NATIVE PLANT SOCIETY OF NORTHEASTERN OHIO
Tom's - Oldum
Founding Chapter Of
THE OHIO NATIVE PLANT SOCIETY
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On the Fringe

THE JOURNAL OF THE OHIO NATIVE PLANT SOCIETY

Volume 8 | November/December 1990 | No. 6

IMPORTANT NOTICE FOR ALL MEMBERS

Due to the retirement of the Executive Secretary of the Cleveland Chapter, there will be an address change.

Effective December 1, 1990, the address for the **Northeast Chapter (Cleveland)** of the Native Plant Society will be: 2651 Kerwick Road, Cleveland, Ohio 44118. Telephone No. 321-3701. Mail relating to the activities of the Northeast Chapter (Cleveland), such as dues and membership inquiries, should be sent to the Kerwick Road address.

However, all mail for business of the **Ohio Native Plant Society** should be sent to 6 Louise Drive, Chagrin Falls, Ohio 44022 as usual. For the time being, the affairs of the state-wide organization will still be taken care of at the Chagrin Falls office.

Ohio Native Plant Society correspondence with other state societies in America and Canada should be sent to the Chagrin Falls address.

During the next several months there will be further address changes as reorganization of the business affairs of the Cleveland Chapter takes place. Notification of these changes will be publicized in the newsletter, which will be under new editorship. In the interim, President Tom Sampliner will handle all local matters at the Kerwick Road address.

CALENDAR OF VARIOUS CHAPTER ACTIVITIES:

Please call chapters if you wish to join them in an activity - phone numbers are listed after the calendar.

SNP - State Nature Preserve

Nov. 3 (Saturday) **10 a.m.** - **Portsmouth Chapter.** Winter Fruits Hike. Meet at Minford High School.

Nov. 3 (Saturday) **11 a.m.** - **Little Beaver Creek Chapter.** Stream monitoring. Meet at Beaver Local High School

Nov. 9 (Friday) **7:30 p.m.** - **Cincinnati Chapter.** Northern Hills Fellowship- Lecture by George Beatty, "In the Footsteps of Linnaeus", detailing the story of Linnaeus' 1732 exploration of Lapland.

Nov. 10 (Saturday) **5:30 p.m.** - **Cleveland Chapter.** Cleveland Museum of Natural History - Annual Dinner and lecture by Dr. Warren Stoutamire, "Native Ohio Orchids".

Nov. 11 (Sunday) **2:30 p.m.** - **Mohican Chapter.** Secrest Arboretum field trip in Wooster.

Nov. 17 (Saturday) **10 a.m.** - **Little Beaver Creek Chapter.** Field trip for waterfowl migration. Meet at Mark's Landing at Guilford Lake.

Nov. 17 (Saturday) **2 p.m.** - **Wilderness Center Chapter.** Field trip to Van Sicle Woods. Call for info.

Nov. 19 (Monday) **6:30 p.m.** - **Dayton Chapter.** Cox Arboretum - Annual Dinner and lecture by Allison Cusick.

Nov. 20 (Tuesday) **7 p.m.** - **Portsmouth Chapter.** Boston Community Center - Annual Dinner and lecture by Eric Metzler, "Ohio Moths and Butterflies".

Dec. 1 (Saturday) **6 p.m.** - **Cincinnati Chapter.** Northern Hills Fellowship - Covered supper and lecture, "Wildflowers in My Own Backyard" by Bill Culbertson.

Dec. 6 (Thursday) **7 p.m.** - **Cleveland Chapter.** Chagrin Falls Library - Perry Peskin will present a slide program on the rare plants of Ohio and the Appalachian Mountains.

Dec. 8 (Saturday) **Wilderness Center Chapter.** All day field trip to Holden Arboretum. Call for info.

Dec. 18 (Tuesday) **7 p.m.** - **New Boston Community Center.** Bird identification refresher for the Annual Bird Count.

Dec. 29 (Saturday) **Little Beaver Creek.** All day Christmas Bird Count.

Dec. 29 (Saturday) **Portsmouth Chapter.** All day Christmas Bird Count.

At the time of publication we had not received program information from the Columbus or Toledo chapters.

BRIGHT STEMS OF WINTER by Claire Sawyers

Most days on the way to and from work I hit a red light at Cleveland Avenue in Newark, Delaware. The expanse of asphalt, the crisscrossing wires overhead, the rusty railroad bridge defaced with graffiti, and the surrounding car lots make this five-way intersection especially dismal. While waiting for a green light my attention is inevitably drawn to a traffic island planted predominantly with **Cornus sericea** 'Flaviramea,' the yellow-stemmed variety of red-osier dogwood. When the winter days start getting longer, the early-morning sun hits this shrub from the direction I travel and turns it into a golden thicket. By summer it becomes a dense mass of greenery, setting off borders of flowers and countering the heat and dust. In the fall the leaves of 'Flaviramea,' lacking red pigments, turn yellow. Driving by this planting twice daily year-round, I've developed a fondness and respect for what **Cornus sericea** can do, even in an inhospitable setting.

The slender, erect stems of **C. sericea** are its horticultural **raison d'etre.** Usually they are some shade of red, whether deep maroon, scarlet, or, less frequently, coral. In the case of 'Flaviramea' they are shiny yellow. **Cornus sericea** is one of few plants that can break the monotony of wintertime browns, providing strong, bright colors when gardeners yearn for them. And unlike berries, which are quickly devoured by birds, the richly colored stems last all winter. They seem even more beautiful protruding from a blanket of snow.

In spring and summer the twigs of **C. sericea** fill in with opposite, oval leaves two to five inches long. Their venation pattern is characteristic of dogwoods, but the leaves themselves are otherwise undistinguished. Small, whitish flower clusters appear in May and sporadically through the summer. The foliage tends to obscure the blooms, even though the flower clusters measure two to three inches across and generally occur at the ends of stems. By mid-June the clusters develop about 30 white berries, but these don't stand out until fall, when the leaves can become as bright and red as the autumn foliage of the familiar flowering dogwood. **C. florida.** The undersides of the leaves, however, remain whitish and, like the berries, contrast with the reds of autumn.

Cornus stolonifera Michx. Red-osier Cornel or Dogwood.

Landscape Uses

Cornus sericea is best planted

in masses with a contrasting background. A planting several shrubs deep and wide will create a thicket of color, while a single shrub or single-file arrangement might be disappointing. Rick Colbert, city horticulturist of Newark, Delaware, who designed the traffic island I regularly pass, also planted 'Flaviramea' in front of the city hall. There the brown-brick facade of the modern building and a nearby stand of Japanese holly, **Ilex crenata**, with its dark evergreen leaves, provide a striking contrast with the yellow-stemmed dogwood. In another planting I admire, on the University of Delaware campus, Japanese black pine, **Pinus thunbergiana**, provides a dark-green background for a mixture of red and yellow-stemmed dogwoods. Nearby golden forms of dwarf conifers repeat the color of 'Flaviramea.' Many conifers could be substituted for the Japanese black pine, but another one that works particularly well is the native Virginia juniper or eastern red cedar **Juniperus virginiana.** In a naturalistic planting I know of at the edge of a pasture, several cultivars of **J. virginiana** have been interplanted with **C. sericea.** The dense, upright form and fine-textured foliage of the juniper seem especially appropriate with the open, linear stems of the dogwood.

