which should be more widely known. It may be best seen in its native beauty on the limestone cliffs of Mesa Verde National Park, where it blooms in late May. A shrub has been in the garden of the writer for several years. Its exquisite, square buds are tinged with rose but the flowers open paper white. It is also a fine textured shrub with very narrowly oblong or linear, grayish green leaves and an erect habit of growth. We hope this species will soon be available from nurseries.

Foliage Shrubs and Small Trees

Aspen, *Populus tremuloides*. Somehow a superstition grew up that this small, white-barked tree was difficult to grow.

But that is certainly not the case in the cities at the base of the mountains which have an altitude above five thousand feet. It requires more water and better soil than some of the shrubs discussed in this article; it does send up suckers and the female trees produce cotton, but in spite of these faults it is being planted more and more. It can be used very effectively in small groupings and such a group will provide the light shade which is ideal for many of our native wild flowers.

Forestiera or Mountain Privet, *Forestiera neo-mexicana*, a member of the Olive Family, is a tall, very useful shrub for background and informal or formal hedge use. On the old stems its bark is light, usually a pale greenish gray, on young twigs it is a darker gray. The habit of close, opposite branching gives it a fairly dense appearance even when leafless. It will stand shearing. This species is dioecious and the female plants often bear quantities of bluish-black berries which are attractive to birds. Before the leaves unfold the shrubs are covered with tiny yellow blossoms. Its light green leaves are spatulate-oblong in shape, from $\frac{1}{2}$ to 1- $\frac{1}{2}$ inches long and often fasciated. They turn an attractive pale, clear yellow in autumn.

Water Birch, *Betula occidentalis*, is one of the most beautiful shrubs of western America whether growing naturally along mountain streams or planted in parks or gardens. Its many names give cause for confusion. Our mountain form was called *B. fontinalis* Sarg. but recent botanists are including it in *B. occidentalis* Hook. It has also several common names including Western Red Birch and River Birch. It is a clump birch with several arching stems clothed in a dark, glossy reddish-brown bark. Its slender twigs are graceful and it has dainty, ovate, sharply cut leaves. Its soft yellow autumn color is beautifully contrasted with the dark bark, and it often retains numerous papery catkins after the leaves have fallen. During the winter a group of these birches seem to hold a purplish haze among their delicate twigs.

Rocky Mountain Maple, *Acer glaberrimum*, is a shrub or tree which may grow, in favorable locations in the wild, to twenty feet in height and with trunks 4

to 5 inches in diameter, but always in clumps. It is easily grown and is valuable in sunny or semi-shaded situations. The main stems have a smooth, gray bark and the young twigs, petioles and winter buds are red. Those who look closely when it is in bloom will discover small corymbs of exquisite, fragrant flowers with tiny chartreuse petals. Most individuals fruit freely and the red-tinged samaras are very attractive during the summer. The leaves are 3- to 5-lobed and sharply and doubly serrate and there are forms with compound leaves. Its pale yellow autumn coloring is not of particular interest.

Big-tooth Maple, *Acer grandidentatum*, is a species of great interest and challenge. It is closely related to the Sugar Maple, *A. saccharum*. In the canyons of Utah where it grows abundantly it is a shrubby tree 20 to 30 feet tall, often growing in thickets where it layers naturally. Its autumn coloration, predominantly a rose-red, is spectacular. In southern New Mexico it is sometimes found as a small shrub on dry ridges, and as a small tree in well-watered canyons. Several people including Kathleen Marriage of Colorado Springs; Robert More, then of Denver; and George Kelly, of Littleton, Colorado, have made efforts to obtain and grow this maple for horticultural use. At present there are a few specimens in Colorado Springs and in Denver. It makes very slow growth but the Western Evergreen Nursery is now raising it from seed so there should be a supply available in the future. Quite possibly it is being used for ornamental planting by persons in the areas where it occurs naturally.

Three-leafed Sumac, *Rhus trilobata*, which is also called Lemonade-berry, Squaw bush, and even Skunkbrush, is a fine, tough species for the dry, hot, gravelly hillside and will thrive under almost any conditions. It is one of the few dry-land natives which has luxuriant looking, *bright* green foliage. Its three leaflets are more or less irregularly lobed and turn beautiful shades of orange and red in autumn. In late summer there are clusters of dark red, pubescent berries. It does not have the bad suckering habit of some other sumacs but does have a pungent odor which is distinctive and, to the writer, not at all skunk-like. This is only noticeable when one bruises



RUTH A. NELSON

Yucca glauca flowering in its native habitat

the twigs or brushes against the foliage. It is very useful on banks, against native rocks, and in many sunny, dry situations.

Bluestem Willow, *Salix irrorata*. This is a native western pussy willow which makes a very attractive shrub under cultivation. It has more slender stems and slightly smaller buds than the French pussy willow and can more easily be kept to a size appropriate to a small garden. It is also more resistant to disease. The dark bark on young stems is coated with a glaucous bloom which increases their attractiveness. It roots easily. It is available from nurseries in the Denver area.

Curl-leaf Mountain Mahogany, *Cercocarpus ledifolius*. This is an erect shrub, or sometimes a small tree, which occurs naturally on dry slopes of the intermountain states. It has only recently become available but it promises to be

very popular because it is, without exception, the only hardy, broad-leaved evergreen which will stand full sun winter and summer in dry, exposed situations along the eastern face of the Rocky Mountains. Its leaves are about 1 or 1-1/2 inches long and 1/4 to 1/2 inch wide, lanceolate or oblong with revolute margins, dark green above and paler beneath. Those who have had the opportunity of seeing "Curl-leaf" in plantings feel that it will soon become one of the most valuable shrubs we have for use in the elevated, semi-arid regions of the West.

