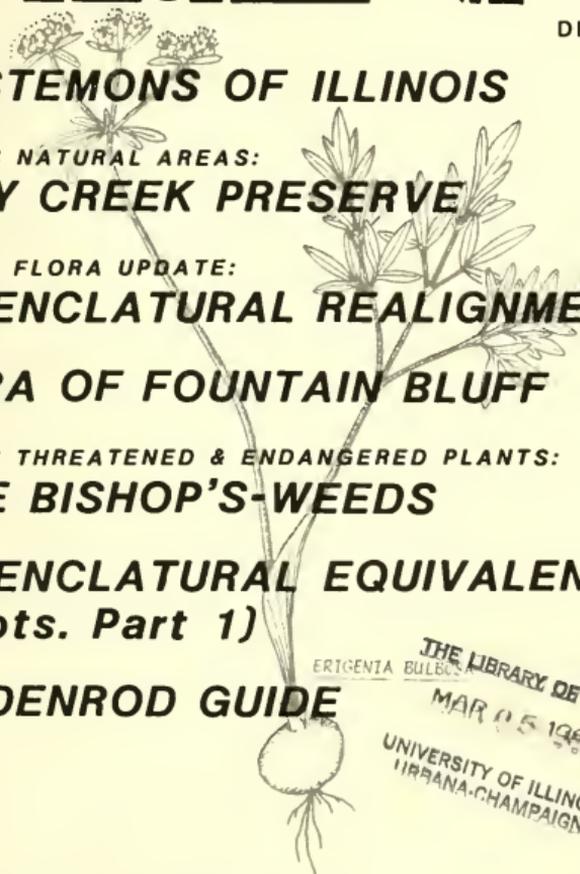


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ERIGENIA 6

DECEMBER 1985

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- **PENSTEMONS OF ILLINOIS**
 - **ILLINOIS NATURAL AREAS:
PINEY CREEK PRESERVE**
 - **ILLINOIS FLORA UPDATE:
NOMENCLATRURAL REALIGNMENTS**
 - **FLORA OF FOUNTAIN BLUFF**
 - **ILLINOIS THREATENED & ENDANGERED PLANTS:
RARE BISHOP'S-WEEDS**
 - **NOMENCLATRURAL EQUIVALENCIES
(Dicots. Part 1)**
 - **GOLDENROD GUIDE**

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THE HARBINGER

Quarterly Newsletter of the Society

Editor: Dr. Robert Mohlenbrock
Dept. of Botany
Southern Illinois University

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TO CONTRIBUTE: See inside back cover for guidelines.

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EDITORIAL

by Mark W. Mohlenbrock

A mere four years ago a group of 12 people, mostly graduate students of Dr. Robert Mohlenbrock, sat in his lab one evening and formed the Southern Illinois Native Plant Society. This small group, which at first was affiliated with the Missouri Native Plant Society, was very active and inovative from the start. Within six months after its founding, the Society established a quarterly newsletter, The Harbinger, and this journal, Erigenia. As I read through the manuscripts for this issue and several others for future issues I couldn't help but reflect how much progress has occurred within the Society since the founding days.

Membership in the Society has steadily increased so as to be more than ten times that of the founding group. The Society has become active in conservation issues such as the Pine Hills Road project and the current River-to-River Road controversy. The Society Book Service now offers hundreds of titles to both members and non-members. The articles appearing in Erigenia offer insight to Illinois botany for both the technical and general audiences. The journal is fast becoming a publication which an Illinois botany or general plant enthusiast can ill afford to pass by.

By far the most exciting advancement to occur in the eyes of your Editor was the reorganization of the Society this past year to form the Illinois Native Plant Society. This move will surely aid in native plant conservation and awareness throughout the state. With the foundation described above, the Illinois Native Plant Society can look toward a bright future with an increasing voice and visibility in conservation issues, advances in Illinois botany, and a greater public awareness of our beloved native flora.

President's Message:

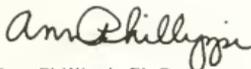
To Society Members:

It is my pleasure to address you as out-going President of the Society. As most of you already know, we have expanded our organization into a statewide Illinois Native Plant Society (INPS). What was formerly known as the Southern Illinois Native Plant Society is now the Southern Chapter of the INPS and the groundwork is being laid for the formation of several other chapters throughout the state. Financial and technical support will be afforded by the Society to facilitate the successful formation of those chapters and we encourage your involvement and/or leadership toward that goal wherever possible.

The Society has also expanded its role in various statewide conservation efforts. For example, we continue to provide a major voice in reviewing the Shawnee National Forest management plan which will determine the management of the Forest for the next 50 years. Another current concern is a proposed river-to-river road through southern Illinois. At present, both the forest plan and the road allow for an unacceptable amount of environmental degradation and we are focusing our efforts so that these unfortunate situations may be rectified.

It is my hope that the Society will continue to expand its membership via new chapters as well as expand its voice on conservation issues that threaten the integrity of natural communities and endangered species.

Sincerely,



Ann Phillippi, Ph.D.
Department of Zoology
Southern Illinois University
Carbondale, Illinois 62901
618/536-2314

THE GENUS Penstemon (Scrophulariaceae) IN ILLINOIS

Robert H. Mohlenbrock¹ and Lawrence R. Stritch²

Penstemon is a genus of Scrophulariaceae with about 300 species, all but two of which occur in the United States. A single species is known from eastern Asia, and another is found in central America.

While the biggest percentage of species is in the western United States, more than a dozen occur in the northeastern region of the country. Of the twelve taxa known from Illinois, only ten are apparently native.

When Samuel B. Mead published the first list of Illinois plants in 1846, he recorded three Penstemons. His P. laevigatus is the same as P. digitalis, his P. pubescens is P. hirsutus, and his P. gracilis is P. pallidus.

Although Pepon attributed P. albidus Nutt. to Illinois (near Joliet) in 1927, there are apparently no specimens to substantiate this report. Penstemon deamii Pennell, recorded in Illinois from Pope, Union, and Wabash counties, may be a good species, but we are excluding it from this treatment because of our inability to distinguish it from other taxa.

Penstemon Mitchell - Beardstongue

Perennials (in Illinois) with erect stems; leaves of two types, the basal ones petiolate and in a rosette, the cauline ones sessile to clasping and alternate; stipules absent or obscure; inflorescence paniculate or racemose, terminal, several-flowered;

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calyx green, united below, 5-lobed above; corolla tubular, 2-lipped, the upper lip 2-lobed and usually smaller than the 3-lobed lower lip; fertile stamens 4, mostly included in the corolla, with two of the filaments longer than the other two; sterile stamen bearded or nearly glabrous; style one, elongate, with a capitate stigma; capsule mostly conical, many-seeded.

Key to the Taxa of Penstemon in Illinois

1. Upper and bracteal leaves clasping; corolla greater than 3.2 cm long-----9. P. grandiflorus
1. All leaves sessile to petiolate; corolla less than 3.2 cm long (except in P. cobaea)-----2
 2. Corolla more than 3.2 cm long-----6. P. cobaea
 2. Corolla less than 3.2 cm long-----3
3. Corolla glandular-pubescent within-----12. P. tubaeiflorus
3. Corolla eglandular within-----4
 4. Anterior lobes of the corolla equalling or narrowly exceeding the posterior lobe; sterile filament slightly to moderately bearded-----5
 4. Anterior lobes of the corolla far exceeding the posterior lobe; sterile filament densely bearded-----7
5. Anthers bearded with short, stiff hairs; corolla white or slightly tinged or lined with purple-----6
5. Anthers glabrous; corolla more or less purple-----4. P. calycosus
6. Corolla 23-30 mm long; stem glabrous, shiny and slightly glaucous; sepals scarious-margined-----7. P. digitalis
6. Corolla 16-23 mm long; stem dull, finely pubescent to glabrous; sepals not scarious-margined---1. P. alluviorum
7. Stems pubescent with glandular hairs; anterior lobes of the corolla arching upward to the posterior lobe-10. P. hirsutus

7. Stems pubescent with eglandular hairs; anterior lobes of the corolla not arching upward-----8
8. Cauline leaves ovate-lanceolate to ovate--5. P. canescens
8. Cauline leaves linear-lanceolate to oblanceolate-----9
9. Sepals from half to nearly equalling the length of the capsule-----8. P. gracilis
9. Sepals less than half the length of the capsule-----10
10. Corolla lined with deeper color, the anterior lobes of the corolla projecting beyond the posterior lobe-----11
10. Corolla unlined, its anterior lip upcurved against the posterior so that the orifice to the throat is closed-----10. P. hirsutus
11. Leaves pubescent, the throat of the corolla much longer than the tube-----12
11. Leaves glabrous or nearly so, the throat of the corolla equalling the length of the tube or scarcely longer-----2. P. arkansanus
12. Corolla white, lined with purple; sterile filament moderately bearded-----11. P. pallidus
12. Corolla purplish; sterile filament strongly bearded-----3. P. brevisepalus
1. *Penstemon alluviorum* Pennell in Small, Man. S.E. Flora 1203. 1933.

Penstemon laevigatus Sol. ssp. alluviorum (Pennell) Bennett, *Phylologia* 9:57. 1963.

Stems erect, 3-10 dm tall, green to purplish, finely puberulent to glabrous; cauline leaves petiolate to clasping, 7-18 cm long, 1.5-2.5 cm wide, lanceolate, sharply serrate, the lower surface paler than the upper, finely pubescent to glabrous; inflorescence generally less than one-third the height of the plant, longer than wide, finely pubescent; calyx 3-5 mm long at anthe-

sis, slightly glandular-pubescent; corolla 15-23 mm long, white or pale purple, lined with purple within, glandular-pubescent externally, finely pubescent internally, the anterior lip projecting outward, the orifice to the throat open.

Common Name: Bottomland Beardstongue.

Habitat: Swampy woods.

Range: Indiana to Illinois, south to Mississippi and Arkansas.

Illinois Distribution: Confined to the extreme southern counties of Illinois.

There is some question as to the distinctiveness of this species from P. digitalis. The main differences lie in the shorter sepals during anthesis of P. alluviorum and the smaller capsules. The swampy woods habitat seems to be consistent for P. alluviorum.

The flowers bloom from May to June.

2. *Penstemon arkansanus* Pennell, Proc. Acad. Nat. Sci. Phila. 73:494. 1922.

Penstemon pallidus Small ssp. arkansanus (Pennell) Bennett, Phytologia 9:57. 1963.

Stems erect, 5-10 dm tall, green to greenish red, puberulent to glabrate; leaves lanceolate to oblanceolate, puberulent to glabrate, 4-7 cm long, 1-2 cm wide, entire to slightly serrate; inflorescence one-third the height of the plant, glandular-pubescent, longer than wide; calyx 2.5-4.7 mm long at anthesis, glandular-pubescent; corolla 15-20 mm long, white externally, lined with fine violet-purple lines internally, pubescent externally, the anterior lip equalling or barely exceeding the posterior lip, the orifice to the throat open.

Common Name: Ozark Beardstongue.

Habitat: Dry, rocky woods and wooded slopes.

Range: Illinois to Missouri, south to Texas and Arkansas.

Illinois Distribution: Known only from Jackson and Randolph coun-

This species differs from the very similar P. pallidus by its nearly glabrous leaves and by the throat of the corolla about as long as the tube.

It flowers from April to June.

3. *Penstemon brevisepalus* Pennell in Small, Man. S.E. Fl. 1204. 1933.

Stems erect, 3-8 dm tall, green to somewhat purplish, finely pubescent; basal leaves broadly elliptic, 6-8 cm long, 1.5-2.5 cm broad, with the petiole 3-4 cm long; cauline leaves lanceolate to oblanceolate, sharply serrate, 7-10 cm long, to 1.5 cm wide, thinly pubescent on both sides, opposite, sessile to nearly clasping; inflorescence one-third the height of the plant, longer than wide, glandular-pubescent; calyx 1.5-3.0 mm long at anthesis, finely glandular-pubescent; corolla 1.5-1.9 cm long, pale lavender outside, internally paler with dark purple lines, finely glandular-pubescent externally, the anterior lip projecting outward, the orifice to the throat open.

Common Name: Short-sepaed Beardstongue.

Habitat: Dry, usually rocky, woods.

Range: Virginia and West Virginia south to Georgia and Tennessee; southern Illinois.

Illinois Distribution: Known only from Pope and Union counties.

Although the senior author at one time suggested that Penstemon brevisepalus intergraded with P. pallidus and should not be recognized as a distinct species, several collections from extreme southern Illinois have convinced him that P. brevisepalus is distinguishable from P. pallidus. The flowers are consistently purple in this species.

Penstemon brevisepalus flowers in May and June.

4. *Penstemon calycosus* Small, Bull. Torrey Club 25:470. 1898.

Penstemon laevigatus Sol. ssp. calycosus (Small) Bennett, Phytologia 9:57. 1963.

Stems erect, 5-12 dm tall, glabrous to hirsutulous, green to purplish; cauline leaves variable in shape and length from lanceolate to oblanceolate, 7-12 cm long, to 3 cm broad, sessile-clasping to long-petiolate, moderately serrate, the lower leaf surface somewhat paler than the upper, glabrous to finely pubescent; inflorescence less than one-third the height of the plant, longer than wide, glandular-pubescent; calyx 5-11 mm long at anthesis, glandular-pubescent; corolla 20-33 mm long, externally pale purple to violet-purple, generally paler to the anterior side, internally almost white to slightly purplish, glandular-pubescent externally, slightly pubescent internally, the anterior lip equal to or slightly exceeding the posterior lip, the orifice to the throat open.

Common Name: Smooth Beardstongue.

Habitat: Wooded slopes, edge of woods.

Range: Maine to Michigan south to Missouri and Alabama.

Illinois Distribution: Throughout the state, except for the northwestern counties.

The general lack of pubescence on this species, particularly on the anthers, sets *P. calycosus* well apart from other species in the genus in Illinois.

The flowers bloom from May to July.

5. *Penstemon canescens* Britt. f. *brittonorum* (Pennell) Fern. *Rhodora* 51:84. 1949.

Stems erect, closely cinereous-pubescent to glabrate, 2.5-8.0 dm tall, greenish purple at the base to green above; basal leaves linear-lanceolate, glabrous to glabrate, 3-6 cm long, 1.2-2.3 cm wide, petiolate; cauline leaves sessile, ovate to broadly oblong-lanceolate, broadly rounded to cordate at the base, 4.5-8.2 cm long, 2.7-5.2 cm broad, glabrous; inflorescence greater than one-third the height of the plant, pubescent, with strictly ascending branches; calyx 3.2-5.5 mm long at anthesis, pubescent; corolla 20-28 mm long, externally pale purple, internally nearly white with lines of purple, strongly ridged within, the anterior lip projecting considerably beyond the posterior lip, the orifice to the throat open; capsule 6-8 mm long.

Common Name: Ashy Beardstongue.

Habitat: Woods.

Range: Pennsylvania to Illinois, south to Alabama and South Carolina.

Illinois Distribution: Known only from Franklin County.

Forma brittonorum differs from typical P. canescens by its glabrous cauline leaves. The broadly ovate leaves distinguish this taxon from the somewhat similar P. pallidus and P. brevisepalus.

The flowers bloom from mid-May through June.

6. *Penstemon cobaea* Nutt. Trans. Amer. Phil. Soc. II, 5:182. 1837.

Stems erect, pubescent, 4.0-7.5 dm tall, green to greenish purple; leaves oblong to narrowly ovate, 5-20 cm long, 2.5-6.0 cm broad, pubescent, strongly serrate, petiolate to sessile and nearly clasping; inflorescence less than one-third the height of the plant, pubescent, longer than wide; calyx 8-11 mm long at anthesis, glandular-pubescent; corolla 35-50 mm long, nearly as broad, white or pale violet-purple, lined with purple within, the throat and the lobes glandular-pubescent internally, pubescent externally, the anterior lip slightly exceeding the posterior lip, the throat abruptly expanding, strongly inflated, narrowing to the open orifice; capsule 9-12 mm long.

Common Name: Large Beardstongue.

Habitat: Flat, dry meadow (in Illinois).

Range: Arkansas to Nebraska, south to Texas; adventive in Illinois.

Illinois Distribution: Known only from Kane County: near Kendall city line, June 25, 1972, J. Philips, D. Young, & R. Schu-
lenberg s.n. (MORT).

Except for P. grandiflorus, this species has the largest flowers of any Penstemon in Illinois. It blooms from mid-May to late June.

7. *Penstemon digitalis* Nutt. ex Sims, Bot. Mag. 52, pl. 2587. 1825.

Penstemon laevigatus Sol. var. digitalis (Nutt.) Gray, Syn. Fl. 1:268. 1878.

Penstemon laevigatus Sol. ssp. digitalis (Nutt.) Bennett, Phytologia 9:57. 1963.

