

Indiana Nature Preserves



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An act passed by the 1967 General Assembly created a Division of Nature Preserves within the Indiana Department of Natural Resources, for the purpose of establishing a state system of these areas. It provided for their acquisition, control, use management, and protection, and made an appropriation. The wording of this legislation was patterned after the earlier Illinois Nature Preserves System Act.

In Indiana a difference occurs in basic authority when compared with some other States. The dedication of each proposed area must be approved and accepted by the Natural Resources Commission, which also acts upon all other pertinent matters concerning the Department of Natural Resources. Illinois has a separate Commission, with the Department of Conservation and other agencies serving as advisor. In Wisconsin, the State Board for the Preservation of Scientific Areas has a representative of the Conservation Commission, who serves as Secretary and executive officer of the board, and the Conservation Department is its administrative agent.

The Indiana Natural Resources Commission is composed of 12 members. Six are ex-officio, including the Chief Engineer of the State Highway Commission; the Technical Secretary of the Indiana Stream Pollution Control Board; the Lieutenant Governor, acting as Director of the Department of Commerce, Agriculture, Industry and Public Relations; the Director of the Department of Natural Resources; the Chairman of the Advisory Council on Water and Mineral Resources; and the Chairman of the Advisory Council on Land, Forest and Wildlife Resources. The remaining six members of the Commission are lay members, appointed on staggered terms by the Governor.

Section 5 of the 1969 Nature Pre-

serve Act was amended by Public Law 107, approved February 14, 1972 as follows: In furtherance of the provisions of this chapter, the President of the Indiana Academy of Science, or his delegate, is hereby made an ex-officio member of the commission.

Another feature of the Indiana act concerns the perpetuation of *nature preserves*. Before the Commission can make any finding of the existence of an imperative and unavoidable public necessity, or dispose of a nature preserve, it must give notice of such proposed action and an opportunity for any person to be heard. This involves publication of at least one notice in a newspaper with general circulation in the county or counties where the nature preserve is located. This notice must be at least 30 days prior to the conduct of a public hearing by the Commission. The Governor also must approve of this action.

A *natural area* is described as an area of land or water, or both land and water, whether in public or private ownership, which either retains or has re-established its natural character (although it need not be undisturbed), or has unusual flora or fauna, or has biotic, geological, scenic or paleontological features of scientific or educational value. A *natural area* does not become a *nature preserve* until it has been formally dedicated.

The idea of *nature preserves* had not been given much consideration by the Indiana Department of Natural Resources prior to introduction of the bill in 1967. The Indiana State Park system was started with McCormick's Creek State Park in 1916 and Turkey Run State Park a few months later. The Department now administers 64,819 acres in 16 State Park, one State Beach, and four State Recreation Areas. Many of these contain outstanding natural features, while

others are of archaeological and historical significance.

A reluctance has existed in Indiana State Park acceptance and/or acquisition of smaller natural areas because of the higher maintenance and operational costs for administering a widely scattered system of small tracts. Modest entrance charges have been a tradition since the beginning, with the philosophy that revenue collected should be sufficient for the operational and maintenance budget. Funds are appropriated from general revenue for capital expenditures on acquisition and development.

Present day emphases are directed toward providing recreation for the masses. Consequently, there has been concern in Indiana about giving protection to outstanding nature areas within our State Park system that might be subjected to development pressure in the future.

Nature preserves can not be evaluated on their relative sizes or ability to produce revenue. In fact, their very uniqueness and need for preservation would mitigate against high public use in many cases.

Acquisition is directed toward the purchase of certain key tracts that are in danger of being lost by timber cutting, mining or other exploitation. Acreage includes the natural tract and a sufficient buffer zone.

Development expenditures involve fencing, concrete boundary markers, signs, foot trails and foot bridges. Any necessary parking lots and roads are located in outside buffer zones. Nature preserves are for walking, observing and nature study. Prohibited activities are logging, mining, drilling, excavating, the dumping, burying and spreading of garbage, or other waste material, fires, picnicking, camping, sports, horseback riding, vehicular traffic, gathering of plant or plant products, grazing by domestic animals, hunting and trapping.



Little Cypress Swamp in Knox County.



Nature preserves may be in either public or private ownership. It is our opinion that a preserve under ownership of a private individual would represent the weakest type of dedication. It would be difficult to hold it in perpetuity. Present owners might have the highest motives for preservation, but the same interest might not be held by the heirs to an estate. Consequently, the state administering agency should endeavor to acquire fee title, by gift or purchase of the particular tract.

Conversely, dedication under the ownership of a private organization is one of the strongest where its sole objective is preservation. Acres, Inc., an Indiana not-for-profit corporation, is such an organization in our state. It may merge or consolidate with any other organization or may convey a tract to another organization with the same objectives. Finally, in the case of any breach of contract, all rights, titles and interests would automatically be vested in *The Nature Conservancy*.

Several private educational institutions already have natural areas in conjunction with their curricula. These can be further protected and recognized by inclusion within the *nature preserve* system.

On the national level, *The Nature Conservancy* represents a strong private organization. It has purchased several outstanding natural areas in Indiana.

Pine Hills, in Montgomery County, is a prime example of an area that would have been lost. In this 596-acre tract, which has been deeded to the Department of Natural Resources, one may view high narrow ridges, commonly known as *backbones*, that overlook deep gorges in Clifty and Indian Creeks. Relict stands of white pine, hemlock and Canada yew occur under microclimatic conditions.

Portland Arch, in Fountain County, was saved by this agency. Here, a stream has pirated its course through a rock escarpment. Precipitous cliffs of Mansfield sandstone rise above Bear Creek, which traverses the area.

The Nature Conservancy can take prompt action in acquiring endanger-

ed areas. Its reverter clause, to protect against any future impairment of natural values, provides further security.

Most Indiana *nature preserves* should be under some type of public ownership. Any unit of government, including Departments, Commissions, Counties, municipalities and institutions can dedicate them, and be responsible for preserving the character of the area. However, nothing in the act shall interfere with the major purposes for which the property was originally acquired—for park, forestry, fish and game or other similar uses.

In addition to the Division of State Parks, two other land-holding divisions within the Indiana Department of Natural Resources have considerable property. The division of Forestry owns 140,000 acres and the Division of Fish and Wildlife has 73,000 acres. Several outstanding natural areas can be found on their properties.

The Hoosier National Forest, with 177,500 acres, now contains areas of floral and geologic significance. Although the U. S. Forest Service can not dedicate *nature preserves* within the state system, it is permissible to have them registered.

Progress made by the Division of Nature Preserves, since its activation in 1968, has involved administrative procedures, preparation of Articles of Dedication and Master Plans, rules and regulations and formal dedications. This action has resulted in the preservation of nature preserves on 13 state parks, 3 state forests, 3 state fish and wildlife areas and 4 acquired by the Division of Nature Preserves. Private preservation organizations are represented by 6 areas owned and managed by Acres, Inc., and 5 by The Nature Conservancy. Park and Recreation Boards in Allen and St. Joseph Counties have one each.

One important activity is an inventory of potential natural areas. It is indeed fortunate that a Ford Foundation grant was made for an *Indiana Natural Area Survey* under the directorship of Dr. Alton A. Lind-



Turkey Run set the pace for all Indiana State Parks.

sey, of Purdue University. He investigated purported natural areas over the entire state.

Ecological summaries are included in a book entitled *Natural Areas in Indiana and Their Preservation*. Five different priority ratings were assigned, ranging from one to four in descending importance, with the fifth category representing questionable areas. Twenty two areas were given first priority; 45 second priority; 48 third priority and 32 fourth priority. This survey provided valuable guidelines for use by the Division in selection of nature preserves, especially for those that were threatened by loss and needed immediate attention.

Indiana University has a Center for Research in Outdoor Recreation. In May, 1965, their *Program for Research in Outdoor Recreation, National Beauty and Environmental Design*, completed an investigation entitled *Natural Areas Study of the Wabash River Basin, Indiana-Illinois*. This project was under the general direction of Professor Reynold Carlson and was prepared for the National Park Service.

Indiana contains 36,045 square miles of land area, besides 280 square miles of Lake Michigan. Nationally it holds 38th place in size and 12th place in population. It ranks third among the States in proportion of improved land, being surpassed only by Iowa and Illinois.

Malott (1922) describes Indiana as being located toward the Eastern edge of the great interior plains of the United States, which stretch between the Rocky Mountains and the Appalachian Highlands. With the exception of about 6,000 square miles in the South-Central section, the rest of the State has been glaciated and is relatively smooth, except for some small morainic areas. The glacial till plain covers a large area to the North, but a considerable part of Southern Indiana lies on a well-dissected low plateau.

Altitudes range from 313 feet at the mouth of the Wabash River to 1,285 feet in Western Randolph County near the Ohio line. About one-tenth of the present drainage goes into the St. Lawrence River

system and the rest into the Ohio-Mississippi River system.

Indiana has a variety of natural features. They range from the Dunes on the Southern end of Lake Michigan, with their native jack pine and white pine, to the ox bow lakes, with bald cypress and pecan in the extreme Southwestern corner, where the Wabash empties into the Ohio River. Over 600 natural lakes are found in the Northeastern morainial lake district. The tall grass prairies also extended into Indiana on its western boundary, and smaller oak-openings, with prairie species, were scattered across the Northern portion of the State.

