NATIVE PLANT SOCIETY OF NORTHEASTERN OHIO

Founding Chapter Of

THE OHIO NATIVE PLANT SOCIETY

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On the Fringe

THE JOURNAL OF THE OHIO NATIVE PLANT SOCIETY

Vol. 8 **March/April** 1990 **No.** 12

PLEASE!! THOSE OF YOU WHO HAVE NOT SENT IN YOUR 1990 DUES, DO IT AT ONCE!!

We depend on your dues for our 1990 operating funds. It is expensive and time-consuming to have to call you individually to remind you about your dues. Sit down now, while you are reading this, and write out your check. And, please, renew at the highest category possible for you.

THE ANNUAL MEETING AND FIELD TRIP OF THE OHIO NATIVE PLANT SOCIETY WILL BE APRIL 21 and 22 AT HUESTON WOODS STATE PARK NEAR OXFORD

Reservations at the Lodge may be made by calling 1-800/282-7275. Be sure to tell them that you are with the Ohio Native Plant Society as they hold all the rooms. This has been a great weekend in the past. The field trips always produce unusual plants, some extremely rare. The programs are great and the followship worth the hourney. **Get your reservation in now!!**

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The Ohio Biological Survey has published **Vascular Flora of the Glaciated Allegheny Plateau** by Dr. Barbara Andreas. It is a New Series Bulletin Vol. 8, No. 1. The book is priced at $15. If you order it from the Ohio Biological Survey you must add $3 for shipping and handling and 5.75% for state sales tax. This will be an invaluable book for all of us living in northeastern Ohio.

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We are still short $1000 for our Royal Catchfly Fund. If just 100 of you would send an additional $10 we would make our goal. Give it a try.

PROGRAM:

March 9 (Friday) **Cincinnati Chapter Annual Meeting - 7:15 p.m.** Northern Hills Fellowship, Fleming Road. Dinner, meeting and program "Habitats of Eastern Wood Warblers".

March 12 (Monday) **Athens Chapter - 7:30 p.m.** - Dr. Henri Seibert, from Ohio University will present "Belize Travelouge."

March 15 (Thursday) **Cleveland Chapter, 7:00 p.m.** - Holden Arboretum. Bill Owen from the Lake County Ohio Cooperative Extension Service will present a program on Ethnobotany which is the study of plant uses, especially the uses of native and naturalized plants by native Americans. Meet in the Corning Building.

March 19 (Monday) **Columbus Chapter - 7:30 p.m.** - Sharon Woods Metro Park. Club member Jim Davidson will present a program on mosses and lichens for us this month.

March 19 (Monday) **Dayton Chapter - 7:30 p.m.** - Cox Arboretum. Slide show of members' favorite slides.

March 24 (Saturday) **Wilderness Center** - All day trip to Columbus area to see the Snow Trillium. Call for information.

March 24 (Saturday) **Dayton Chapter - 10:00 a.m.** - Tour Taylorsville Reserve with Paul Knoop. Meet at the pump in the east parking lot.

March 28 (Wednesday) **Mohican Chapter - 6:30 p.m.** - Hike the Pine Run Valley led by Jamie Little.

March 31 (Saturday) **Athens Chapter - 8:30 a.m.** - Field trip to Lake Katherine State Native Preserve lead by Finley Bryan. Meet at Peden Stadium to car pool (bring lunch).

March 31 (Saturday) **Little Beaver Creek - 10:00 a.m.** - Field trip through Purgatory Hollow. Meet in Frederickstown at Old Schoolhouse - wear your boots!

April 7 (Saturday) **Cincinnati Chapter** - Field trip to Clifty Falls, Indiana. Call for information.

April 9 (Monday) **Athens Chapter - 7:30 p.m.** - Paul Bowles, Dawes Arboretum will talk about Backyard Landscaping for Wildlife.

April 12 (Thursday) **Cleveland Chapter - 7:00 p.m.** - Furnace Run Metro Park. In conjunction with Summit County Park District there will be an information gathering to discuss changes in the flora/natural history of Summit County within the 20th centuery. On hand will be Bert Szabo, Walt Starcher, Joe Jesensky, Alex Karlo, and Art Kuhlman. The program will be held at Brushwood Shelter in Furnace Run Metro Park on Townsend Road west of I-77 midway between the Ohio Turnpike and Rt. 21 in Richfield Township.

April 14 (Saturday) **Athens Chapter - 8:30 a.m.** - Field trip to Marie J. Desonier State Nature Preserve lead by Gayle Muenchow. Meet at Peden Stadium to car pool (or meet in preserve's lot at 9:15 a.m.)

April 16 (Monday) **Columbus Chapter - 7:30 p.m.** - Sharon Woods Metro Park. Club member and current president John Watt will show his slides on Ohio's rare plants.

April 20 & 21 (Friday & Saturday) **Ohio Native Plant Annual Meeting** held at Hueston Woods State Park in College Corner, Ohio. See page for details and reservation information.

April 21 (Saturday) **Little Beaver Creek - 10:00 a.m.** - Early wildflower field trip through Rough Run. Meet at Sprucevale. Note: Stream survey to follow hike - 3 Negley sites.

April 28 (Saturday) **Wilderness Center - 2:00-4:00 p.m.** - Field trip to Clinton Hobbs' House, 952 Ravenna Road, Kent, located on Ravenna Road between Hudson Road and Ferguson Road. Clinton Hobbs has an excellent wild plant collection.

April 28 (Saturday) **Little Beaver Creek - 8:30 a.m.** - Early wildflower field trip to Grimms Bridge Area. Meet at Hogue's Restaurant. Note: stream survey to follow hike.

April 29 (Sunday) **Cincinnati Chapter** - Field trip to Miami Whitewater Forest Shawnee Lookout. Call for information.

April 29 (Sunday) **Mohican Chapter - 2:00 p.m.** - Trip to the Sandusky Scenic River area and maybe Springville Marsh led by Glenna Sheaffer.

CHAPTER CONTACTS

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GARLIC MUSTARD - ALERT!!

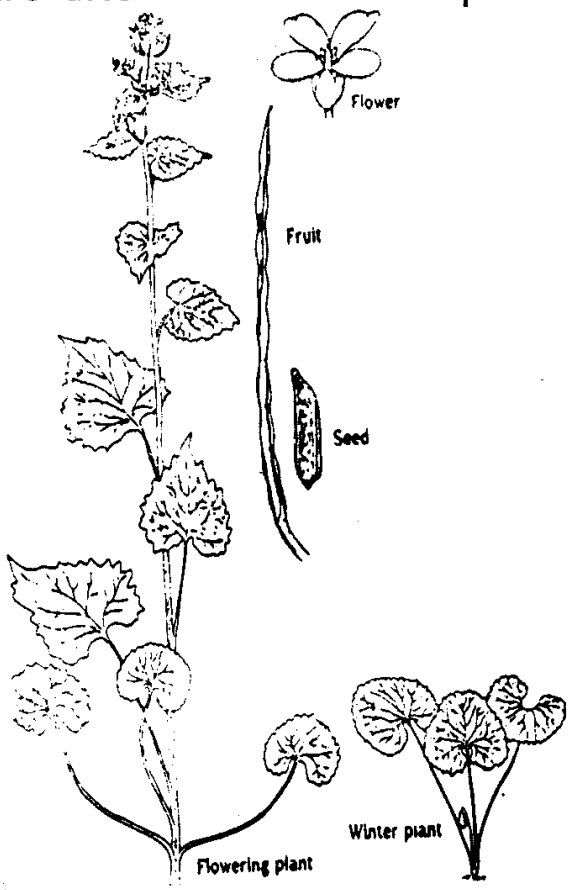
What is Garlic Mustard?