Stems erect, 7-15 dm tall, glabrous, somewhat glaucous, green to purplish; leaves lanceolate to oblanceolate to oblong-ovate, 5-12 cm long, 1.5-3.0 cm broad, moderately serrate, paler on the lower surface, glabrous, petiolate to sessile; inflorescence less than one-third the height of the plant, slightly pubescent. longer than wide; calyx 5-8 mm long at anthesis, glandular-pubescent; corolla 23-30 mm long, white or purplish tinged externally, white internally, glandular-pubescent externally, the anterior lip slightly exceeding the posterior lip, the orifice to the throat open.

Common Name: Foxglove Beardstongue.

Habitat: Woods, thickets, prairies, and fields.

Range: Maine to South Dakota, south to Texas and Virginia.

Illinois Distribution: Throughout the state.

When Mead (1846) and Lapham (1857) first found this species in Illinois, they erroneously called it P. laevigatus. Brendel (1887) and others after him called this plant P. laevigatus var. digitalis. It differs from P. laevigatus by its completely glabrous anthers.

This species flowers from May to July.

8. *Penstemon gracilis* Nutt. var. *wisconsinensis* (Pennell) Fassett, Sp. Fl. Wisc. 144. 1938.

Stems erect, greenish gray, puberulent and often glandular, to 6 dm tall. Leaves obovate to linear-lanceolate, acute at the apex, rounded or tapering to the base, to 8 cm long, to 1.2 cm wide, grayish green and puberulent on both surfaces, sparsely serrate. Inflorescence less than 1/3 the height of the plant, glandular-puberulent; calyx 4-6 mm long at anthesis, glandular-

puberulent, at least half as long as the capsule; corolla 20-24 mm long, pale violet-blue and glandular-puberulent externally, paler and puberulent internally, the anterior lip equalling or barely exceeding the posterior lip, the orifice to the throat open; sterile filament densely bearded. Capsule 5-7 mm long.

Habitat: In cinders (in Illinois).

Range: This variety of P. gracilis is known only from central Wisconsin to northern Illinois.

Illinois Distribution: Kane Co.: Aurora, cattle yards, July 9, 1978, D. Young s.n. (MORT).

The only Illinois record is probably an adventive plant.

The sepals, which are at least half as long as the capsules, distinguish this plant.

This variety flowers during June and July.

9. *Penstemon grandiflorus* Nutt. in Fraser's Cat. 2. 1815.

Stems erect, greenish gray, glabrous, glaucous, to 12 dm tall. Leaves obovate to oblong-lanceolate, obtuse to subacute at the apex, rounded at the base, to 8 cm long, to 3.9 cm wide, glabrous and glaucous on both surfaces, entire or nearly so, the uppermost leaves sessile and clasping. Inflorescence less than 1/3 the height of the plant, glabrous; calyx 8-13 mm long at anthesis, glabrous; corolla 4-5 cm long, pale blue-violet and glabrous externally, paler and marked with deep reddish purple lines and glabrous internally, the orifice to the throat open. Capsule 18-25 mm long.

Habitat: Sandy soil.

Range: Wisconsin and western Illinois to Wyoming, south to Texas and western Missouri.

Illinois Distribution: Apparently native in Henderson, Whiteside, and Winnebago counties; also adventive in McHenry County.

This is the largest flowered species of Penstemon in Illinois.

This species flowers during May and June.

10. *Penstemon hirsutus* (L.) Willd. Sp. Pl. 3:227. 1801.

Chelone hirsuta L. Sp. Pl. 6:1. 1753.

Stems erect, green to gray-green, pubescent, to 75 cm tall. Leaves lanceolate to ovate, acute at the apex, tapering to the base, to 11 cm long, to 2.5 cm wide, dark green and glabrous to pubescent on the upper surface, paler and usually pubescent on the lower surface, serrate. Inflorescence less than 1/3 the height of the plant, glandular-pubescent; calyx 2.5-6.0 mm long at anthesis, pubescent; corolla 15-25 mm long, violet-purple to light violet and glandular-pubescent externally, paler and puberulent internally; sterile filament densely bearded. Capsule 8-9 mm long.

Habitat: Gravelly prairies, wooded slopes.

Range: Quebec to Ontario, south to Illinois and Virginia.

Illinois Distribution: Occasional throughout the state.

During the nineteenth century, this species was generally known as P. pubescens Ait., but Linnaeus' Chelone hirsuta is the same species and clearly predates Aiton's epithet.

The corolla of this species is somewhat similar to that of P. brevisepalus, but differs by being unlined.

This species flowers during June and July.

11. *Penstemon pallidus* Small, Fl. S.E.U.S. 160. 1903.

Stems erect, green to grayish green, pubescent, to 10 dm tall. Leaves narrowly lanceolate to lance-oblong, acute at the apex, tapering or more or less rounded at the base, to 8 cm long, to 2 cm wide, light green and pubescent on both surfaces, serrate to nearly entire. Inflorescence about 1/3 the height of the plant, glandular-puberulent; calyx 3.5-5.0 mm long at anthesis, pubescent; corolla 17-22 mm long, white and glandular-puberulent externally, lined with purple, strongly ridged and puberulent internally, the anterior lip projecting beyond the posterior

lip, the orifice to the throat open; sterile filament densely bearded.

Habitat: Dry woods, prairies, fields.

Range: New York to Michigan, south to Kansas and Georgia.

Illinois Distribution: Common in the southern half of the state, occasional in the northern half.

The small white corolla lined with purple and the gray-puberulent leaves and stems readily distinguish this species.

Mead (1846) and Lapham (1857) reported this species from Illinois as P. gracilis, but this is not the P. gracilis that Nuttall described in 1818.

This species flowers from late April to early July.

12. *Penstemon tubaeiflorus* Nutt. Trans. Phil. Soc. II. 5:181. 1837.

Stems erect, green, glabrous, to nearly 1 m tall. Leaves elliptic to elliptic-lanceolate to oblong, acute to obtuse at the apex, rounded at the base, to 10 (-12) cm long, to 4 (-5) cm broad, green and glabrous on both surfaces, entire. Inflorescence slender, up to 1/4 the height of the plant, glabrous or sparsely glandular-pubescent; calyx 3.0-4.5 mm long at anthesis, glabrous or sparsely glandular-pubescent; corolla 20-25 mm long, white, finely glandular-pubescent internally at the throat. Capsule 6-10 mm long.

Habitat: Prairies and dry woods.

Range: Indiana to Wisconsin and Nebraska, south to Texas and Mississippi.

Illinois Distribution: Not common in the southern one-half of the state, rare in the northern one-half.

This entirely white-flowered species of Penstemon is the only member of its genus in Illinois whose corolla has a glandular-pubescent throat.

The flower blooms from mid May to mid June

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NOTICE TO FUTURE CONTRIBUTORS

There is a constant need for manuscripts pertaining to Illinois native plants, natural areas, horticulture, etc. of both technical and general interest. Guidelines for manuscripts submitted may be found on the inside back cover of this issue. Feature articles may be of any number of topics. We will publish floristics studies of areas in Illinois or the states contiguous to Illinois. If you have an idea for an article but would like to have it approved prior to completion, please feel free to discuss it with the Editor (see inside back cover for address).

ILLINOIS NATURAL AREAS:

PINEY CREEK NATURE PRESERVE

Robert H. Mohlenbrock¹

When I was a graduate student in botany at Southern Illinois University during the spring of 1954, I was perusing a copy of Native and Naturalized Trees of Illinois by R. B. Miller and L. R. Tehon, written in 1929. I was fascinated by a statement under the shortleaf pine that read:

The Shortleaf Pine occurs in two localities in the southern part of the state. The larger stand occupies a tract of about 200 acres on the hills of Union County near Wolf Lake, and the smaller stand grows in a sandstone ravine of Piney Creek, near the town of West Point in Randolph County.

I was aware of the pine stand in the Pine Hills of Union County, which naturalists had been visiting since the latter part of the nineteenth century, but I could find no one who had seen or even heard of the smaller stand along Piney Creek. I was eager to locate Piney Creek and see if the shortleaf pine still occurred after a quarter of a century.

West Point at one time was a tiny village a few miles southwest of Campbell Hill and just across the county line into Randolph County. Since my father's grandparents were the original settlers of Campbell Hill, I quickly involved my father in the project. Despite having spent his boyhood in and around Campbell Hill, he did not recall Piney Creek or any pines that may have grown there. He and I agreed to look for the pine.

On April 24, 1954, my parents and I drove to Campbell Hill and past the abandoned Campbell Hill brick plant at the northern edge of town. The brick plant, whose weathered kilns still stand, was a famous southern Illinois landmark, having supplied fine quality

¹ Robert H. Mohlenbrock is Distinguished Professor of Botany at Southern Illinois University, Carbondale.

bricks to the area for many years.

Three miles west of the brick plant, the narrow county road to the south leads to Shiloh, a community now reduced to a few buildings but once the home of Shiloh College, the first college in the area dating back to 1840. The two-story brick building of the college, constructed in 1881, still stands as an imposing edifice in the village. For a while, General John A. Logan of Civil War fame was a student at the college.



Fig. 1. Water cascades over the exposed sandstone bedrock of Piney Creek. Photo by Dr. John Voigt.

About two miles beyond Shiloh is the picturesque white-steeped West Point Lutheran Church, with its adjoining cemetery, all that remained of the hamlet of West Point. A local farmer told us that Piney Creek was at the foot of the hill, about 100 yards south of the church, and that if we followed the rocky creek westward for a quarter of a mile, we would come to some scenic cliffs.

We followed the directions and soon observed sandstone cliffs beginning to enclose the creek on either side. With each step westward, we became dwarfed by the ever-higher cliffs. In many places, the creek bottom was a solid sheet of sandstone, marked only by long, deep grooves. Occasionally the creek dropped off into small, clear pools.

We continued to watch the vegetation on either side of the creek, trying to see if the shortleaf pine was still there. The creek made a couple of sharp meanders, and we paused again to scan the slopes on either side. Much to our satisfaction, we spied a 15 foot tall pine about halfway up the north slope. We had rediscovered the shortleaf pine at Piney Creek!

No other pines were in view at this point, so we busied ourselves identifying and listing the common spring wildflowers that were beginning to bloom. The mesic woods lining the creek were filled with trilliums, violets, buttercups, phloxes, wild geraniums, bluebells, and many others. One bright yellow buttercup, unrecognized at sight, was routinely collected and placed in my collecting can for later identification.

After following Piney Creek along a series of sharp switchbacks, we came to a north slope studded with several mature specimens of shortleaf pine. The largest was about 60 feet tall and stood high above a number of small pines, pine seedlings, and bird's-foot violets. Not only was the shortleaf pine still along Piney Creek, it was obviously reproducing adequately.

We encountered the silky willow (Salix sericea) and Carolina buckthorn (Rhamnus carolinianus) along the creek, both woody species found infrequently in southern Illinois. Two sedges grew in extensive colonies in and along the creek. These later proved to be Carex substricta and C. torta, two rare plants for the region.



Fig. 2. A specimen of Harvey's Buttercup, Ranunculus harveyi. Photo by Dr. John Voigt.

In places, the creek splashed against vertical cliffwalls whose narrow crevices contained an assortment of ferns. Pinnatifid spleenwort (Asplenium pinnatifidum) was particularly common and showed remarkable variation. A few specimens had leaf tissue so reduced that only the rachis was present. This strange form was later reported in the American Fern Journal by Mohlenbrock and Weber (1956). One fern which I was unfamiliar with caught my eye and was quickly sequestered in my collecting can.

A few yards farther west along Piney Creek, the sandstone cliffs began to taper off, and after a short distance, disappeared and were replaced by a flat floodplain woods.

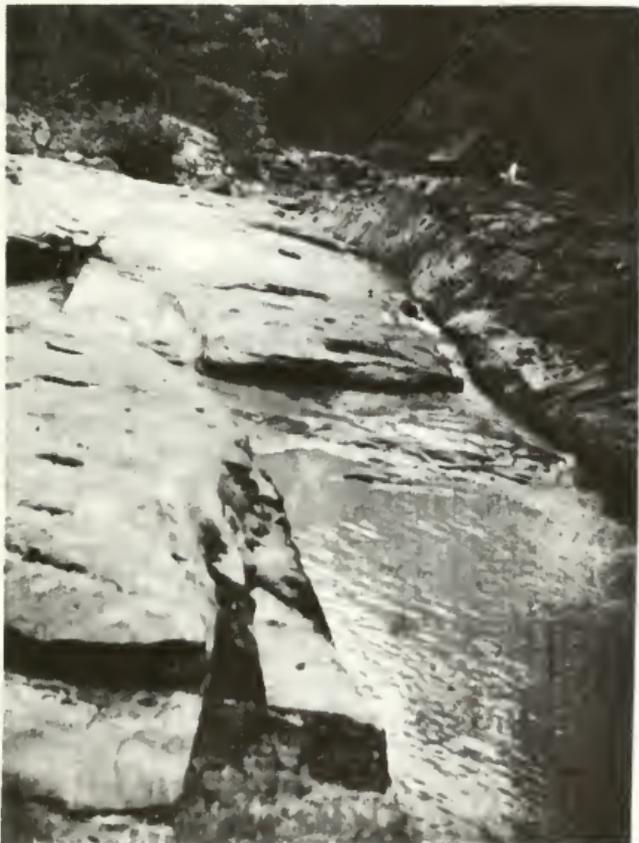


Fig. 3. Carving its way through the sandstone bedrock, Piney Creek calmly flows unaware of the botanical treasures on the nearby slopes. Photo by Dr. John Voigt.

Satisfied with our rediscovery of the shortleaf pine in a beautiful sandstone ravine, we returned to our car and then home where I began to check identifications of the "unknowns." The day's excitement wasn't over. The unrecognized buttercup proved to be Harvey's buttercup (Ranunculus harveyi), while the mysterious fern was identified as Bradley's spleenwort (Asplenium bradleyi). Neither species had ever been found before in Illinois!! Both are characteristic members of the Missouri Ozark flora, as are the shortleaf pine and bird's-foot violet. Piney Creek ravine appears to be an extension of the Missouri Ozarks into southwestern Illinois.

As I am prone to do after I find a rare plant in an area, I return to the site time after time. Frequently I am rewarded with other discoveries. On a subsequent trip to Piney Creek, I found Rubus enslenii, a new blackberry for Illinois.

A thorough botanical survey of this unique area was in order. In 1957, Wallace R. Weber, a graduate student in botany at Southern Illinois University and now Professor of Biology at Southwest Missouri State University and a member of the Illinois Native Plant Society, embarked upon his master's research program at Piney Creek. When the study was completed in 1959, Weber had recorded 441 different kinds of ferns and flowering plants in Piney Creek ravine.

During all of this time, Piney Creek ravine was in private ownership. Fortunately, the landowners were preservation-minded, and were actually proud that they owned property that contained unusual plant species for Illinois. Ultimately, the Illinois Nature Preserves Commission was established and interest swelled in the conservation of natural areas. The Illinois Department of Conservation acquired Piney Creek ravine. Soon after, it was dedicated as an Illinois Nature Preserve and is one of the jewels in this state's fine system of protected areas.

Today, a parking lot along the southwestern corner of the ravine provides easy access by trail into the nature preserve. If you would like a little hike into one of Illinois' most precious areas, make your way to Piney Creek ravine. See you there!

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BOOK REVIEW

Growing and Propagating Wild Flowers. Harry R. Phillips. 1985. The University of North Carolina Press. x + 331 pp. (paper back)

When native plant enthusiasts see a new or different wild flower on the side of the road, we want that plant in our garden. Often the attempt to propagate or move the plant ends in failure, leaving not only our yard but the place the plant was all the poorer for its loss. With this book in hand, all that will change as this is one of the best references I have seen on growing and propagating native plants.

Along with 32 color photographs and over 250 illustrations are chapters on flower bed preparation and design; diseases; collecting cleaning and storage of plant seed; dormancy and pregermination techniques and specific cultural requirements for 79 different species of wild flowers and 15 ferns plus comments on related species. The instructions are very explicit and geared for the novice, but the experienced gardener will profit also, especially when attempting plants with exacting dormancy requirements.

The book has a slightly southeastern US slant, which is not surprising considering the place of publication, but it covers many northern US species. A few of the species included are of dubious merit, such as Yarrow, Queen Ann's Lace and Moneywort, but Phillips more than makes up for this by including Butterfly Weed, Turtlehead, Cardinal Flower, Meadow Beauty, Trillium, many prairie plants and a section on carnivorous plants. All-in-all this book should NOT be on your book shelf--it should be with your garden tools, on your cold frame, or in your greenhouse!

**ILLINOIS FLORA UPDATE:
NOMENCLATRURAL REALIGNMENTS
IN THE ILLINOIS FLORA**

Robert H. Mohlenbrock¹

During the preparation of the second edition of the Guide to the Vascular Flora of Illinois, it was necessary to make several new nomenclatural combinations to coincide with the author's concept of the taxa involved. Those new combinations are formalized below.

When Moran (1981) described the hybrid Shawnee Spleenwort from Williamson County, Illinois, he placed it in the genus Asplenosorus, following the reasoning offered by Mickel (1974). It is my opinion that both parents are in the genus Asplenium, rather than in two genera - Asplenium and Camptosorus. Therefore, the following nomenclatural change is necessitated.