The higher plants of Indiana include 563 genera and 1,769 native species (Heiser and Humbles, 1966). The grass family is the largest in the State, with 51 genera and 171 species. There are 101 trees native to Indiana.

Petty and Jackson (1966) point out that Indiana is a critically located land area with respect to the geography of plant life. Approximately 45% of our flora is comprised of species which are at the limits of their present ranges. Only 10% of our tree species have a statewide distribution. Lindsey, Crankshaw and Qadir (1965) in their study of pre-settlement vegetation determined that 87% of Indiana was covered with forests, 10% with wetlands and 3% dry prairie.

One of the objectives of the Division of Nature Preserves is the dedication of the best representative types of original vegetative cover. *Dry prairies* have all but disappeared in Indiana, with the exception of a few narrow strips along railroad right-of-ways or in odd parcels, and top priority is given to their preservation. Practically all of the *wetlands*, that could be economically drained, have been lost to agriculture.

The Indiana Division of Fish and Wildlife has a *wetlands* acquisition program with a minimum size of 50 acres per tract. Their properties also contain some marshes, bogs and tamarack swamps.

Another 640-acre tract, purchased in an effort to save a remnant popu-

lation of the greater prairie chicken, is the largest existing area containing *wet prairie* species.

Fortunately, *virgin forests* have been preserved in Spring Mill State Park and Turkey Run State Park, in addition to several outstanding old-growth forests in private ownership.

Minimum sizes of eligible *natural areas* may vary from one or two acres of prairie vegetation to 10 acres in an old-growth forest.

The Division of Nature Preserves is also cooperating with the Division of Forestry in locating the best representative stands of 17 different forest cover types which may occur in Indiana, as listed by the Society of American Foresters (1954). Some of these temporary types will eventually revert into climax communities of beech-maple and oak-hickory, but will be of interest and value for studies by ecologists and foresters.

It should be recognized that only a few examples of the original forest cover remain. If the good representative second growth stands on State land are now given protection into perpetuity, there is no reason to believe that many will not develop into prime natural areas in future years. This may well be one of the greatest contributions that will result from the present establishment of a nature preserve system, as it pertains to floristic features of the landscape.

Faunal nature preserves are more difficult to delineate as to minimum size. They will vary with the mobility of the species involved and whether it inhabits terrestrial or aquatic habitats. If one is considering prairie chickens, a minimum of 1,000 to 2,000 acres of land or a series of 40- to 80-acre scattered tracts would be needed. However, intensive farming methods have reduced their grassland habitat requirements and now caused their extirpation in Indiana.

Wildlife refuges for both game and non-game types are merited. These are of value to migratory and resident species. Necessary preservation and protection should be the function of the larger land-holding agencies, rather than the Division of Nature Preserves.



Kickapoo Falls in Warren County.

There are several rare animals that should be given consideration in the establishment of preserves. These include the swamp rabbit, southeastern bat, gray bat, big-eared bat, Indiana bat, and Eastern wood rat.

Cave fauna preservation should also be given careful thought. Possibly 40 acres can be considered as the minimum size for preserving a species even with a small home range.

The physiography of Indiana includes landforms of considerable interest. Several *natural areas*, depicting geological features, have been recommended for inclusion within the system. One area, of only three acres along a stream bank cut, reveals records of the three glaciers that occurred during the Pleistocene Epoch in tills deposited during the Kansan, Illinoian and Wisconsin glaciations.

The oldest exposed bedrock, representing the Ordovician Period, is found in Southeastern Indiana, with the exception of one disjunct outcrop-

ping recommended for a nature preserve in the Northwestern part of the State.

Other formations of Silurian limestone occur in numerous places along the Wabash River. Mansfield sandstone escarpments are prominent along Sugar Creek, East Fork of White River and elsewhere. In addition to being important geologically, they are usually of high scenic value.

The rough terrain, that often occurs with geological phenomena, enhances their botanical worth. Past exploitation in the cutting of timber and clearing of land has frequently by-passed these places, and resulted in preserving the flora. This is particularly true for ferns and their allies.

It also seems fitting that representative lakes in the Northern Moraine and Lake Region should be maintained in their natural state. A few have not been encroached upon by cottage development, due to unsuitable shoreline. This offers an opportunity to maintain aquatic animal life

as well as typical submersed, emerged and adjacent vegetative communities.

The preservation of all or portions of certain natural streams has been initiated by the Division of Outdoor Recreation. Criteria are used to evaluate the natural quality of the stream corridor to determine if the stream is worthy of designation.

The present-day competition for space in Indiana makes it imperative that consideration be given to the preservation of the limited number of *natural areas* that remain here. These ecosystems may be small, but our booming population and its increasing demands on the use of each acre of land make it important to hold them as remnants of the virgin habitats that were commonplace in pioneer days.

Urbanization has drawn our people away from the land and an appreciation of its natural wealth. The protection and preservation of remnant examples of the original Hoosier landscape merits the attention and support of our citizenry.



PINE HILLS

This is an appropriate name for a 470-acre area with scattered stands of evergreens mixed with hardwood trees growing amidst rugged hills and deep gorges. The association of White Pine, Hemlock and Canada Yew represents a relic stand that has persisted from the period following the last Glacier, when the climate was much colder in Indiana.

Pine Hills, in addition to being the first State Nature Preserve in Indiana, is also the 107th site to be included in the *National Registry of Natural Landmarks*.

The Indiana Chapter of The Nature Conservancy, a non-profit organization, raised money through private donations to acquire the tract. On October 16, 1961, it was conveyed to the Department of Natural Resources. On June 1, 1971, Wabash College also gave 12 acres as an addition bordering Sugar Creek. This property, in Montgomery County, is administered as a part of Shades State Park.

Pine Hills was originally divided into a number of ownerships. One of the wider ridges adjoining the more level upland was cleared, but the rest of the land remained essentially in timber.

A sawmill was set up in the 1850s as an addition to the Deer and Canine grist mill at Pine Bluffs. Timber-cutting activities removed many of the larger hardwoods, but the pines and hemlocks were not seriously disturbed.

A commercial enterprise entered the area in 1868 when the Pine Hill Woolen Mill Company placed a dam in Clifty Creek. A notch was excavated through the abutting hill and the impounded water ran through this open cut into a wooden flume connected with a water wheel that powered the mill.

Due to damage from floods, the mill was moved to nearby Pine Bluff in 1873. Thus, the valleys and surrounding hills soon returned to their sylvan beauty.

Pine Hills is of importance from a botanical standpoint. *White Pine* is



unique when considering size and number. This conifer in many places appears to be successfully competing still with hardwoods. *Hemlock* grows more slowly, but is reproducing. *Wintergreen* and *partridgeberry*, found on the forest floor, are of interest.

In the Spring, the rare *snow trillium* is the earliest flowering plant. Clumps of *hepatica* soon bloom, as well as *trout lily*, *wake robin* and

Jack-in-the-Pulpit. Flowering *dogwood* and *redbud* add color in May.

Clifty Creek and Indian Creek flow through the property. Four narrow ridges, called backbones, remain in the upland and are about 75 to 100 feet above the valley floor. These geological features are recognized as the most remarkable examples of incised meanders in the Eastern United States.



Long Beech Fern and Rotting Tree Trunk in Scout Ridge Nature Preserve.

SCOUT RIDGE

Beech-Maple is the dominant forest type found on this 15-acre tract in Morgan-Monroe State Forest. It is situated in the Monroe County part of this property, which is operated by the Division of Forestry of the Indiana Department of Natural Resources.

The largest tree is a 42-inch-diameter beech. Some Sugar Maple, Black Oak, Hackberry and Ash are 30 inches or better d.b.h. (diameter breast height).

The understory is dominated by Spicebush, Pawpaw, Mapleleaf, Vi-

burnum, Red Elm and Sugar Maple. A variety of plants comprises the ground cover. These include seven different ferns and many Spring and early Summer wildflowers.

A self-guiding Nature trail, with 27 marked stations, traverses the cool Northern exposure slopes and adjoining narrow valley. Trees, shrubs, and herbaceous plants are featured, as well as interesting geological examples of *Mississippian* sandstones and shales, and glacial boulders.

DONALDSON'S WOODS

This undisturbed old-growth woods is recognized by botanists as the most

impressive stand of the original forests remaining in Indiana. The Nature Preserve contains 67 acres. It is situated in the Southeastern corner of Spring Mill State Park in Lawrence County.

The mixture of Beech-Maple and Oak-Hickory types classifies it as a Western mesophytic forest. However, recent studies indicate that Beech-Maple is assuming greater importance.

An unusual feature is the high percentage of White Oaks, with one measuring 48 inches. The largest Tulip (Poplar) is 52 inches in diameter.

Spicebush, Maple Leaf Viburnum, Woodbine, Poison Ivy, Hazelnut, Coralberry, Wild Grape, Toothed Arrowhead and Black Haw are ranking shrubs.

In the Fall, herbaceous plants are represented by Greenbrier, Bedstraws, Yellow Agrimony, Sanicle, White Snakeroot, Hog Peanut and Lopseed.

The area is in the famous *karst* region of Indiana and has sinkhole drainage. Twin Caves adjoin the tract.



White Oaks Dominate in Donaldson's Woods.



Large Black Oaks at Grider's Woods.

GRIDER'S WOODS

Jethro Grider formerly owned this small 10-acre woodlot on the Tri-County State Fish and Wildlife Area. It is located in Turkey Creek Township in the Kosciusko County part of this property.

