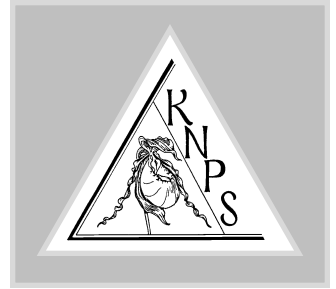


The Lady-Slipper

Kentucky Native Plant Society

Number 18:3

Early Fall 2003



2003 FALL MEETING / Kentucky Native Plant Society

Bernheim Arboretum and Research Forest • Saturday November 1, 2003

Meet at 10:00 am in the parking lot of the Arboretum Center (first building on the right after entering Bernheim)

WE WILL spend the morning and part of the afternoon seeing and experiencing many of Bernheim's completed or ongoing natural area development sites. These may include:

- *the new Cypress-Tupelo Swamp*
- *the soon-to-be Bluegrass Savanna*
- *the Native Plant Nursery*
- *Native Prairie Grasses in the Big Meadow*
- *Stream Restoration project*

FROM LOUISVILLE, take I-65 south to exit 112 (Clermont/Bardstown). Go east on route 245 about a mile to Bernheim's entrance. NOTE: On weekends, there is a \$5 per vehicle charge for those who are not members at Bernheim.

PLEASE BRING your own lunch. We will break for lunch at the Pines Picnic Area at noontime.

We look forward to seeing each and every one of you!

A Message from the President:

HOPE EVERYONE IS HAVING is having a great summer. I spent 3 weeks in the mountains of West Virginia on a rare plant survey project in the Monongahela National Forest. I encountered several interesting plants and natural communities. However, I also came to realize that my body's not as young as it once was, and while I've always loved the mountains, my body is making a case for confining my survey work to the flatter natural communities.

One disturbing observation in West Virginia was the extremely destructive level of deer browse. This is becoming a problem in parts of Kentucky, but I have never seen it as destructive as what I encountered there. There were areas of the forest where there was no herb layer at all except for the few plants that deer apparently don't eat such as stinging nettle, some ferns, sweet white violet and round-leaved yellow violet. Kentucky is in a similar situation to West Virginia and other states where the deer population has grown to uncontrollable and deleterious levels. The damage sustained on our highways, our farms, and our native flora is disturbing. I have nothing against white-tailed deer under normal conditions, but just remember, the next time you see a deer, think about the destructive nature of overpopulation. This is an ever-increasing problem with what seems to be no clear solution. However, increasing awareness can be a step in the right direction.

In my last message, I pointed out several target cities for increasing awareness about KNPS. I'm happy to report that I just received a phone call from one of our members in Owensboro and we will be setting up a booth at a Fall Festival planned in October. I also just recently received a request from a member in Madisonville for some membership brochures to pass out at a garden club function. This is a great beginning for boosting our membership and native plant awareness.

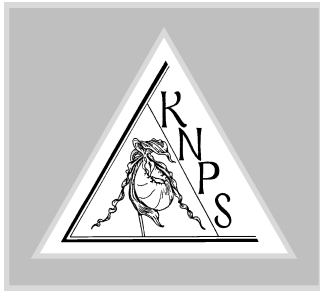
We are also on track with our newsletter improvements. If we remain on track, you should be receiving this issue a little earlier than you would have anticipated. We have established deadlines for getting the newsletter in the mail on the 15th of March, June, September, and December with an article submission deadline a month before. With designated authors contributing in a timely manner, we should be on time and fully packed with interesting and informative articles dealing with our native flora.

Last but not least, please note our Fall Meeting Announcement above. Keep the date, time, and place in mind and on your calendar. The Bernheim Forest folks are doing great things, and this will be an excellent opportunity to see and appreciate their efforts. 🍁

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BACK ISSUES of
The Lady-Slipper
and more — online at
<http://www.knps.org>



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Kentucky's Wetlands – Part IV

by Landon E. McKinney

WETLANDS MAY BE CATEGORIZED or classified based on a variety of characteristics including; vegetation, vegetation structure (e.g. tree, shrub, herbaceous), source of water, and even topographic position. For our purposes and to maintain a level of simplicity, we will use a little bit of each. First, wetlands may be dominated by trees, shrubs, or herbaceous plants exclusively or some combination thereof. Forested wetlands, which are dominated by woody vegetation over 20 feet in height with a diameter at breast height (dbh) of at least 6 inches, constitute 50% or more of the wetland being observed. Trees smaller in size, and thus younger, constitute a scrub wetland. Shrub wetlands are, of course, dominated by shrub species. Shrub wetlands often occur as almost pure stands of one species. They may be transitional or an intermediate successional stage between herbaceous-dominated wetlands and forested wetlands. In some instances, however, they seem to perpetuate themselves for extended periods of time. Shrubs may often be the understory component to a forested wetland. Wetlands dominated by woody vegetation in Kentucky include:

- Bottomland Hardwood Forest
- Bottomland Hardwood Swamp Forest
- Upland Depressional Hardwood Swamp Forest
- Bald Cypress Swamp Forest
- Bottomland Shrub Swamp
- Upland Depressional Shrub Swamp

Wetlands dominated by herbaceous plants are considered emergent wetlands. While an occasional tree or shrub may occur, these wetlands are structurally dominated by the ground cover. Emergent wetlands in Kentucky include:

- Spring Seep
- Marsh
- Mudflat
- Wet Meadow
- Southern Mountain Fen
- Vernal Pool

Before continuing, there are several additional points to keep in mind. First, wetlands, especially the larger ones, can occur as a complex of different types all adjacent

to each other. In other words, one might encounter a large wetland complex that is part bottomland hardwood forest, part shrub swamp, and part marsh. Secondly, if one cared to, any of the above categories could be further divided based on a variety of minor characteristics. For example, a wet meadow could be further divided based on the dominant herbaceous species involved. Thirdly, the above categorization is quite basic and designed to reference Kentucky's wetlands. When one crosses state or regional lines, one often encounters somewhat different terminology for the same kinds of wetlands. The following is a brief synopsis of Kentucky's wetland communities.

BOTTOMLAND HARDWOOD FOREST

Bottomland hardwood forests are floodplain forests along large streams characterized by seasonally wet conditions occurring from surface water (periodic flood events) of short duration and from precipitation. Hardwoods comprise a dominant portion of the canopy. This community may occur in scrub conditions. This wetland community occurs sporadically across the state but is best represented in the Jackson Purchase.

