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Fig. 1.—A quiet pool in Bay Creek as it flows through the Bell Smith Springs Recreational Area.



# Some Unusual Natural Areas in Illinois

Robert A. Evers and Lawrence M. Page

This article has one main purpose: to acquaint interested persons with some unusual natural areas in Illinois. A natural area can be defined as an area of any size in which is found one or more rare species of plants or animals, an important biotic community, a significant natural landscape, or some prehistoric condition that has been scarcely, or not at all, disturbed by the activities of man. This definition permits the designation of certain localities in Illinois as natural areas although they may have been somewhat disturbed by man. Such areas can be called scientific areas as well as natural areas, because they are valuable for certain types of research.

Two centuries ago most of what is now Illinois was scarcely touched by man. By 1900, however, our state had lost much of its forest land and most of the once vast flatland prairie. The big game animals—buffalo, elk, cougar, and bear—could no longer be found in the state. The deer, beaver, and turkey were gone, but they have since been reintroduced. A small area east of Rantoul, Champaign County, was available as one of the last undisturbed flatland prairies of the state, but by 1915 it had been plowed. Illinois now has one sizable sample of flatland prairie—a part of the Goose Lake Nature Preserve—and remnants of varying sizes along railroads and fencerows. Not only the flatland, but other types of prairie have been destroyed. The large expanses of bottomland prairie, grasslands that occupied huge areas of the floodplains of our larger streams, have been plowed and cultivated. Only remnants, mostly along fencerows, remain. Most of the sand prairie has been converted into fields of grain or melons or transformed into Christmas-tree plantations or turkey farms. Prairies on the brow slopes of the valley walls of our large rivers—hill prairies—are the least disturbed of our prairies.

Our state and nation are experiencing a rapid rise in population and a concomitant need for more housing and homesites, more factory sites and shopping centers, and wider highways for swifter transportation. These place heavy demands upon land. As a consequence, many of our wetlands—swamps, marshes, and bogs—refuges for rare and unusual plants and homes or resting places of numerous birds, have been or are being drained. Hill prairies near metropol-

itan areas are being converted into homesites. Some of our remaining forest is being cut, and the land cultivated or used as homesites.

Although we are losing an important heritage—our natural areas—the rapidity of this loss has decelerated somewhat in the past few years.

In 1963 the General Assembly of the State of Illinois enacted legislation establishing an Illinois Nature Preserve System under the direction of the Illinois Nature Preserves Commission. The commission was organized in January 1964 and soon approved the south part of Illinois Beach State Park as the first natural area to become an official nature preserve in the system. Since that time many areas have been dedicated and more are being added to the system. Under the provisions of the law, any dedicated nature preserve cannot be removed from the system except by unanimous approval of the commission, the Director of the Illinois Department of Conservation, and the Governor of Illinois. Thus, natural areas have increased protection under this law if the areas are dedicated nature preserves.

Although natural or scientific areas are ordinarily places of beauty (Fig. 1), to the scientist they are much more than that. In such localities the biota—the community of plants and animals—lives in nearly undisturbed conditions. Here it is possible to study in natural surroundings a single species of plant or animal, or groups of plants or animals, or the relationships of both. It is in these places that the once abundant and now rare species can survive. In these refuges the biologist can study the soil flora and fauna and their relationships to other organisms, a field of study in which much remains to be done. Without these natural areas, protected from all types of "management," such research is impossible. To scientists and laymen natural or scientific areas are of great importance.

It is our hope that because of this report many citizens of Illinois will become conscious of the existence of our remaining natural areas and will obtain some knowledge of them. It is our further hope that this report may arouse a desire in some persons to visit these places, not to pick the flowers or kill the wildlife, but to enjoy the genuine natural beauty. (If a natural area is privately owned, permission to enter it should be obtained from the owner.) Many of us who are concerned about these areas hope that a sizable group of people will become interested and will help in the preservation of some

This paper is printed by authority of the State of Illinois, IRS Ch. 127, Par. 58.12. Dr. Robert A. Evers, until his retirement in March 1976, was Botanist, Section of Botany and Plant Pathology, and Dr. Lawrence M. Page is an Associate Taxonomist, Section of Faunistic Surveys and Insect Identification, Illinois Natural History Survey.

Cover Photograph.—The bluff northwest of Prairie du Rocher. Red cedar and prairie herbs occupy the brow slope.

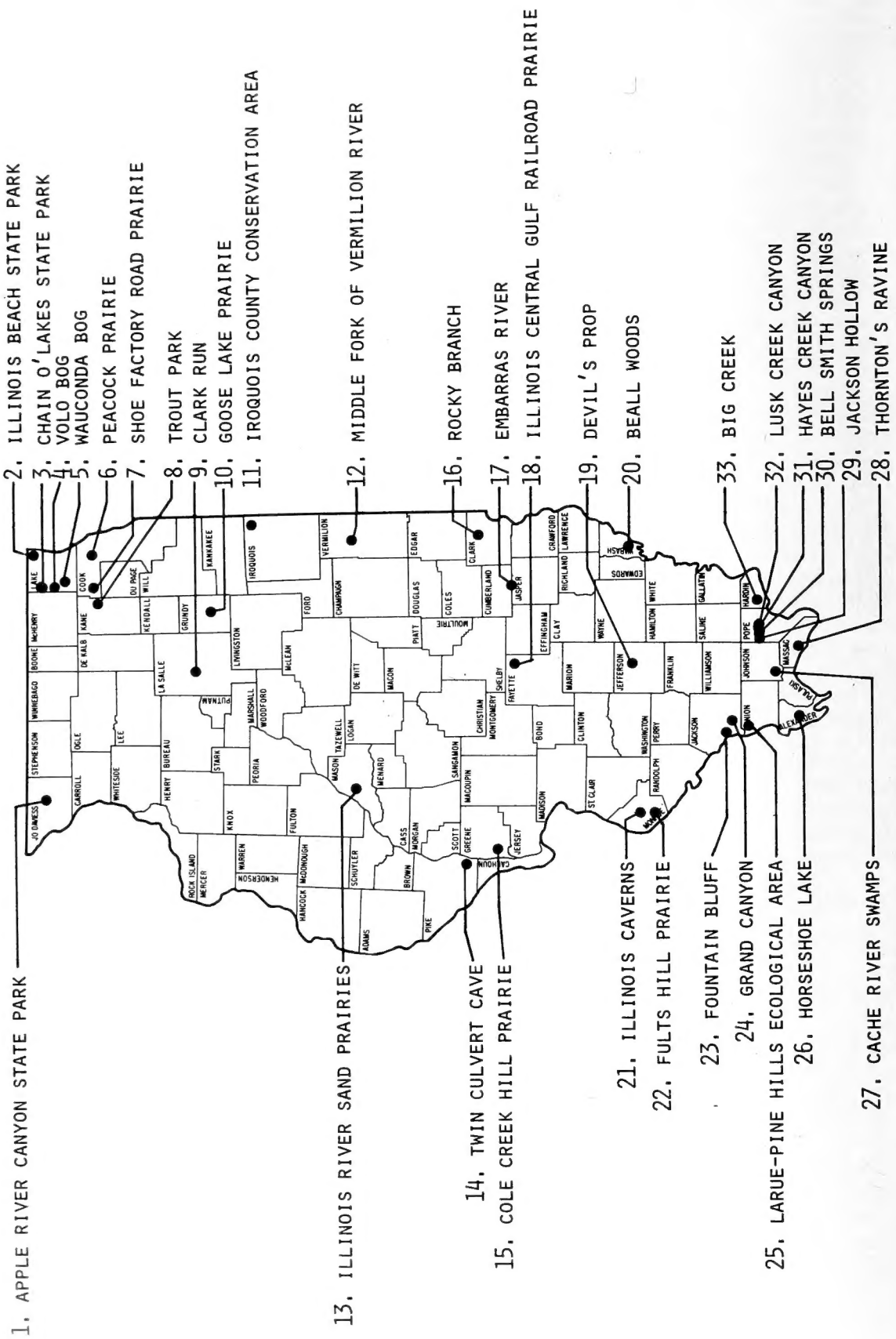


Fig. 2 — Map of Illinois showing locations of natural or scientific areas described in this report.

or all of these localities by supporting organizations that promote the preservation of natural areas and by supporting legislation that makes adequate preservation possible. We hope that Illinois citizens of the present and future generations may enjoy natural and scientific areas in their state.

The areas described in this report (Fig. 2) are not all of the nature preserves in the Illinois Nature Preserve System nor all of the areas owned or controlled by The Nature Conservancy or by other public or private institutions. For this report we have selected some of the natural areas described in a previous publication by Evers (1963); others are areas not described in that report but which have been or may be dedicated as nature preserves in the system.

Not included in the 1963 report but included here is information on the animal life in these areas. Information on the following groups of animals is mainly from the sources listed here: amphibians and reptiles, Smith (1961); fishes, Smith (1965 and 1971); mayflies, Burks (1953); leafhoppers, DeLong (1948); stoneflies, Frison (1935 and 1942); grasshoppers, Hebard (1934); pseudoscorpions, Hoff (1949); plant lice, Hottes & Frison (1931); butterflies, Irwin & Downey (1973); plant bugs, Knight (1941); caddisflies, Ross (1944); mosquitoes, Ross & Horsfall (1965); thrips, Stannard (1968); scorpionflies, Webb, Penny, & Marlin (1975); molluscs, Baker (1922 and 1939) and Parmalee (1967).

Information on the plants in these areas is mostly from the field notes and observations of the senior author as well as from five of his published reports (Evers 1950, 1951, 1955, 1961, and 1963). Other sources are cited in the text.

Common names are employed throughout this report except for plants and animals that have no recognized common names. Lists of the scientific equivalents for the common names are appended.

#### ACKNOWLEDGMENTS

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#### I. APPLE RIVER CANYON

Apple River Canyon, about 4 miles southeast of the village of Apple River, is partly included in a state park that lies in the south half of section 4, T. 28 N., R. 4 E., in Jo Daviess County. The canyon extends beyond the park limits into the northwest quarter of section 9, the east half of section 8, the north half of section 17, and the south half of the northeast quarter of section 18. The actual area of the park is small; much more of the canyon should be purchased and preserved.

Geologically this is a most interesting locality. The valley that trends from northwest to southeast widens southeastward. Another valley, which joins the first at a right angle and trends southwestward, is narrow and has high cliffs. Younger than the valley that trends southeastward, it is the valley through which Apple River flows from this area, not into it, as would be the usual condition.

Before the Illinoian glaciation, Apple River flowed from the northwest to the southeast and possibly continued to the east through a valley now partly occupied by Yellow Creek in Stephenson County. Such a flow would readily explain the wider valley to the southeast. The Illinoian ice front blocked the southeast outlet and impounded the water. The impounded water cut a new channel to the southwest. This channel drained the valley from the northwest and also drained the blocked valley to the southeast. Upon deglaciation, Apple River continued to use this channel to flow southwestward and to empty into the Mississippi River.

The canyon is in a driftless area, one of the unglaciated parts of Illinois. The rocks exposed along the canyon walls are Ordovician in age, about 400 million years old.

Apple River Canyon has a vegetation of deciduous forest with northern coniferous representatives, prairie remnants, and an interesting cliff flora. Among the coniferous representatives are white pine and Canada yew. The forest contains such deciduous trees as white oak, northern red oak, Hill's oak, basswood, hop hornbeam, and rock elm. Prairie is represented mostly by remnants along the roadsides near the park and by a few remnants of the dry prairie type on the ridges. Big bluestem, little bluestem, Indian grass, and sunflowers are reminders of a more widespread prairie. The rare bird's-eye primrose grows on some of the cliffs (Fig. 3). One cliff is so much adorned by this plant that it is known as "Primrose Cliff" (Pepoon 1917). This rare plant also grows on cliffs farther upstream



Fig. 3.—Apple River and the Primrose Cliff in Apple River Canyon State Park, Jo Daviess County. In early May the cliff is bedecked with many pinkish blossoms of bird's-eye primrose.

outside the park boundary. Studies of the plant life have been published by Boewe, Barrick, & Hague (1935) and by Fuller (1946), as well as by Pepoon. One of the bluffs in the canyon is of special interest,



Fig. 4.—Cliff swallow colony on the Apple River in Jo Daviess County.

as it is one of the few nesting sites of the cliff swallow (Fig. 4) in Illinois (Graber, Graber, & Kirk 1972: 25).

Although siltation and barnyard pollution are evident in Apple River, the river was rated good to excellent by Smith (1971:4), who cited as one of the most unusual animals in the area the Ozark minnow, a species mainly limited in distribution to streams of the Ozark Mountains. Another vertebrate found in the canyon and of rare occurrence elsewhere in Illinois is the timber rattlesnake.

Among the unusual invertebrates are several rare caddisflies, including *Leucotrichia pictipes*, recorded from nowhere else in Illinois, and the leafhopper, *Polyamia dilata*, known in Illinois only from this area.

Disturbance by visitors in the park is present but not yet acute. Some pressure on the facilities provided in this park has been removed by the opening of another park—Lake Le-Aqua-Na—to the east in Stephenson County. Picnicking and camping are permitted at Apple River.

Apple River Canyon State Park was acquired by

the state in part through the persistent efforts of Dr. Herman Pepoon, a physician who preferred teaching high school biology to practicing medicine. His interest in nature doubtless developed during his youth, spent in the Apple River area. He visualized a much larger park (Pepoon 1920). Perhaps we can hope that more, if not all, of the canyon can be placed in public ownership.

## 2. ILLINOIS BEACH STATE PARK

Bordering Lake Michigan between Waukegan, Illinois, and Kenosha, Wisconsin, is a sand and gravel beach that is superimposed upon glacial till; its western limit is the Glenwood beach ridge of glacial Lake Chicago. Many writers have referred to this area as "the Waukegan moorland," but Gates (1912), who studied it in detail, called it the "Beach area."

Illinois Beach State Park occupies more than 1,600 acres of this marsh and sand terrace with dune ridges. The southern boundary of the park is approximately the middle of section 10, T. 45 N., R. 12 E. The eastern boundary is Lake Michigan, along which the park extends northward for 3.5 miles to the north line of section 26, T. 36 N., R. 12 E. The northern boundary follows the north line of sections 26 and 27 westward almost to the railroad trackway. The western boundary is irregular. The Illinois Beach Nature Preserve occupies over 700 acres from the southern boundary of the park northward to the old access road and the state park lodge and from the western boundary east to Lake Michigan.

The geologic history of the area is complex. It includes a glacial lake known as Lake Chicago in the Lake Michigan basin. The highest level of this lake, termed the Glenwood stage, was 640 feet above sea level. Subsequent stages, the Calumet and Tolleston, were at respective levels of 620 and 600 feet above sea level. Beaches were developed at all of these levels. The continued lowering of the lake to the present level (580 feet, mean level) resulted in the accumulation of the broad sand terrace of beach and dune ridges. The ridges of sand that border Lake Michigan were formed by currents that moved southward not quite parallel to the present shore. Wind has reworked some of the sand deposits, but no dunes of the magnitude of those on the east shore of Lake Michigan have been formed in the Beach area, because few strong and sustained winds come from the east, the wind direction required for dune building in this locality.

The plant cover of the Illinois Beach Nature Preserve includes deciduous forest, prairie, marsh, a man-made coniferous forest, and the aquatic vegetation of Dead River.

The deciduous forest is represented on the dune ridges, where black oak is dominant. White oak, bur

oak, cottonwood, and quaking aspen also are present. The shrubs include lead plant, New Jersey tea, and poison ivy. Humus is not abundant in this forest.

The dune prairie is the typical sand prairie, with such grasses as little bluestem, switchgrass, Indian grass, and *Calamovilfa longifolia* var. *magna* among the common species. In the sand prairie, especially in blowouts, as well as in the forest, the creeping juniper and bearberry are abundant. These two species help to stabilize the sand. Wet prairie includes such grasses as prairie cordgrass, blue-joint, and sedges of the genus *Carex*. Fringed gentians flower in some of the wet prairies. Cattails are abundant in the marshland, where bulrushes also thrive.

Dead River, a sluggish stream, drains part of this area. Its source is a few small lakes in the marshland near the railroad trackway. The stream meanders northeastward, turns southward and southeastward, and makes an abrupt turn to the north and then to the east to enter Lake Michigan. The mouth of the river is often blocked by a bar (Fig. 5). In the water of Dead River can be found pondweeds, water-milfoil, and waterweeds. Elsewhere along the stream can be seen yellow pond lily and white water lily, pickerel weed, and giant bur-reed. White buttercup and common arrowhead also grow here.

The man-made coniferous forest is unique in Illinois. About a century ago Robert Douglass, a nurseryman, scattered seeds of various species of pines on the prairie-covered ridges south of the mouth of Dead River. The seeds germinated and the pines grew. Presently some species are thriving and seeding themselves. The Austrian pine is the most abundant of them, followed by Scotch pine (Fig. 6).



Fig. 5.—The mouth of Dead River in Illinois Beach State Park. The sand and gravel bar blocks the passage of water from the river into Lake Michigan.



Fig. 6.—Some of the Scotch and Austrian pines that form a part of the coniferous forest south of Dead River in Illinois Beach State Park. Prairie plants dominate the herbaceous layer.

Several white pines survive on the western limits of this forest, and a few pitch pines are scattered in the sand just south of Dead River. A few trees of European larch grow in the interdunal troughs. Many prairie herbs still persist under the pines.

Along the shore of Lake Michigan are a few interesting associations. Beyond the range of the ordinary storm waves, sea-rocket and cocklebur are the dominant species; winged pigweed also grows here, and Russian thistle is an invading species but is not present every year. Arrowgrasses grow on the margins of beach pools.

The abundant animal life of the area includes many common species as well as some that are rare in Illinois. Ornithologists have observed more than 150 birds that use this preserve either as a breeding ground or as a temporary residence. Among the birds using the area as a haven during migration, and otherwise rarely seen in Illinois, are the knot and ruddy turnstone. The piping plover is a summer resident at the park, possibly nesting there.

The park borders the least disturbed Illinois portion of Lake Michigan and provides habitats for species of fishes absent or rare elsewhere in Illinois,

including the lake chub, longnose dace, spottail shiner, lake chubsucker, smelt, ninespine stickleback, and slimy sculpin.

