



TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

Volume 16, Number 1

February 1993

THE IRISES OF TENNESSEE

For TNPS, this Is the Year of the Iris
Field Trips Will Explore Habitats of Six Natives

Aside from its significance as Tennessee's state flower, the iris is perhaps most prominent in politico-floral symbology as the emblem of the French Bourbon monarchy. A stylized iris was depicted in yellow on a field of white as the flag and emblem of French royalty prior to 1793. This symbol, called the Fleur-de-lis or flower of Louis, originated when an early French king led his troops in an escape from enemy encirclement when his sighting of a patch of the yellow *Iris pseudacorus* or yellow flag alerted him to shallows in a river where his army could obtain passage. The Fleur-de-lis persists today in the flag of the Canadian province of Quebec, but is white on a light blue field.

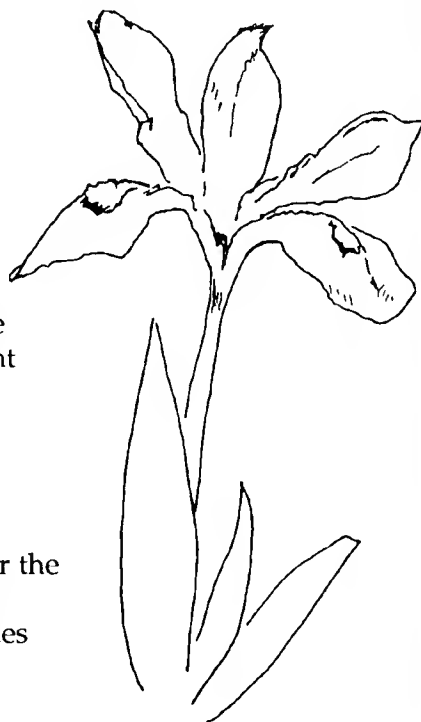
The resolution promulgating the iris as Tennessee's state flower does not specify a species or even a particular color, but in the popular mind it is understood to mean the common blue bearded iris, *Iris germanica*, which frequently escapes to roadsides in our state.

In addition to the occasional persisting populations of *Iris germanica* and *Iris pseudacorus*, there are six species of iris native to Tennessee. Five of these have blue-purple flowers, and one is a maroon-copper color. Some are very widespread and others are rare and of limited range.

Probably the commonest iris in our state is the dwarf crested iris, *Iris cristata*. It is found in woods from middle to lower elevations of the Smokies to the loess bluffs overlooking the Mississippi. Its leaves begin to emerge from shallowly-buried knobby rhizomes in February, and its purple and white flowers generally appear in mid-to-late April. It has a yellow-orange band on its sepals with crinkly ridges—This is the crest. Pure white forms are found in nature and often brought into gardens.

The white form will be sought on our Smokies hike in April. The common blue-purple form will probably be seen on the April 17 Natchez Trace Parkway trip.

Iris verna, the dwarf iris, is scattered over the eastern third of the state in sandy or rocky woods from Putnam and Van Buren counties



Continued Page 2

FIELD TRIP PLANS FOR 1993: MORE AMBITIOUS THAN EVER

This year's TNPS field trip schedule has been organized by Milo Pyne, who has done an excellent job of planning a wide variety of trips.

At the suggestion of our president, Mary Schaffner, we have highlighted the iris species as a focus of the 1993 program. Iris is the Tennessee state flower (though not the state wildflower).

Detailed information about the spring field trips and a table of all 1993 trips are published in this issue.

Again, we remind everyone planning to participate to contact the leader in advance of each trip. This not only gives the leader some idea of how many participants expect but also insures that any last-minute changes or new information is known by everyone prior to the trip.

See you on the trail.

—Dennis Horn
Vice President

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TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

February 1993
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This Newsletter is a publication of the Tennessee Native Plant Society and is published six times a year, generally in February, April, June, August, October, and December.

The Tennessee Native Plant Society (TNPS) was founded in 1978. Its purposes are to assist in the exchange of information and encourage fellowship among Tennessee's botanists, both amateur and professional; to promote education of the public about Tennessee flora, and wild plants in general; to provide, through publication of a newsletter or journal, a formal means of documenting information on Tennessee flora and of informing the public about wild plants; and to promote the protection and enhancement of Tennessee's wild plant communities.

Dues are \$15 for the calendar year (\$10 for students and senior citizens, \$20 for institutions, and \$150 for life memberships). Membership privileges include a subscription to the TNPS Newsletter. Dues may be sent to the Tennessee Native Plant Society, Department of Botany, the University of Tennessee, Knoxville, TN 37996-1100.

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Letters to the editor or correspondence about the Newsletter should be addressed to: TNPS Newsletter, P.O. Box 856, Sewanee, TN 37375.

Tennessee Irises— *Continued*

east to the Smokies. It resembles *I. cristata* but the orange-yellow stripe is smooth. It often blooms when its leaves have barely emerged.

Both of these species range widely across various physiographic provinces of the Eastern U.S., generally from Ohio southward to Georgia or northern Florida. We'll see it at Fall Creek Falls on May 1.

The other four native species are confined to wet places, and three of them, *Iris prismatica*, *Iris brevicaulis*, and *Iris fulva* are listed by the state as rare. The non-listed species, *Iris virginica*, or blue flag, has been collected across the state but in widely scattered locales from Blount, Sevier, and Knox counties in the east to Obion, Weakly, and Henry counties in the northwest. There are fewer records from Middle Tennessee. Despite the records from our mountain counties, this is mostly a southern coastal plains species, ranging from Texas to Virginia.

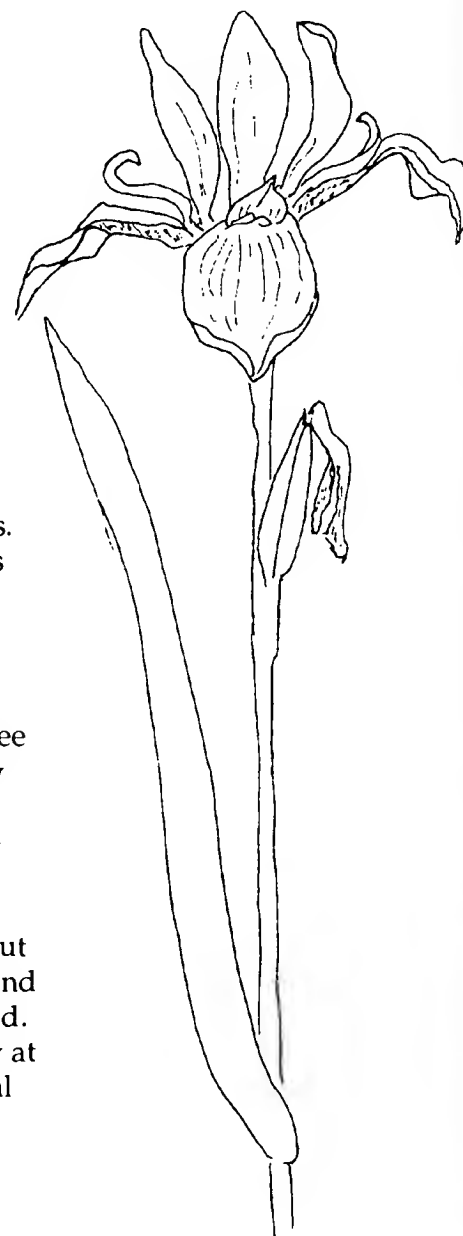
The modern concept of this species includes, without distinction, material referred to variety *shrevei*. In *Iris virginica* the petals, or standards, are not conspicuously erect as in the cultivated *Iris germanica* or bearded irises. It is a blue-purple color typically with a yellow patch on the sepal or fall. We should see it at our annual meeting.

A similar listed species is *Iris brevicaulis*, the short-stemmed or lamance iris, which has only been collected at a few sites in Tennessee and is listed as endangered. It is primarily a gulf-coastal-plain species and is considered by iris fanciers to be in a group of "Louisiana" irises. As the name would imply, the flower is on a very short stem. It grows in open, wet places. We hope to see it on June 12 at Walker Branch in Hardin County. Besides this site, there is an old unverified report from Madison County and a collection from Land Between the Lakes.

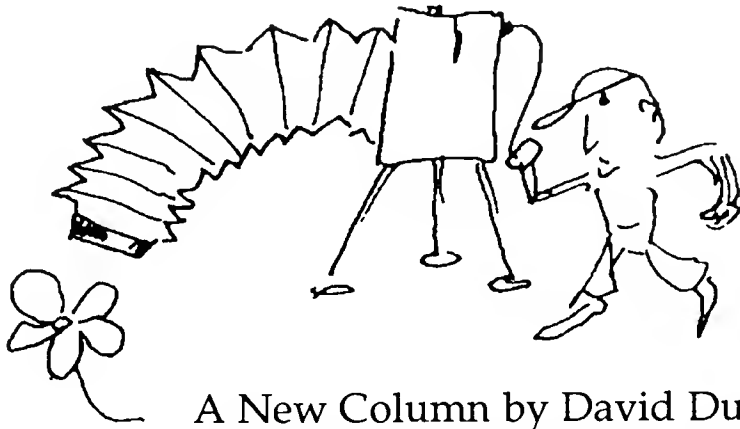
A related but very different looking species is the copper or red iris, *Iris fulva*. It is a member of the "Louisiana" group and can apparently hybridize with *Iris brevicaulis*, but its reddish-maroon flower color makes it unique among Tennessee irises. It is listed by the state as a plant of "special concern," being restricted to wetlands of the counties of extreme west Tennessee. It is a plant of the southern gulf coastal plain which ranges north in the interior to southern Illinois. There are protected populations at Reelfoot Lake and in parks and natural areas around Memphis. We plan to visit it on May 8 in the Memphis area.

The slender blue flag, *Iris prismatica*, our final iris, is another coastal plain species which ranges from Georgia to Nova Scotia but which has a disjunct population in Coffee County. This has been segregated as variety *aristrina* and has been registered with the American Iris Society as the cultivar "Tullahoma." It is distinctive for its very narrow grass-like leaves, which are less than one centimeter wide. It is found in wet woods but blooms best in wet, grassy openings and pond margins. It is listed by the state as threatened. More populations have been found recently at AEDC, where we should see it at our annual meeting.

—Milo Pyne
Nashville



PHOTOGRAPHING WILDFLOWERS



A New Column by David Duhl

Following is the first in a series of columns by TNPS member David Duhl. David is a Nashville-based photographer, with an interest in close-up, wildlife, and scenic photography. His work has appeared in various calendars, books, and magazines, including *The Tennessee Conservationist*, *National Geographic World*, *Harrowsmith Wildflower Calendars*, and *Antique Automobile*. He has co-authored the book *A Guide to Photography and the Smoky Mountains*, and his work has been used in corporate proposals by the Nature Conservancy and in permanent displays.

For two years, David wrote a column on nature photography for *Tennessee Wildlife* magazine. He has taught for Nashville Parks, Cumberland Valley Photographic Workshops, Frances Dorris Photography, Great Smoky Mountains Institute at Tremont, and for Nashville State Technical Institute. We're fortunate to have some expert instruction from one among us.

I feel fortunate that I have been asked to share my thoughts with fellow TNPS members about photographing wildflowers. I say "fortunate" because it's not often that a deeply-felt passion can be shared with a large audience, and yet have it remain intensely personal. And that's what wildflower photography is—a personal experience. For some, it's all about taking snapshots, for others it's a technical nightmare. I suspect that most of us are somewhere in between, and I'm certain we can meet on common ground with common goals in mind. Namely, to develop sound skills in wildflower photography that will serve to help us capture on film what we experience in the field. A more practical benefit may be that some of our well-composed, technically sound wildflower photographs will be selected for the TNPS/AAFB book, *Wildflowers of Tennessee*, that you've been reading about in our newsletters.

In the next few issues of our newsletter, I'm going to offer some suggestions on photographing wildflowers. My intentions are always to remember that it should be useful information and helpful to beginners and more seasoned photographers alike. We're going to deal with such issues as choice of film, camera angle, and lens choice. I'll write about composition, equipment, and filters. I'll tell you what all those strange numbers on your camera mean and how to use them in your photography. Before we finish, I'll tell you about using natural light in the field, how to pack to save a photo trip from going sour, and how to use selective focus.

Along the way, I'll entertain questions, and—if there's enough of an interest—I'll devote an issue to just that. In any event, I welcome your comments, and I hope you are looking forward to this as much as I am.

—David Duhl
Nashville

LICHTERMAN NATURE CENTER GROWING IN MEMPHIS

The next time you're in Memphis, you may find that a visit to the Lichterman Nature Center is time well spent. Larry Wilson, the center's resident naturalist, has undertaken a series of projects designed to create on this old estate a landscape of native plant communities. Larry recently sent us a note about one of the projects called the "mixed border." He calls it an experiment, a trial garden for Southeastern native plants for use in landscaping.

The project began three years ago with the removal of non-native and scrub material between a roadway and mowed area. Mulch and sand were dug in thoroughly.

"Woodies" like red cedar, Saint John's wort, smoke tree, and fragrant sumac were used as the framework around which to plant the many perennials and a few annuals.

"Now that we have installed nearly a hundred kinds of plants in the border, we find our education has just begun. Some plants have unexpectedly become thugs in our loose humusy soil," he said. "Elm-leafed goldenrod that was a knee-high, airy clumper in the wild became a shoulder high spreading invader. (We pot some of the extras for our semi-annual plant sales.)"

"Tall passion fruit vine, the state wildflower of Tennessee, overgrows nearby plants so profusely that we must relegate it to the fence-row border across the roadway," he said.

Larry notes that "Mother Nature helps, too" by sending seed on the wind—tall thoroughwort and white frost aster. "She is an over-achiever sometimes it seems."

He said many other natural forces work constantly: "Butterflies and hummingbirds regularly visit to nectar on the smorgasbord of flowers. Birds bring seeds which they drop and thereby sow throughout the year."

Lichterman, with its gardens and its indoor exhibits, is located at 5992 Quince Road. It is open to the public from 9:30 to 5 Saturdays and 1 to 5 on Sundays. Admission is charged.

A FRESH LOOK AT AN OLD HARBINGER AND FRIEND

Hepatica (*Hepatica nobilis* Miller)

Historical Notes

The Doctrine of Divine Signatures holds that God has provided man with all the medicinal herbs he needs to cure his earthly ills. All people need to do, with the grace of God, is to read the Divine messages in the plants. Devout

Herbalists hold that hepatica can cure liver disease, for the leaves have lobes like the liver and, moreover, they are mottled with purple and bilious green like the human liver.

The Plant

Hepatica is one of the earliest plants to flower at winter's end in our American woodlands, growing from Quebec to Manitoba south to Missouri and Georgia. It grows in clumps almost under last year's fallen leaves, where one sees tufts of delicate stems (scapes), up to 15 cm tall, copiously covered with fine long hairs. On the tops of these sit a single blue, sometimes white, flower up to 2.5 cm in diameter. A cheerful sight when patches of unmelted snow are still around.

The leaves are broadly oval with three wide lobes. The top surface is dull green with purple markings, the lower side is mostly purple. These leaves have stayed alive since the previous year; later in the spring new green leaves will appear.

Looking at the flower, one thinks the blue floral parts are *petals*, and the three oval green parts under the flower are *sepals*. Not so! What look like petals, all 5-12 of them, are *sepals*, and the "sepals" are *involucral bracts*. There are no petals! There is a central cluster of exposed *pistils* and a ring of *stamens*. The flower provides no nectar, and so is of no interest to bees.

By comparing the flower to that of a buttercup, one can readily see the basic similarity. *Hepatica* is in the same plant family, *Ranunculaceae*, the family of little frogs. (*Rana* is Latin for frog.)

In America we have two subspecies of *Hepatica nobilis*: *ssp obtusa*, having leaf lobes bluntly rounded but not deep, and *ssp acuta*, having leaf lobes sharply pointed and cut halfway to the middle of the blade. The former grows in rather dry acid woods; the latter in damper rich limy places.

Toxicity

Hepatica does have potent biologically active principles in it. I have shown that a "tea" of 0.25 gm of dry leaf per dl of water will kill minnows within three minutes; as little as 0.016 gm/dl kills them within one hour. But there is no evidence that hepatica can cure liver disease, or any other ailment, and I do not endorse its use.

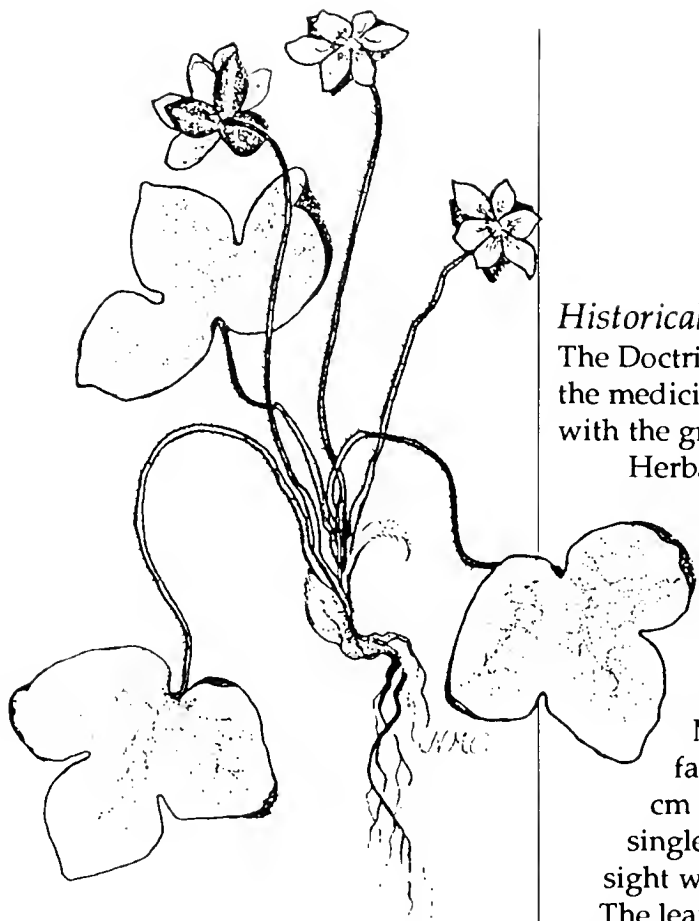
Yet there is no reason to debunk the Doctrine of Divine Signatures. Either the herbalists who read the signs read them wrongly or else they were not in God's good grace.

All of more than a hundred human livers I have seen had two lobes, not three.

Biochemistry

Many plants in the "little frog" family contain protoanemonine, which is poisonous, but many contain other toxic substances as well. The chemistry of hepatica remains unclear.

—John A. Churchill, M.D.
Johnson City



Drawing by Nadine Churchill

Hepatica Days

From a clump of last year's foliage, the white blossoms of hepatica can appear suddenly on sunny spring mornings. On cloudy days the flowers do not open. But they persist, presumably to enhance pollination.

PLANT CONFERENCE ON THE BAYOU

The Gulf Coast Regional Native Plant Conference will be held June 9-12 at the University of Southwest Louisiana in Lafayette.

The conference offers an intriguing array of lectures, workshops, book and plant sales, and field trips.

Catch this: The opening-day field trips provide a choice of (1) Jefferson Island/Live Oak Gardens, (2) Atchafalaya Basin Canoe Trip, and (3) Wetlands Ecology Tour.

For more information write to Bill Fontenot, chairman of the conference steering committee, at Native Plant Conference, Lafayette Natural History Museum, 637 Girard Park Drive, Lafayette, Louisiana 70503 or call 318/235-6181. □

SUMMARY OF SPRING FIELD TRIPS

A Nod to the Iris, a Bow to Variety



Search for the Beaked Trout Lily

March 27

On this first field trip of 1993, we will visit several rich hill-sides searching for early spring flora. We should have no trouble finding hepaticas, spring beauties, toothworts, and maybe bloodroot and twinflower. Our primary objective of this outing is to see *Erythronium rostratum* (beaked trout lily). Maybe we will be lucky enough to find it in several locations. Walking distances will be short. Boots will be useful for crossing small spring branches. A sack lunch is recommended.

Everyone planning to attend should meet at 10 a.m. (Central) at the Shoney's restaurant on U.S. Hwy 43 at the north edge of Lawrenceburg. Check first with Dennis Horn (615/454-5742) or Milo Pyne (615/532-0440).

Finding those Central Basin Mustards

April 3

Our objective is to check various sites of Wilson and Eastern Davidson counties for rare members of the genera *Leavenworthia* and *Lesquerella*, some of which are restricted to only one creek drainage and others of which are more widespread. The hiking will be easy, but some sites are in potentially muddy creek floodplains; so waterproof shoes are advisable. Lunch will be available in nearby restaurants.

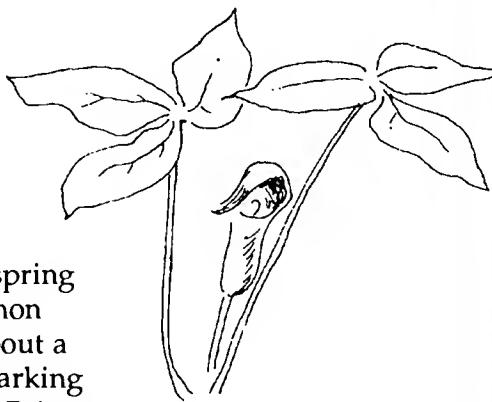
The meeting time will be 10 a.m. (Central) at Stuckey's restaurant on the south side of I-40 on U.S. 231 (Exit 238) east of Nashville. Contact Milo Pyne (615/532-0440) or Andrea Shea (615/532-0439).

Spring Flora on the Trace

April 17

We will seek the spring flora along the Natchez Trace Parkway at Burns's Branch. At this scenic setting on the western highland rim, we will cover a range of elevations, from creek bottom to ridgetop. We will probably see dwarf crested iris, trillium, waterleaf, hepatica, foamflower, spring beauty, jack-in-the-pulpit, and other common spring wildflowers. Moderate hiking of about a half-mile round trip or a mile to another parking lot, with shuttle return, can be considered. Bring a box lunch, and consider an afternoon trip to Primm Springs or the Duck River.

Everyone should meet at 10 a.m. (Central) at Garrison Creek Visitors Center on the Natchez Trace Parkway one to two miles south of Leipers Fork, near Hwy 46. Contact Bob Brown (615/352-7474).



Smoky Mountain Wildflower Pilgrimage

April 22-24

More than ninety field trips will be offered during this popular three-day event, including morning, afternoon, and all-day trips each day. Registration will begin at 7:30 each morning in the W. L. Mills Auditorium in Gatlinburg. For more information, write to: Great Smoky Mountains National Park, Gatlinburg, TN 37738 or call 615/436-1262.

TNPS Members: New and Renewing for 1993

(Continued from December
1992 Issue)

Kathryn R. Adams, Knoxville
Mary Ann Arildsen, Brentwood
Mrs. Daisy Arrington, Doraville, GA
W.B. Rogers Beasley, Sewanee
Sidney A. Berry, Lebanon
Arthur & Willa Brooks, Englewood
Mary I. Burks, Birmingham, AL
Jack/Dorothy Carman, Tullahoma
Dr./Mrs. John Churchill, Johnson City
Helen T. Cutcher, Knoxville
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Mrs. K. R. Egger, Kingsport
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Jan Ehleben, McMinnville
Joe C. Feeman, Jr., Norris
Bruce Gillies, Reliance
Ann W. Goodpasture, Brentwood
Mr/Mrs Anthony Halterlein,
Readyville
Bill and Cherrie Hall, Nashville
James L. Hatmaker, Nashville
Mrs. Joe M. Haynes, Goodlettsville
Kenneth C. Heck, Chattanooga
Annie Heilman, Clarksville
Ann H. Hill, Knoxville
Otto R. Hirsch, Nashville
Raymond W. Holton, Knoxville
Elizabeth Hoover, McMinnville
Nancy Boyd Johnson, Nashville
Dr. David S. Johnston, Charlotte, NC
Patsy/Craig Jones, Thompson Stn
Bill and Kay Jones, Hampshire
Miriam Wright Keener, Chattanooga
Margie Lassetter, Ft. Oglethorpe, GA
Brad Maxwell, Nashville
Ruth V. McMillan, Lascassas
L. V. McNeese, Hendersonville
Agnes Miller, Cowan
Sally Mirick, Knoxville
Joyce Moore, Chuckey
Curtis/Carol Neely, Huntsville, AL
Sibyl W. Nestor, Kingston
Josephine Von Nieda, Nashville
Larry Pounds, Oak Ridge
Cheryl D. Priest, McMinnville
Margaret Rhinehart, Spencer
Frances Riggs, Sparta
Ellen B. Rust, Franklin
Edward Schell, Johnson City
Andrea Shea, Nashville
Dr. Harrison Shoulders, Monteagle
Frank/Mary Alice Tucker, Knoxville
Herb White, Liberty
Karen and Orlan Yarbrow, Knoxville □

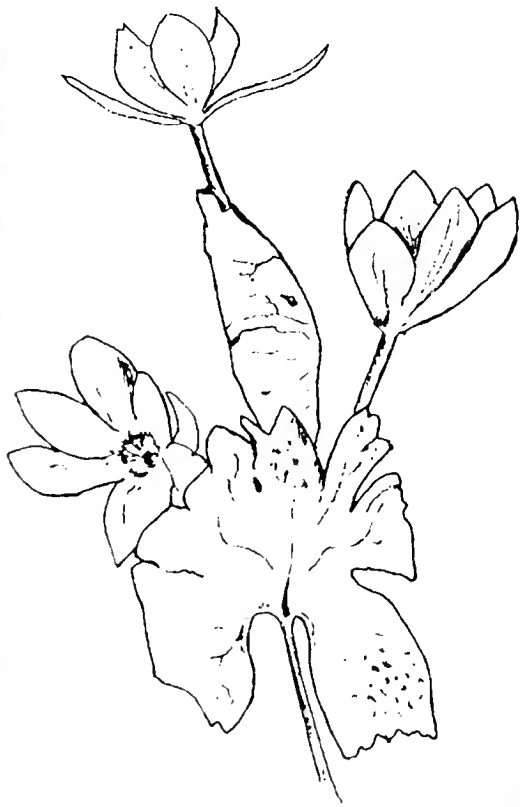
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A FAREWELL TO GOOD FRIENDS

TNPS has lost an important member and leader, J. I. (Bus) Jones of Chattanooga, who died in December of cancer. Bus was a founder and long-time president (and newsletter editor) of the American Association of Field Botanists. He was a board member for TNPS and was instrumental in initiating work on Tennessee Flora 2001.