There is a good mixture of Oaks and Hickories, interspersed with Sugar Maple, Black Walnut, White Ash and Tulip. Several trees exceed 30 inches in diameter, including White Ash, Black Oak, Chinquapin Oak and Red Oak.

In the Spring the ground is carpeted with Spring Beauty, Bloodroot, Anemones, May Apple and beds of the Large-Flower Trillium. Later blooming species are True and False Solomon's Seal, Sweet Cicely, Lady's Thumb, Smartweed, Coneflower, Bedstraws, Nettle and Appendaged Waterleaf.

A self-guiding nature trail, with 25 stations, traverses interesting ecosystems found within the area.

BEAVER LAKE

Originally this Nature Preserve was a part of a shallow lake that comprised one part of the *Grand Marsh of the Kankakee*. Drainage of the Beaver Lake segment resulted in a diversity of dry blow-sand, wet depressions and infertile flats.

Controlled burning is implemented to maintain prairie grasses and eliminate encroachment by woody vegetation. Dry sites are dominated by Little Bluestem and Switchgrass. Associated species include Horsetail, Milkweed, Blazing Star, Pasture Thistle, Goldenrods, Pasture Rose and Mid-grasses.

Ponded areas contain Cattails, Bluejoint Grass, Sedges and other plants found in west prairie associations.

The Division of Fish and Wildlife of the Department of Natural Resources originally acquired this property in an effort to perpetuate the remnant Prairie Chicken population. None of these birds has been seen since the Spring of 1970. The passing of the Prairie Chicken from our State will place more emphasis on the Beaver Lake refuge for preservation



Bee on Field Thistle in Prairie Vegetation at Beaver Lake Nature Preserve.

of indigenous wildlife and interesting vegetation.

Beaver Lake Nature Preserve, containing 640 acres, is situated in McClellan Township, Newton County. It may be reached by going three miles North of Enos on U. S. Highway 41, and thence East one mile and North one mile. Permission to enter must be obtained from the area manager at the nearby Willow Slough State Fish and Wildlife Area.

ROCKY HOLLOW-FALLS CANYON

This Nature Preserve, with 404 acres, lies on the North side of Sugar Creek in Turkey Run State Park in Parke County. After crossing the suspension bridge, proceed either North up Rocky Hollow or West toward Falls Canyon.

This part of Turkey Run contains narrow canyons, flanked by high walls of Mansfield sandstone, to which Ferns, Hydrangeas and native Hemlock trees cling and shade out all but the noonday sun. Miniature waterfalls tumble over the rocks at the heads of these gorges.

A magnificent old-growth forest occupies the upland and alluvial terraces. Large Black Walnut, measuring up to 47 inches, Tulip 51 inches, White Ash 51 inches, Hackberry 38 inches, and a 31-inch Honey Locust are examples of sizes of these hardwood trees. Sassafras, commonly considered a shrub species, reaches 26 inches, and Black Gum 30 inches.

The shrub layer consists of Flowering Dogwood, Ironwood, Spicebush, Mapleleaf Viburnum and Leather-



Shrub Bog and Tamarack Trees in Tamarack Bog Nature Preserve.

wood. Herbaceous plants are Maiden-hair Fern, Rattlesnake Fern, Spleen-worts, Bloodroot, Anemones, Trilliums, Bedstraws, Hepatica, False Solomon's Seal, Dragonroot, and many other wildflowers.

TAMARACK BOG

Tamarack (American Larch) is found at the Southern limit of its range in Indiana. Although it extends South of this location, this stand on the Pigeon River State Fish and Wildlife Area in LaGrange County is the largest remaining one in the State.

It contains a diversity of plant communities. One finds from East to West a small field in the early stage of forest reversion. This is bordered by a lowland stand of Black Oak, Red Elm and Largetooth Aspen.

The shrub layer has clumps of High and Low Bush Blueberries, Prickly Ash and Hazelnut. Bracken Fern dominates the ground cover.

Bloody Run, a small stream annually stocked with Trout, meanders through this part and is flanked by clumps of Royal Fern, Cinnamon Fern, and Skunk Cabbage.

As the water table reaches the top of the sandy soil, Red Maple, Spotted Alder, Trembling Aspen and Tamarack dominate. Tamarack increases as sphagnum-covered hummocks appear. The bog then opens up with scattered Poison Sumac, Swamp Rose, Gray Dogwood and Bush Cinquefoil.

Dwarf Birch is another interesting shrub. Emergent plants and floating aquatics border the part of Pigeon River impounded by Mongo Millpond.

Faunal populations also exhibit a great diversity. White-tailed Deer, Fox Squirrels and Cottontails are found on the upland. Woodcocks are often flushed from Alder thickets. Muskrats, Beaver and many swamp-inhabiting songbirds are attracted, as well as Ducks and other water birds.

This 100 acre Nature Preserve, one mile East of Mongo, is managed by the Division of Fish and Wildlife.



Falls Canyon in Turkey Run State Park.

BEECHWOOD

The Northeast slope of this tract has a second growth of Beech-Maple. However, it is more significant as a depressional site with a variety of habitats drained by a small stream that empties into nearby Little Otter Lake.

A part of the muck soil supports a stand of Yellow Birch, Red Maple, Cork Elm and Blue Beech. Dense thickets of Red Osier and Pale and Gray Dogwoods, occupy more open areas, along with Poison Sumac, Elderberry and Spicebush. One small ponded portion has Cattails and Sedges rimmed with Black Willow, Pussy Willow and Swamp Dogwoods.

Marked foot trails and foot bridges over wet ground permit visitors to traverse the tract at a leisurely pace.

This is the first privately-owned property to be included in the state-wide system of dedicated Nature Preserves. It was given by Mildred and Garnette Foster to Acres, Inc., a non-profit preservation organization with headquarters at Fort Wayne. The 74-acre tract in Steuben County fronts on the West side of U. S. Highway 27 and Interstate 69, North of the entrance to Pokagon State Park.

OGLE HOLLOW

The occurrence of the rare Yellowwood tree is the outstanding feature of this Nature Preserve. Brown County is the only place in Indiana where these trees are known to exist in the wild. The next nearest known location is in Kentucky, about 40 miles South of Evansville.

The 41-acre tract varies in elevation from 1,000 feet above sea level on the ridge to 750 feet in the valley. This difference of 250 feet and the Northern exposure contribute to a moist cool habitat.

The Preserve contains a good variety of trees. Chestnut Oak and Black Oak occur on the upper ridge, while Red Oak and White Oak are at lower elevations. Shagbark and Bitternut Hickories, Green Ash, Sugar Maple, Beech, Largetooth Aspen, Red Elm, Sassafras, Basswood, Red Maple, Black Gum, and Sycamore, as well

as the interesting Yellowwood, grow on the better sites. The largest Yellowwood measures 26 inches D.B.H.

The understory has beautiful Flowering Dogwood and Redbud, mixed with Pawpaw, Spicebush, Ironwood and Blue Beech. Delicate Mapleleaf Viburnum, Spiny Hercules Club, Wild Hydrangea and Witch Hazel add to the attractiveness of the site.

Wild flowers provide a continuous display of colors during the growing season. Typical plants are Wild Ginger, Perfoliate Bellwort, Solomon's Seal, Jack-in-the-Pulpit, Rue Ane-

mone, Bloodroot, May Apple, Reflexed Trillium, Bedstraws and White Baneberry.

Christmas Fern is widely distributed and often associated with Maidenhair Fern and Narrowleaf Spleenwort on the slopes. Fragile Fern, New York Fern, Broad Beech Fern, Silvery Spleenwort and Rattlesnake Fern are other species.

Ogle Hollow is in Brown County State Park near the park office and primitive campground. It contains a self-guiding Nature trail with 25 stations.



Foot Trail Traverses Open Area at Beechwood.



Yellowwood Tree on Steep Slope in Ogle Hollow Nature Preserve.

POST OAK — CEDAR

This Nature Preserve has two contrasting habitats. The upper slopes of limestone and sandstone are dry with slow-growing trees, shrubs and open barrens. The lower slopes and valley with limestone is more mesophytic.

Dry sites support such Oaks as Post, Chestnut, White, Blackjack, Scarlet and Black, mixed with red cedar. Winged Elm and Carolina Buckthorn are also found here. Common shrubs, growing on the thin topsoil, are Dwarf Hackberry, Southern Blackhaw, New Jersey Tea, Deerberry, St. Andrew's Cross, Shrubby St. Johnswort, and Fragrant Sumac.

There is an unusual occurrence of four different species of Smilax, including Sawbrier, Fringed, Round-leaved and Hispid Greenbriers.

Several openings do not support woody growth. These barrens or hill

prairies are unique with Big and Little Bluestems, False Dragonhead, Coneflower, and two species of Blazing Star. Purple-stemmed Cliffbrake Fern clings to exposed rocks.

Moist sites at lower elevations have the usual mixtures of Sugar Maple, Hackberry, Oaks, Ashes and Hickories, with an understory of Ironwood, Blue Beech, Flowering Dogwood, Pawpaw and Wahoo. A self-guiding trail brochure gives more details on natural features of this 42-acre area.

Wild Turkey and Ruffed Grouse have been reintroduced in the vicinity. White Tail Deer and Fox and Gray Squirrels are often seen.

The property is managed by the Division of Forestry in the Harrison-Crawford State Forest. It is located about 12 miles West of Corydon on U. S. Highway 460.