Dominant canopy members may include species like cherrybark oak, swamp white oak, swamp chestnut oak, pin oak, willow oak, overcup oak, shellbark hickory, sweetgum, red maple, green ash, sugarberry, American elm, cottonwood, river birch, box elder, silver maple, sycamore, black willow, and pecan. Black willow and cottonwood are the earliest pioneering species on the wetter sites followed by red maple, sweetgum, and boxelder. Dominant species may be influenced by a variety of factors including logging history or slight variations in elevation.

Understory growth is generally not dense or may even be absent. Typical woodier components of the understory may include poison ivy, trumpet creeper, cat brier, spicebush, hawthorn, stiff dogwood, deciduous holly, and grape. The herbaceous layer is usually sparse. When present, typical species may include impatiens, bittercress, swamp buttercups, nettles, and a variety of sedges.

BOTTOMLAND HARDWOOD SWAMP FOREST

Hardwood swamp forests are floodplain forests characterized by much wetter conditions (usually standing water) than bottomland hardwood forests. They may often be part of a large complex of forested commu-

nities that include bottomland hardwoods and swamp forests. Boundary definitions between each of these communities may be distinct, such as the presence of wetter sloughs in an otherwise bottomland hardwood community, or they may present a patchwork where one slowly grades into another. This community occurs sporadically across the state, but again is better represented in the Jackson Purchase.

Dominant canopy species may include green ash, red maple, sweetgum, swamp cottonwood, and a variety of oaks like overcup, pin, swamp white, and willow. Dominants may also include bald cypress, water hickory, water tupelo, planer tree, and water locust. Shrubs are often present and include buttonbush, swamp rose, and Virginia willow. Sedges often dominate the herbaceous cover. Bottomland hardwood swamp forests serve as habitat for many aquatic species (fish and invertebrates) as well as for a variety of reptiles, amphibians, and birds.

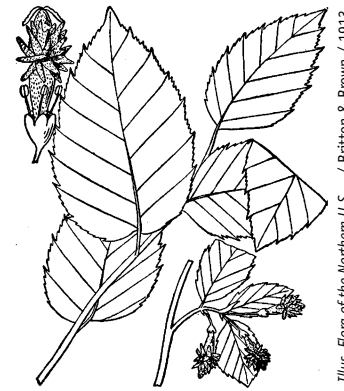
UPLAND DEPRESSIONAL HARDWOOD SWAMP FOREST

Depressional hardwood swamp forests are non-floodplain forests associated with topographic depressions. These wetlands are dependent on groundwater and precipitation for their moisture. Hardwoods dominate the canopy and may include such species as overcup oak, pin oak, willow oak,

sweetgum, red maple, and American elm. Shrubs like buttonbush or swamp rose often dominate the understory, while herbaceous plants are often sparse. This community is sporadic and infrequent across the state.

BALD CYPRESS SWAMP FOREST

These swamps may or may not be associated with stream corridors. They are dominated by bald cypress that comprises at least 50% of the canopy layer. Water tupelo and water hickory may occur as co-dominants. Other hardwoods like cottonwood, red maple, and overcup oak often occur sporadically, especially around the edges. This community can occur in scrub-like conditions. Other woody components



Illus. Flora of the Northern U.S... / Britton & Brown / 1913

Planer tree (*Planera aquatica*) is a member of the elm family and is sometimes found in both bottomland hardwood and bald cypress swamp forests in the Jackson Purchase area of western Kentucky.

(Continued on page 4)

Nominations for the 2004 Kentucky "Wildflower of the Year" Due Dec. 15!

by Mary Carol Cooper

Each year the Salato Native Plant Program (Ky. Dept. of Fish & Wildlife Resources) joins the Kentucky Native Plant Society in selecting a native wildflower as Kentucky's official "Wildflower of the Year." The program is designed to increase appreciation for the beauty, horticulture, wildlife, and other values of our native plants; to promote conservation of native species in the wild; and to encourage local nurseries to make these species available to Kentucky gardeners.

The Wildflower of the Year for 1997 was Butterfly Milkweed (*Asclepias tuberosa*), in 1998, Cardinal Flower (*Lobelia cardinalis*), in 1999, Purple Coneflower (*Echinacea purpurea*), in 2000, Wild Columbine (*Aquilegia canadensis*), in 2001, Wild Bergamot (*Monarda fistulosa*), in 2002, Great Blue Lobelia (*Lobelia siphilitica*) and this year, 2003, the honor

went to Spiked Blazing Star (*Liatrix spicata*). As part of this year's effort to promote the program, the KDFWR distributed 10,000 packets of Spiked Blazing Star seeds to schools, garden clubs, and conservation groups across Kentucky.

Special attributes of a Wildflower of the Year should include its native origin and common distribution in Kentucky, its easy cultivability in appropriate habitats, a known value to wildlife, and ready availability of plants or seed (at least through mail order sources) for gardeners and landscapers.

If you feel your favorite wildflower meets the qualification, please fill out the Nomination Form below and return it to the address noted. *Nominations must be received by December 15, 2003.*



Ky. Dept of Fish and Wildlife and KNPS

2004 WILDFLOWER OF THE YEAR NOMINATION FORM

Wildflower's Common name _____ Latin name (if known) _____ Reasons for nominating _____ _____	Your name _____ Address _____ City, State, Zip _____ Tel.: (Day) _____ E-mail: _____ Date Received (for office use only) _____ <p style="text-align: center;">See the article above for nomination details. Nominations must be received by <i>December 15, 2003.</i></p> <p style="text-align: center;"><i>Return form to:</i> Salato Native Plant Program, Salato Wildlife Education Center, #1 Game Farm Rd., Frankfort, KY 40601</p>
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Kentucky's Wetlands, Part IV (cont.)

may include water locust, planer tree, buttonbush, swamp rose, Virginia willow, and trumpet creeper.

Rooted herbaceous species are generally confined to raised mounds of soil associated with such features as the exposed root systems of fallen trees and, of course, around the perimeter of these communities. Examples include nettles, beggar ticks, water horehound, and a variety of sedges. Aquatic vegetation may be present including a variety of pondweeds, coontail, duckweeds, or mosquito fern. As is the case with bottomland hardwood swamp forests, habitat is provided for a variety of aquatic species, reptiles, amphibians, and birds.