Low-growing, Evergreen Shrubs for Ground Covers

Yucca or Spanish Bayonet, *Yucca glauca*. This species is the common one along the eastern base of the Rockies from northern New Mexico into south-



RUTH A. NELSON

Dry slopes along driveway showing Buffalo Grass, two species of Yucca, Y. glauca and Y. baccata, with wild plum in background

ern Wyoming. It is hardy and extremely drouth resistant. Its large rosettes of pale green, dagger-like leaves liven dry hill-sides during the winter months and the strong panicles of creamy white blossoms transform barren slopes and mesa tops during early summer. Yuccas are picturesque and appropriate in western and contemporary gardens besides being very useful in helping to control erosion on banks, and to fill dry corners. They can also be used as low hedges where something which requires only a minimum of water is needed. Another species, the Datil, *Y. baccata*, which has heavier leaves is hardy as far north as Denver. This forms very decorative clumps and is handsome in bloom. Its leaf-margins are more conspicuously ornamented with curled filaments than are those of the Spanish Bayonet. A smaller species

which has similar recurved filaments along the leaf-margins is *Y. harrimaniae*. Its rosettes are usually about 15 to 20 inches in diameter and extremely bristly. Yuccas may be grown from seed, from root cuttings or from offsets.

Buffalo Grass, *Buchloe dactyloides*. This is a good, tough grass in a dry climate. It forms a dense, strong sod, grows only 3 to 4 inches tall and requires no watering. Its only disadvantage is the shortness of its green season, which is between three and four months. But weigh that against the constant necessity of watering and mowing a bluegrass lawn in the western states and you may decide to try it, as the writer did. From late May to September its color is a beautiful soft, bluish green. A cutting after the staminate heads appear in early summer improves its appearance and



RUTH A. NELSON

*Creeping Mahonia, Berberis repens, as background
and Antennaria as foreground for early Crocus*

another one in late August followed by a good watering, will keep it green to about mid-September. It is ideal for childrens' playgrounds because it may be kept dry.

Antennaria or Pussytoes. Several members of this genus make very attractive, silvery gray ground covers between stepping stones, along walks and in many places where there is not much traffic. It makes a good setting for flowering bulbs but must be kept under control as it spreads rapidly when once established. To maintain a neat appearance it should be clipped once a season after the flower stalks develop. It is collected in the wild and both *Antennaria rosea* and *A. parvifolia* are used. *A. rosea* is smaller leaved and makes a more compact mat than the other.

Creeping Mahonia, *Berberis repens*. This is now well known and much used in western gardens. It has compound, evergreen leaves somewhat similar to

those of the Oregon or Holly-leaved Mahonia but usually grows only about a foot tall and spreads extensively when once established. It is very useful among shrubs, along walls, and in foundation plantings. When shaded from the winter sun it will remain green but in partially sunny locations the leaves turn red or maroon in winter. It is attractive under either condition.

Kinnikinnik, *Arctostaphylos uva-ursi*. Native habitat of this trailing shrub is not restricted to the western mountains but it occurs abundantly here and is one of the few broad-leaved, evergreen species which can be used in this climate. It needs protection from winter sun to retain its glossy, green foliage. A member of the Heath Family, it has charming pink and white jug-shaped blossoms followed by handsome scarlet berries.

Creeping Juniper, *Juniperus horizontalis*. This is a species of the northern



RUTH A. NELSON

Juniperus horizontalis in its native habitat on a very exposed southeast slope in northern Wyoming

United States which occurs naturally in the mountains of northern Wyoming and Montana and is a handsome ground cover and rock garden plant, which is very satisfactory in all but the most extreme conditions of this climate. It is a creeper only 3 or 4 inches tall, rooting from the branches and can easily be divided and transplanted. There are both green and silver forms in nature but all the writer has seen tend to become purplish in winter, as do the cultivars. Several horticultural varieties of this are listed by

some dealers but it has seemed difficult to obtain the true creeping form. The writer has several collected plants which are thriving and compare favorably with all the named varieties seen.

Nature has taken many generations in adapting these western species to their environment. We can save ourselves much labor and expense by making use of them. In this great high, dry, and sunny region there are many additional plants, both woody and herbaceous, which would be valuable in horticulture.

A Book or Two

Berberis and Mahonia.* *A Taxonomic Revision

Leslie Walter Allam Ahrendt. *The Journal of The Linnean Society of London*, volume 57 (Number 369), Burlington House, Piccadilly, London, W. 1, England. May 1961. 410 pages. (Paperback.) Illustrated. \$12.00. (Library)

Although this reviewer cannot give the accolade due this work as he is not a taxonomist, he is thoroughly impressed with it in every detail. He has had occasion to use keys and descriptions prepared by other authors, of authority, and has suffered on more than one occasion by the fact that too wide a latitude was left for him for interpretation.

This work, which represents the end result of twenty-five years of study, not only of herbarium materials but of living plants in cultivation, is singularly excellent in the clarity in which it records every step in the study, the range of definitions supported by clear illustrations, and texts that indicate more than is usually given in such works. The acknowledgments of work done by others, notably Camillo Schneider, Fedde and various Japanese botanists are definite and generous. The work of the author properly includes all of such as remains authentic after his further investigations. It would seem that every possible avenue for the entry of any error, however slight, has been closed. It is also to be noted that every possible aid is presented to the person who must use the keys, whether he be a beginner in the field, or an expert.