SAND HILL

Many sand hills were formed during glacial periods which created the *Northern Moraine* and *Lake Region* in Indiana. Soils were formed by outwash material with variable drainages. These factors have influenced the forest composition on this Nature Preserve.

Well-drained *Plainfield* fine sand is found on the higher ridge. Black Oak dominates here, but there are a few White Oak and Black Gum. Shrub cover is quite sparse and consists of Huckleberry clumps, Woodbine, Poison Ivy and Wild Grape.

Berrien and *Newton* loamy fine sands create a different composition in depressions. Pin Oak, Jack Oak, Black Gum and Red Maple are typical. In a few isolated pockets, stunted Black Gums grow on bare yellow sand with a few Lichens and Roundhead Lespedezas.

A small acreage, previously cleared, is regenerating with trembling Aspen, Pin Oak and Willow. The ground is covered with thick tangles of Blackberry, Sedges and Sensitive Fern.

The Western side is still in an open field after 30 years in public ownership. Dewberry and Field Sorrel indicate its acid condition. Red Crest and Cup Lichens and Mosses are the first invaders on open blow-sand. The presence of Little Bluestem, Prairie Goldenrods and Panic Grasses point to possible maintenance of a prairie site.

The Division of State Parks has jurisdiction over this 60-acre part of Tippecanoe River State Park in Pulaski County near Winamac on U. S. Highway 35.

PEDESTAL ROCK

Deep canyons and high escarpments along Sugar Creek make this Nature Preserve quite similar to Pine Hills. Both tracts are within the boundaries of Shades State Park.

Bowl-shaped *Pedestal Rock* is approximately 20 feet high and stands on a secluded lower slope. In some places the upland extends to high overlooks above Sugar Creek, while

other parts are dissected by narrow ravines containing small rivulets with miniature plunging waterfalls.

Towering Hemlock trees, on steep cool slopes, shade beds of Canada Yew and Partridge-berry on the forest floor. Walking Ferns and Liverworts cling to exposed sandstone that is bordered by thin layers of organic soil with Christmas Fern, marginal Shield Ferns and patches of Hepatica.

The second - growth hardwood stand at upper elevations is mixed with Beech-Maple and Oak-Hickory. There is an open understory of Sugar-Maple, Flowering Dogwood, Elm and White Ash.

This 730-acre Nature Preserve, extending for a distance of three miles along the North side of Sugar Creek, is managed by the Division of State Parks.

False Dragon-Head Is Found in the Hill Prairies at Post Oak — Cedar Nature Preserve.



Fern Bed in Depression at Sand Hill Nature Preserve.

EDNA W. SPURGEON

The physiography of this tract in the Northeastern *Morainal Lake Area* is of particular interest. It is locally identified as *The Knobs*. The rolling upland has some small kames, resulting from glacial deposits.

A diversity of past land use practices has created a site varying from old fields to sizable forest stands. An entrance trail leads through a bluegrass field being invaded by Hawthorns, Sumacs, Blackberries, Elms and Wild Black Cherry.

The adjoining Beech-Maple woods may be divided into two units. The Western side, which was grazed some years ago, contains some older Beech but lacks a dense understory.

The eastern portion, with low ridges and moist troughs, supports a fully-stocked second growth stand of Beech and Maple, with the usual associates of Green Ash, Tulip, Red Oak, Basswood, Hackberry and Wild Black Cherry. There are many dead American Elm, but Red (Slippery) Elm is still present.

Shade-tolerant Sugar Maple dominates the understory, followed by a high incidence of Ironwood. Soils on the better drained ridges and slopes support False Solomon's Seal, Meadow Rue, Violets and Trilliums, while depressions have Stinging Nettle, Jewel-weed, Skunk Cabbage and other herbs.

Sixty acres of the Spurgeon tract have been dedicated as the second Nature Preserve owned by Acres, Inc. This organization uses volunteer help from members for maintenance. Nature trails are marked so that school groups and other interested persons can visit it. Location is in Noble County about three miles Northeast of Ligonier (State Highway 5).



Rare Canada Yew Grows Under Hemlock at Pedestal Rock.

MORaine

Moraine Nature Preserve is a fine example of the many land forms associated with the *Valparaiso Moraine*.

This morainal complex of scenic and geologic interest can be traced for several hundred miles from Southern Wisconsin through Northeastern

Illinois and Northwestern Indiana into West-Central Michigan. Geologically, it is generally considered to mark the Southern edge of the *Lake Michigan Lobe* of glacial times.

This tract in Porter County contains a combination of rolling ridges, steep sidehills, muck pockets, pot holes and a shallow pond. Vege-

tative types are quite diversified on various types of *Miami* soils which extend down to the muck areas and open water.

With the exception of a few upland fields in grass, the ridges and slopes are clothed with woodlands ranging from invading hardwoods and second growth to one small tract in its near original state. Most of the forested sites are moist and are in various stages of succession to the Beech-Maple type.

Typical understory species are Sugar Maple, Red Elm, Mapleleaf Viburnum, Pawpaw, Spicebush and Running Eynonymus, Wild Ginger Large-Flower and Reflexed-sepal Trilliums, False and True Solomon's Seals, Ginseng, Wild Sarsaparilla and different violets grow on these shaded sites. Grape Fern, Broad Beech Fern, Christmas Fern and Ebony Spleenwort are commonly found.

In old fields with scattered invading stems of Red Elm, Wild Black Cherry and Red Maple, one may find the dainty nodding Ladies' Tresses and a few green-carpeted beds of Clubmoss.

One swamp contains a dense growth of buttonwood, edged with Willows and an occasional Winterberry with its bright red fruit after leaves have fallen. Lady Ferns and Indian Cucumber-root grow in bordering moist soil.

Two small kettle holes are rimmed with buttonbush and black willow.

The largest natural pond has a complete cover of Spatterdock. Rice Cutgrass and Water Smartweed on the muddy flats provide an excellent feeding place for dabbling Ducks. Bluewing Teal and Woodducks often flush from its surface, while Great Blue Herons wade in its shallow water.

Anonymous gifts of land have now resulted in a total of 193 acres. As a life estate has been granted, it is not presently open for public use. Management is by the Division of Nature Preserves.



Skeleton of White Pine Exposed in Big Blowout at Indiana Dunes State Park.



Old Beech Trees on Edna W. Spurgeon Tract.



Small Kettle Hole at Moraine Nature Preserve.

DUNES

Strong winds from the North and West have sculptured a nationally famous dunescape along our Hoosier shore of Lake Michigan. It is fortunate that a significant part of this geological phenomenon still remains in the Indiana Dunes State Park. It is also appropriate that 1,530 acres of this 2,182-acre Park have been dedicated as the largest Nature Preserve in the State-wide system.

It includes the Eastern two-thirds of the Park with the exception of the sandy beach bordering the Lake. The tract is approximately 2½ miles long and one mile wide.

The first evidence of Nature's control of shifting sands can be found where the base of the dunes meets the more level lakeshore. Beach grass, with its spreading underground root system, establishes little islands of cover in the wind-blown sand.

Here and there, small mats of Bearberry (Kinnickinnick), a procumbent evergreen shrub, add more stability to the soil. Sumacs, Sand Cherry, Cottonwood, and Prostrate Juniper gradually take over with increases in elevation. A few isolated stands of Jack Pine still persist on these lakeward slopes.

The foredunes are characterized by a series of hills and swales. Ridge tops exist at different elevations, with intervening saddles. Mt. Tom is the highest point, being 186 feet above the Lake. In between these high points and ridges in the foredunes are three important depressions: *Beach House*, *Furnessville*, and *Big Blowouts*.

The interdunes area is composed of a series of hills surrounding pockets and troughs, as well as the inner sections of the larger blow-outs. There are secondary peaks, *Mount Jackson* being 181 feet high.

Blowouts extend into this area. The continuous shifting of sand uncovers trees that were completely buried years ago. Remains of a former *White Pine* forest can be seen in the *Tree Graveyard* part of *Big Blowout*.

The backdunes area begins on the



Thin Layers of Limestone in a Dry Stream Bed at Laughery Bluff.

windward side of active blowouts in some places and on protected ridges elsewhere. Leeward slopes usually face the Southeast.

Tops and upper leeward slopes of the backdunes are forested with nearly pure stands of Black Oak, mixed with a few White Oak and stunted Sassafras. Thick stands of Blueberry, Bracken Fern and Greenbrier are found in the understory. Starry False Solomon's Seal is one of the few plants blooming in late May.

Sandy flats, and lower ground with greater organic matter, border the swamps and marshes lying to the South. One sheltered cove has native White Pines, up to 26 inches d.b.h., associated with Oaks, Tulip, White Ash and Basswood.

Mid-May finds the forest floor with dense stands of flowering plants. The umbrella leaves of May Apple shade Wild Geranium and Large-Flower Trillium with their beautiful white petals that turn pink with age. Jack-in-the-pulpit emerges in beds of Skunk Cabbage. In other places, the

small white flowers of the Canada Mayflower can be found with Indian Cucumber-root.

The second physiographic region, up to ½ mile wide, occupies low ground South of the dunes. These contribute to the headwaters of a tributary flowage into Dunes Creek.

The third physiographic region begins on the South edge of the marshy ground and extends to the South boundary. It marks the beginning of one of the earlier shorelines of prehistoric *Lake Chicago*. Although there is a gradual down-slope to the North, plant zonation does not follow this pattern, due to local differences in drainage and plant nutrients.