Bus had a knack for cultivating botany-loving friends far and wide because of his intense interest in native flora and his enthusiasm for seeking out unusual plants to show and discuss with others. He would travel great distances to see and photograph botanical treasures. His trip last year to Michigan with Ed Schell and Dennis Horn turned out to be his last. He will be missed.

In recalling old friends, we mark the death of Billie Nickell of Dayton, Ohio, a TNPS life member. □



Editor's Note

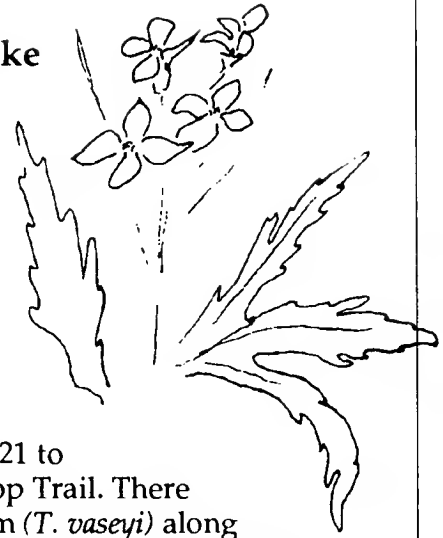
In the December issue, we promised to publish in this issue a summary of the fall membership survey. Alas, not enough room. (Field trips are more important.) Maybe we'll find space in the next issue.

TNPS FIELD TRIPS—CONTINUED

Post-Pilgrimage Hike

April 25

Now a tradition for TNPS, members will gather at the Sugarlands Visitors Center just outside Gatlinburg for a post-Pilgrimage field trip. Our destination for this hike will be Noisy Falls on U.S. Highway 321 going northeast out of Gatlinburg toward Cosby. The easy hike should take us to a patch of white dwarf crested iris, showy orchis, and the southern nodding trillium (*T. rugelii*), both white and maroon color forms. If time permits, we will continue on U.S. 321 to Cosby picnic area and hike the Cosby Nature Loop Trail. There we will find unusual variations of Vasey's trillium (*T. vaseyi*) along with other spring flora. The meeting time is 9:30. Pack a lunch to make the day complete.



Fall Creek Falls Annual Wildflower Pilgrimage

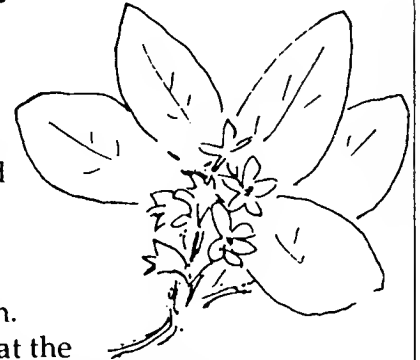
April 30–May 1-2

Stewart Carroll always has a great weekend planned for those who attend the annual wildflower weekend at Fall Creek Falls State Park. Activities include a slide show at 7:30 p.m. on Friday and hikes on Saturday and Sunday, beginning at 9 a.m. We should see both dwarf crested iris (*Iris cristata*), and vernal iris (*Iris verna*) in bloom as well as a large number of late spring flowering plants. Sturdy shoes are required for some hikes.

Finding the Iris at Shelby Farms

May 8

Memphis is our destination this trip as we seek the copper iris in Shelby Farms State Natural Area and visit other sites of mesic forest and wetland herbs. We expect to see other iris species and the state-listed *Phacelia ranunculoides* and *Schizandra glabra*. The hiking will be easy, but some sites will probably be muddy. Bring a sack lunch and bug repellent. Expect the hikes to end about 4 p.m. Everyone is asked to meet at 10:30 a.m. (Central) at the Memphis AgriCenter International. Exit I-40 on east side of Memphis at Hwy 177 (Germantown Pkwy). Turn onto Walnut Grove Road and follow signs to AgriCenter.








Rare Species for the Annual Meeting

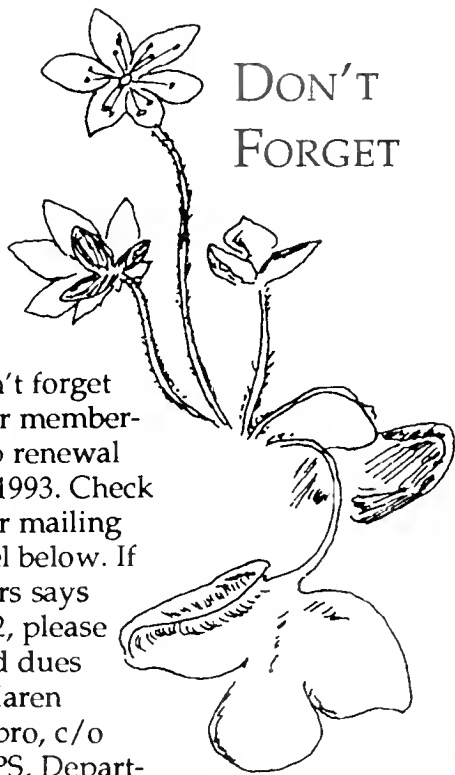
May 14-16

Field trips will include hikes to see the slender blue flag (*Iris prismatica*) and southern blue flag (*Iris virginica*). The AEDC orchids will be starting to bloom at that time as will the rare frostweed (*Helianthemum propinquum*).

A trip outside AEDC is planned to see the lily-leaved twayblade (*Laparis lilifolia*). A visit to nearby May Prairie State Natural Area will allow us to see the false blue indigo (*Baptisia australis*) and the indian paintbrush (*Castilleja coccinea*).

1993 TNPS FIELD TRIP SCHEDULE

Date	Location	Description	Leader	Place/Time
March 27	Lawrence, Wayne Co. 	<i>Erythronium, rostratum</i> (beaked trout lilly)	Dennis Horn 615/454-5742 Milo Pyne 615/532-0440	Lawrenceburg Shoney's 10 a.m. (CT)
April 3	Wilson, Davidson Co.	Central Basin mustards, glade cress, bladder pods	Milo Pyne, Andrea Shea 615/532-0439	Stuckey's, US 231 South side I-40 10 a.m. (CT)
April 17	Natchez Trace Pkwy Burns Branch 	Rich spring flora	Bob Brown 615/352-7474	Garrison Crk Visitors Center 10 a.m. (CT)
April 22-24	Smoky Mt. Wildflower Pilgrimage 	90 field trips, half-day and all- day trips and hikes		Mills Auditorium Registration
April 25	Noisy Creek/Cosby Nature Trail in Smokies	<i>Iris cristata</i> (var. <i>alba</i>) southern nodding trillium	Tom Patrick Dennis Horn	Sugarlands Cntr 9:30 a.m. (ET)
May 1-2	Fall Creek Falls Wildflower Festival 	<i>Iris verna, Synandra hispidula</i>	Stewart Carroll 615/881-5708	Park Nature Cntr Hikes 9 a.m. (CT) May 1 & 2
May 8	Meeman-Shelby, Shelby Farms State Natural Area	<i>Iris fulva</i> (copper iris)	Larry Wilson 901/458-8724	Memphis AgriCenter 10:30 a.m. (CT)
May 14-16	AEDC/Coffee Co. TNPS Annual Meeting	Programs and hikes— <i>Iris</i> <i>prismatica, I. virginica</i> , orchids (including <i>Liparis lillitalia</i>)	Kay Jones (Coordinator) 615/285-2777	Details in separate story.
June 12 June 13	Hardin Co., Walker Branch Bucksnot Bluffs	Zig zag iris (<i>Iris brevicaulis</i>) Price's potato bean	Milo Pyne 615/532-0440	Bucksnot Deli off I-40 just W. of TN River
June 26-27	Bluff Mtn/Blue Ridge Pkwy	Rare plants, fantastic scenery, good company	Ed Schell 615/282-6125	Check later issues
July 24	Van Buren Co.	Fringeless purple orchid	Margaret Rhinehart 615/946-2381	Check later issues
Aug. 14	Eastern Highland Rim, Coffee County	Introduction to grasses, rushes, and sedges	Hal DeSelm 615/974-6208	Check later issues
Aug./Sept.?	VanBuren Co.	Three-bird orchid alert	Margaret Rhinehart 615/946-2381	Check later issues
Sept. 11	Lewis Co. 	<i>Parnassia, Xyris</i>	Bill/Kay Jones 615/285-2777	Check later issues
Oct. 2	Shady Valley Bog	Cranberry bog, rare plants	Ed Schell 615/282-6125	Check later issues
Oct. 9	Fort Oglethorp/Catoosa County, Georgia	<i>Spiranthes magnicamporum</i> , Great plains ladies' tresses	Jim Allison 404/963-4428	Check later issues



DON'T
FORGET

Don't forget your membership renewal for 1993. Check your mailing label below. If yours says 1992, please send dues to Karen Yarbro, c/o TNPS, Department of Botany, University of Tennessee, Knoxville, TN 37996-1100. (\$15 regular, \$10 student and senior)

THE TNPS ANNUAL MEETING

Plans Move Forward for May 14-16 Event

A bundant flora and a variety of interesting programs will highlight this year's TNPS Annual Meeting.

Once again the Tennessee Native Plant Society is combining its annual meeting with that of the American Association of Field Botanists.

The event will be held May 14-16 at Arnold Engineering Development Center in Coffee County.

Kay Jones of Hampshire, the annual meeting coordinator, asks that everyone be ready to register without delay when specific information about prices arrives in the April TNPS Newsletter. A registration form will be published in that issue.

Accommodations and facilities at AEDC will be first class and are provided at a reasonable price. Kay notes that breakfasts and evening meals will be available at the Forest Inn and Arnold Lakeside Club. Participants will need to prepare lunches or seek out restaurants nearby.

The activities being planned include a program on trilliums by Tom Patrick, a slide presentation by photo-naturalist Ed Schell, and a lecture about the natural resources management program at AEDC by Mark Moran, AEDC resource manager. TNPS members are asked to bring their slides for an informal show the opening night (Friday).

Some details about field trips can be found on page 6.

Vol. 16, No. 1; February 1993

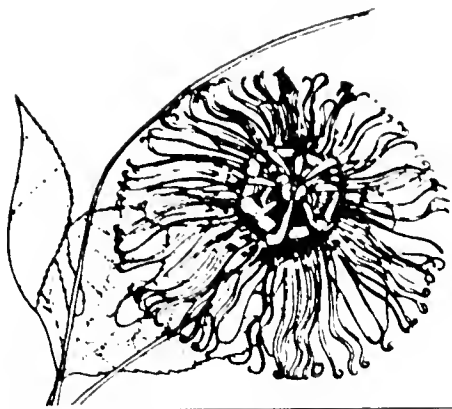
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TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

Volume 16, Number 2

April 1993

ROADSIDE WILDFLOWERS

Pilot Project Ending

★ State Legislation Pending ★

Will Tennessee get a roadside wildflower program this year? The pilot project to preserve and propagate wildflowers along state highways is coming to an end in June, and legislation to establish a permanent program is pending (precariously) on Capitol Hill.

TNPS members are asked to contact key state legislators as soon as possible to urge passage.

Called the Bicentennial Beautification Act of 1993 (Senate Bill 55, House Bill 463), the legislation has the following key provisions:

Section 2. It is the intent of the General Assembly to:

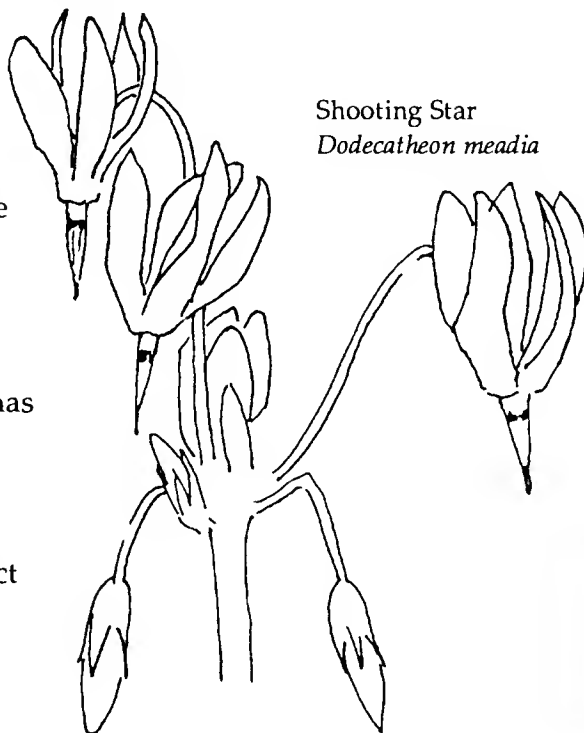
1) Develop a permanent roadside landscaping program with the department of transportation with emphasis on wildflower preservation and propagation.

2) Beautify the state's roadways and enhance the aesthetics of the state's highway system while reducing maintenance costs.

3) Make the public more aware of the state's landscape diversity and improve environmental quality along the roadways.

Section 3. The commissioner of the department of transportation shall establish a landscaping section within the department's maintenance division which will be responsible for implementing and administering a permanent program for the preservation and propagation of the state's native wildflowers along the roadways.

★ The bill was scheduled to go before the house committee by mid-April, and calls should be made as soon as possible to the senate sponsor, Sen. Steve Cohen (615/741-4108) or one of the house sponsors, Rep. John Bragg or Rep. Shirley Duer (615/741-1681).



Shooting Star
Dodecatheon meadia

Although all states adjacent to Tennessee have active roadside wildflower programs, Tennessee has yet to establish a permanent program or policy. This despite the potential savings in the cost of mowing and spraying, despite the enhanced beauty that would attract tourists, despite the availability of

Continued Page 3

DIRECTORS APPROVE AMENDMENTS TO CONSTITUTION AND BYLAWS

The TNPS Board of Directors is asking the membership to consider a series of amendments to the society's constitution and bylaws.

The amendments were approved by the board at its winter meeting on February 27.

Mary Martin Schaffner of Nashville, TNPS president, said the proposed changes reflect primarily what has become, through the years, the actual practice. In some cases, the changes eliminate formality for a society that has always been informal.

These amendments are described on page 2.

All members are asked to mark their approval or disapproval of these amendments and mail the ballot to the corresponding secretary, Andrea Shea, by May 14.

See Page 2
for Amendments

ALSO IN THIS ISSUE

Field Guides
for Tennessee
Page 4

Photography
by David Duhl
Page 5

TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

April 1993
Volume 16, Number 2

This Newsletter is a publication of the Tennessee Native Plant Society and is published six times a year, generally in February, April, June, August, October, and December.

The Tennessee Native Plant Society (TNPS) was founded in 1978. Its purposes are to assist in the exchange of information and encourage fellowship among Tennessee's botanists, both amateur and professional; to promote education of the public about Tennessee flora, and wild plants in general; to provide, through publication of a newsletter or journal, a formal means of documenting information on Tennessee flora and of informing the public about wild plants; and to promote the protection and enhancement of Tennessee's wild plant communities.

Dues are \$15 for the calendar year (\$10 for students and senior citizens, \$20 for institutions, and \$150 for life memberships). Membership privileges include a subscription to the TNPS Newsletter. Dues may be sent to the Tennessee Native Plant Society, Department of Botany, the University of Tennessee, Knoxville, TN 37996-1100.

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Vice-President
Andrea Shea of Nashville,
Corresponding Secretary
Nita Heilman of Clarksville,
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Kay Jones of Columbia
Larry Wilson of Memphis
Sally Mirick of Knoxville

Latham Davis, Editor

Letters to the editor or correspondence about the Newsletter should be addressed to: TNPS Newsletter, P.O. Box 856, Sewanee, TN 37375.

Amendments—continued

Members Asked to Respond

Vote to approve or disapprove the following changes in the constitution and by-laws by marking boxes to the left of each amendment—"yes" for approval, "no" for disapproval.

Please clip and send this ballot or send a copy to the TNPS corresponding secretary, Andrea Shea, 341 Huntington Ridge Dr., Nashville, TN 37211.

Proposed Amendments to the Constitution

1) Under Article IV (officers and duties), delete from the first sentence the words, "who shall serve no more than two consecutive terms of office" (removing the limitation on the terms of TNPS officers).
Yes No

2) Delete the words "to be mailed to the membership not later than January 31st" and substitute the words, "to be included in the last newsletter of each year" (which provides for the publication of the annual report).
Yes No

3) Under Article V (board of directors and duties), delete the last sentence and substitute the following: "At least one Director-at-Large will reside in each of the three Grand Divisions of the State of Tennessee" (which removes the requirement that two directors-at-large must reside in each of the grand divisions).
Yes No

Under Article VII (election and terms), delete the second sentence under Section 1(b) and the words in Section 2 "from each of the three regions of the state designated in Article V" (to conform to the changes in Amendments 1 and 2).

4) Under Article VIII (meetings) delete the words of Section 1(a) "one fall, one winter, and one spring meeting" and substitute the words, "two meetings" (in reference to the number and times of required meetings of the board of directors).
Yes No

5) Under Article IX (amendments) delete the second sentence of Section 1(a): "If approved by the Board, the proposed amendment shall be submitted to the entire membership for their ratification." And delete the second sentence of Section 1(b): "If approved by the Board of Directors, the proposed amendment shall be submitted to the membership by mail for ratification."
Yes No

Delete Section 2 (approval of amendments) and substitute the following:

a) If a majority of the Board of Directors approves a proposed amendment, the amendment shall be submitted to the membership by mail for ratification.

b) A two-thirds majority of members voting shall be necessary to constitute ratification of the amendment by the membership.

Proposed Amendments to the Bylaws

1) Under Article V (standing committees), delete the first sentence, which says, "The standing committees shall be: Program, Publications, Publicity, Conservation, Membership, and such other committees as are deemed necessary," and substitute the following: "The standing committees shall be designated by the Board of Directors."
Yes No

2) Under Article VII (Amendments), delete the second sentence of Section 1(a), the second sentence of Section 1(b), and all of Section 2 (Approval of Amendments), and substitute for Section 2 the following: Section 2(a) If a majority of the Board of Directors approves a proposed amendment, the amendment shall be submitted to the membership by mail for ratification.
Yes No

Section 2(b) A simple majority of members voting shall be necessary to constitute ratification of the amendment by the membership.

THE FASCINATION OF BOTANY

After our article in last December's issue about mistletoe, George Ramseur lent me a book he thought I would find interesting because of a chapter in it about mistletoe, especially Australian mistletoes.

The title of the book is *Wily Violets and Underground Orchids: Revelations of a Botanist*, and I mention it here because its pages are packed with botanical information that is organized into an invitingly readable style. The author, by the way, is Peter Bernhardt, a professor at St. Louis University.

Since I mentioned mistletoe, I will introduce here a few items from the mistletoe chapter of *Wily Violets*. Our December article was occupied primarily with one of perhaps two species that inhabit eastern North America. In contrast, Australia has about sixty mistletoe species. Also, the Australian mistletoes are spread throughout the Australian mainland and exploit almost all native trees and shrubs as hosts. There are, in fact, mistletoes parasitic on mistletoes. So many complexities exist that the author writes: "After five years of field study I am almost willing to admit that Australian mistletoes have elevated parasitism to a fine art."

Bernhardt describes the coevolution of mistletoes and native birds, and he describes in particular the habits of a bird known in Australia as the mistletoe bird (*Dicaeum hirundinaceum*), to which Bernhardt attributes much of the success of the Australian mistletoes.

Altogether there are eighteen chapters in the book, most of them dealing with material Bernhardt has gathered from studies in the U. S. and Central America, as well as Australia. Among the topics (I cannot resist mentioning) is the underground orchid of Australia (*Rhizanthella gardneri*), which exists and flowers entirely underground. Its success is attributed to its ability to harness the food-gathering properties of fungi. It is pollinated, apparently, by a tiny fly. It has two distinct odors, one noxious and one sweet.

I mention Bernhardt's book for another reason. In the foreword, Peter H. Raven, director of the Missouri Botanical Garden, provides a consummate statement on botany. That statement explains exactly my fascination with plants. Perhaps it will explain your fascination, too.

Our relationship with the plant world is based on reciprocity. Plants are all around us, and through their ability to capture some of the sun's energy and make it available in chemical form for biological processes, they make all life possible. But this is only one side of the equation. Plants are immobile, incapable of moving from place to place in search of food or mates. The food they produce themselves. The mates, on the other hand, are found by their control of the activities of insects and other animals. Plants have developed the ability to direct animal activities through such adaptations as flowers and edible or adherent fruits. In this sense, flowers are much more than just colorful and often delightfully scented structures; they are organs designed to manipulate us animals into helping plants propagate. Our interactions with plants are remarkably two-sided—without them, life as we know it would not exist; and without living, mobile animals, many plants would find it very difficult to outbreed successfully, or to disperse their seeds.

By understanding more about the biology of flowers, therefore, we can appreciate plants better and enrich our interactions with them, whether as gardeners, agriculturists, or simply as lovers of beautiful objects. The everyday flowers around us—oaks, chrysanthemums, irises, and azaleas that fill our gardens, woods, and prairies—and also the exotic and often bizarre plants that we encounter in greenhouses or on occasional trips to warmer parts of the globe—become more interesting and vital the better we know them.

Wily Violets and Underground Orchids: Revelations of a Botanist by Peter Bernhardt (New York, Vintage, 1990), \$9.95 paperback.

—Latham Davis



ROADSIDE WILDFLOWERS—Continued

federal funds for landscaping, and despite benefits to the environment.

Several TNPS members expressed interest in the pilot project after an article last year in the TNPS Newsletter. They contacted Candy Swan, the project coordinator, at Tennessee Tech University. Candy helped establish eight test sites throughout the state and collected considerable data about native plant populations and seed sources. She also prepared quarterly reports and a long-term management plan. These steps were required under the 1990 act that established the pilot project.

However, a continuing lack of interest at the state level, in the department of transportation, has meant "business as usual" along state highways.

Andrea Shea, a botanist in the department of environment and conservation and a TNPS member, also assisted with the pilot project and can be contacted about further information. Her office number is 615/532-0439. □

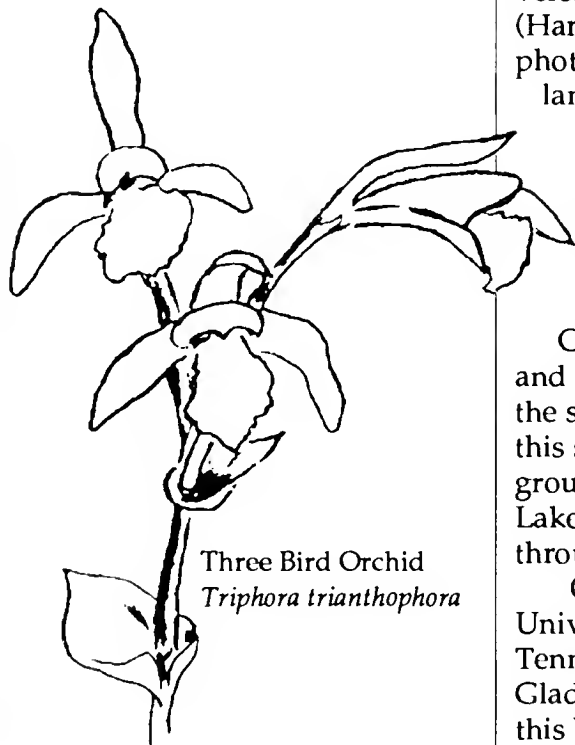
NEW ENDANGERED SPECIES LEGISLATION

The federal Endangered Species Act of 1973 will be closed out this year, and re-enactment of a new law is already a controversial issue nationally.