Cornus sericea frequently inhabits wet or swampy areas in the wild, making it an ideal candidate for stream-banks, drainage ditches, and the edges of ponds. A friend who struggled for years with a seepage area that cut across his lawn gave up mowing it and lined the low area with red and yellow-stemmed cultivars of **C. sericea**, shrubby willows with colored twigs and showy catkins, and deciduous hollies with bright-red fall fruits (**Ilex verticillata** and **I. serrata**). The soggy problem area turned into a corridor of plants, providing rich off-season interest. **Cornus sericea** doesn't require a moist area, however. Recall the planting I've described on the urban traffic island, where the plant has thrived in dry situation with little or no irrigation.

Russell Page, the late, noted landscape designer and author of **The Education of a Gardener** (Random House, 1983), suggests that shrubs with colored stems "are plants only for distant use. Individually seen in detail, they lack interest." I don't fully agree but mention it to emphasize the point that the color of **C. sericea** isn't lost in the landscape. Unlike plants with delicate flowers or fragrance, **C. sericea** is equally effective whether you walk near it or view it from afar. At Mt. Cuba Center, in Greenville, Delaware, the garden where I work, several dozen plants of 'Flaviramea' frame the upper edge of a sloping, three-acre meadow. A bright spot in fall and winter, this planting lures you down a curving path that runs by it and around to the lower edge of the meadow. From the bottom of the meadow it's noticeable again as a chartreuse or yellow patch against the dark woods and brown meadow grasses.

Culture

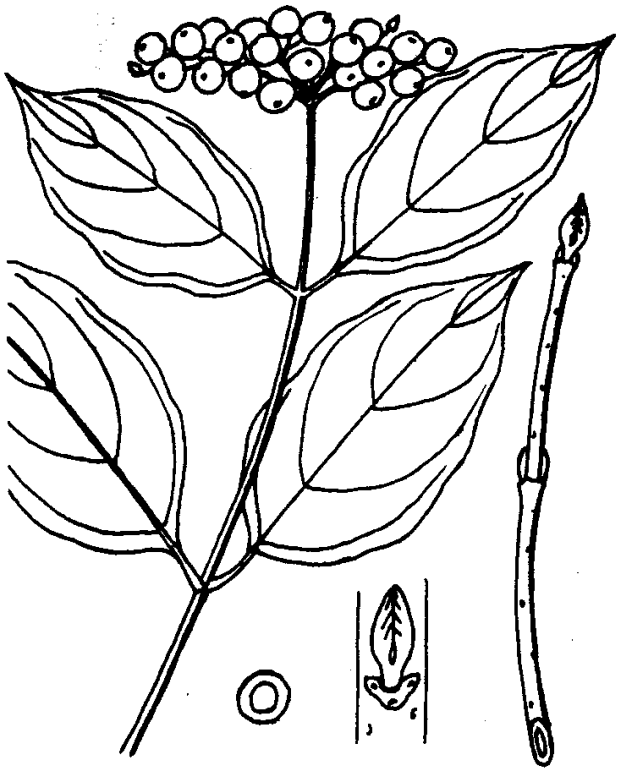
Cornus sericea has a broad native range that extends across much

of North America from Newfoundland to Alaska, south to California, New Mexico, Nebraska, and Virginia, so the question of cold hardiness shouldn't concern most gardeners. At its northern limit it tolerates cold of -40°F (the average annual minimum temperature in USDA Zone 3a). Its southern limit is Zone 8a. However, selections may vary in hardiness, depending on where the parent plant originated. **Cornus sericea** 'Kelseyi,' for example, is cold hardy only to Zone 5a, where temperatures seldom dip below -20°F.

Annual pruning of **C. sericea** is necessary, because the bark turns brown as it matures, usually after several years. Cutting out older stems makes the shrub sucker at the base, and the new shoots display fresh, bright color. At Mt. Cuba Center we prune out old stems in March (when winter is nearly over) and remove at least one-third of the shoots. Flower arrangers may want to prune gradually through the winter, bringing the colored stems for arrangements.

Cornus sericea readily spreads by stolons, another reason to prune it annually. Stems will root down and sucker up, creating a new crown within a short distance of the parent. Colbert's workers regularly saw off these stems at pruning time and remove the newer plants to maintain distinct clumps. If left unchecked, the beds would fill in and become difficult to manage. This characteristic, however, may be an advantage in other sites.

The more old branches are removed, the more young suckers will appear in spring. Shrubs cut to the ground each year will yield a stand of unbranched, pencil-thin shoots that will reach no more than four feet by the end of the summer. Pruning to the ground each year means the planting won't grow tall enough or thick enough to function as a screen during the summer, but it is a way to use **C. sericea** in smaller settings, where a large, dense mass of shrubbery would be overwhelming. And such severe pruning concentrates the color closer to the ground, making the planting more like a coarse groundcover. In some areas of New York State, **C. sericea** grows naturally along the roadsides and gets mown back by highway maintenance crews. I suppose a similar approach could be applied to a large planting as well to reduce pruning time.



Red-Osier Dogwood

Cornus sericea can be easily propagated by sticking hardwood cuttings

in the ground and watering them. The soil should be well tilled and the cuttings (seven to nine inches long) stuck about halfway in and firmly tamped into place. Twigs stuck in the fall should be mulched with hay or leaves. This also means cuttings can be taken when it's easier to judge for bright stem color.

By properly siting **C. sericea,** gardeners can greatly reduce the likelihood of pests and diseases. **Cornus sericea** performs best in full sun, where there is good air circulation. Selecting an open, sunny site will reduce the occurrence of leaf-spot diseases and increase bright autumn coloration. Scale, stem canker, and bagworms have been known to bother **C. sericea.** Pruning out the old stems will help check scale infestations, but look into horticultural oil sprays if the problem gets out of hand. Stem canker and leaf spot tend to be worse in the southern extent of the species' range. Stems that show canker lesions or die out should be cut back and disposed of. If you see bagworms, remove them. The important thing to remember is to make sure new purchases of these plants are healthy.

Cultivars and Selections

Cornus sericea has also been known as **C. stolonifera** and still appears by that name in many books and catalogs. Other shrubby dogwoods resemblinhg this species have also been mixed up with it in the trade, in particular **C. alba,** the Tartarian dogwood. The important horticultural difference between **C. sericea** and **C. alba** results from the fact that the former is native to North America, the latter to Siberia, Manchuria, and Korea. English garden writers call **C. alba** robust and vigorous, but it languishes in the hot, humid summers of much of the United States. In the large planting of **C. sericea** 'Flaviramea' at Mt. Cuba Center, several shrubs of **C. alba** were interplanted years ago to provide spots of red. They sucker little, several stems die back each year, and the leaves become ragged by midsummer. Despite the species' different performances, some botanists feel **C. sericea** and **C. alba** should be classified as one.