Entomologists have found the insect life of the area to be among the most interesting and unusual in Illinois. Ross (1944:11) described the area as having "one of the most extraordinary communities of caddis flies in Illinois" and cited *Fabria inornata*, *Trienodes baris*, and *Polycentropus remotus* as particularly notable species. The park is the only recorded Illinois locality for the plant bug, *Plagiognathus syrticolae*, and for the pseudoscorpion, *Paisochelifer callus*. Other rare insects found in the area are the boreal thrips, *Anaphothrips cameroni*; the grasshopper, *Trimerotropis maritima*, and the leafhopper, *Texanus cumulatus*. Known from nowhere else in Illinois, the butterfly, *Callophrys polios*, is abundant at Illinois Beach.

Shelford (1911a, b, and c) made his classic studies on ecological succession in this area, and Ross (1963) analyzed the biota of the dunesland region in relation to Pleistocene glaciation.

Illinois Beach State Park is owned by the State of Illinois and is under the control and supervision

of the State Park Division of the Department of Conservation. To accommodate the vast throngs of people who descend upon this place of beauty, a number of bathhouses have been constructed along the lake shore for those who wish to swim, and a lodge offers rooms and meals as well as an indoor swimming pool. The camping area has facilities for those who prefer that type of lodging, and numerous tables provide places for picnics. All of these lie north of the nature preserve. A museum or interpretation center is south of the lodge, and several paths direct the visitor through sand prairie and oak forest along Dead River.

Vandalism is still a problem at Illinois Beach, but let us hope that everyone soon will learn what a priceless heritage we have there.

### 3. CHAIN O'LAKES STATE PARK

Chain O'Lakes State Park and Conservation Area, located in T. 46 N., R. 9 E., Lake County, includes over 1,600 acres of disturbed oak woodland on gravel moraine, wet to moderately moist prairie, wet alkaline meadows, fens and cattail marshes, as well as several small natural glacial lakes that have not been altered appreciably.

The vegetation of the nature preserve is rich in species, and some, such as the beaked spike rush, tufted bulrush, pitcher plant, twig rush, and grass of Parnassus, are rare or uncommon in Illinois. Doubtless further search of the area will reveal other unusual plant species.

The pugnose shiner, blackchin shiner, banded killifish, brown bullhead, and Iowa darter are among the unusual fishes found in the glacial lakes.

The area is one of the few in Illinois where black terns and long billed marsh wrens can be observed. Ross (1944:10-11) discussed the uniqueness of the caddisfly community in the lakes, and Hottes & Frison (1931:156) recorded the rare plant louse, *Cinara laticis*, from the area.

The area is owned by the Illinois Department of Conservation.

### 4. VOLO BOG

Volo Bog, 1.5 miles north and 1 mile west of Volo, Lake County, is situated in the center of section 28, T. 45 N., R. 9 E. The bog is a water-laid peat deposit in two basins of a single depression that in earlier times formed a sizable lake on a glacial moraine. The bed is sand. The shallow basin is completely filled; the deeper basin has a pool of open water (Fig. 7). Above the sand is a jellylike ooze, and above the ooze is a deposit of sedge and sphagnum peat. Live sphagnum is growing on the surface. The depth of the peat varies; in the deeper basin it is 33 feet deep. Artist (1936) made a study of the peat, and Reichle (1969) described the vegetational associations in this bog. Sheviak & Haney



Fig. 7.—The pool of open water in Volo Bog, Lake County. Duckweeds grow on the surface of the water. The pool is lined with cattails.

(1973) made a detailed study of the vegetation patterns.

Surrounding the bog is a zone that contains canary reed grass, smartweed, and Canada thistle. A few willows, such as black willow and peach-leaved willow, grow scattered in the narrow border of the bog and in the adjacent fields. The bog is easily viewed from the higher ground of the pastureland on the west. A plank walk (Fig. 8) extends from the pasture to the open pool within the bog.

Within the narrow border is a zone of shrubs in which poison sumac and winterberry are very abundant. Such herbs as sensitive fern, cinnamon fern, and marsh fern grow in the muck of the bog surface. To venture away from the plank walk is very



Fig. 8.—The plank walk near the entrance of Volo Bog. This walk permits easy access to the pool shown in Fig. 7.

hazardous, as it is possible to sink deep into the muck in those places where the plant roots grow sparsely beneath the surface and do not form a dense, tight network. Farther along the plank walk tamaracks tower above the shrubs. Near the open pool the density of the shrubs and trees decreases and herbaceous vegetation predominates.

The pool supports a heavy growth of several species of duckweeds. A zone of cattails with some giant bur-reed scattered throughout lines the shore of this pool. Numerous sedges and some bulrushes grow inland from the cattail zone. Some plants that are rare or semirare in Illinois occur in this zone. They include *Scheuchzeria palustris* var. *americana*, cotton sedge, *Dulichium arundinaceum*, *Pogonia ophioglossioides*, and the grass-pink orchid. An uncommon shrub in Illinois that thrives here is leather-leaf.

Inland from the pool and about 20 feet from the plank walk, the rare pitcher plant was once abundant. Far too many unscrupulous collectors have visited Volo and have almost destroyed the stands. Buckbean and purple cinquefoil were associated with the pitcher plant.

Reichle (1969), in his studies of the bog-inhabiting pselaphid beetles, reported 13 species of this group occurring in Volo Bog. Other insects whose occurrence at Volo Bog is significant because of their extreme rarity in Illinois are the thrips, *Thrips tripartitus*; the mosquitoes, *Wyeomyia smithi*, *Aedes abserratus*, and *A. punctor*; and the plant bugs, *Deracoris laricicola* and *Pilophorus uhleri*. A mouse tick, *Ixodes muris*, rare in museum collections, is known from Illinois on the basis of a specimen taken in this region. The central mudminnow, an acid-

tolerating fish, occurs in this bog but is not restricted to the bog habitat in Illinois.

Part of Volo Bog, about 47 acres, was owned by the University of Illinois. In 1970 ownership was transferred to the Illinois Department of Conservation, and the site was dedicated as a nature preserve in the Illinois system. To preserve it in its natural state, the purchase of the remainder of the bog as well as some adjacent land is desirable. To this end, all of Wilson Bog and a portion of Brandenburg Bog, both lying to the northwest, have been purchased by the Conservation Department.

Volo Bog is a well-used educational and scientific area. Many students from the University of Illinois, Northwestern University, and other universities and colleges annually visit this bog to study ecology.

## 5. WAUCONDA BOG

Wauconda Bog, at the southeast boundary of the village of Wauconda, is in the north half of section 36, T. 44 N., R. 9 E., Lake County. The bog covers about 67 acres.

Like Volo Bog, Wauconda Bog was once part of a large lake of which Bang's Lake is but a small remnant. If the water level of Bang's Lake should rise 8 feet, the surface of Wauconda Bog would be covered with water. Unlike Volo, no pool of open water exists within the bog; the old lake bed is filled with sphagnum and sedge peat. In the cycle of development of bogs, Wauconda is an older bog than Volo.

Wauconda can be characterized as a bog with cattails, low shrubs, and herbs alternating with tamarack, tall shrubs, stunted deciduous trees, and an herbaceous understory (Fig. 9). A large stand of



Fig. 9.—Wauconda Bog, Lake County. At the right are shrubs and small trees. In the middle distance are a few tamaracks. A large expanse of blue-joint is visible in front of the trees on the far side of the bog.





Fig. 10.—Pink ladyslipper, one of the rare plants of Wauconda Bog.

common reed grows near the center of the bog. Some of the tall shrubs are poison sumac, alder buckthorn, red osier, and winterberry. Some of the smaller shrubs are chokeberry, dwarf birch, and a number of species of shrubby willows. Deciduous angiospermous trees include soft maple, bur oak, quaking aspen, and basswood. Numerous sedges and grasses, among them blue-joint, form much of the herbaceous cover. Growing among the grasses and sedges are other herbs, a few of which are marsh marigold, purple cinquefoil, buckbean, swamp thistle, saxifrage, and numerous asters and goldenrods. The beautiful pink ladyslipper (Fig. 10) also grows here. Hummocks of sphagnum moss grow throughout, but not so abundantly as in Volo Bog.

Faunistically, Wauconda and Volo bogs are similar.

Most of Wauconda Bog will soon be ringed by residential areas. The pastureland that once bordered the bog on the south has recently been subdivided into lots and roadways. The north side of the bog touches the village. Part of Wauconda Bog was owned by the University of Illinois. In 1970 ownership was transferred to the Illinois Department of Conservation, and like Volo, Wauconda became a nature preserve in the Illinois system.

## 6. PEACOCK PRAIRIE

Peacock Prairie is a small prairie, only 4 or 5 acres, of the flatland type, located north of the intersection of Greenwood Road and Milwaukee Avenue, and south of Central Road in Maine Township, Cook County. The prairie is an example of the mesic black soil type which Vestal (1914) described from a stand east of Elmhurst on the Cook-Du Page county line. That stand has since been destroyed by urban expansion and interstate highway construc-

tion, and Peacock Prairie is one of the few remnants of this type of prairie in Illinois.

Peacock Prairie is trapezoidal in shape, bounded by homesites on the north and commercial enterprises on the south. As far as is known, it has never been seriously disturbed by plow, overgrazing, fire, or bulldozer. It has been trampled in the past by children's play activities, but this apparently had little adverse effect. Although it is small, it is rich in plant species. Paintin (1929) described this prairie, recorded the plants found in it, and attempted to quantify the data. Forty years later Betz & Cole (1969) made a comparative study to determine changes that had occurred during that period and recorded approximately 130 established plant species.

The preservation of this site can be credited to the determined efforts of a small group of citizens, especially a number of devoted women, such as Mrs. F. T. Popelka, Mrs. Olof Dahlskog, and Mrs. J. Wayne Cole. Their many hours of work were finally crowned with success. Peacock Prairie was purchased, saved from destruction, and set aside as a nature preserve. It is presently under the supervision of the University of Illinois at Chicago Circle.

## 7. SHOE FACTORY ROAD PRAIRIE

Shoe Factory Road Prairie is a rare remnant of prairie vegetation growing on a kame, a hillock of stratified glacial drift. It is located in the northwest quarter of the northwest quarter of section 10, T. 41 N., R. 9 E., about 2 miles north-northwest of Streamwood, Cook County. It lies between Illinois Highway 59 (Sutton Road) and the Elgin, Joliet, and Eastern Railroad on the south side of Shoe Factory Road, from which the natural area takes its name.

A sandy gravel forms the surficial deposit of the kame, and in one place it has been mined, leaving a depression or pit in the moderately steep south-facing slope. From the summit, which lies along the north boundary of the preserve, a steep slope descends to the road and doubtless was formed by man when the road was constructed through a small part of the kame. Eastward and westward from the summit the slopes appear little disturbed and are not so steep as are brow slopes of most bluffs of larger streams in Illinois.

Prairie vegetation covers about 8 acres of the south-, southwest-, and west-facing slopes of the hillcock. Needlegrass and little bluestem are common; Indian grass, prairie dropseed, and side-oats grama also grow here. Canada bluegrass appears to be limited to the disturbed places, such as in the pit or near the road. In spring the prairie shows scattered yellow blossoms of star-grass, puccoon, and lousewort. The purple and the white prairie clovers, the bluish flowers of the many-flowered scurfspea, the white of rattlesnake master and flowering spurge are present in summer. In autumn the white and blue flower

heads of several species of asters and the yellow of the goldenrods add color to the greenish backdrop of grasses. The east-facing slope has forest species, some of which, hazel and box elder, have invaded the prairie.

The presence of side-oats grama, the abundance of little bluestem, and the occurrence of many-flowered scurfpea are reminiscent of the hill or bluff prairies along the western border of Illinois. The presence of the three species of blazing stars and the three species of silphiums, namely compass plant, rosin weed, and prairie dock, together with rattlesnake master and downy gentian remind the observer of prairie wetter than hill prairie but not as wet as the floodplain type. Such a combination of prairie species and the absence of similar prairies in the vicinity make Shoe Factory Road Prairie so unusual and so valuable.

One of the most unusual animals of this prairie is the rare thrips, *Illinothrips rossi*.

Shoe Factory Road Prairie is owned by the Forest Preserve District of Cook County, which also serves as custodian. Through the efforts of a Conservation Director of the district, the late Cap Sauers, a wise and energetic conservationist, this prairie was purchased by the district and, to insure its protection, placed in the Illinois system, where it became the Shoe Factory Road Nature Preserve. The district is to be commended, not only for preserving this unusual prairie, but also for placing in the Illinois Nature Preserve System nearly 4,000 acres of its holdings in Cook County. Some of these are examples of forest types, one contains sand prairie, one a glacial bog, and others preserve marshland and wet prairie. This action is an example of a local governmental agency, a county forest preserve district, setting aside natural areas within its holding as nature preserves in the Illinois system. To some biologists the Forest Preserve District of Cook County is one of the wonders of the modern world. This action certainly strengthened that belief.

## 8. TROUT PARK (ELGIN BOTANICAL GARDEN)

Trout Park, also called Elgin Botanical Garden, is located in the northeast quarter of section 1, T. 41 N., R. 8 E., on the east bluffs of the Fox River in the northern part of Elgin, Kane County. The tract now embraces less than 60 acres; formerly it was larger.

"Trout Park is not a 'park' in the ordinarily accepted sense of the term. It is more than a park; it is a preserve—a last refuge for the plant and animal life of an extensive region in these morainic hills of northern Illinois known as the 'Oak Openings' or Oak Grove Savannas because of their prevailing timber character." So wrote H. C. Benke (1932a) in the Elgin *Courier-News* for March 29.

Numerous springs and seeps occur on the east

bluffs, which are composed of glacial drift. The water from the springs and seeps, forming pools and brooks, makes its way downslope to the base of the bluffs and into the Fox River. These water sources apparently never run dry. The bluffs support a mesic vegetation—plants that grow in habitats that are neither extremely wet nor extremely dry. Along the rivulets and bordering the seeps, arbor vitae grows abundantly (Fig. 11). According to Benke, some individuals of this species in Trout Park are older than our nation. Willows of various species, elderberry, and touch-me-not abound in these moist situations.

The forested ravine slopes of the east bluffs support such trees as butternut, quaking aspen, large-toothed aspen, northern red oak, hackberry, blue ash, and elm. The bluff-top forest includes white oak, northern red oak, white ash, and wild black cherry.

The alternate-leaved dogwood is one of the understory trees. Numerous shrubs grow under the forest canopy. Witch hazel, several shrubby dogwoods, and viburnums are common. Trout Park is rich in an herbaceous flora that includes many species in numerous genera and families. Over 60 species of grasses thrive here. Of rare plants in the Illinois flora, this refuge boasts of six orchids and five gentians, including the bottle or closed gentian and the fringed gentian. Benke (1932a and b) included in his *Courier-News* articles published on consecutive days three lists of the plants in Trout Park and neighboring areas.

The unusual vertebrates of Trout Park are the mottled sculpin and the brook stickleback, both of which occur in the spring-fed rivulets.

Ross (1944:8) discussed the unusual caddisfly community in the Elgin Botanical Garden, citing seven species not found elsewhere in Illinois. Other unusual insects are a rare mayfly, *Baetis vagans*; two rare stoneflies, *Leuctra tenuis* and *Nemoura trispinosa*; and two rare butterflies, the swamp metalmark, *Calephelis muticum*, and Harris' checkerspot, *Chlossyne harrisii*.

On March 29 Benke (1932a) wrote: "While owned by the City of Elgin, the park tract is under the custody of those who so earnestly labored for its acquisition—the nature societies of Elgin, foremost among which are the Illinois Nature Study, and the Elgin Audubon Societies. These establish the rules for the park's supervision which are in turn executed by the city. This admirable arrangement guarantees the tract's preservation with nature supreme and artificialities restricted to the minimum."

Unfortunately, preservation of the tract was not guaranteed. The Illinois Toll Road, Interstate 90, now passes through what was the largest and biologically richest ravine in Trout Park. The right-of-way is about 450 feet in width and stretches in



Fig. 11.—A path on the bluffs at Trout Park, north of Elgin, Kane County. The path leads the visitor past large arbor vitae trees, some of which are visible in the photograph.

the park from the base of the bluff to the summit. The experience of Elgin proves that individuals, organizations, and local governments must be on the alert if they are to prevent the destruction of irreplaceable natural areas by "artificialities" that could be located elsewhere.

Presently, Trout Park is owned by the City of Elgin.

### 9. CLARK RUN

Clark Run is a small stream, about 7 miles long, northeast of Utica, La Salle County. The stream originates in section 31, T. 34 N., R. 3 E., and empties into the Illinois River near Utica. The area of biological importance lies in the extreme

north part of section 9 and the southwest quarter of section 4, T. 33 N., R. 2 E., where the stream flows through a canyon, the walls of which are St. Peter sandstone.

The stream cascades over falls into a canyon (Fig. 12) and then slowly meanders between sandstone cliffs. Marshy areas border the stream in many places where the canyon cliffs have been eroded away. In these areas the skunk cabbage and marsh marigold flower in early spring. The latter occasionally blooms also in autumn. Bordering the stream are stands of blue beech, willows, and other small trees. Mayapples form sizable clones on the relatively dry parts of the floodplain. Canada yew, arbor vitae, red cedar, and white pine grow on the cliffs.



Fig. 12.—Upper part of the canyon at Clark Run. The stream enters the canyon by this route. Mallards were swimming on the water of the pool below the falls on October 11, 1962, the date this picture was taken.

In those places where the sandstone cliffs have eroded to leave steep slopes, rattlesnake plantain, partridge berry, bunchberry, white pine (some of the trees 24 inches in diameter), and other plants can be observed. Witch hazel, saxifrage, pasture gooseberry, and false lily-of-the-valley thrive in the ravines.

Above the cliffs the conditions are more xeric; that is, the water supply is lower and the evaporation rate higher. Black oak and Hill's oak find a favorable environment in such sites. Some of the shrubs of the xeric bluff tops are fragrant sumac, smooth sumac, and leadplant. Herbaceous plants include little bluestem, needlegrass, wild indigo, and the narrow-leaved aster.

In the leaf mold at Clark Run, a southern thrips, *Trachythrips watsoni*, reaches its northern limit. It apparently extends northward along the narrow confines of sand areas that border the Illinois River.

Clark Run, similar in many respects to some of the canyons of Starved Rock State Park, has not been overrun by people. Much of the canyon area and most of the adjacent uplands have been pastured, some parts severely. In spite of this treatment, some of the rare plants have survived. If cattle were removed, doubtless Clark Run would revert to a very beautiful and biologically rich area.

Clark Run is presently in private ownership.

#### 10. GOOSE LAKE PRAIRIE AND MARSHES

Goose Lake prairie and marsh area lies north of the Lorenzo Road and south of the Illinois River,

southeast of Morris and northwest of Lorenzo, and occupies all or parts of sections 3, 4, 9, and 10, T. 33 N., R. 8 E., and parts of section 34, T. 34 N., R. 8 E., in Grundy County. The area of the nature preserve is 1,513 acres. Thus, it is a sizable and valuable preserve.