Conservation groups are working hard to get the best legislation possible. Part of the thrust of these efforts, put forward in the media by people seeking compromise, is the need to de-emphasize or delete single species and small fragmented reserves for endangered species.

These ideas have merit, but many of Tennessee's rarest plants are site-specific. Larger management areas that offer diverse habitat and potential habitat for native species is important, but smaller areas should not be forgotten.

TNPS members should stay informed about this legislation. Also feel free to write and comment about these issues in this—your—newsletter. □



Three Bird Orchid
Triphora trianthophora

Maintaining Complex Natural Eco-systems

Wild natural areas will always be valuable because they are models of communities we can strive to re-establish in altered landscapes. □

WILDFLOWER BOOKS FOR TENNESSEE

The Best of the Basic Field Guides

As we move into the spring season, some of our members have inquired about wildflower books covering Tennessee. Since I've never met a wildflower book I didn't like, let me share some of my favorites with you.

There are many non-technical books with color photographs of the plants they include. For a book that would cover the entire state, two hardback editions stand out. *A Guide to the Wildflowers and Ferns of Kentucky* by Wharton and Barbour (University of Kentucky Press, 1971) has excellent photos, descriptions, and also includes common ferns in our area. The organization of the plants can be awkward, but the similarity of the floras of Kentucky and Tennessee makes this a very good book for our state. I've used this book so much, I'm on my second copy!

Wildflowers of the Southeastern United States by Duncan and Foote (University of Georgia Press, 1975) covers a much larger area, but is still very accurate for Tennessee. The book follows a more traditional phylogenetic order for plant families and features good color photos and descriptions of a wide variety of plants. Another strong point is that plants similar to those pictured are included in the written description. When I take off on a field trip with TNPS, these two books always go in my truck!

If I'm wildflowering in East Tennessee, I use *Wild Flowers of North Carolina* by Justice and Bell (University of North Carolina Press, 1968), *Great Smoky Mountains Wildflowers*, fourth edition, by Campbell, Hutson and Sharp (University of Tennessee Press, 1977) or *Wildflowers in Color* by Stupka (Harper&Row, 1965). These are all available in paperback and have good color photos of our mountain flora. These books should be available at the Sugarlands Visitor Center in the Great Smoky Mountains National Park.

For northern Middle Tennessee, especially the Western Highland Rim, TVA has a series of inexpensive, color paperback books on the Land Between the Lakes. Titles in this series include *Spring Wildflowers of LBL* by Ellis and Chester (Austin Peay State University, 1971), *Summer and Fall Wildflowers of LBL* by Ellis and Chester (APSU, 1973), *Lichens and Ferns of LBL* by Phillips (APSU, 1974), *Trees and Shrubs of LBL* by Ellis and Chester (APSU, 1980), and *Mushrooms and Other Fungi of LBL* by Sundberg and Richardson (Southern Illinois University, 1980). Non-botanical books in the same series cover amphibians, reptiles, and birds. I like all the books in this series, but I'm especially fond of the tree and fern editions because these groups are not always included in wildflower books. The Land Between the Lakes series can be purchased at the LBL Visitor Center at Golden Pond or through the bookstore at Austin Peay State University.

One final book, *Wildflowers of the Central South* by Hemmerly (Vanderbilt University Press 1990), deserves mention. This color book covers the Middle Tennessee area and includes a number of the plants found only in the Cedar Glades. That alone makes this a very special book! You should be able to find this book at most university bookstores in the Middle Tennessee area.

The books I've mentioned are not the only ones available, they just happen to be my personal favorites. Prices generally run \$15 to \$20 for the hardback editions and \$5 to \$10 for the paperback books. Hopefully I've listed something that will help you enjoy and appreciate the wealth of plants in our state. Of course, the best book for Tennessee is not available yet! TNPS is working hard on publishing a color wildflower book to illustrate 600-800 plants found in our state. You'll be reading about our progress in future issues of the newsletter. Hope to see all of you out on the trail sometime this year.

—Nita R. Heilman
Clarksville

WILDFLOWERS OF TENNESSEE

A book of photographs to be published
by the Tennessee Native Plant Society



Photographers are invited to submit slides or prints of wildflowers, ferns, and showy shrubs found throughout Tennessee for inclusion in the book *Wildflowers of Tennessee*. Each photograph will be identified with the name of the photographer.

All proceeds from publication of the photography book will be applied toward the publication of *Flora 2001*—a complete scientific treatise of the native plants of Tennessee.

Image submissions will be accepted from October 1 through November 30, 1993.

For a copy of the photography submission guidelines, requirements, and agreements, as well as a copy of the complete list of plants eligible for the book, send a self-addressed, stamped (52-cent stamp), business-size envelope to:

Jack Carman
106 LaSalle Lane
Tullahoma, TN 37388.

Some of the wildflowers to be included in the book are . . .

Spider Lily (*Hymenocallis occidentalis*)
Yellow Star Grass (*Hypoxis hirsuta*)
Green Dragon (*Arisaema dracontium*)
Jack-in-the-Pulpit (*Arisaema triphyllum*)
Skunk Cabbage (*Symplocarpus foetidus*)
Asiatic Dayflower (*Commelina communis*)
Virginia Spiderwort (*Tradescantia virginiana*)
Fraser's Sedge (*Cymophyllus fraseri*)
Blackberry Lily (*Belamcanda chinensis*)
Crested Dwarf Iris (*Iris cristata*)
Copper Iris (*Iris fulva*)
Slender Blue Flag (*Iris prismatica*)
Dwarf Iris (*Iris verna*, v. *smalliana*)
Southern Blue Flag (*Iris virginica*)
White Blue-Eyed Grass (*Sisyrinchium albidum*)
Wild Garlic (*Allium canadense*)
Nodding Wild Onion (*Allium cernuum*)
Wild Hyacinth (*Camassia scilloides*)
Fairy Wand (*Chamaelirium luteum*)
Bluehead Wood Lily (*Clintonia borealis*)
Native Lily-of-the-Valley (*Convallaria montana*)

Yellow Mandarin (*Disporum lanuginosum*)
Yellow Trout Lily (*Erythronium americanum*)
Beaked Trout Lily (*Erythronium rostratum*)
Orange Day Lily (*Hemerocallis fulva*)
Canada Lily (*Lilium canadense*)
Gray's Lily (*Lilium grayi*)
Michigan Lily (*Lilium michiganense*)
Wood Lily (*Lilium philadelphicum*)
Turk's-Cap Lily (*Lilium superbum*)
Canada Mallow (*Maianthemum canadense*)
Indian Cucumber Root (*Medeola virginiana*)
Bunchflower (*Melanthium hybridum*)
Grape Hyacinth (*Muscari botryoides*)
Smooth Solomon's Seal (*Polygonatum biflorum*)
Yellow Sunnyside (*Schoenolirion croceum*)
False Solomon's Seal (*Smilacina racemosa*)
Catesby's Trillium (*Trillium catesbaei*)

Toadshade (*Trillium cuneatum*)
Wake Robin (*Trillium erectum*)
White-Flowered Trillium (*Trillium flexipes*)
Large-Flowered Trillium (*Trillium grandiflorum*)
Lance-Leaved Trillium (*Trillium lancifolium*)
Yellow Trillium (*Trillium luteum*)
Ozark Least Trillium (*T. pusillum* v. *ozarkanum*)
Least Trillium (*T. pusillum* v. *pusillum*)
Prairie Trillium (*Trillium recurvatum*)
Southern Nodding Trillium (*Trillium rugelii*)
Sessile Trillium (*Trillium sessile*)
Sweet White Trillium (*Trillium simile*)
Twisted Trillium (*Trillium stamineum*)
Southern Red Trillium (*Trillium sulcatum*)
Painted Trillium (*Trillium undulatum*)
Vasey's Trillium (*Trillium vaseyi*)
Large-Flowered Bellwort (*Uvularia grandiflora*)
Eastern Turkey Beard
(*Xerophyllum asphodeloides*)
Death Camas (*Zigadenus leimanthoides*)

Putty Root (*Aplectrum hymemale*)
Grass Pink (*Calopogon tuberosus*)
Spreading Pogonia (*Cleistes divaricata*)
Autumn Coralroot (*Corallorhiza odontorhiza*)
Pink Lady's Slipper (*Cypripedium acaule*)
So. Lady's Slipper (*Cypripedium kentuckiense*)
Small Yellow Lady's Slipper (*C. parviflorum*)
Yellow Lady's Slipper (*Cypripedium pubescens*)
Showy Orchid (*Calearis spectabilis*)
Downy Rattlesnake Plantain
(*Goodyera pubescens*)
Large Whorled Pogonia (*Isotria verticillata*)
Lily-Leaved Twayblade (*Liparis lilifolia*)
Loesel's Twayblade (*Liparis loeselii*)
Southern Twayblade (*Listera australis*)
Kidney-Leaved Twayblade (*Listera smallii*)
Green Adder's Mouth (*Malaxis unifolia*)
Yellow-Fringed Orchid (*Platanthera ciliaris*)

Small Green Wood Orchid
(*Platanthera clavellata*)
Crested Yellow-Fringed Orchid (*P. cristata*)
Southern Rein Orchid (*Platanthera flava*)
Large Purple-Fringed Orchid (*P. grandiflora*)
Yellow Fringeless Orchid (*Platanthera integra*)
Monkey Face Orchid (*Platanthera integrilabia*)
Ragged-Fringed Orchid (*Platanthera lacera*)
Snowy Orchid (*Platanthera nivea*)
Purple Fringeless Orchid
(*Platanthera peramoena*)
Small Purple-Fringed Orchid
(*Platanthera psycodes*)
Rose Pogonia (*Pogonia ophioglossoides*)
Shadow Witch (*Ponthieva racemosa*)
Nodding Ladies' Tresses (*Spiranthes cernua*)
Crane-Fly Orchid (*Tipularia discolor*)
Three-Birds Orchid (*Triphora trianthophora*)
Yellow-Eyed Grass (*Xyris ambigua*)

Fragrant Sumac (*Rhus aromatica*)
Poison Ivy (*Toxicodendron radicans*)
Pawpaw (*Asimina triloba*)
Queen Anne's Lace (*Daucus carota*)
Harbinger-of-Spring (*Eriogonum bulbosum*)
Cow Parsnip (*Heracleum lanatum*)
American Lovage (*Ligusticum canadense*)
Hairy Sweet Cicely (*Osmorhiza claytonii*)
Cowbane (*Oxypolis rigidior*)
Common Golden Alexanders (*Zizia aurea*)
Mountain Golden Alexanders (*Zizia trifoliata*)
Blue Star (*Amsonia tabernaemontana*)
Periwinkle (*Vinca minor*)

American Ginseng (*Panax quinquefolius*)
Dutchman's Pipe (*Aristolochia macrophylla*)
Wild Ginger (*Asarum canadense*)
Little Brown Jug (*Hexastylis arifolia* v. *ruthii*)
Swamp Milkweed (*Asclepias incarnata*)

Butterfly Weed (*Asclepias tuberosa*)
 Yarrow (*Achillea millefolium*)
 White Snakeroot (*Ageratina altissima*)
 (*Eupatorium rugosum*)
 Solitary Pussytoes (*Antennaria solitaria*)
 Sweet Annie (*Artemisia annua*)
 Aromatic Aster (*Aster oblongifolius*)

Rugel's Indian Plantain
 (*Cacalia rugelii*)(*Rugelia nudicaulis*)
 Ox-Eye Daisy (*Chrysanthemum leucanthemum*)
 Green and Gold (*Chrysogonum virginianum*)
 Chicory (*Cichorium intybus*)
 Tall Thistle (*Cirsium altissimum*)
 Bull Thistle (*Cirsium vulgare*)
 Lance-Leaved Coreopsis (*Coreopsis lanceolata*)
 Pale Coneflower (*Echinacea pallida*)
 Purple Coneflower (*Echinacea purpurea*)
 Tennessee Coneflower (*E. tennesseensis*)
 Fireweed (*Erechtites hieraciifolia*)
 Daisy Fleabane (*Erigeron annua*)
 Dog Fennel (*Eupatorium capillifolium*)
 Joe-Pye Weed (*Eupatorium fistulosum*)
 Boneset (*Eupatorium perfoliatum*)
 Grass-Leaved Goldenrod
 (*Euthamia graminifolia*)
 Rabbit Tobacco (*Gnaphalium obtusifolium*)
 Autumn Sneezeweed (*Helenium autumnale*)
 Common Sunflower (*Helianthus annuus*)
 Appalachian Sunflower (*Helianthus atrorubens*)
 Maryland Golden Aster (*Heterotheca mariana*)
 Golden Aster (*Heterotheca pilosa*)
 Rough Blazing Star (*Liatris aspera*)
 Black-Eyed Susan (*Rudbeckia hirta*)
 Southern Ragwort
 (*Senecio anonymus*)(*S. smallii*)
 Southern Rosinweed (*Silphium asteriscus*)
 Great Goldenrod (*Solidago gigantea*)
 Rough-leaved Goldenrod (*Solidago patula*)
 Dandelion (*Taraxacum officinale*)
 Yellow Goatsbeard (*Tragopogon pratensis*)
 Tall Ironweed (*Vernonia gigantea*)
 New York Ironweed (*Vernonia noveboracensis*)

Spotted Touch-Me-Not (*Impatiens capensis*)
 Pale Touch-Me-Not (*Impatiens pallida*)
 Blue Cohosh (*Caulophyllum thalictroides*)
 Twinleaf (*Jeffersonia diphylla*)
 Mayapple (*Podophyllum peltatum*)

Cross Vine (*Bignonia capreolata*)
 Trumpet Creeper (*Campsis radicans*)
 Wild Comfrey (*Cynoglossum virginianum*)
 Viper's Bugloss (*Echium vulgare*)
 Hoary Puccoon (*Lithospermum canescens*)
 Virginia Bluebells (*Mertensia virginica*)
 Small Forget-Me-Not (*Myosotis laxa*)
 Comfrey (*Symphytum officinale*)
 Garlic Mustard (*Alliaria petiolata*)
 Slender Toothwort (*Dentaria heterophylla*)
 Dame's Rocket (*Hesperis matronalis*)

Allegheny Spurge (*Pachysandra procumbens*)
 Prickly Pear (*Opuntia humifusa*)
 Sweet Shrub (*Calycanthus floridus*)
 Tall Bellflower (*Campanula americana*)
 Southern Harebell (*Campanula divaricata*)
 Cardinal Flower (*Lobelia cardinalis*)
 Indian Tobacco (*Lobelia inflata*)
 Great Lobelia (*Lobelia siphilitica*)
 Venus's Looking-Glass (*Triodanis perfoliata*)
 Mountain Honeysuckle (*Lonicera dioica*)
 Yellow Honeysuckle (*Lonicera flava*)
 Maple-Leaved Viburnum
 (*Viburnum acerifolium*)

Deptford Pink (*Dianthus armeria*)
 Bouncing Bet (*Saponaria officinalis*)
 Carolina Pink (*Silene caroliniana*)
 Catchfly (*Silene ovata*)

Starry Campion (*Silene stellata*)
 Fire Pink (*Silene virginica*)
 Bladder Campion (*S. vulgaris*)(*S. cucubalus*)
 Star Chickweed (*Stellaria pubera*)

Strawberry Bush (*Euonymus americanus*)
 Burning Bush (*Euonymus atropurpureus*)
 St. Peterswort (*Hypericum crux-andreae*)(*H. stans*)
 Pale St. Johnswort (*Hypericum ellipticum*)
 Golden St. Johnswort (*Hypericum frondosum*)
 St. Andrew's Cross (*Hypericum hypericoides*)
 Hedge Bindweed (*Calystegia sepium*)
 Common Dodder, Love Vine (*Cuscuta gronovii*)
 Wild Potato Vine (*Ipomoea pandurata*)
 Common Morning Glory (*Ipomoea purpurea*)

Flowering Dogwood (*Cornus florida*)
 Widow's Cross (*Sedum pulchellum*)
 Stonewort (*Sedum sarmentosum*)
 Dwarf Sundew (*Drosera brevifolia*)(*D. annua*)

Trailing Arbutus (*Epigaea repens*)
 Mountain Laurel (*Kalmia latifolia*)
 Pinesap (*Monotropa hypopithys*)
 Indian Pipe (*Monotropa uniflora*)
 Smooth Azalea (*Rhododendron arboreum*)
 Flame Azalea (*Rhododendron calendulaceum*)
 Catawba Rhododendron (*R. catawbiense*)
 Wild Azalea (*R. periclymenoides*)(*R. nudiflorum*)
 Swamp Azalea (*R. viscosum*)
 Large Cranberry (*Vaccinium macrocarpon*)
 Deerberry (*Vaccinium stamineum*)

Wild Poinsettia (*Euphorbia heterophylla*)
 Cumberland Spurge (*Euphorbia mercurialina*)
 Price's Potato Bean (*Apios priceana*)
 Guthrie's Ground Plum (*Astragalus bibullatus*)
 Tennessee Milk Vetch (*Astragalus tennesseensis*)
 Blue False Indigo (*Baptisia australis*)
 Partridge Pea (*Chamaecrista fasciculata*)
 Wild Sensitive Plant (*Chamaecrista nictans*)
 Butterfly Pea (*Clitoria mariana*)
 Crown Vetch (*Coronilla varia*)
 Leafy Prairie Clover (*Dalea foliosa*)
 Nashville Breadroot (*Pediomelum subacaule*)
 Kudzu (*Pueraria lobata*)
 Goat's Rue (*Tephrosia virginiana*)
 Thermopsis (*Thermopsis mollis*)

Red Clover (*Trifolium pratense*)
 White Clover (*Trifolium repens*)
 American Wisteria (*Wisteria frutescens*)
 Squirrel Corn (*Dicentra canadensis*)
 Dutchman's Breeches (*Dicentra cucullaria*)
 Wild Bleeding Heart (*Dicentra eximia*)

Soapwort Gentian (*Gentiana saponaria*)
 Stiff Gentian (*Gentianella quinquefolia*)
 Pennywort (*Obolaria virginica*)
 Rose Pink (*Sabatia angularis*)
 Slender Marsh Pink (*Sabatia campanulata*)
 Carolina Cranesbill (*Geranium carolinianum*)
 Wild Geranium (*Geranium maculatum*)
 Appendaged Waterleaf
 (*Hydrophyllum appendiculatum*)
 Purple Phacelia (*Phacelia bipinnatifida*)
 Blue Scorpion Weed (*Phacelia ranunculacea*)

Yellow Giant Hyssop (*Agastache nepetoides*)
 Downy Wood Mint (*Blephilia ciliata*)
 Cumberland Rosemary (*Conradina verticillata*)
 Dittany (*Cunila origanoides*)
 American Pennyroyal (*Hedeoma pulegioides*)
 Henbit (*Lamium amplexicaule*)
 Purple Dead-Nettle (*Lamium purpureum*)
 Bergamot (*Monarda bradburiana*)
 Bee Balm (*Monarda didyma*)
 Catnip (*Nepeta cataria*)
 Obedient Plant (*Physostegia virginiana*)
 Heal-All (*Prunella vulgaris*)

Lyre-Leaved Sage (*Salvia lyrata*)
 Hairy Skullcap (*Scutellaria elliptica*)
 Common Yellow Flax
 (*Linum medium* v. *texanum*)
 Indian Pink (*Spigelia marilandica*)
 Purple Loosestrife (*Lythrum salicaria*)
 Rose Mallow (*Hibiscus moscheutos*)
 Maryland Meadow Beauty (*Rhexia mariana*)
 Virginia Meadow Beauty (*Rhexia virginica*)

Yellow Pond Lily (*Nuphar luteum*)
 Fragrant Water Lily (*Nymphaea odorata*)
 Slender Gaura (*Gaura filipes*)
 Common Evening-Primrose (*Oenothera biennis*)
 Sundrop (*O. fruticosa*)(*O. tetragona*)
 Showy Evening-Primrose (*Oenothera speciosa*)
 Squawroot (*Conopholis americana*)
 Beechdrops (*Epifagus virginiana*)
 One-Flowered Cancer-Root (*Orobanche uniflora*)

Bloodroot (*Sanguinaria canadensis*)
 Celandine Poppy (*Stylophorum diphyllum*)
 Passion-Flower (*Passiflora incarnata*)
 Pokeweed (*Phytolacca americana*)
 Blue Phlox (*Phlox divaricata*)
 Wild Sweet William (*Phlox maculata*)
 Moss Pink (*Phlox subulata*)
 Greek Valerian (*Polemonium reptans*)
 Gaywings (*Polygala paucifolia*)
 Common Smartweed (*Polygonum hydropiper*)

Lady's Thumb (*Polygonum persicaria*)
 Virginia Spring Beauty (*Claytonia virginica*)
 Limestone Fame Flower (*Talinum calcaricum*)
 Scarlet Pimpernel (*Anagallis arvensis*)
 Shooting Star (*Dodecatheon meadia*)
 Monkshood (*Aconitum uncinatum*)
 White Baneberry (*Actea pachypoda*)
 Wood Anemone (*Anemone quinquefolia*)
 Thimbleweed (*Anemone virginiana*)
 Wild Columbine (*Aquilegia canadensis*)
 Marsh Marigold (*Caltha palustris*)
 American Bugbane (*Cimicifuga americana*)
 Black Cohosh (*Cimicifuga racemosa*)
 Leather Flower (*Clematis pitcheri*)
 Virgin's Bower (*Clematis virginiana*)
 Dwarf Larkspur (*Delphinium tricorne*)
 False Rue Anemone (*Enemion biternatum*)
 Sharp-Lobed Hepatica (*Hepatica acutiloba*)
 Round-Lobed Hepatica (*Hepatica americana*)
 Golden Seal (*Hydrastis canadensis*)
 Mouse Tail (*Myosurus minimus*)

Hooked Buttercup (*Ranunculus recurvatus*)
 Early Meadow Rue (*Thalictrum dioicum*)
 Rue Anemone (*Thalictrum thalictroides*)
 New Jersey Tea (*Ceanothus americanus*)
 Goat's Beard (*Aruncus dioicus*)
 Wild Strawberry (*Fragaria virginiana*)
 American Ipecac (*Porteranthus stipulatus*)
 Bowman's Root (*Porteranthus trifoliatum*)
 Rough Cinquefoil (*Potentilla norvegica*)
 Common Cinquefoil (*Potentilla simplex*)
 Three-Toothed Cinquefoil (*Potentilla tridentata*)
 Carolina Rose (*Rosa carolina*)
 Multiflora Rose (*Rosa multiflora*)
 Swamp Rose (*Rosa palustris*)
 Common Blackberry (*Rubus allegheniensis*)
 Purple-Flowering Raspberry (*Rubus odoratus*)
 Southern Dewberry (*Rubus trivialis*)

Quaker Ladies (*Hedyotis caerulea*)
 Small Bluet (*Hedyotis crassifolia*)
 (*Houstonia pusilla*)
 Golden Saxifrage (*Chrysosplenium americanum*)
 Wild Hydrangea (*Hydrangea arborescens*)
 Bishop's Cap (*Mitella diphylla*)
 Grass of Parnassus (*Parnassia asarifolia*)
 Mountain Saxifrage (*Saxifraga michauxii*)

WILDFLOWER PORTRAITS WITH MACRO LENSES

Some of the wildflower portraits we've admired most have no doubt been made with macro lenses. In this article, I'd like to address this approach to wildflower photography. I realize that not everyone has a macro lens—don't despair. In the next article, I'll address less costly alternatives. For now—since macro lenses are equated with wildflower photography by so many people—let's start there.

A macro lens simply lets you focus more closely to the subject than would be possible using an ordinary lens. As a result, the image on the film is larger. Some longer lenses—and especially zoom lenses—are advertised as having "macro capability" because they fit this definition. While this is true, these still won't let you get as close to the subject (get as large an image on film) as a true macro lens does. But, there's no doubt that these zoom lenses will solve many problems that a fixed focal length macro lens cannot. Like anything else, the right lens for you depends on your needs and finances (It didn't take long to get off the subject, did it?).