BOTTOMLAND SHRUB SWAMP

Bottomland shrub swamps are floodplain swamps dominated by shrubs and generally characterized by standing water. Dominant shrubs may include rose mallow, swamp privet, and water willow but are more often dominated by almost pure stands of buttonbush. Shrub swamps are often transitional between herbaceous and forested wetlands. Herbaceous species may or may not be present dependent to some extent on the density of the shrub layer.

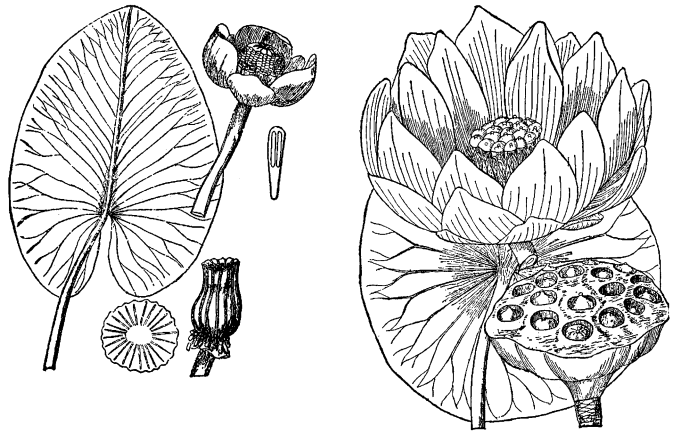
Bottomland shrub swamps provide homes and refuge for a wide variety of aquatic animals as well as being sources of food, refuge, and nesting grounds for a variety of terrestrial animals and birds. They occur throughout most of the Jackson Purchase and to a lesser extent in the Shawnee Hills region, especially along the Ohio River.

UPLAND DEPRESSIONAL SHRUB SWAMP

Depressional shrub swamps are non-floodplain forests associated with topographic depressions. These depressions may or may not be associated with karstic features such as sinkholes. They are generally dependent on groundwater and precipitation for their moisture and are typically dominated by buttonbush or water willow. Depressional shrub swamps are rare across the state.

MARSH

Marshes are generally associated with topographic depressions. They may include a combination of standing water (inundation) and extremely wet soil (saturation). Moisture may be derived from surface water, groundwater, precipitation or any combination thereof. Marsh communities may include several zones of vegetation based on water depth, substrate accumulation, and groundwater influence. They may be relatively stable or purely successional in nature. Marsh communities may provide a combination of growth forms that include submerged, floating, and emergent vegetation. Trees or shrubs can be present but never as dominants. Dominant plants usually include a variety of broadleaf herbs and graminoid species (grass-like which can include both grasses and sedges). Many marsh communities exhibit almost pure stands of cat-tails, spatterdock, or lotus-lily. In those areas especially associated with significant disturbances, such as mined lands, they often exhibit almost pure stands of common reed.



Illus. Flora of the Northern U.S. . . . / Britton & Brown / 1913

Spatterdock above (*Nuphar advena*) and Lotus-lily at right (*Nelumbo lutea*) often appear in almost pure stands in marshes across Kentucky.

Marsh communities are essentially common across the state. They may occur as small, isolated wetlands or occur as part of a larger wetland complex.

MUDFLATS

Mudflats are often found along the outer perimeter of inundated wetlands like swamp and marsh communities or along the major river corridors. Mudflats occur as water recedes, often on a seasonal basis. They may also be associated with agricultural fields during wetter than normal conditions. Soils are wet on a seasonal basis and often dry throughout much of the year. Much of the soil is bare. Mudflats are not considered permanent wetland communities. They come and go with seasonal changes or with normal river fluctuations. The plants inhabiting them seldom make it past the annual or first year perennial stage. However, mudflats are treated here because of their importance to many herbaceous species that often occur no where else. The herbaceous flora, while often weedy, may include an interesting and diverse mix of species including sedges, rushes, smartweeds, hedge hyssop, toothwort, bur-head, buttercups, or marsh cress. This community is best defined in the Jackson Purchase region.

VERNAL POOLS

As with mudflats, vernal pools (seasonal ponds) are not necessarily considered permanent wetland communities. They are most obvious during the spring associated with snowmelt and spring rains. They are typically shallow depressions either in or along the edge of forests. They vary in size, shape, and diversity. Inundation may last for 2–3 months during the late winter and spring or longer, but they may dry up during the summer months. These seasonal pools are free of fish and thus, often support a rich community of amphibians and invertebrates. They attract organisms capable of rapid development and are often considered extremely important as breeding grounds for many frogs and salamanders. They may or may not host a variety of emergent vegetation around their perimeter, and they may be found sporadically throughout the state.

WET MEADOW

Wet meadows are generally wet to extremely wet but not inundated. Wet meadows, while typically small in size, are often the most floristically diverse. Dominant plants include a variety of broadleaf herbs, sedges, rushes, beak rushes, bulrushes, and flat sedges. Visually, wet meadows often do not exhibit any obvious wetland characteristics, except for vegetation, during much of the year. Wet meadows are essentially common throughout the state and are generally successional, developing into shrub/scrub and forested conditions over time. However, wet meadows often occur under conditions where the normal successional patterns are thwarted by disturbances such as mowing, especially when occurring in utility right-of-ways. With such disturbance, a wet meadow may be maintained in a preclimax condition indefinitely.

SPRING SEEPS

Spring seeps occur when groundwater surfaces and flows across the ground in either a sheet-like manner or eventually developing one or more small channels. They are often referred to as groundwater seepage wetlands or seepage swamps. The soils are usually perpetually saturated. Spring seeps are usually located on slopes or at the base of slopes. Herbaceous dominants may include a variety of broadleaf herbs and graminoids but are seldom floristically diverse.

SOUTHERN MOUNTAIN FEN

Southern mountain fens occur sporadically throughout the Appalachian Highlands. The Appalachian Highlands encompass the Appalachian Plateau, Ridge and Valley, and Blue Ridge physiographic provinces. In Kentucky, this rare type of wetland is only known from portions of the Appalachian Plateau. They are associated with streamheads along the crest of Pine Mountain.

These fens are, in many ways, similar to the fens common to the northern tier of states and Western Europe. However, they differ by having mineral soils instead of the characteristic organic soils (peatmoss) of the northern fens and bogs (peatlands).