Best examples of mesophytic forests are found in rolling sandy areas abutting swamps. More mature stands contain some of the largest specimen trees.

Dunes Nature Preserve is under administration of the Division of State Parks. It is located three miles north of Chesterton in Porter County on U. S. Highway 20.

LAUGHERY BLUFF

This Bluff overlooks the deeply-incised valley carved by Laughery Creek in Versailles State Park in Southeastern Indiana. In fact, the Nature Preserve extends down the side hill to the flood plain along this stream. The tract is of unusual floral and geological significance.

It is underlain by flat-lying limestones and shales of the *Silurian Age*. This formation is well exposed on the Western boundary of the area in a tributary stream bed. There is a sloping wet weather waterfall about 23 feet high. Stratified layers are highly fossilized with animals that lived during the period when this section was covered by an *Inland Sea*.

Fossils in the rock strata in the upper end of this valley, as well as those found in fragmented rock slabs in the stream bed below, are rich with Brachiopods, Corals, Bryozoans and Gastropods.

Dr. Marion T. Jackson, an ecologist at Indiana State University, who spent his early boyhood days on this former farm, has made extensive studies of the woodland. The upper promontory has beech-maple, with 10 other species of substantial importance. Some old Beech trees reach a diameter of 40 inches. Large Tulip, Sugar Maple and Black Walnut also contribute to the impressiveness of this old forest.

Flowering Dogwood adds much beauty in the Spring. Ironwood, usually a small tree of the understory, reaches 14 inches in diameter.

Past cutting on the steep slopes reduced the number of older trees, but one Chinquapin Oak, 43 inches in diameter, is still standing.

Ground vegetation is influenced by residual limestone soils. Twin-leaf and Black Cohosh are found with the usual Mayapple, Jack-in-the-pulpit, Bloodroot and White Baneberry.

This Nature Preserve, containing 81 acres, lies about one mile Southeast of Versailles on U. S. Highway 50



Old Growth Stand in Dogwood Nature Preserve.

DOGWOOD

A small undisturbed old-age stand of hardwoods grows on a cool Northern slope in the Southern end of Versailles State Park. It was used for many years by the late Dr. John E. Potzger for Butler University field studies.

The high incidence of Flowering Dogwood, in the small tree and shrub classes, prompted the name for this Nature Preserve.

Again, the forest composition is predominantly Beech and Maple, with the usual associations of White Ash, Wild Black Cherry, Black Walnut, Tulip, Red Oak, Hackberry, Basswood and some Shagbark Hickory. An unusually fine specimen of Sassafras, 29 inches in diameter, stands in the Northwestern corner.

The Northeastern corner of the Preserve contains an old field in an advanced stage of succession with some Sugar Maple, Tulip, White Ash and Black Walnut, mixed with Red Cedar, Honey Locust and Sassafras.

In the old woods the herbaceous composition includes dense beds of May Apple, Sweet Cicely and Bedstraws. The beautiful white flowers of Rue Anemone and Wood Anemone complement the green fronds of Christmas Fern, Lady Fern, Maidenhair Fern and Narrowleaf Spleenwort.

The 20-acre Dogwood Nature Pre-

serve in Ripley County also is managed by the Division of State Parks.

EUNICE HAMILTON BRYAN

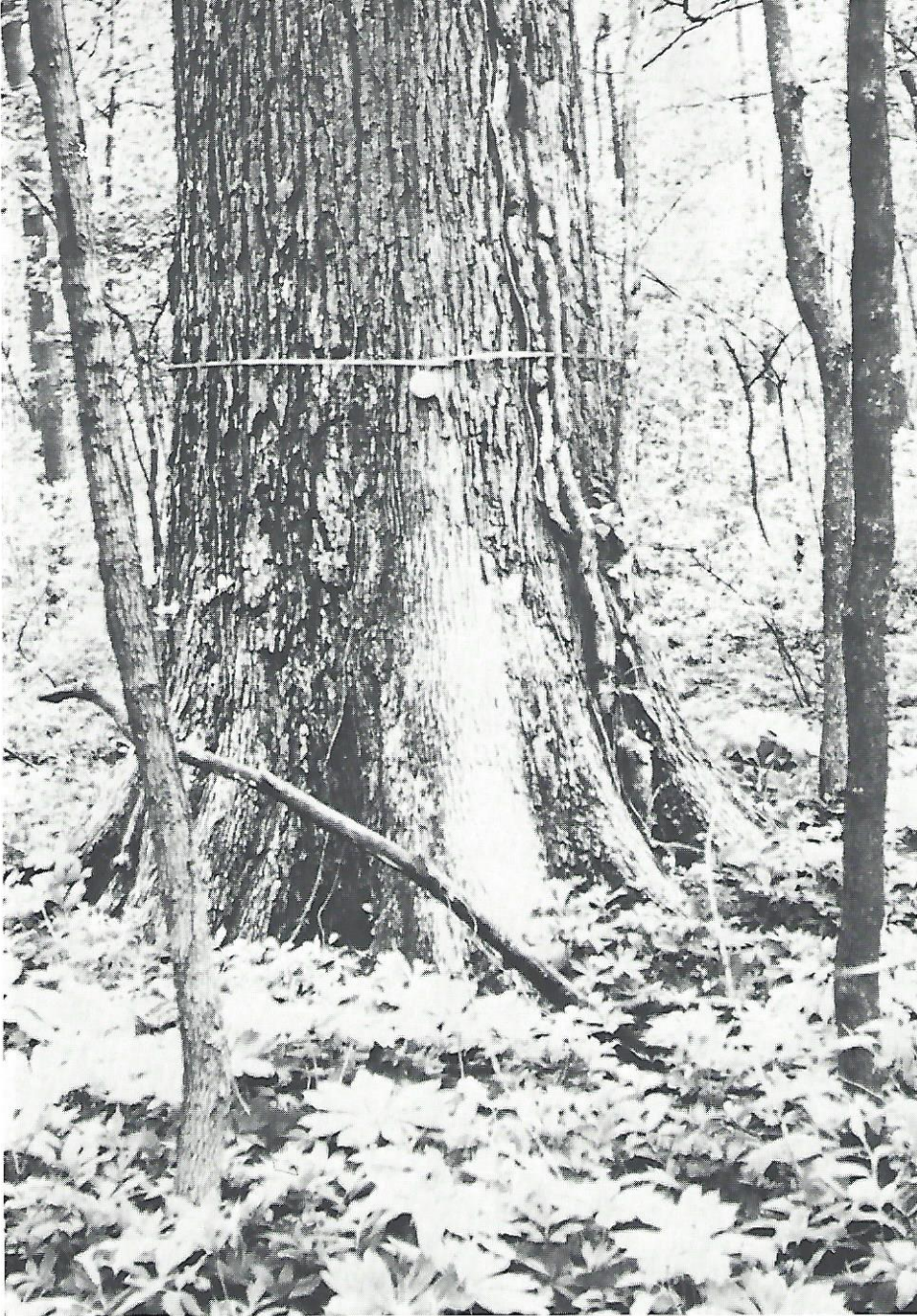
The late Henry R. Smith bequeathed this property to the State of Indiana with the stipulations that it should be a memorial to his mother-in-law and should remain forever as refuge for wildlife and forestry purposes. The 30-acre Nature Preserve stands like an oasis surrounded by highly productive farmland.

Giant White Oaks, four feet in diameter, are found with large Red Oaks, Beech, Basswood and Shagbark Hickory on drier sites. Smaller poorly-drained spots have Pin Oak, Bur Oak and Red Maple.

Spicebush, Poison Ivy, Greenbrier, Black Haw and Pawpaw are common shrubs in drier portions, while Buttonbush and Winterberry surround a small pond.

Spring wild flowers are represented by Yellow Troutlily, Dutchman's Breeches, Toothwort, and Spring Beauty. These are soon followed by Wild Phlox, Virginia Waterleaf, Wild Cranesbill and other beautiful flowering plants.

Dr. George Parker, Purdue University, is starting studies of the effects of public use on the native biota. Administration of this 30-acre tract located seven miles Northwest of Frankfort in Clinton County, is under the Division of Nature Preserves.



Large White Oak and Dense Undergrowth in Eunice H. Bryan Area.

BENDIX WOODS

In 1966 the Bendix Corporation gave 175 acres to the St. Joseph County Park and Recreation Board. It had formerly been part of Studebaker Proving Ground. Most of this gift park is used for all types of outdoor recreation. However, one corner containing 27 acres has a woods with Large Beech, Sugar Maple, Red Elm and Basswood. This outstanding natural area has been set aside for walking and observing only.

A Naturalist will conduct guided tours on the rolling terrain and maintain a Nature Center with interpretive exhibits in another part of the

property. Persons will remain on paths that wind through an understory of Spicebush and Pawpaw and Lianas of Woodbine climbing the tall trees.

In moist spots there are dense growths of jewelweed and nettle. Solomon's Seal, Wild Ginger, Sanicle, Running Euonymus, Blue Cohosh and Ferns are some of the plants found along the upper trail.

Bendix Woods Nature Preserve is the first to be dedicated and managed by a County government in Indiana. It is located on the South side of State Highway 2, 10 miles West of South Bend.