For speed and effectiveness, using true macro lenses is the best way to get close-up photographs and, compared to their non-macro counterparts, they're generally more compact. On the down side, they are sometimes hard to focus, sometimes heavy, and always more expensive. Almost every major lens manufacturer offers true macro lenses, and they are most commonly found in three sizes, or focal lengths: 55 mm, 100 mm and 200 mm. For reasons clear to optical scientists (but not to most photographers), some manufacturers produce lenses with 60 mm and 105 mm focal lengths. Some are even available with autofocus capability (a feature, by the way, that has limited usefulness for wildflower portraits).

Although you can photograph wildflowers with any macro lens, the ones with longer focal lengths (105 mm or 200 mm) will probably serve you best. There are two reasons for this. The first is that a longer focal length lens takes in less of an area of view, so you're actually seeing a smaller part of the whole. This can be most useful if you want your photograph to include the intricate centers of a passion flower, and nothing else, for example. A 55-mm macro lens will allow you to get close enough, but would take in too much area. The resulting photograph might be a tight shot of several flowers and some of the background—not the goal at all. In this case, it would be great to have a lens with a narrower angle of view that would include only the centers.

The second advantage is related to the optical properties of lenses. It turns out that a longer focal length lens that is focused closely will allow you to isolate the subject from the background. I remember one time I was photographing showy lady's slippers in Michigan. I set up a portrait with a 105 mm macro lens, and the background—about 15 feet behind the flower—still had too much detail and competed with the flower for attention. When I switched to a macro lens with a longer focal length (200 mm), the background became featureless and the flower really stood out.

To summarize, macro lenses are just like any other lens, but they allow you to focus more closely. They come in different focal lengths, the longer ones generally being more useful for wildflower portraits. They are the best way to photograph close-ups, but they're expensive. They can solve many problems, including separating the subject from the background. If you own one of these lenses, why not try using it to create wildflower portraits with a background that does not compete with the flower?

—David Duhl

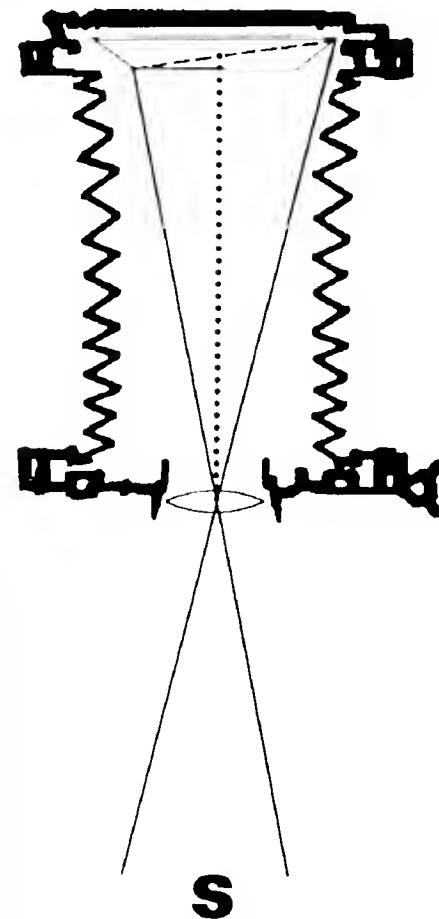
(David Duhl is a nature photographer living in Nashville and may be contacted at 817 Kent Road, Nashville, Tennessee 37214.)

CEDAR GLADES PHOTO EXHIBIT AT CHEEKWOOD

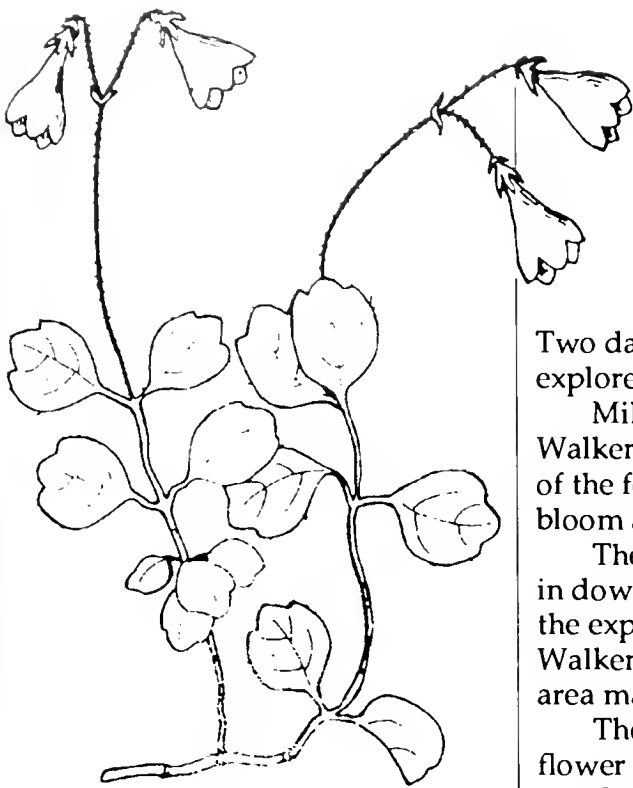
An exhibit of twenty-eight photographs of cedar glade flora will open April 18 at Cheekwood Botanic Gardens in Nashville.

The photographs are the work of Tony Myers of Nashville, who has made a speciality of the flora of the cedar glades.

The opening day will include a reception from 2 to 4 p.m., and the photographs will remain on exhibit in the Botanic Hall until June 20. □



A lens is considered long for a camera if its focal length (dotted line) is appreciably greater than the picture diagonal (broken line). It then collects light over an angle that is narrower than that covered by human vision, producing an enlarged view of a restricted area (S).



Twinflower
Linnaea borealis

HIKES TO WALKER'S BRANCH AND BUCKSNORT BLUFFS

Milo Pyne leading June 12 and 13 Field Trips

Two days of field trips on June 12 and 13 will provide a good opportunity to explore flora of the western Highland Rim, including some wetland species.

Milo Pyne is in charge of this expedition into Hardin County along Walker's Branch and then to a place called Bucksnot Bluffs and to the habitat of the federally listed Price's potato bean (*Apios priceana*), which should be in bloom along the roadside.

The first day, June 12, members will meet at 10 a.m. at McDonalds located in downtown Savannah at the junction of highways 64 and 128. From there the expedition will travel south to Walker's Branch. Milo says the hike into the Walker's Branch area may be as far as 1.5 miles round-trip and some of the area may be wet; so be sure to select your shoes or boots accordingly.

The group will be looking for zig zag iris (*Iris brevicaulis*) and bunch flower (*Melanthium virginicum*) among other wetland species.

On the second day, June 13, two hikes will be divided by lunch. Members will meet at 11 a.m. at the Bucksnot Deli (BP station) just off I-40 exit 152 east of the Tennessee River (one hour west of Nashville).

Price's potato bean should be found at sites near roadways, and the group will also explore a wildflower area for *Aralia racemosa* and *Hymenocallis*.

At 2 p.m. the group will rendezvous again at the Bucksnot Deli before exploring Bucksnot Bluffs and surrounding areas. Some unusual taxa may be seen.

Notify Milo at 615/532-0440 if you're coming.

NOTECARDS

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Line Drawings

Packet of 10
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plus \$1.25 postage

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Plant Society**

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BLUE RIDGE PARKWAY AND BLUFF MOUNTAIN

Hikes with Ed Schell June 26 and 27

TNPS members are invited to join Ed Schell, acclaimed nature photographer, for hikes along the Blue Ridge and to Bluff Mountain in North Carolina on June 26 and 27.

The first day, a Saturday, members are asked to meet at 9:30 a.m. at McDonalds restaurant in West Jefferson. West Jefferson, about two miles from Jefferson, North Carolina, is north of Boone.

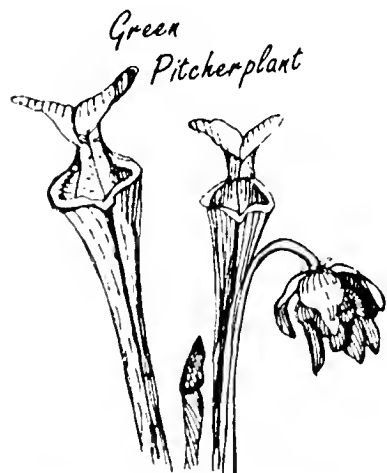
Ed will then guide everyone to some key places along the Blue Ridge Parkway. He expects to find turkey beard, mountain laurel, and catawba rhododendron in bloom and perhaps also silverling and pale corydalis. He said many other species will be sighted.

A different meeting place, though in the same area, has been selected for Sunday, June 27—the Beacon Heights overlook where the parkway intersects with highway 221. Everyone is asked to be present promptly at 9:30 a.m. Among the rich flora to be seen will be Gray's lily, purple fringed orchis, fly poison, Roan Mountain bluets, spreading avens, and Indian paintbrush.

Ed said participants will trek a maximum of four miles each day.

Accommodations may be a crucial consideration; so Ed recommends the Best Western Motel at Jefferson (800/221-8802 or 919/246-8845).

If you plan to make the trip, let Ed Schell know by calling 615/282-6125. □



MAKE YOUR RESERVATIONS

No time to lose!

Reservations must be telephoned to Kay Jones as soon as possible for the TNPS Annual Meeting May 14-16. Fees for meals and rooms are now set.

Overnight accommodations will cost \$8 per room (whether or not one or two persons stay in the room). Evening meals Friday and Saturday will cost \$10.30 each. Breakfast Saturday will cost \$5.50. Everyone who attends is also asked to pay a \$2 registration fee to help cover the cost of facilities. The maximum charge is \$44.10 for a person staying two nights and eating all meals.

Breakfast will not be served Sunday, but Kay explains that each room is equipped with a coffee maker, microwave oven, and refrigerator, making the preparation of a simple breakfast quite easy.

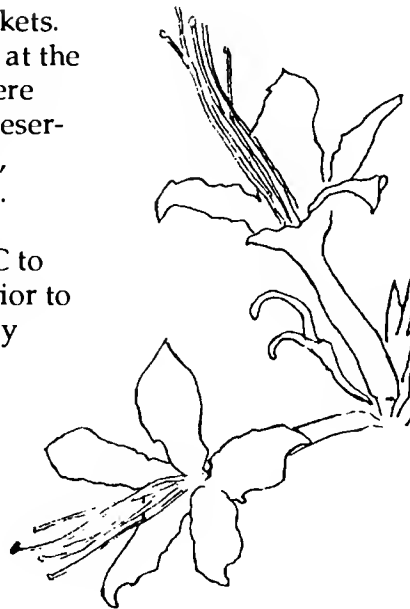
The rooms are located at the Forest Inn and Arnold Lakeside Club at Arnold Engineering Development Center between Manchester and Tullahoma. Kay, who is the annual meeting coordinator, said that if for any reason members must stay elsewhere, motels are located within a fifteen-minute drive, as are restaurants and markets.

Members who like to camp may wish to stay at the nearby AEDC campground, but reservations there must be made separately by calling 454-6084. (Reservations only after April 15.) At the campground, trailer hookups are \$8, and the fee for tents is \$5.

But everyone planning to attend the annual meeting must call Kay. She is required by AEDC to report the number of participants four weeks prior to the meeting. And she must provide the names by May 1. Therefore, she asks that reservations be telephoned to her at 615/285-2777 evenings or weekends. Her address is P.O. Box 193, Hampshire 38461.

Arrangements can be made for vegetarian meals; otherwise, the two evening meals will be broiled chicken and ham.

Call Reservations
to Kay Jones—
615/285-2777



DIRECTIONS TO AEDC

Members traveling to the Annual Meeting along I-24, should leave the interstate at Exit 117 just south of Manchester, following the signs toward AEDC and Tullahoma.

Within a few miles, you will pass the main gate of Arnold Center and soon afterward gates on the right marked "Gate 1" and then "Gate 2." Just beyond gate 2 will be a left turn that should be marked with signs directing visitors to the Lakeside Club and Forest Inn. This road will proceed to Woods Reservoir. Follow the main road as it turns to the right, and follow the signs a short distance to a left turn directly to the Lakeside Club.

Members approaching through Tullahoma should leave Tullahoma on Highway 55 but turn right at the last traffic light, following the signs to AEDC. The turn to the Lakeside Club, just short of gate 2, is about nine miles from Tullahoma.

ANNUAL MEETING, WITH FIELD TRIPS AND PROGRAMS

The TNPS Annual Meeting offers members a variety of interesting programs and field trips, beginning the opening night, Friday, May 14.

Dinner will begin at 6 p.m. that evening at the Arnold Lakeside Club. It's a great time to get acquainted.

At 7:30 Ed Schell, nationally known nature photographers, will narrate a slide presentation about Roan Mountain. Afterward members will be asked to participate in an informal slide show; so bring your photographs.

On Saturday sleep late or take a walk before breakfast, which begins at 8 a.m. at the Lakeside Club.

Field trips will get underway at 9:30. Dennis Horn, program coordinator, suggests there may be two or three different hikes, depending on the number attending and the desires of the members. Lunch will involve box lunches or stops at restaurants in Manchester or Tullahoma.

A second series of field trips will get underway about 1:30 p.m.

The TNPS board and membership meeting will begin about 5 p.m., concluding by dinner at 6 o'clock at the Lakeside Club.

The evening programs will begin with a presentation by Mark Moran, AEDC resource manager, about the AEDC Natural Resources Program.

The major program will be a presentation about trilliums, with slides, by Tom Patrick, Georgia state naturalist.

Sunday activities will begin with breakfast at 8 p.m. Everyone is welcome to remain for the meetings of the wildflower book committees, which are expected to adjourn about 11 a.m.

The field trips will give members opportunities to see a wide range of species, including rose pogonia, iris virginica, slender blue flag, skullcap, sundew, frostweed, pale coneflower, ragged fringed orchid, false blue indigo, and bladderwort. □

Check inside about the TNPS annual meeting May 14-16. Make your reservations now.

FIRST CALL FOR PHOTOGRAPHS FOR WILDFLOWER BOOK

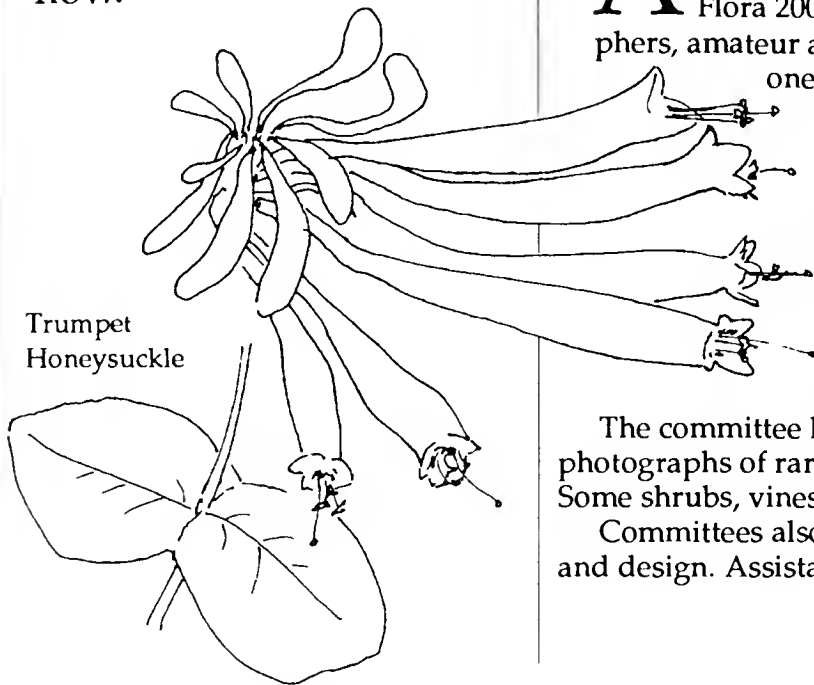
At the center of this newsletter issue is a sheet calling for photographs for the soon-to-be-published Tennessee wildflower book, part of the Flora 2001 Project. This is an excellent opportunity for photographers, amateur as well as professional, to assist with the project and to see one or more of their own photographs published in what everyone expects will be an excellent field guide.

The TNPS committee designated to select species for the book has narrowed down the state list of more than 2,700 species to about 1,000. The published book is expected to contain color photographs of 500 to 600 species.

Dennis Horn, chairman of the selection committee, said, "Some tough decision will have to be made to cut any more plants from the list."

The committee has determined that the published book should not include photographs of rare plants, with the possible exception of showy rare plants. Some shrubs, vines, ferns, mosses, and lichens will also be included.

Committees also exist to plan descriptions of plants and page composition and design. Assistance is being sought from many botanists.



Trumpet
Honeysuckle

Vol. 16, No. 2; April 1993

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Tennessee Native Plant Society Newsletter

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TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

Volume 16, Number 3

June 1993

HIGHWAY WILDFLOWERS

New Law Promotes Wildflowers along Roadways

The Tennessee General Assembly has passed an act that provides for the planting and protection of wildflowers along highways throughout the state.

Known as the Bicentennial Beautification Act of 1993, the new law surprised some enthusiasts who did not expect legislative action this year. The law is limited, not specifying native plants at all sites and not requiring more than twenty-four acres in any one of the four regions of the state. But to members of TNPS, this is clearly a step in the right direction.

The General Assembly stated that its interests were to 1) develop a permanent roadside landscaping program within the Department of Transportation with emphasis on wildflower preservation and propagation, as well as the planting of trees in urban areas, 2) to beautify the state's roadways and enhance the aesthetics of the state's highway system while reducing maintenance costs, and 3) to make the public more aware of the state's landscape diversity and improve environmental quality along the roadways.

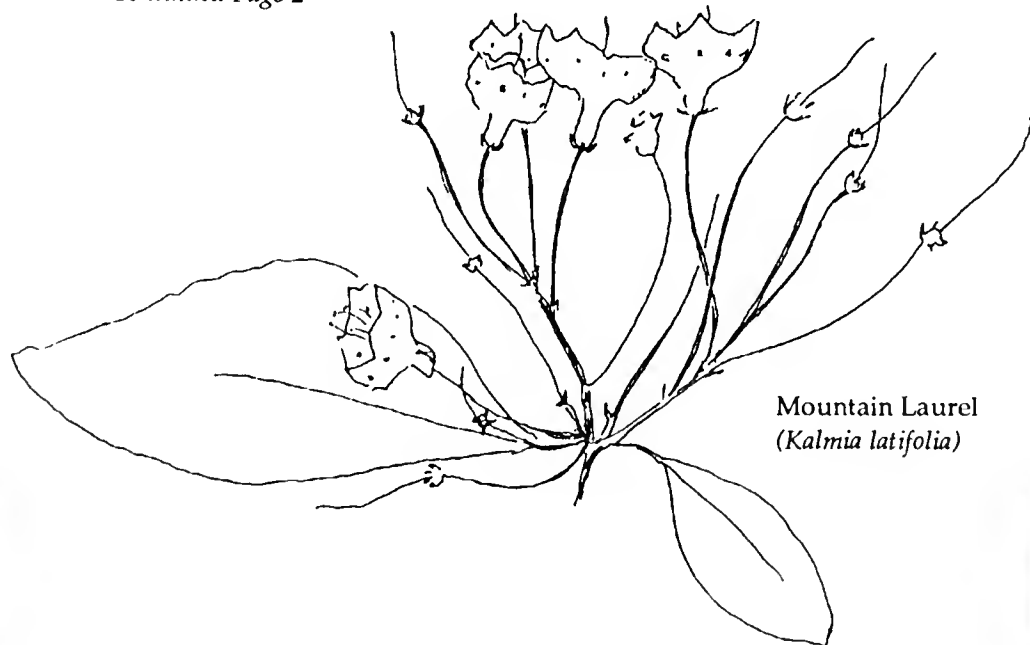
The provisions of the act provide:

(1) The Department of Transportation shall continue the wildflower research program.

(2) The Department of Transportation shall plant in each of the four regions of the state not less than twenty-four acres of wildflowers along the highway system and at appropriate interchanges that are heavily traveled.

(3) For the benefit of the traveling public and mowing crews, such areas shall carry appropriate notations stating that the wildflowers are native to the state.

Continued Page 2



Mountain Laurel
(*Kalmia latifolia*)

NEW LAW MAY HAVE A TOUGH ROAD AHEAD

The fate of the federally funded Tennessee Wildflower Research Project may shed some light on what to expect after the new State Bicentennial Beautification Act takes effect July 1. (See related story this page.)

The research project, initiated last year and scheduled to end this month, was designed to collect data principally through the creation of several wildflower plots along interstate highways and state roads of Tennessee. The data was meant to provide important information to the State Department of Transportation for its maintenance program.

Candy Swann of Cookeville, the principal staff member for the project, said she thinks the research work has been a great success. Her final report provides germination data on the sites of 150 species, along with information on maintenance and seed harvesting.

Most of what the transportation

Continued page 2

ALSO IN THIS ISSUE

Photography
by David Duhl
Page 3

Grasses
by Hal DeSelm
Page 4

TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

June 1993

Volume 16, Number 3

This Newsletter is a publication of the Tennessee Native Plant Society and is published six times a year, generally in February, April, June, August, October, and December.

The Tennessee Native Plant Society (TNPS) was founded in 1978. Its purposes are to assist in the exchange of information and encourage fellowship among Tennessee's botanists, both amateur and professional; to promote education of the public about Tennessee flora, and wild plants in general; to provide, through publication of a newsletter or journal, a formal means of documenting information on Tennessee flora and of informing the public about wild plants; and to promote the protection and enhancement of Tennessee's wild plant communities.

Dues are \$15 for the calendar year (\$10 for students and senior citizens, \$20 for institutions, and \$150 for life memberships). Membership privileges include a subscription to the TNPS Newsletter. Dues may be sent to the Tennessee Native Plant Society, Department of Botany, the University of Tennessee, Knoxville, TN 37996-1100.

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Letters to the editor or correspondence about the Newsletter should be addressed to: TNPS Newsletter, P.O. Box 856, Sewanee, TN 37375.

HIGHWAY WILDFLOWERS—*continued*

(4) The state's Urban Forestry Council and personnel shall work in cooperation with the Department of Transportation in keeping with the requirements of any federal funding.

(5) The Department of Transportation shall report on the fifteenth of January and July of each year to the speaker, the chair of the transportation committee, and the prime sponsors of this legislation of each of the respective houses on the progress of the program.

In a final section the act states:

It is the intent of the General Assembly to encourage business groups, civic organizations, garden clubs, and individuals to assist, on a volunteer basis, in planting and maintaining Tennessee native wildflowers, other native plants, and other plants along the highway system and at appropriate interchanges that are heavily traveled.

The commissioner of transportation may enter into formal agreements with business groups, civic organizations, garden clubs, and individuals for volunteer service to assist, on a volunteer basis, in planting and maintaining Tennessee native wildflowers, other native plants, and other plants along the highway system in accordance with plans devised by the commissioner after consultation with the volunteers.

The commissioner may direct that appropriate signs be erected to recognize and express appreciation to a provider of volunteer services.



TOUGH ROAD AHEAD—*continued*

department needs to do is simple, she said. DOT employees need to alter their spraying and mowing schedules. The wildflowers will mostly take care of the rest.

Swann, however, is dubious about the prospects for the new law. She said that although the transportation department was required to maintain wildflower sites established under the research project, little or no maintenance was done except by herself and her colleagues. She said one designated site was mowed down and another near Memphis was destroyed by what appeared to be herbicide. The transportation department regularly uses herbicide along major highways.

Swann said the new law is not clear about how well the 100 acres or more of highway wildflowers are to be maintained. The definition of "wildflower" is vague enough that almost any taxa would qualify and, therefore, justify the actions of the department of transportation.

The key factor, Swann said, is whether administrators at DOT care about wildflower landscaping. So far they've shown almost no interest at all. Some difference may be made by the new commissioner, Carl Johnson, who is said to be sympathetic to wildflower landscaping.

Swann also mentioned that \$13 million in federal funds was provided last year in a program to encourage wildflower propagation along highways. Apparently the funds were used for road maintenance.

Candy Swann said perhaps the best site under the research program is called the Burgess Falls site at exit 286 of I-40 near Cookeville. It was the site she was able to watch closely. Some of the flora at the site are *Penstemon smallii* and *australis*; *Coreopsis lanceolata*, along with clasping leaved coneflower, prairie coneflower, and purple coneflower.

Swann, who is located at Tennessee Tech University, would seem to be a logical choice to oversee and monitor wildflower sites under the new law, but on June 3 she said no one had contacted her. She said she heard that Tennessee State University was being discussed for possible involvement.