The currently known southern mountain fens are dominated by sphagnum, a variety of sedges, cinnamon fern, and royal fern. One recent study estimated as many as 60 of these southern mountain fens occurring in Kentucky. However, we currently know of only several making this one of our rarest wetland types in the state.

IN CONCLUSION, Kentucky has suffered an extensive loss of wetlands (approximately 80%). Some of what we have left is being protected outright by public agencies like the Kentucky State Nature Preserves Commission or indirectly by the Kentucky Department of Fish and Wildlife Resources (those occurring in wildlife management areas). While wetlands occur sporadically across the state, some of the best and largest wetland communities occur in the 8-county area of the Jackson Purchase region. I hope this series of articles has provided each of you with a better understanding and appreciation of wetlands.



Medicinal History of INDIAN TOBACCO — *Lobelia inflata*

by Robert Paratley

Curator, University of Kentucky Herbarium

"No medicine has been more used or more abused by the empirics, especially the Thomsonians, than lobelia; yet it is a valuable article when judiciously employed. Although cases of its fatal effects, from the recklessness and ignorance of quacks, are not very unfrequent"

— Dr. Clapp, 1852

"If yer ever wants to get rid of what's inside yer, just make a tea of lobelia leaves and I'll bet my team of hosses out there it'll accommodate you."

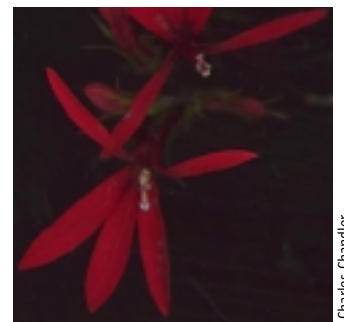
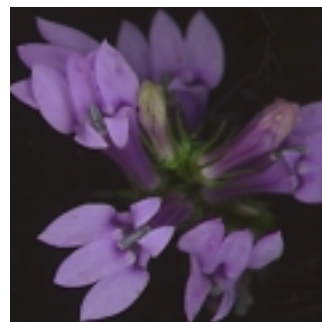
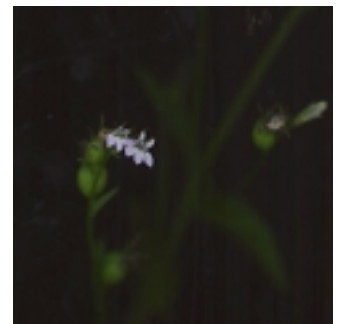
— Canadian farmer, 1879

INDIAN TOBACCO, *Lobelia inflata*, is commonly found in fields, roadsides, and open woods throughout Kentucky and most of eastern U.S. The lobelias also include the more attractive and familiar great lobelia, *Lobelia siphilitica*, and cardinal flower, *Lobelia cardinalis*. Lobelia is usually placed in the bluebell family, Campanulaceae, but is sometimes treated as its own family, Lobeliaceae. Indian tobacco is smaller and less conspicuous than great lobelia and cardinal flower, and is probably the weediest of the five common lobelia species in our state. (There are two threatened or endangered lobelias in Kentucky). The Latin species name refers to the inflated calyx (sepals) which persist in fruit.

It might be assumed from its common name that Indian tobacco has a long and intimate association with Native American tribes. In fact, only sporadic use has been recorded for the plant by native tribes. The Lloyd brothers, important Cincinnati-based producers of pharmaceuticals

(Continued on page 6)

Of the handful of Lobelia species in Kentucky, Indian tobacco's flowers (right) are the smallest. The flowers of great blue lobelia (left below) and cardinal flower (right below) are much less likely to be overlooked. All are pictured at actual size.



Medicinal History of INDIAN TOBACCO—*Lobelia inflata* (continued)

in the late 1800s–early 1900s, observed that this misconception was due to the tobacco-like taste of its leaves. At that time they could find no records of natives smoking *Lobelia inflata* (Lloyd and Lloyd, 1886), although a few have turned up since then (as in Bolyard, 1981). More than one hundred years later, Daniel Moerman in his monumental *Native American Ethnobotany* (1998), has a brief but colorful entry on Indian tobacco. Essentially corroborating the Lloyd brothers' assessment, Moerman records its use as a ritual plant in religious ceremonies (Cherokee, Crow), to ward off ghosts (Cree), as love medicine (several tribes), as divining agent, or to counteract sickness brought on by witchcraft (Iroquois).

Poison Hemlock Threatening Kentucky

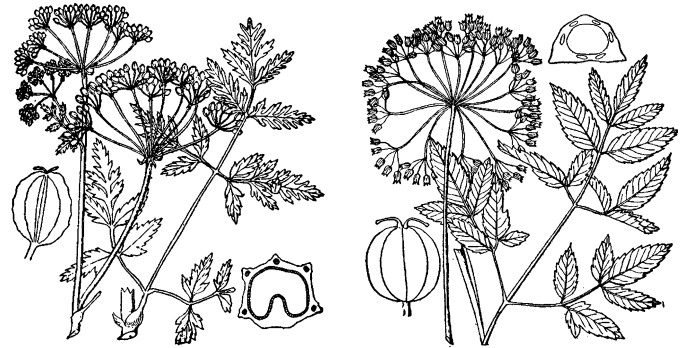
by Michael Thompson

NOT TO BE CONFUSED with our native Eastern Hemlock (*Tsuga Canadensis*), poison hemlock (*Conium maculatum*) has begun threatening native plant communities in Kentucky. Poison hemlock is a tall, smelly, biennial of the carrot family (Umbelliferae). As of 2001 it has been rated as a "severe threat" in Kentucky by the Southeast Exotic Pest Plant Council, meaning that the plant is invasive and capable of crowding out native species. It has also been recognized as a threat in neighboring Tennessee. Originally introduced from Europe as a garden plant, it has become a common sight along Kentucky roadsides, ditches, and fields, especially in the central and northern portions of the state.

Poison hemlock is easy to recognize—it is a tall (5–8 ft.), perennial plant with fern-like leaves that are two or three times pinnately compound, glabrous, shiny, and very conspicuously serrated and lobed. The leaves have a very foul odor when crushed. It blooms from June–August. The flowers are white, have five petals, lack sepals, and are borne on compound umbels. From the flower clusters, the stems are speckled or striped purple, round, smooth, and glabrous. The stems are hollow between nodes and chambered at the base. The fruits of the plant are green with ridges, rough in texture, and turn brownish when mature. Poison hemlock has a long, white taproot like other members of the carrot family and is often confused with them. In particular, it is often confused with water hemlock (*Cicuta maculata*), which is native, and also poisonous. These two species may be distinguished through the differences in the fruits, leaves, or stems (see figures above). Water hemlock has leaves that are not as deeply lobed, and its fruits are flattened laterally and are not as prominently ridged.