Some people prefer **C. alba** over **C. sericea** because cultivars of the former ('Sibirica' and 'Westonbirt,' for example) have stems that are a brighter red than those found on the latter. Also, some **C. alba** cultivars with variegated leaves have been introduced ('Argenteo-marginata' and 'Gouchaultii'). Professor Harold Pellett and others at the University of Minnesota Landscape Arboretum have been working to produce equally attractive selections of **C. sericea.** In 1985 the arboretum released **C. sericea** 'Cardinal,' accurately named for its exceptionally bright-red twigs. The plant resulted from crossing wild plants that grew around the arboretum. It may take several more years before it becomes widely available, but when it does, 'Cardinal' should be popular (it is described as being more resistant to leaf spot than other cultivars.) Pellett is continuing to evaluate several other new clones from the same group of seedlings.

At Mt. Cuba Center, Director Richard Lighty is also developing several selections of **C. sericea** for superior stem color and garden performance. Propagated from exceptional specimens in a large native population in northern New Jersey, his selections include plants with bright-red, dark-red, and salmon-colored stems, illustrating the variety of bark color in the group. After several more years of evaluation, some may prove worthy of being introduced to the trade.

Variegated forms of **C. sericea** exist and were noted as long ago as the 1930s—even though none appears in nursery catalogs today. Liberty Hyde Bailey, in his **Standard Cyclopedia of Horticulture** (Macmillan, 1933), describes varieties with variegated leaves but lists no cultivar names. Perhaps one of these was that which G.W. Naderman, of Oakville, Washington, sent in the form of six cuttings to the University of Washington Arboretum in 1941. The cuttings rooted, and the plants multiplied naturally by stolons. Over the years the staff transplanted the variegated plants to various spots around the arboretum. In 1984 the plant was named **C. sericea** 'Sunshine' and fully described in the **University of Washington Arboretum Bulletin.** Its leaves are pale yellow or chartreuse and "may be all of one hue, or may have yellow margins and an irregular green area in the center; more rarely they are creamy white with a central green blotch." In the landscape the shrub appears as a light-yellow mass, with luminous foliage and bright winter stems.

A neatly variegated spot appeared several years ago on a 'Flaviramea' plant at Mt. Cuba Center. Cuttings were made of the branch, the resulting plants displayed leaves with an irregular edge of creamy white. None of these plants has reverted to producing all green foliage. Director Lighty named this plant 'Silver and Gold.' It combines "silvery" summertime foliage with golden winter stems and should appear in retail catalogs as early as next year, as limited stock has been distributed to several wholesale nurseries.

Other named selections of **C. sericea** include 'Isanti' and 'Cheyenne.' 'Isanti,' another selection from the University of Minnesota Landscape Arboretum, is a compact plant but otherwise is typical. 'Cheyenne' has spreading branches, less erect than the species, and red stems. 'Nitida' appears in several references. I've come to the conclusion that this plant, named for its green stems, has been lost to cultivation, since no one I know has ever seen it.

With red-osier dogwood's ability to transform traffic islands into horticultural attractions, turn wet problem areas into colorful thickets, and brighten a variety of winter landscapes, it's a shrub that seems destined for wider use in the garden.

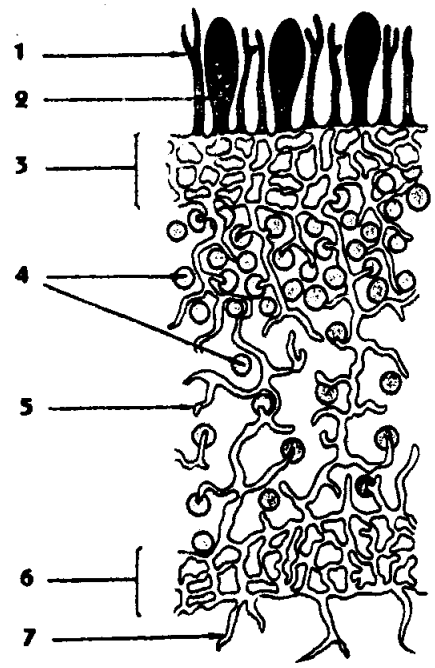
This article is reprinted from the October, 1989 issue of **Horticulture.**

LONG LIVE THE LICHENS by Dr. Howard Crum

To Linnaeus, the most famous botanist of all time, lichens were no more than the poor trash of creation, wretched food in barbarous countries. In the 1800s, nearly a century after Linnaeus, another botanist of distinction called them vegetable monstrosities derived from decomposing water, in reality incompletely formed mosses. Lichens may appear strange, even bizarre, but they are scarcely monstrous and quite unrelated to stagnant water or mosses. Made up of two dissimilar plants, an alga and a fungus, living together in close association, in a symbiosis, they resemble neither algae nor fungi and live quite well in desperate habitats where neither can survive alone. Like cockroaches, they seem to live on nothing. Indeed, they get what little they need from the air, water in the air, and each other.

Where do lichens not grow? They adorn rocks wetted by ocean spray and appear in the shallows of freshwater streams. They festoon trees in tropical rain forests and telephone wires in California. They thrive in dry, exposed places, on roadside tree trunks, fence posts, sandy soil, bare rocks, sidewalks, tombstones, slick volcanic glass, stained glass windows of medieval churches, and even on the backs of giant beetles in New Guinea.

The toughest of all plants, they endure desert heat and arctic cold. In Antarctica, where winter temperatures are the lowest on earth and summer temperatures hover near freezing, lichens outnumber all other kinds of plants. Only a few degrees from the South Pole, they cover dark, heat-absorbing rocks where surface temperatures reach 80°F, not unlike air temperatures on a fine summer day in Michigan. In Greenland, living lichens have been found under ice believed to have been in place for decades. Specimens frozen in liquid oxygen at -183°C for 18 hours have shown signs of life on thawing. One species survived temperatures close to absolute zero (-273°C) and retained vitality after six years in a vacuum. Drought-susceptible lichens stand as much as 16 weeks of dehydration, and species especially geared for drought show no damage after more than a year of total dryness. When dry, many lichens are extremely tolerant of high



C. Section of lichen along line c-d, greatly enlarged. 1. Sterile hyphia. 2. Spore sac (ascus). 3. Upper cortex. 4. Unicellular algae. 5. Mycelial filament. 6. Lower cortex. 7. Hold-fast hypha.

temperatures, even 205°C. Hot or cold, they have the ability to go in and out of dormancy quickly and to suspend life processes for long periods of time.

They survive drought, but lichens have no way of storing water. Here in Michigan they take up water from the morning dew and lose it as quickly as Monday's wash hung out on the line to dry. By 10 a.m., photosynthesis has passed its peak or stopped all together. During the rest of the day, the lichens live in desertlike drought and keep their food-consuming metabolism at a minimum. With so little time for photosynthesis, they are limited in growth. Relatively large leafy-seeming lichens rarely grow more than 10 millimeters a year, but crusts may grow less than one millimeter a year. However, they live long. Some of the larger leafy or shrubby species may live 30 years, but rock-growing crusts live much longer. Because they grow so slowly and live so long, their sizes can be used to date the rocks on which they grow. This technique of dating, called lichenometry, is especially useful in dating glacial events and vegetational successions nearby. Glacial moraines in the Swiss Alps have been dated at 1000 years. In the Canadian Arctic some lichen crusts may be 6000 years old!