Asplenium Xshawneense (R.C. Moran) Mohlenbr., comb. nov.
Basionym: Asplenosorus Xshawneensis R.C. Moran, Am. Fern. Jour. 71:87. 1981.

Species of the large grass genus Panicum can usually be divided into two rather distinct groups which have been recognized by most botanists as subgenera. Hsu (1965) presented significant data that showed the distinct differences between these groups, and Gould (1974) followed this by recognizing each group as a distinct genus, Panicum and Dichantherium. Since that time, several workers (Clark & Gould, 1975; Brown & Smith, 1975; Gould & Clark, 1978; Freckmann, 1981) have transferred several taxa from Panicum to Dichantherium.

Several Illinois taxa, most of them reduced to synonymy by one or more of the above workers, appear to be recognizable, based on Illinois material. These are maintained in the Illinois flora, but have never been transferred to Dichantherium. This paper formalizes those transfers.

¹Robert H. Mohlenbrock is Distinguished Professor of Botany at Southern Illinois University, Carbondale.

Dichanthelium bosei Gould & Clark var. *molle* (Vasey) Mohlenbr.,
comb. nov.

Basionym: *Panicum latifolium* L. var. *molle* (Vasey) Hitchcock &
Chase in Robinson, *Rhodora* 10:64. 1908.

Dichanthelium commutatum (Schult.) Gould var. *ashei* (Fern.)
Mohlenbr., comb. nov.

Basionym: *Panicum commutatum* Schult. var. *ashei* Fern. *Rhodora*
36:83. 1934.

Dichanthelium joori (Vasey) Mohlenbr., comb. nov.

Basionym: *Panicum joori* Vasey, U.S.D.A. Div. Bot. Bull. 8:31.
1889.

Dichanthelium linearifolium (Scribn.) Gould var. *wernerii* (Scribn.)
Mohlenbr., comb. nov.

Basionym: *Panicum wernerii* Scribn. in Britt. & Brown, Ill. Fl.
3:501. 1898.

Dichanthelium mattamuskeetense (Ashe) Mohlenbr., comb. nov.

Basionym: *Panicum mattamuskeetense* Ashe, Journ. Elisha Mitchell
Sci. Soc. 15:45. 1898.

Dichanthelium microcarpon (Muhl.) Mohlenbr., comb. nov.

Basionym: *Panicum microcarpon* Muhl. ex Ell. Bot. S.C. & Ga.
1:127. 1816.

Dichanthelium nitidum (Lam.) Mohlenbr., comb. nov.

Basionym: *Panicum nitidum* Lam. Tabl. Encycl. 1:172. 1791.

Dichanthelium oligosanthes (Schult.) Gould var. *helleri* (Nash)
Mohlenbr., comb. nov.

Basionym: *Panicum oligosanthes* Schult. var. *helleri* (Nash) Fern.
Rhodora 36:80. 1934.

Dichanthelium polyanthes (Schult.) Mohlenbr., comb. nov.

Basionym: *Panicum polyanthes* Schult. Mantissa 2:257. 1824.

Dichanthelium Xscoparioides (Ashe) Mohlenbr., comb. nov.

Basionym: *Panicum scoparioides* Ashe, Journ. Elisha Mitchell Sci.
Soc. 15:53. 1898.

Dichanthelium villosissimum (Nash) Freckm. var. *pseudopubescens*
(Nash) Mohlenbr., comb. nov.

Basionym: Panicum pseudopubescens Nash, Bull. Torrey Club 26:577. 1899.

Dichanthelium yadkinense (Ashe) Mohlenbr., comb. nov.

Basionym: Panicum yadkinense Ashe, Journ. Elisha Mitchell Sci. Soc. 16:85. 1900.

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A FLORISTICS STUDY OF FOUNTAIN BLUFF, JACKSON COUNTY, ILLINOIS

Robert H. Mohlenbrock¹ and Keith Wilson²

Fountain Bluff is a prominent monolith in the broad Mississippi River floodplain immediately southeast of the village of Gorham, Jackson County, in southwestern Illinois. It extends for four miles in a north-south direction and has a maximum width of approximately $1\frac{1}{2}$ miles. Massive sandstone cliffs are exposed in the northern one-third of Fountain Bluff and all along the west side, the tallest rising about 200 feet above the surrounding floodplain. A rim of exposed limestone borders the southwestern corner of the area.

At one point along the southwest face of Fountain Bluff, the Mississippi River comes to within a few hundred yards of the bluff. Most of the precipitous sandstone cliffs are west-facing and provide a habitat for xerophytic species of plants on the exposed rock faces. Extensive mesophytic woods have developed under dense shade along the bases of these west-facing cliffs. Several rivulets descend from the summit of Fountain Bluff, occasionally dropping abruptly into picturesque waterfalls. Elevation of the area varies from about 350 feet near Trestle Hollow to 769 feet at the site of the dismantled lookout tower. Patches of hill prairie dot the top of the limestone escarpment.

Natural springs which emanate from the bluffs account for the common name of Fountain Bluff and were no doubt an incentive to white settlers to colonize the area. The first permanent white settler was Allen Henson, arriving at the bluff in 1808. A pioneer cemetery exists near the north end of the bluff and contains the grave of Benningsen Boone, a relative of Daniel Boone. Several families still live along the eastern side. Except for the private inholdings, the bluff is part of the Shawnee National Forest.

Occasional visits to Fountain Bluff by biologists since 1890 revealed the area to contain many plant species unusual for southern

¹Robert H. Mohlenbrock is Distinguished Professor of Botany at Southern Illinois University and ²Keith Wilson resides in Seattle.



Fig. 1. Map of Fountain Bluff, Jackson County, Illinois.

Illinois. The senior author has been studying the vegetation of Fountain Bluff since 1953. The junior author made an intensive search for plants from 1971 to 1973. This paper is the result of these studies.

Geology

Both Mississippian and Pennsylvanian rocks are exposed on Fountain Bluff. There are three stratigraphic units of the Mississippian exposed--Menard limestone, Palestine sandstone, and the Clore formation. All of these form vertical bluffs on the southwest side of Fountain Bluff. Menard limestone forms a slope 10 to 80 feet high. It is highly fossiliferous with pelecypods, brachiopods, bryozoans, crinoids, and trilobites. A small layer near the center is high in clay and locally forms a calcareous shale.

Palestine sandstone forms a cliff 70 to 80 feet high for 3½ miles on the south and west sides of Fountain Bluff. It is a thin- to medium-bedded sandstone with some shale beds to 6 inches thick. Usually fine grained and sometimes calcareous, this sandstone is conformable with the underlying Menard limestone and the overlying Clore formation.

There are two exposures of the Clore formation on the southwestern and western sides of Fountain Bluff. This formation consists of finely crystalline to very fossiliferous limestone, fine-grained to calcareous sandstone, sandy siltstone, and sandy shale. It has a maximum thickness of 60 feet and is unconformable with basal conglomerate.

Pennsylvanian rocks are made up of Wayside-Battery Rock sandstone and Pounds sandstone in the McCormick group of the Caseyville formation. They are unlike the Mississippian sandstones in that they contain pebbles of quartz and chert.

The Wayside-Battery Rock sandstone members attain a maximum thickness of 135 feet on the southwest side of Fountain Bluff. This coarse conglomerate at the base consists of rounded quartz pebbles, silicified limestone pebbles, and subangular to angular chert fragments. The chert is residual from pre-Pennsylvanian erosion of the Upper Mississippian beds on the upthrown side of the Rattlesnake Ferry Fault. The sandstone is well sorted and medium-grained. Occasional poor cementing results in honeycomb weathering.

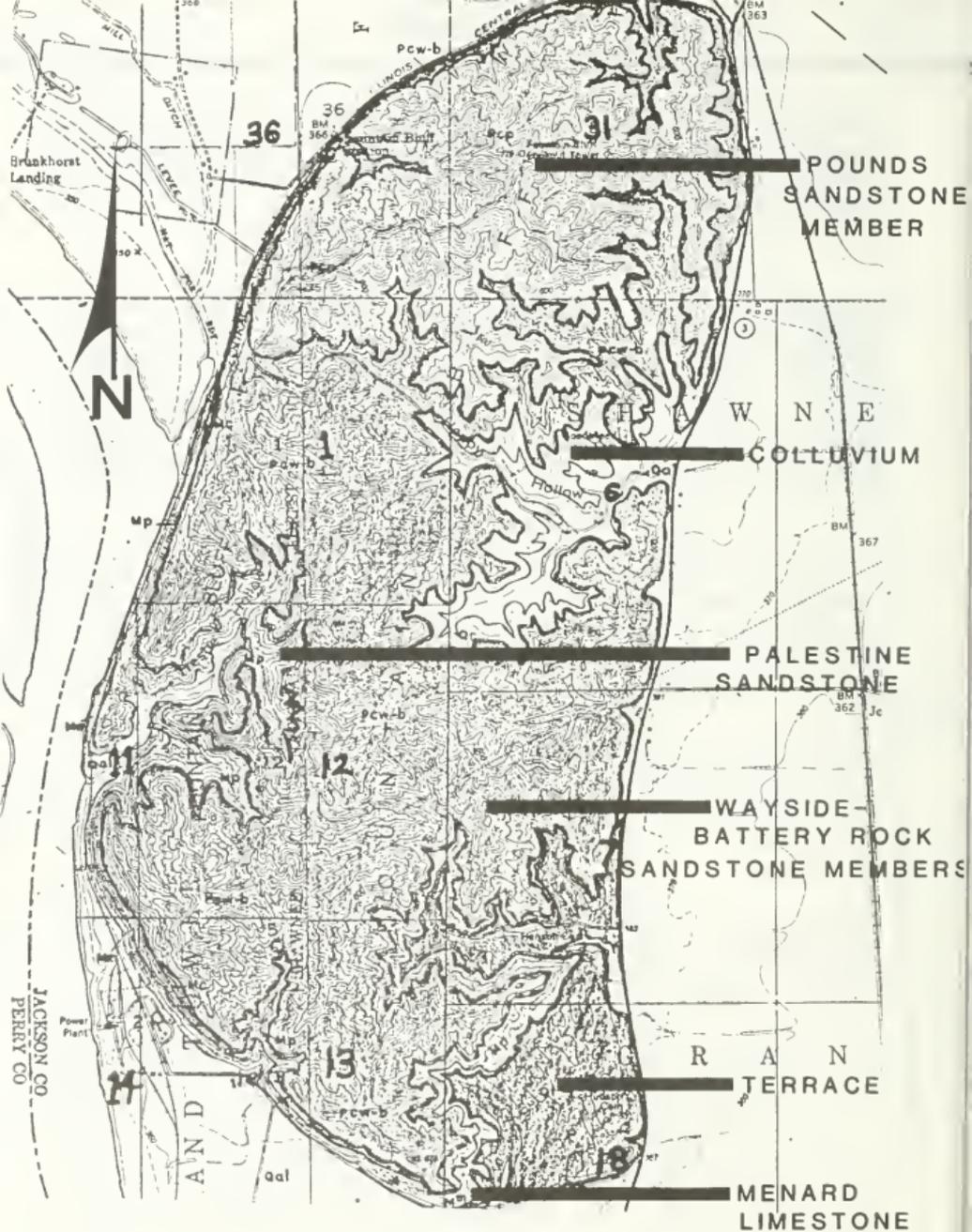


Fig. 2. Map of Fountain Bluff showing major geologic features.

At the northern end of Fountain Bluff, Pounds sandstone forms the upper portion of the vertical cliffs. It is fine- to coarse-grained massive sandstone containing mica. It is cross-bedded and weathers to brown.

Plant Communities

Floodplain Woods. This habitat is limited to a small area at the mouth of Trestle Hollow (T10S, R4W, Section 11) near the Mississippi River. Seasonal flooding of this area by the Mississippi River usually does not exceed the 350-foot contour.

The most common trees of this habitat are cottonwood (Populus deltoides), silver maple (Acer saccharinum), sugarberry (Celtis laevigata), and sycamore (Platanus occidentalis). Other trees are sweet gum (Liquidambar styraciflua), cherrybark oak (Quercus pagoda), kingnut hickory (Carya laciniosa), American elm (Ulmus americana), honey locust (Gleditsia triacanthos), and Shumard oak (Quercus shumardii).

The most common shrub of the understory is swamp holly (Ilex decidua). Poison ivy (Toxicodendron radicans) and catbrier (Smilax bona-nox var. hederaefolia) are common woody vines.

Important species of the herbaceous layer are scouring rush (Equisetum hyemale var. affine), lizard's-tail (Saururus cernuus), false nettle (Boehmeria cylindrica), snailseed (Cocculus carolinus), and aster (Aster lateriflorus).

Limestone Woods. A dry south-facing woodland on shallow soil over limestone occurs in the eastern half of Section 13, T10S, R4W. The most common trees are yellow chestnut oak (Quercus muhlenbergii) and white ash (Fraxinus americana). Also present are Shumard oak (Quercus shumardii), red cedar (Juniperus virginiana), winged elm (Ulmus alata), and black walnut (Juglans nigra).

Common shrubs and small trees in the limestone woodland are swamp holly (Ilex decidua), rusty nannyberry (Viburnum rufidulum), paw-paw (Asimina triloba), and Carolina buckthorn (Rhamnus caroliniana). Catbrier (Smilax bona-nox) is the most conspicuous vine.

Prairie forbs present due to the open nature of the limestone woodlands include hoary puccoon (Lithospermum canescens), rosinweed (Silphium integrifolium), false boneset (Brickellia eupatorioides), and wild hyacinth (Camassia scilloides).

Shaded outcroppings of limestone support spring cress (Arabis laevigata), woods fern (Woodsia obtusa), and purple cliffbrake (Pellaea atropurpurea).

Sandstone Cliff Faces. Over 5½ miles of nearly vertical sandstone cliffs varying from 15 to over 100 feet in height define the north, northwest, west, and southwest margins of Fountain Bluff.

The lower cliffs of Palestine sandstone on the southwest side are the driest. Woody plants occupying this habitat include dwarf hackberry (Celtis tenuifolia), winged elm (Ulmus alata), and barberry leaf hawthorn (Crataegus engelmannii). Herbaceous vegetation is sparse and consists primarily of wild petunia (Ruellia humilis), Drummond's goldenrod (Solidago drummondii), ebony spleenwort (Asplenium platyneuron), woods fern (Woodsia obtusa), and several grasses (Panicum lanuginosum var. fasciculatum, P. linearifolium, and Bromus racemosus).

The west- and northwest-facing cliffs above the Mississippi River are composed of Palestine and Wayside-Battery Rock sandstone. The soil-filled crevices and narrow ledges are occupied by a variety of species typical of the dry ledges, prairies, and woodlands above.

The highest cliffs, on the northwest and north sides of Fountain Bluff, are composed of Wayside-Battery Rock sandstone capped by Pounds sandstone. The numerous small ledges and more mesic rock exposures support the greatest diversity of cliff face vegetation. The moist cliffs extend into the interior of Fountain Bluff along the steep canyon walls of Swimming Hole Hollow and Orchard Hollow. Plants restricted to these cliffs are blue ash (Fraxinus quadrangulata), American barberry (Berberis canadensis), honeysuckle (Lonicera dioica var. glaucescens), columbine (Aquilegia canadensis), pinnatifid spleenwort (Asplenium pinnatifidum), smooth cliffbrake (Pellaea glabella), bellwort (Campanula rotundifolia), and muhly grass (Muhlenbergia racemosa).

Prairies. Small prairie patches have developed atop the limestone bluffs at the south end of Fountain Bluff. Species composition of these prairies include big bluestem (Andropogon gerardii), little bluestem (Schizachyrium scoparium), sideoats grama (Bouteloua curtipendula), Indian grass (Sorghastrum nutans), purple and white prairie clovers (Petalostemum purpureum and P. candidum), false boneset (Brickellia eupatorioides), and blazing stars (Liatris cylindracea and L. scabra).

Mesic Woods. Mesic woods that occur along the base of the west-facing cliffs are among the best for spring wildflowers in southern Illinois. Sessile trillium (Trillium sessile) opens the flowering season in mid-March and is followed by an abundance of white trillium (Trillium flexipes), celandine poppy (Stylophorum diphyllum), blue cohosh (Caulophyllum thalictroides), bluebells (Mertensia virginiana), wild larkspur (Delphinium tricorne), and many others.

Disturbed Habitats. A number of disturbed areas are found along the periphery of Fountain Bluff. Public roads encircle most of the bluffs. A railroad, now abandoned, extends along the entire western side of the bluff. Several homes and abandoned homesites provide additional areas for non-native species.

Taxonomic List

The list of plants that follows is based upon specimens which have been collected within the boundaries of Fountain Bluff. The specimens are deposited in the herbarium of Southern Illinois University (SIU). A total of 991 taxa of vascular plants has been recorded. Most of these are indigenous plants or plants that have been thoroughly naturalized. The few plants on Fountain Bluff which appear to be the direct result of man's plantings are indicated in the list by an asterisk (*). The nomenclature and sequence of taxa follow Mohlenbrock (1975).