A number of biotic communities are represented in this preserve. Tall-grass prairie, grassland with dominant grasses 5-8 or more feet tall, occupies portions of the area. In this type of prairie at Goose Lake, big bluestem is the dominant grass. Associated with it are Indian grass and switchgrass, as well as wild roses, sunflowers, and goldenrods. Midgrass prairie of grasses between 2 and 5 feet tall is represented by a large stand. Little bluestem and Indian grass are dominant. In dryer parts of the nature preserve Kentucky bluegrass has become dominant, possibly because cattle in years past concentrated on these sites. A disturbance community occupies those places which had been cultivated and since have been allowed to return to prairie. In such situations at Goose Lake switchgrass and Indian grass are common. In the wet prairie community, prairie cordgrass is dominant, but blue-joint is common. In the marsh community, river bulrush, great bulrush, cattail, and common reed dominate. The aquatic community is represented in the numerous bodies of open water, an outstanding feature of the area.

Campbell *et al.* (1970) compiled a list of 326 species of vascular plants that grow in this nature preserve. Zales (1971) listed 30 species of mosses and liverworts.

The ponds are shallow and muddy and support few aquatic vertebrates but offer nesting habitats for a number of unusual birds, including the American bittern, upland sandpiper, Henslow's sparrow, and marsh hawk (Birkenholz 1975). A butterfly occurring in Goose Lake Prairie but rare elsewhere in Illinois is the broad winged skipper, *Poanes viator*.

The purposes of this preserve are preservation of a native prairie community, education, and research. To carry out the second purpose, an interpretive center and a system of trails have been constructed in the preserve and the buffer zone to the west of the nature preserve. Prairie species are to be planted in the buffer zone used for educational purposes. When the interpretive center, trails, and observation towers are completed, Goose Lake Prairie and Marshes Preserve will be an outstanding preserve in the Illinois system.

Goose Lake area is owned by the Department of Conservation.

#### 11. IROQUOIS COUNTY CONSERVATION AREA

Iroquois County Conservation Area lies in sections 22, 23, and 24, T. 29 N., R. 11 W., east-north-

east of Beaverville, Iroquois County. This area of sand, clothed with black oak forest, prairie, marsh, and pools of open water, has about 2,000 acres.

Among the unusual plants in the forest and prairie are colicroot, white-bract hymenopappus, and nodding ladies'-tresses. Here are also habitats for outlier populations of reptiles normally more western in distribution, including the bullsnake, ornate box turtle, and six-lined racerunner.

In and near the conservation area, especially to the south, are small to medium-sized creeks with sandy bottoms, masses of submerged vegetation, and headwater marshes. These streams contain fishes peculiar to sand areas, including the ironcolor shiner and weed shiner, and other uncommon fishes, such as the blacknose shiner, the lake chubsucker, starhead topminnow, northern longear sunfish, and least darter. The major stream of the area is Beaver Creek, cited

by Smith (1971) as a particularly notable stream with a rich assemblage of unusual species.

Owned by the state and managed by the Illinois Department of Conservation, the Iroquois County Conservation Area almost adjoins the Willow Slough Wildlife Refuge in Newton County, Indiana, considerably enhancing the area as a biological refuge. The area also provides suitable nesting habitat for the veery (Graber & Graber 1973), a rarity in Illinois.

## 12. MIDDLE FORK OF THE VERMILION RIVER

The Middle Fork (Fig. 13) of the Vermilion River between Potomac and the junction with the Salt Fork near Oakwood in Vermilion County is a high-gradient river with many boulder riffles, extensive raceways over both gravel and sand, and clear pools over sand or silt substrates. Many raceways are bordered by emergent vegetation, especially



Fig. 13.—Middle Fork of the Vermilion River near Collison, Vermilion County. In addition to an extensive bed of gravel, the Middle Fork has boulder riffles and exposures of bedrock.

water-willow. The river has a large variety of aquatic animals that are very unusual in Illinois. Terrestrial habitats on the floodplain and on the slopes of the bluffs harbor a great diversity of plants and wildlife.

Several of the animals in the Middle Fork are highly indicative of clean, clear, gravel-bottom streams and denote the Middle Fork as a stream only minimally disturbed by human activities, an attribute rapidly becoming a rarity in Illinois. These Middle Fork inhabitants are the river redhorse; big-eye chub; silver redhorse; suckermouth minnow; mimic shiner; bluebreast darter; eastern sand darter; dusky darter; rainbow darter; greenside darter; small-mouth bass; the crayfish, *Orconectes propinquus*; and the caddisflies, *Hydropsyche frisoni* and *H. cheilonis*.

Among the fishes of the Middle Fork are four recognized as rare and endangered fishes of the mid-western states (Miller 1972): the bluebreast darter, bigeye chub, river redhorse, and mimic shiner. The first three of these fishes were also recognized by Lopinot & Smith (1973) in their list of rare and endangered fishes of Illinois. The bluebreast darter occurs in Illinois only in the Middle Fork.

Baker (1922) and Ross (1944) commented on the unusualness and diversity of the Middle Fork invertebrate fauna. In discussing the fauna of the Vermilion River system, Baker noted especially the great diversity of the molluscan fauna, having found 60 varieties of molluscs in his survey of the stream system. The mussel, *Lampsilis fasciola*, is restricted in Illinois to tributaries of the Vermilion River.

In addition to the uniqueness of the aquatic fauna, suitable terrestrial habitats exist along the Middle Fork to support a large diversity of wildlife, including 20 species of amphibians, 23 reptiles, 58 nesting birds, and about 37 mammals. For several species, including the red-backed salamander, queen snake, and ringneck snake, the Middle Fork environs form the periphery of their respective ranges, and they are able to use the area as a refuge from further range shrinkage. The rare and unusual salamander, *Ambystoma platineum*, occurs in Illinois only in wooded areas along the Middle Fork (Morris 1974). The southeastern shrew, recently found in the area, is extremely rare in Illinois. The lark sparrow, known to nest along the Middle Fork, is rarely found in eastern Illinois.

In section 8, T. 20 N., R. 12 W., 3.5 miles southeast of Collison, a unique prairie occupies the upper slopes of the west-southwest-facing gravel bluff. Seep springs occur at the bluff base bordering the Middle Fork. Locally the prairie is called Windfall. It is one of the few gravel bluff or gravel hill prairies in Illinois. In addition to the usual prairie grasses, many other prairie plants grow here. Some of these are Indian paint brush, blazing star, azure aster, and hill prairie ladies'-tresses. Grass of Parnassus, Riddell's goldenrod, and four-flowered loosestrife occur in the seeps.

The uniqueness of the Middle Fork was recently recognized in a publication of the Illinois Natural History Survey (Smith 1971) in which streams were classified on the basis of their fish diversity and in which the Middle Fork was described as "one of the finest in Illinois."

A considerable portion of the lower Middle Fork is included in Kickapoo State Park, the site of a former Indian village and, more recently, of abandoned strip mines. Here and farther upstream the relatively steep stream gradient, rocky riffles, deep pools, and wooded banks make the river attractive to canoeists, hikers, naturalists, and fishermen. The varying habitats support a number of important sport species, including smallmouth bass, spotted bass, rock bass, longear sunfish, channel catfish, and several species of suckers.

A proposed impoundment of the Middle Fork would inundate the best stretch of the river and eliminate much of its natural beauty and most of its unique biological characteristics, as discussed by Smith (1968). In contrast, an alternative plan, establishing the Middle Fork as a river corridor park, would maintain and protect the unique characteristics of the river.

### 13. ILLINOIS RIVER SAND PRAIRIES

Along the east side of the Illinois River from the big bend in Putnam County south into Scott County sizable deposits of sand form terraces upon which a dune topography has developed. These deposits were laid down during the Wisconsin glacialiation. At that time the meltwater from the ice front with its load of sand and silt was flooding the valley of the Illinois and aggrading it. After the close of glacialiation, the river cut its channel into these sand deposits, leaving the terraces. The sand terraces of the Illinois River valley supported forest, prairie, and marshland until the coming of European man. After his arrival, much of the area of sand terraces was put into cultivation—into fields of corn, wheat, soybeans, rye, melons, or into pine plantations or turkey farms. Scattered throughout the area are small remnants of forest and prairie.

The University of Illinois Foundation owned land on the sand terrace northwest of Kilbourne, Mason County. This tract, known as the Wilkinson Farm, as well as additional acreage to the north, was acquired by the Illinois Department of Conservation. Most of the acquisition was dedicated as a nature preserve in the Illinois system. This holding includes both prairie and forest.

The prairie lacks large dunes but possesses sizable blowouts of a compound nature. These blowouts tend to be stabilized by goat's rue (Fig. 14); three species of three-awn grass; the common panic grass of sand areas, *Panicum pseudopubescens*; and the sedge, *Bulbostylis capillaris*. Other sedges, *Cyperus schweinitzii* and *C. filiculmis*, grow scattered in the



Fig. 14.—View of a sand prairie near Kilbourne, Mason County, showing a society of goat's rue. The black-jack oak and black oak forest in the distance is second growth.

blowouts. Black-jack oak thrives at the border of one blowout.

Elsewhere the sand prairie contains such grasses as little bluestem, switchgrass, sand love-grass, needle-grass, and the tall *Calamovilfa longifolia* var. *magna*. In the interstices are such plants as goat's rue, polygala, small to moderately large patches of prickly pear, and rose mallow. A common shrub of this prairie is fragrant sumac. In one depression where the sand remains quite moist, blackberries and seed-box thrive.

It is impossible to find all the plants of the Illinois River sand prairies growing in this one locality near Kilbourne. Within a 15-mile radius, in other prairie remnants, numerous other species can be found, including two plants rare in Illinois, *Cristatella jamesii* and bladder-pod, the latter growing in the Henry Allan Gleason Memorial Nature Preserve, north of Topeka, Mason County, an area dedicated in 1970.

Unusual vertebrates in the Illinois River sand prairies are the Illinois chorus frog and the Illinois mud turtle. Great Plains vertebrates, animals restricted in distribution in Illinois, that live in these sand prairies include the slender glass lizard, western

hognose snake, and the bullsnake. Other vertebrates found here and notable for their rarity in Illinois are the spotted sunfish, ironcolor shiner, starhead topminnow, lake chubsucker, and lark sparrow. Graber, Graber, & Kirk (1974:10) recorded the western kingbird in this area but noted that it is not likely to be found with much regularity.

The rock pocketbook, a mussel rarely found in large populations, is locally abundant in the Illinois River in the sand prairies region. Insects of the area that never or rarely have been found elsewhere in Illinois are the thrips, *Anaphothrips nanus*; the mayfly, *Baetis anachis*; the caddisfly, *Lype diversa*; the grasshoppers, *Amphitornus coloradus* and *Mermiria neomexicana*; and a butterfly called the Ottoo skipper, *Hesperia ottoo*.

During the early part of this century a number of workers were occupied with studies of sand areas in Illinois. The work of Hart & Gleason (1907) is considered a biological classic. A study of the sand land vegetation by Gleason (1910) included the Illinois River sand areas. Vestal (1913) studied the relationships of plants and animals, especially the insects, in the sand areas of the Illinois River, chiefly

those near Havana. Recently, Johnson (1970) made a study of the vegetation and the resident populations of mammals and birds of the Wilkinson Farm area.

#### 14. TWIN CULVERT CAVE

Twin Culvert Cave is located in the middle of the southwest quarter of section 17, T. 7 S., R. 2 W., about 2 miles southwest of Pearl, Pike County. The name is taken from the two large limestone overpasses (Fig. 15) that span a small stream, the bed of which at this place also forms a part of the county road to the southeast. The overpass or culvert on the south carries tracks of the Illinois Central Gulf Railroad. The culvert on the north has become covered with brush. It was once part of a railroad trackway, now abandoned. The creek that flows through these culverts is small, but in periods of heavy rains it may rise 8 feet or more above the gravel stream bed. The cave is located between the two culverts, upslope on the west bank of the small stream, very close to the present railroad trackway.

The slope on which the cave is found supports a deciduous forest containing such species as hard maple, white ash, black walnut, chinquapin oak, hop hornbeam, and shingle oak growing together. Some of the common shrubs are poison ivy, wild hydrangea, bladdernut, wafer ash, and buckthorn. Wild grapes and climbing bittersweet are common vines. Of the herbaceous plants, fragile fern, clearweed, bedstraws, and violets occur frequently.

The bluff bordering the abandoned trackway on the west side of the creek has been altered by the removal of rock, possibly for the construction of the fill and the culverts. This disturbed site contains a mixture of native forest and prairie species, as well as some common weeds of European origin.

The chief objects of interest in this locality are



Fig. 15.—Culverts constructed of local limestone near Pearl, Pike County. These culverts supply the name—Twin Culvert Cave—for the nearby cave. An infrequently used county road and a small stream share the culverts.



Fig. 16.—Entrance to Twin Culvert Cave. Because of the nature of this cave, ropes, ladders, and ample light should be available if its exploration is attempted.

the cave (Fig. 16) and springs. Bretz & Harris (1961) described the cave. "Entrance to this cave is through a roof breakdown. A network of joint-controlled vertical slots that should not be negotiated without a rope is immediately encountered. Two sets of joints cross at approximately right angles. Ceilings and depths appear to vary along each set." The cave is sometimes visited by a large colony of gray bats (Smith & Parmalee 1954:201), a migratory species that is rare and poorly known. Other unusual vertebrates in the vicinity of the cave are the banded sculpin, southern redbelly dace, and timber rattlesnake.

Twin Culvert Cave is owned by The Nature Conservancy.

#### 15. COLE CREEK HILL PRAIRIE

Cole Creek hill prairie is located in the northwest quarter of section 4, T. 9 N., R. 13 W., 2 miles south of Eldred, Greene County. The prairie occupies part



Fig. 17.—One of the spurs of the hill prairie along Cole Creek, south of Eldred, Greene County. Forest with many chinquapin oaks grows in the coves.



of a bluff of the Illinois River and part of the north bluffs of Cole Creek. This locality was previously described under the name South Eldred hill prairie (Evers 1955).

The bluff of the Illinois River has a small toe slope, a limestone cliff, and a loess-covered brow slope. The bluffs of Cole Creek also have a loess cover but few visible rock outcrops. The loess was deposited during Wisconsin time.

Vegetation characteristic of hill prairies covers more than 4 acres of three southwest-facing slopes that extend downslope (Fig. 17). Little bluestem is the dominant grass. Some other grasses of these slopes are big bluestem, Indian grass, side-oats grama, and Scribner's panic grass. The bluets, *Houstonia nigricans*, grows in this prairie, which is near the northern limit of the range of the species in Illinois. On October 1, 1958, 29 stems of hill prairie ladies'-tresses (Fig. 18) were observed in this prairie.

This orchid appears well adapted for growth in hill prairie stands of pastured loess slopes. A few miles south of Cole Creek, at Dayton Hollow, 91 stems were counted on October 10, 1968. More astonishing, however, were the 275 stems found in pastured hill prairie on October 6, 1970, a little more than 4 miles north of Eldred.

The toe slope, the ravines, and the bluff tops support a deciduous forest in which common tree

species are white ash, American elm, various oaks and hickories, red cedar, and Iowa crabapple. Some of the shrubs present are prickly ash and rough-leaved dogwood.

Local residents report that they frequently observe white-tailed deer on these prairie slopes. In the vicinity is a relict colony of northern ringneck snakes, and both the western long-tailed salamander and glass lizard occur in the area. The westernmost record of the leaf beetle, *Brachycoryna melsheimeri*, is based upon a collection made here.

Cole Creek hill prairie is presently in private ownership.

## 16. ROCKY BRANCH

Rocky Branch is the name applied to a small stream in northern Clark County. This small stream, not more than 1.5 miles in length, has its source in the east half of section 30, T. 12 N., R. 12 W.; it empties into the West Fork of Big Creek in section 29 of the same township. The area of greatest interest to naturalists is more than 300 acres in extent. It centers on the small stream, on the surrounding forest, and on much of the forest on the south bank of Big Creek, including its tributary ravines. By road, the Rocky Branch natural area is 1.5 miles east and 1 mile north of Clarksville (known also as Dolson).

Rocky Branch has long been attractive to the lover of natural beauty (Stover 1930). The small stream has cut deeply into the sandstone to form a valley with steep walls and, in some places, perpendicular cliffs (Fig. 19). Sizable undercuts in many of the cliff bases clearly show the eroding power of the stream when in flood. During flood stage the water in Rocky Branch may rise 8 feet above its gravel and sandstone bed, as evidenced by the debris left in trees and shrubs along the bank. Several small tributary ravines enter Rocky Branch from the south. Their streams have carved beautiful gorges in the sandstone.

The vegetation of Rocky Branch is chiefly deciduous forest. In wide parts of the valley are small plots that were once cleared of trees, maintained for a while as cultivated fields, and later abandoned. The narrow road that once traversed the valley from its head to its mouth has also been abandoned. The forest of the ravine floor is rich in plant species. Trees of this forest include sycamore, hard maple, tulip tree, beech, butternut, white ash, and hackberry. Some of the understory trees and shrubs are blue beech, wild hydrangea, elderberry, bladdernut, and spicebush. The ravine floor is a place of beauty in the spring, when it is carpeted with numerous patches of colorful wild flowers. By autumn the forest floor is no longer a carpet of color, but here and there are asters, goldenrods, and white snakeroot. Among the plants of the forest floor are such ferns as the broad beech, Christmas, and grape.



Fig. 18.—Hill prairie ladies'-tresses. In 1958, 29 stems of this species were observed in Cole Creek hill prairie.



Fig. 19.—Rocky Branch area. This view from the bed of Rocky Branch shows a cliff, the undercut formed by the stream, and the steep slope above the cliff.

Ravine slopes support vegetations that range from the xeric to the mesic. The driest slopes maintain a forest of black oak, northern red oak, shagbark hickory, and other species. Poverty grass, various mosses, and lichens are abundant on the dry soil. The moist ravine slopes sustain a forest of beech, hard maple, hop hornbeam, redbud, flowering dogwood, and other arborescent species. Beech-drops, Christmas fern, wild hydrangea, and arrowwood, as well as numerous mosses, grow on these slopes. In one locality at the summit of a sandstone cliff, sphagnum moss is abundant. In another locality the walking fern, hepatica, and asters grow together in patches of moss on large sandstone blocks that lie above the floodwaters of the creek.