The lichen symbiosis is a kind of parasitism. The alga, enveloped by the fungus, is sickly and slow-growing. Most of the lichen body, or thallus, consists of interwoven fungal filaments. The fungus gets carbohydrates and vitamins, including some of the B complex, from the alga. What the alga gets in return has never been demonstratedpresumably water, minerals, and vitamin C.

Both symbionts can be isolated and grown in culture. The fungus grows slowly and forms only an amorphous, unnamable mass lacking in reproductive structures. It is clear that the fungus, while enslaving the alga, has lost its own independence. It is unable to live and reproduce except when lichenized. The alga, on the other hand, grows well in culture as an identifiable, free-living species, obviously healthier and more vigorous in growth than in its symbiotic bondage. Researchers have had poor success in putting fungus and alga back together in anything suggesting their original lichen form.

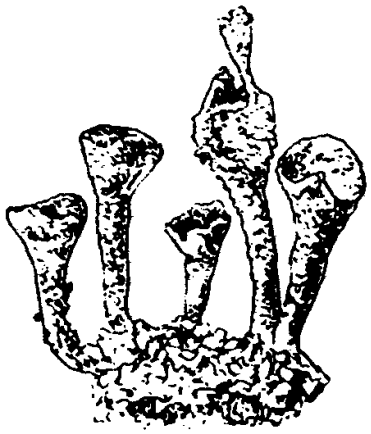
About 18,000 lichens can be distinguished as species, 2,500 of them in North America, 600 in Michigan. Most can be recognized with the naked eye or through a magnifying lens. They differ endlessly in shape and color, but show only a few basic body forms--crustose (scabby), squamulose (scalelike), foliose (leafy), fruticose (shrubby), pulverulent (powdery), filamentous, and jellylike. Some few genera have unique lichen substances, often called lichen acids, which provide accessory characters for identification. Some lichen

acids can be detected by simple spot tests yielding color with drops of household bleach or a lye solution, extracting and identifying lichen acids in crystalline form, or testing their solubility in certain reagents by chromatography. Crusts can generally be named only by microscopic features, especially spore characters, and are, in fact, shunned by most lichenologists. Mason Hale's **How to Know the Lichens** is a well illustrated guide to all the known foliose and fruticose lichens of North America. It works well in Michigan--and easily. The author designed it with an intelligent high school student in mind.

Lichen algae reproduce by simple cell division. The fungal component produces spores in sac-like asci, but a very few tropical species have spores at the tips of club-shaped basidia. In order to form a lichen, the spores on germination must make contact with the appropriate alga. Most lichens reproduce themselves by fragmentation and regeneration, and many of them regularly reproduce by means of small, air-dispersed structures, powdery eruptions from the interior (soredia) or tiny outgrowths from the surface (isidia).

Lichens are fungi and are classified into orders and families according to the reproductive structures of the fungal component. No lichenized fungus has been identified as a free-living species, but the algal hosts belong to nearly 40 different free-living species, about two-thirds of them green algae, the remainder blue-green.

The cell walls of lichenized fungi consist almost entirely of a unique starch called lichenin that requires a special enzyme for ready digestion. Herbivores, such as sheep, caribou, and reindeer, make good use of lichens. In fact, 95 percent of the winter diet of arctic caribou consists of lichens. The reindeer of the Old World, scarcely distinguishable from caribou, likewise live largely on a lichen diet. In Norway lichens are harvested as hay for cows, ponies, rabbits and reindeer. In northern Asia reindeer are herded into lichen pastures found by aerial reconnaissance. It appears that man is less able to digest lichens than herbivores, but cooking seems to aid the digestion process. In Iceland and Scandinavia lichens are used to thicken soups and puddings and



Cladonia pyxidata

mixed with wheat flour to make bread. Eskimos eat with gusto the lichen-filled paunch of the caribou, getting from it a winter source of vitamins, not to mention a supply of ready energy from carbohydrates. In northern Europe lichens have served as a sugar source for making brandy and as a hoplike flavoring for beer.

The food value of lichens compares well with that of cereal grains, and they are three times as nutritious as potatoes. They contain vitamins A, C, D, and some of the B complex, but they are low in proteins and fats. Lichens are at best tasteless, though some of them have a bitterness that can be removed by parboiling with soda. One lichen, **Letharia vulpina**, is poisonous (in massive doses). European peasants used to mix it with fat and nails and leave it for hungry wolves. That same species hangs from pine trees in the western moutains in spectacular displays of bright-yellow.

The Menominee Indians of Michigan's Upper Peninsula once stored foliose lichens for winter food, and Indians of British Columbia consumed a hairlike **Alectoria**, but only when faced with starvation. Rock tripes, sometimes as big as a dinner plate, were eaten, together with shoe leather (which they resemble), by members of the Franklin Expedition hopelessly lost in the Arctic. They found it to be a bitter, griping purgative.

An unattached lichen of the deserts of North Africa, ranging across to the steppes of southern USSR, is sometimes eaten as an alternative to starving. Called **Lecanora esculenta**, it resembles a chick pea. It blows great distances in violent storms, sometimes gathering in windrows. A portion of Alexander the Great's army in Persia was supposedly saved from starvation by an unexpected rain of **Lecanora**, and similar godsend appearances in Iran were documented in the nineteenth century. The lichen, so miraculous in appearance, is often thought of as the manna from Heaven that served the Children of Israel so well as they wandered in the wilderness of Sinai.

Sheep pastured in the Libyan desert eat **Lecanora** in preference to other plants available to them. Rundown flocks can be fattened up quickly on lichen forage, but they wear their teeth down because of sandy grit and soon develop a variety of sumptoms presumably associated with dietary imbalance. The people of that area, in dire straits, eat the lichen parched over heat and make it into bread.

Liberated from dependence on decaying organic matter, lichenized fungi can colonize bare rock owing to their remarkable ability to absorb life-giving substances from atmospheric moisture. But because of their small size, slow growth, and weak acids, they have little significance in weathering rocks and producing soil. They are pioneers, yes, but only because they grow where nothing else can. Rather

than starting vegetational successions, as commonly believed, they often follow plants of larger size, byrophytes, herbs, and even shrubs.

Because they accumulate substances from dust in the air and from rainfall, winter and summer, and have no means of excretion, lichens are very sensitive to atmospheric pollution. Sulfur dioxide is especially damaging because it removes magnesium from chlorophyll A, and lichens have little chlorophyll relative to their mass. The sensitivity is greatest in fruticose lichens, less in foliose, still less in crustose. The body form, abundance, and diversity of lichens provide the means of mapping the effects of pollution outward from an industrial source. But lichen sensitivity shows only what the level of pollution has been in the past.