Poison hemlock has no known economic or medicinal use. It is highly toxic to both humans and to livestock due to three piperidine alkaloids: GGGG-coniceine, coniine, and N-methylconiine. These toxins are contained in most parts of the plant, including the flowers, leaves, fruit (when mature), taproot, and stems. The seeds, leaves, and lower stem portions of the plant are particularly toxic. It is thought that environmental stresses, such as a late freeze, may enhance the production of these alkaloids by the plant.

Hemlock poisoning in humans is usually through confusion of the root for wild parsnips. The symptoms of hemlock



Poison hemlock

Water hemlock

Illus. Flora of the Northern U.S... / Britton & Brown / 1913

poisoning in humans include headache, loss of coordination, vomiting, thirst, and dilation of the pupils. Ingestion of large amounts of the plant can cause coma, heart failure, or death by asphyxiation.

The piperidine alkaloids are teratogens, and can cause birth defects in livestock even at low doses. While livestock normally avoid this plant, they may inadvertently ingest dead plants that are included in haystacks, or may feed on it during cold parts of the year when it is the only vegetation available. It's thought that ingestion of this plant by pregnant mares was responsible for an abnormal spate of foal deaths in 2001. Due to its toxicity and invasiveness, stands of the plant should be eradicated aggressively by removal of the plants or spraying with a glyphosate-containing herbicide.



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It was used medicinally in a limited way. He also includes an interesting record of *Lobelia inflata* being used to “break the tobacco habit” (Cherokee).

Indian tobacco’s story really takes off in the late 1700s in colonial America. The first reference to lobelia was by John Bartram, the great 18th-century Pennsylvania botanist, as a cure for “pox” (probably venereal disease). He may well have been referring to the great lobelia, *Lobelia siphilitica*. The efficacy of any lobelia in this instance is discredited today. In 1785, Rev. Manessah Cutler wrote specifically about *Lobelia inflata*:

If the leaves are held in the mouth for some time, they produce giddiness and pain in the head, with a trembling agitation of the whole body: at length they bring extreme nausea and vomiting... a plant possessed of such active properties, notwithstanding the violent effects from chewing the leaves, may possibly become a valuable medicine” (Lloyd and Lloyd, 1903)

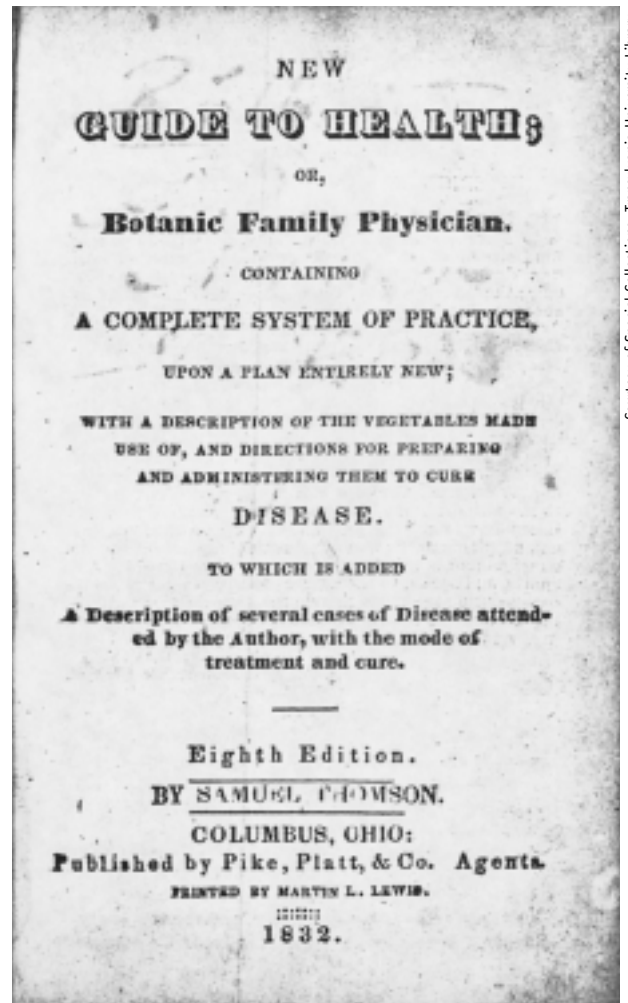
For a growing movement in early 1800s rural New England, lobelia would become just that.

SAMUEL THOMSON (1769–1843) was the son of a poor New Hampshire farmer who learned “healing arts” from a local herbal healer. At an early age he developed a distrust and distaste for conventional physicians after seeing his mother die and, later, his wife nearly lose her life in the hands of conventional “heroic” physicians. Thomson remembered scornfully, “They galloped her [Thomson’s mother] out of the world in about nine weeks” (Coffey, 1993). And, later again, conventional physicians failed his young family: “After nursing one of his own children back to health when the local doctor had almost given up, he set out on what became a life-long crusade to put Botanic Medicine on the rapidly expanding map of America.” (Bellamy and Pfister, 1992) Learning the healing arts from local herbalists, he soon developed his own unconventional approach, relying mostly on botanicals in his treatments. His distrust of professional physicians was returned in kind by the medical establishment in the form of ridicule, threats, and even litigation. In spite of the hostility from the “city doctors,” Thomsonian medicine became first a local phenomenon in rural New England, and, later, a full-blown fad through a home-study course called *New Guide to Health; or Botanic Family Physician*. In its heyday about three million Americans subscribed and belonged to his “Friendly Botanical Societies” (Coffey, 1993).