The sandstone cliffs possess a flora of mosses and liverworts; *Conocephalum conicum* is the common species. In the recesses wild hydrangea and several species of asters and goldenrods, as well as the maiden-

hair fern, find places in which they can live. Part-ridge berry is not uncommon at the tops of the cliffs, and it grows elsewhere with mosses. Lady fern thrives in some places at the cliff bases.

The upland woods is one of oaks and hickories. The forest is dry, and the floor supports mosses, lichens, poverty grass, and other xeric species. Nodding ladies'-tresses, which blooms as late as mid-October, grows in the open parts of the upland woods.

The abandoned fields maintain a mixture of herbs and varying numbers of trees and shrubs scattered here and there. In a field abandoned in 1958, one of the few woody plants observed in 1961 was the black-berry. In older fields smooth sumac, black walnut, tulip tree, northern red oak, and American elm have become established and perhaps are the beginnings of a deciduous forest that eventually will dominate the fields.

Rocky Branch is of interest botanically because



Fig. 20.—Southern redbelly dace, a brightly colored inhabitant of spring-fed streams of Illinois.

it lies in the westernmost natural limit of the black gum and the tulip tree in central Illinois. In addition, several species of orchids grow here. According to Stover (1930), the ground pine, *Lycopodium lucidulum*, thrives on the sandstone. Irresponsible collectors and vandals have destroyed all traces of this club moss at Rocky Branch. The absence of sizable forest trees indicates that the original forest was felled at some earlier date. Additional botanical studies have been made by Ebinger & Parker (1969) and by Hellinga & Ebinger (1970).

The southern redbelly dace (Fig. 20); blacknose dace; two-lined salamander; several rare land snails, including *Zonitoides limulatus* and *Polygyra obstricta*; the thrips, *Eurythrips virginianus*; and the plantbug, *Neolygus belfragii*, all animals of unusual occurrence in Illinois, are found at Rocky Branch.

The Nature Conservancy purchased 175 acres of Rocky Branch and transferred title, with a reverter clause, to Eastern Illinois University. The area has served as an outdoor laboratory for students of botany and zoology at Eastern Illinois University for more than 4 decades.

#### 17. EMBARRAS RIVER

The Embarras River from Greenup to Newton, in Cumberland and Jasper counties, is unpolluted and mostly unmodified and represents one of the finest aquatic natural areas remaining in Illinois. The river itself has a wide variety of habitats and supports a diverse fish fauna. The wooded floodplain along the river also is unmodified through much of the area.



Fig. 21.—Embarras River near Greenup, Cumberland County. The Embarras has many fast riffles bordering sand and gravel bars that alternate with deep, quiet pools.

The moderate-sized, high-gradient Embarras River has extensive deposits of gravel and sand (Fig. 21) offering habitats to several unusual Wabash Valley fishes. The harlequin darter occurs nowhere else in Illinois or in the north-central states. Other fishes in the Embarras that are rare or limited elsewhere in Illinois are the eastern sand darter, mountain madtom, dusky darter, and greenside darter.

A notable terrestrial animal of the area is the timber rattlesnake, found in the wooded, rocky hillsides along the river.

The Embarras from Greenup to Newton is in private ownership, but access is available at the many bridges crossing the river. Sport fishing activity is moderate to heavy, with the major sport fishes being the channel catfish, spotted bass, longear sunfish, white crappie, and flathead catfish.

The Embarras River is dammed at Charleston, north of the area of interest. Smith (1968) discussed the unusual fishes of the Embarras and warned that modification of the river would eliminate the harlequin darter and decimate other fishes that are rare in Illinois. The natural state of the Embarras River and its resultant large populations of fishes seldom encountered elsewhere in Illinois were major factors

in its selection as a site for life-history studies on the dusky darter (Page & Smith 1970) and the slender-head darter (Page & Smith 1971).

#### 18. AN ILLINOIS CENTRAL GULF RAILROAD PRAIRIE

A little over a century ago much of east-central Illinois was flatland prairie. Although early settlers shunned this land as unsuitable for cultivation because of a belief that only forest soils were fertile, later ones found it extremely productive and valued it highly. After a suitable plow had been perfected to break and turn the prairie sod and after drain tile had been placed to lower the water level, vast stretches of prairie were converted to farmland. Now only remnants of prairie are left; they are along roadsides or railroad trackways. These remnants must be preserved if we wish any Illinois flatland prairie vegetation to remain for future generations to study and enjoy.

A prairie area located along the trackway of the Illinois Central Gulf Railroad between Laclede, Fayette County, and Alma, Marion County, is actually a series of remnants of the Twelve-Mile Prairie of south-central Illinois. Numerous stretches along this track-



Fig. 22.—An expanse of big bluestem. This grass is the dominant plant in many of the flatland prairie remnants of central Illinois.

way have been plowed for the production of farm crops or of nursery stock. Some stretches that were cultivated have been abandoned and have reverted to a prairie type of vegetation.

The area is relatively flat except for those places where small streams have eroded into the flatlands. A century ago the drainage was poor, and the flatlands between the streams were very wet except in late summer, the dry season. At that season giant cracks appeared in the clay soil. Today numerous ditches along the railroad and highway drain the land rapidly. What effect the drainage had on the biota no one knows, as no one carefully studied these prairies a century ago.

The plants of the area are typically those of the tall-grass prairie. Big bluestem (Fig. 22) is the usual dominant although switchgrass and Indian grass are locally abundant and occasionally dominant. In the wettest parts of the prairie, prairie cordgrass is the dominant plant and densely covers the ground. In



Fig. 24.—Prairie remnant in railroad trackway near Watseka, Iroquois County. Such remnants are all that remain of a once great expanse of flatland prairie.

places of little disturbance, the prairie is a patchwork of a few species covering sizable areas. In some sites big bluestem covers much ground, while a short distance away may be blazing stars, rosinweed, prairie-dock, compass plant, wild hyacinth, or one of the numerous goldenrods, as *Solidago rigida*. Shrubs in the prairie include New Jersey tea and lead plant.

The seasonal aspect of the prairie is interesting to observe. In early spring the prairie is dormant and shows little activity until May, except for the flowering of a few small and delicate cruciferous weeds, including Whitlow's grass. Some of the early flowers are small and rather inconspicuous, as blue-eyed grass, or small and conspicuous, as puccoon. The large and showy flowers of the beard-tongues appear in late May. In June the lead plant and the purple coneflower give a purple cast to the landscape. From then to the frosts of autumn a gradual but continual change of blossoms occurs, with the purple being replaced by yellow as the dominant color. Goldenrods and asters bloom profusely toward the close of the growing season.

Unfortunately, many people incorrectly believe the coarse prairie plants to be undesirable weeds. Within undisturbed prairie remnants very few, if any, noxious weeds—the type that cause the farmer trouble—can be found. Only after the prairie has been plowed or tremendously disturbed do the noxious weeds obtain a foothold. They then remain long after the land is no longer cultivated, and they even thrive in the secondary prairie type that develops.

Zoologically the Illinois Central Gulf Railroad prairie is of interest because of the interdigitation of prairie and forest habitats. This is one of the few areas where the ornate box turtle, a prairie animal, lives side by side with the eastern box turtle, a forest



Fig. 23.—Mud turrets of chimney-building crayfish.

creature. This prairie also provides ideal habitat for the crawfish frog. In the spring, turrets (Fig. 23) of a chimney-building crayfish, *Procambarus gracilis*, are conspicuous as one drives the highway bordering the prairie. Prairie insects are now becoming rare because of the widespread destruction of their habitat by plow and pesticide. They still abound, however, in the Illinois Central Gulf Railroad prairie. The area is the type locality of *Anaphothrips sandersoni*, a thrips that lives only on prairie cordgrass.

The trackway prairie between Laclede and Kinmundy, owned by the Illinois Central Gulf Railroad, has been little disturbed during the past 7 years by the railroad except where the safety of train operation required it. It is a credit to the Illinois Central Gulf that it is instrumental in preserving this heritage. Credit must also be given to the Toledo, Peoria and Western Railroad for preservation of a prairie remnant along their trackway east of Watseka (Fig. 24).

### 19. DEVIL'S PROP

Devil's Prop is the local name applied to a ravine area in the northwest quarter of section 25, T. 1 S., R. 3 E., 2 miles south of Divide, a very small community in north-central Jefferson County. The ravine has been carved from the sandstone that underlies the area. At one place a pillar of sandstone appears to support the cliff (Fig. 25). From this pillar, or prop, the locality received its name—Devil's Prop.

The upland to the west and northwest of the ravine has been disturbed by agricultural pursuits. Some of this land has served as pasture. On the southeast side of the ravine a part of the upland has served as pasture and another part is a fallow field that is unpastured. In the fallow field certain prairie plant species have persisted and are common. These



Fig. 25.—Devil's Prop area. A pillar of sandstone that appears to support the cliff above supplies the name for this area near Divide, Jefferson County.



Fig. 26.—A narrow, V-shaped valley through which a small stream flows in the Devil's Prop area.

include Indian grass, little bluestem, blazing star, American feverfew, goldenrods, and asters. Broom-sedge grows in this area. The forests of the upland contain shagbark hickory, red cedar, black-jack oak, and post oak. Poverty grass, pencil-flower, and several species of three-awn grass grow on the floor of the relatively open woods. Sizable patches of mosses of several species and some lichens form patches on the soil. The orchid, *Spiranthes grayi*, is not uncommon in the fallow field, and a few plants grow in the woodland border.

At one place the small stream flows through a narrow, V-shaped ravine (Fig. 26). In some places the sandstone of the steep sides is exposed and in other places covered with a thin layer of soil. Much of the steep slopes is covered with a growth of mosses, including hairy-cap moss. On the less steep slopes and on the floor of the widest portions of the ravine grows a deciduous forest; black gum, northern red oak, bitternut hickory, shadbush, white oak, and hop hornbeam are some of the tree species. Wild hydrangea and winged sumac are common shrubs in this forest.

The fauna is typical of southern Illinois habitats of this type.

Devil's Prop, with an area of 40 acres, was a gift of Dr. Carl Schweinfurth in 1970 to The Nature Conservancy. Thus, this delightful spot in Jefferson County has been set aside as a nature preserve so that future generations may also enjoy it.

### 20. BEALL WOODS

Beall Woods Nature Preserve is located east of Keensburg or about 5 miles southwest of Mt. Carmel, Wabash County. To the south lies a small commu-

nity known as Rochester. The preserve, a part of Beall Woods State Park, is a part of section 11, T. 2 S., R. 13 W. It has an area of 290 acres.

Beall Woods is the only sizable, near-virgin remnant in Illinois of the once extensive deciduous forest of the Wabash River valley. Because of the richness of species and the immense size of the trees, the forest of the Wabash valley was considered by some to be one of the wonders of the world. Except for Beall Woods, it was lost in Illinois by clearing for cropland or by lumbering operations. Beall Woods itself almost met such an end, but devoted and influential citizens, a sympathetic governor, and a determined director of the Department of Conservation made its purchase and preservation possible.

Bottomland forest grows along the Wabash River and on the floodplain of Coffee Creek, a tributary of the Wabash that meanders through a part of Beall Woods. This creek received its name because in pioneer days a boat carrying coffee capsized at the mouth of the then unnamed stream. Some sizable trees grow on this bottomland. Large sycamores can be found, Shumard's oak, bur oak, and big shellbark hickory are represented by specimens over 3 feet in diameter. Hackberry, white ash, sweet gum, and Kentucky coffee-tree are a few other trees of this bottomland. The low bluffs of Coffee Creek support some sizable specimens of northern red oak and chinquapin oak. The upland forest is rich in arboreal species. Here one can observe large tulip trees, black oaks, white oaks, and shagbark hickories. Beech also grows here. Flowering dogwood, papaw, hop hornbeam, and mulberry are a few of the understory trees. The herbaceous flora is typical of the deciduous forest of eastern Illinois. Jack-in-the-pulpit, green dragon, bloodroot, toothwort, spring beauty, purple trillium, and dwarf larkspur are a few of the herbaceous species. Ashby & Ozment (1967) listed 340 species of vascular plants in the preserve.

Over 100 different birds have been observed in Beall Woods. The pileated woodpecker is one of many that are delightful to see and to hear. The land snail, *Mesomphix friabilis*, rare in Illinois, occurs in Beall Woods.

That portion of the Wabash River adjacent to Beall Woods is an especially noteworthy stream segment, with a variety of habitats supporting populations of fishes rare elsewhere in Illinois. These fishes, the mountain madtom, northern madtom, speckled chub, mimic shiner, and goldeye, combine with the floral and avian elements of Beall Woods to make the area one of extreme biological interest.

The visitor to Beall Woods should go first to the Red Barn Visitor Center, where he will receive material to guide him on his visit. It is a short distance from the Center to the forest, and not far from the edge of the woods he has a choice of several trails through the preserve.

Although Beall Woods is theoretically protected because it is in the Illinois Nature Preserve System, a threat exists. A coal seam lies 790 feet beneath the surface of this preserve. Recently an agreement has been reached between a mining company and the Department of Conservation which provides for the mining of a maximum of 40 percent of the coal and the leaving of 60 percent for support.

## 21. ILLINOIS CAVERNS

Illinois Caverns, in the north-central part of section 31, T. 3 S., R. 9 W., Monroe County, are also known as Mammoth Cave of Illinois, Eckert's Cave, and Burksville Cave. The cave is entered via a stairway descending one of the numerous sinkholes in the area. As described by Bretz & Harris (1961: 69-70) the cave is narrow, long, and crooked; has a small stream meandering along the floor; and has occasional accumulations of fallen rocks.

The cave has representatives of a number of interesting and unusual animals. Among the most evident are the scuds which can be observed in large numbers in the cave stream. The scuds in the cave are *Gammarus acherondytes*, a rare species known only from caves in Monroe and St. Clair counties, Illinois; *Gammarus troglophilus*, a large, relatively rare scud with a range limited to small areas of Illinois and Missouri; and *Bactrurus brachycaudus*, a slender eyeless species occupying subterranean habitats in southwestern Illinois and eastern Missouri.

Also found in Illinois Caverns are cave-adapted millipedes, flatworms, spiders, salamanders, the rare springtail, *Tomocerus missus* (Mills 1948:358), and the white, eyeless, aquatic sowbug, *Asellus packardii*.

A tour of part of the cave may be made after contacting the custodian. The large passage and relatively flat floor make Illinois Caverns easier than most caves to walk through and examine.

## 22. FULTS HILL PRAIRIE

Fults Hill Prairie is located on the bluff south of Fults Creek, southeast of the village of Fults in Monroe County, about midway between Valmeyer and Prairie du Rocher. The prairie is a part of old French land grants, the longest boundaries of which were perpendicular to the bank of the Mississippi River. Such boundaries were common in St. Clair, Monroe, and Randolph counties.

The bluff on which the prairie is located trends northwest to southeast; the brow slope faces southwest. This bluff, like others in the vicinity, is tall, towering more than 300 feet above the adjacent bottomland (Fig. 27). The limestone bedrock is exposed for some distance as a tall cliff. The toe slope of the bluff is talus. A blanket of loess caps the bedrock to form the brow slope, which varies in width. This slope is widest at the northwest, where there are sizable spurs and coves. Southeastward the brow slope



Fig. 27.—Fults hill prairie, southeast of Fults, Monroe County, as seen from the adjacent bottomland. Several rare species of plants and animals live on this bluff.

is not so wide, and the spurs and coves are poorly defined. At the extreme southeast, however, the brow slope widens and supports a broad expanse of prairie.

Vegetation of the bluff is of two types. The toe slope and the larger coves on the brow slope support deciduous forest. The spurs and the remainder of the brow slope are prairie. At the top of the cliff is a narrow rock ledge. The tall cliff faces are devoid of plants except for a few ferns and a few composites.

Fults Hill Prairie is not rich in plant species. As on other hill prairies, little bluestem is the dominant grass. The rare or semirare species this hill prairie contains make it important as a natural area. The bedstraw, *Galium virgatum*, is known in Illinois only at this site, where it grows abundantly at the base of one prairie spur. Scattered plants of bluehearts grow in this prairie. The rare *Heliotropium tenellum*, first reported in Illinois from this site, and stickleaf grow on the rock ledge.

The bluffs at Fults have some unusual animals. Among the vertebrates are the eastern narrow-mouthed toad, Great Plains rat snake, coachwhip, flat-headed snake, six-lined racerunner, and the ornate box turtle. An especially unusual invertebrate for Illinois is the scorpion, *Centruroides vittatus*. It has been found in Illinois only at Fults, and this is the northernmost record for this species.

Fults Hill Prairie and bluff is owned by the Illinois Department of Conservation and forms a part of the Fults Hill Prairie and Kidd Lake Marsh Nature Preserve.

### 23. FOUNTAIN BLUFF

Fountain Bluff, in Jackson County, is located south of Gorham and north of Grand Tower. It is an outlier of the bluffs of the west side of the Mississippi River valley; it was isolated by the diversion of the river from its main valley on the east into a narrower valley on the west. The older valley on the east is 4 miles wide; the one on the west is about 1 mile wide.

Fountain Bluff is 4 miles long and 1.8 miles across at the widest point; it has a perimeter of slightly more than 10 miles. Limestone of the Chester series, which scarcely outcrops at the south end of this outlier, is overlain with Caseyville sandstone. This massive sandstone forms the spectacular cliffs of Fountain Bluff. In a number of places the sandstone has been eroded to form large ravines or small valleys, some of which have been named. Loess caps the sandstone. The highest elevation on Fountain Bluff is 779 feet above sea level, or 419 feet above the floor of the valley to the east and about 430 feet above the Mississippi River to the west.





Fig. 28.—Mouth of the ravine at the site of the old Fountain Bluff station. This is the only sizable break in the tall sandstone cliff in the north side of the bluff.

Approximately a dozen farm homes are located at the base of the cliffs and in the largest ravine, known as Happy Hollow. A road follows the creek through Happy Hollow for a mile before it ascends to the top of the ridge on the west and then trends about a mile northeastward to the point of highest elevation, the site of Fountain Bluff Lookout Tower, a structure removed before 1950. On the east side of Fountain Bluff, three cemeteries, Goodbread, Henson, and Hudson, occupy small areas. A railroad, a branch of the Illinois Central Gulf from Carbondale,



Fig. 29.—Japanese honeysuckle in the Fountain Bluff area. This plant forms a dense cover over the ground and on shrubs; it also forms a dense columnar growth on tree trunks.

skirts the base of Fountain Bluff on the north and west. Years ago Fountain Bluff station stood at the mouth of a beautiful ravine on the northwest side of the bluff (Fig. 28). Later a dam was constructed across this ravine, near its mouth, to impound water for a swimming pool. Both station and pool have disappeared. The pool was filled by silt carried in by running water. The silt now supports semiaquatic and mesic plants.