Lichens tolerate remarkably high levels of heavy metal pollutants, lead and mercury, for example, and can be used in mineral prospecting. Uranium can sometimes be detected by using a Geiger counter on dried specimens stored in herbaria. Rapidly growing, seasonal plants cannot accumulate metallic ions from run-off water, but long-lived lichens in intimate contact with rock substrates can. Over time they take up detectable amounts of elements present in the rocks only in scant supply.

These remarkable plants are three times as resistant to ionizing radiation as flowering plants. During atom bomb tests in the South Pacific in the early sixties, lichens thousands of miles away in arctic Alaska and Scandinavia took on a high burden of radioactive materials that was passed on to caribou and reindeer and thence to Eskimos and Laplanders, both of whom have higher than permissible amounts of cesium-137 and strontium-90 in their body tissues. Laplanders herd reindeer and live almost entirely on them. They are accordingly more vulnerable to radioactive fallout than the Eskimos, who live mainly on the sea but may also follow the lichen-eating caribou in its migrations. (The danger is that cesium-137 replaces potassium in man and animals, and strontium-90 replaces calcium.) In 1987, after the nuclear disaster at Chernobyl, entire herds of reindeer were slaughtered to reduce the dangers of radioactive pollution to Laplanders using them for food.

Figure 25. Foliose growth form (*Parmelia austrosinensis*).

In 1972, at least two months after other bomb tests in the South Pacific, student researchers at the University of Michigan measured significant amounts of cesium-137 in lichens found growing on oak trees near Chelsea, not far from Ann Arbor. (The found none in leaves or acorns, because absorption takes place through the roots, not through aerial parts as in lichens.) Since the half life of cesium-137 is only four months, the original dosage must have been large indeed.

Lichens were used in former times for treating disorders of tissues and organs that they resemble--skin, liver, lungs, and brain. Jaundice was treated with yellow lichens, and a few centuries ago a common **Peltigera** with dog-tooth fruiting structures was prescribed for rabies. A good number of lichen acids are antibiotic. Most notable among them is usnic acid, which imparts a yellowish-green tinge to many lichens. It inhibits the growth of many bacteria, including the tubercle bacillus and the staph that causes boils. It is effective against scarlet fever, pneumonia, lupus, athlete's foot, and impetigo. Commercial preparations are available in Europe. On the other hand, usnic acid has been implicated as the cause of skin allergies occasionally afflicting foresters who come in contact with lichens.

Egyptian mummies, for whatever reason, were once stuffed with the lichen **Evernia prunastri**, known as **mousse de chene**, or oak moss. Today, this species is picked from shrubby growth in the south of France and Yugoslavia and used as a fixative in soaps and perfumes to strengthen fragrances such as lavender, orange blossom, and tuberose.

Lichens have been important since ancient times as a source of dyestuffs. Almost any lichen will yield, on boiling in water, soft shades of beige, yellow, and brown. Mordanting with various salts will intensify or alter those colors (to green with copper sulfate, orange with chrome salts, dark brown with iron compounds, even rusty nails). Harris tweeds were dyed with such lichens until some 25 years ago. From 1700 B.C. until Tyre and Sidon were destroyed by crusaders, royal purple was made by the Phoenicians from a secretion meagerly produced by certain shellfish of the Mediterranean. Only royalty and princes of the church could afford to wear fabrics of such brillance. An Egyptian papyrus of the third century after Christ listed 20 cheap ways to fake royal purple, including the use of lichens. The lichen dye was a poor substitute for it, mauve rather than a brilliant purple. And royal purple is forever; lichen purple fades. The substitute dye was made from a sizable fruticose lichen called **Roccella** that grew on rocks at the shores of the Mediterranean. The dye was marketed for centures following the crusades by a Florentine family. Lichen dyes cannot be used for cotton or syn-

thetics, but they give wool and silk lovely shades, subtle and velvety in tone. They are not as colorfast as the synthetic analine dyes. And it takes long hours to gather the pound of lichens needed to dye a pound of wool. In terms of conservation, should a lichen that took 35 years to grow be used when onion skins might do as well?

Lichens, biologically interesting, surprisingly useful, sometimes beautiful, are the "trashy" plants that Linnaeus held in low esteem and most of us never notice.

Dr. Howard Crum is Professor of Botany at the University of Michigan and one of the world's leading authorities on mosses and lichens.

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SUMAC JELLO by Edelene Wood

I save any leftover Sumac punch for this jello. Sprinkle one envelope of unflavored gelatine over one half cup of cold water. Dissolve over low heat. Remove and add 1/4 cup of sugar and 1-1/2 cups of Sumac juice. Stir until dissolved. Chill until firm.

RECYCLING STYROFOAM A Report by the Solid Waste Committee of the Cleveland Sierra Club

What can be done with Styrofoam? This is one of the most asked questions of our committee. The answer is, at least for now, very little. However, things appear to be happening that may provide us with some options in the future.

First, expanded polystyrene (what most people call styrofoam) is environmentally damaging regardless of its use or its ability to be recycled. Quoting from **50 Things***, "The material is made from benzene (a known carcinogen), converted to styrene, and then injected with gases that make it a "foam product." The gases used pollute the atmosphere and/or deplete the ozone layer. It is completely non-biodegradable; it wastes space in our landfills and is deadly to marine life. So, the most environmentally conscientious thing we can do is to refuse to use it.

As environmentalists, we can debate the justification of offering recycling of expanded polystyrene knowing that it will give the impression to many that its environmentally OK to consume since it is recyclable. Be that as it may, sometimes we get duped into using it even though we'd prefer not to. What can we do? Well, we have found that PACKING styrofoam, the familiar "popcorn" and/or "peanuts," can be reused as packing material. Some companies will even pay, while some will even pick up in bulk quantities! Typically, however, these companies will accept only on donation and expect you to drop it off. A brief survey of area "Mail Boxes Etc." produced this list:

Cleveland	3778 Rocky River Dr.	941-1660	Pick Up
Euclid	25931 Euclid Ave.	289-3722	Drop-Off
Garfield Heights	12600 Rockside Rd.	475-7855	Drop-Off
Lyndhurst	5124 Mayfield Rd.	442-4333	Drop-Off
Mentor	7900 Plaza Blvd.	1-255-3166	Call First
North Olmsted	27113 Brookpark Ext.	734-1515	Will Pay $1/lg Bag
North Olmsted	23146 Lorain Rd.	777-3133	Drop-Off
Painesville	1471 Mentor Ave.	1-352-1935	Drop-Off
Parma	1128 Pleasant Valley	885-3200	Drop-Off
Parma Heights	6370 York Rd.	883-6007	Drop-Off
Solon	34208 Aurora Rd.	248-7994	Drop-Off
Strongsville	14761 Pearl Rd.	572-1050	White Only
Willoughby	5900 SOM Center	943-5544	Drop-Off

These places are only taking PACKING styrofoam, but its a start and reuse is better than recycling anyway. You may be able to find other companies that will take the material. It doesn't hurt to ask; let us know if you find other places that will take it.

Now, regarding recycling, as far as we know the only facility in our area that accepts styrofoam for recycling is the Akron WTE Material Recovery Facility. In cooperation with Dow Chemical, they are in the process of assembling an experimental facility that will take many types of plastic including styrofoam.