The keys are several and there is a fine section telling precisely how to use them and if characters appear in them that need clarification for the beginner, the illustrations and the definitions in the preliminary texts make matters relatively easy.

There is notation as to which of the species are in cultivation, and cultivation in this work refers to Britain only.

In addition to the plates that clarify all terms related to definition of terms and characters, there is an excellent series of maps showing the geographical ranges of the Sections into which the two Genera have been separated, with identifying symbols to indicate the location of the actual species of the Section.

The quotation under the title on page one, is taken from Shirley Hibberd who spoke strongly of the value of *Berberis* in gardens; this cannot ever be the case in the United States where we have first a strong regard for our quarantines that safeguard wheat production, and second, climates that will not be favorable to many of the species that seem the most handsome, judged by the descriptions. This is particularly true of the many evergreen species both Asiatic and South American, only a few of which have come

into general cultivation, and then usually in definite areas within our country. The reviewer did not find any reference to the fact that in *Berberis*, as in many other genera that furnish some excellent ornamental shrubs, there are any number of species that might as well have been left in their native homes! This is entirely proper as this is a taxonomic work, and makes no pretenses to horticulture, other than to admit various hybrids presumably of garden origin.

Any future student of the genera will be forever in debt to Dr. Ahrendt for all he has done and has brought together so superbly.

B. Y. MORRISON

Handbook on Trees, Shrubs and Roses

Walter G. Hazelwood. Hazlewood Nurseries, Party, Limited, Epping, Sydney, New South Wales, Australia. 1960. 180 pages. \$2.75. (Library)

Handbook of Trees and Shrubs for the Southern Hemisphere

Richmond E. Harrison. R. E. Harrison & Company, Limited, Palmerston North, New Zealand. 1960. 340 pages. Illustrated. \$4.75.

These two down-under books have several things in common. Most important is that both were written by nurserymen who have had many years of experience getting acquainted with and growing a host of Australian and New Zealand plants which growers in other lands often find difficult. Both these experts devote considerable attention to cultural directions, to selectivity of species, to suggestions for overcoming many problems, and offering individual help where the book directions are too general. And both nurserymen acted as their own publishers.

Both books review alphabetically the principal plants encountered in their respective localities. Hazelwood's book is more modest and less expensive, with no illustrations. Harrison's book is much more comprehensive, includes about 300 illustrations, of which some are in color, and the plates are exceptionally fine. Most authors divide their world longitudinally; Harrison divides his world at the equator and it is the first book this reviewer has ever seen which discusses plants from this viewpoint. Strangely enough, many Australian plants grow better in New Zealand than in their native land, with the result that Harrison's volume is far more comprehensive than the other, describing some 2,200 trees and shrubs and this nurseryman's experience with them.

Both books may be purchased in U. S. from the reviewer at Stuart, Florida.

EDWIN A. MENNINGER

(Books available for loan to the Membership are designated: (Library). Those not so designated are in private collections and are not available for loan. Books available for sale to the Membership are designated with the special reduced price and are subject to the usual change of price without notice. Orders must be sent through the American Horticultural Society accompanied by the proper payment. Please allow two to three weeks for delivery. Those not designated for sale to the Membership at reduced prices can be purchased through the Society, however, at the retail prices given. In these instances the full profit is received by the Society to be used for increased services and benefits of the Membership.)

Alpines for Trouble-Free Gardening

Alan Bloom. Charles T. Branford Company, 75 Union Street, Newton Centre 59, Massachusetts. 1961. (U. S. Edition). 140 pages. Illustrated. \$5.00. (Library)

The author uses the word "alpine" as a collective term rather than a descriptive one. Alpines are described as low growing, hardy perennials capable of surviving wintry conditions and increasing. They differ from other perennials only in height and habit of growth. The author describes the general culture of such plants and makes suggestions on how they may be used. Raised or "walk around" beds are suggested. These are especially useful when a collection of such plants are being used in the garden. Raised beds offer a way of growing those kinds that require well drained soil where such conditions may not exist. Alpine plants are useful as ground covers or on slopes where they will give cover. On steeper slopes retaining walls may be necessary.

The author describes the culture of each of the plants discussed, as it would be followed in Great Britain. This can be modified or adjusted to suit American conditions. Over 200 genera are considered with one or more species that fit the author's description of an alpine. This, together with the lists of the plant suggestions for special uses makes this a good reference to persons interested in perennial plants.

C. B. L.

Flowering Trees of the World. For Tropics and Warm Climates

Edwin A. Menninger. Hearthside Press, Inc., 118 East 28th Street, New York 16, New York. 1962. xvi+336 pages. Illustrated. \$18.95. (Library)

Only rarely is one privileged to secure a book as lavishly illustrated as E. A. Menninger's 336-page *Flowering Trees of the World for Tropics and Warm Climates*. The first 30 pages portray the enthusiasm, persistence and accomplishments of the author in his search for and culture of tropical flowering trees. These pages reflect the triumphs and failures of many years and unfold a fascinating personal odyssey of the development of his interest in the trees. They contain information of value for others who may wish to take up the cause of flowering trees.