EQUISETACEAE

- Equisetum arvense* L.
Equisetum hyemale L. var.
affine (Engelm.) A.A. Eaton

LYCOPODIACEAE

- Lycopodium lucidulum* Michx.

OPHIOGLOSSACEAE

- Botrychium dissectum* Spreng.
 var. *dissectum*
Botrychium dissectum Spreng.
 var. *obliquum* (Muhl.) Clute
Botrychium virginianum (L.) Sw.
Ophioglossum vulgatum L. var.
pycnostichum Fern.
Ophioglossum engelmannii
 Prantl

POLYPODIACEAE

- Adiantum pedatum* (Tourn.) L.
Pteridium aquilinum (L.) Kuhn
 var. *latiusculum* (Desv.)
 Underw.
Pellaea atropurpurea (L.)
 Link
Pellaea glabella Mett.
Cheilanthes lanosa (Michx.)
 D.C. Eaton
Polypodium vulgare L. var.
virginianum (L.) Eaton
Polypodium polypodioides (L.)
 Watt var. *michauxianum*
 Weatherby
Polystichum acrostichoides
 (Michx.) Schott
Onoclea sensibilis L.
Thelypteris hexagonoptera
 (Michx.) Weatherby
Dryopteris marginalis (L.)
 Gray

- Athyrium pycnocarpon* (Spreng.)
 Tidestrom
Athyrium thelypteroides (Michx.)
 Desv.
Athyrium felix-femina (L.) Roth
 var. *rubellum* Gilb.
Athyrium felix-femina (L.) Roth
 var. *asplenioides* (Michx.) Farw.
Asplenium rhizophyllum L.
Asplenium pinnatifidum Nutt.
Asplenium Xebenooides R.R. Scott
Asplenium trichomanes L.
Asplenium platyneuron (L.) Oakes
Woodsia obtusa (Spreng.) Torr.
Cystopteris bulbifera (L.) Bernh.
Cystopteris fragilis (L.) Bernh.
 var. *fragilis*
Cystopteris fragilis (L.) Bernh.
 var. *protrusa* Weatherby

PINACEAE

- Pinus echinata* Mill.*
Pinus resinosa Ait.*

CUPRESSACEAE

- Juniperus virginiana* L.

TYPHACEAE

- Typha latifolia* L.

ALISMACEAE

- Sagittaria calycina* Engelm.
Alisma subcordatum Raf.

POACEAE

- Bromus tectorum* L.
Bromus secalinus L.
Bromus racemosus L.
Bromus commutatus Schrad.
Bromus japonicus Thunb.

- Bromus inermis* Leyss.
Bromus purgans L.
Bromus pubescens Muhl.
Vulpia octoflora (Walt.) Rydb.
 var. *octoflora*
Vulpia octoflora (Walt.) Rydb.
 var. *tenella* (Willd.) Fern.
Vulpia octoflora (Walt.) Rydb.
 var. *glauca* (Nutt.) Fern.
Festuca ovina L. var. *duriuscula* (L.) Koch
Festuca pratensis Huds.
Festuca obtusa Bieler
Poa annua L.
Poa chapmaniana Scribn.
Poa pratensis L.
Poa compressa L.
Poa sylvestris Gray
Dactylis glomerata L.
Koeleria macrantha (Ledeb.) Spreng.
Sphenopholis obtusata (Michx.) Scribn. var. *obtusata*
Sphenopholis obtusata (Michx.) Scribn. var. *major* (Torr.) Erdman
Sphenopholis nitida (Biehler) Scribn.
Agrostis elliottiana Schult.
Agrostis hyemalis (Walt.) BSP.
Agrostis perennans (Walt.) Tuckerm.
Agrostis alba L.
Cinna arundinacea L.
Phalaris arundinacea L.
Alopecurus carolinianus Walt.
Phleum pratense L.
Elymus hystrix L.
Elymus virginicus L. var. *virginicus*
Elymus virginicus L. var. *submuticus* Hook.
Elymus virginicus L. var. *glabriflorus* (Vasey) Bush
Elymus villosus Muhl. f. *villosus*
Elymus villosus Muhl. f. *arkansanus* (Scribn. & Ball) Fern.
Elymus canadensis L.
Hordeum pusillum Nutt.
Agropyron repens (L.) Beauv.
Triticum aestivum L.
Glyceria striata (Lam.) Hitchcock
Brachyelytrum erectum (Schreb.) Beauv.
Diarrhena americana Beauv. var. *obovata* Gleason
Digitaria sanguinalis (L.) Scop.
Digitaria ischaemum (Schreb.) Muhl.
Paspalum pubiflorum Rupr. var. *glabrum* (Vasey) Vasey
Paspalum laeve Michx.
Paspalum ciliatifolium Michx.
Paspalum bushii Nash
Panicum dichotomiflorum Michx. var. *dichotomiflorum*
Panicum dichotomiflorum Michx. var. *geniculatum* (Muhl.) Fern.
Panicum flexile (Gattinger) Scribn.
Panicum philadelphicum Bernh.
Panicum rigidulum Bosc
Panicum anceps Michx.
Panicum depauperatum Muhl.
Panicum linearifolium Scribn.
Panicum laxiflorum Lam.
Panicum nitidum Lam.
Panicum dichotomum L. var. *dichotomum*
Panicum dichotomum L. var. *barbulatum* (Michx.) Wood
Panicum lanuginosum Ell. var. *lanuginosum*
Panicum lanuginosum Ell. var. *implicatum* (Scribn.) Fern.
Panicum lanuginosum Ell. var. *septentrionale* (Fern.) Fern.
Panicum villosissimum Nash
Panicum sphaerocarpon Ell.
Panicum polyanthes Schult.
Panicum malacophyllum Nash
Panicum oligosanthes Schult.

- Panicum oligosanthes* Schult.
 var. *scribnerianum* (Nash)
 Fern.
Panicum leibergii (Vasey)
 Scribn.
Panicum commutatum Schult.
Panicum clandestinum L.
Panicum latifolium L.
Panicum boscii Poir.
Echinochloa pungens (Poir.)
 Rydb. var. *microstachya*
 (Wieg.) Mohl.
Echinochloa pungens (Poir.)
 Rydb. var. *wiegandii* Fassett
Setaria lutescens (Weigel)
 Hubb.
Setaria faberi Herrm.
Setaria viridis (L.) Beauv.
Cenchrus longispinus (Hack.)
 Fern.
Erianthus alopecuroides (L.)
 Ell.
Sorghum halepense (L.) Pers.
Sorghum bicolor (L.) Moench
Sorghastrum nutans (L.) Nash
Andropogon gerardii Vitman
Andropogon virginicus L.
Schizachyrium scoparium (Michx.)
 Nash
Zea mays L.*
Eragrostis hypnoides (Lam.)
 BSP.
Eragrostis cilianensis
 (All.) Mosher
Eragrostis poaeoides Beauv.
Eragrostis spectabilis (Pursh)
 Steud.
Eragrostis pectinacea (Michx.)
 Nees
Eragrostis capillaris (L.) Nees
Eragrostis frankii C.A. Meyer
Tridens flavus (L.) Hitchcock
Muhlenbergia capillaris (Lam.)
 Trin.
Muhlenbergia schreberi J.F.
 Gmel.
- Muhlenbergia sobolifera* (Muhl.)
 Trin.
Muhlenbergia frondosa (Poir.)
 Fern.
Muhlenbergia racemosa (Michx.)
 BSP.
Muhlenbergia glabrifloris Scribn.
Muhlenbergia tenuiflora (Willd.)
 BSP.
Muhlenbergia sylvatica (Torr.)
 Torr.
Muhlenbergia mexicana (L.) Trin.
Sporobolus asper (Michx.) Kunth
Sporobolus clandestinus (Biehler)
 Hitchc.
Sporobolus vaginiflorus (Torr.)
 Wood
Eleusine indica (L.) Gaertn.
Leptochloa filiformis (Lam.)
 Beauv.
Leptochloa attenuata (Nutt.)
 Steud.
Cynodon dactylon (L.) Pers.
Bouteloua curtipendula (Michx.)
 Torr.
Aristida oligantha Michx.
Aristida purpurascens Poir.
Aristida longespica Poir.
Aristida dichotoma Michx.
Arundinaria gigantea (Walt.) Chapm.
Leersia oryzoides (L.) Swartz
Leersia virginica Willd.
Danthonia spicata (L.) Beauv.
Chasmanthium latifolium (Michx.)
 Yates
Cyperus densicaespitosus Mattf.
 & Klükenth.
Cyperus flavescens L.
Cyperus aristatus Rottb.
Cyperus ovularis (Michx.) Torr.
Cyperus filiculmis Vahl var.
macilentus Fern.
Cyperus esculentus L.
Cyperus ferruginescens Boeckl.
Cyperus strigosus L.
Eleocharis obtusa (Willd.) Schult.

Scirpus atrovirens Willd.
Scirpus pendulus Muhl.
Carex retroflexa Muhl.
Carex texensis (Torr.) Bailey
Carex convoluta Mack.
Carex rosea Schk.
Carex cephalophora Muhl.
Carex muhlenbergii Schk.
Carex muhlenbergii Schk. var.
 enervis Boott
Carex sparganioides Muhl.
Carex vulpinoidea Michx.
Carex annectens Bickn.
Carex stipata Muhl.
Carex crus-corvi Shuttlew.
Carex scoparia Schk.
Carex tribuloides Wahlenb.
Carex projecta Mack.
Carex normalis Mack.
Carex festucacea Schk.
Carex brevior (Dewey) Mack.
Carex molesta Mack.
Carex jamesii Schwein.
Carex pennsylvanica Lam.
Carex artitecta Mack.
Carex nigromarginata Schwein.
Carex umbellata Schk.
Carex hirtifolia Mack.
Carex shortiana Dewey
Carex hirsutella Mack.
Carex caroliniana Schwein.
Carex bushii Mack.
Carex virescens Muhl.
Carex swanii (Fern.) Mack.
Carex davisii Schwein. & Torr.
Carex granularis Muhl.
Carex amphibola Steud.
Carex grisea Wahlenb.
Carex flaccosperma Dewey
Carex glaucodea Tuckerm.
Carex oligocarpa Schk.
Carex tetanica Schk.
Carex digitalis Willd.
Carex laxiculmis Schwein.
Carex albursina Sheldon

Carex laxiflora Lam.
Carex blanda Dewey
Carex gracilescens Steud.
Carex frankii Kunth
Carex squarrosa L.
Carex typhina Michx.
Carex lacustris Willd.
Carex hyalinolepis Steud.
Carex lurida Wahlenb.
Carex grayi Carey
Carex lupulina Muhl.
Carex careyana Torr.

ARACEAE

Arisaema dracontium (L.) Schott
Arisaema triphyllum (L.) Schott
 var. *triphyllum*
Arisaema triphyllum (L.) Schott
 var. *pusillum* Peck

LEMNACEAE

Lemna minor L.

COMMELINACEAE

Tradescantia subaspera Ker var.
 subaspera
Tradescantia subaspera Ker var.
 montana (Shuttlew.) Anders. &
 Woodson
Tradescantia ohlensis Raf.
Tradescantia virginiana L.
Commelina diffusa Burm. f.
Commelina erecta L.

JUNCACEAE

Luzula multiflora (Retz.) Lejeune
 var. *multiflora*
Luzula multiflora (Retz.) Lejeune
 var. *echinata* (Small) Mohlenbr.
Juncus effusus L. var. *solutus*
 Fern. & Wieg.

Juncus biflorus Ell.
Juncus secundus Beauv.
Juncus tenuis Willd.
Juncus interior Wieg.

LILIACEAE

Lilium michiganense Farw.
Lilium superbum L.
Hemerocallis fulva L.
Camassia scilloides (Raf.) Cory
Erythronium americanum Ker
Erythronium albidum Nutt.
Uvularia grandiflora Sm.
Polygonatum commutatum (Schult.)
 A. Dietr.
Polygonatum biflorum (Walt.)
 Ell.
Smilacina racemosa (L.) Desf.
Asparagus officinalis L.
Allium tricoccum Ait.
Allium sativum L.
Allium ampeloprasum L. var.
atroviolaceum (Boiss.) Regel
Allium canadense L.
Allium stellatum Ker
Allium vineale L.
Nothoscordum bivalve (L.) Britt.
Trillium recurvatum Beck
Trillium sessile L.
Trillium flexipes Raf.
Yucca filamentosa L. var.
smalliana (Fern.) Ahles
Narcissus pseudo-narcissus L.
Polyanthes virginica (L.) Shiner
 s
Hypoxis hirsuta (L.) Coville

SMILACACEAE

Smilax glauca Walt. var. *glauca*
Smilax glauca Walt. var. *leuro-*
phylla Blake
Smilax bona-nox L. var. *bona-*
nox

Smilax bona-nox L. var. *hederae-*
folia (Beyrich) Fern.
Smilax rotundifolia L.
Smilax hispida Muhl.
Smilax lasioneuron Hook.
Smilax pulverulenta Michx.

DIOSCOREACEAE

Dioscorea villosa L.
Dioscorea quaternata (Walt.) J.F.
 Gmel.
Dioscorea batatas Dcne.

IRIDACEAE

Iris shrevei Small
Iris pseudacorus L.
Iris cristata Ait.
Belamcanda chinensis (L.) DC.
Sisyrinchium angustifolium Mill.
Sisyrinchium albidum Raf.

ORCHIDACEAE

Cypripedium calceolus L. var.
pubescens (Willd.) Correll
Orchis spectabilis L.
Habenaria peramoena Gray
Liparis liliifolia (L.) Rich.
Spiranthes ovalis Lindl.
Spiranthes cernua (L.) Rich.
Spiranthes tuberosa Raf.
Triphora trianthophora (Sw.)
 Rydb.
Corallorhiza wisteriana Conrad
Corallorhiza odontorhiza (Willd.)
 Nutt.
Hexalectris spicata (Walt.) Barnh.
Aplectrum hyemale (Muhl.) Torr.

SAURURACEAE

Saururus cernuus L.

SALICACEAE

Salix nigra Marsh.
 Salix caroliniana Michx.
 Salix amygdaloides Anderss.
 Salix alba L.
 Salix interior Rowlee
 Salix rigida Muhl.
 Populus deltoides Marsh.
 Populus alba L.

Quercus velutina Lam.
 Quercus rubra L.
 Quercus palustris Muenchh.
 Quercus shumardii Buckley
 Quercus coccinea Muenchh.
 Quercus muhlenbergii Engelm.
 Quercus alba L.
 Quercus stellata Wagh.
 Quercus macrocarpa Michx.
 Quercus Xbushii Sarg.

JUGLANDACEAE

Juglans cinerea L.
 Juglans nigra L.
 Carya illinoensis (Wang.) K.
 Koch
 Carya cordiformis (Wang.) K.
 Koch
 Carya texana Buckl.
 Carya pallida (Ashe) Engl.
 & Graebn.
 Carya ovalis (Wang.) Sarg.
 Carya glabra (Mill.) Sweet
 Carya tomentosa (Poir.) Nutt.
 Carya ovata (Mill.) K.
 Koch
 Carya laciniosa (Michx.)
 Loud.

ULMACEAE

Ulmus rubra Muhl.
 Ulmus americana L.
 Ulmus alata Michx.
 Celtis occidentalis L.
 Celtis laevigata Willd.
 Celtis tenuifolia Nutt.

MORACEAE

Morus rubra L.
 Morus alba L.
 Broussonetia papyrifera (L.)
 L'Hér.
 Maclura pomifera (Raf.) Schneider
 Humulus lupulus L.
 Cannabis sativa L.

BETULACEAE

Betula nigra L.
 Corylus americana Walt.
 Ostrya virginiana (Mill.)
 K. Koch
 Carpinus caroliniana Walt.

URTICACEAE

Boehmeria cylindrica (L.) Sw.
 Pilea pumila (L.) Gray
 Laportea canadensis (L.) Wedd.
 Parietaria pensylvanica Muhl.

FAGACEAE

Fagus grandifolia Ehrh.
 Quercus imbricaria Michx.
 Quercus marilandica Muenchh.
 Quercus falcata Michx.
 Quercus pagoda Raf.

SANTALACEAE

Comandra richardsoniana Fern.

LORANTHACEAE

Phoradendron flavescens (Pursh)
 Nutt.

ARISTOLOCHIACEAE

- Asarum canadense* L. var. *reflexum* (Bickn.) Robins.
Aristolochia serpentaria L.
Aristolochia tomentosa Sims

POLYGONACEAE

- Rumex acetosella* L.
Rumex obtusifolius L.
Rumex crispus L.
Rumex altissimus Wood
Rumex mexicanus Meisn.
Polygonum sagittatum L.
Polygonum cristatum Engelm. & Gray
Polygonum scandens L.
Polygonum tenue Michx.
Polygonum aviculare L.
Polygonum ramosissimum Michx.
Polygonum virginianum L.
Polygonum punctatum Ell.
Polygonum persicaria L.
Polygonum cespitosum Blum var. *longisetum* (DeBruyn) Steward
Polygonum setaceum Baldw. var. *interjectum* Fern.
Polygonum hydropiperoides Michx.
Polygonum coccineum Muhl.
Polygonum lapathifolium L.
Polygonum pensylvanicum L.