CLOSE-UPS WITH EVERYDAY LENSES

Last time, I wrote about using macro lenses to create intimate wildflower portraits. While these lenses are great, they're also expensive. In this issue, I'd like to address three alternatives to macro lenses: 1) extension tubes, 2) teleconverters, and 3) diopters. Each will convert any lens you own to a macro lens at a very reasonable cost.

Extension tubes are nothing more than hollow tubes that fit between your camera and lens. Each camera manufacturer makes them compatible with their products to retain most or all camera functions (but not autofocus or matrix metering—at least, not yet). They come in different sizes; so—by placing them between camera and lens—they serve to move the front element of the lens farther away from the film. This allows you to get physically closer to the subject and still maintain sharp focus. The result is magnification. It's really the same way a bellows works. In fact, a bellows is nothing more than an infinite number of extension tubes. While a bellows has more versatility, it's also heavier, bulkier, and more expensive than the extension tube I can place in my pocket. Both are a great way to do close-up photography of wildflowers, but remember: the more extension, the slower shutter speed you're going to need to use because of light loss (you're putting a lot of distance between your camera and lens). Sometimes that's a problem, and that's why I prefer not to use a bellows. Other people create beautiful images with them.

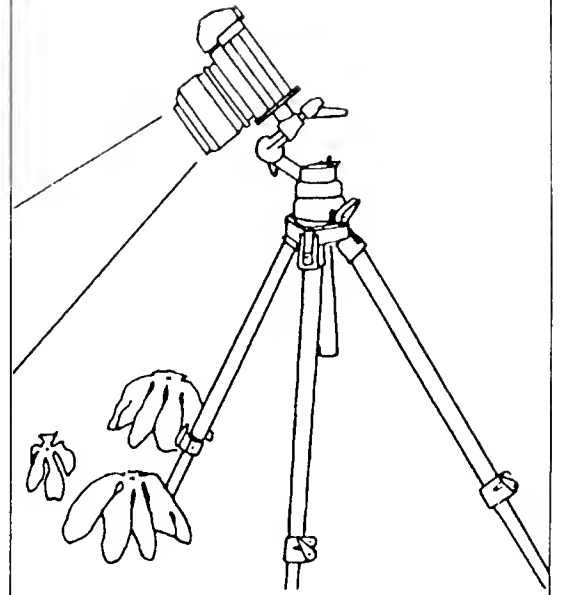
A second simple way to do close-up photography is to use a teleconverter. In this case, you simply place a "lens" between your camera and lens, and the result is instant magnification. They come in different strengths: a 1.4x teleconverter will magnify the image 1.4 times (and you will lose exactly one stop of light), and a 2x teleconverter . . . well, you get the idea. The big advantage of this approach is that you don't have to get any closer to the subject in order to get magnification. If you think you might like this idea, try to borrow one before you commit yourself because they are somewhat expensive. And by the way, use one manufactured by the same camera company that made your camera and lens—it will give you the best possible results.

A third way to do close-up photography is one of the best kept secrets. If you purchase a close-up diopter, you will screw it on to your lens as you would a filter, and instantly convert your everyday lens to a close-up lens. They work particularly well on the zoom lenses you probably own. I would *strongly* suggest that you consider the ones made by Nikon (regardless of the make of your camera) because they are optically corrected for distortion. Now, these come in different filter sizes and strengths: 3T and 4T are for 52mm filter sizes, while 5T and 6T are for 62mm. In each size, the higher number is stronger than the lower number. By using these, you'll be able to focus much closer and the image size will be larger. Best of all, they're relatively inexpensive (about fifty dollars), they fit in your pocket, and there is no light loss when you use them.

To summarize, there are three ways to convert your everyday lens to a close-up lens. Extension tubes will allow you to get physically closer to the subject, but you'll need to use a slower shutter speed. With teleconverters, you won't have to move closer to get a larger image, but you'll still lose light. Close-up diopters *require* you to move closer to the subject, but there's no light loss. All three can, of course, be used in combination, and any one of them will *instantly* allow you to take wildflower close-up photographs.

—David Duhl
Nashville

(David Duhl is a nature photographer living in Nashville and may be contacted at 817 Kent Road, Nashville, Tennessee 37214.)



CULLOWHEE HAS THE GRANDDADDY OF NATIVE PLANT CONFERENCES

It's not too late (we think) to make plans to attend the 1993 Cullowhee Conference on Landscaping with Native Plants.

The conference is scheduled for July 22-24 at Cullowhee, North Carolina. Its schedule is always filled with entertaining and informative lectures and workshops about all phases of native plant propagation, gardening, and landscaping.

If you're not already on the Cullowhee mailing list, write to Jim Horton, 132 Natural Science Building, Western Carolina University, Cullowhee, NC 28723. □

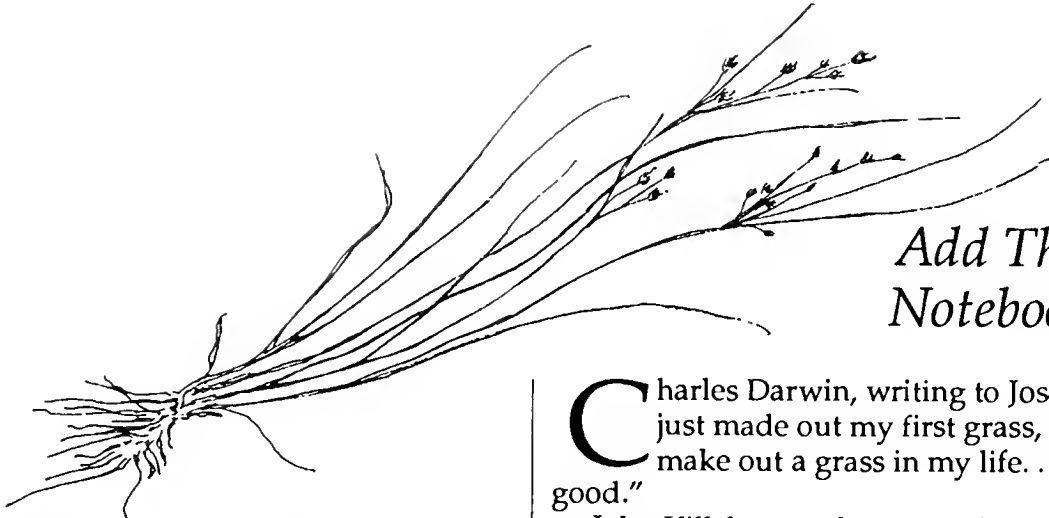
JUST A LITTLE POLLEN GRAIN

The pollen grain of a sequoia tree that grows to a height of over 300 feet happens to be the same size as the pollen of a violet.

Even the largest pollen grain, such as the pollen from a pumpkin flower, is just barely visible without magnification to someone with sharp eyes. A pollen grain is but one cell, but what a powerful cell it is. □

GRASSES

Add Them to Your Botanical Notebook (They Can Be Fun)



MILO PYNE NAMED STATE BOTANIST

Milo Pyne, who has done extensive field work in plant communities in Tennessee and across the Southeast, has been named state botanist in the Department of Environment and Conservation's Division of Ecological Services.

Milo has worked with the division as a contract field botanist and ecologist since 1986, when he investigated the flora, plant communities and rare plants of Reelfoot Lake. In 1989 he surveyed for and prepared reports on the Silurian limestone glades of the state's western valley region.

He has developed a wetland plant identification program for wildlife biologists and collaborated with satellite remote sensing applications specialists in the development of vegetation map pilot projects for Tennessee. In addition, he developed a "Guide to Rare Plants" for the Tennessee Division of Forestry.

Milo's other work has included conducting on-site botanical inventories for various private concerns such as Willamette Industries and the Nature Conservancy, as well as participation in the Albermarle/Pamlico Estuarine Survey in North Carolina.

A *summa cum laude* graduate of North Carolina State University of Raleigh, Pyne's academic background is in botany with a specialization in ecology. In 1991 he was the first recipient of the Larry A. Whitford Scholarship awarded by the NCSU Department of Botany.

Milo is an active member of TNPS. He takes the position previously held by Paul Somers, who left the department last year to take a position as botanist with the Massachusetts Heritage Program. □

Charles Darwin, writing to Joseph Hooker in June 1855, said, "I have just made out my first grass, hurrah, hurrah! . . . I never expected to make out a grass in my life. . . . It has done my stomach surprising good."

John Killebrew, who wrote the first book about Tennessee grasses in 1878, quotes an English proverb: "No grass no cattle, no cattle no manure, no manure no grass." Elsewhere he says, "Grass is wealth."

Isaiah 40:6 states, "All flesh is grass. . . ."

Over much of the world, people make it their business to cut the forest and plant grass, to create maintained grassland. Much of what we eat comes directly from maize, wheat, oats, rye, barley, and rice. Or it may come to us in animal protein and fat from forage grasses. Knowledge of grasses for at least some people in our society is essential for our survival, but we eat, directly or indirectly, only a few species.

In Tennessee there are at least 339 species and varieties known. A good many are cultivated or are weeds. To join Darwin, Killebrew, and others who know some grasses, read on, and plan to join us on the Native Plant Society graminaceous field trip on August 14 in the Tullahoma area.

But start now to get ready. Take a grass you know, like Kentucky bluegrass or tall fescue, and pull the smallest pedicelled unit from the inflorescence; this is the spikelet. Its two basal parts are called glumes, the lowest one is the first glume, the next one up is the second glume. These are attached to the rachilla; attached above these are one or more florets. Florets have easily visible parts as the lemma and palea (palet) which look like glumes. They enclose stamens (usually three) and ovary (with a feathery stigma). The structure of dozens of genera of our grasses is just about like this. Others are more specialized.

With some terms in mind you can key (or key and look at pictures) to determine genus and species. Hitchcock and Chase, Pohl, Radford, et al are illustrated and very good. Gleason and Cronquist, Fernald, and Wofford are also excellent but are not illustrated.

Press each collection in newspaper and save them from year to year so you can review in 1994 what you determined in 1993. Write on the lower margin of the paper the name and other pertinent information about the collection.

When you are stuck, ask your county agent to help. Or send the specimen to Dr. B. E. Wofford, 437 Hesler Biology Building, Botany Department, University of Tennessee, Knoxville 37996-1100. He is the curator of the herbarium and knows the Tennessee flora well.

With an effort at collecting you will see many grasses. In Hitchcock and Chase the genera are organized in two subfamilies and 14 tribes based chiefly on spikelet character. But agrostologists (botanists who specialize in grasses) have found many other characteristics (mostly microscopic) that seem to be more important in grass classification. So today, the U. S. grasses, native and introduced, are classed in six subfamilies and 25 tribes. Tennessee taxa occur in all six subfamilies and 17 tribes. But, while some subfamilies and tribes are recognizable and may be helpful in recognition, they are not necessary for learning grass genera and species.

Tennessee grass flora is of 223 native species and varieties. Forty-four percent recur widely across the state and would be expected in most collections in most counties; they occur widely across eastern United States. Nearly a third of our taxa are southern in most of their range, and reach their northern limit in Tennessee or in adjacent counties of Kentucky or Virginia. Sixteen percent are northern and reach Tennessee chiefly on the Plateau or in the Blue Ridge. Only five percent are mainly western in their range—these occur mainly in the limestone areas of the state, the western Tennessee River valley,

the Central Basin, and the Ridge and Valley.

Suppose you learned some grasses—what would you be able to do? You could evaluate your property and your neighbor's property as to weed content of lawns, pastures, and roadsides and feel good about your better-kept-up property. You would be able to recognize barrens, the grass stages of old field succession, and forests which have had understory surface fires. But mostly it would be very satisfying.

What is going on among grass people? There are various groups writing up a manual of the grasses of the Southeast and of North America and another group wants to revise Hitchcock and Chase. You could read about collectors' results in the journal, *Castanea*, published by the Southern Appalachian Botanical Society (Write the Society at Department of Biology, University of South Carolina, Columbia, SC 29208, for information). You can join the American Bamboo Society (Contact the Society at P. O. Box 215, Slingerlands, NY 12159-0215) and its Southern Highlands Chapter (Contact the chapter at 700 Cotton Grove Road, Jackson, TN 38305).

You can read about grass use as ornamentals in Loewer (1988). You could key most cultivated grasses (not always found in books mentioned before) in Bailey. You can read about bamboos in Recht and Wetterwald (1992). You can read about grasses as forage plants in Heath et al (1985). You can read about grass use in turfs in Beard (1973).

—Hal DeSelm
University of Tennessee

Some Books of Interest

Bailey, L. H. 1951. *Manual of Cultivated Plants*. Revised edition. Macmillan Company, New York. Keys and descriptions but scarcely illustrated.

Beard, J. S. 1973. *Turfgrass: Science and Culture*. Prentice-Hall Inc., Englewood Cliffs, New Jersey.

Fernald, M. E. 1950. *Gray's Manual of Botany*. Eighth edition. American

Book Co., New York. Reprinted with corrections, Dioscoides Press, Portland, Oregon, 1987. Keys and descriptions, scarcely illustrated.

Gleason, H. A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. New York Botanical Garden, Bronx, New York. Not illustrated. Keys and descriptions.

Heath, M. E., R. F. Barnes, and D. S. Metcalfe. 1985. *Forages*. Fourth edition. Iowa State University Press, Ames, Iowa.

Hitchcock, A. S. and A. Chase. 1950. *Manual of the Grasses of the United States*. U. S. Government Printing Office, Washington, D. C. Reprinted by Dover in 2 volumes. Virtually all of our U. S. grass, illustrated. Keys, descriptions, line drawings.

Killebrew, J. B. 1878. *The Grasses of Tennessee, Including Cereals and Forage Plants*. The American Co. Printers, Nashville, Tennessee.

Loewer, P. (guest editor). 1988. *Ornamental Grasses, Plants and Gardens*. Brooklyn Botanical Garden Record 44(3).

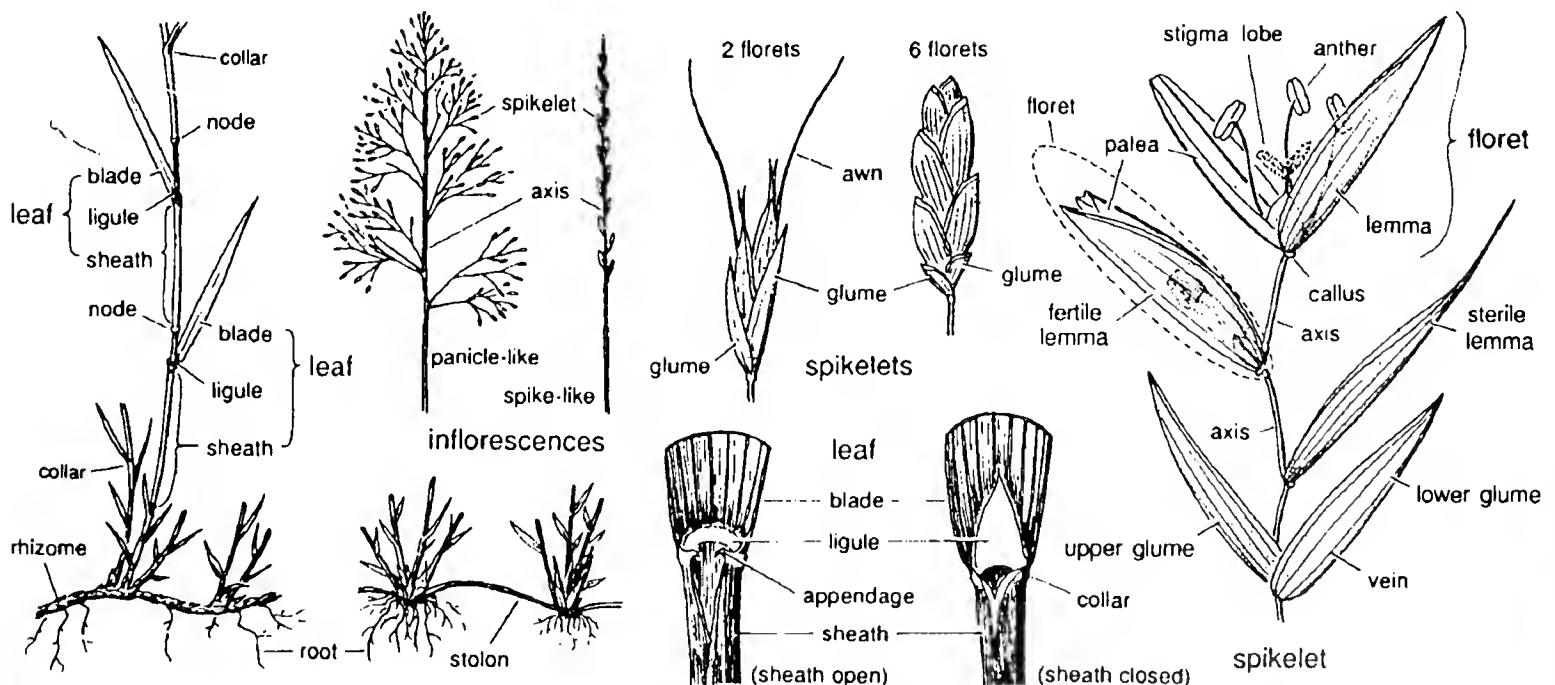
Pohl, R. W. 1968. *How to Know the Grasses*. The Picture Key Nature Series. W. C. Brown Company Publishers, Dubuque. Most common grasses, illustrated, keys.

Radford, A. E., H. E. Ahles and C. R. Bell. 1968. *Manual of the Vascular Flora of the Carolinas*. University of North Carolina Press, Chapel Hill. Keys and illustrations, maps.

Recht, C. and M. F. Weterwald. 1992. *Bamboos*. Timber Press, Portland, Oregon.

Wofford, B. E. 1989. *Guide to the Vascular Plants of the Blue Ridge*. University of Georgia Press, Athens. Keys. □

The Grass Family



THE CONFESSIONS OF A RESIDENTIAL LANDSCAPER

By the August day we moved into our newly finished house, we had already begun to create an ambitious landscaping plan. Gardening books and magazines collected under the living room chairs and around our bed. We were eager to learn what flowers would tolerate shade, what plants would spread quickly on disturbed soil, what would withstand dry weather.

In one of our books we were impressed by a picture of periwinkle (*Vinca minor*) spreading along a shaded garden bank. We loved the rich foliage of a Russian olive in another picture. We collected plants here and there from our gardening friends, and we ordered eagerly from White Flower Farm and Wayside Gardens. Life was fresh and new.

Only as the years passed did we gradually realize how naive we were. Yes, like 99 percent of all gardeners, we were naive about our landscape. And if we cannot plead innocent on grounds of naivety, perhaps we can get an early parole through repentance.

Even the repentant, however, must pay for their sins. To truly repent, in fact, we face the task of reversing the effects of our carelessness. We have begun the grueling job of pulling alien species out of our garden and yard. The task is daunting. It is almost too late.

That "wonderful" vinca has spread out into the woods where we now hope to preserve a small but promising colony of Virginia blue bells and a grove of May apples. We could pull the periwinkle away several feet, but what sort of reprieve is that? In a mere half-dozen years, the periwinkle has spread from a small innocent-looking patch into a pervasive army of runners and branches thirty feet long and twenty feet wide. It loves the cool, rich soil under the hardwoods.

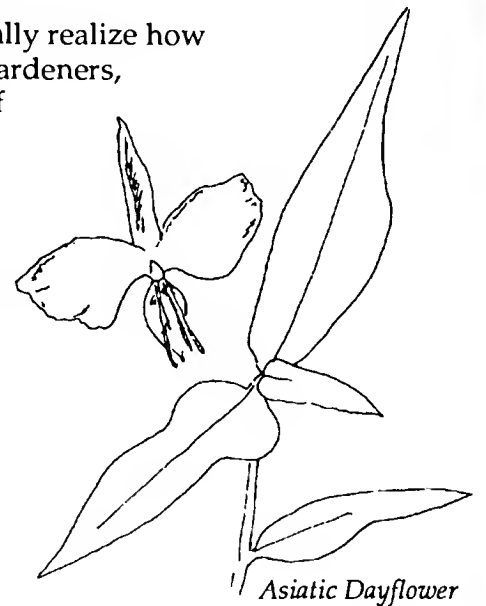
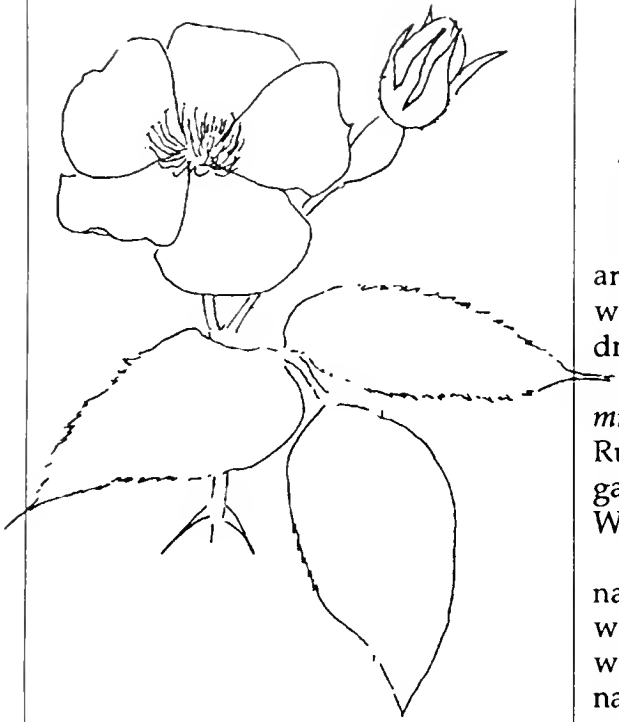
How well can the blue bells compete? We don't wish to find out. We have seen the impact of aliens in other gardens and other landscapes. We can observe abandoned lots trying to go "back to nature" burdened with the presence of privet, Japanese honeysuckle, and daffodils.

A couple of years ago on a TNPS trip, standing near the base of Millstone Mountain, a group of us observed the presence of an alien grass near the path. "I wonder what native would be there if the grass were not there," someone ask rhetorically. Perhaps the point is worth considering in other situations as well. It is not a matter of one species having rights over another as if they were playing out some human drama. The point is whether the indigenous ecosystems can be preserved and, thereby, serve us in the future.

The introduction of alien species may be only part of the global problem of biodiversity. But in my yard, it is a big part of the picture. Will the *Spiria japonica* encroach on the blue berries and wild azalea? Has the invasive shepherd's crook escaped from the perennial garden? And where next will that asiatic day flower appear?

I wish to keep at least part of my small landscape as it might have been before the mountain men came through. I cannot seem to do that and, at the same time, entertain our foreign guests. It is a hard lesson but perhaps not learned too late.

—Latham Davis
Sewanee



WEEDS WITHOUT VISAS

The naturalist John Burroughs once remarked that most of this country's pernicious weeds are foreign. "Our native weeds are for the most part shy and harmless and retreat before civilization. We hardly have a weed we can call our own," he said.

INFORMATION NEEDED ON LADY'S SLIPPER SALES

Andrea Shea, a staff botanist with the Ecological Services Division in the Department of Environment and Conservation, asks that anyone who observed this year the commercial sale of pink lady's slippers notify her at her office by writing to Division of Ecological Services, Eighth Floor, L&C Tower, 401 Church Street, Nashville, TN 37243-0447 or by calling 615/532-0439.

Andrea said she will want to notify any nurseries, markets, or landscapers of the law that now protects the lady's slipper from digging and sale.

STUDY GRASSES IN COFFEE COUNTY BARRENS

Hal DeSelm Leads Hike August 14

If you think grasses, sedges, and rushes are too dull to qualify among your botanical interests, you've not spent time with Hal DeSelm, retiring but never-resting professor of botany and TNPS member. A few hours in Coffee County will change your perspective.

After meeting in Manchester, we'll seek specimens along roads and in fields of the area, where Hal has done a long-term study of the barrens. To prepare, he suggests we take some fescue and key it out backwards to learn to use the key. Otherwise, we'll cover the topic as we go.

He asks that everyone meet at 10 a.m. at McDonalds in Manchester—just west of exit 114 on I-24. Tell him your coming by calling 615/974-6208. □

THE ANNUAL MEETING

Accommodations, programs, field trips
worth remembering

The TNPS Annual Meeting May 14-16 was one of the best ever in terms of attendance and one of the best ever for the quality of its program and field trips.

About 60 members attended, most of whom stayed at the Forest Inn by the lake of Arnold Center, which lies between Manchester and Tullahoma.

Ed Schell presented a program about Roan Mountain, featuring his breathtaking slide photography from all seasons on the mountain near Ed's home. Afterward several members showed slides from their recent trips.