His aims are "to present beauty without botany, to sort out those trees whose floral displays are visually the most important or more conspicuous phase of their year-round appearance!" and to stimulate interest in tropical flowering trees.

The 425 color prints are an unusually valuable feature of the book. Many are excellent. Some are not well focused and the color of some could be more true to life. However, as the author points out, the pictures were often taken under difficult conditions and many were contributed. Despite their shortcomings the color plates should be useful as an aid to amateurs in the identification of flowering tropical trees. There is no identification key but lists are given of the generic names or groups that have a common characteristics, such as "fragrant flowers," "bad-smelling flowers," "fast-growing trees," "the

thorny ones" and "salt resistant." Unless a flower was available and one of the good pictures matched it, identification of a particular specimen would be difficult.

Popular long to short descriptions of species are given on pages 31 to 291. They reflect generally the uncertainties of knowledge about many kinds of tropical trees. Mr. Menninger is to be congratulated on the contribution he has made. The foreword by B. Y. Morrison is a sparkling gem of his philosophy as a plantsman.

M. C.

New Horizons in Flower Arrangement

Myra J. Brooks, with Mary Alice and John P. Roche. M. Barrows and Company, Inc., 425 Park Avenue, South, New York 16, New York. 1961. 192 pages. Illustrated. \$10.00. (Library)

The authors have indeed risen to new heights in combining their talents to produce these "New Horizons"! The text is most readable, the photography is excellent, but over and above this—the book is useful, both to the home maker and the flower show addict. It makes one *think*, and in thinking to see beauty in the most utilitarian objects, as Mrs. Brooks has done. To quote from the cover jacket, "From it emerges a new way of thinking, a creative approach to the use not only of ideas drawn from arts and crafts through the ages but of your own favorite possessions, besides, in combination with plant materials. It meets in a new way the flower arranger's particular challenge of bringing the beauty of nature into the home."

The book is divided into four parts: Flower Arrangers' Holidays, The Amateur Craftsman, The Designer-Craftsman, and the Flower Show. The arrangements are all skillfully designed and constructed, the color plates are superb, the black and whites very clean cut and show every detail. The arranger can find something to intrigue her in each section; some she will rave over, some she will "drool" over, but a few of the arrangements will leave her "cold." Truly this is a book to "have and to hold," and also to give as a gift to your dearest friend.

G. P. W.

Hardy Heaths and Some of Their Nearer Allies

A. T. Johnson. St. Martin's Press, 175 Fifth Avenue, New York 10, New York. 1956 (Revised Edition). 128 pages. Illustrated. \$2.50. (Library)

This is a charming book about a group of plants much neglected in this country. The author was a well known writer of garden books whose garden in North Wales, as this reviewer can testify, was a thing of beauty, as well as a notable horticultural collection. He had "grown all the varieties obtainable for over forty years," and in that time "never had any losses or serious injury which could be attributed to diseases or pests."

The heaths are praised as the most desirable group of plants in cultivation to aid in "cutting down maintenance costs, as ground covers and weed eliminators." The economics discussed, however, in no way detracts from the delineation

tion of the beauty and landscape uses of the heaths. Propagation and culture are explained in lucid style although we are left with the assurance that these plants are not at all demanding.

Probably the most useful part of the book is the discussion of the classification of the heaths, *Erica* spp., and the true heather, *Calluna vulgaris*, and their horticultural varieties. Information as to origin, special requirements, and garden use are given for many of the forms described.

A special bonus is provided in the form of chapters on "Some allied shrubs" and how they may be used with the heaths, and "Heaths in industry and legend."

The question always arises about a book by an author from another part of the world, "Will it fit my garden conditions?" In this case, "For the most part, yes," although there are many questions which might be raised by American gardeners about hardiness, adaptability, and availability of varieties.

J. HAROLD CLARKE

Colonial Williamsburg Its Buildings and Gardens

A. Lawrence Kocher and Howard Dearstyn. Colonial Williamsburg Publication, Distributed by Holt, Rinehart and Winston, Inc., 383 Madison Avenue, New York 17, New York. 1961 (Revised Edition). viii + 104 pages. Illustrated. \$3.95. (Library)

A story of the restoration and development of Williamsburg as living history. The book is well illustrated showing the reconstruction and development of this project, both the buildings and the gardens. The chapter on the Gardens is of interest to gardeners as it includes the reasons why certain designs were used or plants selected. In the restoration plants were used which were known to have been planted in the colonial period. Plants of more recent use or origin have been removed. This book is of especial interest to those who wish to develop their home or garden in a colonial manner.

C. B. L.

Spices and Herbs Around the World

Elizabeth S. Hayes. Doubleday and Company, Inc., 575 Madison Avenue, New York 22, New York. 1961. 266 pages. Illustrated. \$5.95. (Library)

As the title indicates, the book treats both spices and herbs, which sets it somewhat apart from the usual herb book and constitutes its greatest attraction. Mrs. Hayes deals mainly with the folklore and uses of the individual spices and herbs, and includes one or more recipes in her discussions of many of the plants. In addition to the better known spices and the better known culinary herbs, she discusses the beverage plants, coffee, tea and cocoa, and, strangely, an occasional medicinal herb.

The scientific nomenclature used in the book is frequently incorrect and there are other mistakes. The most serious of the latter is the confusion of the May-apple (*Podophyllum peltatum*), sometimes called American mandrake,

with the totally unrelated true mandrake (*Mandragora officinalis*).