WOLF CAVE

Wolf Cave and Littens Branch in McCormick's Creek State Park are not as widely known as the geological features and more spectacular scenery along the main gorge in the other part of this property. The longer walk on Trail 5 has preserved its natural beauty from the heavier public use at more accessible places.

Wolf Cave is a small underground passage for water that enters from a wet weather stream and emerges a short distance below into a secluded valley. However, one feature of geological significance has escaped attention.

At the point where the flow emerges, a collapse in the limestone ceiling has occurred for a short distance and caused the formation of an adjoining natural bridge. This phenomenon, over which the trail passes, has a larger opening than the much more publicized Portland Arch in Fountain County.

Small waterfalls and low rock outcrops are found along Littens Branch, and large sinkholes in the uplands further diversify landforms.

Mosses, Liverworts and Walking Ferns have established their niche communities on limestone talus. Stonecrops, Hepatica, Christmas and Fragile Ferns help to stabilize the soil on adjoining slopes. One old field in

Beech and Maple Border a Foot Trail in Bendix Woods.





A Natural Bridge, Hitherto Unpublicized, at Wolf Cave.

the Northeastern part has several large beds of Clubmoss.

Several typical forest associations are found here. Beech dominates cool slopes with associates of Red Oak, White Ash, Tulip, Sugar Maple and Hackberry. In narrow valleys, Sycamore, Red Elm and Black Walnut increase in numbers. Drier uplands have Chinquapin Oak, Red Oak, White Oak and Shagbark Hickory.

This 214-acre tract is situated in the Northcentral part of McCormicks Creek State Park. It can be reached by taking Trail 6 from the Environmental Education Center or by making the complete circuit of Trail 5 from its starting point on the main park road. This state park is in Owen County with the entrance located on State Highway 46, two miles southeast of Spencer, Indiana.



Portland Arch

This State Nature Preserve, containing 247 acres, has been recognized for its natural uniqueness since the first settlers came to Western Indiana. A stone arch and rugged canyon attract visitors to this scenic area in Fountain County near the Wabash River.

Bear Creek flows through a deep ravine with high rock walls on each side. It is joined by a small tributary stream that has carved an opening through a massive *Mansfield* sand-

stone formation and created a natural bridge, known as Portland Arch.

A few native White Pine are mixed with Oaks and Hickories growing on the thin mantle of soil on steep slopes. The ground is covered with mosses and lichens and supports scattered beds of Blueberry, Huckleberry and Wintergreen. The rare Bush-Honeysuckle occurs here. This is also the only known place in the State where the Canada Blueberry is found.

Vertical cliff faces have small crevices from which grow Bulblet, Hayscented and marginal Shield Ferns. Several colonies of Forbes Saxifrage

are found in larger pockets of soil. Liverworts cover moist portions of some rocks and are occasionally joined by the creeping fronds of Walking Ferns.

The area is under the direct administration of the Division of Nature Preserves. More acreage has been added to the portion of this property, which previously was owned by The Nature Conservancy. A hiking trail has been established on it. The original tract contains a self-guiding trail. It is 0.8 miles long with 25 marked stations. The trail begins at the registration box located at the main parking area. It goes through the former area used as a Boy Scout camp and continues downhill through sugar maple, white pine and oaks to a former resort site. This area once contained log cabins, which burned down in 1917. The trail continues down a steep side slope to the rock escarpment where Portland Arch is located. It then passes between a high walled canyon on one side and Bear Creek on the other. After passing an abrupt turn in the stream valley, it again goes uphill to the ridge and returns to the parking lot.

Portland Arch is a registered National Natural Landmark. To get there from Attica, Indiana, go South on U.S. Highway 41 for a distance of about five miles; then turn West on County Road 650 North and drive five miles to Fountain, Indiana. Portland Arch adjoins the South side of this village.

Lloyd W. Bender

This Memorial Forest in Noble County was given to Acres, Inc., a not-for-profit preservation corporation with headquarters in Fort Wayne.

The South Branch of the Elkhart River and its floodplain form the North and West boundaries of the 60-acre Nature Preserve. The combination of swamp forest, ponded wetlands and upland ridges, along with old fields reverting to woody vegetation, provides a wide diversity of plant and animal communities.

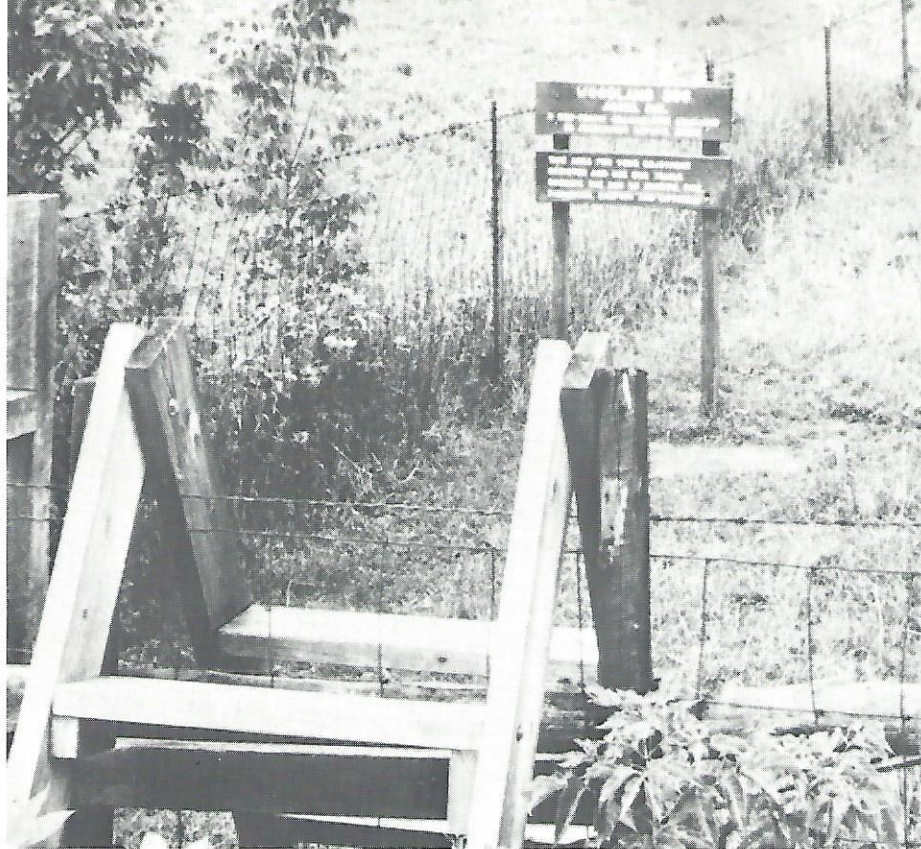
Low ground trees include Silver Maple, Green and Black Ashes, Swamp White Oak, Cottonwood, American



Blue Flag Is Found in the Lowlands at Lloyd W. Bender Nature Preserve.



Bear Creek Canyon at the Famous Portland Arch State Nature Preserve.



The Stile Entrance to Woodland Bog Nature Preserve (Above), and Rare Flowering Raspberry at Blue Bluff Nature Preserve (Below).

Elm and Box Elder. Shrubs are Swamp Rose, Dogwoods and Poison Ivy. Stinging Nettles is the dominant herb. Upland morainal ridges primarily support second-growth stands of Shagbark Hickory, Red Oak, Red Elm, Tulip and Green Ash.

The tract is two miles Southwest of Albion. Take the River Road to the entrance sign and follow a trail to the woods.

Woodland Bog

This former peat bog in Steuben County has passed through the successional stage into a swamp-forest dominated by Soft Maple, Wild Black Cherry, Red Elm, Pin Oak, Swamp White Oak and Largetooth Aspen. A few Tamarack trees still stand as evidence of their former dominance when the site was seasonally ponded with water.

Prickly Ash, Wild Grape, Virginia Creeper and Highbush Blueberry grow in profusion above mats of Swamp Dewberry. Other areas, with tussocks formed by the roots of fallen trees, are covered with dense growths of Cinnamon Ferns and Royal Ferns. Red baneberry, club moss and Canada Mayflower are of particular in-

terest along with the more common fragile, sensitive and Rattlesnake Ferns, Jewelweed, tall Bellflower and the ever-present Stinging Nettle.

This 20-acre property is also owned and managed by Acres Inc., and was made possible by a gift from Dr. Burtis E. and Dr. Bernice E. Horrall. It is located approximately three and a half miles Northeast of Angola. A stile, one-half mile East of the intersection of County Roads 200 East and 100 North, crosses a fence that follows a right-of-way to the Southeastern corner of the tract.

Blue Bluff

This 32-acre Nature Preserve in Morgan County is situated on a range of river hills bordering the West Fork of White River. The particular hill, known as Blue Bluff, was created during the *Mississippian Period*. One





portion, East of this tract, is too steep to support vegetation, thus exposing the blue siltstone for which it is named.

The small Nature Preserve has a difference of 220 feet in elevation. The top of the ridge offers a beautiful panoramic view of the tree-lined river and adjacent valley.

Red Oak is the dominant tree. Its mixture with Hickories, Sugar Maple, Beech, Tulip and Ash creates an interesting slope forest. The occurrence of Flowering Raspberry on outwashes of blue siltstone is of particular interest. This plant, with beautiful purple flowers and Maple-shaped leaves, is

Lake Lonidaw Borders a Tamarack Swamp at Potawatomi State Nature Preserve.

reported from only five other Counties in the State.