On the west side of Fountain Bluff is another large ravine, Trestle Hollow. On the southwest, not on the bluff but on the riverbank and adjacent bottomland, several industries—a grain loading dock, a sand and gravel company, and a power station—have developed. Three power lines from the power station cross Fountain Bluff. Two extend eastward; the third stretches northward for some distance on the crest of the bluff ridge along the Mississippi River.

The vegetational cover of Fountain Bluff is mostly deciduous forest interspersed with small prairie openings and formerly one large hill prairie. A small area serves as agricultural land for crop and livestock pro-



Fig. 30.—Plume grass on Fountain Bluff. These culms are over 8 feet tall.

duction and as a site for a commercial enterprise. The dominant tree of the forest appears to be the tulip tree. This tree grows on the slopes and in the ravines. Associated with this species is northern red oak, black oak, white oak, chinquapin oak, and white ash. In the valleys or ravines the sycamore, beech, honey locust, hard maple, and American and slippery elms grow profusely. Black locust evidently was once widely planted in the area. The understory trees include sassafras, redbud, flowering dogwood, hop hornbeam, Iowa crabapple, and blue beech. Common shrubs and vines are poison ivy, spicebush, wild hydrangea, and the introduced Japanese honeysuckle. In some places this honeysuckle has become a pest; it covers the ground surface, forms a dense growth on tree trunks (Fig. 29), and completely covers small shrubs. Many ferns and herbaceous flowering plants, including rare orchids, grow in the moist ravines. Mosses are ordinarily common on the soil surface, and both mosses and liverworts abound on the moist sandstone outcrops and cliffs in the ravines. Of interest to botanists are the numerous patches of plume grass that are scattered on the ridge top to the north and at the base of the bluff to the east. This grass may reach heights of 8 feet or more (Fig. 30).

The prairie openings are small, and most of them are on the ridge tops (Fig. 31). The one sizable hill prairie of this area was situated on the southwest-facing ravine slope at the northern end of Fountain Bluff, but invasion by forest has reduced it to a few small openings. The dominant grass of the prairie types is little bluestem; big bluestem and Indian grass are not uncommon.

The Illinois wood rat, a subspecies of the Eastern wood rat, is one of the unusual animals at Fountain Bluff, being known from only two other areas in Illinois (Klimstra 1969:7). In winter, at temperatures above freezing, the wingless insect, *Boreus brumalis*, wanders about on mosses or snow (Stannard 1958). Fountain Bluff and a few other localities in southwestern Illinois are the isolated stations of *B. brumalis*, far removed from its main range in the eastern states.

Other invertebrates of interest at Fountain Bluff are the land snails, *Retinella rhoadsi* and *Bulimulus dealbatus*, recorded in Illinois only from this area; the thrips, *Dorcadothrips walteri*, also known in Illinois only from Fountain Bluff; the pseudoscorpion, *Larca granulata*; and the grasshopper, *Ischnoptera deropeltiformis*.



Fig. 31.—One of the small prairie openings on a ridge top on the western side of Fountain Bluff.

## 24. GRAND CANYON

Grand Canyon natural area, located about 8 miles southwest of Murphysboro, Jackson County, occupies the southeast quarter of section 35 and the southwest quarter of section 36, T. 9 S., R. 3 W.; the west half of section 1 and much of section 2, T. 10 S., R. 3 W.; it is more than 700 acres in extent. The names Chalk Bluff, Hickory Ridge, and Viney Ridge are applied to the area or to parts of it.

This natural area is a part of the bluff system of the Mississippi River valley. From the floodplain the bluffs rise precipitously 360 feet, reaching an altitude of 720 feet above sea level. The tall, west-facing cliff in section 2 is about 0.75 mile in length and is named Chalk Bluff. The cliff is plainly visible from Fountain Bluff, 4 miles to the west, and from other points in the river valley. Above the tall cliff lies a stony slope; loess caps the bluff.

To the north of Chalk Bluff is a large valley, not quite 0.25 mile across, that is tributary to the Mississippi. This tributary valley, known as Grand Canyon, has steep walls and cliffs. To the south of Chalk Bluff is Clear Creek. This stream flows in a rather broad valley approximately 0.5 mile wide and enters the Big Muddy River, which here flows southward through the Mississippi River floodplain. From Grand Canyon sizable ravines trend upslope to the south and from Clear Creek valley similar ravines trend upslope to the north to dissect the area into a series of deep ravines separated by ridges. The main ridge, which trends eastward from Chalk Bluff, almost midway between Grand Canyon and Clear Creek, is known as Viney Ridge. A half mile east of Chalk Bluff is Hickory Ridge. The elevation at this site is 740 feet. Fig. 32 shows a view of the ridges and bottomland taken from a fire tower that formerly stood on the crest of the ridge.

The ridges support a mixed forest, including such

species as chinquapin oak, northern red oak, black oak, sweet gum, bitternut hickory, tulip tree, and red cedar. Hop hornbeam, Hercules' club, and red-bud grow as understory trees. Poison ivy, smooth sumac, and winged sumac are common shrubs. In some places two species of greenbrier form dense, almost impenetrable patches. Plume grass grows profusely in some of the small openings of the ridge top and also on some slopes.

The ravine slopes support a forest that includes some of the species enumerated above and also beech, which is very abundant. The understory includes flowering dogwood, papaw, and, along the rivulets, the blue beech. On these slopes the Christmas, the maidenhair, the broad beach, the glade, and other ferns are not uncommon. In spring numerous wild flowers clothe the slopes.

In 1949 a small hill prairie occupied part of the west-facing brow slope at the northern extremity of Chalk Bluff. Little bluestem was the dominant grass. Scattered throughout the prairie were small hickories, sassafras, and white oak. In 1970 hill prairie no longer occupied this brow slope. White oak and hickories were present as in 1949, but so were beech, northern red oak, white ash, and hop hornbeam. Some of the shrubs were farkleberry, smooth sumac, fragrant sumac, poison ivy, and Virginia creeper. Prairie plants were few, both in numbers of species and individuals.

The bottomland forest beyond Chalk Bluff toward the Big Muddy River contains such species as overcup oak, swamp white oak, pin oak, pecan, and big shellbark hickory.

This bottomland woods is of special interest to herpetologists because it contains one of the best known snake dens in eastern North America. For many decades the Grand Canyon area has been visited by zoo personnel and other zoologists (Ditmars



Fig. 32.—Deciduous forest as seen from Hickory Ridge Look-out Tower (since removed) in the Grand Canyon area.



Fig. 33.—An adult timber rattlesnake from Jackson County.

1937:103; Minton & Minton 1969:179–180). The timber rattlesnake (Fig. 33), cottonmouth, copperhead, a great variety of harmless snakes and other reptiles, and numerous amphibians live in the area. Unfortunately, the area has also been visited by untrained and uneducated persons, some of whom love only to kill any animal that creeps on the surface of the earth. Although for a long time the snake den was well off the beaten trail, no longer is this true.

Occasionally a visitor to Grand Canyon is rewarded by finding the eastern hercules beetle, *Dynastes tityus*. In size this southern beetle exceeds that of our smallest mammal, the pigmy shrew.

Grand Canyon harbors some rare and semirare plant species: the club moss, *Lycopodium lucidulum*, which grows on a sandstone cliff of one of the tributary ravines; sphagnum moss, which covers a sizable, moist sandstone outcrop in another ravine; and several orchids, including Wister's coralroot and twayblade.

Much of the Grand Canyon natural area is under the supervision of the U. S. Forest Service, but some parts remain in private ownership.

## 25. LaRUE-PINE HILLS ECOLOGICAL AREA

One of the most beautiful, unusual, and outstanding natural areas in Illinois is Pine Hills and the adjacent LaRue swamp in Union County. No matter what the season, this place abounds in natural beauty. It is located in sections 4, 9, 10, 15, 16, 21, 22, and 28, T. 11 S., R. 3 W.

The LaRue-Pine Hills Ecological Area is bordered on the west by a railroad, on the east by the road at the crest of the bluff, on the north by the levee and the road north of the levee at the base of the bluff. The southern boundary, which is south of the road from LaRue, is irregular. The preserve encompasses an area of 1,996 acres, of which almost 1,905 acres are under the National Forest Administration.

The bluffs of the Mississippi River that form Pine Hills are underlain with cherty limestone that outcrops to form sizable cliffs up to 100 feet high (Fig. 34). Cherty slopes lie above the cliffs, and loess caps the bluffs. At the cliff bases, toe slopes of various sizes have been formed of rock fragments that have spalled from the cliff faces. The swamps are in the bottomland adjacent to the bluffs (Fig. 35). They occupy the old channel of the Big Muddy River, which enters the Mississippi River valley west of Murphysboro, Jackson County, and meanders southward along the bluffs into section 4, T. 11 S., R. 3 W., then southwestward and westward to enter the Mississippi River below Grand Tower. In earlier days the Big Muddy continued its course southward along the bluffs. Present-day Otter Pond and Wolf Lake, which lie south of the LaRue-Pine Hills Ecological Area, are parts of the old river channel. Big Muddy is an example of a Yazoo River type of tributary.



Fig. 34.—Cherty limestone cliff on the bluffs of the Mississippi River at Pine Hills. This cliff rises to a height of 100 feet above the nearby bottomland.

The vegetation of Pine Hills is mostly deciduous forest. Prairie openings and one hill prairie are found here. The toe or talus slopes of the bluffs are forested, as are the ravines that extend eastward into the bluffs. The south-facing ravine slopes are cov-



Fig. 35.—Bottomland swamp as seen from the bluff top in the Pine Hills area.

ered with xeric oaks and hickories and some prairie herbs, the north-facing slopes with mesic forest, including tulip tree and hard maple. The cliffs support few plants except scattered individuals of cliff brake, some species of goldenrod, especially Drummond's, and red cedar.

The brow slopes above the cliffs maintain forest in some places, prairie in others. Some of this prairie is of the typical hill type, with little bluestem the dominant grass, and some exists as small openings within the forest. The forest is a mixed deciduous type, with southern yellow pine and pink azalea as unusual species. Southern yellow pine is restricted in Illinois to two localities: Pine Hills and southern Randolph County to the north. Farkleberry is a common shrub on the Pine Hills slopes. These slopes are also the type locality of *Liatris scabra*, a species of blazing star that was first described from collections made here.

The swamps are of interest botanically for the occurrence of several species that are rare in Illinois. Several species of duckweeds, including *Wolffiella floridana*, live in the water of this swamp, as do frogbit and swamp loosestrife, the last a species more common much farther north. Here can also be found the rare grass, *Glyceria pallida*.

The vertebrates in this locality present a rich assemblage of northern, southern, eastern, and western elements occurring in relatively undisturbed habitats. They have been subjects of several investigations, including those by Gunning & Lewis (1955), Rossman (1960), Klimstra (1969), and Boyd et al. (1975). The unusual fishes are the spring cavefish, banded pygmy sunfish, bantam sunfish, spotted sunfish, and starhead topminnow. Unusual amphibians are the mole salamander, cave salamander, bird-voiced treefrog, and green treefrog (Fig. 36).

The swamps harbor the cottonmouth in sizable numbers, the green water snake, the mud snake, and many other more widely distributed species of snakes. On the bluffs are habitats supporting populations of



Fig. 37.—Rice rat, a small rodent inhabiting marshes and swamps of extreme southern Illinois.

many reptiles, including timber rattlesnakes and flat-headed snakes. Pine Hills is the only locality in Illinois from which the scarlet snake has been recorded.

The large bird community includes the Mississippi kite, many species of waterfowl, and a common egret rookery. The plaintive calls of the chuck-will's-widow and the mockingbird remind one that he is now in the southland. The Illinois wood rat, rice rat (Fig. 37), Indiana bat, evening bat, and bobcat are a few of the mammals rarely found in Illinois that are inhabitants of LaRue-Pine Hills Ecological Area (Klimstra 1969; Klimstra & Roseberry 1969; Smith & Parmalee 1954).

For the listener during the spring and early summer, the nightly performances of the amphibian choir, with pitches from the highest sopranos of treefrogs to the deepest basses of bull frogs, cacophonous but beautiful, is a never-to-be-forgotten experience.

Especially unusual invertebrates at LaRue-Pine Hills are an endemic scud, *Gammarus minus pinicollis* (Cole 1970); the dwarf crayfish, *Cambarellus shufeldtii*; the scorpionflies, *Boreus brumalis*, *Merope tuber*, and *Bittacus punctiger*; the stonefly, *Hastaperla brevis*; the thrips, *Heterothrips azaleae* and *Oxythrips divisus*; the grasshoppers, *Schistocera obscura* and *Neotettix femoratus*; and the butterflies, *Amblyscirtes carolina*, *Autochton cellus*, and *Atlides halesus*.

Part of Pine Hills and the adjacent swamps is in the Shawnee National Forest, part in the Southern Illinois University Biological Station, and part in private ownership.

To stop overexploitation of the flora and fauna by collectors, the U. S. Forest Service recently designated the area an Ecological Area, and collecting is allowed by permit only. At last this remarkable area



Fig. 36.—A subadult green treefrog from Union County. The green treefrog is bright leaf-green with a white lateral stripe and gold flecks on the back.

has received some of the protection it has for so long needed and deserved. The staff members of the U. S. Forest Service who made this possible are to be commended for their action and deserve the thanks of the citizens of Illinois.

## 26. HORSESHOE LAKE

Picturesque Horseshoe Lake, located south of Olive Branch, occupies parts of 12 sections in T. 16 S., R. 2 W., in Alexander County. The outline of the lake, which somewhat resembles a horseshoe, possibly suggested the name. The lake was formed from an old meander of the Mississippi River, which is now several miles to the west. The east arm of the lake is approximately 3.75 miles long and 0.25 mile across. To the northwest is a mixture of small lakes and swamp areas. Stretching from the northwest are two arms. One trends southeastward, is about 2.75 miles long and 0.25 mile across, and joins the east arm about 0.5 mile north of the southern extremity of the lake. Between this, the central arm, and the east arm is an island about 2 miles long and 0.5 mile wide. The other arm, the western, trends southward for 0.5 mile, where a levee impounds the water and prevents its flow to the old lake bed that stretches on farther to the south. A dam and spillway at the south ends of the eastern and central arms control to some extent the water level of the lake. Overflow at the dam enters Lake Creek and flows northeastward into the Cache River. Runoff from the surrounding farmland and several small creeks to the north, including Pigeon Roost Creek, supply water to the lake. During dry seasons, several large wells augment this supply. The lake and some of the surrounding area serve as a state wildlife refuge.

The native vegetation of the refuge can be classified as (1) forest and (2) aquatic and semiaquatic. On the island and on some of the land to the west of the central arm are cultivated fields of corn, sunflowers, and soybeans. The products of these fields serve as food for the Canada geese that come here in huge numbers in October and remain until March.

Floating on or just beneath the surface of the lake, sometimes densely covering immense areas, are several duckweeds, including the rare *Wolffiella floridana*. The mosquito fern floats in such numbers on the water, either with the duckweeds or in pure stands, that the surface of some parts of the lake is completely covered (Fig. 38) and assumes a purplish hue. Hornwort and other aquatic plants grow submerged in the lake. Bald cypress and tupelo rise from the shallow water to produce the picturesque appearance of Horseshoe Lake (Fig. 39). In small, shallow pools of the west arm, American lotus covers large areas. The vast numbers of large, circular leaves rise from the water to heights of about 6 feet. In July and August thousands of cream-colored flowers, 6 inches or more across, appear over the leafy mass.



Fig. 38.—One of the coves of Horseshoe Lake. When this picture was taken, mosquito fern completely covered the surface of the cove to give the effect of a lawn rather than open water.

In the very shallow water along the shore, such plants as arrowhead, pickerel weed, and primrose-willow are frequently observed. Other plants of the fluctuating shoreline are buttonbush, swamp privet, swamp honey locust, swamp cottonwood, Drummond's maple, box elder, and numerous herbs, including *Eclipta alba*.

On slightly higher ground bordering the lake shore, other tree species grow in profusion. Shingle, pin, swamp white, overcup, and southern red are the most common of the species of oaks. Soft maple is common; basswood is scattered here and there, as are black walnut and pecan. Three vines are common on trunks of the trees: Virginia creeper, trumpet creeper, and poison ivy. Two additional vines, raccoon grape and passion flower, are less common but can be easily found. In the plant community bordering the lake, clearweed, false nettle, and water horehound are abundant.

The animal life at Horseshoe Lake includes numerous representatives of the Coastal Plain fauna, making it among the most interesting assemblages of animals in Illinois. Amphibians of the area are especially interesting, with large populations of species rarely encountered elsewhere in the state. Included among these are the marbled salamander, mole salamander, bird-voiced treefrog, and green treefrog. Rare reptiles at Horseshoe Lake are the broad-banded water snake, known from nowhere else in Illinois, and the green water snake, known only from Horseshoe Lake and LaRue-Pine Hills.

Other rare animals at Horseshoe Lake are the big-eared bat (Smith & Parmalee 1954:204); southeastern bat (Illinois Natural History Survey specimen); southeastern shrew; rice rat (Necker & Hatfield 1941:42, 53); bobcat (Klimstra & Roseberry 1969: 415); bald eagle (which has nested at Horseshoe Lake in recent years); Swainson's warbler; a crayfish, *Orconectes lancifer*, known in Illinois only from Horseshoe Lake (Page & Burr 1973:52); spotted gar; pugnose minnow; and brown bullhead.



Fig. 39.—Bald cypress and tupelo growing in the water of Horseshoe Lake, Alexander County. Primrose-willow also grows in the water here (foreground).

Rare insects at Horseshoe Lake include a thrips, *Scirtothrips taxodii*, and plant bugs, *Pilophorus taxodii* and *Phytocoris taxodii*, living on cypress trees; a thrips, *Heterothrips aesculi*, living on buckeye; an earwig, *Vostox brunneipennis*; and two species of scorpionflies, *Boreus brumalis* and *Bittacus punctiger*.

Numerous picnic tables have been placed near the lake and close to some of the all-weather roads. The island is usually closed to the public. The overwintering geese attract to this area numerous hunters and bird watchers who, it is estimated, spend over a million dollars annually in Cairo and vicinity.

Horseshoe Lake Wildlife Refuge is under the supervision and control of the State of Illinois Department of Conservation.

The southern part of the island has been dedicated as a nature preserve in the Illinois system.