The herbal star attraction of Thomson’s system was *Lobelia inflata*. Both the tops of the plant and seeds were used in various combinations with stimulating spices like cayenne pepper, and with hot steam baths as part of a “cure-all” package. He claimed that there was no more powerful herb for removing disease and promoting health, and it became the centerpiece of his home study course. *Lobelia inflata*, he said, would “cleanse the Stomach, overpower the Cold, and promote free perspiration” (Coffey, 1993). He used it as a muscle relaxant,

(Continued on page 8)

Samuel Thomson’s pocket-sized *New Guide to Health; or Botanic Family Physician* was published in 1822. By 1832 it was in its 8th edition and its popular influence, for better or worse, continued for several more decades. In 1909, Thomson’s life and work were reviewed in the *Bulletin of the Lloyd Library*. The issue included a portrait of Thomson from the *New Guide* which is reproduced at right with John Uri Lloyd’s added note of authentication.



Courtesy of Special Collections, Pennsylvania State University Library



Bulletin of the Lloyd Library, no. 11, 1909

Samuel Thomson.
His System and practice Originating with Himself.
 Born Feb. 9th 1769

[From “The New Guide to Health,” 1835.]

This portrait was taken when Thomson was younger than that shown in our frontispiece. It is characteristic in the prominence given the wart on the side of the nose. —J. U. L.



Medicinal History of INDIAN TOBACCO (cont.)

particularly in childbirth, and as an anti-spasmodic for convulsive disorders. He touted its anti-inflammatory properties and applied it to skin abscesses in a poultice. His method is described as follows:

On first arriving, he would give them [his patients] large doses of Lobelia to produce an emetic/vomiting situation, continuing with Lobelia in large doses over a short period of time until he had achieved the cleansing of the body by this method. He then would wrap them in blankets taking hot bricks from the fireplace, packing the bricks around them, creating a sweating situation just as they did in the Indian sweat lodges... It has a genuine effect on the whole system... Copious amounts of water need to be taken with Lobelia [to] aid the body in elimination of body and drug-induced toxic waste. (Ritchason, 1995)

Thomson deflected criticism, waved off cries of danger, and denied any negative effects. But adverse reactions to lobelia did not escape the notice of his many detractors. His enemies eventually brought him into court for the death of a man who had taken lobelia. He was acquitted, according to one source because the prosecution's expert witness could not correctly identify lobelia. Another interpretation had it that the judge opined that anyone foolish enough to put himself in Thomson's care was responsible for his own demise! (Coffey, 1993).

There is a question of whether Thomson himself discovered Indian tobacco or actually observed natives employing the herb. Rafinesque in 1830 was under the impression that he learned from local natives.

In its effects it acts very much like tobacco, but the action is more speedy, diffusible, and short;... Samuel Thomson claims in his guide to health to have discovered the properties of this plant towards 1790; but the Indians knew some of them; it was one of their pukeweeds, used by them to clear the stomach and head in their great councils.

Pukeweed, was a common colloquial name for *Lobelia inflata*, along with vomitwort, gagroot and the like (Bolyard, 1981). Today this action is called emetic, and, indeed, some New England natives were recorded using lobelia as such, as did the colonists. These local names speak volumes of the dramatic effects of Thomson's star herb.

John Gunn in 1847 (in Erichsen-Brown, 1979) suggested that a particular New England tribe used Indian tobacco, but, also claims little knowledge of the plant by natives:

The Penobscot tribe...used it in the form of a tea to produce vomiting, and as their unfailing remedy for colic, hence the name Colic weed. The New England people obtained this information from the Indians and used it in various complaints, particularly colic, and considered it perfectly safe and harmless. I have traced it back to the year 1772 and with the exception of the Penobscots, I find the American aborigines had no knowledge of its properties and virtues.

Thomson's movement eventually fell from favor with the public, splintering into accusatory rival groups. Though they were superseded in mid-19th century America by the more professional efforts of Eclectic physicians, their most important botanical remained in wide use. Herbalists like R. E. Griffith in 1847 stated with enthusiasm that the "principle employment of lobelia, in the hands of regular practitioners, is as an antispasmodic, especially in asthma, the attacks of which it often relieves, or even removes, even in doses not sufficient to cause vomiting" (Crellin and Philpott, 1990). Another herbal practitioner, Robert Bartholow, recorded its use as an expectorant (to bring up mucus in respi-

ratory illnesses): “Lobelia is much employed by the self-styled physio-medical practitioners as a ‘sanative agent’. The great quantity of mucus discharged from the stomach under its emetic action is considered by them as proof of its power as an eliminating agent” (Bartholow, 1876). The most common uses for lobelia in the 1800s were for asthma and other respiratory ills. It was found by many that lobelia was effective when used in formulas—mixtures with other herbs. For instance, whooping cough was treated with a formula including Indian tobacco, black cohosh, bloodroot and squill. A poultice of lobelia, capsicum, wormwood, and mints was used on sprains and body bruises (Hutchins, 1991).

Not everyone was enthusiastic. The question for herbal healers was often not so much one of Indian tobacco’s efficacy—it was still widely known for its effects on the bronchial passages, the gastrointestinal tract, and the nervous system—but whether it was simply too unpredictable and risky a treatment. Rafinesque (1830) sounded the alarm early on:

...It is now extensively used, although many physicians consider it as a deleterious narcotic, uncertain and dangerous in practice... The whole plant is used but the most powerful part are the seeds... In large doses it is a deadly narcotic, like tobacco and henbane, producing alarming symptoms, continual vomiting, trembling, cold sweat, and even death. It appears to act on the brain rather than the stomach, as usual with narcotics, and is therefore dangerous in practice unless prescribed with great care and caution

Charles Millspaugh, in his great work on American plant medicines (1892), was also no great fan of Indian tobacco:

Lobelia has been recommended and used in the Botanic practice particularly, either alone or compounded with other drugs, for almost every disease known, and has proven curative in some cases, palliative in more, useless in many, and a deadly poison in more cases than one. Its action...is, as in all narcotics, principally on the brain, thus making it anything but a desirable emetic, as which it is most frequently used.

He lists many actions—anti-spasmodic, muscle relaxant, increase in flow of mucous—and also records its use by individuals with “murderous intent”! He clearly believed that lobelia was used irresponsibly, noting the Eclectic practice of injecting a lobelia-laden mixture into the veins for lockjaw and tetanus. He lists numerous side-effects of overdose and abuse: depression, exhaustion, pressure in the throat, nausea, cardiac constriction and slowed pulse, abdominal pain, chill and fever. A stark warning, indeed (Millspaugh, 1892).

