

A FLORA OF PINEY CREEK RAVINE

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ABSTRACT.—A brief descriptive account of the geology, topography, and plant communities of Piney Creek Ravine, Randolph County, Illinois is presented, followed by a checklist of the 441 taxa thus far found in the area. An attempt is made to explain the unusual occurrence of some of the species in this unique floristic area.

A small, scenic area, unique both in its topography and vegetation, lies near West Point, Randolph County, in southwestern Illinois. This area had been relatively unexplored, until 1957, except for a few sporadic visits made by botanists collecting in southern Illinois. However, from these few investigations came reports of several rare specimens, which stimulated the author to undertake a more intensified study.

The site of these investigations is Piney Creek Ravine. It lies in the southeastern portion of Randolph County, except for the creek source, which originates in the northwest corner of Jackson County. The entire area (Figs. 1 & 2) consists of approximately 900 acres.

The first record of investigation in this area by any botanist was that of Miller and Tehon (1929) who made reference to a small stand of *Pinus echinata* Mill., one of two stands in the state, located in "a sandstone ravine of Piney Creek, near the town of West Point in

Randolph County." A second record of collection in this area occurred nearly twenty years later in 1948, when G. N. Jones and G. D. Fuller (1955) listed West Point as the location for the same species of pine. More recently, in 1954, R. H. Mohlenbroek recorded from Piney Creek *Asplenium bradleyi* D. C. Eaton and *Ranunculus harveyi* (Gray) Britt., both new records for Illinois.

The drainage system is simple, consisting of Piney Creek and its several small tributaries, flowing chiefly from east to west directly into the larger Mill Creek. This latter stream, similar in its topography to Piney Creek, flows in a northwesterly direction until it reaches Mary's River. Finally, several miles to the west, this latter stream empties into the Mississippi River.

Through the process of erosion Piney Creek has gradually worn through sandstone forming a rocky ravine with high bluffs and steep slopes. This sandstone was formed during the Pennsylvanian Epoch and, for the most part, consists of rocks from the Caseyville Formation. However, a small portion of the area, in the vicinity of West Point, is made up of rocks from the Tradewater Formation, which

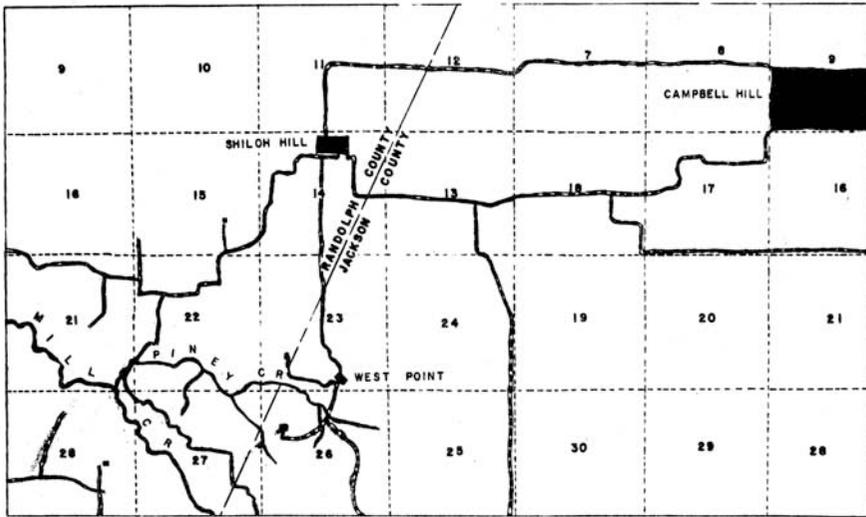


FIGURE 1. A Portion of the Campbell Hill Quadrangle Within R 5 W; T 7 S.

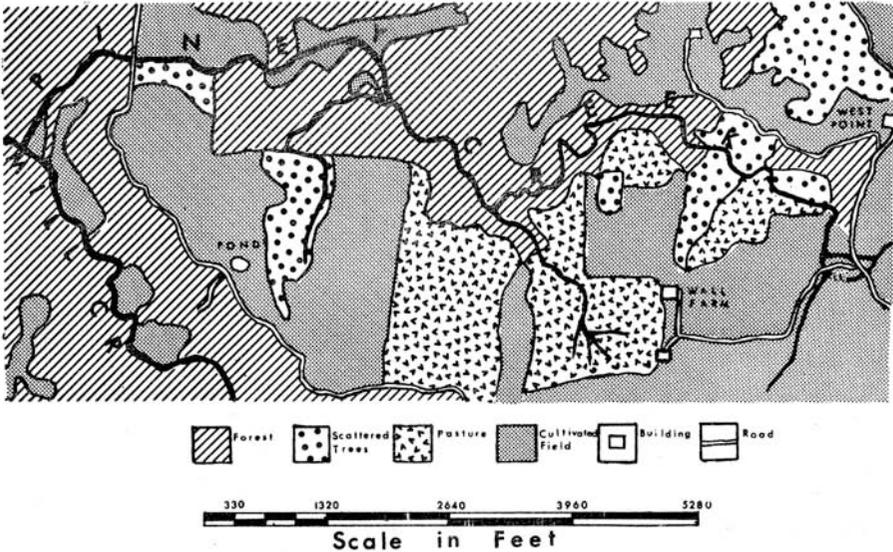


FIGURE 2. Map of Study Area Within Portions of Sections 21, 22, 23, 26, 27, and 28 Illustrated in Figure 1.

are considered by geologists to be the oldest of the epoch (Worthen, 1882).