Garlic Mustard (**Alliaria petiolata,** formerly **A. officinalis**) is a rapidly spreading weed of forests that is displacing our native woodland wildflowers. It is an exotic species introduced from Europe by early gardeners for its supposed medicinal properties. Unlike most weeds which invade disturbed habitats, garlic mustard readily spreads into high quality old growth forests. It is very aggressive and completely dominates the forest floor, replacing the native wildflowers. This noxious pest is a major threat to the survival of woodland herbaceous flora and the wildlife dependent upon it. It is spreading rapidly because it is a biennial, producing abundant seed only two years after sprouting from seed. The seeds seem to be spread on the fur of larger animals such as deer, by flowing water and by human activities.

Identifying Garlic Mustard

The most unique identifying characteristic of garlic mustard is the strong odor of onion or garlic that its leaves and stems give off when crushed.

Flowering (second year) plants are about 1 to 2 feet tall when in bloom from May through early July. Fruiting plants in late July through August reach 2 to 3.5 feet in height. The numerous white flowers have four separate petals, occur in clusters at the top of the stem and are about 1/4 inch across. Fruits are slender capsules 1 to 2.5 inches long that produce a single row of oblong, black seeds with ridged seed coats. Stem leaves are alternate on stalks up to 1 inch long, triangular in shape, have large teeth and can be 2 to 3 inches across in fruiting plants.



First year plants are sterile and consist of a cluster of 3 or 4 rounded to kidney-shaped leaves rising 2 to 4 inches high from a root crown near the soil surface. These plants are present throughout the summer and remain green the following winter. See the illustration for additional aid in identification.

Searching for Garlic Mustard

Garlic mustard tends to grow in dense stands or beds. The green winter plants make it possible to check for the presence of this pest in your woods all year long. It generally needs at least some shade and is not a severe

pest in sunny, hot habitats. It invades forests first along streams, edges of woods and along trails; so be sure to check these areas. Often infestations will be of a single "generation" with almost no mixing of first year and flowering plants. Apparently seeds lie dormant for one growing season before germinating, so it is possible to have a rather severe infestation in the seed stage with few plants visible in a given year.

Controlling Garlic Mustard

Minor infestations can be eradicated by hand pulling at or before the onset of flowering or by cutting it at or within a few inches of the soil surface just as flowering begins. If flowering has progressed so that viable seed may exist in the cut or pulled plants, remove them from the area.

For larger infestations, fall or early spring burning is effective. The evergreen first year plants are killed by fire; however dense stands of these green plants will not burn without additional fuel. Dense populations may best be burned in fall when new leaf fall provides adequate fuel. Springs burns should be early to minimize possible injury to surviving spring wildflowers. Severe infestations will require several years of burning and should be followed by hand pulling or cutting of remnant populations.

Application of 2% Roundup herbicide (a formulation of Glyphosate) to the foliage of individual plants and dense clones is effective in Fall and Spring. At this time, most native plants are dormant but garlic mustard is green and vulnerable. Be sure to avoid native species with green leaves and remember that by law herbicides must be applied per label instructions.

Acknowledgements

Much of the information on control of garlic mustard in this alert is based upon research by Victoria Nuzzo of Rockford and management experience of the Illinois Field Office of The Nature Conservancy and the Dept. of Conservation's Natural Heritage Division. Dr. Robert H. Mohlenbrock and the Southern Illinois University Press kindly allowed use of illustrations from their "Illustrated Flora of Illinois."

This article was prepared by John Schwegman.

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HERE IS ONE SKUNK'S PATH YOU'LL <u>WANT</u> TO CROSS!
(or)
EARLIEST BLOOMING WILDFLOWER STINKS! by Gina Jelinas

Symplocarpus foetidus "Skunk Cabbage"
Family Araceae "Arum Family"

It seems unfortunate that our earliest Spring flower (for such it undoubtedly is) should possess so unpleasant an odor as to win for itself the unpoetic title of 'Skunk Cabbage." It is also unfortunate in that this has kept many people from discovering that skunk cabbage is also one

of our more interesting Spring wildflowers. In February, when other flowers lie dormant under the snow, skunk cabbage, which has already poked its closed spathe above the ground the previous Fall, begins to actually produce its own heat! Enought, in fact, to melt the snow around itself; the temperature inside the spathe being around 70°. This is accomplished by the flower buds beginning to enlarge and the respiration, or release of energy, by the plant. This is when the spathe starts to open to admit early insect pollinators who are attracted by the odor of the volatile chemicals which have been released by the heat.

Bees and flys are among the first visitors. In fact skunk cabbage is an important first source of pollen for hives of wild bees, who might starve otherwise. These early pollinators may linger inside the spathe taking advantage of the warmth. It has also been suggested that yellow-throat warblers may also make use of the plant's warmth by building their nests inside the spathe.

The flowers, which are situated upon the spadix (enclosed by the spathe) bloom from February to May. Each flower has both male and female parts. They bloom from the top of the spadix down, the female parts maturing first, so that while the flowers on the bottom are still female, the top flowers have become male.

The spathe is about 2-6 inches tall and mottled yellow-green, purple and brown in color. The tissue of the spathe has many air pockets, which may serve as insulation to keep the heat in.

The spadix is ovoid (egg shaped), approximately an inch across and an inch and a quarter high. After the flowers have been blooming for several weeks the leaves start to unroll from their bud, growing to be 2-4 feet long and 1-2 feet across.

Another interesting feature of skunk cabbage is its root system. Since the roots are difficult to dig, it is best to find a plant growing near a small stream where the moving water may have exposed them. The roots appear segmented, reportedly looking..."a lot like large earthworms." The ring-like ridges around the roots are evidence "...to the fact that after the roots grow in late spring, they contract slightly, pulling the plant down into the earth a fraction of an inch each year. In this way the leaves and buds always stay low to the ground."