The book is illustrated by a very attractive colored frontispiece of black pepper, and by numerous attractive, if not helpful, line drawings by J. M. Yeatts. There are short chapters on growing herbs and on their collection and drying. The included "Rules for judging herb exhibits" will be helpful to flower show exhibitors. The short bibliography at the end of the book should prove helpful.

DONALD G. HUTTLESTON

California Spring Wildflowers

Philip A. Munz. University of California Press, Berkeley, California. 1961. 122 pages. (Paperbound). Illustrated. \$2.95. (Library)

The purpose of this little book is, says the author, ". . . to bring before the public in compact and useful form something by which wildflowers can be identified. . . ." This purpose should be admirably served. One wonders, however, whether the purpose would not have been better served by a more inclusive discussion of "How to Identify a Wildflower" and by a more logical arrangement of color plates.

The section in the Introduction on "How to Identify a Wildflower" deals only with the flower and its component parts. Actually the user needs only to decide which of the four flower color categories his unknown specimen fits to find the section where he can identify his specimen with one of the excellent line drawings and arrive at a generic or specific determination. To accomplish this identification, the user must concern himself more with the gross aspects of a flowering stalk than with details of flower structure. Hence, "How to Identify a Wildflower" might well have included a brief discussion of phyllotaxy and inflorescence types.

The book contains 96 plates, each a superior color photograph. Half of these are found at the end of Section One (flowers whitish) and half at the end of Section Three (flowers bluish). The plates are not segregated by flower color. A more convenient, but admittedly less artistic arrangements would have been achieved by distribution of the plates in four sections according to flower color of the plant pictured. The author, however, provides an Index to Color Plates which groups them by flower color categories. Nevertheless, for the novice to exhaust all possibilities within a given color category (the only means of identification available) he must check each color plate listed under that color category in the Index. The 24 plates showing whitish flowers, for example, are scattered on 18 pages in two sections; these could have been grouped on 8 pages in the section dealing with whitish flowers. I suspect that beginners will refer first to the color pictures and then to the line drawings, simply because the former look more like the real thing.

The brief, informative comments accompanying each figure and plate reflect the author's intimate knowledge of his subjects. A good deal of natural history pervades these comments and they cannot help stimulating more of the public to a more active interest in the wealth of plant life around them.

QUENTIN JONES



GOTTSCHO-SCHLEISNER, INC.

Lilium lankongense

The Gardeners' Pocketbook

Lilium lankongense—the Lankong lily

There are several small lilies with dainty blossoms—all species—that come from China. They are best planted to themselves away from taller more striking *Lilium speciosum*, *L. regale*, and their hybrids, so their effect will not be lost. All of the small lilies seem to require a good, medium rich and well drained soil and resent being crowded by other plants, especially when these are coarse growing.

Among the small lilies are *pumilum*, with martagon shaped flowers, and *concolor*, with upright cup-shaped bloom. They come in scarlet, orange, and sometimes *pumilum* will be canary yellow. *Concolor* comes from Central China and *pumilum* from N. E. China. I find *concolor* to be the more vigorous of these two. Both set seed readily and new plants are always raised. These, like the others of the group, bloom in two years after being sown.

I have not been too successful with the pink *cernuum* from Korea. The others to be mentioned come from high altitudes either on the Yunnan Plateau or nearby mountains, and all have martagon shaped flowers. In *duchartrei* the blossoms are white-spotted and streaked with deep purple; similar to this is *wardii*, with stoloniferous bulbs and flowers from pale to deep rose; *taliense* is similar to *wardii* in color but there are structural differences.

Lankongense, the heroine of my story, comes from Lankong near Tali Lake in Northern Yunnan where it was found by Delavay in 1886 and 1888. In my garden the bulbs I bought, as also the flowers raised from seed, bloom in early July after *duchartrei*, *pumilum*, and *concolor* have finished and at the same time as the first *regale*. My plants have avoid bulbs which are stoloniferous, so they soon make a group. The stems are nineteen inches high, though they are reported to reach two to four feet. The foliage begins about nine inches above the ground and consists of thickly disposed thread-

like leaves. Some of them are so thin that they curve upward at the tips. These leaves are dark green, four inches long and one third of an inch broad and have their margins minutely toothed. The flowers are arranged in an umbel and the one photographed had six blooms; they often have more. The blooms are nodding, martagon shaped and one and five eighths of an inch across with the segments nobby at the tips. They are rose-colored with a brownish cast and are spotted with fine lines of a deeper color. Some are pinker than others. There is a green nectar furrow down each segment and the blossoms have a faintly unpleasant smell. On the whole, they have seemed to prefer a sunny place, but a few have done well in semishade.

It is always a delight to see these delicate looking blossoms, that come from such high altitudes, blooming in my lush garden so near the sea and at only five hundred feet altitude.

On the whole, I have found it best to start lily seed of all kinds indoors from February to April. It is cool then and I can keep the soil moist. I plant everything, except vegetables and annuals which are sown out of doors, in shallow azalea pots three inches across, and am careful not to crowd the seeds. The soil consists of one part each, top soil, compost, and sand, and it is disinfected before being put into the pots over pieces of broken clay. The seeds are barely covered and if the soil is washed away, a little is scattered over them to cover them again.