Beginning at the source of Piney Creek, and continuing for approximately one-third of its course, a rather unique condition exists. Here the creek bed consists almost entirely of solid sandstone with occasional drops of one to ten feet, at the bottom of which are shallow or deep pools of clear water. Throughout this rocky area numerous "pot-holes" occur, as well as many long, narrow grooves, probably indicating weak areas of a less resistant sandstone.

The high bluffs and rocky walls consist almost entirely of massive cliff-forming beds of this sandstone, except for occasional thin-bedded strata in the lower sections. Along the sides of these high vertical walls are many moist, soil-covered ledges on which are found a large number of mosses and liverworts, plus a number of ferns and flowering plants. Covering slopes and bluff tops on both sides of the creek are narrow zones of forest, limited on the periphery by cultivated fields and pastures.

This entire area lies within the boundary of Pleistocene glaciation, which attained its most southern extension several miles south of Piney Creek with the advance of the Illinoian glacier. Following glaciation and subsequent wind activity, large amounts of loess were deposited; it is this type of soil that covers the bluffs along this stream. The soil of the alluvial valley, however, is of a very sandy texture and has resulted from the erosion of the exposed sandstone surfaces.

RESULTS

After forty-four weeks of collecting in the vicinity of Piney Creek Ravine, the author identified the following taxa. The nomenclature followed in this list is that used in "New Britton and Brown Illustrated Flora of the Northeastern United States and Canada" (Gleason, 1952). Specimens have been deposited in the Southern Illinois University Herbarium.

An asterisk (*) preceding the taxon indicates a Randolph County new record. This information is based on species distribution maps in "Vascular Plants of Illinois" (Jones and Fuller, 1955), and at the time of collection represented county records.

DIVISION BRYOPHYTA

CLASS MUSCI

SPHAGNACEAE

Sphagnum capillaceum (Weiss)
Shank

CLASS HEPATICAE

Cephaloziella subdentata
Warnstf. or *C. elachistata*
(Jack) Schiffn.

DIVISION TRACHEOPHYTA

SUBDIVISION SPHENOPSISIDA

EQUISETACEAE

Equisetum hyemale L.

SUBDIVISION PTEROPSISIDA

CLASS FILICINEAE

OPHIOGLOSSACEAE

**Botrychium virginianum* (L.)
Sw.

POLYPODIACEAE

Adiantum pedatum L.
Cheilanthes lanosa (Michx.)

D. C. Eaton

Polypodium vulgare L. var. *virginianum* (L.) D. C. Eaton

Asplenium trichomanes L.

Asplenium platyneuron (L.)

Oakes

Asplenium bradleyi D. C. Eaton

Woodsia obtusa (Spreng.) Torr.

Cystopteris fragilis (L.) Bernh.

Thelypteris hexagonoptera
(Michx.) Weaherby
Dryopteris marginalis (L.) A.
Gray
Polystichum acrostichoides
(Michx.) Schott

CLASS GYMNOSPERMAE

PINACEAE

Pinus echinata Mill.

CUPRESSACEAE

Juniperus virginiana L. var.
crebra Fern.

CLASS ANGIOSPERMAE

GRAMINEAE

**Arundinaria gigantea* (Walt.)
Chapm.
**Bromus ciliatus* L. var. *intonsus*
Fern.
Bromus commutatus L.
**Bromus racemosus* L.
Festuca elatior L. var. *arundi-*
nacea (Schreb.) Wimmer
Festuca octoflora Walt. var.
tenella (Willd.) Fern.
**Festuca octoflora* Walt. var.
aristulata Dewey
Glyceria striata (Lam.) Hitchc.
var. *striata* (Scribn.) Fern.
Poa compressa L.
**Poa chapmaniana* Scribn.
**Poa paludigena* Fern. and Wieg.
**Poa sylvestris* Gray
Eragrostis cilianensis (All.)
Link
**Eragrostis capillaris* (L.) Nees
Uniola latifolia Michx.
Triodia flava (L.) Smyth
Elymus virginicus L. var. *je-*
junus (Ramaley) Bush
Elymus virginicus L. var. *gla-*
briflorus (Vasey) Bush forma
australis (Scribn. and Ball)
Fern.
Elymus villosus Muhl. forma
arkansanus (Scribn. and
Ball) Fern.
Elymus villosus Muhl. forma
villosus
Elymus canadensis L.
Hordeum pusillum Nutt.
Hystrix patula Moench forma
patula
Sphenopholis obtusata (Michx.)
Scribn.
Danthonia spicata (L.) Beauv.
**Agrostis stolonifera* L. var.
compacta Hartm.
**Agrostis perennans* (Walt.)
Tuckerm. var. *perennans*
**Agrostis hyemalis* (Walt.) BSP
var. *tenuis* (Tuckerm.) Gl.