CHENOPODIACEAE

- Chenopodium ambrosioides* L.
Chenopodium album L.
Chenopodium gigantospermum Aellen
Chenopodium standleyanum Aellen

AMARANTHACEAE

- Amaranthus spinosus* L.

- Amaranthus albus* L.
Amaranthus graecizans L.
Amaranthus retroflexus L.
Amaranthus hybridus L.
Amaranthus tamariscinus Nutt.
Froelichia gracilis (Hook) Moq.

NYCTAGINACEAE

- Mirabilis nyctaginea* (Michx.) MacM.

PHYTOLACCACEAE

- Phytolacca americana* L.

AIZOACEAE

- Mollugo verticillatus* L.

PORTULACACEAE

- Portulaca oleracea* L.
Claytonia virginica L.

CARYOPHYLLACEAE

- Paronychia fastigiata* (Raf.) Fern.
Sagina decumbens (Ell.) Torr. & Gray
Holosteum umbellatum L.
Stellaria media (L.) Cyrillo
Cerastium vulgatum L.
Cerastium nutans Raf.
Cerastium viscosum L.
Cerastium brachypodum (Engelm.) B.L. Robins.
Arenaria serpyllifolia L.
Dianthus barbatus L.
Silene stellata (L.) Ait.
Silene antirrhina L.
Saponaria officinalis L.

RANUNCULACEAE

- Ranunculus pusillus Poir.
 Ranunculus harveyi (Gray)
 Britt.
 Ranunculus abortivus L.
 Ranunculus micranthus Nutt.
 Ranunculus recurvatus Poir.
 Ranunculus hispidus Michx.
 Ranunculus septentrionalis
 Poir.
 Ranunculus sardous Crantz
 Delphinium ajacis L.
 Delphinium tricornis Michx.
 Thalictrum revolutum DC.
 Thalictrum dasycarpum Fisch. &
 Lall. var. hypoglaucum
 (Rydb.) Boivin
 Thalictrum dioicum L.
 Actaea pachypoda Ell.
 Hepatica nobilis Schreb. var.
 acuta (Pursh) Steyerl.
 Hydrastis canadensis L.
 Isopyrum biternatum (Raf.)
 Torr. & Gray
 Anemone thalictroides (L.)
 Spach
 Anemone virginiana L.
 Myosurus minimus L.
 Aquilegia canadensis L.
 Clematis virginiana L.
 Clematis pitcheri Torr. & Gray

BERBERIDACEAE

- Berberis thunbergii DC.*
 Berberis canadensis Mill.
 Podophyllum peltatum L.
 Caulophyllum thalictroides (L.)
 Michx.

MENISPERMACEAE

- Calycocarpum lyonii (Pursh)
 Gray

- Menispermum canadense L.
 Cocculus carolinus (L.) DC.

MAGNOLIACEAE

- Liriodendron tulipifera L.

ANNONACEAE

- Asimina triloba (L.) Dunal

LAURACEAE

- Sassafras albidum (Nutt.) Nees
 Lindera benzoin (L.) Blume

PAPAVERACEAE

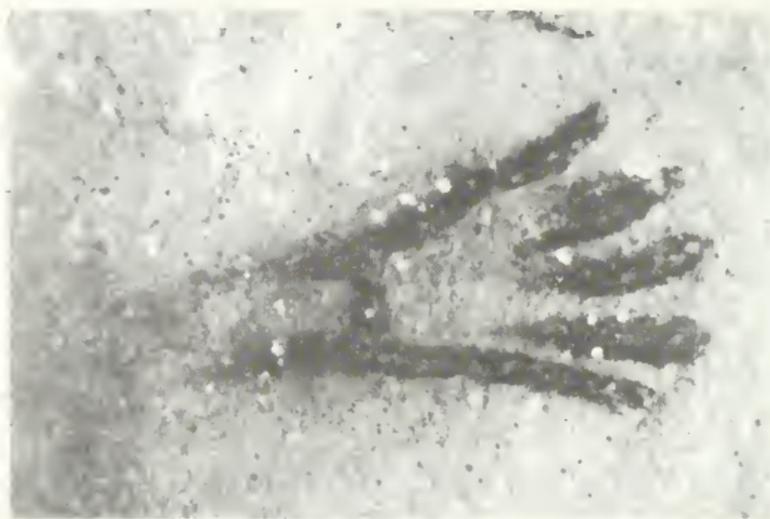
- Sanguinaria canadensis L.
 Stylophorum diphyllum (Michx.)
 Nutt.
 Dicentra cucullaria (L.) Bernh.
 Dicentra canadensis (Goldie)
 Walp.
 Corydalis flavula (Raf.) DC.

CAPPARIDACEAE

- Polanisia dodecandra (L.) DC.

CRUCIFERAE

- Dentaria laciniata Muhl.
 Capsella bursa-pastoris (L.)
 Medic.
 Arabis canadensis L.
 Arabis laevigata (Muhl.) Poir.
 Arabis hirsuta (L.) Scop. var.
 adpressipilis (M. Hopkins)
 Rollins
 Descurainia pinnata (Walt.) Britt.
 var. brachycarpa (Richards.)
 Fern.
 Cardamine hirsuta L.
 Cardamine pensylvanica Muhl.



Figs. 3 & 4. Close-up photos of Indian petroglyphs located on large overhanging bluffs of Fountain Bluff. Photos by Dave E. Mueller.

- Cardamine parviflora L. var.
arenicola (Britt.) O.E.
Schulz
- Draba verna L.
- Draba reptans (Lam.) Fern.
- Draba brachycarpa Nutt.
- Arabidopsis thaliana (L.)
Heynh.
- Lepidium virginicum L.
- Nasturtium officinale R. Br.
- Thlaspi arvense L.
- Barbarea vulgaris R. Br.
- Brassica hirta Moench
- Brassica kaber (DC.) L.C.
Wheeler var. pinnatifida
(Stokes) L.C. Wheeler
- Sisymbrium officinale (L.)
Scop.
- Rorippa sessiliflora (Nutt.)
Hitchc.
- Rorippa islandica (Oeder)
Borbas var. fernaldiana
Butt. & Abbe
- CRASSULACEAE
- Sedum sarmentosum Bunge*
- Sedum telephium L.*
- SAXIFRAGACEAE
- Philadelphus inodorus L.
- Hydrangea arborescens L.
- Ribes cynosbati L.
- Mitella diphylla L.
- Heuchera parviflora Bartl. var.
rugelii (Shuttlw.) Rosend.,
Butt. & Lak.
- Heuchera hirsuticaulis (Wheeler)
Rydb.
- Penthorum sedoides L.
- HAMAMELIDACEAE
- Liquidambar styraciflua L.
- PLATANACEAE
- Platanus occidentalis L.
- ROSACEAE
- Spiraea prunifolia Sieb. & Zucc.*
- Prunus persica (L.) Batsch.*
- Prunus hortulana Bailey
- Prunus munsoniana Wight &
Hedrick
- Prunus angustifolia Marsh.
- Prunus mexicana S. Wats.
- Prunus americana Marsh. var.
lanata Sudw.
- Prunus avium L.*
- Prunus serotina Ehrh.
- Amelanchier arborea (Michx. f.)
Fern.
- Pyrus communis L.*
- Malus pumila Mill.*
- Malus ioensis (Wood) Britt.
- Crataegus phaenopyrum (L. f.)
Medic.
- Crataegus crus-galli L.
- Crataegus engelmannii Sarg.
- Crataegus calpodendron (Ehrh.)
Medic.
- Crataegus viridis L.
- Crataegus pruinosa (Wendl.) K.
Koch
- Crataegus mollis (Torr. & Gray)
Scheele
- Rubus occidentalis L.
- Rubus trivialis Michx.
- Rubus flagellaris Willd.
- Rubus allegheniensis Porter
- Rosa multiflora Thunb.
- Rosa setigera Michx.
- Rosa carolina L.
- Rosa wichuriana Crepin
- Potentilla simplex Michx.
- Potentilla recta L.
- Potentilla norvegica L.
- Fragaria virginiana Duchesne

- Aruncus dioicus (Walt.) Fern.
 Gillenia stipulata (Muhl.)
 Baill.
 Geum canadense Jacq.
 Geum vernum (Raf.) Torr. &
 Gray
 Geum virginianum L.
 Agrimonia parviflora Ait.
 Agrimonia pubescens Wallr.
 Agrimonia rostellata Wallr.
- LEGUMINOSAE
- Cercis canadensis L.
 Gymnocladus dioica (L.) K. Koch
 Gleditsia triacanthos L.
 Desmanthus illinoensis (Michx.)
 MacM.
 Albizia julibrissin Duraz.*
 Amorpha fruticosa L.
 Robinia pseudoacacia L.
 Crotalaria sagittalis L.
 Psoralea psoralioides (Walt.)
 Cory var. eglanulosa (Ell.)
 Freeman
 Vicia villosa Roth
 Cassia tora L.
 Cassia marilandica L.
 Cassia fasciculata Michx.
 Cassia nictitans L.
 Apios americana Medic.
 Petalostemum candidum (Willd.)
 Michx.
 Petalostemum purpureum (Vent.)
 Rydb.
 Coronilla varia L.
 Tephrosia virginiana (L.) Pers.
 Astragalus canadensis L.
 Melilotus alba Desr.
 Melilotus officinalis (L.) Lam.
 Trifolium dubium Sibth.
 Trifolium pratense L.
 Trifolium repens L.
 Trifolium hybridum L.
 Medicago sativa L.
- Medicago lupulina L.
 Stylosanthes biflora (L.) BSP.
 Lespedeza striata (Thunb.) Hook.
 & Arn.
 Lespedeza stipulacea Maxim.
 Lespedeza procumbens Michx.
 Lespedeza repens (L.) Bart.
 Lespedeza hirta (L.) Hornem.
 Lespedeza stuevei Nutt.
 Lespedeza cuneata (Dum.-Cours.)
 G. Don
 Lespedeza violacea (L.) Pers.
 Lespedeza intermedia (S. Wats.)
 Britt.
 Lespedeza virginica (L.) Britt.
 Phaseolus polystachios (L.) BSP.
 Desmodium nudiflorum (L.) DC.
 Desmodium glutinosum (Muhl.) Wood
 Desmodium pauciflorum (Nutt.) DC.
 Desmodium rotundifolium DC.
 Desmodium illinoense Gray
 Desmodium canescens (L.) DC.
 Desmodium cuspidatum (Muhl.) Loud.
 Desmodium laevigatum (Nutt.) DC.
 Desmodium marilandicum (L.) DC.
 Desmodium rigidum (Ell.) DC.
 Desmodium nuttallii (Schindl.)
 Schub.
 Desmodium dillenii Darl.
 Desmodium paniculatum (L.) DC.
 Glycine max (L.) Merr.*
 Strophostyles leiosperma (Torr.
 & Gray) Piper
 Strophostyles helvola (L.) Ell.
 Strophostyles umbellata (Muhl.)
 Britt.
 Galactia volubilis (L.) Britt.
 var. mississippiensis Vail
 Amphicarpa bracteata (L.) Fern.
 var. bracteata
 Amphicarpa bracteata (L.) Fern.
 var. comosa (L.) Fern.

LINACEAE

- Linum medium* (Planch.) Britt.
var. *texanum* (Planch.) Fern.

- Chamaesyce humistrata* (Engelm.)
Small
Chamaesyce maculata (L.) Small

OXALIDACEAE

- Oxalis violacea* L.
Oxalis dillenii Jacq.
Oxalis stricta L.

CALLITRICHACEAE

- Callitriche heterophylla* Pursh
Callitriche terrestris Raf.

GERANIACEAE

- Geranium maculatum* L.
Geranium carolinianum L.

- Toxicodendron radicans* (L.)
Kuntze
Rhus copallina L.
Rhus glabra L.
Rhus aromatica Ait.

RUTACEAE

- Xanthoxylum americanum* Mill.

AQUIFOLIACEAE

- Ilex decidua* Walt.

SIMAROUBACEAE

- Ailanthus altissima* (Mill.)
Swingle

CELASTRACEAE

- Euonymus obovatus* Nutt.
Euonymus atropurpureus Jacq.
Celastrus scandens L.

POLYGALACEAE

- Polygala verticillata* L.

STAPHYLEACEAE

- Staphylea trifolia* L.

EUPHORBIACEAE

- Phyllanthus caroliniensis* Walt.
Croton glandulosus L. var.
septentrionalis Muell.-Arg.
Croton monanthogynus Michx.
Crotonopsis elliptica Willd.
Acalypha ostryaefolia Riddell
Acalypha rhomboidea Raf.
Acalypha virginica L.
Acalypha gracilens Gray
Euphorbia corollata L.
Poinsettia dentata (Michx.) Kl.
& Garcke
Chamaesyce supina (Raf.) Mol-
denke

ACERACEAE

- Acer negundo* L.
Acer barbatum Michx.
Acer saccharum Marsh.
Acer saccharinum L.
Acer rubrum L.

HIPPOCASTANACEAE

- Aesculus discolor* Pursh
Aesculus glabra Willd.

BALSAMINACEAE

Impatiens biflora Walt.
Impatiens pallida Nutt.

RHAMNACEAE

Ceanothus americanus L. var.
 pitcheri Torr. & Gray
Rhamnus caroliniana Walt.

VITACEAE

Parthenocissus quinquefolia (L.)
 Planch.
Ampelopsis cordata Michx.
Vitis aestivalis Michx.
Vitis cinerea Engelm.
Vitis vulpina L.
Vitis palmata Vahl.
Vitis riparia Michx.

TILIACEAE

Tilia americana L.

MALVACEAE

Malva neglecta Wallr.
Hibiscus lasiocarpus Cav.
Sida spinosa L.

HYPERICACEAE

Ascyrum hypericoides L. var.
 multicaule (Michx.) Fern.
Hypericum perforatum L.
Hypericum punctatum Lam.
Hypericum spathulatum (Spach.)
 Steud.
Hypericum sphaerocarpum Michx.
Hypericum mutilum L.
Hypericum gentianoides (L.) BSP.
Hypericum drummondii (Grev. &
 Hook.) Torr. & Gray

CISTACEAE

Lechea tenuifolia Michx.

VIOLACEAE

Hybanthus concolor (T. F. Forst.)
 Spreng.
Viola cucullata Ait.
Viola pratensis Greene
Viola missouriensis Greene
Viola sororia Willd.
Viola triloba Schwein. var.
 dilatata (Ell.) Brainerd
Viola pubescens Ait. var. *erio-*
 carpa (Schwein.) Russell
Viola striata Ait.
Viola rafinesquii Greene

PASSIFLORACEAE

Passiflora lutea L. var. *glabri-*
 flora Fern.

CACTACEAE

Opuntia compressa (Salisb.)
 Macbr.

ELAEAGNACEAE

Elaeagnus umbellata Thunb.

LYTHRACEAE

Cuphea petiolata (L.) Koehne
Lythrum alatum Pursh
Rotala ramosior (L.) Koehne
Ammannia coccinea Rottb.

NYSSACEAE

Nyssa sylvatica Marsh.

ONAGRACEAE

- Circaea quadrisulcata* (Maxim.)
Franch. & Sav. var. *canadensis* (L.) Hara
Ludwigia palustris (L.) Ell.
var. *americana* (DC.) Fern. &
Griseb.
Ludwigia alternifolia L.
Jussiaea repens L.
Oenothera laciniata Hill
Oenothera biennis L.

ARALIACEAE

- Aralia spinosa* L.
Aralia racemosa L.
Panax quinquefolium L.

UMBELLIFERAE

- Thaspium trifoliatum* (L.) Gray
Sanicula gregaria Bickn.
Sanicula canadensis L.
Daucus carota L.
Cryptotaenia canadensis (L.) DC.
Sium suave Walt.
Osmorhiza longistylis (Torr.)
DC.
Osmorhiza claytonii (Michx.)
Clarke
Erigenia bulbosa (Michx.) Nutt.
Chaerophyllum procumbens (L.)
Crantz
Chaerophyllum tainturieri Hook.
Taenidia integerrima (L.) Drude
Polytaenia nuttallii DC.
Cicuta maculata L.

CORNACEAE

- Cornus florida* L.
Cornus drummondii C.A. Mey.

ERICACEAE

- Monotropa hypopithys* L.
Monotropa uniflora L.
Vaccinium arboreum Marsh.
Vaccinium vacillans Torr.

PRIMULACEAE

- Dodecatheon meadia* L.
Samolus parviflorus Raf.
Anagallis arvensis L.
Lysimachia ciliata L.
Lysimachia lanceolata Walt.
Lysimachia nummularia L.