(Presumably, Akron's reputation as being the Polymer Capital influenced Dow to move the operation from California to Ohio.) The plant is expected to be operational by September, 1990. At this point it is unclear under what conditions communities and individuals, outside of Akron, will be allowed to utilize the facility.

As you may know, Turtle Plastics, a Cleveland-based company, has been marketing products made from recycled styrofoam. They purchase the "washed regrind" from a company in Mass., as they do not have equipment to do this for styrofoam. The equipment to do this very expensive; perhaps $1 million in up-front capital is necessary to build such a facility. Recognizing this fact, McDonald's Restaurants may be willing to help finance some of these facilities nationwide, but Cleveland is not one of the projected sites. Turtle is proposing a petition drive to get McDonald's to consider Cleveland as a possible site. Our committee is reviewing the proposal and will report if this is something we want to promote. We will issue an update as conditions warrant.

***50 Simple Things You Can Do to Save The Earth**, Earthworks Group, 1989

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THE THREE KINDS OF EASTERN SUMAC by Edelene Wood

The Latin name for Staghorn Sumac means densely velvety, and the twigs and berries are that, so much so that hunters are known to shoot at the leafless branches thinking they are deer antlers. Smooth Sumac is my favorite. I gather these bright red, smooth heads of Sumac for my pink lemonade, jelly, punch, pies, jello, ice cream, candy and powdered flavoring. I use Sumac berries in all of these concoctions. The Dwarf Sumac is notable because it is the only one with webbed leaves. By this, I mean you will notice wing-margines between the leaflets.

HOW TO PREPARE THE BERRIES by Edelene Wood

When the Sumac heads turn red, taste the berries of those you are about to pick. If they are tart, they will be good, if not, don't waste your time. Cut off the entire head and put your harvest in a paper bag. When you are ready to use the berries, take the berries off these heads with a fork. Discard the undesirables. Put berries in glass container and pour cold water over them. Let set 24 hours, then strain out berries using a clean white cloth and throw away the berries, saving the juice. This is the basic Sumac ade.

WILD BLEEDING HEART by Jan Midgley

The wild bleeding heart, **Dicentra eximia,** is a common eastern plant that is uncommonly useful. Try this 18 inch tall perennial with its three-foot spread as a ground cover. Its rosy-pink, heart-shaped blossoms hang in pendulous racemes among glaucous, lacy, fern-like leaves. The main flush of bloom occurs in late April through May with sporadic rebloom through September. Foliage persists until hard frost, a decided advantage over the frequently used non-native bleeding heart, **Dicentra spectabilis,** which goes dormant by mid-summer.

The natural range of our native bleeding heart is from southern New York southward into the mountains of Tennessee and North Carolina. If its modest cultural requirements are met, it thrives in cultivation well outside of its natural range. (Including northeast Ohio.) Editor's note.

With a little help from the gardener, this plant can look better than it usually does. The soil should be as rich as possible. **Dicentra** prefers high, light shade or a half-day of full sun — morning only. Afternoon sun causes the leaves to become yellow and spindly. Provide a humusy, moist but well-drained soil with a pH of 4-6. If necessary, acidify the soil and enrich it with organic matter such as compost or well-rotted wood chips. In clay soils, sharp sand or pea gravel may be added to improve drainage. If given a moist site supplemented with humus, the plant will remain rich in bloom and leaf color. Add a fine mulch, such as pine needles, to the porous soil and the plants will self-sow.

In addition to self-sowing, bleeding heart can be increased by seed or by clump division. Sow collected seed promptly in an outdoor seed frame. The seed requires 4-6 weeks of cold, moist stratification and will germinate the following spring. Wait at least 8 weeks before transplanting the seedlings.

Faster bloom production can be achieved by divison — usually in April or just as growth emerges. Divide the tough rootstock with a sharp knife. Each vegetative bud can be used at this time of year. Divisions made in the fall root poorly.

Bleeding heart works well in the garden with a variety of plants. Mixed with foamflower (**Tiarella cordifolia**) and the alien forget-me-nots (**Myosotis alpestris**), it creates a lovely spring picture. Bugbane (**Cimicifuga racemosa**) has similar cultural requirements and adds background height, coarser leaves, and summer bloom. Complete the scene with bluestemmed goldenrod (**Solidago caesia**) for yellow, fall color in the midline.

Variations in flower color are available with the selections 'Bountiful' (red), 'Alba' (white), and 'Snowdrift' (also white and a bit better than 'Alba'). The cultivar 'Luxuriant,' a cross between **D. eximia** and **D. peregrina** is reported to be especially floriferous and holds its blue-green foliage until the Fall.

This article was reprinted from Bluebird Nursery **Native Notes,** Vol. 2 No. 2, Srping 1990 issue.

Here in Massachusetts, **Chamaelirium's** quirky biology as well as its unfortunate setting in increasingly overgrown, deeply shaded woods, does not bode well for its survival. A two years' census has suggested that the population is merely hanging on. It must be quite old — at least as old as the forty- to fifty-year old upstart deciduous trees that have moved in. The Natural Heritage and Endangered Species program as well as The Nature Conservancy places a premium on rare species, or I would not have been engaged in this project in the first place. But Moldenke's meadow of fairy wands may be lost to us forever. Even if the Berkshire site were managed by removing brush and thinning the canopy in the hopes of encouraging flowering — and therefore sexual reproduction — would it be worth it? This wildflower is neither rare nor struggling in its native range down south, and its presence here is an artifact of the days when New England was nearly stripped bare of all its native forests. Is it such a bad thing to sacrifice a wildflower at the edge of its range for the return of the woodland in what was once exploited land?

Terri Dunn is an amateur botanist and an associate editor at Horticulture Magazine. This article is a reprint from The Journal of the Massachusetts Audubon Society **Sanctuary,** May/June 1990.

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ADVENTURES OF A 'WILD' PLANTS WOMAN: IN PURSUIT OF NATIVE PLANT PRESERVATION by Norma Phillips

Norma Phillips began growing wild plants in the 1940s and came to operate a successful wild-plants nursery in Minnesota. This book is an unusual combination of autobiography and reference work, alternating between descriptions of wild plants and her reminiscences about collecting and growing them.

It is full of sensible advice, the result of long experience, and may be most valuable on that account. Phillips avoids the enigmatic statements found in standard references, and simply cites her own observations and practice, usually in considerable detail. She writes, for example, that the red and blue cardinal flowers, **Lobelia cardinalis** and **siphilitica,** did not winter well for her: "I have tried various mulches, all airy. Sometimes that works and sometimes not, so I've decided they are not hardy enough." Nonetheless, she offers detailed advice about cultivating, propagating, and shipping both plants.

Many of the entries are iconoclastic. Citing the common statement that **Hepatica americana** prefers a dry setting, she writes, "They do not want wet soil but neither do they prefer dry, really dry, soil. There is always a layer of decaying leaves and other litter covering the ground helping to hold moisture." Perhaps it is a question of what constitutes a dry or damp setting.