If descriptiveness is important in a

name, then skunk cabbage certainly is an appropriate common name. When injured the plant gives off an odor very similar to a skunk's scent. The leaves bear a resemblance to cabbage. The generic name, **Symplocarpus** is made of two words from the Greek, "symploce" meaning connection, and "carpos" fruit. The specific name, **foetidus**, is a Latin form of fetid (stinking). **S. foetidus**, which grows in swampy areas throughout N. Eastern U.S. (and Southern Canada) has not been entirely without use. American Indians at one time ate the leaves, boiled in several changes of water, like spinach and "...inhaled the odor of the crushed leaves to cure headache which may be a classic case of a cure worse than the disease..." The thoroughly dried leaves can be added to soups and stews and the dried rootstock made into flour. The thorough drying removes the burning effects of skunk cabbage's calcium oxalate crystals. These crystals and the smell may help keep away most predators. Only slugs, and possibly bears have been observed eating the plant. Pheasants and grouse occasionally eat the seeds.

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Gina is a member of the new Mohican Chapter in Mansfield and a student at Ohio State University, Mansfield.

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Dr. Barbara Andreas will be giving her popular Field Botany course from April 2nd to mid-June at Cuyahoga Community College East. It is on Monday and Wednesday from 12 noon to 3:00 p.m. It is open to all on a first-come basis. Registration may be made by calling Tri-C East. Those over 60 can attend free. What a great opportunity to learn more about basic plant identification!

In the March 1989 issue of The Journal Dr. Barbara Andreas wrote the first part of her "Peatland" article, **The Bog.** Herewith is the second part, **"The Fen."** The illustration in the center of the article is by Larry Giblock. **The Bog** article has been reprinted in other publications in the U.S. since its appearance here and will come out in expanded form in Ohio Journal of Science later this year. We are honored to publish this material from so highly a regarded scientist.

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OHIO WETLANDS: The Peatlands. Part II-Fens by Barbara K. Andreas

As mentioned in the first article on Ohio Wetlands (Andreas, 1989a), the type of plant community and plant diversity occurring in wetlands is determined by water factors such as depth, chemistry of the water and surrounding substrate, source of water entering the wetland, and the impact of run-off. Peatlands are a type of wetland that develop where the substrate is composed of partially decayed organic matter of plant origin. The slow and incomplete decay of the plant material is a result of a saturated substrate. Peatlands are commonly divided into bogs and fens. The first article featured kettle-hole bogs, those peatlands with a substrate composed of partially decomposed mosses and a water with a range of pH 3.5-5.5. The purpose of this article is to discuss Ohio fens.

According to Stuckey and Denny (1981), the British term "fen" was first applied to United States plant communities in the 1940s. Often a misunderstood community, fens have carried a variety of common names including bogs, swamps, sedge meadows, alkaline bogs, prairie fens, bog fens, wet prairies, shrubby cinquefoil bogs, shrub carrs, tamarack fens, and cedar bogs, to mention a few. Part of this confusion comes from the fact that a few really unusual plants, like pitcher plants, sundews, cranberries and tamarack, are found in both types of peatlands. Another reason for the confusion is that most Ohio fens are small and blend into other types of wetland communities. In casual conversation, no distinction is made as to which part of the natural area is being addressed.

In a broad sense, fens are characterized by having 1) relatively clear water coming from artesian sources that surface as springs or seeps, 2) a wet, springy calcareous substrate which supports mineral-loving species of bryophytes and some species of **Sphagnum**, but these bryophytes do not accumulate to form a continuous mat; 3) vegetation dominated by members of the sedge, sunflower and grass families; and 4) water pH between 5.5 and 8.0 (Andreas, 1989b).

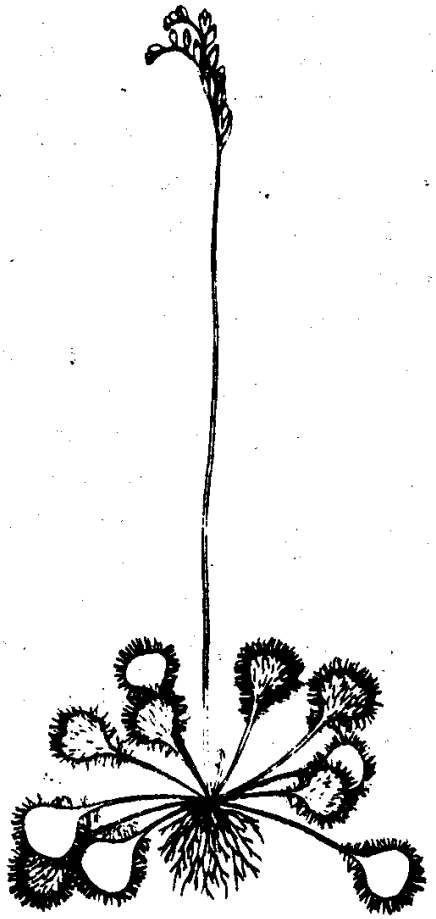
The occurrence of fens in Ohio is somewhat predictable. With the exception of a few fens on outwash deposits in Fairfield County, fens occur within the area glaciated by Wisconsinan advances. They are associated with kame and esker complexes, or on lacustrine (glacial lake

derived) soils. The vast majority of Ohio fens develop on buried river valleys (Andreas, 1985). This is especially true of the western Ohio fens. In addition, fens develop in the headwaters of drainage systems. Johnson (1986) states that most fens in northeastern United States occur when water is at the surface, discharging or moving downhill. This downhill flow may or may not be evident.

Water Chemistry of Fens

Based on pH, conductivity, and calcium and magnesium ion concentrations, there exists a continuum within peatlands that allow these communities to be divided based on water chemistry characteristics (Table 1). In bogs, or ombrotrophic peatlands, nutrients and water are brought into the system primarily through rain, and values for the above parameters are low. In weakly, moderately and strongly minerotrophic peatlands, nutrients and water enter the system primarily through ground water and run-off, and the values for the above parameters are at the high end of the continuum (Table 1). The variety of plant species found in the peatland is directly related to its water chemistry parameters: low values, few species; higher values, more species. In addition, in some communities the build up of organic material can raise plant roots above the water source, and a nutrient poor condition can arise on a hummock growing in a nutrient rich community. All fens studied to date in western Ohio have been strongly minerotrophic fens. Most eastern Ohio fens, with exceptions in Ashtabula, Portage, Stark and Summit counties, are weakly minerotrophic peatlands.

In fens, specific conductance is high. Specific conductance is a numerical expression of the ability of water to conduct an electric current. Conductivity provides information of the degree of mineralization of water in each area. Although numerous ions could be measured in peatlands, the two most consistently measured are the metallic cations calcium and magnesium. Weakly minerotrophic fens have low values for these two ions, whereas strongly minerotrophic ions have high values. In fact, Ohio fens have some of the highest (Table 2).