Tom Patrick, formerly a leader with TNPS and now a botanist in Georgia, provided a program on trilliums, complete with slides and descriptions of the thirty species of the Southeast. There are forty-two species of trillium in North America.

For the field trips, members separated into groups and followed their leaders to selected sites, mostly on the AEDC Reservation. These sites were open dry fields, power-line vistas (wet and dry), and wooded areas. Some also visited May Prairie. Among the finds were *Iris virginica*, two species of sundew (spatulate-leaved and dwarf sundews), zig-zag bladderwort, blue false indigo, and low frostweed.

Reports were presented at the business meeting, including an update of the plans for the Tennessee Flora 2001 wildflower book. The plant selection committee has completed a list of more than 600 species, as reported previously, and the photography selection committee under Jack Carman of Tullahoma has requested photography by next November.

Work also needs to be done on descriptions of plants. And Dennis Horn said that requests for these will be mailed soon to persons the committee hopes will help with the project. Mary Schaffner, TNPS president, emphasized again the desire to have broad participation in the preparation of the book.

Mary Schaffner also announced that a life membership was awarded to Latham Davis for his work in editing the TNPS Newsletter.

Special thanks also are due to Kay Jones for arrangements made for the annual meeting and to Dennis Horn for organizing the program.

Among the leaders and "sub-leaders" of the field trips were Milo Pyne, Dennis Horn, Jack Carman, Andrea Shea, Ed Clebsch, Chuck Wilson, and Harry Yeatman. □

CHECK YOUR DIRECTIONS; THEY MAY BE WRONG

We regret that a mistake was made in the April issue, whereby directions to two North Carolina hikes were switched.

To study flora along the Blue Ridge Parkway on June 26, members are asked to meet Ed Schell at 9:30 at the Beacon Heights overlook where the parkway intersects with highway 221.

The next day, for a trip to Bluff Mountain, members are asked to meet at 9:30 a.m. at McDonalds restaurant in West Jefferson. West Jefferson, about two miles from Jefferson, North Carolina, is north of Boone.

We hope everyone planning to attend reads this note or calls Ed. For more than one reason, a call to the hike leader is always recommended. Ed's phone number is 615/282-6125.



Indian Pink
(*Spigelia marilandica*)

HOW TO BECOME A MEMBER OF TNPS

Whether you're a seasoned botanist or just an admirer of wildflowers and native plants, whether you garden and landscape with natives or spend your weekends photographing flora in the field, you're welcome as a member of the Tennessee Native Plant Society.

Dues are \$15 for the calendar year, unless you are a senior citizen or student, in which case your dues are \$10.

Send your name and address with your check to the Tennessee Native Plant Society, Department of Botany, University of Tennessee, Knoxville, TN 37996-1100.

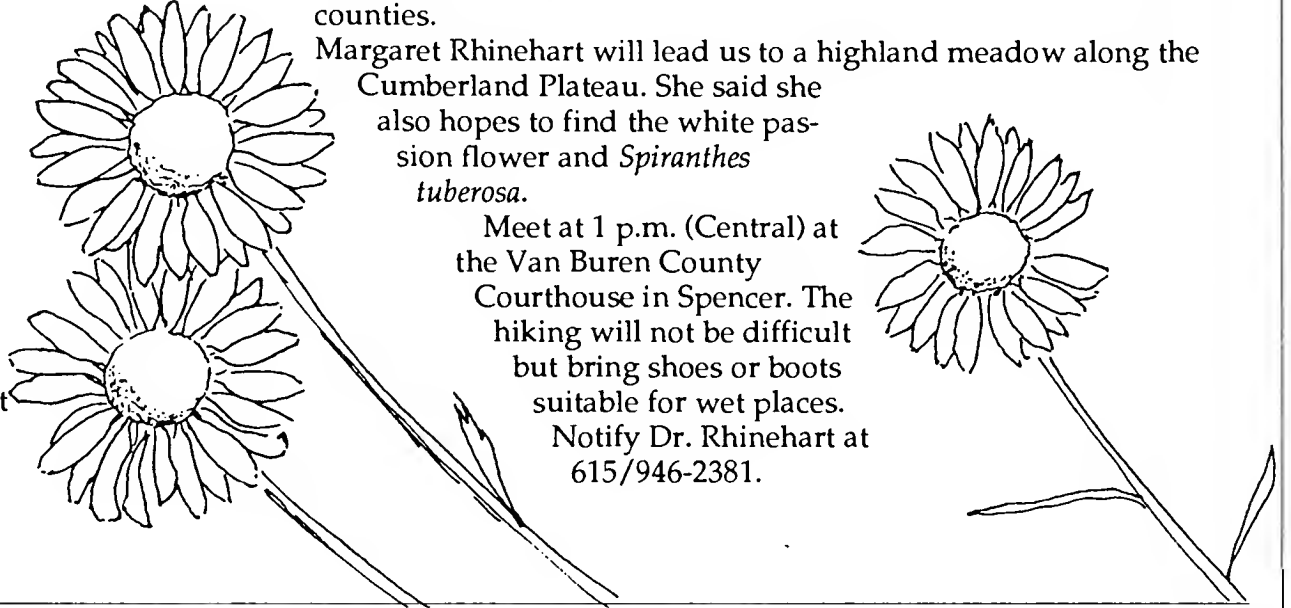
EXPLORING NEW SITES OF THE CUMBERLAND PLATEAU

Join Margaret Rhinehart July 24 at Spencer

Although the blooming season for most flora is late this year, members can expect to see the stunning purple fringeless orchid and other unusual species on a hike July 24 in Van Buren and Warren counties.

Margaret Rhinehart will lead us to a highland meadow along the Cumberland Plateau. She said she also hopes to find the white passion flower and *Spiranthes tuberosa*.

Meet at 1 p.m. (Central) at the Van Buren County Courthouse in Spencer. The hiking will not be difficult but bring shoes or boots suitable for wet places. Notify Dr. Rhinehart at 615/946-2381.



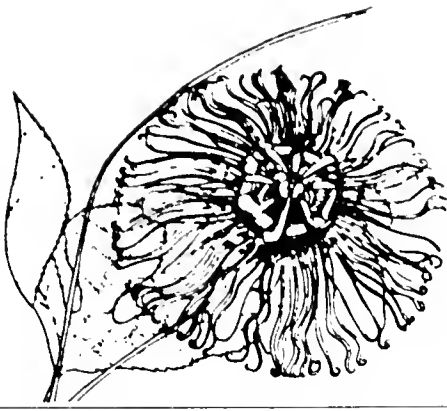
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TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

Volume 16, Number 4

August 1993 (Delayed)

ENDANGERED SPECIES ACT

Federal Legislation Still Pending

Watch for news about the Endangered Species Act. Its reenactment is scheduled for this year's congressional session, but neither its schedule nor its provisions are certain.

First passed in 1973, the act came up for reenactment last year with important new language to strengthen and improve implementation. But reenactment was delayed.

One of the more hotly debated provisions of the new bill concerns the deemphasis of single species and small-fragmented reserves. Instead there is an emphasis on larger systems—habitats and potential habitats in multi-purpose management areas.

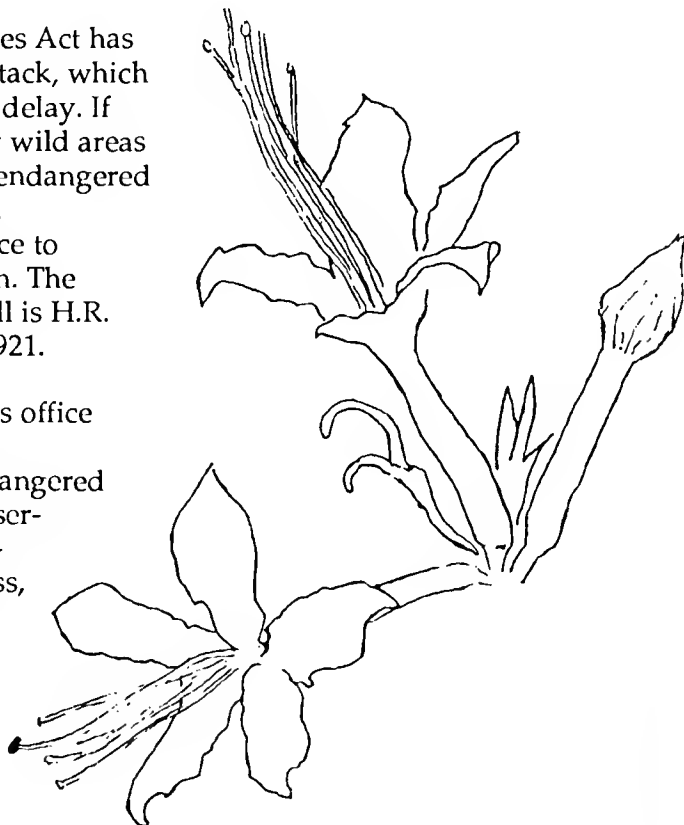
The discussions among many conservation groups shows some fear that many site specific rare plants may be lost as small sites are abandoned.

Andrea Shea, rare plant botanist in Tennessee's Division of Ecological Services, believes the new law may be helpful in providing greater protection for many wild plants. She cited the glade systems of Middle Tennessee in which glade plants are abundant. The glade systems themselves, however, are threatened and shrinking because of development, and those systems need protection.

The Endangered Species Act has come under increasing attack, which is one cause of last year's delay. If the act is killed, many wild areas critical to the survival of endangered species will be destroyed.

You can lend your voice to support of new legislation. The House reauthorization bill is H.R. 2043. The Senate bill is S.921.

The Ecological Services office provided information on Tennessee's rare and endangered plants to the Nature Conservancy, which in turn provided a report to Congress, as consideration of the Endangered Species Act began. □



not quite correct

PLANS FOR 1994 ANNUAL MEETING

TNPS and the Kentucky Native Plant Society are planning joint annual meetings for September of next year at Arnold Engineering Development Center, reports Dennis Horn, TNPS vice-president.

"We hope to secure accommodations at the Forest Inn, where we stayed during the annual meeting last May," he said. "The plan would be for KNPS to host the fall meeting in 1995."

Dennis said these plans may stimulate interest for both groups at a time of the year when field trip interest is relatively low. The invitation is open to the American Association of Field Botanists to join us "to make this an even bigger event."

Among the possibilities for activities include May Prairie, the large AEDC reservation, Old Stone Fort State Park, Short Springs, South Cumberland Recreation Area, and Carter Mountain. Composites, gerardias, the rare *Pedicularis lanceolata*, grass of parnassis, *Spiranthes cernua*, and gentians should all be flowering at that time.

ALSO IN THIS ISSUE

Native Plant Gardening
by Ed & Meredith Clebsch

Page 2

Photography
by David Duhl

Page 4

TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

August 1993
Volume 16, Number 4

This Newsletter is a publication of the Tennessee Native Plant Society and is published six times a year, generally in February, April, June, August, October, and December.

The Tennessee Native Plant Society (TNPS) was founded in 1978. Its purposes are to assist in the exchange of information and encourage fellowship among Tennessee's botanists, both amateur and professional; to promote education of the public about Tennessee flora, and wild plants in general; to provide, through publication of a newsletter or journal, a formal means of documenting information on Tennessee flora and of informing the public about wild plants; and to promote the protection and enhancement of Tennessee's wild plant communities.

Dues are \$15 for the calendar year (\$10 for students and senior citizens, \$20 for institutions, and \$150 for life memberships). Membership privileges include a subscription to the TNPS Newsletter. Dues may be sent to the Tennessee Native Plant Society, Department of Botany, the University of Tennessee, Knoxville, TN 37996-1100.

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Latham Davis, Editor

Letters to the editor or correspondence about the Newsletter should be addressed to: TNPS Newsletter, P.O. Box 856, Sewanee, TN 37375.

GARDENING WITH NATIVES

This is the first of what the authors and editor (and TNPS president) intend to be a regular feature of the Newsletter. The authors, Ed and Meredith Clebsch, are co-owners of Native Gardens, a commercial nursery in Loudon County, Tennessee, specializing in native perennials. They established this rather unusual type of nursery ten years ago and both are regular participants at native plants conferences and nursery association meetings. Ed is also professor of botany and ecology at the University of Tennessee, Knoxville.

This series will include practical information about gardening with native plants, seasonal information, a bit of philosophizing, features on the use of particular species or genera, a generous dash of ecology, and some conservation messages. This article, a launching into (for us) uncharted waters, will include some definitions and a discussion about what we mean when we talk of *gardening with native plants*.



Defining what 'native' is and isn't could be the subject of a whole column. Simple definitions get challenged, and some of those challenges generate heat among participants at native plant conferences. (More about those conferences in a later column.) A working definition for our purposes might be that any plant in question was in the region in pre-Columbian time (though it may have been moved around by native Americans) and persists there without the involvement of modern man.

Most of the plants we discuss will be *native* to eastern North America, but may well include exotics—species native (by our definition) somewhere else but possibly *naturalized*, persisting by unaided reproduction in the region.

Kudzu, woolly mullein, Japanese honeysuckle, and queen Anne's lace are examples of naturalized exotics. Pretty obviously, naturalized exotics may be good garden plants or may be noxious. Nasturtiums are good garden flowers, are exotic, but don't naturalize in Tennessee climates. Let us hear from you if these ideas get your intellectual dander up.

If we're going to define 'native,' we'd better define 'gardening' as well. The dictionary definition of 'garden' that applies here is, "a piece of ground for the growing of fruits, flowers, or vegetables, usually close to a house." It may be as informal as 'planting some bushes up around the house,' or it may be as formal as the former palace garden in Paris—the Tuileries—or the gardens at the Biltmore estate. However you like it, it involves controlling space which contains plants. You could make a predominantly native garden with any or all of the fruits, flowers, or vegetables in the definition.

The prevailing concept of a native plant garden in the embryonic period of 'the native plant movement,' only a decade ago, was one of woodland spring wildflowers. That is still a widely held concept, and it is a pleasant surprise to many folks to find that there are good native garden plants available, in quantity and commercially, that bloom at other times of the year, that have brilliant colors other than white and pink and blue, that are happy in full sun, partial shade, or deep shade. There are even species which are well adapted to various soil moisture conditions, to temperatures that range from constantly cool to blistering hot, and that can even stand wind.

Styles of gardens are rightly as personal and different as we are as individuals. We agree that it is good to start with a plan, and there are qualified professionals in abundance to help you with a plan for your space (for a price).

There is no apology needed for developing a garden haphazardly, *if the result pleases you*. However you choose to develop your garden, do it in such a way that the result is personally aesthetic. If it happens to please others, so much the better.

One guideline that we embrace is that we control the garden—the garden doesn't control us. That doesn't mean that our garden is free from all attention and maintenance, but it does mean that the garden takes its place alongside other individual and collective pursuits.

We subscribe to several gardening magazines and are enthralled at the pictures of exquisite, manicured, gorgeous gardens. We love visiting such gardens, but we're always curious about whose labor goes into the manicuring. We simply don't have the time to develop and tend such space nor the money to hire it done. Fortunately for us, that's not a source of frustration, because we both lean toward what we've learned to call 'naturalized' gardening. That style does have some design in it, it has color, it has something interesting from early spring to late fall, it has textural variety, and it requires minimal maintenance effort.

Some of our friends, but only some, are too polite to refer openly to our garden of weeds. It didn't all happen over night, either. We work at trying to concentrate on a little new piece every year.

If one explores the market a bit and is willing to ask lots of questions of purveyors of plant materials (or read their catalogs or one or more of the numerous good books on native plant gardening), it is surprising how much gardening one can learn to do with natives alone. One of the things you *can't* do is to buy a packet of native plant seeds and have every resulting plant as nearly identical as you expect in marigolds, pansies, or petunias. Selection for such monotonous uniformity just hasn't progressed that far with any of our native plants (thank goodness!).

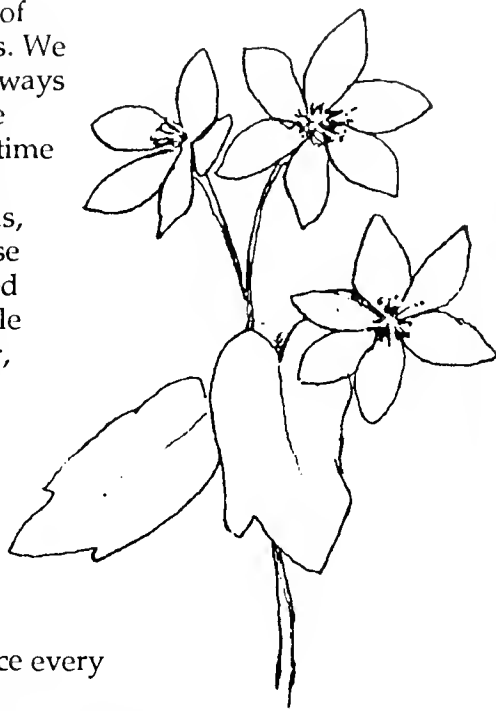
We plan to do a column on sources of plant materials, and we will discuss horticultural selections in many species, so stay tuned. We also plan a column on the available literature.

When we first thought about starting a native perennial nursery, the thing that gave us most pause was a concern based on years of experience as field botanists. Many of the plants which we thought would be good nursery plants were pretty particular about where they grow in their native habitats. (What pleasant surprises we've had about the breadth of ecological tolerances of most species.) They also produced few seedlings, and germination requirements seemed strict and specific. Further, we thought that raising them in containers would require substrata tailored to each species.

What a surprise we got from the native gardening pioneers at the North Carolina Botanical Garden when they showed us their germination beds (and told us of their successes!) and their basic potting mix (modified for special needs)! That gave us the courage to start.

Whether you want to start a garden from plants which you rescue from certain death, from wild gathered seeds, from commercial suppliers, from cuttings which you root, or from a mixture of the above, we encourage you to start. If there are gardening subjects you'd like to have covered in a column, let us know.

—Ed and Meredith Clebsch
Greenback



RARE PLANT LIST

The Scientific Advisory Committee to the State Division of Ecological Services will meet in October in Nashville to recommend changes to the state rare plant list.

Later the revised list will be made available for public comment.

Currently there are 419 rare plants and about 90 endangered plants on the Tennessee list. □

Passionflower from Cuttings

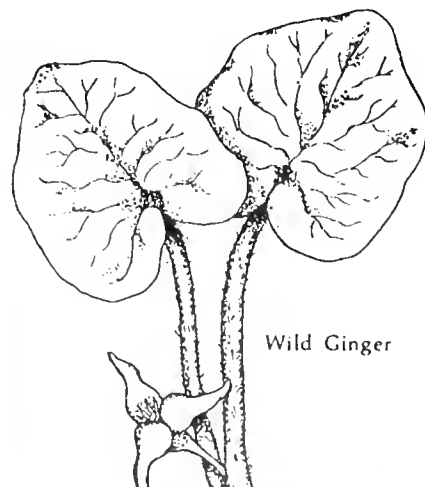
If you have ever tried to propagate passionflower from seeds, you know how slow the process can be. A better method of propagation is the careful collection of stem cuttings.

Begin with cuttings of six to eight inches in length and remove the lower leaves. Plant the cuttings in a well-drained medium, making sure that one node of each stem is buried in the medium. Keep the cuttings under mist until a good root system is established, then plant under full sun. □

Packet of 10
\$3.00 per packet
plus \$1.25 postage

All proceeds go to the
**Tennessee Native
Plant Society**

Send orders to:
Helen Warren
105 Evans Lane
Olk Ridge, TN 37830



DEADLINE NEARS FOR PHOTOGRAPHS

The deadline is nearing for the submission of photographs for the Tennessee wildflower book, part of the Tennessee Flora 2001 project.

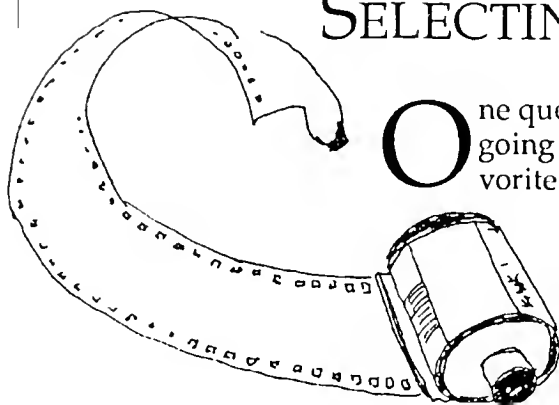
The selection committee, chaired by Jack Carman of Tullahoma, is accepting photography between October 1 and November 30.

Anyone who is interested in submitting photographs to the committee but has not received the guidelines and list of plants may send a self-addressed, stamped (52-cent stamp), business-sized envelope to Jack Carman, 106 LaSalle Lane, Tullahoma, TN 37388.

As many as 600 species endemic to Tennessee are expected to be described in the book. □



SELECTING FILM



One question many photographers ask before going into the field to photograph their favorite wildflower is "which film should I use?" The short answer is "try them all and see which one you prefer." The longer answer follows.

There are so many films—and companies that make film—that it's a pretty sure bet you'll find one to suit you. Major film manufacturers

include 3M, Agfa, Fuji, Kodak, and Konica. If you want to photograph in black and white, add Ilford to the list. Want to use print film? You'll find the same players. When you consider slide film, you'll notice that almost all films can be processed in the same way: by a professional or by yourself using a home kit. Kodachrome, however, is the exception and must be processed in a special way; only a few places in the country will process it. In order to make an informed decision, you may want to consider the following factors when choosing a film.

Speed

Most of you probably know that a fast film (ISO 400, for example) will allow you to use a fast shutter speed as compared to what you would need with a slow film (ISO 50, for example). With fast film, you may be more likely to leave your tripod at home or to photograph flowers blowing in the wind, but—as you'll see—there's a trade-off for such a luxury. Don't let the slow speed discourage you, though, because there are plenty of advantages that outweigh the [speed] disadvantage of using a slow film. In other words, a fast film might allow you to "freeze" the pink lady's slipper moving in the wind, but the resulting photograph may not be to your liking. Read on to see why.

Grain

Fast films, by their nature, are grainy—it's those big grains of silver that make the film more sensitive to light. All films have some grain; faster films simply have bigger grains than slower films. Now, large grain may have some aesthetic appeal, but for most wildflower photos it's going to be there big time and may compromise the photograph, especially if you make an enlarged print from your slide or negative. This could be a real problem if you're photographing a white subject. For example, the large grain of a fast film will appear very prominently on the white of a large-flowered trillium, while a slower film—with smaller grain—will record the smooth white petals with all its texture. Kodak has attempted to solve this problem by using Tgrain technology in its newest generation of films. That is, they use the same unique technology they've been using in their black-and-white films for years. The result is a fine-grained slow film.

Sharpness

For this discussion, we'll combine sharpness (crisp, precise texture and detail), acutance (sharp distinction between dark and light areas on film), and resolution (ability of film to distinguish two closely placed objects) all in one and just call it sharpness. Simply put, when you photograph a wildflower—Tennessee coneflower, for example—the edges of the petals should be sharp, and the small hairs of the stem should be, too. The problem is that faster films—with those great big silver grains—can rarely accomplish this, and it can compromise the photograph, especially if you're going to make an enlarged print from your original. In order to avoid this problem, use a slower film.

Color

Film confirms what we already know about color: that there are big differences between color that is real, remembered, and desirable, so it's easy to understand that this feature is the one in which the various films differ the most. In addition, the same object can appear different under various lighting conditions: we've all seen what the warm-toned early morning light can do to a field of white flowers—Queen Anne's Lace, for example—so just what is "real" color anyway?

Some films are color biased—to the blue (many Ektachromes) or red (Kodachrome)—while some are neutral (Ektachrome Lumiere). Some films are even biased to warm colors (Ektachrome Lumiere-X, Fujichrome Velvia, some Agfachromes), like you would find in early morning or late evening. This could be a great feature if you're looking to extend those hours of golden light. Of course, if you're photographing with a botanical end in mind—like if you think you've seen a new variety of purple coneflower, for example—this may not be such a great idea. In this case, many people place a color chart in their photo so that colors can easily be matched.