The Nature Conservancy, a national preservation organization with offices in Arlington, Virginia, owns this site. It is maintained by the Indiana Chapter.

From the junction of County Roads 150 East and 600 North at Centerton, go Southwest one and one half miles. Use the small parking lot after crossing the bridge.

Potawatomi

A small natural lake, Cattail marshes, Sedge meadows, Tamarack and Yellow Birch swamps and adjoining uplands covered with hardwoods are features of this 208-acre State Nature Preserve in Pokagon State Park. It is an outstanding example of the original landscape in the Northeastern Morainal Lake Region.

Lake Lonidaw is nestled in a depression bordered by marsh vegetation and an adjoining Tamarack-Black Ash swamp. Three Northern White Cedars are found in a nearby wet-seep. Their origin has not been determined. If they are native, they rep-



Indiana's Most Famed River Flows Past the Acres Along the Wabash Nature Preserve.

resent the only known occurrence of this tree in Indiana.

The higher morainal ridges support stands of Red and White Oaks, Wild Slack Cherry, Shagbark Hickory and Sugar Maple. Flowering Dogwood and Mapleleaf Viburnum add color to the understory in Spring. Wild Sarsaparilla, Wake Robin, Bellwort and Hepatica are found in the ground cover.

Other swampy areas have dense beds of Cinnamon Ferns and Royal Ferns, growing beneath an overstory of Red Maple, Tamarack, Yellow Birch and Black Ash. In fact, the largest known Tamarack and Yellow Birch Trees in the State are found here. Waterfowl nest in marshy places. White-tailed Deer, Raccoons, Fox Squirrels and Chipmunks are common residents of the area.

Pokagon State Park is six miles North of Angola in Steuben County, which forms the Northeast corner of Indiana.

Acres Along the Wabash

This property in Wells County borders the North bank of the Wabash River for a distance of three-fourths of a mile. On the alluvial bank there are scattered large specimens of Red Oak, Bur Oak and Sycamore, along with Silver Maple, Cottonwood, Black Willow and Box Elder. Wafer Ash, Bladdernut and Black Haw are interesting shrubs.

The West portion of the 27 acres in this Nature Preserve has a second-growth stand of mixed hardwoods, with high frequencies of Sugar Maple, Black Maple and Red Elm. Associated trees are Red Oak, Green Ash, Hickories, White Oak, Basswood, Hackberry, Buckeye and Beech.

Fox Squirrels, Chipmunks and Woodchucks are common residents of the woodland. The tracks of Raccoons and Muskrats are indented in the soft mud along the river. Wood Ducks often flush from the pools that are created by limestone riffles.

Acres, Inc., owns and manages this tract, as a gift from Roland and Catherine Maxwell. It contains a Nature Trail, and lies on the Southwest side



Pileated Woodpeckers Make Rectangular Holes in a Tree at Shrader-Weaver State Nature Preserve.

of State Highway 116, approximately one and a half miles Northwest of Murray, in Wells County.

Shrader-Weaver

The history of Shrader-Weaver Woods and its dedication as a State Nature Preserve, involves the activities of two pioneer families and their interest in the preservation of an old-growth forest. Located in Posey Township of Fayette County, it is included in the National Registry of Natural Landmarks.

The 108-acre property, owned by the State, is under the management of the Division of Nature Preserves. It contains a pioneer homestead, open fields, and wooded tracts. An old-growth forest of 28 acres is one of the few remaining such stands in Indiana. A self-guiding trail winds through this

climax Beech-Maple woods. In addition to these two dominant trees, there are large specimens of Tulip, Wild Black Cherry, Black Walnut, Red Elm and Bur Oak. These, along with other natural features, are identified at 25 marked stations.

A second self-guiding trail will be established to illustrate succession in an old field. It will traverse another low ground woods along Williams Creek.

The Nature Conservancy obtained this tract from Laz Weaver and his sister, Miss Edith Weaver. In turn, it was deeded to the Indiana Department of Natural Resources.

From Bentonville go one mile East on County Road 700 North, then one and three-fourths miles South on County Road 450 West.



A Nature Study Class at Fox Island Nature Preserve (Above) and Hornbeam Catkins at Hornbeam State Nature Preserve (Left).



Fox Island

The Allen County Park and Recreation Board purchased this 381-acre tract for outdoor use by its citizens. The entire Northern portion of 220 acres is set aside as a Nature Preserve for the protection of its unique biotic and geological features.

There are marshes and swamps that border a dune developed after the recession of the last *Wisconsin glacier*. Fourteen different soil types have been identified. These land and water forms in turn, have created a diversity of plant and animal ecosystems.

Old fields are in various successional stages. Black Oak predominates on the higher dry dunes. White Oak, Black Walnut and Wild Black Cherry increase on moist slopes, and are replaced by Willows, Cottonwood and Sycamore on lower mucky soils. Wetlands in the Northwest part have open water surrounded by emergent vegetation. These features also contribute to faunal distribution, with 83 species of birds being listed along with many mammals.

Fox Island also is of historical significance, as early explorers in this region of the Midwest used these wetlands as the portage between the Great Lakes and Mississippi drain-

ages. From Lake Erie they came up the Maumee River, and the lower section of the St. Marys River before crossing into these marshes and swamps in the headwaters of the Little Wabash.

Nature trails are now being established by the Park Board for use by students and the general public. A resident naturalist oversees the property. Fox Island is Southwest of Fort Wayne at 7324 Yohne Road.

Hornbeam

A 37-acre area on the West side of Whitewater Lake in Whitewater State Park has been dedicated as an example of a mixed (mesophytic) hardwood forest in the East-Central part of Indiana. The forest type tends towards Beech-Maple, but the high numbers of Red Oak, Green Ash and some Hickory rate it as mesophytic. The understory contains an unusual number of large Ironwood and Blue Beech. The two trees are collectively known as Hornbeams, thus prompting the name of this Nature Preserve.

Spring wildflowers carpet the ground, with an unusual density of cut-leaved Toothwort and Bedstraws. Dutchmen's-Breeches, Jewelweed, Jack-in-the-Pulpit, Bloodroot, Violets, and Solomon's Seal are other



An Autumn Scene at Bitternut Woods Nature Preserve.



Swamp Rose State Nature Preserve Is Noted for This Beautiful Flower.

species. Large-flower Trillium and Twinleaf are also of interest. Whitewater State Park is in Union County three miles South of Liberty and is adjacent to Brookville Lake.

Swamp Rose

This State Nature Preserve in St. Joseph County has both geological and biotic features. There are round-topped hills, known as *glacial kames*, and lower outwashes characteristic of an era when ice extended into Indiana during the *Pleistocene Epoch*. The low ground, with seasonal standing water, was originally a pasture, most of which is reverting into a shrub swamp type, with Swamp Rose clumps as the prominent cover. There are dense colonies of Rushes, Sedges, Cattails and Grasses, denoting different hydroseric zones. Marsh Marigold, Blue Flag, Jewelweed and Bittercress add color to this plant community.

An adjoining moist terrace supports a woodland gradating from Silver and Red Maples, Green Ash and Red Elm in the wettest portion to Beech, Sugar Maple, Wild Black Cherry, Tulip, Red Oak and Bitternut Hickory at slightly higher elevations.

Animal signs indicate a good Raccoon and Whitetail Deer population. It is also an attractive habitat for Woodcock and Jacksnipe. Minnows and aquatic organisms are found in a seasonal rill.

The 100-acre area is located in the extreme Northeast corner of Potato Creek State Recreational Area. This new property of the Department of Natural Resources is operated by the Division of State Parks.

Bitternut Woods

Indiana Chapter of The Nature Conservancy also has this 22-acre



Hemmer Woods Nature Preserve Has Outstanding Mixed Oaks and Hickories.



area in Hamilton County. It is presently not open to public use.

Williams Creek meanders through a narrow valley. A second-growth forest on the floodplain and adjoining terrace has scattered large specimens of Beech, Bitternut Hickory, Sycamore, Oaks and Blue Ash. One Bur Oak measures 53 inches D.B.H. (diameter breast high). A Chinquapin Oak measures 45 inches, a Red Oak 46 inches, and a Blue Ash 30 inches.

At this stage in the transition of a former woods pasture it contains large colonies of Spring wildflowers, including Wild Ginger, Appendaged Waterleaf, May Apple and Bloodroot.

The preservation of such small tracts, as green spaces with a good diversity of Natural features, becomes increasingly important in a burgeoning urban area.

Hemmer Woods

This old-growth woods in Gibson County contains 72 acres and is representative of the original forests of

The Orangeville Rise at the Truly Unique Lost River.

Southwestern Indiana. The larger upland portion supports the Oak-Hickory type, with large White Oak and Black Oak as the dominant trees. There are also nice specimens of White Ash, Red Oak and Sassafras, along with Pignut, Small-fruited Hickory and Shagbark Hickorys. The bottom land has Sweet Gum, Tulip, River Birch, Sycamore, Wild Black Cherry and mixed Oaks. These outstanding features have merited its recognition as a registered National Natural Landmark.

A dense understory of Flowering Dogwood and Pawpaw stands above large beds of Spring wildflowers.

This property had been in the Hemmer Family for more than 100 years. It is now owned by the State and is managed by the Division of Natural Preserves. It is approximately two miles East of Buckskin. Follow County Road 900 South to County Road 1050 East.