## 27. CACHE RIVER SWAMPS

Remnants of once-vast cypress swamps are found in a number of localities in southern Illinois, including the Cache River valley and the broad valley that extends from Belknap eastward to the Ohio River. In preglacial times it was not the Cache but an extension of the present Cumberland River that flowed through this valley; the Cache was then a tributary that entered the larger valley where it does

now, that is, between Belknap and Forman, Johnson County. After glaciation, the Cumberland emptied into the Ohio; the Cache followed the preglacial valley of the Cumberland and flowed westward and southward to empty sometimes into the Ohio and sometimes into the Mississippi. In this valley are numerous remnants of cypress swamps, three of which are especially noteworthy for both plants and animals.

Two and one-half miles west and 1 mile north of Karnak was a sizable remnant of a cypress swamp. It occupied parts of sections 7 and 8, T. 14 S., R. 2 E., in Johnson and Pulaski counties. During the past few years the Johnson County segment of the swamp has been totally cleared, leaving wet, open land; the Pulaski County segment, in 1970, still contained cypress swamp, but some logging had been carried out. The river here serves as the county line. Illinois highway 37 traverses this swamp from north to south. The Cache River here occupies a part of the preglacial Cumberland valley.

During much of the year the ground is inundated, often by as much as 6 feet of water, but frequently in the dry season—late summer and early autumn—the water recedes, and it is possible to walk in the swamp. The large trees of this swamp are bald cypress and tupelo, both of which have buttressed bases. Many of the bald cypresses are surrounded by

pneumatophores, or knees (Fig. 40), that grow up to 7 feet high. Other trees of this swamp are overcup oak, swamp cottonwood, Mississippi hackberry, river birch, Drummond's maple, swamp honey locust, and water elm. The last is limited in Illinois to a few of the cypress swamps.

Common shrubs in the Karnak swamp include swamp privet, buttonbush, and, less frequently but still locally abundant, Virginia willow. Trumpet creeper is a very abundant vine in this swamp; *Brunnichia cirrhosa* grows along the border.

The floor of the swamp near the border supports a growth of herbaceous plants, including lizard's-tail, false nettle, a rare milkweed named *Asclepias perennis*, and clearweed. Deep in the swamp the floor is mostly devoid of vegetation except for seedlings of some trees. On decaying logs that float when water is present or rest on the swamp floor in the dry season are found peculiar plant associations that have such species as clearweed, Virginia willow, beggarticks, the small composite known as *Eclipta alba*, and marsh St. John's-wort crowded together.

The large number of sizable bald cypress trees in this swamp is of interest to botanists. Some individual trees are 3.5-4.0 feet in diameter above the buttressed bases. Several specimens measure 5.0-5.5 feet in diameter and up to 100 feet in height. Also of interest to botanists is the polypody found growing as an epiphyte on a single ash tree.

Another cypress swamp remnant in the Cache River valley is a mile north and one-half mile east of Belknap, or slightly more than a mile southwest of Forman in Johnson County. It is located in the northeast quarter of section 36, T. 13 S., R. 2 E., and occupies about 100 acres. This swamp is in the pre-glacial Cache River valley and is near the point



Fig. 40.—Cypress swamp in the Cache River bottomland. The "knees" grow up to 7 feet tall and tend to surround the bald cypress trees. This picture was taken during the dry season.

where the Cache enters the larger valley of the pre-glacial Cumberland. The area of biological interest embraces not only the cypress swamp, but also the forested bluff to the south of the swamp; at the base of the bluff is a spring, known as Bird Spring.

The forest trees of the bluff include hard maple, black walnut, hickories, sweet gum, mulberry, and papaw. Poison ivy is the most abundant shrub under the forest canopy, but wild hydrangea and spicebush are frequently seen there. Buttonbush is found at the base of the bluff. The herbaceous flora of the bluff is rich in species. Numerous grasses, sedges, and ferns grow on the stony slope. In the vicinity of the spring at the base of the bluff, clearweed, wild hydrangea, false nettle, and touch-me-not are common.

At the border of the swamp and bluff base, several plants of the rare spider lily grow under the soft maples and American elms. In the swamp the bald cypress grows abundantly and the pneumatophores are very common on the swamp floor. Associated with the bald cypress are big shellbark hickory, Drummond's maple, swamp cottonwood, overcup oak, and other trees. Common vines in this area are catbird grape and trumpet creeper. Erect shrubs include swamp privet, buttonbush, Virginia willow, and swamp rose.

Not all of this swamp floor supports an herbaceous vegetation, but where the herbs grow can be found ditch stonecrop, lizard's-tail, skullcap, and the beautiful, deep red cardinal flower. Among these are scattered plants of *Asclepias perennis*. A most unusual plant in this swamp is American featherfoil (Fig. 41), which was observed on May 2 and 6, 1969, in large numbers. On the first date it was also seen in smaller quantity in a swamp northwest of Vienna. The associations of plants on the decaying logs (Fig. 42) are similar to those in the Karnak swamp.

The third swamp, generally known as Heron Pond, lies in the low floodplain of the Cache River about 1 mile northwest of Forman in Johnson County. It has been studied recently by Anderson & White (1970). It is a larger swamp than that southwest of Forman and contains about 200 acres that are covered with water throughout the year. The Heron Pond area was relatively inaccessible because of the low bottomland and streams without bridges although a road and paths are now available. Earlier logging activities of man in parts of the area and changes in water level caused by beaver dams produced variations in the swamp community.

Bald cypress is the dominant tree of the swamp community. Tupelo is especially abundant in the recently cutover area. Drummond's maple grows on the rotten logs in the swamp and is also rooted in soil in the swamp border, where dogwoods, oaks, and slippery elms thrive. Buttonbush, swamp rose, snowbell, and Virginia willow are the common shrubs of the swamp; marsh St. John's-wort is a common herb.





Fig. 41.—In Illinois, American featherfoil is restricted to the quiet water of the swamps in Jackson, Union, Johnson, and Pope counties. It is endangered because of habitat destruction in these counties.

In places duckweeds and mosquito fern float on the surface of the water.

A floodplain forest grows on slightly higher ground. Arboreous species such as big shellbark and shagbark hickories, mockernut, southern red oak, Shumard's oak, swamp chestnut oak, white oak, sweet gum, and catalpa grow here. Spicebush, possumhaw, hop hornbeam, blue beech, and poison ivy are present in the understory.

The bluffs to the north are mostly forested on the basal slopes by sweet gum, tulip tree, and such oaks as Shumard's, white, and northern red. Spicebush is the understory plant. Higher up the slope the forest contains white ash, hard maple, and Hercules' club. A hill prairie occupies one of the stony, southwest-facing slopes of the bluffs.

These three bald cypress swamps provide habitats for a number of interesting and unusual animals. In the swamps themselves are the banded pygmy sunfish and other fishes and crayfishes normally found in more southern states. *Cambarellus puer* and *Procambarus viaeviridis*, two crayfishes only recently discovered in Illinois (Page & Burr 1973:51), are common in the heavily vegetated parts of the swamp.

Amphibians and reptiles that are rare in Illinois but common in the swamps of the Cache River include the marbled salamander, mole salamander, cave salamander, bird-voiced treefrog, green treefrog, and



Fig. 42.—A decaying log on the floor of a Cache River cypress swamp. An interesting association of plants grows on such logs, which are afloat during wet seasons and grounded during dry periods.

cottonmouth. Unusual birds in the swamps are Swainson's warbler and the yellow-throated warbler.

The distinctiveness of the fauna in the Cache River swamps is demonstrated by the numerous insects cited as unique or nearly unique in Illinois to these swamps. These insects include a rare grasshopper, *Inscuddevia taxodii*, living on cypress trees; the mosquito, *Aedes aurifer*, for which these swamps are the only Illinois locality; rare plant bugs, *Ceratocephalus taxodii* and *Phytocoris purvus*; and the leafhopper, *Chlorotettix dentatus*, recorded in Illinois only from the Cache River swamps.

The first two swamps described here are in private ownership. The third, the Heron Pond area, is owned by the Illinois Department of Conservation and has been dedicated as the Heron Pond Nature Preserve of the Illinois Nature Preserve System. The Nature Conservancy has purchased much of the area near Heron Pond known as Little Black Slough and has transferred its holdings to the Department of Conservation. This purchase insures the preservation of a sizable acreage of cypress swamp in Illinois.

## 28. THORNTON'S RAVINE

Thornton's Ravine, located along the Ohio River about 5 miles downstream from Metropolis, or slightly more than 2 miles upstream from Joppa, in Massac County, occupies parts of sections 19, 20, 29, and 30, T. 15 S., R. 4 E., but can no longer be considered an unusual natural area. During the middle 1960's, logging was carried out and left a tangle of stumps, slash, brush, and even some felled but abandoned trees. The new owner had all this debris removed by a special machine. When the senior author visited the area on June 4, 1970, he found the slopes more or less intact but the floor of the ravine cleared of its cover.

Perhaps in a quarter century this area, if left to develop naturally, will again be of interest.

## 29. JACKSON HOLLOW

Jackson Hollow, Pope County, occupies about 320 acres in section 31, T. 11 S., R. 5 E., and in section 6, T. 12 S., R. 5 E., to the west of Little Bay Creek and a section of the Illinois Central Gulf Railroad, the section that is commonly called the Edgewood cutoff.

Much of the beauty of Jackson Hollow, like that of so many other beautiful sites in southern Illinois, results from the tall cliffs and the numerous, adjacent rock blocks that strew the slopes from the cliffs to the creeks. The cliffs and blocks are sandstone. Below the sandstone, in some places, layers of coal and shale are exposed. The sandstone is subjected to erosion by water, and, in those places where streams of water flow at the cliff bases or cascade over the cliffs, huge undercuts, locally called caves,

have been formed by the breaking away of large masses of rock (Fig. 43). The small creeks in Jackson Hollow flow across beds or fragments of sandstone or beds of gravel or sand and, near Little Bay Creek, through deposits of silt.

The vegetation of Jackson Hollow falls into two main types, grassland and forest. Grassland is restricted to small prairie openings, most of them above the cliffs, and to fields of broomsedge that developed on abandoned farmland. Forests are represented by the mesic type; with beech, hard maple, and tulip tree, and by the xeric type, with certain oaks and hickories. The former type occupies the spaces below the cliffs, the latter the dry, stony slopes above the cliffs. Smooth alder, river birch, blue beech, and willows thrive along the streams, especially on the banks of Little Bay Creek at the mouth of Jackson Hollow. Farkle-



Fig. 43.—A huge undercut in Jackson Hollow, Pope County. Filmy fern grows at the back of this undercut. The two figures near the center serve as a scale to determine size.



Fig. 44.—Rock selaginella growing in a mass of lichens. This species grows on sandstone in southern Illinois and also in sand prairie in central and northern Illinois.

berry is a common shrub on the stony slopes above the cliffs. The sandstone ledges support numerous lichens, some grasses, and innumerable patches of the moss, *Grimmia*, which when wet are deep green but when dry are almost black.

Many unusual plants occur in Jackson Hollow. The first collection in Illinois of the orchid, *Tipularia discolor*, was made here and cited by Mohlenbrock & Voigt (1959). The first collection of filmy fern in Illinois was made in this locality by Dr. Mary M. Steagall of Southern Illinois University, August 2, 1923. The fern was reported to grow in two of the numerous undercuts in the sandstone cliffs. On April 3, 1963, Dr. Warren H. Wagner, Jr., professor of botany, University of Michigan, accompanied R. A. Evers to Jackson Hollow, and he discovered a third stand in a cleft in one of the cliffs. On May 13, 1963, Evers found a fourth stand in an undercut.

The club moss, *Lycopodium lucidulum*, grows on a flat sandstone surface in one moist ravine, and rattlesnake plantain grows nearby. Professor Wagner and Evers found another club moss, *L. porophyllum*, on one of the sandstone cliff faces. A number of orchids, including puttyroot, grow scattered throughout. Indian pipe and beech-drops are not rare here. Above the cliffs, rock selaginella (Fig. 44) and talinum thrive in scattered patches.

The vertebrate fauna of Jackson Hollow is rich and typical of that occupying the Shawnee Hills physiographic province. Of the invertebrate animals, one insect is of special interest and importance; it is

the staphylinid beetle, *Stictocranius puncticeps*, an eastern species found here but apparently nowhere else in Illinois.

Presently Jackson Hollow is owned by the federal government and is under the control of the U. S. Forest Service.

### 30. BELL SMITH SPRINGS

Several miles east of Jackson Hollow is another of the numerous beauty spots of southern Illinois—Bell Smith Springs Recreational Area. It lies south-east of the community known as McCormick in Pope County. Within the area, Spring Branch, Hunting Branch, and Hill Branch enter Bay Creek, which then flows southward. Most of the area is in sections 33 and 34, T. 11 S., R. 5 E.

The huge cliffs and the small-to-massive blocks that strewn the slopes between the cliffs and streams are sandstone. The cliffs have numerous undercuts, and a large natural bridge is developing along Bay Creek north of Spring Branch. Many years ago, Hill Branch cut into the sandstone and at one place formed a sizable gorge (Fig. 45). Beyond the gorge, downstream, the bed of Hill Branch is strewn with rock fragments. The beds of Hunting and Spring branches are of similar aspect. In some places the streams are shallow and have riffles or small falls; in other places they are deep and form quiet pools. Visitors use some of the large, deep, quiet pools as swimming holes (Fig. 1).



Fig. 45.—A gorge cut into the sandstone along Hill Branch at Bell Smith Springs, Pope County. The steep upper slopes are in many places covered with mosses and lichens.



Fig. 46.—A beech-maple forest between the sandstone cliff and Bay Creek at Bell Smith Springs. This path leads the visitor to the natural bridge.

The vegetation of Bell Smith Springs is deciduous forest with prairie openings. Rock ledges and cliffs provide interesting plant habitats (Winterringer & Vestal 1956). A mesic forest, with beech and hard maple as the most common species, occupies the stream valleys (Fig. 46). Above the cliffs several species of oak and hickory replace the beech and maple. Along the stream banks the red maple, river birch, smooth alder, and Virginia willow thrive. Spicebush is a common shrub in the valley forest; farkleberry is common in the dry forests above the cliffs. Mosses, liverworts, and lichens clothe many of the moist, shaded overhangs. Some cliff faces lack plants and some support growths of lichens and a few ferns. A few hardy composites thrive in some of the cliff recesses. Some rock ledges are bare, but most are clothed with lichens and bryophytes. Vascular plants grow in crevices of the ledges or in the small pockets of soil that accumulate on the surface of the rock. In one overhang the filmy fern grows in scattered patches.

Students from Southern Illinois University have completed a botanical study of this area (Mohlenbrock 1968).

A very interesting insect, originally described from Illinois, lives on the dryer, lichen-covered sandstone ledges. It is the lichen grasshopper or lichen locust, *Trimerotropis saxatilis*, (Fig. 47). The coloration of this insect is such that it blends with the grayish-green lichens and the blackened sandstone.



Fig. 47.—The lichen grasshopper, an insect with a pigmentation pattern enabling it to blend in closely with the lichens on which it lives.

The ravines, slopes, and streams harbor the rich and varied fauna characteristic of the Shawnee Hills. In the streams are two especially interesting animals, the stripetail darter and a crayfish, *Orconectes illinoensis* (Fig. 48). The stripetail darter is distributed mainly in rocky streams in Kentucky and Tennessee and in Illinois is limited to the clear rocky streams in the Shawnee Hills. The crayfish is endemic to the Shawnee Hills. Bell Smith Springs is the only Illinois locality for two species of thrips, *Hoplothrips terminalis* and *Liothrips brevicornis*.

This area, under the control of the U. S. Forest Service, is used to some extent as a picnic area. The name is sometimes spelled "Belle Smith Spring," and for many years the name so spelled was carved on the Forest Service sign at the entrance. According to Allen (1949), the name should be Bell Smith.



Fig. 48.—*Orconectes illinoensis*, a crayfish endemic to rocky streams of the Shawnee Hills.

### 31. HAYES CREEK CANYON

Hayes Creek Canyon, less than a mile north of Eddyville, Pope County, occupies part of section 31, T. 11 S., R. 6 E., and part of section 6, T. 12 S., R. 6 E. In this locality, Hayes Creek flows southward over beds of sandstone. A tributary stream from the east flows over similar beds and has cut a steep gorge at the escarpment (Fig. 49). Some distance below the escarpment this tributary joins Hayes Creek, which then flows southwestward.



Fig. 49.—The gorge of a tributary stream at Hayes Creek Canyon, north of Eddyville, Pope County.

The types of vegetation at Hayes Creek Canyon are similar to those at Bell Smith Springs. Rock selaginella and *Selaginella apoda* (Fig. 50) grow on the sandstone, and the filmy fern grows in two stations about one-fourth mile apart. Christmas fern, common wood fern, and common polypody are the abundant ferns in this area. Twayblade grows in the moist woods along the stream.

Among the unusual animals in Hayes Creek Canyon and the nearby area are a rare thrips, *Heterothrips quercicola*; a crayfish endemic to the Shawnee Hills, *Orconectes illinoiensis* (Fig 48); and the fishes, cypress darter and stripetail darter. The cypress darter is found in only three streams in Illinois.

An excellent nature trail could be constructed from Ozark, Johnson County, eastward through Camp Packentuck (now a part of Camp Ondessonk), Jackson Hollow, Bell Smith Springs, through Spring Branch to Cedar Grove Church, and eastward past Cedar Head to Hayes Creek Canyon and Lusk Creek.

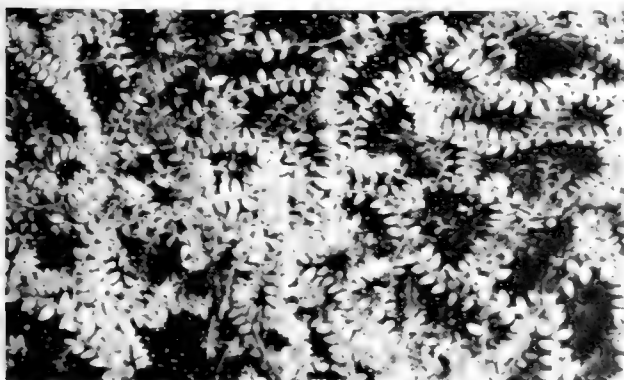


Fig. 50.—A selaginella, *Selaginella apoda*, which grows on the moist sandstone of Hayes Creek Canyon.

Hikers should have a scenic trail over hills and through valleys in southern Illinois.