The seeds generally germinate quickly, for these small lilies belong to the class that comes up the first season. By mid-June the pots will be full of little grass-like spears, and there will be a tiny bulb at the base of each of them. In August they are transplanted into a cold frame where the soil consists of top soil and compost, and they are left there one or two years. Sometimes *cernuum* will bloom in the cold frame the second summer and so may *lankongense*.—HELEN M. FOX, *Mount Kisco, New York*.

Heat for Nerine

Here, we grow primroses, azaleas, and fuchsias in full sun; members of the Amaryllis Family are not generally grown except under glass. If the thermometer reaches eighty, we are having a heat wave.

For three years, *Nerine bowdeni* grew and multiplied, but gave no bloom. Last fall, some rocks the size of an orange were placed close to the bulbs near their bases. In early summer a rock mulch about two inches deep was placed on top of the soil away from the bulb necks.

This gave them the baking they require and as a result, they have flowered well.

I am familiar only with *N. bowdeni*. It has the growing habits of old *Amaryllis belladonna*, now *Brunsvigia rosea*, a species that really thrives here. *Sprekelia* does well too, and the old Oxblood lily, *Rhodophiala bifida*, blooms but leaves something to be desired.

When one succeeds in growing something that is foreign to his region, it makes him feel a fair gardener after all.—C. H. FELT, *Fortuna, California*.

Seed Sowing Out of Doors

Growing things without glass, or cover of any kind except slats, I was plagued with all kinds of trouble in starting my seeds. I have used all and sundry methods that I have read about, never with as good results as I obtain now, with my own methods tested for the last two years.

I had used sealed containers and invariably lost many plants in transplanting in the open. I had used pans covered with glass and watered from the bottom, but lost plants from damping off or from having them dried after cats would knock off the covers.

In watering from the top, I had the seeds floated to one side, or, trying to avoid this, had buried them too deeply to come through.

Now, my way is this: prepare seed beds in the pans (using regular potting soil, with a little manure, either sheep or cow one to one and a half inches below the surface), place the seed any way you wish, press them down, sift some sand to cover—barely covering—and then put over this at least one quarter inch of

medium chicken grit, more will not hurt. I use medium grit because it is much airier than small and much lighter than large.

Place this prepared pan with the rest of your potted plants in the open, and water with the same nozzle when watering the others.

To be absolutely sure that the top of your soil in the pan is moist all the time, sprinkle the grit a little every evening, two minutes' work, and even this I sometimes forget.

With this method my seedlings grow in full sun, without damping off or getting spindly, and even when slugs or grasshoppers mow them down to the grit, they are up again in no time as healthy as before.

This works from Z to A, from Zephyranthes to Anthuriums. Who can find a better way to raise seedlings of Amaryllids, African irids, and succulents? Succulents of any kind, including cacti?—ALEX KORSKOFF, *Miami 37, Florida*.

Cedrus deodara in Southeastern Pennsylvania

A specimen of *Cedrus deodara* 'Kashmir' has been growing at our home at Kennett Square, Pennsylvania, since 1949 and is now approximately thirty feet tall. During that time it has endured temperatures consistently below freezing for as long as two weeks. In January 1954 we recorded one morning temperature of zero and in February 1955, an early morning reading of five below zero. During January 1961 temperatures for the last half month ranged from 24 degrees to 4 degrees at night, with few readings above freezing during the daylight hours. On February 1, 1961, the thermometer dipped to 9 degrees, with a high for the day of twelve.

The winters of 1960 and 1961 were also disastrous for evergreens in this area because of drying winds but 'Kashmir' came through unharmed.

Cedrus deodara 'Kashmir' is an accidental selection of Styer's Nurseries of Concordville, Pennsylvania. In 1933 the nursery brought a shipment of *C. deodara* seedlings from the South for trial as lining out stock. The winter of 1934 was unusually severe and by the following spring only one seedling tree was alive. It continued to grow in a com-



LONGWOOD GARDENS, G. HAMPFLER

*Cedrus deodara 'Kashmir' at Kennett Square, Pennsylvania
has survived severe winters of the last decade*

pletely unprotected location surviving particularly severe winters in 1938 and 1945. By that time it had grown into an attractive pyramidal tree with graceful branches and blue-green needles, and the nursery decided to give it a name (un-

patented) and to propagate by grafting.

It is indeed gratifying to find a form of this attractive member of the *Cedrus* trio which survives our southeastern Pennsylvania winters.—MRS. VIOLET K. THOMAS, Kennett Square, Pennsylvania.

To save or not?

The problem of what to do with Christmas plants has several answers but this one has to do only with the Jerusalem Cherry (*Solanum pseudo-capsicum*) which is often recommended for the disposal bin after it has shed its first crop of berries!

Three years ago, we decided not to follow this advice. Soon, of course, the attractive orange red fruits began to fall, and within two months none was left on the plant. As the foliage was green and attractive, we decided to leave it among the pot plants on a sunny windowsill. At the same time we allowed about a half dozen of the bright little balls to remain where they fell, around the edge of the rather large pot. Soon we noticed that these so-called cherries were sprouting and after a few leaves appeared, we removed each new plant to its own pot.

When warm weather came in May, we set all the plants outdoors in a sunny spot, sheltered from the wind, and close to a brick wall that doubtless reflected further warmth upon them. Soon the original plant showed a new fruit crop forming and by September it was a really lovely specimen, with fuller and even larger "cherries" than before. The small plants showed no fruit as yet, but were large enough to need new pots when we brought all inside.

