ILLINOIS STATE ACADEMY OF SCIENCE
GEOLOGY AND BOTANY FIELD TRIP
GUIDE LEAFLET
PINE HILLS AREA
April 27, 1963

JACKSON AND UNION COUNTIES

ALTO PASS, CARBONDALE,
JONESBORO, MURPHYSBORO, AND
ALLENBURG QUADRANGLES

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Guide leaflet No. 63
Assembly Point. Parking lot west of Agriculture Building, Carbondale. First 11 miles are over a dissected plain (Mount Vernon Hill Country) which is glacial till overlain by a cover of wind-blown loess (mixture of silt and clay). Only an immature soil is developed on the loess. Major agricultural uses include apple and peach orchards, pasture, and grain farming. Old fields are often in broom sedge (andro2ogon virginicua) for many years. Hedgerow trees include sassafras, persimmon, shingle oak, red cedar, elm, and in lower areas, pin oak and sycamore.

0.25 0.25 Turn right on Oakland Avenue.
0.15 0.4 Turn left (west) on Chautauqua Road.
0.5 0.9 Hilltop. Straight ahead is good view of dissected plain.
0.6 1.5 On left, area for field studies in zoology.
0.5 2.0 Turn right (north) on Tower Road. A good example of a broom sedge field is at the northwest corner.
0.05 2.05 Road cuts show loess.
0.95 3.0 Turn left.
1.5 4.5 Crossroads. Straight ahead.
2.2 6.7 Note headward erosion of numerous gullies in loess several hundred feet across field on left.
0.4 7.1 Turn left on Illinois State Highway No. 127.
1.5 8.6 Good view of dissected loess upland.
0.9 9.5 Gulf, Mobile and Ohio Railroad on right, parallel to highway.
1.6 11.1 View of Shawnee Hills straight ahead.
0.5 11.6 Road cut on right. Outcrops of Pounds Sandstone (Lower Pennsylvanian in age).
0.8 12.4 Stream terrace across field to right.
0.25 12.65 Bridge over Cedar Creek. Southern limit of continental glaciation (Illinoian age). Enter Shawnee Hills and leave Mount Vernon Hill Country.
0.55 13.2 Road cut on right. Outcrop shows contact of Drury Shale (Lower Pennsylvanian in age) and overlying Pounds Sandstone. Coal exposed in cut is oldest Pennsylvanian coal in area and is probably equivalent to the Gentry Coal of Southeastern Illinois.
1.4 14.6 View of loess-covered dissected upland underlain by rocks, chiefly sandstones, of Lower Pennsylvanian age.

0.4 15.0 Pine plantation on left. Short leaf, white, Scotch, and other pines may be planted on old fields.

1.1 16.1 Crossroads. Straight ahead. Outcrops of Pounds Sandstone in field to right.

2.1 10.2 Outcrops in field to right are probably the Battery Rock Sandstone (Lower Pennsylvanian in age).

1.6 19.8 Bridge over G M & O Railroad.

0.5 20.3 Underpass. Start down escarpment from upland underlain by sandstones of Pennsylvanian age to lowland underlain by rocks of Mississippian age, chiefly limestones.

0.2 20.5 Outcrops in road cut on left. Uphill end shows the Palestine Sandstone (Upper Mississippian in age) somewhat slumped and cut by a poorly exposed fault. Downhill end shows the underlying Menard Limestone which contains abundant fossils of crinoids, brachiopods, bryozoans, and blastoids. Upland oak-hickory forest.

0.3 20.3 Outcrop in road cut on left, Waltersburg Sandstone.

0.6 21.4 Hill in far distance to right with cross on top is Bald Knob—the highest elevation (1020 feet) in southern Illinois.

0.3 21.7 Outcrop in cut on right. Waltersburg Sandstone.

0.5 22.2 Outcrop in cut on right. Probably Hardinsburg Sandstone.

0.2 22.4 Road cut on right. Tilted Cypress Sandstone strongly ripple marked. Tilting is a result of nearby faulting.