Water arising from springs and seeps in fens is cool, generally around 12°C. Once exposed to surface temperatures, minerals may precipitate out and form a whitish-gray deposit

called marl. Shell fragments are often common in marl deposits. Weakly minerotrophic fens are usually not actively forming marl, whereas strongly minerotrophic fens usually have open marl flats. As the water flows across the surface of the wetland it warms up as the season warms. During summer months, pools within the wetlands can reach temperatures of 27°C (Bryan and Andreas, 1988).

Table 2 provides a comparison of water chemistry values for selected Ohio fens. Also included in the table are values taken from peatland literature for plant communities considered fens in other states. These figures support the idea that the term fen is broadly used to describe at least three different types of minerotrophic peatlands.

Plant Succession in Fens

Most articles that discuss fen succession begin by assuming that all fens have started out as marl flats. These marl flats are the most open areas within the community and are associated with moving water. Indeed, the degree of openess is directly related to the volume of water emerging from seeps and springs. The first plants to colonize these marl flats are **Rhynchospora capillacea** (slender beak rush), **Triglochin palustre** (marsh arrow-grass), **Tofieldia glutinosa** (false asphrodel), and sedges (such as **Carex sterilis** (fen sedge) and **Carex cryptolepic** (little yellow sedge). It is generally believed that these marl flats are kept open because they are "chemically extreme" and have a high concentration of minerals. However, in studying western Ohio fens, Bryan and Andreas (1988) noted little change in the concentration of ions in the substrate of these areas versus areas where a vegetation cover has formed.

As organic matter from the decomposed vegetation begins to accumulate, a few bryophytes, such as those belonging to the genera **Campylium** and **Drepanocladus**, colonize. In fact, **Drepanocladus** can be found on bare marl. Growing in the organic build-up are additional sedges and species including **Lobelia kalmii** (Kalm's lobelia), **Parnassia glauca** (Glass-of-Parnassus), **Solidago uliginosa** (marsh goldenrod), and **Drosera rotundifolia** (found-leaf sundew). As more organic matter accumulates, **Carex stricta** (hummock sedge) can become the dominant sedge, forming an extensive sedge meadow. Additional herbaceous plants found in this region are **Eupatorium maculatum** (mottled joe-pye weed), **Sanguisorba canadensis** (Canada burnet), **Eleocharis rostellata** (beaked spike rush), **Solidago ohioensis** (Ohio goldenrod), and sedges, including **Carex tetanica** (slender millet sedge), **C. leptalea** (delicate sedge), **C. prairea** (prairie sedge), **C. suberecta** and **C. crawei** (Crawe's sedge). **Andropogon gerardii** (big bluestem), **A. scoparius** (little bluestem), **Sphenopholis intermedia** (wedge grass), **Muhlenbergia glomerata** and **Sorghastrum nutans** (Indian grass) are frequently interspersed with the sedges (especially in strongly minerotrophic fens).

Shrubs eventually become established. Common to almost every Ohio fen is **Potentilla fruticosa** (shrubby cinquefoil) and **Rhamnus alnifolia** (alder-leaved buckthorn). Willows, such as **Salix discolor** (pussy willow), **S. sericea** (silky willow), **S. candida** (hoary willow) and **S. serissima** (autumn willow) are components of shrubby zones in fens. Two fen shrubs, **Alnus serrulata** (common alder) and **Myrica pensylvanica** (bayberry), are nitrogen fixers. Frequently **Sphagnum** hummocks form around the bases of shrubs. **Vaccinium macrocarpon** and other more typically "bog" plants are associated with these hummocks. **Rhamnus frangula** (European buckthorn) is quickly invading Ohio fens. Both ODNR and The Nature Conservancy have active eradication programs to keep this aggressive nonnative taxon from overtaking native vegetation.

As organic matter builds up, more and more of the fen surface becomes shrub dominated. Native shrubs, including shrubby cinquefoil, willows, and dogwoods, particularly **Cornus amomum** (silky dogwood) and **C. stolonifera** (red osier), are removed from several protected Ohio fens in order to maintain an earlier stage of development.

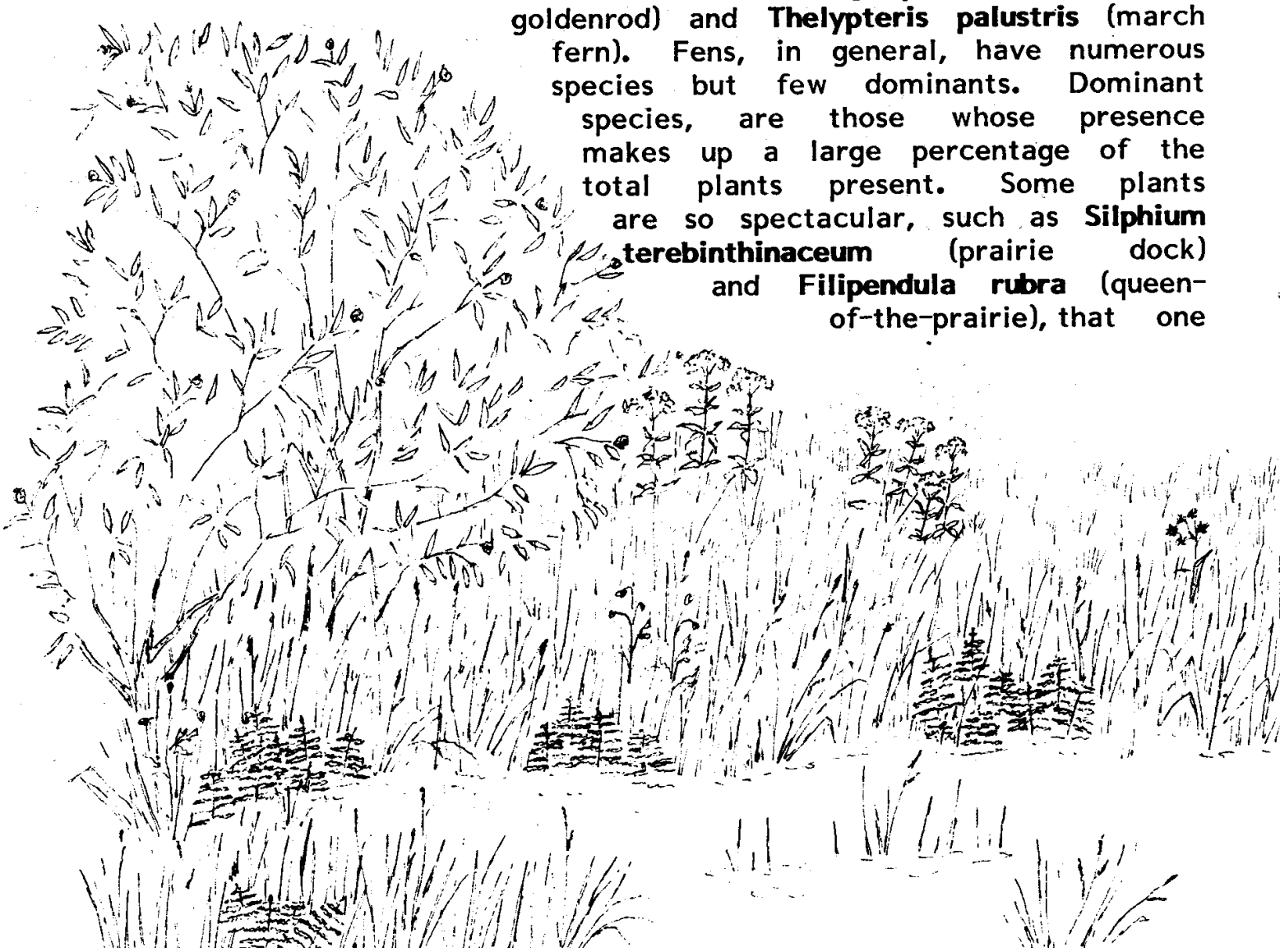
Some fens, such as Mud Lake Bog in Williams County, Herrick Fen in Portage County, and unnamed area in Geauga County, develop into treed fens, where the dominant tree is tamarack (**Larix laricina**). (Cedar Bog is a variation of a treed fen where **Arbor vitae** (white cedar) is dominant). Under the shade of these trees a different type of understory develops, comprised of plants more frequently associated with bogs.