In her plain-spoken way, Phillips also comments, "Some folks claim Hepatica lose their leaves in winter but that may be because they rake them away, or trim them away to neat up the garden."

The book is loosely arranged by plant families and covers a very large number of plants. All the common wild plants seem to be represented, but so are comparatively rare ones, including many not likely to be found in commerce. How many books give complete instructions for propagating the bottle gentian, **Gentiana andrewsii**, from seed, by crown division, and from root cuttings?

These instructions alone would make an essential, but thinner, book. For the casual reader, the author's anecdotes about searching for wild plants and struggling to grow them will be of equal interest, and her trenchant comments about visitors to the nursery may ring too true for comfort.

Readers may take issue with the opening chapter, on collecting plants in the wild, but it is clear from remarks elsewhere in the book that Phillips refers only to gathering specimens for propagation, and then only with permission of the landowner. In any case, her discussion of gathering and transplanting wild plants will be invaluable for anyone engaged in plant rescue or preservation. So will her suggestions for reliable but unobtrusive ways of marking plants, and for recognizing them outside the flowering season or even while they are dormant.

The book, which may be self-published, is set humbly in typewriterlike print and is sparingly illustrated with the author's drawings and a few good color plates. It may be difficult to obtain through general bookstores, but is readily available from Capability's (1-800/247-8154).

Either as a nearly exhaustive reference work, or as winter reading, this book will be a delight to anyone interested in wild plants.

This book review was submitted by Paul Solyn of Ohio University.

* * * * * * *

SUMAC PUNCH, A CONCOCTION OF CLARENCE JUERGENS, HAZEL WOOD AND E. WOOD by Edelene Wood

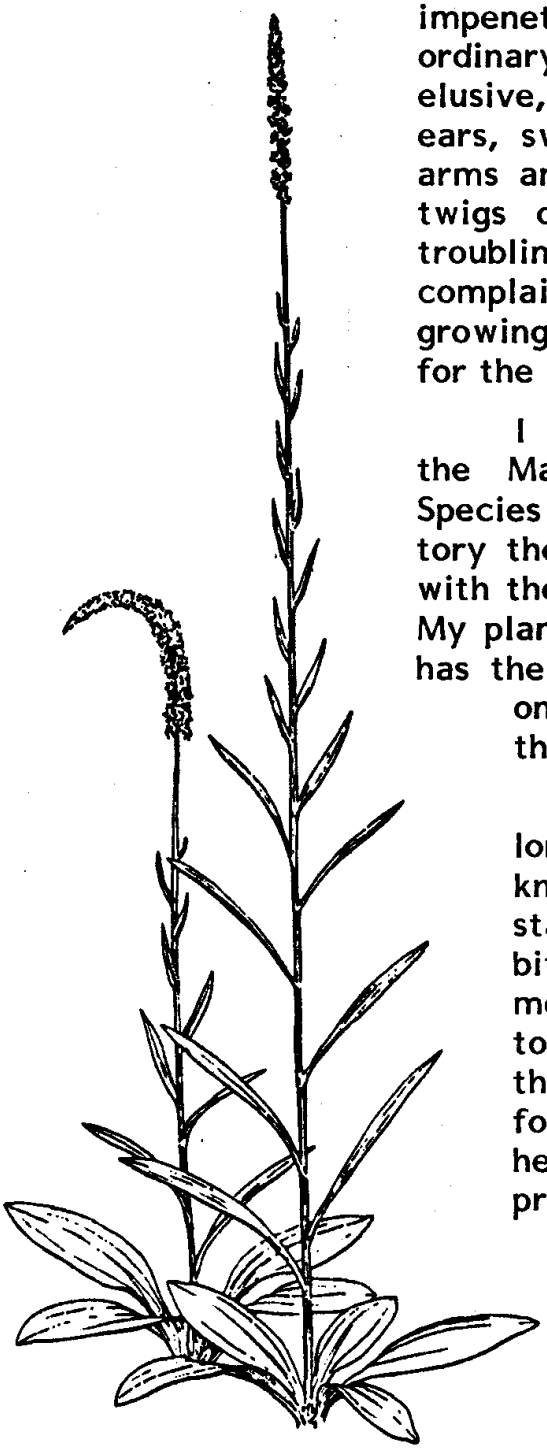
My mother and I were trying to make Sumac punch for Cordie Hudkins, then Superintendent of North Bend State Park, and offered some of it to Park Chef Clarence Juergens. He asked if he could add something - a bottle of grenadine syrup. It was a great addition, so our suggestion is add grenadine syrup to about a half gallon of juice. Stir and add ice.

THE LAST TIME I SAW SQUIRREL TAIL by Teri Dunn

Looking for Liles Where Lilies No Longer Bloom

"Fortunate the wanderer," botanist Harold Moldenke wrote in 1949, who happens upon a moist meadow - as I once did in eastern Connecticut - aglow with hundreds upon hundreds of the dainty Fairy Wand."

Not so fortunate the late twentieth century plant researcher. One hot afternoon last summer I thrashed through a nearly impenetrable thicket, scanning the ground for the ordinary-looking rosette of my quarry, this same, now elusive, fairy wand. Hungry mosquitoes whined by my ears, sweat streamed down my face and back, and my arms and legs stung from the continual slap of the slim twigs of sassafras and young red maples. But more troubling than my discomfort — pretty ordinary complaints in this line of work, after all — way my growing suspicion that these woods were inhospitable for the plant.



I was in the process of conducting a census for the Massachusetts Natural Heritage and Endangered Species Program that day. The program seeks to inventory the rare plants, animals, and habitats in the state, with the ultimate goal of preserving them when possible. My plant is indeed rare — this site, in Berkshire County, has the last remaining population in the state, the only one of a handful of turn-of-the-century records that has been reverified.

My quarry is **Chamaelirium luteum,** a long-lived perennial, a member of the lily family known variously as devil's bit, fairy wand, blazing star, and squirrel tail. Its botanical name is a bit of a misnomer: **chamae,** from the Greek word meaning ground; **lirium** for lily; and **luteum** referring to yellow, a color the flowers only achieve when they fade. My "ground lily" must have been named for a nonflowering specimen — actually, in this heavily shaded site, the misnomer becomes appropriate because the plant is unable to flower.

When **Chamaelirium** blooms, it is an arresting sight. The flowers are gorgeous, and they were once much more common in this region. The numbers Moldenke so extravagantly tossed off back in 1949 tantalize me; this site has fewer than a hundred plants.

The woods here are still young, the soil rich in humus and well drained, so it is no wonder that a jungle of opportunistic plants has lustily colonized what was once an upland meadow. There are remnants of the former incarnation of the place; sections of a low stone wall are still present, the occasional large white pine or chestnut oak towers above the thicket, and I've stumbled across old bottles and, once, a rusted scythe. The terrain is uneven, with an occasional depression to mark where the root ball of a tall tree, now rotted, once stood. There are woods like this all over New England, once cultivated or grazed, now returning to climax forest, their native condition. As long as development spares these former fields and meadows, succession will continue to take its natural course. New England has substantially more forest than it did at the turn of the century.