0.4 22.8 Side road from left. Sinkhole containing water on right is in Ste. Genevieve Limestone.

0.3 23.1 Approximate location where road crosses the Rattlesnake Ferry Fault—the major fault in southwestern Illinois (at this location the fault is not exposed but is probably partly a bedding plane fault). Leave the Shawnee Hills and enter the Ozark Plateau.

0.7 23.8 Road cut on right. Chert residuum from the Lingle-Alto Limestones (Middle and Upper Devonian in age).

0.03 23.83 Crossroads. Straight ahead.

0.37 24.2 Road cuts. Grand Tower Limestone (Middle Devonian in age) which contains abundant fossils of crinoids, brachiopods, and corals.

0.2 24.4 Creek on right. Outcrops of Clear Creek Chert.
0.2 24.6 Creek to left. Outcrop of Dutch Creek Sandstone (Middle Devonian in age).

2.5 27.1 Turn right on gravel road at sign which reads "Union State Tree Nursery." Hillside on left immediately after turn has outcrops of Clear Creek Chert (Middle Devonian in age). The forest type of the Conservation Area was predominantly beech, tulip tree (yellow poplar), with some sweet (or red) gum and sugar maple on the lowest slopes, and sycamore along the creek.

0.6 27.7 Creek bank across field. Exposure of Clear Creek Chert partially weathered to tripoli (powder form of silica).

0.2 27.9 Right of road. Outcrop of Clear Creek Chert.

0.4 28.3 Entrance to Union County Tree Nursery.

0.4 20.7 Road cuts. Weathered Clear Creek Chert. Red clay soil developed from weathering of limestone interbedded with chert. View ahead shows mature topography developed by dissection of weathered Clear Creek Chert.

1.3 30.0 Stop 1. Headquarters, Union State Tree Nursery. 3,585,000 trees shipped in 1962.

0.1 30.1 Clear Creek Chert exposed in creek bank on left.

0.3 30.4 Road junction. Straight ahead. Weathered Clear Creek Chert in creek bank on left.

0.2 30.6 Aggrading stream on left.

0.2 30.8 Cut on right shows thick loess. Mississippi River flood plain on left.

0.3 31.1 Bridge. Levee along small creek protects flooding from backwater of Mississippi River.

0.4 31.5 Road junction. Straight ahead.

0.2 31.7 Road cuts show loess.

0.5 32.2 Hillside on right. Outcrops of Clear Creek Chert.

1.8 34.0 Large cut on right. Chert residuum overlain by loess.

0.1 34.1 Road junction. Turn right.

1.4 35.5 Ford.

0.3 35.8 Tulip tree plantation on right. Native honey locust on low ground.

0.5 36.3 Ford. Weathered chert from Grassy Knob Chert (Lower Devonian in age) on left.
0.4 36.7 Southern Illinois University Pine Hills Field Station fence on the left.

0.4 37.1 Outcrop of Grassy Knob Chert on left.

0.5 37.6 View to left of Mississippi River Valley. Upland underlain by weathered Backbone Chert.

0.35 37.95 McGee Hill Picnic Ground.

0.15 38.1 Riding trail which traverses southern Illinois from the Mississippi River to the Ohio River.

1.1 39.2 View of Mississippi River Valley.

0.1 39.3 Road junction. Straight ahead.

0.4 39.7 Saddle Hill overlook.

0.4 40.1 Twin Ridge overlook.

0.4 40.5 Stop 2. Government Rock. Park in parking area on right of road. Walk up paths to top of hill. Discussions on botany and geomorphology. Upland oak-hickory forest and an isolated hill prairie with little and big bluestem, Indian grass, side oats, grama grass, puccoon (Lithospermum canescens) and prairie clover (Petalostemon purpureum and P. candidum).

0.3 40.8 Old Trail Point. Oxbow lake on flood plain below. Hills in distance are Missouri.

0.9 41.7 Road cut on right. Bailey Limestone (Lower Devonian in age) with much chert.