EBENACEAE

- Diospyros virginiana* L.

OLEACEAE

- Fraxinus quadrangulata* Michx.
Fraxinus pensylvanica Marsh.
Fraxinus americana L. var. *americana*
Fraxinus americana L. var. *biltmoreana* (Beadle) J. Wright
Syringa vulgaris L.*
Ligustrum obtusifolium Sieb. &
Zucc.*

GENTIANACEAE

- Swertia caroliniensis* (Walt.)
Kuntze
Obolaria virginica L.
Sabatia angularis (L.) Pursh

APOCYNACEAE

- Apocynum Xmedium* Greene
Apocynum cannabinum L.
Apocynum cannabinum L. var. *pubescens* (Mitchell) A. DC.

ASCLEPIADACEAE

Asclepias tuberosa L. var.
interior (Woodson) Shinnery
Asclepias verticillata L.
Asclepias viridiflora Raf.
Asclepias purpurascens L.
Asclepias syriaca L.
Asclepias quadrifolia Jacq.
Asclepias variegata L.
Asclepias exaltata L.
Asclepias incarnata L.
Cynanchum laeve (Michx.) Pers.

CONVOLVULACEAE

Convolvulus arvensis L.
Calystegia sepium (L.) R. Br.
var. *americana* (Sims) Mohlenbr.
Ipomoea pandurata (L.) G.F.W.
Mey.
Ipomoea hederacea (L.) Jacq.
Ipomoea lacunosa L.
Ipomoea purpurea (L.) Roth
Cuscuta cuspidata Engelm.
Cuscuta polygonorum Engelm.
Cuscuta gronovii Willd.
Cuscuta indecora Choisy

POLEMONIACEAE

Polemonium reptans L.
Phlox bifida Beck
Phlox divaricata L.
Phlox pilosa L.
Phlox paniculata L.

HYDROPHYLLACEAE

Hydrophyllum appendiculatum Michx.
Hydrophyllum canadense L.
Phacelia purshii Buckley
Phacelia bipinnatifida Michx.

BORAGINACEAE

Mertensia virginica (L.) Pers.
Cynoglossum virginianum L.
Hackelia virginiana (L.) I.M.
Johnston
Myosotis virginica (L.) BSP.
Myosotis virginica (L.) BSP. var.
macrosperma (Engelm.) Fern.
Lithospermum arvense L.
Lithospermum latifolium Michx.
Lithospermum canescens (Michx.)
Lehm.

VERBENACEAE

Lippia lanceolata Michx.
Verbena canadensis Britt.
Verbena bracteata Lag. & Rodr.
Verbena simplex Lehm.
Verbena stricta Vent.
Verbena hastata L.
Verbena urticifolia L.

PHRYMACEAE

Phryma leptostachya L.

LABIATAE

Isanthus brachiatus (L.) BSP.
Mentha arvensis L.
Mentha arvensis L. var. *villosa*
(Benth.) S.R. Steward
Lycopus americanus Muhl.
Lycopus virginicus L.
Lycopus rubellus Moench
Teucrium canadense L. var.
virginicum (L.) Eat.
Scutellaria parvula Michx.
Scutellaria ovata Hill
Scutellaria elliptica Muhl.
Scutellaria incana Biehler
Cunila organoides (L.) Britt.
Monarda bradburiana Beck

Monarda fistulosa L.
 Blephilia ciliata (L.) Benth.
 Blephilia hirsuta (Pursh)
 Benth.

Collinsonia canadensis L.
 Hedeoma hispida Pursh
 Hedeoma pulegioides (L.) Pers.
 Pycnanthemum tenuifolium
 Schrad.

Pycnanthemum pilosum Nutt.
 Agastache nepetoides (L.) Ktze.
 Nepeta cataria L.
 Lamium amplexicaule L.
 Lamium purpureum L.
 Stachys palustris L. var.
 homotricha Fern.
 Stachys tenuifolia Willd.
 Leonurus cardiaca L.
 Perilla frutescens L.
 Physostegia virginiana (L.)
 Benth.

Prunella vulgaris L.
 Prunella vulgaris L. var.
 lanceolata (Bart.) Fern.

SOLANACEAE

Solanum carolinense L.
 Solanum americanum Mill.
 Datura stramonium L.
 Physalis longifolia Nutt.
 Physalis pruinosa L.
 Physalis virginiana Mill.
 Physalis heterophylla Nees
 Physalis heterophylla Nees var.
 ambigua (Gray) Rydb.
 Physalis pubescens L.
 Physalis lanceolata Michx.
 Petunia axillaris (Lam.) BSP.

SCROPHULARIACEAE

Paulownia tomentosa (Thunb.)
 Steud.
 Veronicastrum virginicum (L.)
 Farw.

Veronica peregrina L.
 Veronica arvensis L.
 Gratiola neglecta Torr.
 Lindernia anagallidea (Michx.)
 Pennell
 Lindernia dubia (L.) Pennell
 Penstemon digitalis Nutt.
 Penstemon calycosus Small
 Penstemon pallidus Small
 Conoclea multifida (Michx.)
 Benth.
 Pedicularis canadensis L.
 Gerardia flava L.
 Gerardia gattingeri Small
 Gerardia tenuifolia Vahl
 Seymeria macrophylla Nutt.
 Mimulus alatus Ait.
 Scrophularia marilandica L.
 Verbascum thapsus L.
 Verbascum blattaria L.

BIGNONIACEAE

Campsis radicans (L.) Seem.
 Catalpa bignonioides Walt.

OROBANCHACEAE

Epifagus virginiana (L.) Bart.
 Orobanche uniflora L.

ACANTHACEAE

Ruellia humilis Nutt.
 Ruellia pedunculata Torr.
 Ruellia strepens L.

PLANTAGINACEAE

Plantago aristata Michx.
 Plantago pusilla Nutt.
 Plantago lanceolata L.
 Plantago virginica L.
 Plantago rugelii Dcne.
 Plantago major L.

RUBIACEAE

Cephalanthus occidentalis L.
Galium circaezans Michx.
Galium pilosum Ait.
Galium triflorum Michx.
Galium aparine L.
Galium tinctorium L.
Galium concinnum Torr. & Gray
Galium obtusum Bigel.
Diodia teres Walt.
Spermacoce glabra Michx.
Mitchella repens L.
Houstonia minima Beck
Houstonia pusilla Schoepf
Houstonia nigricans (Lam.) Fern.
Houstonia longifolia Gaertn.
 var. *longifolia*
Houstonia longifolia Gaertn.
 var. *tenuifolia* (Nutt.) Wood

CAPRIFOLIACEAE

Sambucus canadensis L.
Lonicera prolifera (Kirchn.)
 Rehd.
Lonicera dioica L. var.
glaucescens
Lonicera japonica Thunb.
Symphoricarpos orbiculatus
 Moench
Viburnum rufidulum Raf.
Viburnum prunifolium L.
Triosteum angustifolium L.

VALERIANACEAE

Valeriana pauciflora Michx.
Valerianella radiata (L.) Dufr.

CUCURBITACEAE

Cucurbita pepo L. var. *ovifera*
 (L.) Alef.
Melothria pendula L.

Sicyos angulatus L.

CAMPANULACEAE

Specularia biflora (R. & P.)
 Fisch. & Mey.
Specularia perfoliata (L.) A. DC.
Campanula rotundifolia L.
Campanula americana L.
Lobelia silphilitica L.
Lobelia inflata L.

COMPOSITAE

Polymnia uvedalia (L.) L.
Silphium perfoliatum L.
Silphium terebinthinaceum Jacq.
Silphium integrifolium Michx.
Parthenium integrifolium L.
Iva annua L.
Ambrosia bidentata Michx.
Ambrosia trifida L.
Ambrosia artemisiifolia L.
Xanthium strumarium L. var.
canadensis (Mill.) Torr. &
 Gray
Heliopsis helianthoides (L.)
 Sweet
Eclipta alba (L.) Hassk.
Rudbeckia laciniata L.
Rudbeckia subtomentosa Pursh
Rudbeckia hirta L.
Echinacea purpurea (L.) Moench
Ratibida pinnata (Vent.) Barnh.
Helianthus annuus L.
Helianthus microcephalus Torr.
 & Gray
Helianthus decapetalus L.
Helianthus divaricatus L.
Helianthus strumosus L.
Helianthus grosseserratus Martens
Helianthus tuberosus L.
Helianthus hirsutus Raf.
Verbesina helianthoides Michx.
Verbesina alternifolia (L.) Britt.

- Coreopsis palmata* Nutt.
Coreopsis tinctoria Nutt.
Coreopsis tripteris L.
Bidens cernua L.
Bidens aristata L.
Bidens bipinnata L.
Bidens frondosa L.
Bidens vulgata Greene
Heterotheca villosa (Pursh)
 Shinners
Solidago caesia L.
Solidago flexicaulis L.
Solidago bicolor L. var. con-
 color Torr. & Gray
Solidago buckleyi Torr. & Gray
Solidago petiolaris Ait.
Solidago missouriensis Nutt.
Solidago juncea Ait.
Solidago speciosa Nutt.
Solidago gigantea Ait.
Solidago ulmifolia Muhl.
Solidago drummondii Torr. & Gray
Solidago radula Nutt.
Solidago canadensis L.
Solidago nemoralis Ait.
Solidago rugosa Mill.
Boltonia asteroides (L.)
 L'Hér.
Aster anomalus Engelm.
Aster shortii Lindl.
Aster cordifolius L.
Aster sagittifolius Wedem.
Aster sagittifolius Wedem. var.
 drummondii (Lindl.) Shinners
Aster oblongifolius Nutt.
Aster patens Ait.
Aster pilosus Willd.
Aster vimineus Lam.
Aster praealtus Poir.
Aster turbinellus Lindl.
Aster ontarionis Wieg.
Aster lateriflorus (L.) Britt.
Aster simplex Willd.
Erigeron pulchellus Michx.
Erigeron philadelphicus L.
Erigeron annuus (L.) Pers.
Erigeron strigosus Muhl.
Erigeron divaricatus Michx.
Erigeron canadensis L.
Achillea millefolium L.
Matricaria matricarioides (Less.)
 Porter
Chrysanthemum leucanthemum L.
Artemisia annua L.
Antennaria plantaginifolia (L.)
 Richards. var. *plantaginifolia*
Antennaria plantaginifolia (L.)
 Richards. var. *arnoglossa*
 (Greene) Cronq.
Gnaphalium purpureum L.
Gnaphalium obtusifolium L.
Erechtites hieracifolia (L.) Raf.
Cacalia muhlenbergii (Sch.-Bip.)
 Fern.
Senecio aureus L.
Senecio plattensis Nutt.
Senecio glabellus Poir.
Eupatorium purpureum L.
Eupatorium coelestinum L.
Eupatorium serotinum Michx.
Eupatorium rugosum Houtt.
Eupatorium altissimum L.
Brickellia eupatorioides (L.)
 Shinners
Liatris cylindracea Michx.
Liatris aspera Michx.
Vernonia missurica Raf.
Vernonia baldwinii Torr.
Elephantopus carolinianus Willd.
Arctium minus (Hill) Bernh.
Cirsium vulgare (Savi) Tenore
Cirsium discolor (Muhl.) Spreng.
Cirsium altissimum (L.) Spreng.
Gentaurea maculosa Lam.
Gentaurea cyanus L.
Cichorium intybus L.
Krigia dandelion (L.) Nutt.
Krigia biflora (Walt.) Blake
Krigia oppositifolia Raf.
Tragopogon dubius Scop.

Taraxacum officinale Weber
Taraxacum laevigatum (Willd.)
DC.
Sonchus asper (L.) Hill
Lactuca canadensis L.
Lactuca serriola L.
Lactuca saligna L.

Lactuca floridana (L.) Gaertn.
Pyrrhopappus carolinianus
(Walt.) DC.
Prenanthes altissima L.
Hieracium scabrum Michx.
Hieracium gronovii L.

EDITOR'S NOTE: The taxa in the above list are not underlined due to the reduction in print which would make them difficult to read.



Fig. 5. Bend along the Mississippi River as seen from the top of Fountain Bluff. Photo by Dave E. Mueller.

Fountain Bluff Endangered and Threatened Species

Fountain Bluff is home to several species considered endangered or threatened in the state of Illinois (Natural Land Institute, 1981). They are:

Berberis canadensis	Lilium superbum
Carex nigromarginata	Panax quinquefolius
Carya pallida	Panicum nitidum
Hexalectris spicata	Paspalum bushii
Hydrastis canadensis	

Other rare taxa for southern Illinois that have been found at Fountain Bluff are Lycopodium lucidulum, Asplenium Xebenoides, Carex swanii, Tradescantia subaspera var. montana (only Illinois location; nearest known station is in West Virginia), Allium tricoccum, Iris cristata, Spiranthes ovalis, Aristolochia tomentosa, Draba reptans, Geum virginianum, Xanthoxylum americanum, Viola cucullata, Lonicera dioica var. glaucescens (only Illinois location), and Melothria pendula.

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ILLINOIS THREATENED & ENDANGERED PLANTS:
BISHOP'S-WEEDS OF THE GENUS
Ptilimnium (APIACEAE) IN ILLINOIS

Robert H. Mohlenbrock¹

In the first and second editions of Jones' Flora of Illinois (1945; 1950), two species of the umbelliferous genus Ptilimnium were reported from Illinois. Both P. capillaceum and P. nuttallii were listed as rare in swamps and swampy ground in southern Illinois.

When Jones, et al. (1955) were preparing their book of distribution maps of Illinois plants, they apparently wished to review the status of this genus in Illinois. Accordingly, Mr. Harry Ahles, Jones' assistant, contacted me in 1954 while I was a graduate student at Southern Illinois University and asked me if I would collect Ptilimnium capillaceum from a previous collection site of this species around Campbell Lakes, near Elkhville, Jackson County.

I went to Campbell Lakes and, while exploring in marshy terrain, found several specimens of Ptilimnium, all apparently of the same species. Much to my surprise, they keyed out to Ptilimnium costatum, a species not attributed to Illinois. They were not Ptilimnium capillaceum!! When I reported this to Ahles, he and I undertook a close check of all the Ptilimnium capillaceum specimens deposited at the University of Illinois, Illinois State Museum, the Illinois Natural History Survey, and Southern Illinois University. All proved to be Ptilimnium costatum. In addition, a few specimens previously identified and filed as Carum carvi were also P. costatum.

I spent the summer of 1954 trying to relocate all previous Illinois stations for both Ptilimnium capillaceum and P. nuttallii. Authentic P. capillaceum could not be found, nor has it been discovered in Illinois to this date. It has been stricken from the Illinois flora.

Ptilimnium costatum was discovered in Union County (LaRue Swamp)

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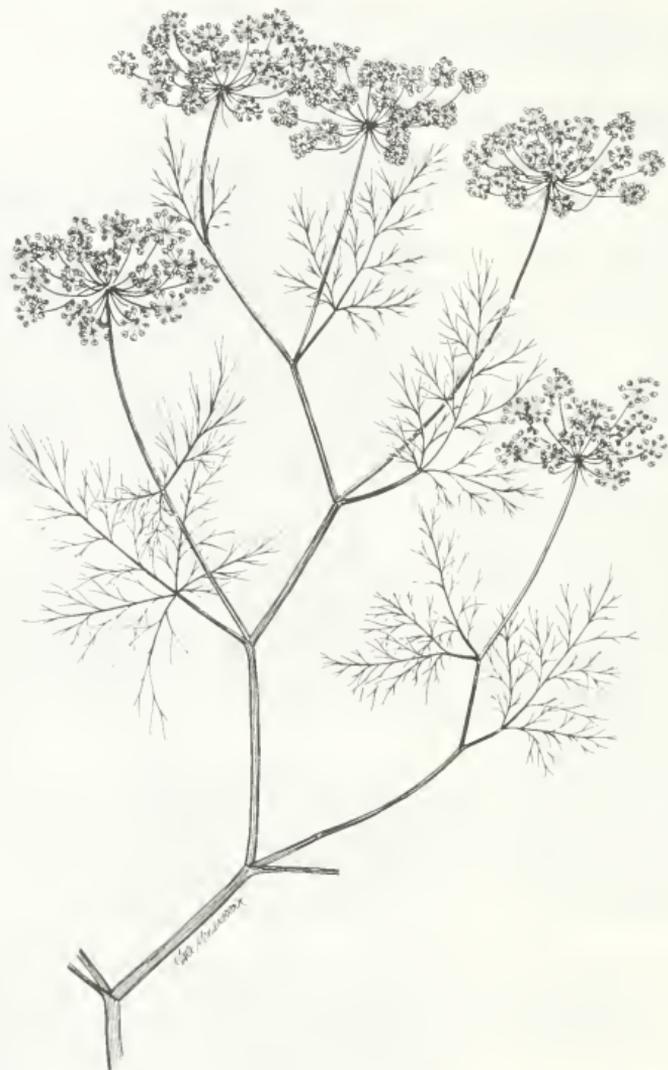


Fig. 1. Bishop's-weed, Ptilimnium costatum. Illustration by Mark W. Mohlenbrock.

and Massac County (near Mermet), as well as at several Jackson County locations (Campbell Lakes and near Howardton). The Pulaski County site, based on a collection by Fricke, without locality or date, was not rediscovered.