Nevertheless, a burgeoning market for lobelia was kept supplied especially by the Shakers of New Lebanon, New York. The Shakers were serious entrepreneurs, dealing in mail-order herbs in addition to their more well known furniture and seed packet businesses. Much of their herb business went overseas. Lobelia was especially used in Britain as a remedy for asthma and other respiratory ills (Erichsen-Brown, 1979). The debate about safety was taken up in Europe—Dr. Clapp’s cautionary endorsement quoted at the front of this article is typical (Coffey, 1993)—but lobelia became a well-employed workhorse for English doctors before 1900. The domestic market continued to be strong in post-Civil War America as well. In the 1870s in Appalachia, lobelia seeds could be gathered in any quantity for resale. The plant was also used by mountain healers in a cough syrup, for cancer, animal bites, dysentery, and a host of other maladies (Bolyard, 1981), and lobelia was adopted by Homeopathic practitioners for a variety of respiratory and gastrointestinal problems, including alcohol hang-over.

By the turn of the 1900s, Felter and Lloyd doubted that lobelia would present a clear danger because its “emetic action is so prompt and decided, that the contained alkaloid



Köhler's *Medizinal-Pflanzen* / Franz Eugen Köhler / 1887

Although Rafinesque warned of its potential dangers in his 1828–30 *Medical Flora* (at left above), Indian tobacco’s late 1880s appearance in Köhler’s *Medizinal Pflanzen* (above) in Germany testifies to its long-continued and widespread use. By 1892, Millspaugh could confidently report in *American Medicinal Plants* (left below) that Indian tobacco’s effects were “pretty thoroughly known” due to “much reckless prescribing... and to murderous intent.”

Each Indian tobacco calyx contains 450–500 seeds (shown actual size). Their properties were considered more uniform and reliable than those of the herb (Lloyd and Lloyd, 1886).



Charles Chandler

(Continued on page 10)



Medicinal History of INDIAN TOBACCO (continued)

could not, under ordinary circumstances, produce fatal results." (McGuffin, et. al., 1997). It was included in the U.S. Pharmacopeia, the major compendium of medicines (roughly equivalent to today's *Physicians' Desk Reference*), from 1820 to 1936, and was included from that year to 1960 in the *National Formulary* (the work which replaced the U.S.P.). In Europe, it was listed into the 1970s.

In the 1930s, lobelia was still being used as an emetic, for respiratory ailments (especially asthma), and had emerged as a tobacco substitute for smokers in their effort to quit smoking. The principle chemicals in lobelia are similar in effect to those of nicotine (see "Chemistry..." below). A number of clinical studies have documented this and other physiological effects, although tests as a nicotine substitute have been disappointing (Peirce, 1999). Apparently Millspaugh and other students of medicinal herbs had it right—Indian tobacco at first and in low doses stimulates the central nervous system (CNS), and later or in higher doses, leads to CNS depression. Hence its use as a muscle relaxant. Records of livestock poisoning are few. Apparently, animals avoid Indian tobacco due to its acrid taste (Sanders, 1993).

Today *Lobelia inflata* is not a common choice for herbalists, although it is still listed in quite a few modern sources as well as in the homeopathic *Materia Medica* (Boericke, web site). Indian tobacco's active principles (see "Chemistry..." below) were still employed in commercial quit-smoking products into the 1980s (Bolyard, 1981; Duke, 1986). Apparently lobelia has obtained notoriety in some quarters as a mind-altering substance. Jim Duke in his *Handbook of Medicinal Plants* quotes from an obviously peripheral source that lobelia's effects are "mildly euphoric...conferring to the mind a great sense of clarity."

The Chemistry of *Lobelia inflata*

THE BASIC ACTION of *Lobelia inflata* on the nervous system is the stimulation of the autonomic nerve ganglia followed by depression. The autonomic nervous system regulates the internal environment of the body, and is more or less outside voluntary control: heart rate, hormone secretion, vessel constriction and dilation, sweating, etc. One well known effect of lobelia is that it dilates bronchioles (small branches in the lungs) by relaxing bronchial muscles. It accomplishes this by its depressing effect on controlling nerve centers (vasomotor center) and the vagus nerves, (important cranial nerves of the autonomic system controlling, among other things, breathing and heart rate). The gastrointestinal system is another target of lobelia, as for instance the suppression of appetite, also mitigated through effects on autonomic nerves.

The active principles in *Lobelia inflata* are piperidine alkaloids. Alkaloids are nitrogen-containing secondary chemicals which very often affect the nervous system. Many are mimics of neurotransmitters, the body's chemical messengers rapidly transmitting signals between nerve endings. Alkaloids may suppress or enhance neurotransmitter effects, depending on the specific chemical and dosage. (Many hallucinogenic or psychologically active plants contain alkaloids.) Alkaloids are classed in numerous groups based on their basic chemical "skeleton," derived from particular precursors or molecular starting points. Most precursors are amino acids. The piperidine alkaloids, for example, are synthesized using the amino acid lysine as a precursor. They are not widespread in plants. The principle alkaloid in Indian tobacco is lobeline, which is found along with thirteen others of similar structure like lobelanine and isolobeline. They are in glycoside form, with simple sugars attached to the active portion of the compound. Sources vary in the estimation of alkaloid content in lobelia,

ranging from about .5% to a bit more than 1% by weight. Indian tobacco flowers contain a greater amount than leaves (Burrows and Tyrol, 2002). Of the lobelias tested for alkaloid content, *Lobelia inflata* came out relatively high (highest: *Lobelia puberula*) (Crellin and Philpott, 1990). According to Bruneton (1999), the pharmacological action of lobeline is as "a respiratory stimulant, which enhances and accelerates the respiratory movements by improving the reactivity of the brain stem centers to carbon dioxide." He also mentions its action as a bronchiodilator. Hoffmann (1998) states that lobeline is a respiratory stimulant, but that another alkaloid, isolobeline, is a respiratory relaxant.

Lobeline readily crosses the blood brain barrier so it easily and rapidly effects the CNS. Although synthesized in a different way than nicotine, lobeline apparently is capable of acting on nicotine receptors in the brain. This is why lobelia has been used as a tobacco substitute for some who have wanted to quit smoking. Apparently lobeline decreases the desire for nicotine, as there is a cross-tolerance between the two chemicals. Depending on the effected nerve receptor, lobeline can influence the contraction and timing of the heart muscle action, and increase blood pressure. "At low doses, lobeline stimulates respiration, and at large doses, it produces a curare-like effect. When administered at toxic doses, lobeline depresses respiration by inhibiting the respiratory centers in the brain stem." (Fetrow and Avila, 2000). (Note: curare is an arrow poison employed to kill game by paralysis. In low concentrations it has been used as a muscle relaxant in surgery.) Lobeline is actually milder than nicotine in its effects on the central nervous system. The well-known emetic action of the herb is attributed to other alkaloids (lobelanine, lobelanidine) which it contains in smaller concentrations.