0.4 42.1 Stop 3. McCann Spring Picnic Ground. Several trees of restricted distribution in southern Illinois found here include basswood, buckeye, butternut, and cucumber tree (Magnolia acuminata). Within 1000 yards on the west-facing ridge are black hickory (Carya texana) and blue ash (Fraxinus quadrangulata) of the xeric forest type.

0.1 42.2 Road junction. Turn left. Outcrop on left is Bailey Limestone. Mississippi River flood plain on right.

0.2 42.4 Cliff on left is Bailey Limestone and Grassy Knob Chert. Shows weathering along prominent joints and a well developed talus deposit at base of cliff.

0.4 42.6 Road junction. Straight ahead.

0.1 42.7 Winter Pond. Cherry bark oak (Quercus falcata var. pagodaefolia) and Q. muhlenbergii are common locally.

0.6 43.3 Riding trail.
0.0 43.3 Stop 4. Cold water spring. The water temperature remains 57° F. throughout the year. Outcrops on left are Bailey Limestone. Localized species include water cress, giant bulrush, <i>glyceria pallida</i>, and <i>galium tinctorium</i>. Across the road is well developed swamp vegetation with cypress-knee sedge, swamp rose, duckweed species, water fern, water willow, pumpkin ash, and many other species.

0.4 43.7 Bailey Limestone on left.

0.5 44.2 Bailey Limestone on left. Contains thin layers of chert.

0.5 44.7 Bailey Limestone on left.

0.1 44.8 Left above. Small natural bridge.

0.4 45.2 Horse riding trail.

0.2 45.4 Elm Springs. Automobiles with low clearance should park here. Walk or double up in cars to next stop. Take poor gravel road to left. Abundant planaria are found in the springs.

0.4 45.8 Stop 5. Lunch. Southern Illinois University Pine Hills Field Station. Outcrops of Bailey Limestone on hillside. Oxbow lake on Mississippi River flood plain. Return to Elm Springs. See later sheets for maps and brief description of the vegetation.

0.4 46.2 Road junction at Elm Springs. Turn left.

0.1 46.3 Water gauge on left. Trees found in this swamp include swamp red maple, water locust, swamp cottonwood, pumpkin ash, and sugarberry (<i>Celtis laevigata</i>).

0.7 47.0 Railroad crossing. Danger. Look carefully before crossing.

0.5 47.5 Railroad crossing. Danger. Junction of Illinois Highway 3. Turn right.

1.2 48.7 Bridge. Big Muddy River. Flood plain trees include willows, silver maple, and box elder.

1.9 50.6 Right across flood plain. Bluff of Bailey Limestone and Grassy Knob Chert.

2.8 53.4 Road junction. Turn left on Grand Tower Road.

0.7 54.1 Right across field. High level river terrace.

0.9 55.0 Village of Grand Tower. Bear left and go up on levee.

0.2 55.2 Straight ahead is Devil's Backbone (an end view of hogback - a linear ridge due to differential erosion of tilted strata). Mississippi River to left. Turn right at road junction.

0.05 55.25 Abandoned road metal and tripoli quarry on left. Tripoli formed by weathering of chert in the Clear Creek Chert.
0.4 55.65 Turn left into Devil's Backbone State Park. Grand Tower Limestone exposed on left. Limestone vegetation includes red cedar, winged elm, Dutchman's pipe, slender lip fern, and purple cliff-brake fern.

0.35 56.0 Old iron furnaces on left. Used hematite and limonite concretions and nodules from rocks of Pennsylvanian age which are exposed a few miles to the north and northeast.

0.1 56.1 Grand Tower Limestone on left. Somewhat slumped.

0.1 56.2 Stop 6. Road junction. Turn right. Site of old railroad ferry across river. Backbone Limestone which contains many crinoid stems. Island in river (Grand Tower) shows dipping Grand Tower Limestone. Island is smallest U. S. National Monument.

1.8 58.0 Road junction. Turn left on Illinois Highway 3.

1.7 59.7 High level river terrace on left.