Orangeville Rise of Lost River

This small three-acre geological area in Orange County is one of the two rises of Lost River. The very unusual underground stream emerges in a semicircular rock-walled pit, 110 feet across. This great artesian spring, draining about 30 square miles, is the third largest in Indiana.

The Lost River watershed occupies 355 square miles in five Counties in South-Central Indiana. The entire drainage area is situated within two physiographic units, the *Mitchell Plain* and the *Crawford Upland*. The upstream portion is primarily characterized by dry-beds on the surface. In the lower portion of this Karst valley two forms of subterranean drainage develop by stream piracy and subterranean cutoffs. This limestone region is widely known for its sinkholes, caves, underground streams and blind fish.

This Nature Preserve, owned by The Nature Conservancy, also has been designated as a National Natural

Landmark. It is located at Orangeville, about seven miles West of Orleans.

White Oak

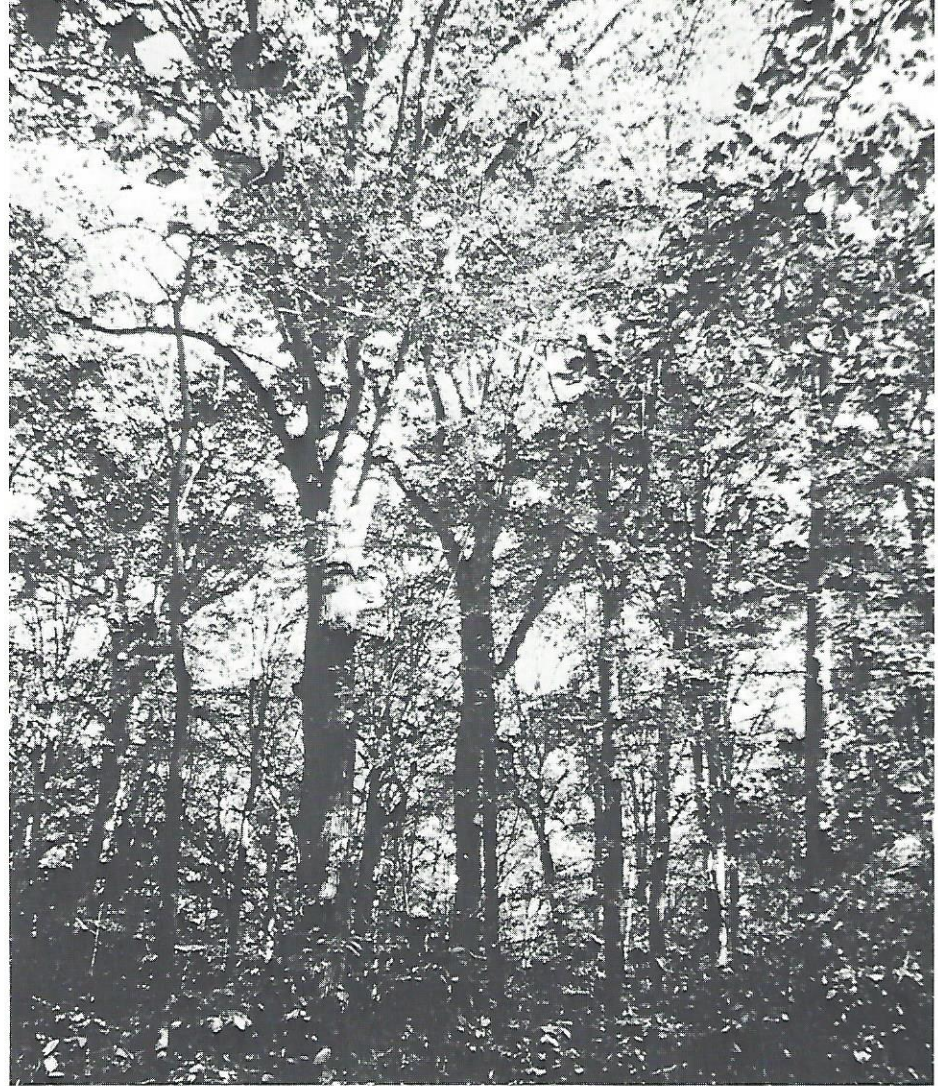
This tract in Clark State Forest is an appropriate name for a Nature Preserve with White Oak as the dominant tree. However, it also supports a good variety of Red, Black, Scarlet Oak, Post Oak and Chestnut Oak, along with Pignut, Shagbark Hickory and Bitternut Hickorys. The Oak-Hickory forest type, with scattered native Virginia Pine, provides an interesting natural area.

Understory trees and shrubs are Flowering Dogwood, Juneberry, Roundleaf, Greenbrier, Virginia Creeper and Pasture Rose. Dryland Blueberry clumps indicate the acid condition of the soil.

Most of the ridges and slopes are dry and contain the above mentioned vegetation. However, one low North-facing slope has Beech and Hard Maple, interspersed with Oaks and Hickories, on a moist site.

These diversities contribute to a varied display of wildflowers in accordance with exposures and soil moisture. Dry sites have Pussytoes, Spring Beauty, Shooting Star, Orange Hawkweed, Phlox, Firepink, Bluets

Indian Cucumber-root Grows in dense Shade at Barker Woods Nature Preserve.



and Goatrue. Mesic sites have Maidenhair, Fragile, Rattlesnake and Christmas Ferns, as well as Jack-in-the-Pulpit, Wild Ginger, Toothwort, Wild Yam, Virginia Dayflower, Wild Geranium, May Apple and Jewelweed.

Oaks Dominate at White Oak State Nature Preserve.

The 143 acres have acid erodable soils, best suited for forestry purposes. Small rocks and finer material can be seen in the ephemeral stream beds bordering the higher "Knobstone" area.

Clark State Forest is the oldest forest operated by the Division of Forestry of the Department of Natural Resources, having been acquired in 1903. The entrance to this Nature Preserve adjoins Franke Lake. A self-guiding trail, nearly one mile long traverses it.

Barker Woods

This 30-acre green oasis in LaPorte County is surrounded by Michigan City. It is not open to the public. The Barker family has preserved it as an example of a wooded tract in a low depression bordered by sandy slopes.

Many trees, shrubs and flowers are of Northern affinity. Gray and Yellow



Lady Slippers and Yellow Birch in the Swamp at Ropchan Memorial Nature Preserve.

Birches grow in peaty deposits, but Pin Oak and Red Maple are the major trees. Plantations of Scotch, Jack and Red Pines have been placed on higher ground adjacent to natural stands with White, Black and Red Oaks, and Black Gum, Tulip, Beech and Sugar Maple.

Blueberry and Huckleberry bushes, Chokeberry, Witchhazel, and Gray Dogwood are typical representatives of shrubs similar to those found in depressions back of the dunes bordering the Lake Michigan shore in Indiana and to the North in Michigan. Likewise, Cinnamon and Royal Ferns, Canada Mayflower, Indian Cucumberroot, Canada Cinquefoil and Skunk Cabbage grow in moist ground. Bracken Fern blankets dryer soil, with associated species of False Solomon's Seal, Asters, Wild Lettuce and Goldenrods.

The Nature Conservancy owns this tract. A local committee has been appointed to evaluate further its Natural features and to formulate proper management plans.

Ropchan Memorial

Sam and Adeline Ropchan gave these 77 acres in Steuben County as a living memorial for the inspiration and education of all generations under

the stewardship of Acres, Inc. It is protected and managed by this private preservation organization.

The diversity of geological features, with morainal ridges, kettle holes, swamps and bogs, contributes to a good floral distribution. Sandy loam ridges surround pockets of muck and peat. These higher and drier portions support associations of Shagbark Hickory, White Oak, Red Oak, Black Oak, Wild Black Cherry and Sassafras, interspersed with occasional clumps of Largetooth Aspen.

Red Maple becomes common, as soil moisture increases in lower slopes, and this tree dominates where water remains on the surface. Tamarack replaces Red Maple in the deeper peat pockets and swamps. A lone native White Pine stands in a boggy area where a long pole, probed through the Sphagnum Moss, never reaches a solid bottom.

The dispersion of soil types results in an understory of Hazelnut, Dogwood, Arrowwood, Gooseberry, Virginia Creeper and Poison Ivy among brambles of Blackberry and Raspberry on dry sites. Prickly Ash, Mapleleaf Viburnum, Bittersweet and Highbush Blueberry become more frequent on lower ground bordering Red Maple swamps that are edged with

Winterberry and the rarer Mountain Holly. In places shallow-rooted Red Maples have fallen and created hummocks covered with the large spreading fronds of Cinnamon Ferns.

On the sandy upland Bracken Ferns are interspersed with Pointed-leaf Tickclover, False Solomon's Seal, Wild Cicely, Wild Geranium, Black Snakeroot, Common Cinquefoil, Wild Sarsaparilla and different Bedstraws. False Rue Anemone, Golden Alexanders, American Vetch, Yellow Pimpernel, White Lettuce, Foxglove, Whorled Loosestrife, Roundlobe Hepatica and Rattlesnake Fern reflect increases in soil moisture.

This Nature Preserve may be reached by going two miles east of Orland on State Highway 120, then 40 rods north on Steuben County Road 750 West to the parking lot.

In summary, these 36 unique Natural Areas contain 6,203 acres. Their protection and preservation merit special significance as we celebrate our 200th Anniversary of American Independence. They retain many of the original features of the Hoosier landscape which, now protected by law, will remain in their Natural state for present and future generations.

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