Duke includes this for completeness; he seems clear that, given the wealth of information he includes on toxic effects, mind alteration and most other uses are not recommended. He calls it an herb of "dubious salubrity" (Duke, 1986). It has been declared poisonous by the Food and Drug Administration. *Tyler's Herbs of Choice* dismisses it briefly by stating that it cannot be safely used because standardized preparations do not exist (Robbers and Tyler, 1999). Fetrow and Avila (2001) urge special caution: "Although less potent than nicotine, all *Lobelia* species should be considered dangerous. Death has occurred from respiratory depression and paralysis of the respiratory muscles." Their list of symptoms reads much like that of Millspaugh over 120 years ago, and includes coma, seizures, and tachycardia (very fast heart rate.) Most responsible herbalists look elsewhere for treatment.



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2003 FALL MEETING

Kentucky Native Plant Society

Bernheim Arboretum & Research Forest

Saturday November 1, 2003

Meet at 10:00 am in the parking lot of the Arboretum Center (1st building on right after entering Bernheim)

WE WILL spend the morning and part of the afternoon seeing and experiencing many of Bernheim's completed or ongoing natural area development sites.

These may include:

- *the new Cypress-Tupelo Swamp*
- *the soon-to-be Bluegrass Savanna*
- *the Native Plant Nursery*
- *Native Prairie Grasses in the Big Meadow*
- *Stream Restoration project*

FROM LOUISVILLE, take I-65 south to exit 112 (Clermont/Bardstown). Go east on route 245 about a mile to Bernheim's entrance. **NOTE:** On weekends, there is a \$5 per vehicle charge for those who are not members at Bernheim.

PLEASE BRING your own lunch. We will break for lunch at the Pines Picnic Area at noontime.

We look forward to seeing each and every one of you!

Kentucky Native Plant Society

MEMBERSHIP FORM

Memberships are for the calendar year (January-December).

Name(s) _____

Address _____

City, State, Zip _____

KY County _____

Tel.: (Home) _____ (Work) _____

E-mail _____

Add me to the e-mail list for time-critical native plant news.

Include my contact info in any future KNPS Member Directory

Membership Categories: Annual - \$10; Lifetime - \$150

This is a renewal. This is a new membership.

Membership \$ _____

Gift (optional) \$ _____ Gifts are tax deductible. [IRC 501(c)(3)]

Total \$ _____ (payable to Kentucky Native Plant Society)

Return form & dues to:

KNPS MEMBERSHIP, P.O. Box 1152, Berea, KY 40403

CALENDAR of Native Plant-related Events

Sat., Oct. 4, 9 am–noon – Seed Collecting in the Research Forest, Bernheim Arboretum, Clermont, KY. Meet at the visitor center. For more info or to sign up as a volunteer, contact Barbara Hurt, 502-955-8512, ext. 249.

Tues., Oct. 7, 8 am–noon – Restoration Nursery Bed Maintenance, Bernheim Arboretum, Clermont, KY. Meet at the Bernheim library. For more info or to sign up as a volunteer, contact Barbara Hurt, 502-955-8512, ext. 249.

Thurs., Oct. 9, 8 am–noon – Seed Collecting/Restoration Nursery Beds, Bernheim Arboretum, Clermont, KY. *See Oct. 7 above for details.*

Sat., Oct. 11, 9–11:30 am – Restoration Workday at the Arboretum, Lexington, KY. Meet in the arboretum parking lot on Alumni Drive. For more info, contact Jim Lempke, 859-257-9339 or arboretum@lsv.uky.edu

Tues., Oct. 14, 9 am–noon – Seed Collecting/Research Forest, Bernheim Arboretum, Clermont, KY. *See Oct. 4 above for details.*

Thurs., Oct. 23, 8 am–noon – Seed Collecting/Restoration Nursery Beds, Bernheim Arboretum, Clermont, KY. *See Oct. 7 above for details.*

Sat., Oct. 25, 9 am–noon – Wildflower Woods Fun Day, Cherokee Park, Louisville, KY. Volunteers meet at the wooded triangle behind the Daniel Boone statue. For more info contact Ward Wilson, 502-299-0331 or ward@wwilson.net

Sat., Oct. 25, 9 am–5 pm – Griffith Woods Workday, Harrison Co., KY. Volunteers meet at Silver Lake Farm (from Lexington—

go north for 30 minutes on Russell Cave Road (KY 353) until it ends at US 62; turn right onto US 62; enter first driveway on right, about 200 yards from 353. Please do not visit the farm at other times without permission. For more info, contact Julian Campbell, 859-271-4392 or jcampbell@tnc.org

Tues., Oct. 28, 9 am–noon – Seed Collecting in the Research Forest, Bernheim Arboretum, Clermont, KY. *See Oct. 4 above for details.*

SAT., Nov. 1, 10 AM – 2003 KNPS FALL MEETING, Bernheim Arboretum, Clermont, KY. See information boxes on front cover or on p. 11 for details. SEE YOU THERE!

Fri.–Sun., Nov. 7–9 – Sierra Club Cumberland Chapter Annual Meeting, Natural Bridge State Park, Slade, KY. All are welcome for a weekend of socializing, entertainment, and activities. Joyce Bender will lead a workshop on Exotic Invasive plants including an outing on Sat. afternoon and a short service trip to remove invasives in the park on Sun. *For details and a registration form, see <http://www.kentucky.sierraclub.org/> or contact Mary Carol Cooper, marycarolcooper@insightbb.com*

Sat., Nov. 8, 9–11:30 am – Restoration Workday at the Arboretum, Lexington, KY. *See Oct. 11 above for details.*

Sat., Nov. 22, 9 am–noon – Wildflower Woods Fun Day, Cherokee Park, Louisville, KY. *See Oct. 25 above for details.*

Sat., Nov. 29, 9 am–5 pm – Griffith Woods Workday, Harrison Co., KY. *See Oct. 25 above for details.*

SEE PAGE 2 FOR CONTACT INFORMATION.

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