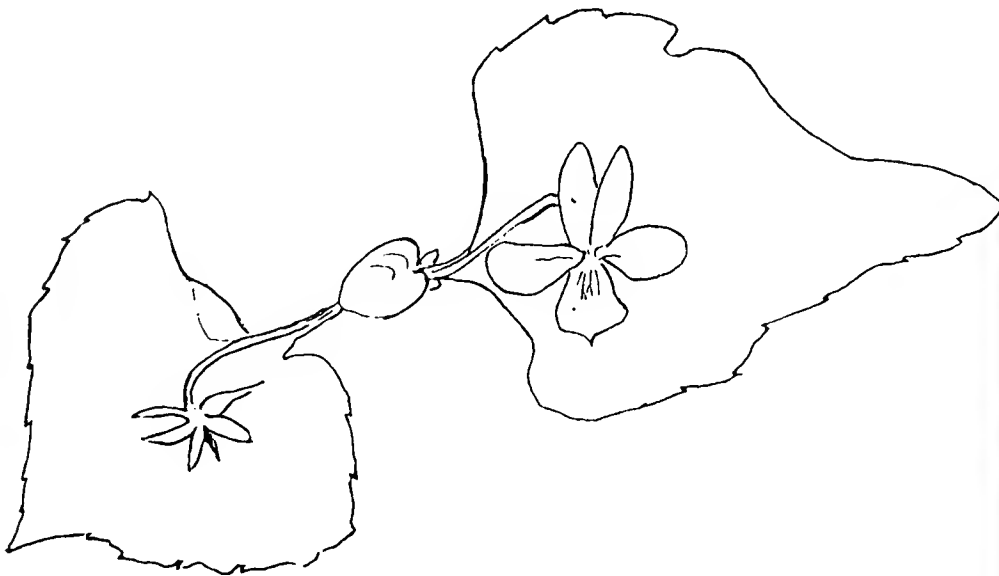
Other Factors

Extremes of heat should always be avoided, but there's no need to go overboard about it. If you're out photographing, your film will be perfectly fine in your camera and camera bag. An expiration date is always provided with a roll of film, and many people successfully extend that date by storing their film in the refrigerator or freezer. This is particularly important if you use film marked as professional because the useful window of peak performance is much smaller. And, while we're on the subject, some people prefer professional film while others don't think it's worth the extra price. Kodak professional films are simply released at their peak of usefulness. Fuji professional films share this characteristic, but also have a unique film base designed for publishing the image. If the film's been handled properly, it's almost impossible to tell the difference between professional and amateur versions.

In summary, there are films that will record the colors of wildflowers accurately, and some that will really exaggerate them. With some films, you'll be able to "freeze" them in the wind, but the result may be a very grainy image. Why not try a few different rolls of film and compare them for speed, color, and grain? Pick the one you prefer and learn its characteristics and subtleties. I think you'll find a film that satisfies your needs in no time at all.

—David Duhl

(David Duhl is a nature photographer living in Nashville and may be contacted at 817 Kent Road, Nashville, Tennessee 37214.)



BOTANICAL BOOKS CATALOGUE

A catalogue from a Florida bookseller has arrived in the editor's mail. This bookseller specializes in botanical books. While you can find or order most newer titles at your neighborhood bookstore, the specialist may be able to get hard-to-find or even out-of-print titles.

Ask for a botanical books catalogue when you write to W. G. Winter, bookseller; 2409 S.W. Thirteenth St.; Gainesville, FL 32608.

The catalogue has a special section on orchids.

As a footnote: Hal DeSelm introduced his recent field trip on grasses with a discussion of books on the subject, a discussion of much interest to the dozen participants. During that time Dr. DeSelm mentioned books out of print, particularly a three-volume set by H. A. Gleason published in 1952. According to DeSelm, this is a work by a genius, yet copies are almost unobtainable. Perhaps Mr. Winter could help. □

Liparis loeselii in Lewis County

The Sunday afternoon that the TNPS annual meeting ended, Bill and Kay Jones hurried home to check out the twayblades they had been watching and waiting to bloom. As they had suspected and hoped, the tiny orchid turned out to be *Liparis loeselii* (fen or bog twayblade).

In modern times, this pale green orchid has previously been found in Tennessee only near Center Hill Lake, in a wet quarry site. Within the week, Margaret Rhinehart determined that the ones she had been watching near McMinnville were also the fen twayblade. The Joneses have eight plants or so with bloom stalks, and more younger plants not in bloom. They say that they expect more will be located with a more thorough search, now that they are familiar with the habitat and leaf shape.

Kay says the plant is very similar to the much more common lily-leaved twayblade, when not in bloom. □

Write for the TNPS Newsletter; You'll Like It

You don't need to be an expert to write something for the TNPS Newsletter. The editor is proof of that. A love of and fascination with native plants is all that's needed.

Therefore, consider sharing some of your interests by submitting an article or even just a note of a few sentences for publication.

Subjects could range from your own study of a favorite species, to observations in your garden, to experiences on a wildflower trip.

The editor would be thankful for the help. And your fellow members would be grateful to be able to add to their own understanding.

If you're still unsure, query the editor . . . at P.O. Box 856, Sewanee, Tennessee 37375. □

FROM ROUGH RIDGE TO BLUFF MOUNTAIN

Seven TNPS and AAFB members located the correct one of several spots "where Highway 221 crosses the Blue Ridge Parkway" on June 26 to join Ed Schell for a delightful day. (Locating the meeting place is another reason to call the trip leader before you come on an outing.)

At the first stop, Beacon Heights, round-leaved orchid was found, thanks to directions from a man who asked for help in identifying it. Stops at Rough Ridge and Flat Rocks brought other species of the high mountains—red, black, and purple chokeberries, three-toothed cinquefoil, mountain ash, small false hellebore, minnie-bush, rosebay rhododendron, and mountain cranberry bush. A hard rain shower didn't dampen anyone's enthusiasm for the day.

The next day's trip attracted twelve, from middle and east Tennessee, Ohio, and Georgia, to Bluff Mountain in North Carolina, one of the Nature Conservancy's finest preserves. Accompanied by the Conservancy's intern at the preserve, they visited rock outcrops, wooded areas, and a wet area. The rare mountain stonecrop (not yet located in Tennessee), mountain dwarf dandelion, Gray's lily, Small's twayblade, gooseberry, nine-bark, sundrops, Roan Mountain bluets—and a peregrine falcon—were all seen. Thanks to Ed, our Appalachian mountain expert, for the leadership and botany lessons.

—Kay Jones
Columbia, Tennessee

New TNPS T-Shirts Available, along with Decals and Hats

New TNPS T-shirts are now available for sale. Nita Heilman reports that members attending the recent trip to Spencer liked the new shirts, which have some slight color changes.

Nita is now in charge of sales of shirts, hats, and decals.

Thanks are due to Patsy Huffman of Murfreesboro for the good job she has done with sales over the last three years.

The Tennessee Native Plant Society decals may be ordered for \$1 each, plus a self-addressed and stamped envelope (unless a T-shirt is also ordered).

Nita also has TNPS hats. The lightweight twill hats are white, with a passion-flower design in purple and green (like the decal). One size fits all. Nita said hats are available at meetings and trips only since she has no convenient way of mailing them.

About 20 old-style T-shirts are still available for \$10.50, plus \$2 if mailed. These are 100 percent cotton, mostly small and extra-extra large white, and medium white and yellow.

The new shirts have the same six-color design, with two slight ink changes. These are 50 percent cotton in white, cool mint green, lemon yellow in medium, large, and extra-large. A popular ash gray shirt is available also in the extra-extra-large size. Nita said she sold all nine samples of gray she took on the Spencer trip.

When ordering, specify size, color, and material. If possible give a second choice of color and indicate if 50 percent cotton can be substituted for 100 percent cotton shirts.

Make checks payable to TNPS and send orders to Nita Heilman, 429 Rivermont Drive, Clarksville, TN 37043 or phone 615/645-9338. □

GEORGIA CEDAR GLADES

A Trip with the Georgia Botanical Society
Saturday, October 10

The Georgia Botanical Society is inviting TNPS members to join a field trip October 10 to the cedar glades of Chickamauga National Battlefield. Jim Allison, the trip leader, asks that everyone meet at 10 A.M. (Eastern) in the parking lot of the park headquarters.

Highlight of the trip may be locating the newest orchid on the Georgia list of flora, the Great Plains ladies' tresses (*Spiranthes magnicamporum*). Several populations of this species are found on the glades in and near the park.

The glades of Chickamauga Battlefield support a wide array of endemic and characteristic species. They are also among the best preserved anywhere, the more extensive and better known glades of Middle Tennessee having been largely driven over, dumped on, or pasturized.

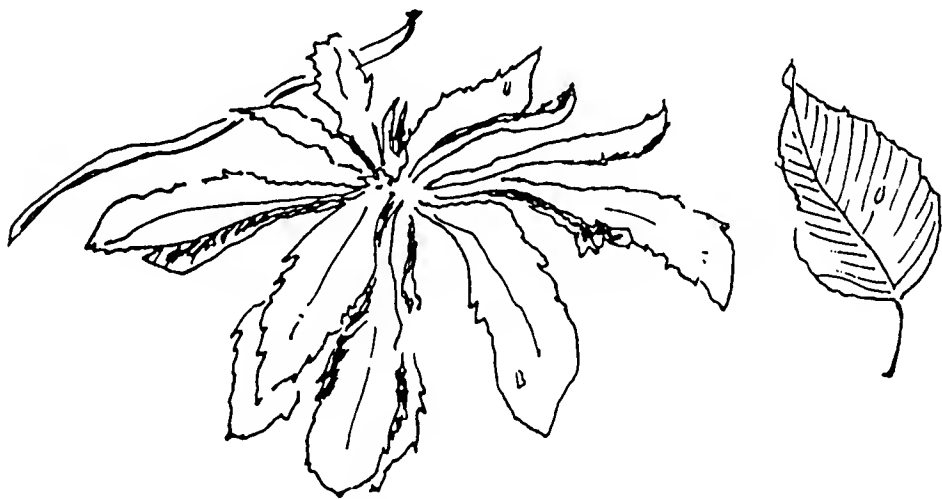
The walking conditions will be easy, totalling not more than a mile.

Those bringing lunch may picnic in the park. Others can find restaurants in nearby Fort Oglethorpe.

To reach the park headquarters, exit I-75 at Highway 2. Go west 6.4 miles to the intersection with U.S. Highway 27 in Fort Oglethorpe. Turn left and drive another 0.9 miles to the intersection with Reeds Bridge Road and proceed through the intersection, entering the National Battlefield. The headquarters is just beyond on right.

For overnight accommodations, Jim recommends the Best Western in Fort Oglethorpe.

Allison can be reached at 404/918-6411 (day) or 404/963-4428 (evenings).



Hope you were in Lewis Co.

Unavoidable delays in publishing the August issue kept us from reporting plans for the September 11 field trip to the hillside seeps of the western Highland Rim in Lewis County.

Bill and Kay Jones were hosts for this gathering at their home, Ridgetop, near Hampshire, between Columbia and Hohenwald.

The hike was listed in the 1993 field trip schedule published early this year, and the Joneses hoped to have a good response from that. We'll have a report in the next issue, and perhaps Bill and Kay will organize another hike next year to explore the hillside seeps. The rarest of the plants unique to these seeps is the Tennessee yellow-eyed grass (*Xyris tennesseensis*), found only in a few locations in Lewis County, Tennessee, and north Alabama. Also of interest is large-flowered grass of Parnassus (*Parnassia grandiflora*), phlox, tear thumb, fire weed, and other wet-area plants. In the drier areas is found beechdrops, false foxglove, lobelia, autumn coralroot, pinesap, asters, and perhaps some ladies' tresses, and crane-fly orchid still in bloom. □

SUMMER ORCHIDS WITH MARGARET RHINEHART

A group of nearly thirty people, members of TNPS and the American Association of Field Botanists and guests, assembled on the courthouse lawn in Spencer hoping for an opportunity to see the Purple Fringeless Orchid (*Platanthera peramoena*). We were not to be disappointed as Margaret Rhinehart led us to a damp cow pasture near the edge of the Cumberland Plateau where the orchids grew in abundance. Some were faded by the hot sun, but many were in prime condition to challenge the photographers. Nearly 100 flowering stems in all were counted.

Since the white passion flower did not return this summer and the other orchids on the plateau were not ready yet, we decided to drive to Manchester and visit the May Prairie. There we found the snowy orchis (*P. nivea*) in large numbers and in good condition despite the dry weather. The false asphodel (*Tofieldia racemosa*), white-bracted thoroughwort (*Eupatorium leucolepis*), southern rein orchid (*P. flava*) and mock bishop's-weed were all in bloom at the prairie and all rare plants in Tennessee. The tassel rue (*Trautvetteria caroliniensis*) was quite showy with its numerous white stamens forming spherical heads.

By now the sun was low in the sky, but several of us stopped by the powerlines at AEDC to see a large display of the yellow fringed orchid (*P. ciliaris*). These were in prime condition and in larger numbers than had been observed in previous years. What a nice way to wrap up a successful day in the field.

—Dennis Horn
Tullahoma



CRANBERRIES FROM AN ICE AGE SITE

The whole bottom of Shady Valley in Johnson County was once one large bog, formed along the southern range of glaciers, during the last ice age. One-tenth of an acre is all that remains of bogs that in 1857 covered 10,000 acres.

The sites of large cranberry (*Vaccinium macrocarpon*) are as much as 5,000 years old, according to botanists. This is much older than the cranberry sites of New England now so well established in commercial production with the very same species of cranberry.

Cranberries vines grow out of sphagnum moss, which covers old growth and spurs new leaves in the spring. The small "crane-necked" flowers bloom about July, and the berries begin to ripen in October to a deep, red color.

THE FLORA OF SHADY VALLEY SATURDAY, OCTOBER 2

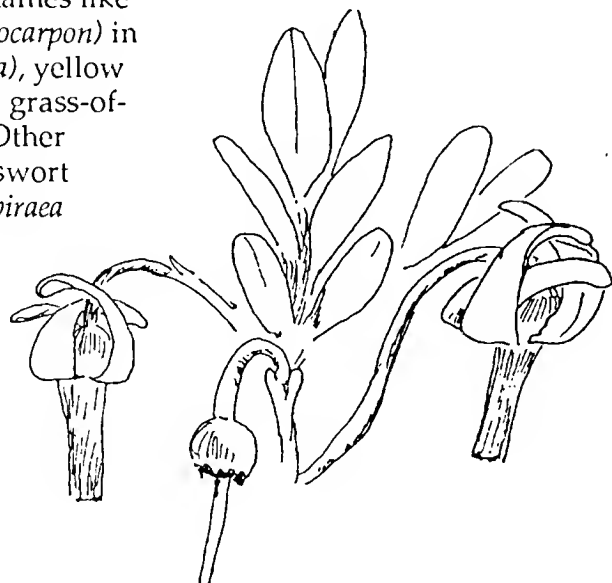
Ed Schell of Johnson City will lead TNPS members into the romantic sounding environs of Shady Valley October 2 to seek out several late blooming species of East Tennessee.

Members will meet at the intersection of U.S. Highway 421 and State Highway 91 in Shady Valley.

Ed whets our appetite with names like large cranberry (*Vaccinium macrocarpon*) in fruit, winterberry (*Ilex verticillata*), yellow bartonia (*Bartonia virginica*), and grass-of-parnassus (*Parnassia asarifolia*). Other quarries include marsh St. Johnswort (*Triadenum fraseri*), hardhack (*Spiraea tomentosa*), rough-leaved goldenrod (*Solidago patula*).

Ed leaves open the option of a Sunday trip also, which he will explain on Saturday.

Call Ed Schell in Johnson City at 615/282-6125.



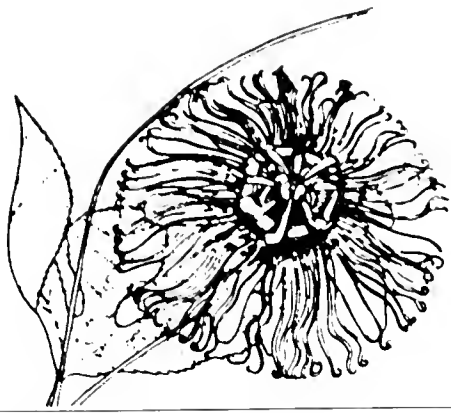
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TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

Volume 16, Number 5

October 1993

NEW WORLD NATURALIST

A Century Before Audubon, Mark Catesby Pioneered
the Field of Scientific Illustration

(With permission we are reprinting here most of an article about Mark Catesby which was published in the November-December 1992 issue of *Southern Accents* magazine. Though we're unable to reproduce the fine color illustrations, we are grateful to *Southern Accents* and the author, Patricia O. LaLand, for this article.)

One hundred years before the appearance of Alexander Wilson's *American Ornithology* (1808-14) and John James Audubon's *Birds of America* (1827-38), eighteenth-century naturalist Mark Catesby recorded in detail the strange plants and animals of North America.

Over the past two years, prices of original Catesby prints have escalated two to three times. Collectors can expect to pay between \$800 and \$6,000, depending on the quality and desirability of the image. In 1984, a fine copy of the first edition of his book *The Natural History of Carolina* was priced at \$84,000.

The first of the two volumes of *The Natural History of Carolina* was completed by 1731, the second in 1743. He also personally hand-colored the plates in the first edition. A second edition of the work, revised by George Edwards, was published in 1754. A third edition, which contained a Linnaean index of plants and animals, appeared in 1771 with a Catesby family history.

* * *

Catesby's books established him as a true pioneer in the field of scientific illustration, and for one hundred years his work was the illustrative treatment of the flora and fauna of the New World.

Born during the reign of Charles II in 1682 in Essex, Mark Catesby spent time at his grandfather's botanical garden, which played a part in stimulating his interest in natural history. But, as a young man, he found himself, as he wrote, "much suppressed by residing too far from London the center of all Science. I was deprived of all opportunities and examples to excite me to a stronger pursuit after those things to which I was naturally bent." Fate, however, intervened.

Catesby traveled to Virginia to visit his sister Elizabeth and her husband, Dr. William Cocks. He arrived in April 1712 and spent the next seven years in Williamsburg. There he discovered the wild creatures and plants of the marshes, fields, and woods surrounding Virginia's burgeoning capital city.

He returned to England in 1719 to share his discoveries and to find enthusiastic nature lovers to sponsor his return trip across the Atlantic. Arriving in what is now South Carolina in May 1722, he confined his explorations for the first year to the Low Country near the coast and then went inland to the upper, uninhabited parts of the country and continued to Fort Moore, which

—Continued Page 2

FLORA OF NORTH AMERICA BEING PUBLISHED

The first two volumes of the *Flora of North America* were released this fall by Oxford University Press. These first volumes, along with twelve others being prepared, are presented as the first comprehensive description of the plants growing naturally in the United States, Canada, and Greenland.

Volume I contains a series of introductory essays that provide a foundation for the *Flora*. The essays, written by nearly two dozen botanical authorities, discuss climate, geology, the history of vegetation and its current status, expeditions, research, classifications, and use of the fourteen volume set. Volume II contains taxonomic treatments of ferns and gymnosperms.

The *Flora of North America* project is a collaborative effort of thirty botanical institutions and

—Continued Page 3



TENNESSEE NATIVE PLANT SOCIETY NEWSLETTER

October 1993
Volume 16, Number 5

This Newsletter is a publication of the Tennessee Native Plant Society and is published six times a year, generally in February, April, June, August, October, and December.

The Tennessee Native Plant Society (TNPS) was founded in 1978. Its purposes are to assist in the exchange of information and encourage fellowship among Tennessee's botanists, both amateur and professional; to promote education of the public about Tennessee flora, and wild plants in general; to provide, through publication of a newsletter or journal, a formal means of documenting information on Tennessee flora and of informing the public about wild plants; and to promote the protection and enhancement of Tennessee's wild plant communities.

Dues are \$15 for the calendar year (\$10 for students and senior citizens, \$20 for institutions, and \$150 for life memberships). Membership privileges include a subscription to the TNPS Newsletter. Dues may be sent to the Tennessee Native Plant Society, Department of Botany, the University of Tennessee, Knoxville, TN 37996-1100.

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Letters to the editor or correspondence about the Newsletter should be addressed to: TNPS Newsletter, P.O. Box 856, Sewanee, TN 37375.

Naturalist—Continued

is on the Carolina side of the Savannah River. Catesby's recordings of the different varieties of snakes were of great interest to fellow naturalists, who had not seen many of the specimens he collected.

No doubt in deference to Catesby's botanical sponsors, he was particularly motivated to collect information on trees and shrubs, noting their practical uses as building materials or for their medicinal properties, as well as their prospective adaptation to the English climate. He was most fascinated, however, by birds, finding their great variety and their colors irresistible. By his own reckoning, he felt that he had recorded every variety except for a few waterfowl and seabirds. His observations of many of their habits were the first to be read by Europeans and led to new information about migratory habits.

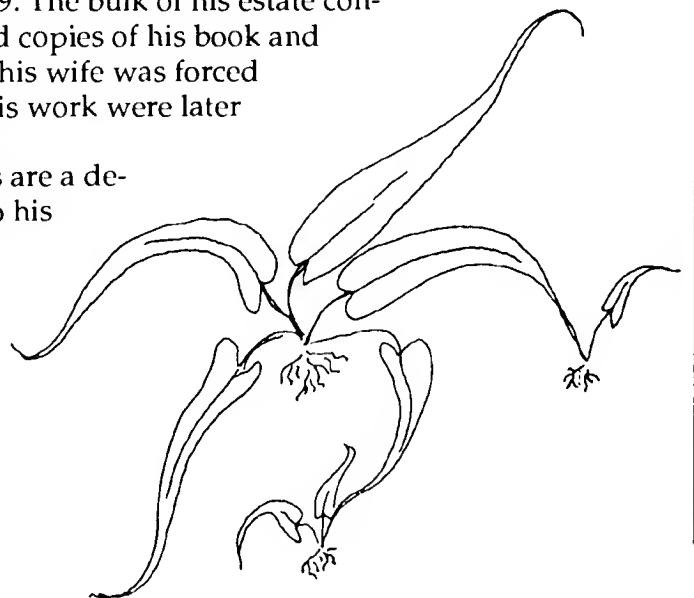
In his paintings, Catesby attempted to use live models of birds, which gave his work a great deal of unusual authority and charm. He also tried to be very exact in recording the colors and textures of plants, which he always painted in a fresh state. But apparently Catesby was not totally comfortable with his lack of formal training as a painter and offered apologies for his skill. "As I was not bred a painter," he wrote, "I hope some faults in perspective, and other niceties, may be more readily excused; for I humbly conceive that plants, and other things done in a flat, though exact manner may serve the purpose of natural history, better in some measure, than in a more bold and painter-like way." He generally portrayed wildlife with what he believed were the plant materials that were their choices of habitat.

Returning again to England in 1726, he succumbed to the urgings of his learned friends to have his work published. Plans were thwarted, however, by the high cost of the engraver's fees. As a result, he learned the engraver's art, and, as he said, "I have not done a graver-like manner, choosing rather to omit their method of crosshatching, and to follow the humor of the feathers, which is more laborious, and I hope has proved more to the purpose." Catesby etched all but two of his 220 prints himself; the remaining two were executed by the German botanic artist, Georg Dionysius Ehret.

In describing specimens, he recorded the names of birds and plant materials largely as they were known locally and descriptively, such as "Round-crested Duck," known to us as the Hooded Merganser. At that time, there was no standard system for naming the overwhelming wealth of new plants and animals being described from all over the world. However, in 1758, Swedish naturalist Carolus Linnaeus devised the system that gives each species a unique two-part Latin name. Eventually, scientific snobbery disqualified any describer, including Catesby, who did not follow the Linnaean system. Two species, however, honor the illustrious naturalist: the bullfrog, *Rana catesbeiana*, named for him in 1802, and *Gentiana catesbaei*, which is commonly known as soapwort gentian.

Catesby's last years were spent in London, where he died at the age of sixty-seven in 1749. The bulk of his estate consisted mostly of some unsold copies of his book and his engraving plates, which his wife was forced to sell. Revised editions of his work were later printed and sold by others.

His pictures and writings are a delightfully factual insight into his observations and provide a window to the eyes, heart, and mind of this consummate eighteenth-century naturalist who has won lasting acclaim as the first illustrator of American ornithology. □



Camera Angles

We've all taken photographs of ourselves, our kids or family. The mental sequence is inevitable: shoot at eye level, make eye contact, then try something different like shooting up at the subject or use a wide angle lens to change your point-of-view. It's a pattern deeply embedded.

For some reason, when we point our cameras at wildflowers, all is forgotten. Read on, and I'll show you how easy it is to improve your wildflower photographs by recalling what you already know!

Wildflower portraits (like the kind I presented in earlier columns) can result in striking photographs, but don't always distinguish themselves from the pack. They're simply not different enough from what many other photographers do. What is needed is a different perspective that represents your unique interpretation.

You can achieve this new perspective simply by reconsidering how you view the subject.

We all care deeply about our wildflower heritage, and I invite you to translate that to film. For example, the very first thing you might want to do is walk around your subject to find the most suitable background, most photogenic angle, or unusual view in much the same way you might make your child's portrait in the park.