0.9 60.6 Begin Fountain Bluff on left. An erosional remnant in the middle of the Mississippi River flood plain. Leave the Ozark Plateau and enter the Shawnee Hills.

0.6 61.2 Outcrops on hillside to left. Battery Rock Sandstone. Note honey-comb weathering.

0.6 61.8 Battery Rock Sandstone on hillside to left.

0.8 62.6 Battery Rock Sandstone on hillside to left. Funk's Hybrid Seed Corn farm.

0.7 63.3 Battery Rock Sandstone exposed on left.

0.4 63.7 Bridge. Planted bald cypress ahead.

1.3 65.0 Turn right on gravel road.

1.8 66.8 Sand dune in field on right. Road junction. Turn right.

0.7 67.5 Bridge. Big Muddy River. Danger. Only one car should be on bridge at a time.

0.5 68.0 Road cut on left. Pounds Sandstone.

0.4 68.4 Left across field. Cut in loess. Calcareous concretions present in loess. Southern limit of Illinoian glaciation is along and parallel to road.

0.2 68.6 River birch among willows by creek to right of road. River birch is common east of Carbondale and relatively uncommon to the west.

1.0 69.6 Outcrops on hillside to right. Pounds Sandstone. Begin blacktop road. Leave Ozark Plateau and enter Mount Vernon Hill Country. Broom sedge becomes more common in old fields.
2.0 71.6 Outcrops in creek on left. Spoon Formation (Pennsylvanian in age).
1.0 72.6 Bridge. Big Muddy River. Town ahead is Murphysboro.
0.4 73.0 Turn right on Lake Street. On flood plain of Big Muddy River.
0.9 73.9 Crossroads. Straight ahead on Illinois Highway 127.
0.4 74.3 Road junction. Turn right.
0.2 74.5 Road junction. Straight ahead on Illinois Highway 13.
0.3 74.8 High level river terrace.
5.4 80.2 City limits of Carbondale.

End of Trip
Geomorphology

We have been driving along the narrow crest of the Pine Hills Ridge. To the west the Mississippi Valley bluffs drop precipitously 350 to 400 feet to the flood plain; to the east steep amphitheater-like hollows funnel runoff into closely spaced southeastward flowing streams. Note that most runoff flows away from the Mississippi.

The bluffs below us are a complex of landforms. Below Government Rock and at most look-out vantages, the cherty Grassy Knob Formation forms a cliff 10 to 50 feet high. It is broken by many joints and is rather easily traversed. The rock is chert with irregular brecciated structure, innumerable cavities and reddish in color. Below the cliff the steep slopes plunge downward to narrow stream channels. The slopes are partly veneered with loess-derived silt and partly with loose scree of chert fragments. The valley bottoms are filled with coarse chert blocks which show evidence of repeated transport during storms. In the lower part of their course, the valleys broaden somewhat before plunging over cascades or waterfalls made by the resistant Bailey Limestone. This formation forms the great cliffs which truncate the ridge spurs. The tops of these lower cliffs can be reached along the spurs but are most striking when viewed from the levee below.

The Mississippi River can be seen to the northwest against the Missouri side of the valley. The levee, extending from the Mississippi toward the bluffs below us, borders the Big Muddy River. This stream drains a considerable area of southern Illinois north of Carbondale and reaches the Mississippi Valley west of Murphysboro some 12 miles north of us. It has followed a meandering course along the base of the bluffs to this point. Here a former meander of the Mississippi intersected the Muddy and "captured" its flow. The former channel, now cut off, is represented by the sinuous swamps and lakes below us.

The swamps are maintained by numerous large springs fed by waters percolating into the ground on the upland and valley bottoms to the east. The high relief of the bluff produces a much steeper ground-water slope toward the west than toward the east.
The Pine Hills Field Station is located approximately three miles north and two miles east of Wolf Lake, Illinois, in the portion of the Illinois Ozarks known as the Pine Hills. The Station, which borders on the flood plain of the Mississippi River, at present comprises 258 acres of land on long-term lease from the Trojan Powder Company of Wolf Lake. Environments found on the Station include dry uplands, ravines, rock bluffs, swamps, and a lake. The area is unique because of the great diversity of plants and animals, many at the edge of their habitat ranges.