### 32. LUSK CREEK CANYON

Lusk Creek Canyon, also known as Lusk Creek Gorge, is the most beautiful stream valley in southern Illinois and perhaps in the entire state. Lusk Creek drains much of northeastern Pope County. Its source is near Delwood, a small community on Illinois highway 145. As the creek flows southward, it is joined by numerous tributary streams and finally empties into the Ohio River at Golconda. The locality of special interest is the valley of Lusk Creek as it passes through sections 33 and 34, T. 11 S., R. 6 E., about 2.5 miles east and 1.5–2.0 miles north of Eddyville.

In this locality Lusk Creek has cut through the massive sandstone, carving a valley, canyon, or gorge with cliffs that vary from only a few feet to almost 100 feet high. In some places the valley floor is moderately wide and the bluffs of the stream have steep toe slopes beneath the cliffs. In a few places there is no valley floor except that which the creek occupies. The creek in some areas is shallow and flows swiftly around numerous rocks and over riffles; in others it is deep and forms quiet pools. A canyon in section 34 is hairpin- or horseshoe-shaped. The cut-bank of this canyon or gorge is a towering, vertical sandstone cliff almost devoid of vegetation (Fig. 51). The slip slope—the slope opposite the cutbank—is not vertical but rather a steep sandstone slope that is clothed with mosses, lichens, and deciduous trees. Near the top of the canyon wall is the Indian Kitchen. The summit of the ridge, the area within the horseshoe, is quite rocky; the sandstone is exposed as large ledges, with only a few large blocks near the cliff tops.

Upstream from this beautiful gorge, Lusk Creek flows between steep cliffs, and within 0.5 mile it makes a right-angle bend. At this point Bear Creek joins Lusk Creek. The cliffs along Bear Creek are tall at this junction but decrease in height upstream and finally disappear as the creek flows over the upper surface of the sandstone escarpment. The cliffs along Lusk Creek, upstream from the Bear Creek junction, are quite tall; approximately 0.5 mile north of the junction they reach a height that is tremendous for Illinois.

Above the cliffs of Lusk Creek are slopes of varying steepness. The less steep slopes were cultivated in earlier days but now are deserted fields or have been converted into pine plantations. Some prairie plants thrive in the deserted fields. The upland above Indian Kitchen and within the horseshoe supports a xeric forest, with red cedar, black-jack oak, and farkleberry as common plants.

Deciduous forest covers the toe slopes of the bluffs. Beech, hard maple, red maple, river birch, alder, and sycamore grow near the stream, oaks and



Fig. 51.—The deep gorge along Lusk Creek, northeast of Eddyville, Pope County. The cliff supports little plant life; the slip slope is covered with mosses, lichens, and some trees.

hickories higher up the slopes. The cliffs vary from extremely dry and lacking plant life to very moist and abounding in mosses, liverworts, lichens, and small herbaceous plants, including asters and golden-rods. On one of these cliffs the club moss, *Lycopodium complanatum* var. *flabelliforme*, (Fig. 52) grows. Partridge berry and sphagnum moss are not uncommon on the moist cliffs.

In the springtime the abundant flowers of the shadbush and flowering dogwood create a beautiful sight. And here in autumn the pastel colors of the oak leaves on the upper slopes, most beautiful and restful to the eyes of the observer, provide a never-to-be-forgotten experience. The lichens, bryophytes, ferns, and fern allies have been studied by Skorepa & Snider (1967).

In the area of Lusk Creek can be seen the pileated woodpecker. Turkey vultures apparently nest in the recesses of the tall cliffs north of the junction of Lusk Creek with Bear Creek. White-tailed deer are abundant here, as they are in many other parts of southern Illinois.

Lusk Creek was described by Smith (1971:7) as an outstanding Illinois stream with rocky pools,

gravelly riffles, and cold springs. Among the unusual fishes of Lusk Creek are the black redbhorse, spottail darter, stripetail darter, and mimic shiner. The bird fauna of the area is quite diverse, with the hooded warbler and chuck-will's-widow being especially interesting because of their rarity in Illinois.

Some of the unusual invertebrates inhabiting the Lusk Creek area are the amphipods, *Crangonyx anomalous* and *Synurella dentata*, the former known in Illinois only from the Lusk Creek drainage; the crayfish, *Orconectes illinoiensis* (Fig. 48), an endemic of the Shawnee Hills; a rare stonefly, *Isoperla burksi*; two rare mayflies, *Stenonema pudicum* and *Pseudocloeon myrsum*; and the butterfly, Bell's roadside skipper, *Amblyscirtes belli*, known in Illinois only from the Lusk Creek area.

Most of the Lusk Creek Canyon area is a part of the Shawnee National Forest. A small part is owned by the Illinois Department of Conservation and is a dedicated preserve in the Illinois system.



Fig. 52.—The club moss, *Lycopodium complanatum* var. *flabelliforme*, on a bluff bordering Lusk Creek.

### 33. BIG CREEK

Big Creek is a beautiful, clear, rocky, spring-fed stream draining limestone formations in western Hardin County. The stream system is mostly between Karbers Ridge and Elizabethtown and is composed of three main tributaries: Big Creek proper (Fig. 53), Hogthief Creek, and Goose Creek. All three tributaries have large influxes of spring water, upstream substrates of slab stones, and downstream substrates of gravel and rock. The hilly scenery and the biota of Big Creek are near facsimilies of those of some Appalachian streams of Kentucky and Ten-

Fig. 53.—Big Creek in Hardin County, a rocky spring-fed stream supporting populations of many unusual animals.



ennessee. Smith (1971:7) considered Big Creek to be the outstanding stream in southeastern Illinois.

The stream has populations of three rare crayfishes, relict populations of northern fishes, and several other fishes with very limited distributions in Illinois. These organisms inhabit Big Creek because of its unique characteristics, most notably the large influx of spring water and the preponderance of rocky substrates.

Among the animals in Big Creek of special interest are the crayfishes, *Orconectes placidus*, known in Illinois only from Big Creek, *Orconectes kentuckiensis*, a rare crayfish found in Illinois only in Big Creek and nearby Peters Creek, and *Cambarus laevis*, restricted in Illinois to a few spring-fed streams.

The fishes of special interest are the stripetail and spottail darters, rock bass, smallmouth bass, northern hog sucker, black redhorse, least brook lamprey (known in Illinois from only two streams), and the spring cavefish (Fig. 54), known in Illinois from only two other areas.

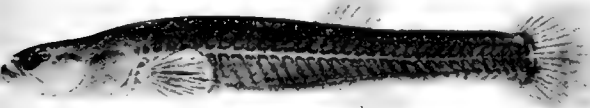


Fig. 54.—Spring cavefish, a rare fish limited in distribution in Illinois to a few springs in the extreme southern part of the state.

Most of the stream system is forested although clearing for agricultural purposes has eliminated wildlife habitats from some rather large areas. Winding gravel roads transect the stream system at many

points and provide a particularly interesting drive. A historic attraction on the watershed is Illinois Furnace, the site of an early iron works in Illinois. Illinois Furnace is approximately 3 miles north of Elizabethtown and is marked on most maps.

The rare pseudoscorpion, *Heterochthonius multispinosus*, and the rare plant bug, *Lygocoris tinctus*, are among the unusual animals of Big Creek.

Much of Big Creek is federally owned and is managed by the U. S. Forest Service. Even so, Big Creek is at present under serious threat of overdevelopment. The stream banks are being cleared of trees at various points, and in all likelihood this will result in a raising of the water temperature, because of reduced shading, and in the extirpation of those species in Big Creek dependent on the cool-water environment.

The populations in Big Creek of animals rare elsewhere in Illinois have led to the selection of the stream as a site for several life-history studies. Studies on the crayfishes are now in progress by personnel of the Illinois Natural History Survey, and studies on the spottail darter and stripetail darter have already been completed (Page 1974 and 1975).

#### RECAPITULATION

These and other natural areas of our state are of great value to scientists of Illinois and elsewhere. To others these natural areas are also of value. Although most persons will never carry out biological studies, the natural areas offer them opportunities to see bits of the forests and prairies for which Illinois was once famous and to observe the plants and animals, both common and rare, in some of these interesting habitats. It is in these places that they can relax and listen to the sounds of nature. Many per-

sons receive a lift from such relaxations. In our society, which requires a rapid pace but also provides much leisure time, these individuals deserve consideration. The observers of nature should be provided with places where they can enjoy their leisure hours and where they can relax, just as others have been provided with hunting, fishing, boating, and playground areas.

We have attempted to take you very quickly through 33 natural or scientific areas of Illinois by means of descriptions and photographs. We hope that this vicarious journey may arouse an ardent desire in you to visit these localities, at least the ones nearest home. Enjoy yourselves in these places. Help preserve them for future generations.

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#### SCIENTIFIC EQUIVALENTS OF COMMON NAMES OF PLANTS

- Alder, smooth—*Alnus serrulata* (Ait.) Willd.  
 Arbor vitae—*Thuja occidentalis* L.  
 Arrow-grass—*Triglochin maritima* L.  
                                   *T. palustris* L.  
 Arrowhead, common—*Sagittaria latifolia* Willd.  
 Arrow-wood—*Viburnum dentatum* L.  
 Ash, blue—*Fraxinus quadrangulata* Michx.  
 Ash, prickly—*Zanthoxylum americanum* Mill.  
 Ash, wafer—*Ptelea trifoliata* L.  
 Ash, white—*Fraxinus americana* L.  
 Aspen, large-toothed—*Populus grandidentata* Michx.  
 Aspen, quaking—*Populus tremuloides* Michx.  
 Aster—*Aster* spp.  
 Aster, narrow-leaved—*Aster linariifolius* L.  
 Aster, azure—*Aster azureus* Lindley  
 Azalea, pink—*Rhododendron roseum* (Loisel.) Rehd.  
 Basswood—*Tilia americana* L.  
 Bearberry—*Arctostaphylos uva-ursi* (L.) Spreng.

- Beard-tongue—*Penstemon* spp.  
 Bedstraw—*Galium* spp.  
 Beech—*Fagus grandifolia* Ehrh.  
 Beech, blue—*Carpinus caroliniana* Walt.  
 Beech-drops—*Epifagus virginiana* (L.) Bart.  
 Beggar-ticks—*Bidens* spp.  
 Birch, dwarf—*Betula pumila* L.  
 Birch, river—*Betula nigra* L.  
 Bittersweet, climbing—*Celastrus scandens* L.  
 Blackberry—*Rubus* spp.  
 Bladdernut—*Staphylea trifolia* L.  
 Bladder-pod—*Lesquerella ludoviciana* (Nutt.) Wats.  
 Blazing star—*Liatris aspera* Michx.  
     *L. cylindracea* Michx.  
     *L. pycnostachya* Michx.  
 Bloodleaf—*Iresine rhizomatosa* Standl.  
 Bloodroot—*Sanguinaria canadensis* L.  
 Blue-eyed grass—*Sisyrinchium albidum* Raf.  
 Bluegrass, Canada—*Poa compressa* L.  
 Bluegrass, Kentucky—*Poa pratensis* L.  
 Bluehearts—*Buchnera americana* L.  
 Blue-joint—*Calamagrostis canadensis* (Michx.) Nutt.  
 Bluestem, big—*Andropogon gerardi* Vitman  
 Bluestem, little—*Andropogon scoparius* Michx.  
 Box elder—*Acer negundo* L.  
 Broomsedge—*Andropogon virginicus* L.  
 Buckbean—*Menyanthes trifoliata* L.  
 Buckeye—*Aesculus glabra* Willd.  
 Buckthorn—*Rhamnus lanceolata* Pursh  
 Buckthorn, alder—*Rhamnus frangula* L.  
 Bulrush—*Scirpus* spp.  
 Bulrush, great—*Scirpus validus* Vahl  
 Bulrush, river—*Scirpus fluviatilis* (Torr.) Gray  
 Bulrush, tufted—*Scirpus cespitosus* L.  
 Bunchberry—*Cornus canadensis* L.  
 Bur-reed, giant—*Sparganium eurycarpum* Engelm.  
 Buttercup, white—*Ranunculus aquatilis* L.  
 Butternut—*Juglans cinerea* L.  
 Buttonbush—*Cephalanthus occidentalis* L.  
 Cabbage, skunk—*Symphlocarpus foetidus* (L.) Nutt.  
 Cardinal flower—*Lobelia cardinalis* L.  
 Catalpa—*Catalpa* spp.  
 Cattail—*Typha latifolia* L.  
     *T. angustifolia* L.  
 Cherry, wild black—*Prunus serotina* Ehrh.  
 Chokeberry—*Aronia melanocarpa* (Michx.) Ell.  
 Cinquefoil, purple—*Potentilla palustris* (L.) Scop.  
 Clearweed—*Pilea pumila* (L.) Gray  
 Cliff-brake—*Pellaea atropurpurea* (L.) Link  
 Clover, purple prairie—*Petalostemum purpureum* (Vent.) Rydb.  
 Clover, white prairie—*Petalostemum candidum* (Willd.) Michx.  
 Cocklebur—*Xanthium strumarium* L.  
 Coffee-tree, Kentucky—*Gymnocladus dioica* (L.) K. Koch  
 Colicroot—*Aletris farinosa* L.  
 Compass plant—*Silphium laciniatum* L.  
 Coneflower, purple—*Echinacea pallida* Nutt.  
 Coralroot, Wister's—*Corallorhiza wisteriana* Conrad  
 Cordgrass, prairie—*Spartina pectinata* Link  
 Cottonwood—*Populus deltoides* Marsh.  
 Cottonwood, swamp—*Populus heterophylla* L.  
 Crabapple, Iowa—*Malus ioensis* (Wood) Britt.  
 Cypress, bald—*Taxodium distichum* (L.) Rich.  
 Dogwood—*Cornus* spp.  
 Dogwood, alternate-leaved—*Cornus alternifolia* L. f.  
 Dogwood, flowering—*Cornus florida* L.  
 Dogwood, rough-leaved—*Cornus drummondii* C. A. Mey.  
 Dropseed, prairie—*Sporobolus heterolepis* Gray  
 Duckweed—*Lemna* spp.  
     *Wolffia* spp.  
     *Wolffiella floridana* (Smith) Thompson  
 Elderberry—*Sambucus canadensis* L.  
 Elm, American—*Ulmus americana* L.  
 Elm, rock—*Ulmus thomasi* Sarg.  
 Elm, slippery—*Ulmus rubra* Muhl.  
 Elm, water—*Planera aquatica* (Walt.) Gmel.  
 Farkleberry—*Vaccinium arboreum* Marsh.  
 Featherfoil, American—*Hottonia inflata* L.  
 Fern, broad beech—*Dryopteris hexagonoptera* (Michx.) C. Chr.  
 Fern, Christmas—*Polystichum acrostichoides* (Michx.) Schott  
 Fern, cinnamon—*Osmunda cinnamomea* L.  
 Fern, common wood—*Dryopteris intermedia* (Muhl.) Gray  
 Fern, filmy—*Trichomanes boschianum* Sturm  
 Fern, fragile—*Cystopteris fragilis* (L.) Bernh.  
 Fern, glade—*Athyrium pycnocarpon* (Spreng.) Tidestr.  
 Fern, grape—*Botrychium virginianum* (L.) Sw.  
 Fern, lady—*Athyrium angustum* (Willd.) Presl.  
 Fern, maidenhair—*Adiantum pedatum* L.  
 Fern, marsh—*Dryopteris thelypteris* (L.) Gray  
 Fern, mosquito—*Azolla mexicana* Presl.  
 Fern, sensitive—*Onoclea sensibilis* L.  
 Fern, walking—*Camptosorus rhizophyllus* (L.) Link  
 Feverfew, American—*Parthenium integrifolium* L.  
 Frogbit—*Limnobium spongia* (Bosc) Steud.  
 Gama grass—*Tripsacum dactyloides* L.  
 Gentian—*Gentiana* spp.  
 Gentian, closed—*Gentiana andrewsii* Griseb.  
 Gentian, downy—*Gentiana puberula* Michx.  
 Gentian, fringed—*Gentiana crinita* Froel.  
 Goat's rue—*Tephrosia virginiana* (L.) Pers.  
 Goldenrod—*Solidago* spp.  
 Goldenrod, Drummond's—*Solidago drummondii* T. & G.  
 Goldenrod, Riddell's—*Solidago riddellii* Frank  
 Gooseberry, pasture—*Ribes cynosbati* L.  
 Grama, side-oats—*Bouteloua curtipendula* (Michx.) Torr.  
 Grape—*Vitis* spp.  
 Grape, catbird—*Vitis palmata* Vahl  
 Grape, raccoon—*Ampelopsis cordata* Michx.  
 Grass of Parnassia—*Parnassia glauca* Raf.  
 Greenbrier—*Smilax bona-nox* L.  
     *S. rotundifolia* L.  
 Green dragon—*Arisaema dracontium* (L.) Schott  
 Gum, black—*Nyssa sylvatica* Marsh.  
 Gum, sweet—*Liquidambar styraciflua* L.  
 Hackberry—*Celtis occidentalis* L.  
 Hackberry, Mississippi—*Celtis laevigata* Willd.  
 Hazel—*Corylus americana* Walt.  
 Hepatica—*Hepatica acutiloba* DC.  
 Hercules' club—*Aralia spinosa* L.  
 Hickory—*Carya* spp.  
 Hickory, big shellbark—*Carya laciniosa* (Michx. f.) Loud.  
 Hickory, bitternut—*Carya cordiformis* (Wang.) K. Koch  
 Hickory, shagbark—*Carya ovata* (Mill.) K. Koch  
 Honeysuckle, Japanese—*Lonicera japonica* Thunb.  
 Horehound, water—*Lycopus americanus* Muhl.  
 Hornbeam, hop—*Ostrya virginiana* (Mill.) K. Koch  
 Hornwort—*Ceratophyllum demersum* L.  
 Hyacinth, wild—*Camassia scilloides* (Raf.) Cory  
 Hydrangea, wild—*Hydrangea arborescens* L.  
 Hymenopappus, white-bract—*Hymenopappus scabiosaes* L'Her.  
 Indian grass—*Sorghastrum nutans* (L.) Nash  
 Indian pipe—*Monotropa uniflora* L.  
 Indigo, wild—*Baptisia leucophaea* Nutt.  
 Ivy, poison—*Rhus radicans* L.  
 Jack-in-the-pulpit—*Arisaema triphyllum* (L.) Schott  
 Juniper, creeping—*Juniperus horizontalis* Moench  
 Ladies'-tresses, hill prairie—*Spiranthes magnicamporum* C. J. Sheviak  
 Ladies'-tresses, nodding—*Spiranthes cernua* (L.) Rich.  
 Ladyslipper, pink—*Cypripedium reginae* Walt.  
 Larch, European—*Larix decidua* Mill.  
 Larkspur, dwarf—*Delphinium tricorne* Michx.  
 Leadplant—*Amorpha canescens* Pursh