Through the fall, the large plant remained lovely and was a "conversation piece," but by Christmas the fruits were beginning to fall. We continued the routine as before, keeping the soil moist, and again allowed a number of "cherries" to sprout. By the end of the second summer, our first crop of young plants were forming fruits, and two pots went as gifts to friends. We are again having young plants coming along. It seems to us now that with a little extra work, we retained on attractive plant, lost nothing, and are easily raising more!—GERTRUDE B. FIERTZ, *Manhasset, Long Island, New York*.

Iris in Southern Arizona

Bearded irises have offered a challenge to many iris growers in the warm desert areas of Arizona. Irises are not easy to grow here but with care gardeners are rewarded with blooms as lovely as those grown any place in the world.

Spuria iris do thrive in this area and Yuma is fortunate in having the President of the Spuria Iris Society, (Spuria Section of The American Iris Society), Mrs. Clarence Redford, living here. Mrs. Redford's enthusiasm is catching and many gardeners are learning the beauty of this hardy iris that seems to enjoy drought and summer neglect.

The common name of "Butterfly Iris" is apt for the spurias, for the blooms have an airy grace on their tall stalks and the colors—browns, tan, yellows, blues and whites—are butterfly colors. Gardeners familiar with the old spuria varieties are amazed to see the increased size of the blooms on the new hybrids. I grow a large number of my seedlings, thus obtaining a much wider color range than I might obtain commercially for use in arranging.

Spurias should be planted in the fall, after new growth begins. Unlike tall bearded iris, their roots must be kept damp until they are transplanted, and they should be watered well until established. Newly set plants are sometimes slow to establish themselves, but if they are planted in well enriched soil and left undisturbed thereafter, with annual fertilizing, they soon make vigorous clumps. They are most dormant in summer after blooming and do better if they are not watered during this period.

Spurias self-seed readily, so planned crosses should be guarded by emasculating the flowers in the bud, and bagging the bud in plastic after pollenizing. Seed should be planted, if possible, when the pods begin to split open, for highest rate of germination. Seeds will not all germinate the first year, so leaving the ground undisturbed will result in more seedlings each spring for two or three years. This is especially true of stored seed. Transplanted seedlings, lined out in good soil, should bloom the second year with good luck, or almost surely the third year.

Fine hybrid garden varieties now obtainable include: WHITE: Morningtide, Wakerobin, Big Cloud and White Heron. YELLOW: Wadi Zem Zem, Sunny Day, Golden Lady, Investment. BLUE: Fairy Lantern, Dutch Defiance, Sunlit Sea. BROWN: Black Point, Bronze Butterfly, Cherokee Chief, Driftwood. BLUE-PURPLE: Premier, Blue Nightshade, Euphrosyne, Royal Toga. LAVENDER BLENDS: Two Opals, Zephyroso, Ka-

trina Nies. YELLOW AND WHITES: Lark Song, Canary Island, Orange Delight.

As with the good new tall bearded iris, spurias are not found in nurseries but may be had from iris growers whose catalogs are usually listed in the Bulletins of The American Iris Society or newsletters of The Spuria Iris Society. Mrs. Redford, at Route 1, Box 650-E, will supply information.

The real surprise is that Louisiana iris do so very well in Arizona. Mrs. Redford has crossed these and has been very generous in sharing some of the beautiful hybrids she has developed. Care must be taken that they do not become dry until established, but then they will thrive with minimum attention and grow in regular garden conditions.

Iris, the despair of hot climate gardeners a few years ago, are gaining in popularity every year as more of us learn how and what to grow. We truly appreciate their beauty.—PHOEBE A. STRINGFELLOW, Yuma, Arizona.

Some Pines in Houston

Pines are by far the most widely distributed and important conifers in the South. Despite this, relatively few species are represented from this large genus.

Around Houston, on the southwest edge of the southern pine belt, the loblolly pine, *Pinus taeda*, is the common native species. A few shortleaf pines, *P. echinata*, are scattered through these stands. The most commonly planted pine here, for shade and ornamental use, is slash pine, *P. caribaea*, native from Louisiana to Florida. Longleaf pine, *P. palustris*, found seventy-five miles to the east of us, is also planted.

Trial of some introduced pine species has begun. *Pinus halepensis*, the Aleppo Pine, grows well in some locations and is used more in the drier sections, especially in the San Antonio area. Canary Island Pine and Monterey Pine, *P. canariensis* and *P. radiata*, dislike our wet climate. Italian Stone Pine, *P. pinea*, often looks well in well drained soil, although it is very slow growing. Japanese Black Pine, *P. thunbergii*, is being tried in some quantity and grows well but the Japanese Red Pine, *P. densiflora*, is slower

here and has not been tried in as great numbers. *Pinus patula*, from Mexico, has drooping foliage and branches; it grows well but is often troubled badly with scale. Pinyon Pine, *P. cembroides*, must be planted high like a cactus and is extremely slow in growth. For persons wanting a dwarf tree in dry places, it should be ideal.

A species that looks especially interesting and promising is *P. roxburghii* from the Himalayas. It is called Chir in *Hortus II*. In the last five years it has a thrifty look through long rainy spells, drought periods and summer heat. It has grown well from seed planted outside, although temperatures in the low 20's nip the tops of one year seedlings. The recent January (1962) low of 11 degrees, froze some of the needles on a five year old tree, that is still under observation.