As mentioned earlier, not all fens start out as a marl flat. Some fens develop along the open margin of a lake where sedges become dominant and more and more "fen" species move into the peat sedge. I believe that many weakly minerotrophic fens in northeastern Ohio have developed in sedge peat originally formed from a sedge meadow community dominated by **Carex stricta.** There are few references in the literature discussing the origin of fen communities.

Fens are among the most diverse plant communities in Ohio. Knoop and Andreas (1987) found more than 30 species of vascular plants within a meter square frame while studying Springfield Fen, Clark County. Plant lists showing the large number of species found in a particular fen are available in Stuckey and Denny (1981) and Andreas (1980).

Stuckey and Denny (1981) separated Ohio fens into two categories: bog and prairie fens. Their concept is a good one when looking at plants that are more or less confined to one part of Ohio. For instance, western Ohio fens (prairie fens) typically include **Filipendula rubra** (Queen-of-the-prairie), **Scleria verticillata** (whorled nut-grass), **Eleocharis elliptica** (yellow seeded spike-rush), **Salix myricoides** (blueleaf willow) and **Carex suberecta.** Primarily limited to eastern Ohio fens (bog fens)are **Alnus rugosa** (speckled alder), **Aronia prunifolia** (= **Pyrus melanocarpa**) (black chokeberry), **Ribes hirtellum** (smooth gooseberry), **Eriophorum viridi-carinatum** (green cotton-grass), **Geum rivale** (water avens), **Salix candida** (hoary willow), and **Salix serissima** (autumn willow).

However, in a quantitative study of several Ohio fens, Jeff Knoop and I found that the truly dominant species, based on percentage cover and frequency are common to both: **Aster puniceum** (fen aster), **Cirsium muticum** (swamp thistle), **Carex stricta** (hummock sedge), **C. prairea** (prairie sedge), **C. leptalea** (delicate sedge), **Senecio aureus** (golden ragwort), **Rhynchospora capillacea** (slender beak rush), **Pycnanthemum virginianum** (mountain-mint), **Sanguisorba canadensis** (Canada burnet), **Solidago patula** (rough-leaved goldenrod) and **Thelypteris palustris** (march fern). Fens, in general, have numerous species but few dominants. Dominant species, are those whose presence makes up a large percentage of the total plants present. Some plants are so spectacular, such as **Silphium terebinthinaceum** (prairie dock) and **Filipendula rubra** (queen-of-the-prairie), that one

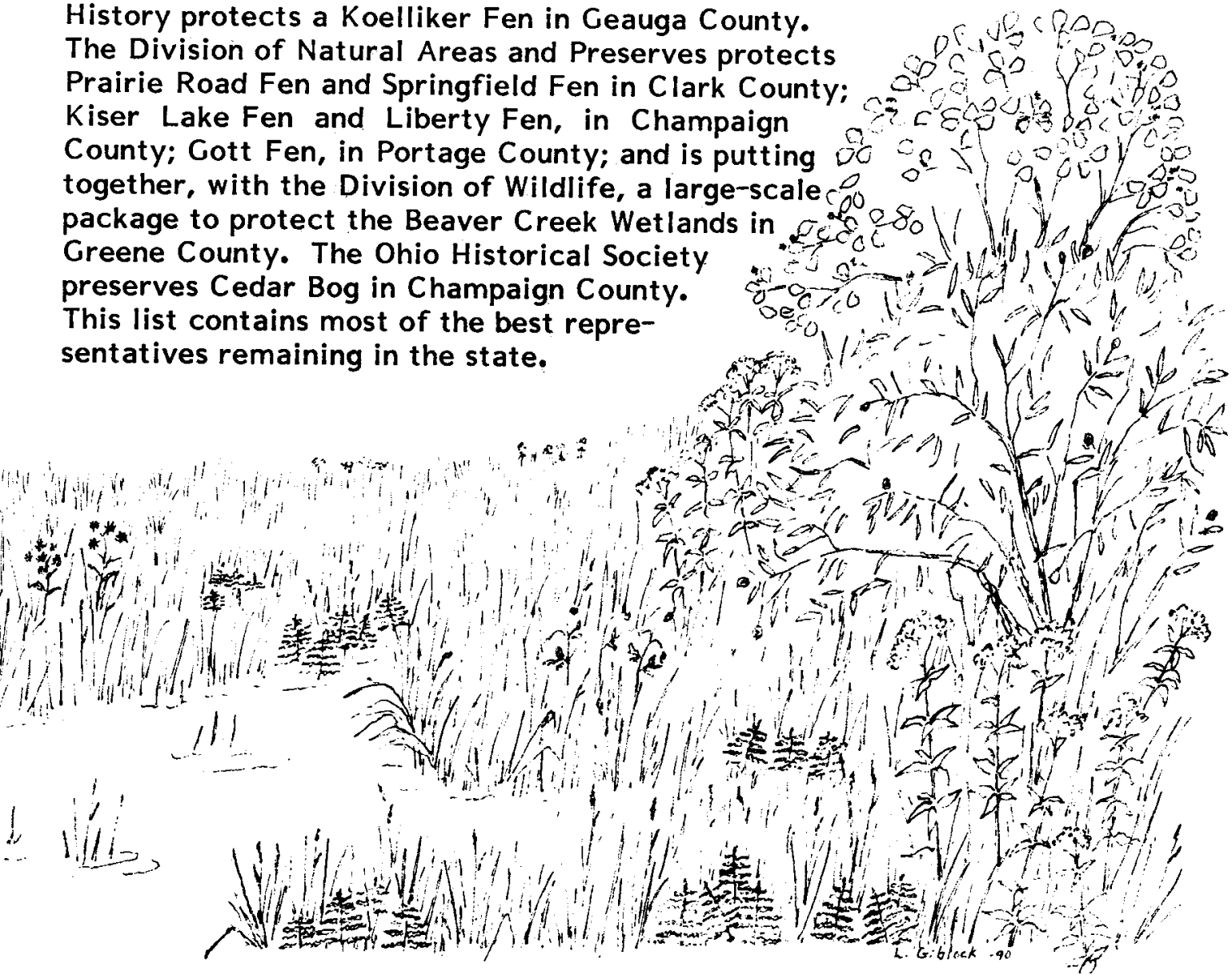


mistakes their boldness for dominance. In terms of plant composition, the difference among Ohio fens is in the floristic composition between weakly minerotrophic fens and strongly minerotrophic fens. And, as pH and conductivity rise, so do species richness (Table 1).