Geology

Pine Hills is a segment of the valley wall of the Mississippi River where the latter cuts through a highland of resistant siliceous limestone. Devonian Bailey Limestone forms the lower cliffs and numerous waterfalls along the steep valleys. The upper cliff just below the ridge road is dominantly chert (flint) of the Grassy Knob formation.

The Station is in an area of challenging geologic and geomorphic relationships. The accompanying topographic map shows local divisions of landform types. Steep slopes are mostly stony, while the ridges are deeply mantled by wind-blown silts. Rivers on the backslope have steep valley heads but broad alluvial flats downstream with channels choked by chert gravel. They are subject to frequent floods but flow with clear water through the summer.

Botany

Drs. R. H. Mohlenbrock and J. W. Voigt have prepared "An Annotated Checklist of Vascular Plants of the Southern Illinois University Pine Hills Field Station and Environs." Nine hundred and fifty-three species were collected in a six square mile area. These species are distributed in 434 genera of 115 plant families. They comprise 11 percent of all vascular plant species found in Illinois. The short-leaf pine is native only to this region of Illinois.

Drs. W. C. Ashby and R. W. Kelting carried out an analysis of the vegetation on the Station, using stereoscopic analysis of aerial photographs. Each vegetation unit identified on the photographs was surveyed on the ground and the boundaries checked. Over fifty original areas were combined into eight basic types shown on the accompanying vegetation map. The relationship of vegetation and topography is shown by using the topographic map as an overlay on the vegetation map.

The vegetation on the Station is typical of that of the western Illinois Ozarks. A Black Oak Type may be found on the ridges. On upper slopes one encounters the White Oak-Hickory Type, and in many smaller ravines the Red Oak-Black Gum-Beech Type. In the more mesic larger ravines the Sweet Gum type is found. Tulip tree is common to both of the ravine types. The area near the swamp on the flood plain
supports the Swamp Maple-Swamp Cottonwood Type. Buttonbush is found in shallow water and the submerged aquatic plants Pondweed and Hornwort predominate in Otter Pond.

In addition to the vascular plants, 106 species of mosses have been identified in the area. Various groups of the lower plants (algae and fungi) have been incompletely studied. One student who studied the genus *Trachelomonas* of the Euglenophyta (a small phylum of algae) found 30 species and varieties, two of which are new to science. Twenty-five of these are the first records for Illinois.

**Zoology**

Many of the animals found in the Station area are of great interest to the layman as well as to the scientist. Forty mammals (including eight species of bats) have been collected or observed in the region. This includes all southern Illinois mammals except the bobcat and the pine mouse. Of particular interest are the eastern woodrat, the rice rat, and the golden mouse.

Twenty-four amphibians and 35 reptiles have been taken in the area. The cottonmouth moccasin is abundant on the flood plain and adjacent rock bluffs. Twenty-three species of fishes have been collected from a large spring and adjacent swamp area. One hundred and seventy-three birds have been observed and/or collected in the area in a two-year study. Other animal groups are, at present, incompletely known.

Protection to a number of the animal and plant species is partially afforded by various State agencies. An important function of the Station will be to preserve the total physical and biological features of this varied landscape.
The ridge, Devils Backbone, is a hogback formed by resistant limestones and cherts of Devonian age which dip moderately toward the northeast. This ridge, as well as Walker Hill about 1200 feet to the northeast and Fountain Bluff about 1½ miles to the north, were originally part of the bluff on the Missouri side of the Mississippi River. These hills were isolated by erosion presumably during Late Pleistocene time. The flat flood plain between the village of Grand Tower and the main bluffs about 4 miles to the east is underlain by at least 150 feet of alluvial fill. The prominent river terrace on the east edge of the village of Grand Tower has a cover of loess and is believed to be Tazewell in age.