I wonder how many would choose to make their children's Christmas photograph with outdoor

What's Your Position?



bathrooms in the background when they can just as easily shoot in the other direction and portray them in front of a waterfall. Similarly, if I were photographing a pink lady's slipper, I might check out all the angles and choose the one with the best background or the smallest blemish on the delicate flower.

I probably would choose to photograph the people I care about at eye level and I would make eye contact. Most of you probably do the same but never thought about it. It's an unspoken sign of respect for the subject. In wildflower photography, it also is a sign of respect. If you don't look down on your subjects mentally, then show that respect in your photographs.

Get your knees dirty, scrape your elbows, get at eye level and photograph the flower from an angle most of us would not see. Photograph the *back* of a Tennessee coneflower or the underside of an oxeye daisy. It will immediately give your photographs a unique look to them, a more intimate look. It will bring the viewer into the photograph because it brought *you* into it.

The photographs of your family that you really treasure are probably the ones that say something about the subject. The essence of a great photograph is not just what you see, but also *how* you see your subject.

Even the best techniques can't help if you don't see the possibilities. So the next time your out photographing wildflowers, consider walking around the subject first, and consider all the angles. One of them may just be the "right angle."

Flora—Continued

hundreds of botanists. The Missouri Botanical Garden serves as the organizational center for the project.

The fourteen volume set will be published over a period of twelve years. Each volume will include identification keys, short descriptions, distributions, and other information of biological interest for a particular group of plants. When necessary, each species entry corrects erroneous information, qualifies any variant names the editors believe misapplied, and notes known hybridizations. The final volume will contain a comprehensive bibliography and index.

Despite ongoing study of plants in North America, many species and many geographical areas are still poorly known. *Flora* organizers say the project will stimulate initial research on these subjects, and the printed *Flora* will identify species and areas in need of further study. They say the *Flora* will also provide essential data for identifying and protecting the 15 percent of the flora of the U.S. that is threatened with extinction.

Nancy Morin, convening editor of the *Flora* of North America project and assistant director of the Missouri Botanical Garden, notes that "there has never before been one place to obtain all the information this project is providing."

Efforts to produce a comprehensive flora began almost 160 years ago with the work of John Torrey and Asa Gray. Another attempt was made in 1965 but was discontinued because of lack of funding. Foundation grants and private gifts have been providing \$1 million annual funding for the project.

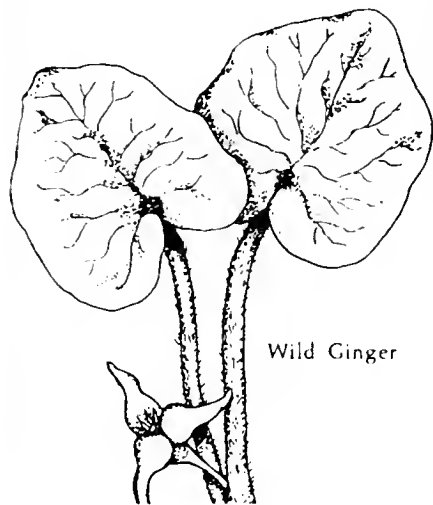
Copies of the first two volumes may be ordered from Oxford University press by calling 800/451-7556. The volumes are priced at \$75 each. □

(David Duhl is a nature photographer living in Nashville and may be contacted at 817 Kent Road, Nashville, Tennessee 37214.)

GARDENING WITH NATIVES

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105 Evans Lane
Olk Ridge, TN 37830

Although gardening calendars call for work in the ground this month—planting, dividing, preparing seedbeds for early sowing of perennials, etc., there is still plenty of flower color to be enjoyed, too, just in this one family of plants.

October and composites are almost synonymous in my mind. The composites include the asters, sunflowers, goldenrods, coneflowers, and some other really good fall garden plants. We won't cover but a few. We've chosen the composites because the family is big—15,000 species worldwide, and even in Tennessee it offers much diversity of size, color, form, habitat, and texture for either traditional or naturalized gardens.

How big is the choice among the asters? Arthur Cronquist lists sixty-six species in his recent book on the Asteraceae of the Southeast, and Eugene Wofford lists thirty-eight species for the Blue Ridge Mountains of Virginia and southward. That offers more diversity than we currently know how to use.

Since the flowers of asters are of two types, there is at least a chance of getting a double dose of color. The ray flowers commonly come in white, blue, pink, lavender, rose, and purple, and the disk flowers are commonly yellow or reddish. Of the ones we know, there is variation in flowering time from late summer to frost. Some that begin flowering in late summer and bloom into fall are *Aster curtisii* (Curtis's aster, blue), *A. divaricatus* (white wood aster), *A. linearifolius* (stiff-leaved aster, blue), *A. novaeangliae* (New England aster, blue and pink-purple), and *A. patens* (late purple aster).

More strictly fall species are *A. carolinianus* (climbing aster, purple and pink-purple), *A. grandiflorus* (great aster, pink-purple), *A. oblongifolius* (aromatic aster), and *A. undulatus* (wavy aster, blue). Aromatic aster is the last to bloom, even after frost. The climbing aster is woody, scrambles, and gets up to four meters tall. A trellis aster!? Wow!

Curtis's and the stiff-leaved asters get only one to two feet tall, the white wood aster and aromatic and late purple asters get to three feet, and New England aster will get to four feet tall. None of them require the best in soils, and climbing aster, Curtis's, great, stiff-leaved, late purple, and wavy asters all can be grown in poorer than average soil. Though most do best in bright sun, white wood aster does very well in full, deep shade. It and New England aster require moisture.

On the other hand, climbing aster will stand conditions ranging from wet to dry, Curtis's, stiff-leaved, aromatic, wavy, and late purple are happy in moist to dry soils, and great aster does well in dry soils. What a wide diversity in one genus, and we've mentioned only nine species! Before you run out and grab any aster you see, though, be warned that some species are pretty weedy and can be invasive.

The sunflowers (*Helianthus* spp.) offer as much diversity of vegetative form, size, and habitat as the asters, but the range of flower colors is severely limited. You have to like yellow, but within yellow you can find lots of shades. The disk flowers are either red-purple or yellow. The genus has only half the number of species of asters in the Southeast, according to Cronquist.

The ones we know and can recommend (*H. atrorubens*, hairy wood sunflower, *H. maximilliani* Maximillian's



WINTER KILL

The death of plants by winter-killing or from cold at any time, is very frequently the result of desiccation rather than directly from low temperature. Thus, plants that are protected from drying winds can endure much lower temperatures than those of the same species that are fully exposed. (*Plant Ecology*, by W. B. McDougall, 1931, Lea & Febiger, Philadelphia.) □

sunflower, *H. simulans* (*H. angustifolius*), swamp or narrow-leaved sunflower, and *H. tomentosus*, (hairy sunflower) are all big (six to ten feet or even fifteen feet tall if well cared for) and all do best in moist, average quality soil. Many other species are worth trying in the garden. The birds like them all for seeds, but especially like hairy sunflower. *H. annuus*, the common one from which oil seed and bird seed sunflowers were derived, and *H. tuberosus*, Jerusalem artichoke, are invasive.

Other, less boisterous yellow composites, up to two feet tall and able to take partial shade and moist to dry conditions are two species of *Chrysopsis*. Maryland golden-aster (*C. mariana*) has many long lasting flowering heads and requires low maintenance. Its relative, silk-grass (*C. graminifolia*), has silvery grey, long and narrow leaves, and will take the driest, sandiest place you can find and will still produce prolifically. Our Tennessee endemic, Ruth's golden-aster (*C. ruthii*), is not in the trade yet but shows some promise as a garden plant.

The best white composite around is a selection from a common Tennessee plant, *Boltonia asteroides* 'Snowbank'. It requires full sun, gets up to four feet tall, prefers about average soil, tolerates dry periods well, and mixes well with other plants and other colors. Untried in our experience are the several white species of the boneset *Eupatorium*'s. They brighten moist, shady situations.

The Joe-pye *Eupatorium* species are generally too big and overpowering for most gardens. They do produce a wonderful pink to mauve bundle of flowers that are long lasting, that dry well, and that get gray to white as they mature. Shorter (four feet tall) selections like 'Gateway', with deep mauve flowers and dark stems, are in the trade now.

A blue native composite? Yes, *Eupatorium coelestinum*! Wild ageratum is the name taken from its European look alike and I like the poetry of 'mist flower' better. A bit invasive, it needs to be boxed in with other plants.

Growing up in semi-rural middle Tennessee, the ironweeds (*Vernonia* spp.) were weeds. Friends struggled over digging them out of moist pastures. Beauty has changed in the eye of this beholder since youth, and I readily admit that I think they're stunning. We've even found a well behaved purple one that gets about five feet tall, *V. arkansana*. It still likes a moist setting and full sun.

Want a bold splash of bicolor—red and yellow on the same ray flowers? Try the annual, *Gaillardia pulchella*, Indian blanket. It blooms all summer, and in poor soil! There is also a perennial species that is much like it. Both are quite adaptable, as long as they're in full sun.

The goldenrods (*Solidago* spp.) are almost as diverse as the asters in the Southeast, with an even fifty species in Cronquist's book. They make a super addition to a fall border, meadow, or fencerow. They've gotten a bum rap as a source of hay fever, 'cause it ain't so. They're all insect pollinated, but they bloom conspicuously at the same time as the culprit but inconspicuous ragweeds that are wind pollinated.

If you look around the goldenrod genus, there are species which can stand full shade and moderately dry sites (*S. caesia*, *S. curtissii*, *S. sphacelata*), ones that like sunny dry places (*S. nemoralis*, gray goldenrod, *S. odora*, sweet goldenrod, *S. pinetorum*, early goldenrod), some that like moister sunny habitats (*S. rugosa*, rough-leaved goldenrod, *S. sempervirens*, seaside goldenrod (long lasting cut flowers!), *S. speciosa*, showy goldenrod, and *S. sphacelata*, false goldenrod). The last one is very adaptable—sun or shade—and has had a very well behaved selection made from it, 'Golden Fleece', and it and the species provide nice evergreen rosettes through the winter. Again, be cautious. *S. canadensis*, giant goldenrod, is a common old field invader that will do the same to your garden. Avoid it.

Rudbeckia is a genus that has produced several fine garden plants—black-eyed Susan (*R. hirta*), orange sunflower (*R. fulgida* varieties), and thin-leaved coneflower (*R. triloba*). They are real winners, and the genus has several more species that hold promise.

Only part of one family, doggone it, and we've still got lots of other colors in other families and genera. I guess we need another October this year for another column on other good fall plants. Next year!

—Ed and Meredith Clebsch

BOOKS FOR YOUR WINTER READING

Gardening members who enjoy some reading during the long winter season may wish to look for copies of these books:

A Garden of Wildflowers: 101 Native Species and How to Grow Them, by Henry W. Art. A fine introduction to native gardening that covers the botany, as well as gardening techniques. Well written and well illustrated. Two pages are devoted to each of the 101 species. (1986, Storey Communications, Schoolhouse Road, Pownal, Vermont 05261), 290 pages, illustrated with line drawings, \$16.95.

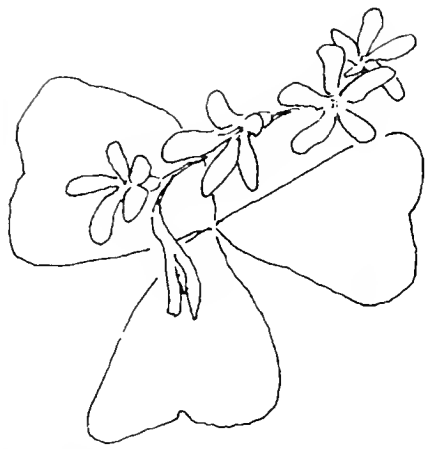
Landscaping with Wildflowers: An Environmental Approach to Gardening by Jim Wilson (1992, Houghton Mifflin Co.; \$35). This book shows gardeners in every area of the country how to use suitable native plants, appropriately and imaginatively. Wilson, a host of the PBS TV show *The Victory Garden*, addresses each of the major types of wildflower landscaping—woodland garden, meadow, damp and wet spots, etc., including gardens for attracting birds and butterflies.

Gardening with Native Wild Flowers by Samuel B. Jones, Jr., and Leonard E. Foote (1990; Timber Press; \$32.95). This book provides detailed information on which native plants to choose and practical advice on how to use them in the garden and in landscapes. It covers more than 1,000 species of herbaceous plants, native to the eastern and mid-western U.S.

The Environmental Gardener (1992; Brooklyn Botanical Garden, 100 Washington Avenue, Brooklyn, New York 11225; \$6.95 includes shipping and handling). This is a collection of papers centering upon a theme: in this case, reversing the loss of biological diversity by recreating native plant communities in gardens.

Growing and Propagating Showy Woody Native Plants by Dick Bir (1992; University of North Carolina Press, P.O. Box 2288, Chapel Hill, North Carolina 27515; \$18.95). Bir is

—Continued Page 6



Reading—Continued

a former director of the Cullowhee conference on landscaping with native plants and Extension Horticulture Specialist at NCSU. His manual is a practical, hands-on guide to propagating and cultivating southeastern native trees and shrubs that have ornamental appeal. Flower, fruit, foliage, twig, and bark characteristics are described and depicted for more than ninety species.

Field and Forest: A Guide to Native Landscapes for Gardeners and Naturalists by Jane Scott (1992; Walker & Co.; \$24.95). This easy-to-read book attempts to give an ecological overview of the landscapes of eastern North America and the species involved, as well as guidance in gardening with native plants. The first section covers natural succession and plant communities, and man's impact on them. The second describes the characteristics and species of specific plant communities. Section three delivers ecological advice to gardeners. The fourth part covers botanical nomenclature and plant identification.

Genetics and Conservation of Rare Plants, edited by Donald A. Falk and Kent E. Holsinger (1991; Oxford University Press, 2001 Evans Road, Cary, North Carolina 27513; \$49.95, plus \$2.55 for shipping). This is the first book-length treatment of the subject of rare plant biology and conservation. The book summarizes current knowledge of the genetics and population biology of rare plants, and integrates it with practical conservation recommendations. It is the result of a national conference held in 1989 by the Center for Plant Conservation at the Missouri Botanical Garden. □

A GLIMPSE OF THE CLUBMOSES

The Lycopodium Species in Tennessee

Hiking the winter woods may bring you eventually upon some green patches of ground cover, ferny plants that may remind you of cedar in some cases or moss in others. You may recognize these as clubmosses, fern allies.

Clubmosses date from the Paleozoic era, that's more than three hundred million years ago. Their relatives were the clubmoss trees that helped create vast jungles that across the continents spread layer upon layer of what became seams of black coal. The eons have relegated these plants to a rather insignificant status in the plant kingdom. But if your botanical eye is well focused, you'll see some fascinating traits in these diminutive neighbors.

The order Lycopodiales has but one family, Lycopodiaceae, which in turn has two genera. One of these, *Phylloglossum*, has only one species, found Down Under. The other genus, *Lycopodium*, has more than 100 species spread throughout the world. The tropical species are usually epiphytic; temperates are usually terrestrial.

The Tennessee checklist of vascular plants lists twelve species of *Lycopodium* in the state. Some of these are very difficult to find. In fact, three are on the state rare plant list.

Known popularly as ground pine or ground cedar, many of the showier clubmosses have been collected over the years for Christmas decorations. It is feared that this collecting is driving some species into extinction, though land development and the draining of bogs and other wetlands have created their usual havoc.

Harry Yeatman of Sewanee believes it somewhat unusual that five species of *Lycopodium* are located around his neighborhood, the southern portion of the eastern Highland Rim. The most common is *L. digitatum*, a southern species closely related to *L. complanatum*, known also as running pine.

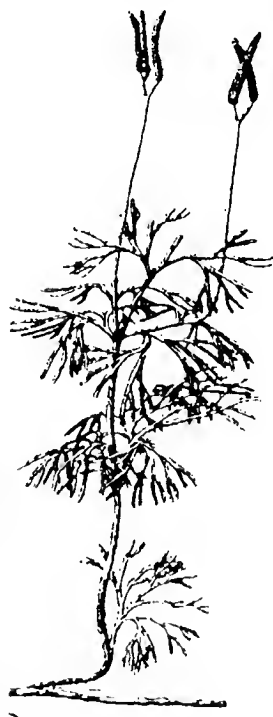
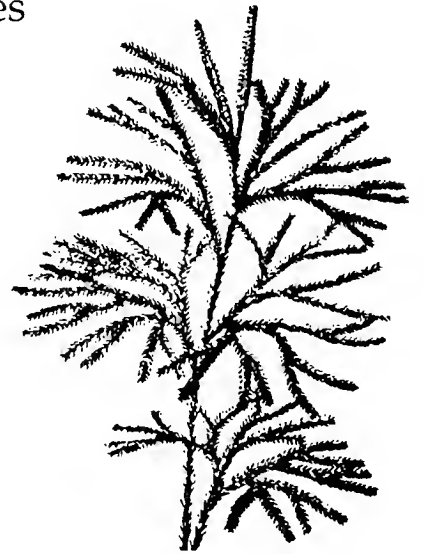
A much rarer member of the genus is *L. appressum* or bog clubmoss, broken off from the more northern species, *L. inundatum*. It is so rare in Tennessee that the bar pit site near Sewanee may hold the states only population. A University of Tennessee student making a study of bog clubmoss a few years ago said the only other known site at that time had been paved over for a parking lot.

Another rare species, *L. alopecuroides*, or foxtail clubmoss, was recently discovered in a pit not far from Sewanee. Its single stalk has an end that resembles a fox tail.

Two other species are *L. lucidulum* or shining clubmoss, and *L. obscurum*, ground pine or tree clubmoss, which produces stemless spore cones along the plant.

Lycopodium grows in acid soil on the forest floor or at the edges of bogs.

Some of the more intriguing traits of clubmoss involve reproduction, proving once again that humans have nothing on plants in the area of sex. All clubmosses produce spores. For most



they are borne above the top leaves in cones. These microscopic spores ripen in enormous quantities in late summer or early fall and disperse on the slightest movement of air. With the dispersal of so many spores it might seem these plants would reproduce with ease. Not so.

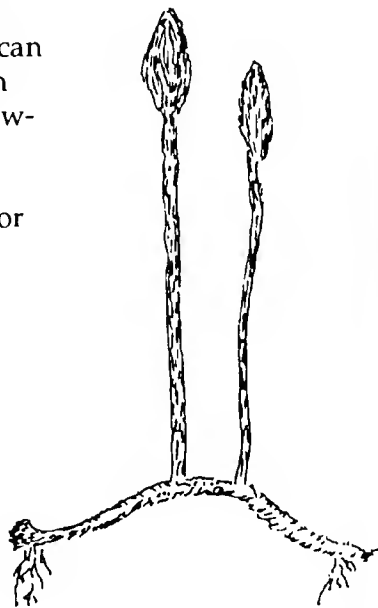
Whether the spores develop on soil surfaces or deep beneath the soil, depending on the species, they will take seven or more years to develop the gametophyte. Then another ten years pass before the gametophyte develops into a new plant above the ground. Clubmoss gametophytes are so small that they are difficult to find and study. But those that have been studied reveal a complex process of fertilization.

Fortunately some species have other methods of propagation. One conspicuous method is by underground rhizomes, thus one common name, running pine clubmoss. The foxtail clubmoss actually sends out runners that can climb over rocks and other obstacles. Old growth dies back but these clubmosses, though slow growing, can spread into large colonies.

The Peterson Field Guide to ferns and fern allies mentions another method of propagation for some species. This is by bulblets, or plantlets, which appear at the base of the upper leaves. When fully developed they fall to the ground and start new plants.

There have been commercial uses of clubmoss, including use of the spores in fireworks. Medical studies have also revealed the presence of hypoglycemic properties in the leaves.

However, because of difficulty transplanting clubmosses and of propagating clubmosses under cultivation, even by root cuttings, it may be best to leave these plants alone in the wild.



Foxtail Clubmoss

BOTANICAL NOTES

James A. Duke, renowned consultant on medicinal plants, reports in *Coltsfoot*, November 1992, that a sample of needles from eastern yew (*Taxus canadensis*), sent to the National Cancer Institute, was found to contain nearly six times more of the cancer-fighting compound, taxol, than western yew bark. Needles harvested in moderation won't kill the trees as stripping the bark does.

Kudzu, that pernicious vine all too familiar on the Southern landscape, may actually have valuable medicinal properties. It seems that a tea made from Kudzu flowers has been used for centuries in China to treat alcoholism. Scientists believe an extract could be formulated and used commercially to reduce the effects of alcohol addiction. □

FOR THE NEXT ISSUE

An article in the July/August newsletter of the National Wildflower Research Center estimates that millions of plants a year are being harvested from the wild for commercial sales. This commercial digging has damaged many natural areas and threatens remaining wildflower populations. Tennessee is particularly hard hit.

Attempts to regulate or limit this harvesting have been largely unsuccessful, and the buying public is greatly misinformed. As the research center's article says: "The Federal Trade Commission's *Guides for the Nursery Industry* actually encourage nurseries to label plants taken from the wild as 'nursery grown'—as long as they are maintained for as little as one growing season."

A number of national and regional organizations are at work on the problem. In the next issue we hope to have more details of these efforts and what we can do to help. □

A QUICK NOTE FROM THE FIELD

Picture your poor editor. He staggers in at dusk from plowing the corn rows. The cook stove is cold, the kids are screaming, the dogs barking, neighbors are complaining, and there's a TNPS Newsletter to be done.

Now nothing is really wrong with this scene except that the editor is unaware of that native plant conference coming up or the wildflower program you've been to. He certainly hasn't seen the short article you read yesterday about wetlands conservation. So even if the newsletter can be finished, no one would enjoy reading it. You wouldn't read it. You'd throw it out with the other junk mail.

Therefore, since this is a member participation society (Did you know that?), all members have an obligation to send notes, letters, clippings, photographs, original (or plagiarized) essays, reviews, or anything else remotely related to native flora—send this to: The Poor Editor, TNPS Newsletter, P.O. Box 856, Sewanee, TN 37375.

You may not get an answer in return—nary a "How do you do." Don't be concerned. Rest assured that someone out there behind the plow will, at an appropriate time, offer up your name for notice in heaven.

—The Poor Editor

A GOOD TIME TO RENEW

The new year will be here before we know it—sorry to have to tell you. So it's not too early to renew your membership in the Tennessee Native Plant Society.

The date on your label will tell you the year through which your membership is paid.

Dues remain the same: \$15 for regular membership and \$10 for students and seniors.

Renewals, as well as new memberships, should be mailed to Karen Yarbro, c/o TNPS, Department of Botany, University of Tennessee, Knoxville, TN 37996-1100.

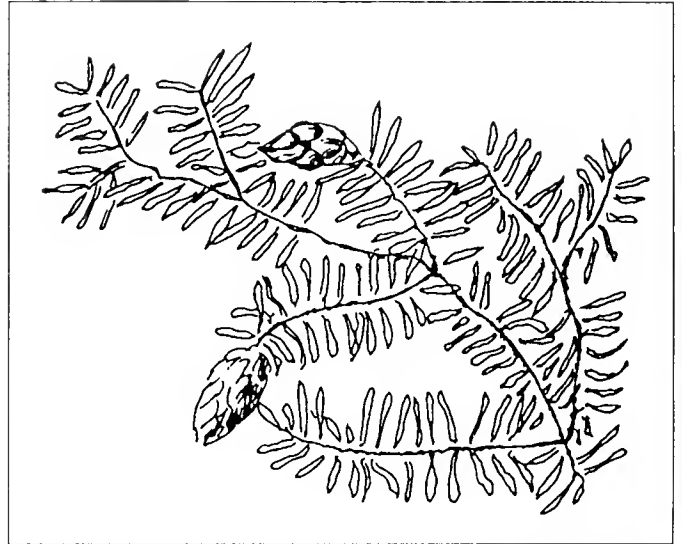
Also, consider joining for a friend or mentioning TNPS to a biology teacher, park naturalist, or your local nurseryman. □

TRACING WILD ORIGINS VEGETABLE GENEALOGY

According to *Smithsonian Institution Research Reports* (Autumn 1992), archaeologists have located in the wild one of the five species of *Cucurbita* that were introduced to European settlers of North America by the American Indians.

Cucurbita pepo ozarkana has been collected from the Ozark River Basin at least since 1840, but the plants had always been regarded as escapees from cultivation. Through life cycle and environmental studies, and enzyme and genetic analyses, it has been established that the wild plants are the progenitors of zucchini and acorn squash.

Archaeological excavations in the Ozarks have shown that, in addition to *C. pepo*, sunflower, marshelder, and chenopod had been domesticated 4,000 years ago. □



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