Protection of Fens

Some of the most unusual Ohio fens have disappeared. Dachnowski (1912) describes a rich fen community called Canton Bog, which occurred in practically the present-day downtown Canton. **Valeriana uliginosa** (swamp valerian), presumed extirpated from Ohio, grew there. Myers Lake (Stark County) had an extensive treed fen community that included **Andromeda glaucophylla** (bog rosemary), now presumed extirpated from Ohio. Way Swamp (Portage County) had **Ledum groenlandicum** (Labrador-tea), currently known from only one station in Ohio. Stuckey and Denny (1981) state that approximately one-fourth of Ohio's fens documented from Ohio, either in the literature or on herbarium specimens, have disappeared, or are so badly degraded that there is little chance for survival.

In spite of these bleak statistics, fens are one of the best protected plant community in Ohio. The Cleveland Museum of Natural History protects a Koelliker Fen in Geauga County. The Division of Natural Areas and Preserves protects Prairie Road Fen and Springfield Fen in Clark County; Kiser Lake Fen and Liberty Fen, in Champaign County; Gott Fen, in Portage County; and is putting together, with the Division of Wildlife, a large-scale package to protect the Beaver Creek Wetlands in Greene County. The Ohio Historical Society preserves Cedar Bog in Champaign County. This list contains most of the best representatives remaining in the state.



In conclusion, even though we have a great deal more knowledge about the flora of fens today than was available to the early naturalists, it is still easy to confuse fens with other types of plant communities. The concept of a fen, in northeastern Ohio, is unclear when looking only at the floristic make up of the community. Water chemistry is a very good way of separating the different types of minerotrophic peatlands. It also helps to remember that plant communities do not have abrupt boundaries but instead often merge gradually into one another.

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Table 1. Classification of peatlands based on ranges in wahter chemistry characteristics (Adapted from Bryant Andreas, 1986, 1988).

	pH	Conductivity umhos/cm	Ca mg/1	Mg ml/1	Water Movement	Species Richness
ombrotrophic	3.2-3.8	12-27	0.6-2.1	0-0.2	slow (blockage)	101 (<50)
semi-ombrotrophic	3.7-4.2	20-50	1.5-3.5	0.2-1.0	slow (blockage)	low (<50)
weakly minerotrophic	4.0-6.0	25-75	3.5-12	1.0-1.5	slow	moderate (<100)
moderately minerotrophic	5.8-7.0	70-120	10.0-30	1.1-2.8	flowing	high (>100)
strongly minerotrophic	7.0-8.0	>120	>30	>2.8	flowing	high (>100)

* * * * * * * *

Table 2. A comparison of water chemistry values from fens of OH, MN, WI, and Canada.

Location	pH	Conductivity umhos/cm @ 25°C	Calcium mg/1	Magnesium mg/1
MN[1]	5.0-6.6	31- 67	4.0-10.0	
WI[1]	6.4-7.0	380-650		
MI[1]	5.7-7.0	83-379	11.0-75.0	10.5
Jackson Fen, Stark C., OH[2]	7.4-7.8	747± 89	87±45	51±2
Herrick Fen, Portage Co., OH[2]	7.1-7.7	446± 15	36± 8	52±2
Average of 5 western Ohio fens[3]	7.2-7.8	630-735	42-64	30-36
Mud Lake Fen, Williams Co., OH[5]	6.97	429	88	20
Cedar Bog, Champaign Co, OH[5]	7.3-8.4	422-750	100	40
New York[6]	7.5-7.6	265-318		
Alberta, Canada[7]	6.8-7.9	140-456	18-37	4-18

[1]Schwintzer and Tomberlin, 1982 (@ 20°C)
[2]Bryand and Andreas, 1986
[3]Bryan and Andreas, 1988
[4]Broberg, 1976
[5]Environmental Contrrol Corp., 1973
[6]Seischab, 1984
[7]Slack, Vitt and Horton, 1980

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AMERICAN HOLLY by Jean Andrews

American Holly is an evergreen large bush or tree that can grow up to 50 feet tall. It has thick leathery oblong to ovate leaves, two to four inches long, with stout spines along the margin and at the tip. There are distinct male and female trees. After flowering the female trees bear small red fruits which remain long on the tree.

There are numerous cultivars of holly, many of which may be identified by their unusual names. One example is **Ilex x** 'farage' which was named forty years ago by a grower who developed this outstanding holly on the "far" side of his "garage." **Ilex x** 'Hoosier Waif' was developed and named by holly expert Dr. Richard Rypma of Athens, who found it growing in Indiana, far from its usual distribution.

Holly is associated with the December holiday season. Bringing holly branches indoors is an ancient tradition, practiced centuries ago in temples during midwinter festivals. Holly was and still is symbolic of immortality, or the continuity of life.

There have been numerous medicinal uses described for holly. In the last century, fresh bark and fruits were gathered before the first frost, chopped up into a fine pulp, mixed with alcohol, stored for eight days in a dark place, and then filtered. This decoction was used as a laxative or for treating worms, coughs, pleurisy, fever, gout, rheumatism, or tumors. Root bark decoctions have also been used to treat colds, coughs and tuberculosis. A related species, the Yerba Mate' (**Ilex paraguariensis** St. Hil.) of Brazil, Peru and Argentina has caffeine in the berries. Poisoning may occur from eating holly berries, causing vomiting, diarrhea or stupor when eaten in quantity, especially by small children.

According to E. Lucy Braun, American Holly is a southern species, ranging north in the interior to northern Kentucky (Lewis Co.) and southern Missouri, and in the east near the coast to New Jersey and eastern Massachusetts. American Holly is found in moist woodlands and occurs naturally in only a few counties in Ohio: Fairfield, Washington, Lawrence and Scioto. These Ohio locations represent natural extensions of the more continuous range not far to the south.

* * * * * * * *

In a January 6, 1990 letter, James L. Hodgins, Editor of the glossy magazine Wildflower, published by the Canadian Wildflower Society, says: "You certainly can be proud in producing one of the continent's better botanical journals." This Journal belongs to all of you: Support it with your dues!!