A major fault, the Rattlesnake Ferry Fault (called the Ste. Genevieve Fault in Missouri), is present just northeast of Devils Backbone and Walker Hill but is concealed by alluvium. It trends northwest-southeast, is steeply dipping, and probably has several hundred feet displacement. Devils Backbone and Walker Hill are on the upthrown side of the fault and Fountain Bluff is on the downthrown side. The local dip of rock units near Grand Tower is a result of the faulting.

A section at the south end of Devils Backbone follows:

<table>
<thead>
<tr>
<th>Formation</th>
<th>Description</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Creek Chert</td>
<td>Chert, weathered; some units of dolomitic limestone in lower part</td>
<td>30</td>
</tr>
<tr>
<td>Backbone Limestone</td>
<td>Limestone, bluish-gray, medium to coarsely crystalline, many crinoid stems</td>
<td>40</td>
</tr>
</tbody>
</table>

A section in the middle part of the ridge (near the park) shows:

<table>
<thead>
<tr>
<th>Formation</th>
<th>Description</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lingle Formation</td>
<td>Shale, greenish-gray, fossiliferous</td>
<td>10</td>
</tr>
<tr>
<td>Limestone</td>
<td>Limestone, buff to tan, finely crystalline, fossiliferous</td>
<td>20</td>
</tr>
<tr>
<td>Grand Tower Limestone</td>
<td>Limestone, gray, finely crystalline, some fossiliferous beds, cross-beded in part</td>
<td>85</td>
</tr>
</tbody>
</table>

An abandoned quarry on the northwest end of Walker Hill contains the Salem Limestone of Mississippian age. About 200 feet east of the quarry the St. Louis Limestone is exposed.
# Generalized Geologic Column
**Pine Hills Area**

Prepared by the Illinois State Geological Survey

<table>
<thead>
<tr>
<th>Era</th>
<th>Periods</th>
<th>Epochs</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td><strong>Proterozoic</strong></td>
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<td></td>
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<td></td>
<td>Referred to as &quot;Precambrian&quot; time.</td>
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<td></td>
<td>No data.</td>
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<tr>
<td><strong>Archeozoic</strong></td>
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<td><strong>Paleozoic</strong></td>
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<td><strong>Middle Life</strong></td>
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<td><strong>Recent Life</strong></td>
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<tr>
<td><strong>Permo-Carboniferous</strong></td>
<td>Age of Amphibians and Early Plants</td>
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<tr>
<td><strong>Carboniferous</strong></td>
<td>Age of Reptiles</td>
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<tr>
<td><strong>Triassic</strong></td>
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<tr>
<td><strong>Jurassic</strong></td>
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<tr>
<td><strong>Cretaceous</strong></td>
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<tr>
<td><strong>Tertiary</strong></td>
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<tr>
<td><strong>Quaternary</strong></td>
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</tbody>
</table>