- Leather-leaf—*Chamaedaphne calyculata* (L.) Moench  
 Lily-of-the-valley, false—*Maianthemum canadense* Desf.  
 Lily, spider—*Hymenocallis occidentalis* (Le Conte) Kunth  
 Lizard's-tail—*Aururus cernuus* L.  
 Locust, black—*Robinia pseudoacacia* L.  
 Locust, honey—*Gleditsia triacanthos* L.  
 Locust, swamp honey—*Gleditsia aquatica* Marsh.  
 Loosestrife, four-flowered—*Lysimachia quadriflora* Sims  
 Loosestrife, swamp—*Decodon verticillatus* (L.) Ell.  
 Lotus, American—*Nelumbo lutea* (Willd.) Pers.  
 Love-grass, sand—*Eragrostis trichodes* (Nutt.) Wood  
 Lousewort—*Pedicularis canadensis* L.  
 Mallow, rose—*Callirhoe triangulata* (Leavenw.) Gray  
 Maple, Drummond's—*Acer rubrum* var. *drummondii* (H. & A.) Sarg.  
 Maple, hard—*Acer saccharum* Marsh.  
 Maple, red—*Acer rubrum* L.  
 Maple, soft—*Acer saccharinum* L.  
 Marigold, marsh—*Caltha palustris* L.  
 Mayapple—*Podophyllum peltatum* L.  
 Mockernut—*Carya tomentosa* Nutt.  
 Moss, hairy-cap—*Polytrichum* spp.  
 Mulberry—*Morus rubra* L.  
 Needlegrass—*Stipa spartea* Trin.  
 Nettle, false—*Boehmeria cylindrica* (L.) Sw.  
 New Jersey tea—*Ceanothus americanus* L.  
 Oak—*Quercus* spp.  
 Oak, black—*Quercus velutina* Lam.  
 Oak, black-jack—*Quercus marilandica* Muenchh.  
 Oak, bur—*Quercus macrocarpa* Michx.  
 Oak, chinquapin—*Quercus muhlenbergii* Engelm.  
 Oak, Hill's—*Quercus ellipsoidalis* E. J. Hill  
 Oak, northern red—*Quercus rubra* L.  
 Oak, overcup—*Quercus lyrata* Walt.  
 Oak, pin—*Quercus palustris* Muenchh.  
 Oak, post—*Quercus stellata* Wang.  
 Oak, shingle—*Quercus imbricaria* Michx.  
 Oak, Shumard's—*Quercus shumardii* Buckl.  
 Oak, southern red—*Quercus falcata* var. *pagodaefolia* Ell.  
 Oak, swamp chestnut—*Quercus michauxii* Nutt.  
 Oak, swamp white—*Quercus bicolor* Willd.  
 Oak, white—*Quercus alba* L.  
 Oak, willow—*Quercus phellos* L.  
 Orchid, grass-pink—*Calapogon pulchellus* (Salisb.) R. Br.  
 Osier, red—*Cornus stolonifera* Michx.  
 Paint brush, Indian—*Castilleja coccinea* (L.) Spreng.  
 Panic grass—*Panicum pseudopubescens* Nash  
 Panic grass, Scribner's—*Panicum oligosanthos* var. *scribnerianum* (Nash) Fern.  
 Papaw—*Asimina triloba* (L.) Dunal.  
 Partridge berry—*Mitchella repens* L.  
 Passion flower—*Passiflora lutea* L.  
 Pear, prickly—*Opuntia rafinesquii* Engelm.  
 Pecan—*Carya illinoensis* (Wang.) K. Koch  
 Pencil-flower—*Stylosanthes biflora* (L.) B.S.P.  
 Persimmon—*Diospyros virginiana* L.  
 Pickerel weed—*Pontederia cordata* L.  
 Pigweed, winged—*Cycloloma atriplicifolium* (Spreng.) Coult.  
 Pine, Austrian—*Pinus nigra* Arnold  
 Pine, pitch—*Pinus rigida* Mill.  
 Pine, Scotch—*Pinus sylvestris* L.  
 Pine, southern yellow—*Pinus echinata* Mill.  
 Pine, white—*Pinus strobus* L.  
 Pitcher plant—*Sarracenia purpurea* L.  
 Plantain, rattlesnake—*Goodyera pubescens* (Willd.) R. Br.  
 Plume grass—*Erianthus alopecurioides* (L.) Ell.  
 Polygala—*Polygala verticillata* L.  
     *P. polygama* Walt.  
 Polypody—*Polypodium polypodioides* (L.) Watt  
 Polypody, common—*Polypodium vulgare* var. *virginianum* (L.) Eaton  
 Pond lily, yellow—*Nuphar advena* Ait.  
 Pondweed—*Potamogeton* spp.  
 Possumhaw—*Ilex decidua* Walt.  
 Poverty grass—*Danthonia spicata* (L.) Beauv.  
 Prairie dock—*Silphium terebinthinaceum* Jacq.  
 Primrose, bird's-eye—*Primula mistassinica* Michx.  
 Primrose-willow—*Jussiaea decurrens* (Walt.) DC.  
     *J. repens* L.  
     *J. leptocarpa* Nutt.  
 Privet, swamp—*Forestiera acuminata* (Michx.) Poir.  
 Puccoon—*Lithospermum canescens* (Michx.) Lehm.  
 Puttyroot—*Aplectrum hyemale* (Muhl.) Torr.  
 Rattlesnake master—*Eryngium yuccifolium* Michx.  
 Redbud—*Cercis canadensis* L.  
 Red cedar—*Juniperus virginiana* L.  
 Reed, common—*Phragmites communis* Trin.  
 Reed grass, canary—*Phalaris arundinacea* L.  
 Roses—*Rosa* spp.  
 Rose, swamp—*Rosa palustris* Marsh.  
 Rosin weed—*Silphium integrifolium* Michx.  
 Rush, twig—*Cladium mariscoides* (Muhl.) Torr.  
 St. John's-wort, marsh—*Triadenum walteri* (Gmel.) Gl.  
 Sassafras—*Sassafras albidum* (Nutt.) Nees.  
 Saxifrage—*Saxifraga pensylvanica* L.  
 Scurfpea, many-flowered—*Psoralea tenuiflora* Pursh  
 Sea-rocket—*Cakile edentula* (Bigel.) Hook.  
 Sedge—*Carex* spp.  
 Sedge, cotton—*Eriophorum virginicum* L.  
 Seed-box—*Ludwigia alternifolia* L.  
 Selaginella, rock—*Selaginella rupestris* (L.) Spring  
 Shadbush—*Amelanchier arborea* (Michx. f.) Fern.  
 Skullcap—*Scutellaria lateriflora* L.  
 Smartweed—*Polygonum hydropteroides* Michx.  
 Snakeroot, white—*Eupatorium rugosum* Hoult.  
 Snow-bell—*Styrax americana* Lam.  
 Sphagnum—*Sphagnum* spp.  
 Spicebush—*Lindera benzoin* (L.) Blume  
 Spike rush, beaked—*Eleocharis rostellata* Torrey  
 Spring beauty—*Claytonia virginica* L.  
 Spurge, flowering—*Euphorbia corollata* L.  
 Star-grass—*Hypoxis hirsuta* (L.) Cov.  
 Stickleaf—*Mentzelia oligosperma* Nutt.  
 Stonecrop, ditch—*Penthorum sedoides* L.  
 Sumac, fragrant—*Rhus aromatica* Ait.  
 Sumac, poison—*Rhus vernix* L.  
 Sumac, smooth—*Rhus glabra* L.  
 Sumac, winged—*Rhus copallina* L.  
 Sunflowers—*Helianthus* spp.  
 Switchgrass—*Panicum virgatum* L.  
 Sycamore—*Platanus occidentalis* L.  
 Talinum—*Talinum parviflorum* Nutt.  
 Tamarack—*Larix laricina* (DuRoi) K. Koch  
 Thistle, Canada—*Cirsium arvense* (L.) Scop.  
 Thistle, Russian—*Salsola kali* var. *tenuifolia* G. F. W. Meyer  
 Thistle, swamp—*Cirsium muticum* Michx.  
 Three-awn grass—*Aristida desmantha* Trin. & Rupr.  
     *A. oligantha* Michx.  
     *A. tuberculosa* Nutt.  
 Toothwort—*Dentaria laciniata* Muhl.  
 Trillium, purple—*Trillium recurvatum* Beck  
 Trumpet creeper—*Campsis radicans* (L.) Seem.  
 Touch-me-not—*Impatiens biflora* Walt.  
 Tulip tree—*Liriodendron tulipifera* L.  
 Tupelo—*Nyssa aquatica* L.  
 Twayblade—*Liparis lilifolia* (L.) Rich.  
 Viburnum—*Viburnum* spp.  
 Violet—*Viola* spp.  
 Virginia creeper—*Parthenocissus quinquefolia* (L.) Planch.  
 Walnut, black—*Juglans nigra* L.  
 Water lily, white—*Nymphaea tuberosa* Paine.  
 Water-milfoil—*Myriophyllum verticillatum* L.

Waterweed—*Anacharis* spp.  
 Water-willow—*Dianthera americana* L.  
 Whitlow's grass—*Draba* spp.  
 Willow—*Salix* spp.  
 Willow, black—*Salix nigra* Marsh.  
 Willow, peach-leaved—*Salix amygdaloides* Anders.  
 Willow, Virginia—*Itea virginica* L.  
 Winterberry—*Ilex verticillata* (L.) Gray  
 Witch hazel—*Hamamelis virginiana* L.  
 Yew, Canada—*Taxus canadensis* Marsh.

## SCIENTIFIC EQUIVALENTS OF COMMON NAMES OF VERTEBRATE ANIMALS

### Fishes

Banded killifish—*Fundulus diaphanus* Jordan & Copeland  
 Banded pygmy sunfish—*Elassoma zonatum* Jordan  
 Banded sculpin—*Cottus carolinae* (Gill)  
 Bantam sunfish—*Lepomis symmetricus* Forbes  
 Bigeye chub—*Hybopsis amblops* (Rafinesque)  
 Blackchin shiner—*Notropis heterodon* (Cope)  
 Blacknose dace—*Rhinichthys atratulus* (Hermann)  
 Blacknose shiner—*Notropis heterolepis* Eigenmann & Eigenmann  
 Black redbhorse—*Moxostoma duquesnei* (Lesueur)  
 Bluebreast darter—*Etheostoma camurum* (Cope)  
 Brook stickleback—*Culaea inconstans* (Kirtland)  
 Brown bullhead—*Ictalurus nebulosus* (Lesueur)  
 Central mudminnow—*Umbra limi* (Kirtland)  
 Channel catfish—*Ictalurus punctatus* (Rafinesque)  
 Cypress darter—*Etheostoma proeliare* (Hay)  
 Dusky darter—*Percina sciera* (Swain)  
 Eastern sand darter—*Ammocrypta pellucida* (Putnam)  
 Flathead catfish—*Pylodictis olivaris* (Rafinesque)  
 Goldeye—*Hiodon alosoides* (Rafinesque)  
 Greenside darter—*Etheostoma blennioides* Rafinesque  
 Harlequin darter—*Etheostoma histrio* Jordan & Gilbert  
 Iowa darter—*Etheostoma exile* (Girard)  
 Ironcolor shiner—*Notropis chalybeus* (Cope)  
 Lake chub—*Couesius plumbeus* (Agassiz)  
 Lake chubsucker—*Erimyzon sucetta* (Lacépède)  
 Least brook lamprey—*Lampetra aepyptera* (Abbott)  
 Least darter—*Etheostoma microperca* Jordan & Gilbert  
 Longear sunfish—*Lepomis megalotis* (Rafinesque)  
 Longnose dace—*Rhinichthys cataractae* (Valenciennes)  
 Mimic shiner—*Notropis volucellus* (Cope)  
 Mottled sculpin—*Cottus bairdi* Girard  
 Mountain madtom—*Noturus eleutherus* Jordan  
 Ninespine stickleback—*Pungitius pungitius* (Linnaeus)  
 Northern hog sucker—*Hypentelium nigricans* (Lesueur)  
 Northern longear sunfish—*Lepomis megalotis peltastes* Cope  
 Northern madtom—*Noturus stigmosus* Taylor  
 Ozark minnow—*Dionda nubila* (Forbes)  
 Pugnose minnow—*Notropis emiliae* (Hay)  
 Pugnose shiner—*Notropis anogenus* Forbes  
 Rainbow darter—*Etheostoma caeruleum* Storer  
 River redbhorse—*Moxostoma carinatum* (Cope)  
 Rock bass—*Ambloplites rupestris* (Rafinesque)  
 Silver redbhorse—*Moxostoma anisurum* (Rafinesque)  
 Slimy sculpin—*Cottus cognatus* Richardson  
 Smallmouth bass—*Micropterus dolomieu* Lacépède  
 Smelt—*Osmerus mordax* (Mitchell)  
 Southern redbelly dace—*Phoxinus erythrogaster* (Rafinesque)  
 Speckled chub—*Hybopsis aestivalis* (Girard)  
 Spottail darter—*Etheostoma squamiceps* Jordan  
 Spottail shiner—*Notropis hudsonius* (Clinton)  
 Spotted bass—*Micropterus punctulatus* (Rafinesque)  
 Spotted gar—*Lepisosteus oculatus* (Winchell)  
 Spotted sunfish—*Lepomis punctatus* (Valenciennes)  
 Spring cavefish—*Chologaster agassizi* Putnam  
 Starhead topminnow—*Fundulus dispar* (Agassiz)

Stripetail darter—*Etheostoma kennicotti* (Putnam)  
 Suckermouth minnow—*Phenacobius mirabilis* (Girard)  
 Weed shiner—*Notropis texanus* (Girard)  
 White crappie—*Pomoxis annularis* Rafinesque

### Amphibians

Bird-voiced treefrog—*Hyla avivoca* Viasca  
 Bullfrog—*Rana catesbeiana* Shaw  
 Cave salamander—*Eurycea lucifuga* Rafinesque  
 Crawfish frog—*Rana areolata* Baird & Girard  
 Eastern narrow-mouthed toad—*Gastrophryne carolinensis* (Holbrook)  
 Green treefrog—*Hyla cinerea* (Schneider)  
 Illinois chorus frog—*Pseudacris streckeri illinoensis* Smith  
 Long-tailed salamander—*Eurycea longicauda* (Green)  
 Marbled salamander—*Ambystoma opacum* (Gravenhorst)  
 Mole salamander—*Ambystoma talpoideum* (Holbrook)  
 Red-backed salamander—*Plethodon cinereus* (Green)  
 Two-lined salamander—*Eurycea bislineata* (Green)  
 Wood frog—*Rana sylvatica* Le Conte

### Reptiles

Broad-banded water snake—*Natrix fasciata confluens* Blanchard  
 Bullsake—*Pituophis melanoleucus sayi* (Schlegel)  
 Coachwhip—*Masticophis flagellum* (Shaw)  
 Copperhead—*Agkistrodon contortrix* (Linnaeus)  
 Cottonmouth—*Agkistrodon piscivorus* (Lacépède)  
 Eastern box turtle—*Terrapene carolina* (Linnaeus)  
 Flat-headed snake—*Tantilla gracilis* Baird & Girard  
 Great plains rat snake—*Elaphe guttata emoryi* (Baird & Girard)  
 Green water snake—*Natrix cyclopion* (Dumeril, Bibron, & Dumeril)  
 Illinois mud turtle—*Kinosternon flavescens spooneri* Smith  
 Mud snake—*Farancia abacura* (Holbrook)  
 Northern ringneck snake—*Diadophis punctatus edwardsi* (Merrem)  
 Ornate box turtle—*Terrapene ornata* (Agassiz)  
 Queen snake—*Natrix septemvittata* (Say)  
 Ringneck snake—*Diadophis punctatus* (Linnaeus)  
 Scarlet snake—*Cemophora coccinea* (Blumenbach)  
 Six-lined racerunner—*Cnemidophorus sexlineatus* (Linnaeus)  
 Slender glass lizard—*Ophisaurus attenuatus attenuatus* Cope  
 Timber rattlesnake—*Crotalus horridus* Linnaeus  
 Western hognose snake—*Heterodon nasicus* (Baird & Girard)

### Birds

American bittern—*Botaurus lentiginosus* (Rackett)  
 Bald eagle—*Haliaeetus leucocephalus* (Linnaeus)  
 Black tern—*Chlidonias niger* (Linnaeus)  
 Chuck-will's-widow—*Caprimulgus carolinensis* Gmelin  
 Cliff swallow—*Petrochelidon pyrrhonota* (Vieillot)  
 Common egret—*Casmerodius albus* (Linnaeus)  
 Henslow's sparrow—*Passerherbulus henslowii* (Audubon)  
 Hooded warbler—*Wilsonia citrina* (Boddaert)  
 Knot—*Calidris canutus* (Linnaeus)  
 Lark sparrow—*Chondestes grammacus* (Say)  
 Long billed marsh wren—*Telmatodytes palustris* (Wilson)  
 Mallard—*Anas platyrhynchos* Linnaeus  
 Marsh hawk—*Circus cyaneus* (Linnaeus)  
 Mississippi kite—*Ictinia mississippiensis* (Wilson)  
 Mockingbird—*Mimus polyglottos* (Linnaeus)  
 Pileated woodpecker—*Dryocopus pileatus* (Linnaeus)  
 Piping plover—*Charadrius meladus* Ord  
 Ruddy turnstone—*Arenaria interpres* (Linnaeus)  
 Swainson's warbler—*Limnothlypis swainsonii* (Audubon)  
 Turkey vulture—*Cathartes aura* (Linnaeus)  
 Upland sandpiper—*Bartramia longicauda* (Bechstein)  
 Veery—*Catharus fuscescens* (Stephens)  
 Western kingbird—*Tyrannus verticalis* Say  
 Yellow-throated warbler—*Dendroica dominica* (Linnaeus)

## Mammals

Big-eared bat—*Plecotus rafinesquii* LessonBobcat—*Lynx rufus* (Schreber)Evening bat—*Nycticeius humeralis* (Rafinesque)Gray bat—*Myotis grisescens* HowellIllinois wood rat—*Neotoma floridana illinoensis* HowellIndiana bat—*Myotis sodalis* Miller & AllenPigmy shrew—*Microsorex hoyi* (Baird)Rice rat—*Oryzomys palustris* (Harlan)Southeastern bat—*Myotis austroriparius* (Rhoads)Southeastern shrew—*Sorex longirostris* BachmanWhite-tailed deer—*Odocoileus virginianus* (Zimmermann)