* * * * * * * *

July 30 to August 16, 1990, the Glen Helen Association in Yellow Springs, Ohio will be leading a Kenya Safari. Ralph Ramey, noted Ohio conservationist and director of Glen Helen, will be the leader. This will be his fourth trip to Africa. If you've never had the wonderful experience of an African Safari, this is the time to go. Contact Ramey at Glen Helen, 405 Corry St., Yellow Springs, Ohio 45387.

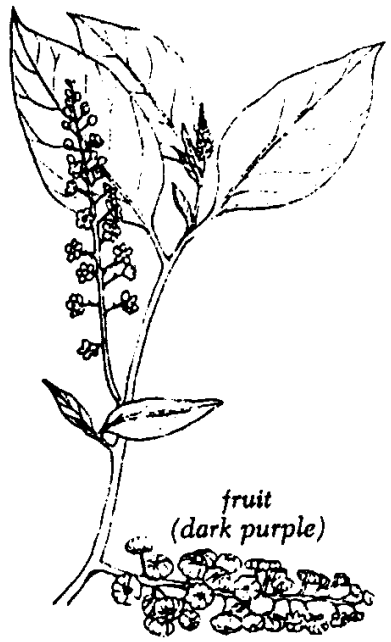
POKEWEED by Jean Andrews

Pokeweed (**Phytolacca americana**) goes by a variety of names including pokeroot, pokeberry, American nightshade, crowberry, inkberry, scoke, garget, and pigeonberry. It is a weedy perennial herb with an unpleasant odor, with shoots rising up to nine feet and thick poisonous roots. The berries are produced in long racemes, appearing in the autumn and lasting well into the winter. They are about one centimeter thick, juicy and their dark red to black color contrasts sharply with the bright red or green of the fruiting stalks and stems. Berries are a food source for birds in the late fall, which eat them and disseminate their seeds. They are apparently attracted by the red and black color contrast, which may signal ripeness or quality of the fruit.

Pokeweed has been used in a variety of ways. The genus Phytolacca comes from the Greek word phyton meaning "plant" and lacca. The latter is the Latinized form of the Hindi word lakh, meaning "crimson-lake" and refers to the dye or staining qualities of the fruit.

Native Americans used the powdered roots in a poultice to treat cancer. They also applied the roots to the palms and soles of the person with fever. Early settlers used the juice of the berries to treat skin eruptions and cancerous skin ulcers. The young green leaves and stems are frequently boiled and used as greens or canned for future use.

Nevertheless, this is one of the most dangerous poisonous plants in the United States because people eat the leaves without proper or complete boiling or accidently pull up the roots with the leaves. The poison is most concentrated in the roots with lesser concentrations in the leaves, stems and fruits. It causes stomach cramps, pain, nausea, diarrhea, severe convulsions and death. Infants and young children can be fatally poisoned by eating just a few berries.



Pokeweed occurs commonly in Ohio and the Appalachian region. It is native to southern Canada and throughout the eastern United States, where it grows in old fields, roadsides, disturbed areas, waste places and strip mine spoils.

This article is a reprint from the Athens Chapter NPS News, November 1989.

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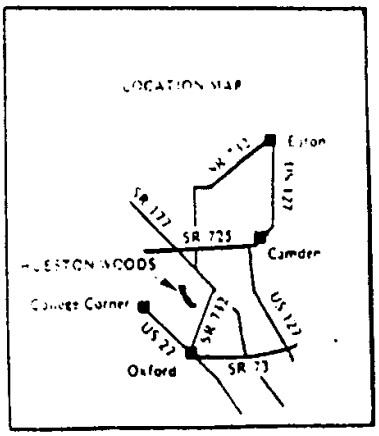

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THE CLIMATE IS RIGHT by Gerald T. Donnelly

Collections-oriented botanical gardens and arboreta in North America are entering into a period of critical self-analysis. Collecting, collections management and standards, and inter-institutional cooperation are being examined in a climate of assessment and interaction like no other in the history of these institutions. Strategies for the coordinated and sensible development of botanical and horticultural collections are evolving for the benefit of the entire garden/museum community.

Botanical gardens and arboreta create and develop their collections through a variety of means. Plants or plant parts may be collected directly from local habitats or through plant exploration of more distant lands. Plants also may be propagated from seed or other plant parts obtained by exchange with other botanical institutions. And plants may be purchased.

Living plant collections, naturally, are different from other types of museum collections. They are self-dynamic. Plants grow in size, often spreading to areas not intended for them. Plants also grow in number through self-propagation. This reproductive capacity transforms otherwise sedentary plants into mobile creatures that colonize new and unpredictable locations. As living organisms, plants also die. This dynamism makes collections management, and record keeping in particular, difficult as well as confusing.

Outdoor settings for botanical gardens suggest unlimited space for the accumulation of collections, but this is a false perception. Site limits, maintenance, access, availability of water, security, and funding factors combine to restrict the overall scope of the collections. Gardens practice an open storage, as many other kinds of museums do. Plants require regular care and often are not movable.

Because of these factors, well-defined collecting criteria and collections policies are essential. Yet few botanical gardens have comprehensive collections policies that can guide collecting and the development and management of their collections. In the early 1980s, an estimated 35 percent of botanical gardens and arboreta in the American Association of Botanical Gardens and Arboreta had anything resembling a collections policy. The association has established as one of its fundamental objectives to encourage and assist gardens in the development of professional collections management standards and practices, including effective collections policies. New guidelines have been developed and will be available soon for distribution to botanical gardens that want to develop or improve their collections policies. With these new initiatives, more botanical gardens will be able to develop plant collections policies to guide future collecting.

Guidelines for Collecting

One important criterion for collecting is the priority for known,

documented, original sources of accessions. For most plants, this means plants or seeds collected from wild populations. For horticultural varieties of plants, the original source would be the company, individual, or institution that selected and described that variety. Many botanical gardens and arboreta obtain plants or seeds from the collections of other botanical gardens. Because of the nature and complications of plant culture and record keeping, and through human error, many plants are inaccurately identified and named. These inaccuracies are compounded as recipient gardens exchange with others. Added to this is the possibility (and likelihood, in some cases) of hybridization among related species of plants not normally within breeding range except in botanical gardens. Open and uncontrolled natural pollination of garden plants renders much of the seed from garden collections of questionable value.

Seed collecting and exchange is one of the primary means of collecting. An international seed exchange program exists among botanical gardens and arboreta of the world and is surprisingly successful despite the lack of any global coordination across language barriers. Preference for seed collected from the wild is compelling more botanical gardens to collect and offer more seed of wild plants found in local and regional areas.

But exploration for plants in distant areas of the globe is practiced by botanical gardens to a much more limited extent today than in the past. This is not so much because most plants already have been discovered (far from it, in fact) but because plant exploration is a costly and complicated venture. The direction for exploration in the future will be for more defined target species and habitats and a greater degree of cooperation and cost sharing among institutions.