**Remarks:**
- Upland loess and valley train alluvium. Area is partly outside glaciated region.
- Not present in the Pine Hills area.
- Not present in this area.
- Not present in Illinois.
- Removed by erosion.
- Sandstone, shale, & coal.
- Mainly massive sandstone.
- Succession of alternating thin sandstone, limestone, and shale formations.
- Mainly thick limestones.
- Limestone and shale.
- Mountain Glen shale, Alto limestone
- Lingle limestone, Grand Tower limestone, Dutch Creek sandstone, Clear Creek chert
- Backbone (Little Saline) limestone, Grassy knob chert, Bailey limestone
- Present south of area.
- Present south of area.
- No data.
<table>
<thead>
<tr>
<th>Stage</th>
<th>Substage</th>
<th>Nature of Deposits</th>
<th>Special Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent</td>
<td></td>
<td>Soil, youthful profile of weathering, lake and river deposits, dunes, peat</td>
<td>Outwash along Mississippi Valley</td>
</tr>
<tr>
<td></td>
<td>5,000 yrs.</td>
<td>Outwash</td>
<td>Ice withdrawal, erosion</td>
</tr>
<tr>
<td></td>
<td>Valderan</td>
<td>Peat and alluvium</td>
<td>Glaciation, building of many moraines as far south as Shelbyville, extensive valley trains, outwash plains, and lakes</td>
</tr>
<tr>
<td></td>
<td>11,000 yrs.</td>
<td>Outwash</td>
<td>Ice withdrawal, weathering, and erosion</td>
</tr>
<tr>
<td></td>
<td>Twocreekan</td>
<td>Drift, loess, dunes, lake deposits</td>
<td>Glaciation in northern Illinois, valley trains along major rivers, Winnebago drift</td>
</tr>
<tr>
<td></td>
<td>12,500 yrs.</td>
<td>Drift, loess</td>
<td>Ice withdrawal, weathering, and erosion</td>
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<tr>
<td></td>
<td>Woodfordian</td>
<td>Soil, silt and peat</td>
<td>Ice withdrawal, weathering, and erosion</td>
</tr>
<tr>
<td></td>
<td>22,000 yrs.</td>
<td>Soil, silt and peat</td>
<td>Ice withdrawal, weathering, and erosion</td>
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<tr>
<td></td>
<td>Farmdalian</td>
<td>Drift, loess</td>
<td>Glaciation in northern Illinois, valley trains along major rivers, Winnebago drift</td>
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<tr>
<td></td>
<td>28,000 yrs.</td>
<td>Drift, loess</td>
<td>Ice withdrawal, weathering, and erosion</td>
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<tr>
<td></td>
<td>Altonian</td>
<td>Soil, mature profile of weathering, alluvium, peat</td>
<td>Glaciers from northeast at maximum reached</td>
</tr>
<tr>
<td>Sangamonian</td>
<td>50,000 to 70,000 years</td>
<td>Soil, mature profile of weathering, alluvium, peat</td>
<td>Mississippi River and nearly to southern tip of Illinois</td>
</tr>
<tr>
<td>(3rd interglacial)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illinoian</td>
<td>Buffalo Hart</td>
<td>Drift</td>
<td>Glaciers from northeast at maximum reached</td>
</tr>
<tr>
<td>(3rd Glacial)</td>
<td>Jacksonville</td>
<td>Drift</td>
<td>Mississippi River and nearly to southern tip of Illinois</td>
</tr>
<tr>
<td></td>
<td>Liman</td>
<td>Drift, loess</td>
<td>Glaciers from Northeast and northwest covered much of state</td>
</tr>
<tr>
<td>Yarmouthian</td>
<td></td>
<td>Soil, mature profile of weathering, alluvium, peat</td>
<td>Glaciers from northeast at maximum reached</td>
</tr>
<tr>
<td>(2nd interglacial)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kansan</td>
<td></td>
<td>Drift, loess</td>
<td>Glaciers from northeast at maximum reached</td>
</tr>
<tr>
<td>(2nd Glacial)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aftonian</td>
<td></td>
<td>Soil, mature profile of weathering, alluvium, peat</td>
<td>Glaciers from northwest invaded western Illinois</td>
</tr>
<tr>
<td>(1st interglacial)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nebraskan</td>
<td></td>
<td>Drift, loess</td>
<td>Glaciers from northwest invaded western Illinois</td>
</tr>
<tr>
<td>(1st Glacial)</td>
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</tr>
</tbody>
</table>
PHYSIOGRAPHIC DIVISIONS OF ILLINOIS

GEOLOGIC MAP OF ILLINOIS showing BEDROCK BELOW THE GLACIAL DRIFT 1961

KEY

Tertiary
(Pliocene omitted)

Cretaceous

Pennsylvanian
(Above No. 6 Coal)

Pennsylvanian
(Below No. 6 Coal)

Mississippian
(Upper)

Mississippian
(Middle and Lower)

Devonian

Silurian and Devonian

Silurian

Ordovician

Cambrian

Fault

Complex faulted area

MILES

0 10 20 30 40 50

ILLINOIS STATE GEOLOGICAL SURVEY, URBANA

(47669—15M—11—61)