As for Ptilimnium nuttallii, I was unable to relocate any of the prior sites in Jackson, Pulaski, Randolph, and St. Clair counties, even though the Jackson and Randolph collections were made as recently as 1950. The species was relocated in the LaRue Swamp of Union County, where it still occurs.

For anyone interested in trying to find Ptilimnium costatum, P. nuttallii, or P. capillaceum, the following key is provided:

1. Bracts at base of umbel branches 3-parted-----P. capillaceum
1. Bracts at base of umbel branches entire-----2
2. Leaflets whorled; fruits about 3.0 mm long-----P. costatum
2. Leaflets opposite or alternate; fruits about 1.5 mm long---
-----P. nuttallii

Look for these white-flowered umbelliferous plants that grow 3-4 feet tall in marshy ground, around ponds, at the edges of swamps, or in roadside ditches during July and August.

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NOMENCLATRURAL EQUIVALENCIES IN THE ILLINOIS FLORA II. Dicots (Part 1)

Robert H. Mohlenbrock¹

In Erigenia 3 (1983), I published the first of a series of articles equating the scientific names used in my Guide to the Vascular Flora of Illinois (1975) with two recent publications (Kartesz & Kartesz, 1980; United States Department of Agriculture, 1982) that are intended to standardize the nomenclature of the flowering plants of the United States. The first article in this series covered the monocots, while this article deals with a portion of the dicots.

Many nomenclatural changes for plants in the Illinois flora were suggested by both of these recent works as a result of more recent systematic treatment of various plant groups. Not only are there substantial changes from the nomenclature used in 1975 in the Guide to the Vascular Flora of Illinois, the two more recent works differ considerably from each other. I am making no effort in this article to evaluate the merits of these two works.

In this article, I am presenting the nomenclatural changes between my 1975 guide and the two later checklists. In the format below, Column I lists the nomenclature used in my Guide to the Vascular Flora of Illinois; Column II lists the nomenclature accepted by Kartesz & Kartesz (1980); Column III enumerates the nomenclature recognized by the United States Department of Agriculture (1982).

In the listings below, if there is a blank in either columns II or III, it indicates that the nomenclature used in that work is identical with the one used in Guide to the Vascular Flora of Illinois. If the term synonym appears in column I, it means that the taxon in either or both columns II and III was considered synonymous and therefore not recognized as valid in the Guide to the Vascular Flora of Illinois.

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I	II	III
<u>Quercus pagodaefolia</u> (Ell.) Ashe	<u>Q. pagoda</u> Raf.	<u>Q. falcata</u> Michx. var. <u>pagodaefolia</u> Ell.
<u>Quercus Xhillii</u> Trelease	<u>Q. Xschuettei</u> Trelease	<u>Q. Xschuettei</u> Trelease
<u>Quercus Xfallax</u> E. J. Palmer	<u>Q. Xdeamii</u> Trel.	<u>Q. Xdeamii</u> Trel.
<u>Quercus prinus</u> L.	<u>Q. montana</u> Willd.	
<u>Morus alba</u> L. var. <u>tatarica</u> (L.) Loudon	<u>M. alba</u> L.	<u>M. alba</u> L.
<u>Pilea opaca</u> (Lunell) Rydb.	<u>P. fontana</u> (Lunell) Rydb.	<u>P. fontana</u> (Lunell) Rydb.
<u>Comandra richardsoniana</u> Fern.	<u>C. umbellata</u> (L.) Nutt.	<u>C. umbellata</u> (L.) Nutt.
<u>Phoradendron flavescens</u> (Pursh) Nutt.	<u>P. serotinum</u> (Raf.) M.C. Johnston	
<u>Aristolochia serpentaria</u> L. var. <u>hastata</u> (Nutt.) Duchartre	<u>A. serpentaria</u> L.	<u>A. serpentaria</u> L.
<u>Brunnichia cirrhosa</u> Banks	<u>B. ovata</u> (Walt.) Shimmers	
<u>Rumex maritimus</u> L. var. <u>fueginus</u> (Phil.) Dusen		<u>R. fueginus</u> Phil.
<u>Rumex mexicanus</u> Meisn.	<u>R. triangulivalvis</u> (Danser) Rech. f.	<u>R. triangulivalvis</u> (Danser) Rech. f.

I

II

III

Polygonum cristatum Engelm.
& Gray

P. scandens L. var. cristatum P. scandens L. var. cristatum
(Engelm. & Gray) Gleason (Engelm. & Gray) Gleason

Polygonum aviculare L. var.
littorale (Link) W.D.J.
Koch

P. buxiforme Small

Polygonum prolificum (Small)
Robins.

P. ramosissimum Michx. var.
prolificum Small

Polygonum exsertum Small

P. ramosissimum Michx.

Polygonum coccineum Muhl.

P. amphibia L. var. emer-
sum Michx.

P. amphibia L. var. emer-
sum Michx.

Polygonum longistylum Small

P. pensylvanicum L.

Polygonum scabrum Moench

P. lapathifolium L.

Salsola kali L. var. tenui-
folia Tausch

S. iberica Sennen & Pau

Chenopodium ambrosioides L.
var. antheiminticum (L.)
Gray

C. ambrosioides L.

Amaranthus graecizans L.

A. blitoides S. Wats.

I

Amaranthus torreyi (Gray)
Benth.

Amaranthus ambigens Standl.

Amaranthus tamariscinus Nutt.

Cerastium vulgatum L.

Cerastium velutinum Raf.

Cerastium tetrandrum Curtis

Cerastium viscosum L.

Cerastium brachypodium
(Engelm.) B.L. Robins.

Arenaria stricta Michx.

Arenaria patula Michx.

Arenaria lateriflora L.

Tunica saxifraga (L.)
Scop.

II

A. bigelovii Uline & Bray

A. tuberculatus (Moq.) Sauer

A. rudis Sauer

C. fontanum Baumg. ssp. trivialis (Link) Jalas

C. arvense L.

C. diffusum Pers.

C. glomeratum Thuill.

C. nutans Raf. var. brachypodium Engelm.

Minuartia michauxii (Fern.)
Farw.

Minuartia patula (Michx.)
Mattf.

Moehringia lateriflora (L.)
Fenzl

Petrorhagia saxifraga (L.)
Link

III

A. tuberculatus (Moq.) Sauer

A. rudis Sauer

C. arvense L.

Minuartia michauxii (Fern.)
Farw.

Minuartia patula (Michx.)
Mattf.

?

Petrorhagia saxifraga (L.)
Link

I

Lychnis alba L.Lychnis dioica L.Silene cucubalus WibelSaponaria vaccaria L.Ceratophyllum echinatum
GrayNymphaea tuberosa PaineRanunculus trichophyllus
ChaixRanunculus longirostris
Godr.Ranunculus abortivus L.
var. acrolasius Fern.Ranunculus hispidus Michx.
var. marilandicus (Poir.)
L. BensonRanunculus septentrionalis
Poir. var. caricetorum
(Greene) Fern.

II

Silene alba (P. Mill.)
KrauseSilene dioica (L.) Clairv.S. vulgaris (Moench) GarckeVaccaria pyramidata Medic.C. muricatum Cham.N. odorata Ait.R. aquatilis L. var. capil-
laceus (Thuill.) DC.R. longirostre Godr.R. abortivus L.R. hispidus Michx. var.
falsus Fern.R. septentrionalis Poir.

III

S. pratensis (Raf.) Gren.
& Godr.Silene dioica (L.) Clairv.S. vulgaris (Moench) GarckeVaccaria pyramidata Medic.C. muricatum Cham.R. abortivus L. ssp. acro-
lasius (Fern.) KapoorR. septentrionalis Poir.

I

Delphinium ajacis L.Thalictrum dasycarpum Fisch.
& Lall. var. hypoglaucum
(Rydb.) BoivinIsopyrum biternatum (Raf.)
Torr. & GrayAnemone thalictroides
(L.) SpachAnemone patens L.Clematis dioscoreifolia
Levl. & VaniotLindera benzoin (L.) Blume
var. pubescens (Palmer
& Steyererm.) Rehd.Sassafras albidum (Nutt.)
Nees var. molle (Raf.)
Fern.Corydalis halei (Small)
Fern. & Schub.

II

Consolida ambigua (L.) Ball
& HeywoodThalictrum thalictroides
(L.) Eames & BoivinPulsatilla patens (L.) P.
Mill. ssp. multifida
(Pritz.) ZamelC. terniflora DC.Lindera benzoin (L.) BlumeS. albidum (Nutt.) NeesC. micrantha (Engelm.) Gray
ssp. australis (Chapman)
G.B. Ownbey

III

Consolida ambigua (L.) Ball
& HeywoodT. dasycarpum Fisch. & Lall.Ememion biternatum Raf.Thalictrum thalictroides
(L.) Eames & BoivinPulsatilla patens (L.) P.
Mill. ssp. multifida
(Pritz.) ZamelC. terniflora DC.L. benzoin (L.) BlumeS. albidum (Nutt.) NeesC. micrantha (Engelm.) Gray
ssp. australis (Chapman)
G.B. Ownbey

- Corydalis campestris (Britt.) C. micrantha (Engelm.) Gray
Buchholz & Palmer ssp. australis (Chapman)
G.B. Ownbey
- Corydalis montana (Engelm.) C. aurea Willd. ssp. occidentalalis (Engelm.) G.B. Ownbey
Gray
- Cruciferae
- Cakile edentula (Bigel.) C. edentula (Bigel.) Hook.
Hook. var. lacustris (Fern.)
Holten
- Eruca sativa Mill. E. vesicaria (L.) Cav. ssp.
sativa (P. Mill.) Thellung
- Descurainia pinnata (Walt.) D. pinnata (Walt.) Britt.
Britt. var. brachycarpa (Richards.) ssp. brachycarpa (Richards.)
(Richards.) Fern. Detling
- Draba verna L. Erophila verna (L.) Chev.
- Draba verna L. var. boerhaavii Van Hall Erophila verna (L.) Chev. ssp. D. verna L. var. aestivalis
Walters
- Draba reptans (Lam.) Fern. ssp. D. reptans (Lam.) Fern. var.
var. micrantha (Nutt.) stellifera (O.E. Schulz) stellifera (O.E. Schulz)
Fern. Abrams Hitchc.
- Armoracia lapathifolia A. rusticana (Lam.) Gaertn., A. rusticana (Lam.) Gaertn.,
Gilib. Mey. & Scherb. Mey. & Scherb.

I

II

III

- Alliaria officinalis Andrz. A. petiolata (Bieb.) Cavara & Grande
- Brassica hirta Moench Sinapis alba L. Sinapis alba L.
- Brassica kaber (DC.) L.C. Sinapis arvensis L. Sinapis arvensis L.
Wheeler var. pinnatifida
(Stokes) L.C. Wheeler
- Brassica kaber (DC.) L.C. Sinapis arvensis L. Sinapis arvensis L.
Wheeler var. schkuhriana
(Reichenb.) L.C. Wheeler
- Brassica rapa L. B. rapa L. ssp. olifera DC. R. palustris (L.) Bess.
- Rorippa islandica (Oeder) Borbas R. palustris (L.) Bess. R. palustris (L.) Bess.
- Rorippa islandica (Oeder) Borbas var. fernaldiana Butt. & Abbe R. palustris (L.) Bess. ssp. glabra (O.E. Schulz) R. Stuckey
- Rorippa islandica (Oeder) Borbas var. hispida (Desv.) Butt. & Abbe R. palustris (L.) Bess. ssp. hispida (Desv.) Jonsell
- Ribes sativum (Reichenb.) Syme R. rubrum L. var. alaskanum (Berger) Boivin
- Heuchera parviflora Bartl. H. parviflora Bartl. H. parviflora Bartl.
rugelii (Shuttlew.) Rosend., Butt. & Lackey

I

Prunus americana Marsh. var. P. nigra Ait.
lanata Sudw.

Prunus susquehannae Willd.

Amelanchier interior Nielsen

Amelanchier laevis Wieg.

Amelanchier humilis Wieg.

Malus coronaria (L.) Mill.
var. lancifolia Rehder

Crataegus cuneiformis
(Marsh.) Eggelest.

Synonym of C. cuneiformis
(Marsh.) Eggelest.

Crataegus margaretta Ashe

Crataegus collina Chapm.

Synonym of C. collina Chapm.

II

P. nigra Ait.

P. pumila L. var. susquehannae (Willd.) Jaeger

A. Xwiegandii Nielsen

A. arborea (Michx. f.)
Fern. var. laevis (Wieg.)
Ahles

M. coronaria (L.) Mill.
var. dasycalyx Rehder

C. disperma Ashe

C. pratensis Sarg.

C. punctata (Ashe) E.J.
Palmer

C. Xlettermanii Sarg.

III

P. nigra Ait.

P. pumila L. var. susquehannae (Willd.) Jaeger

A. Xwiegandii Nielsen

A. arborea (Michx. f.)
Fern. var. laevis (Wieg.)
Ahles

A. sanguinea (Pursh) DC.

?

C. disperma Ashe

?

C. chrysocarpa E.J. Palmer

C. punctata (Ashe) E.J.
Palmer

C. Xlettermanii Sarg.

I	II	III
<u>Crataegus hannibalensis</u> E.J. Palmer	<u>C. crus-galli</u> L.	<u>C. crus-galli</u> L.
<u>Crataegus engelmannii</u> Sarg.		<u>C. berberifolia</u> Torr. & Gray
<u>Crataegus fecunda</u> Sarg.		<u>C. berberifolia</u> Torr. & Gray
<u>Crataegus acutifolia</u> Sarg.	<u>C. crus-galli</u> L.	<u>C. crus-galli</u> L.
<u>Crataegus permixta</u> Palmer	<u>C. crus-galli</u> L.	<u>C. crus-galli</u> L.
Synonym of <u>C. calpodendron</u> (Ehrh.) Medic.	<u>C. Xwhittakeri</u> Sarg.	<u>C. Xwhittakeri</u> Sarg.
Synonym of <u>C. calpodendron</u> (Ehrh.) Medic.	<u>C. chrysoarpa</u> Ashe	<u>C. chrysoarpa</u> Ashe
<u>Crataegus neobushii</u> Sarg.	<u>C. intricata</u> Lange	<u>C. intricata</u> Lange
Synonym of <u>C. viridis</u> L.	<u>C. ovata</u> Sarg.	?
<u>Crataegus faxonii</u> Sarg.		<u>C. chrysoarpa</u> Ashe
<u>Crataegus tortilis</u> Ashe	<u>C. schuettei</u> Ashe	<u>C. coccinea</u> L.
Synonym of <u>C. pruinosa</u> (Wendl.) K. Koch	<u>C. dissona</u> Sarg.	?
<u>Crataegus holmesiana</u> Ashe		<u>C. coccinea</u> L.
Synonym of <u>C. holmesiana</u> Ashe	<u>C. biltmoreana</u> Beadle	<u>C. intricata</u> Lange

III

II

I

- Synonym of C. holmesiana Ashe C. intricata Lange
- Crataegus pedicellata Sarg.
- Crataegus pringlei Sarg.
- Crataegus corusca Sarg.
- Crataegus macrosperma Ashe
- Rubus procerus P.J. Muell. R. discolor Weihe & Nees
- Rubus occidentalis Bailey R. roribaccus (Bailey) Rydb. R. roribaccus (Bailey) Rydb.
- Synonym of R. flagellaris Willd. R. baileyanus Britt. R. baileyanus Britt.
- Synonym of R. enslenii Tratt. R. mundus Bailey R. mundus Bailey
- Rubus schneideri Bailey R. missouricus Bailey R. missouricus Bailey
- Synonym of R. schneideri Bailey R. wheeleri Bailey R. wheeleri Bailey
- Synonym of R. argutus Link R. blakei Bailey R. blakei Bailey
- Synonym of R. argutus Link R. abactus Bailey R. abactus Bailey
- Synonym of R. argutus Link R. virilis Bailey ?
- Synonym of R. argutus Link R. ostryifolius Rydb. R. ostryifolius Rydb.

C. coccinea L.C. coccinea L.C. coccinea L.C. Xanomala Sarg.C. flabellata (Bosc) K. Koch

I

II

III

- Rubus avipes Bailey R. pergratus Blanch. R. pergratus Blanch.
- Synonym of R. pensylvanicus R. recurvans Blanch. R. recurvans Blanch.
Poir.
- Synonym of R. pensylvanicus R. bellobatus Bailey R. bellobatus Bailey
Poir.
- Rosa pimpinellifolia L. R. spinosissima L. R. spinosissima L.
- Rosa lunellii Greene R. arkansana Porter var. R. arkansana Porter
suffulta (Greene) Cockerell
- Rosa suffulta Greene R. arkansana Porter var. R. arkansana Porter
suffulta (Greene) Cockerell
- Potentilla millegrana Engelm. P. rivalis Nutt.
- Fragaria americana (Porter) F. vesca L. ssp. americana F. vesca L. ssp. americana
Britt. (Porter) Staudt (Porter) Staudt
- Gillenia stipulata (Muhl.) Porteranthus stipulatus Porteranthus stipulatus
Baill. (Muhl.) Britt. (Muhl.) Britt.
- Geum strictum Ait. G. allepicum Jacq. G. allepicum Jacq.