Compared to slash pine, its branches are very crooked. It carries leaves in bundles of three, and its needles, twelve to fourteen inches long exceed those of slash pine by about two inches. The crooked young seedlings, if grown in cans should be staked at the time of transplanting into gallon cans. There, they become stockier and stand up well by the time they reach five feet in height. Chir pine grows faster and more easily here, than another Himalayan pine, now *P. nepalensis*, once *P. griffithiana*, and before that *P. excelsa* names more familiar to some of us than the most recent. Pine tip moth damages some young shoots on Chir, but new shoots always develop for quick recovery.

Spruce Pine, *P. glabra*, the Cedar Pine in *Hortus II*, is a native of southeastern States and is worthy of more planting. It is short needled with short branches and smooth bark that does not appear on slash and longleaf pines found in the same areas. It makes a small tree. To those of us who rarely see northern conifers, it does have a "sprucier" look.

Since pines are one of our best liked trees, these and other species should be more widely tested through all the Gulf States, with some attention to other Asiatic species.

After the cold of mid-January 1962, some of the plants of *Pinus roxburghii* look badly burned, but even so, one must push on with their trial.—LYNN LOWREY, Houston, Texas.



IVAN N. ANDERSON

Andromeda polifolia glauca

Andromeda polifolia

It has always been the fashion of texts to give northern limits of hardiness, but no one as yet has risked his reputation even to suggest how far south a plant may survive under cultivation, which is not the same as the southern extension of any range. The knowing gardener can often make adjustments that would not often occur in nature.

Naturally, when the range in nature is given as one that is completely northern, any attempt to grow a plant from such an area is experimental if not foolhardy.

Three plants of forms of this species were bought and planted out here, with full knowledge that the results would probably be failure in varying degrees. They were!

The large plant that came as *A. polifolia glauca* lived long enough to flower well, as the buds were set before the shipping date, and to make what appeared to be a fair growth on new wood by late June, and even a few suckering shoots appeared about the base of the plant. But by mid-summer it became apparent that even in semi-shade, the plant was not growing well. No attempt was made to give it an overall clipping which might have helped by a temporary slow-

ing down of growth rates. By autumn, there was scarcely a vestige left of green leaves. Now, in mid-winter, the only signs of life are on the lowest, newest branches which suggest that a trimming next spring after growth starts will be in order.

The plant is a lovely thing, in its best condition, with compact twiggy growth, a grayish cast to the foliage and masses of small urn-shaped white bells, each borne on pedicels that are pale pink and darken somewhat with age.

The other plants purchased as *A. polifolia glauca nana*, were smaller plants—newly propagated, perhaps, and these have settled down making wider ranging underground stems and even now in midwinter, showing a full quota of leaves. There was no appreciable difference in flowering or flower characters. Having seen the fate of the other form, these, too, will get a shearing in early summer.

The only bit of information in advance that gave courage to the experiment, was the statement that the first plant had lived well in Central California, where the heat would be as intense, though dry heat, rather than humid, heat such as one has here.—B. Y. MORRISON, *Pass Christian, Mississippi*.

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The American Horticultural Magazine of 1960

January 1960* 64 pages 43 plates 75 cents

• The Fairchild Tropical Garden • Blueberry Breeding: Past, Present, Future • The Calabash Trees • Lenten Roses in the Southeast • 24 book reports • NOTES: Ornamental Species of *Mucuna*. Notes on Two Heath Plants. *Tulbaghia violacea*. Our Native False Aloe. *Byblis gigantea*. *Leucojum vernum* and *L. aestivum* Gravetye Giant. *Camellia granthamiana*: Another rare gift from China. • *Byblis gigantea* illustrated on the front cover; *Mucuna rostrata*, on the back.

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• Rhododendron Species for the Small Home Garden • Echeveria • Daphnes • Cultivated Philippine Mussaendas • Blackspot and Powdery Mildew on Roses • 16 book reports • NOTES: *Magnolia wilsoni*. Pumice Rocks. Rutherford Hybrid Azaleas. Two Uncommon African Members of the Mint Family. *Magnolia coco*. • *Echeveria lozani* illustrated on the front cover; *Opuntia camanchia*, on the back.

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• The Gotelli Arboretum of Dwarf and Slow Growing Conifers (22 illustrations) • Adventures with Hardy, Herbaceous Hibiscus • A New Plant Hardiness Map for the United States and Southern Canada • Some Moraeas for Southwest Gardens • Snapdragons for Gardens, Greenhouses, and Research • The Yellowgroove Bamboo • 18 book reports • NOTES: Two Unusual Hoyas. *Nymphaea* 'Bob Trickett.' My Experience with *Gloriosa*. *Kaempferia*, Again. On the Distribution of *Loropetalum chinense*. Allegheny *Pachysandra* as a Groundcover. *Habranthus robustus*. Two *Zephyranthes* New Here. • Complete index for the year • *Loropetalum chinense* illustrated on the front cover; a wood carving of *Typha latifolia*, on the back.

*Journal of the American Horticultural Society was changed to The American Horticultural Magazine in 1960.





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the PEONIES

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EDITORS—John C. Wister, Director, Arthur Hoyt Scott Horticultural Foundation, Swarthmore College; Gertrude S. Wister.

CONTRIBUTORS—Silvia Saunders; P. P. Pirone; William H. Krekler; Harold E. Wolfe.

Getting down to *specifications of this book*: It, of course, deals with both *TREE PEONIES* (*Suffruticosa* or *Moutan*, *Delavayi*, *lutea*, *potanini*) and the more familiar *HERBACEOUS PEONIES*.

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