As a consequence of the goal to collect plants from known wild sources, and because of the relative availability of many native plants, botanical gardens may collect a considerable number of plants from the wild. Overcollecting, even by professional botanists, can result. Only recently have guidelines for conservation-minded plant collection by plant professionals been developed.

The Plant Conservation Roundtable, an informal but active group of individuals concerned about plant conservation, has developed conservation-oriented plant-collection guidelines for scientists and teachers. Guidelines for amateur collecting and plant collecting for the nursery trade are forthcoming. The Plant Conservation Committee of the American Association of Botanical Gardens and Arboreta also is developing guidelines that specifically address conservation practices.

Special sensitivity is required in the collection of rare, threatened, and endangered species. The impact of collecting on plant populations being sampled and on the habitats in which they must occur must be weighed

carefully. Collecting permits and coordination with appropriate authorities also are required of collectors of species that are legally protected. The Center for Plant Conservation, a network of botanical gardens and arboreta in the U.S., has been established to coordinate collections of rare, threatened, and endangered species. Network paraticipants not only serve as repositories for living collections but also provide propagated plants to others to minimize the need for individual collecting in the wild.

Going to the Source

Botanical gardens are leading the fight against irresponsible collecting of wild plants by some flower nurseries and plant collectors. With the growing interest in the use of wildflowers in home gardens and landscapes, the demand for these plants has increased rapidly. Wild populations cannot sustain collecting pressures for this kind of commercial enterprise.

Some of the plants that botanical gardens display are purchased. Many gardens now will buy only plants from nurseries that propagate their own plants of native species or of species likely to have been foraged from the wild, such as many cacti. Some plants, when offered by a nursery, act as flags that indicate illegitimate collection of wild plants. A good example is the beautiful, stemless lady's slipper **Cypripedium acaule**, for which no successful horticultural propagation methods are known.

Botanical gardens and arboreta also play a role in educating the public about appropriate sources of plants. Lists of nurseries that do not collect from the wild (nut propagate plants instead) are made available by many gardens. And the impact that casual collecting can have on the viability of natural plant populations—and the often fragile habitats in which they occur-are explained through garden-sponsored programs.

In a new development, the American Association of Botanical Gardens and Arboreta has begun planning for a system of coordinated collections across North America that would have an impact on collecting strategies during the next decade. A plant collections consortium has been proposed to serve as a network of gardens that hold significant, documented taxonomic collections.

The consortium would offer several benefits, one of which is the reduction of overlapping collections. Many gardens in similar climates grow the same plants; often, these are plants most likely to be available through exchagne with other institutions. As a consequence, a so-called "botanical gardens flora" has emerged, the components of which can be seen in many different gardens. This situation is probably more similar to zoological parks that to other kinds of museums, because more-typical museum holdings often consist of specialized collections of unique items.

Under the conceptual guidelines of the consortium plan, participating

gardens and arboreta would commit to maintaining a collection or collections of a specific taxonomic group. For example, an arboretum might agree to develop a comprehensive collection of maple trees. If institutional resources were limited, the collection could be restricted to just red maples and could include all known cultivated varieties and also significant genetic diversity within the species from throughout its range.

Botanical gardens would likely still exhibit many components of the botanical gardens flora to serve the purpose of its general collections, such as for educational programming. Participation in the plant collections consortium, however, would allow botanical gardens of all types and sizes to join a continentwide system.

In addition, gardens and arboreta are increasingly conservation oriented, as plant habitats continue to be destroyed around the world. Conservation efforts include preservation of threatened habitats, habitat reconstruction, creation of nature preserves, promotion of a conservation ethic for land management, and "plant rescues" from sites slated for development.

Guardians of Genetic Diversity

Collecting of endangered plants for **ex situ** conservation also is being practice to augment **in situ** efforts. Cooperating institutions in the Center for Plant Conservation network serve as guardians of genetic diversity for endangered species by collecting, maintaining, and propagating plants in the region they represent. These living "genetic banks" are thereby available for scientific research, for reintroduction (where appropriate), and to provide suitable stock for horticulture.

Unfortunately, a serious imbalance exists between the location of the world's botanical gardens and the plant species richness of the areas in which they occur. According to the International Union for the Conservation of Nature and Natural Resources, two-thirds of the world's flora are in the tropics and subtropics, but the majority of botanical gardens are concentrated in the north-temperate zone of the globe. An estimated 60,000 plant species are at risk of extinction in the next 40 years, or one-quarter of the world's total plant species diversity. Conservatory-based collections of tropical plants in temperate gardens provide only limited opportunity to conserve the tremendous plant diversity of threatened tropical habitats. The international union has urged the establishment of new botanical gardens in the tropics and subtropics to develop active plant collecting strategies.

During the next decade, botanical gardens and arboreta will organize and direct their collecting to create more significant plant collections for education, research, and conservation. These collections will be more accurate, better documented, and networked with one another. Collecting

will be done in a more ecologically compatible way that will not create further problems.

These directions will carry botanical gardens toward a greater role than they have played before. Their collections will grow from those of relatively local interest to those of national and global significance.

This article is reprinted from the September/October 1989, Museum News.

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WITCH HAZEL by Jean Andrews

Witch Hazel is often called Snapping Hazel and Winter Bloom indicating the peculiarities of this plant. In late autumn, after the leaves drop, last year's fruit pods "pop" their seeds for distances up to 20 feet! The pale yellow flowers appear from mid-September to mid-November and sometimes even after snow is on the ground. It is possible that the Witch Hazel was named by the first English settlers because its leaves looked like those of the witch hazel elm. Uses of Witch Hazel include an extract of the bark that has long been used for medicinal purposes. In 1785, the Reverend Manasseh Cutler wrote: "The Indians considered this tree as a valuable article in their materia medica...They applied the bark, which is sedative and discutient, to painful tumors and external inflammations. A cataplasm of the inner rind of the bark, is found to be very efficacious in removing painful inflammations of the eyes. The bark chewed in the mouth is, at first, somewhat bitter, very sensibly astringent, and then leaves a pungent, sweetish, taste, which will remain for a considerable time."

Witch Hazel branches have been made into "divining rods" in attempts to indicate the presence of underground water. The seeds, buds, or twigs are also food for pheasant, bobwhite, ruffed grouse, whitetail deer, cotton-tail rabbit, and beaver.

Local distribution of Witch Hazel is sporatic but widespread. Single shrubs or small trees are growing in moist woods in Sells Park, Fox Lake, Waterloo Wildlife Refuge, near the boat ramp at Burr Oak State Park, as well as on the old Athens Mental Health Center grounds. It also makes attractive landscape plants and can be found in front of Galbreath Chapel on the Ohio University campus.

Reprint is from Athens Chapter, 10-89.

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