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A GUIDE TO THE GOLDENRODS OF ILLINOIS¹

Robert H. Mohlenbrock²

Probably no group of flowering plants in the midwest is brought to mind more quickly by the mention of autumn than goldenrods. The yellow displayed by goldenrods can be seen in fields, in prairies, in dry, rocky woods, in rich forested ravines, along backroads, and even around marshes and swamps.

Goldenrods sometimes evoke distasteful thoughts. The coarse growth form of some of them and their tendency to invade old fields and roadsides give them a weedy reputation, but every goldenrod in Illinois except for one rarely encountered species is native to the state. Many people blame goldenrods for their hayfever in autumn, but this again is a bad rap. Goldenrods are mostly self-pollinated, which means that there is a minimal chance for pollen to escape from the flowers to be blown about by the wind. The reason for goldenrod's bad reputation as a hayfever plant is that it blooms at the same time as the notorious ragweeds. Since the flowers of the ragweeds are inconspicuous, one has the tendency, when hayfever strikes, to look outside, note the showy goldenrods in flower, and lay the blame on these plants.

Goldenrods are placed in the genus Solidago and are members of the aster family. The latin name for the genus means "to make solid," or "to make whole," alluding to the medicinal properties attributed to some of the species. There are more than 100 different kinds of goldenrods in the world, with most of them native to the eastern United States. Thirty-two different ones have been found in Illinois.

Botanists and other wildflower enthusiasts often shudder at the thought of trying to identify a goldenrod to the species level. I must admit that some of them are difficult to identify. This

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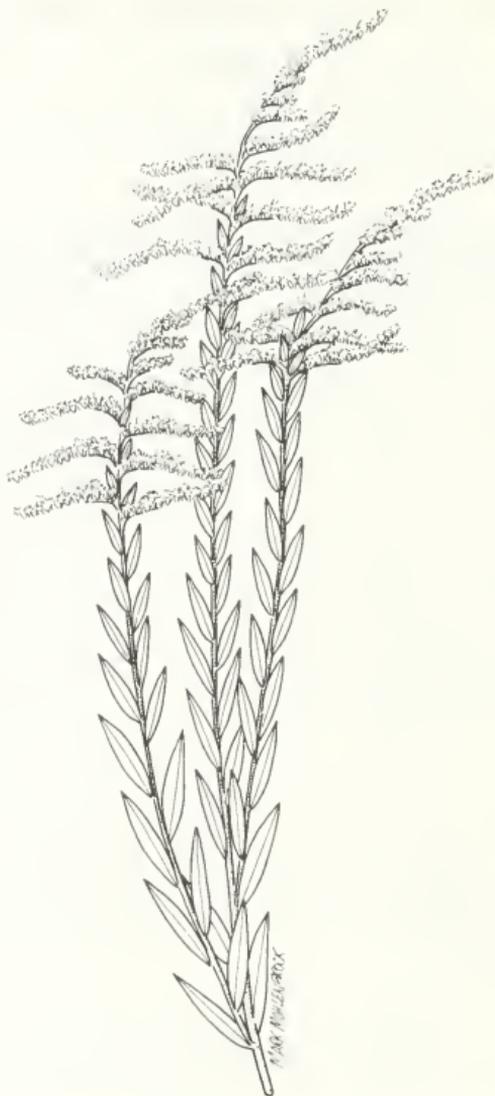


Fig. 1. *Solidago canadensis* var. *hageri*. Illustration by Mark W. Mohlenbroek

is due in part to the fact that several species of goldenrods are known to hybridize, and intermediate forms are not uncommon to find in Illinois. A second fact is that some of the species are not clearly defined, and there is intergradation among closely related species.

Most goldenrods, however, can be identified, if careful observations are made of the arrangement of the flower clusters, the degree of hairiness of both the upper and lower parts of the stem, and of the nature of the leaves, particularly those that occur near the base of the stem. In some of the species more difficult to recognize, it may be necessary to examine the characteristics of the fruit.

Each individual goldenrod head, which to many looks like a miniature yellow daisy, is actually a small group of crowded flowers. Each of the little structures which appears to be a petal is considered to be a separate flower, known as a ray flower. If it were to be examined closely, it would be seen to have a slender pistil at its base, indicating that it is a pistillate flower. The ray flowers do not form pollen-producing stamens.

The few ray flowers in a head surround a tiny central area known as the disk. The disk is of a similar yellow color and is made up of a few flowers of a different shape, called the disk flowers. These disk flowers do not have a conspicuous yellow petal-like ray; instead, each disk flower is a tiny tubular structure at the base of which are stamens and a pistil. Because of this, the disk flowers are said to be perfect.

On the outside of each little head, near the base, is a series of narrow greenish structures called bracts. There are several of them, and they are crowded together in two or three rows. It is sometimes necessary to examine the nature of these bracts during the identification process.

Many heads are arranged together in goldenrods, usually resulting in a showy mass of flowers. Sometimes these masses of yellow heads are arranged in elongated sprays, known as racemes or panicles, and are formed at the upper end of the plant. Other species of goldenrods have their flowering heads arranged in a rounded or flat-topped cluster. Still others have small groups of flowers borne near the base of the leaves.

The fruit that develops from each pistil is small, slender, dark

hard, and either smooth or hairy. It is known as an achene. Attached to its upper tip is a small tuft of soft, white bristles, the pappus, which enables the seed to be air-borne by wind currents.

Let us discuss first the goldenrods whose heads are arranged in broadly rounded, or flat-topped, clusters. These may be further subdivided into two types, those with slender, narrow leaves rarely more than one-half inch broad, and those with leaves mostly broader than one-half inch. There are four species of round-topped, very narrow-leaved species.

One of them, Solidago ptarmicoides, has white flowers and is the subject of debate among botanists, some of whom classify it as an Aster. It does, in fact, have some features that are aster-like, and some that are goldenrod-like. Today the general consensus is that it is a goldenrod, and that is how I treat it. It lives in dry, sandy soil and has only been found in the northern half of the state.

The other three species of goldenrods with very narrow leaves and rounded flower clusters have yellow flowers and are known as grass-leaved goldenrods. Their narrow leaves give them a slender appearance, and they do not remind most people of good typical goldenrods. In fact, they do differ in several characteristics from other goldenrods, and some botanists have actually segregated them into their own genus Euthamia. In my new Guide to the Vascular Flora of Illinois, to be released by the Southern Illinois University Press next April, I do indeed recognize Euthamia, and attribute three species to it in Illinois. One is Euthamia graminifolia, a species found in moist soil throughout Illinois. It differs from the other two Euthamias in that its leaves have 3 or 5 veins.

The other two grass-leaved goldenrods, which have only one main vein per leaf, are much less common in the state. Euthamia tenuifolia is found mostly in sandy soil along Lake Michigan. Each individual flower head is less than one-fourth inch high. The other Euthamia, E. gymnospermoides, also grows in sandy soil, but it is more widespread in the central and northern counties of the state. Its flower heads measure more than one-fourth inch tall.

There are three round-topped species that still are kept in the genus Solidago. Solidago rigida, the rigid goldenrod, differs from the others by its middle and upper leaves that are usually

nearly as broad as long and as rough as sandpaper to the touch. This is a common inhabitant of prairies, and is found throughout Illinois except for the southernmost tip. Riddell's goldenrod, Solidago riddellii, is an interesting species in that its long, narrow leaves are usually folded together lengthwise. In addition, there is not a trace of any teeth on the edges of the leaves. It is found in moist soil mostly in the northern half of Illinois, although it also occurs today in Macoupin County, and at one time it was found in St. Clair and Wabash counties. Somewhat similar is Solidago ohioensis, the Ohio goldenrod, but its slender leaves are not folded together lengthwise, and there usually are a few tiny teeth along the edges of the leaves. This species is confined to moist soil around Chicago and Peoria.

The remaining 25 kinds of goldenrods have their flower heads either in elongated clusters or nestled at the base of the leaves. These can also be divided immediately into two groups. One of these groups has the flower heads in elongated, arching or drooping clusters with the heads all on one side of the branches. The other group has the flower heads either in upright elongated clusters or in small groups in the axils of the leaves.

The goldenrods with the elongated, arching or drooping clusters are the ones probably most familiar to Illinoisans and are likely to be the stereotypes for goldenrods. These species are the ones usually observed because they are common in fields, in woods, and along roads.

One of those with nodding flower clusters is not native in Illinois but was found growing once in the Chicago area. It is the seaside goldenrod, Solidago sempervirens, and differs from all the rest by its rather fleshy leaves. Another easy species to recognize is Solidago sphacelata, which has heart-shaped basal leaves. Illinoisans will have to go to the river bluffs along the Ohio River in Pope and Hardin counties to see this lovely species, because that is the only place it grows in the state.

For the remainder of the nodding goldenrods, it is necessary when you see the plants to observe whether the lowermost leaves are larger or smaller than the leaves on the middle part of the stem. If the lower leaves are the larger, then we are dealing with one of the following goldenrods in Illinois: Solidago nemoralis, S. patula, S. juncea, S. missouriensis, S. arguta, S. boottii, S. strigosa, S. neurolepis, and S. ulmifolia. In the first four of these, the lower leaves gradually taper into the petiole. Of

these, Solidago nemoralis, the field goldenrod, has its stems and leaves completely covered with very short, grayish hairs. This is one of the most common goldenrods in Illinois, and will be one of the most frequently encountered whether you are in fields, dry woods, or simply driving along country lanes. Solidago patula, the spreading goldenrod, usually has hairs on only the lower part of the stem, but its best identifying feature is its sandpapery leaves. This species grows in very wet soils, and even in marshes, in almost all of Illinois except the northwestern counties.

Solidago juncea and S. missouriensis are similar in having smooth leaves and stems, but the leaves of S. juncea usually have only one main vein, while the leaves of S. missouriensis have 3 strong veins. Solidago juncea is called the early goldenrod, because it is usually the first goldenrod to bloom in Illinois, sometimes as early as Memorial Day. It is found in fields, in woods, and along roads throughout the state. Solidago missouriensis is a species of prairies and dry open woods found throughout all of Illinois.

The five species of goldenrods in Illinois which have large basal leaves that are abruptly narrowed to the petioles are probably the most difficult of all goldenrods to distinguish in the state. The first thing to do is to check the mature achenes. If they do not have hairs, the plant is Solidago arguta, a species confined to dry, rocky woods in Jackson and Union counties. Check next to see if there is a rosette of leaves around the base of the plant. If there is no basal rosette, the plant is the common statewide woodland elm-leaved goldenrod, Solidago ulmifolia. Of the three goldenrods with basal rosettes, Boott's goldenrod, Solidago boottii, lacks elongated hairs on the veins of the lower leaf surface. Boott's goldenrod is known only from cherty wooded slopes in Union County. The remaining species, Solidago neurolepis and S. strigosa, have hairy veins and are rare species that grow in dry, rocky woods in Jackson and Union counties. The former species has tiny achenes less than 1/10 inch long, while the achenes of S. strigosa are more than 1/10 inch long.

There are five Illinois goldenrods that have arching or nodding clusters of flowers and leaves on the mid-part of the stem larger than those at the base of the stem. The rough-leaved goldenrod, Solidago rugosa, is the only one of these five that does not have three conspicuous veins on its larger leaves; its leaves only have a single main vein. The rough-leaved goldenrod is confined to the southern half of the state where it grows in moist soil.

Next check to see if the stems below the flower cluster are hairy. If the stems are smooth, the plant is Solidago gigantea, the late goldenrod. This species grows in moist soil throughout all of Illinois. We are now down to three species--Solidago altissima, S. drummondii, and S. radula. Solidago altissima, the tall goldenrod, probably the most common goldenrod in the state, has relatively narrow leaves, most of them more than four times longer than broad. The other two have broader leaves. Drummond's goldenrod, Solidago drummondii, grows only on exposed limestone bluffs along the Illinois and Mississippi rivers. Most of its leaves have distinct petioles. None of the leaves on the middle part of the stem of S. radula has a leaf stalk. This species occurs in dry open woods in some of the western and southern counties of the state.

Let us now discuss the nine species of Illinois goldenrods that have upright flower clusters and/or flower clusters confined to the axils of the leaves. Again we must check to see if the leaves near the base of the plant are larger or smaller than the leaves at the mid-part of the stem. Of those species with the lower leaves the larger, Solidago uliginosa, the swamp goldenrod, is very distinctive because of its long, narrow leaves that are at least five times longer than broad. This species of swamps and bogs is confined to the northern half of the state.

The most unique of this group of species is the silverrod, Solidago bicolor, whose flowers are silver or cream colored, rather than yellow. It is a species of dry open woods. It has been found from one end of the state to the other, but it is not a common plant. To distinguish Solidago sciaphila, S. hispida, and S. speciosa, first check the achenes. If they are not hairy, the goldenrod is Solidago sciaphila, a rare species confined to limestone cliffs in Carroll, JoDaviess, LaSalle, and Ogle counties. Solidago hispida and S. speciosa, both species with hairy achenes, differ by the hairy stems of S. hispida and the nearly smooth stems of S. speciosa. Solidago hispida, the hispid goldenrod, is found in dry, open woods in Jackson, Union, and Alexander counties. Solidago speciosa, the showy goldenrod, lives in woods and prairies throughout the state.

We are left with the four species of goldenrods that have axillary clusters of flowers and whose lower leaves are smaller than the middle leaves. Woodland goldenrod, Solidago caesia, and broad-leaved goldenrod, S. flexicaulis, species with smooth stems and hairy achenes, both live in moist, shaded woodlands and are found

in most parts of Illinois. The woodland goldenrod has narrow leaves essentially without petioles, while the broadleaved goldenrod has broad leaves that have well developed petioles. Solidago buckleyi and S. petiolaris have hairy stems and smooth achenes. They both live in dry, open woods and only in the southern one-fourth of the state. Buckley's goldenrod has relatively thin, sharply toothed leaves, while the leaves of S. petiolaris are thicker and have few teeth.

Autumn is the season for goldenrods. Next time you are out, try your hand at identifying them. You will soon find that they don't all look alike.

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Manuscripts pertaining to the native flora of Illinois, natural areas, gardening with native plants and related topics are accepted for publication. The author shall be required to cover publication costs, if financially able, by remitting \$5.00 per page of manuscript (including illustration and map pages). Manuscripts should be typed single-spaced with 1 3/4 inch top and bottom margins and 1 1/2 inch side margins. Title pages should have 2 1/4 inch top margins. Paragraphs should be double-spaced. Paragraphs are not to be indented. Pages are to be numbered, but in pencil only. Tables and figures should be numbered consecutively and an indication should be made as to where the author would like them placed. Either "Literature Cited" or "References" may be used. Use of the Harvard style for citing literature is recommended. If at all possible, please use an IBM Selectric typewriter and indicate which element was used as the editor can correct the copy much easier this way. Illustrations and maps are printed up to a maximum size of 5-by-7 inches. Four-by-five inch glossy black and white photos are also accepted. Cost of each photo to author is \$7.50. The original manuscript and one copy must be included. Title and author's name should be typed on the first page of the manuscript in a manner found in ERIGENIA 2 or more recent issue. A one paragraph biographical sketch of the author must also accompany manuscripts submitted. Manuscripts are not returned to the author. If other materials such as photos or illustrations are requested to be returned, a self-addressed stamped envelope is required and should accompany the manuscript.

Five free reprints of articles submitted are provided to the author. Additional reprints may be ordered by the author at a charge (write to the editor for details and prices). ADDITIONAL REPRINTS MAY BE ORDERED ONLY AT THE TIME THE MANUSCRIPT IS SUBMITTED.

Each manuscript received by the editor will be sent out for review to one (or more) of the members of the editorial review board. Authors will be notified of any revisions judged necessary and will, if necessary, have the manuscripts returned for revision. The editorial staff reserves the right to reject any manuscript which does not comply to the above guidelines.

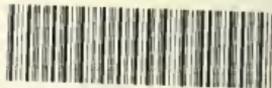
Contributors are also needed to submit book reviews to be published in the journal. Please inform the editor of the title wished to be reviewed prior to submitting it. Guidelines are the same as above except no biographical sketch is needed and the review should not exceed one page in length.

As a special service, floristic studies and related topics of areas in Illinois and the states which border Illinois will be accepted for publication. Guidelines are as those for above manuscripts except that plant lists are to be typed in double columns with 1/2 inch margins around the page. (Plant lists shall be printed in a slightly reduced form.)

Copy ready manuscripts and/or questions concerning publication should be sent to:

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Department of Botany and Microbiology
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Tempe, Arizona 85287

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