I first met **Chamaelirium** in 1983, when The Nature Conservancy hired me and botanist Kathy Venezia for the summer to study the plant in Dutchess County, New York (not far from the Massachusetts border), where it is also rare. The two populations we studied contained about 250 plants, the majority in a damp meadow, the rest on the south side of a ridge in shady woods. The company **Chamaelirium** kept in the meadow featured plants associated with alkaline soils such as certain sedges and grass-of-Parnassus. The sweetness of the soil was at odds with the profile of **Chamaelirium** in many field guides and floras, which invariably mentioned rich, acidic soils characteristic of the woodland site. Yet it flowered better in the meadow. It seems to me now that **Chamaelirium** fared well because the site offered some moisture — even in the hottest part of July — as well as sunshine; the plant had simply tolerated or adapted to the soil conditions.

Chamaelirium is dioecious — the individual plants are either male or female. The male plants are more attractive and must account for the enchanting common names. Their slim one- to two-foot stalks emerge from the "ground lily" rosette by July in New York, waving a delicate raceme of tiny white flowers that nod over at the top. The female stalk, in constrast, is straight and sturdy two- to three-feet high with a raceme of inconspicuous white flowers that develop tiny, nearly round, winged seeds by summer's end. The female stalk often persists through the following winter, like goldenrod and evening primrose and any number of other wildflowers.

Kathy and I spent our days gathering data and mapping the two sites and our evenings reading about **Chamaelirium** in reference books. **Gray's Manual of Botany** became our inspiration — M.L. Fernald closed his brief entry for the plant with a terse "needing further study." Upon hearing that it was much more common in the Southeast, we sought out the more current **Manual of the Vascular Flora of the Carolinas**, in which we found the intriguing comment that our plant occasionally deviates from its normally dioecious character. Indeed, a small number of our male plants developed ovaries at the base of their inflorescenses as their flowers fadded. (These ovaries, however, withered away, unfertilized.)

Like other lilies, **Chamaelirium** is probably wind-pollinated. A mere 5 to 8 percent of our populations flowered; we later learned not to be dismayed by this low number, as only 10 to 20 percent of a population flowers even in the heart of its range. Of those that do flower, males typically outnumber females three to one. Males are supposed to flower every year, while flowering and setting seed so exhausts a female that it may not flower again for three years. Because we now knew that we were studying these plants at the edge of their range, we were not surprised to note that our populations flowered less frequently.

Particularly at the shady-woods site, we noticed many of the nonflowering plants were growing in clusters and, acting on a hunch, we dug some up. Sure enough: the plants were reproducing vegetatively, that is, generating more than one rosette per rhizome. While vegetative reproduction is hardly unusual among wildflowers, including some of **Chamaelirium**'s relatives in the lily family, such as Canada mayflower (**Maianthemum canadense**) and false Solomon's seal (**Smilacina racemosa**), we had cause to be surprised by this observation. The only scientific papers we had found in our literature search were a series of detailed studies by Thomas Meagher, then at Duke University in North Carolina, an area where **Chamaelirium** is common. In one of his papers, he recounted how he had rescued a population of a thousand plants from a planned development, and, from that operation and his previous experience with the plant, he had concluded flatly that vegetative reproduction "does not occur." Yet we had found clear evidence to the contrary and speculated that this was an adaptation to life at the edge of its range.

My interest in **Chamaelirium** at the edge of its range was revived one evening a couple of years later, after I had moved to Massachusetts. My friends John and Kate invited me to join them at an open house at Harvard's Gray Herbarium. While the guests milled about, sipping white wine and nibbling on botanical hors d'oeuvres, John introduced me to a professor from whom he had taken a botany course. The conversation turned to the Gray's collection, and I wondered aloud if there was any **Chamaelirium** in Massachusetts. Soon — with some misgivings, but caught up in our enthusiasm — the professor was leading us stealthily up an unlit back stairway, heading for the room with the Lilaceae cabinet. A click of the lights, an impressive whir of a high-tech lock tumbling, and the cabinet slid open. "Raiders of the lost herbarium!," John whispered, as I lifted out the few sheets of dried and pressed specimens in the **Chamaelirium** folder. It was there that I learned that my plant had not been recorded in this state since the turn of the century. Our guide hurried us out, and the cabinet rolled shut behind us.

That spring, while visiting south-central Virginia, a few hundred miles north of Meagher's well-studied sites, I took the opportunity to look up **Chamaelirium** in the heart of its range. I sought out the herbarium at the local college, Longwood College, and met Alton Harvill (author of the state's flora) who was still going strong in his seventies. He knew the plant and

led me directly to his Lilaceae cabinet, where I found more than two dozen sheets, well labeled, only ten to twenty years old.

Dr. Harvill helped me choose a typical site: "Wooded slope, north fork of river, Red Hill, Albemarle County," the label promised. Red Hill turned out to be a hamlet in an unpopulated area at the foot of the Blue Ridge Mountains that to my weary New England eyes looked absolutely pristine. The narrow river was easily located, and I hadn't walked up its left side for long when I found one rosette, and then another, then dozens. It was classic **Chamaelirium** habitat by all field-guide standards: rich, moist, but well-drained soil, sheltered by the high shade of an open mature-oak forest. None of the plants were in flower, but I was early - **Chamaelirium** blooms in April there. I could see a few of last year's female stalks, however. Such a large and healthy population, and the presence of many others in the area, was thrilling yet sobering; it was clear to me that the northern populations, in sharp contrast with the southern ones, were struggling.

Back home in Massachusetts, I got a letter from Dr. Harvill. His irrepressible curiosity had gotten the better of him. He had looked up **Chamaelirium** in a few reference books and couldn't help commenting, "Your plant is a very odd species." He had also gone to the considerable effort of drawing up a distribution map for me, verifying some information I had. The plant is recorded from Pennsylvania and Ohio, and south as far down as South Carolina, with the greatest concentrations in Virginia and the Carolinas, where it is found in nearly every inland county. There were a scattering of reports from bordering states such as West Virginia and Kentucky. The distribution suggested not the random stranding of disjunct populations by glacial activity (as is the case with some rare plants in New England and elsewhere), but simple opportunistic migration. As the woods were cleared to make way for pasture, my guess is that **Chamaelirium** made its forays north into these marginal, but acceptable, habitats.

When the Massachusetts Natural Heritage and Endangered Species Program hired me to study the Berkshire County site, I found a population in more precarious condition than the Dutchess County, New York, sites I had studied several years before. Like in those populations, I found a small percentage reproducing vegetatively in the Berkshire County site — but no flowering, nor hope of it.

Studying Dr. Harvill's range map, it now occurs to me that the flowering time may be the greatest problem for the perpetuation of these northern populations. **Chamaelirium** blooms in April in Virginia, June in Delaware, July in the New York sites, and presumably July or even August as far north as Massachusetts. While **Chamaelirium** may qualify as a spring wildflower down south, flowering early and going to seed as the deciduous trees leaf out, up here, the soil hasn't even warmed up by April, and by July and August when it has, it is dry, and woods are shady.

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