**Cinna arundinacea* L.
Alopecurus carolinianus Walt.
Phleum pratense L.
Muhlenbergia schreberi Gmel.
**Muhlenbergia sobolifera*
(Muhl.) Trin.
**Muhlenbergia frondosa* (Poir.)
Fern.
**Brachyelytrum erectum*
(Schreb.) Beauv.
Leptochloa filiformis (Lam.)
Beauv.
Eleusine indica (L.) Gaertn.
**Leersia virginica* Willd.
Digitaria sanguinalis (L.) Scop.
Digitaria ischaemum (Schreb.)
Muhl.
**Paspalum ciliatifolium* Michx.
var. *ciliatifolium*
**Panicum philadelphicum* Bernh.
Panicum flexile (Gatt.) Scribn.
Panicum dichotomiflorum
Michx. var. *dichotomiflorum*
Panicum capillare L. var.
agreste Gatt.
Panicum capillare L. var.
campestre Gatt.
Panicum anceps Michx.
**Panicum agrostoides* Spreng.
var. *agrostoides*
**Panicum perlongum* Nash.
Panicum depauperatum Muhl.
var. *psilophyllum*
**Panicum lanuginosum* Ell. var.
fasciculatum (Torr.) Fern.
**Panicum lanuginosum* Ell var.
tennesseense (Ashe) Gl.
**Panicum polyanthes* Schult.
Panicum sphaerocarpon Ell. var.
sphaerocarpon
Panicum clandestinum L.
Panicum boscii Poir.
Panicum nitidum Lam. var.
ramulosum Torr.
**Panicum dichotomum* L.
Echinochloa pungens (Poir.)
Rydb.
Setaria glauca (L.) Beauv.
**Andropogon scoparius* Michx.
var. *scoparius*
Andropogon virginicus L. var.
virginicus

CYPERACEAE

**Cyperus esculentus* L.
Cyperus ovularis (Michx.) Torr.
**Cyperus strigosus* L.
**Scirpus atrovirens* Willd. var.
georgianus (Harper) Fern.
Scirpus lineatus Michx.
Carex cephalophora Muhl. var.
mesochorea (MacKenzie) Gl.
**Carex annectens* (Bickn.)
Bickn. var. *annectens*

- Carex vulpinoidea* Michx.
 **Carex normalis* MacKenzie
Carex brevior (Dewey) MacKenzie
Carex umbellata Schk.
Carex laxiflora Lam. var. *blanda* (Dewey) Boott.
 **Carex granularis* Muhl.
 **Carex grisea* Wahl.
Carex bushii MacKenzie
Carex complanata Torr. & Hook. var. *hirsuta* (Bailey) Gl.
Carex torta Boott.
Carex aquatilis Wahl.
 **Carex typhina* Michx.
 **Carex artitecta* Mack.
- ARACEAE
 **Arisaema triphyllum* (L.) Schott. var. *triphyllum*
Arisaema dracontium (L.) Schott.
- COMMELINACEAE
 **Tradescantia virginiana* L.
Commelina communis L.
Commelina diffusa Burm. f.
 **Commelina virginica* L.
- JUNCACEAE
Juncus tenuis Willd. forma *williamsii* (Fern.) Hermann
Juncus dudleyi Wieg.
Luzula campestris (L.) DC. var. *multiflora* (Ehrh.) Celak.
- LILIACEAE
Allium canadense L.
Nothoscordum bivalve (L.) Britt.
Erythronium albidum Nutt.
 **Ornithogalum umbellatum* L.
Smilacina racemosa (L.) Desf.
Polygonatum biflorum (Walt.) Ell.
Trillium recurvatum Beck
 **Smilax hispida* Muhl.
- DIOSCOREACEAE
 **Dioscorea quaternata* (Walt.) Gmel.
Dioscorea villosa L.
- AMARYLLIDACEAE
 **Hypoxis hirsuta* (L.) Coville
 **Agave virginica* L.
- IRIDACEAE
Sisyrinchium albidum Raf.
- ORCHIDACEAE
Spiranthes gracilis (Bigel.) Beck
- SALICACEAE
Populus deltoides Marsh.
- Salix nigra* L.
Salix sericea Marsh.
- JUGLANDACEAE
Juglans nigra L.
 **Carya ovata* (Mill.) K. Koch
Carya ovalis (Wang.) Sarg.
Carya cordiformis (Wang.) K. Koch
 **Carya tomentosa* (Poir.) Nutt.
Carya buckleyi Durand
- BETULACEAE
Corylus americana Walt.
Carpinus caroliniana Walt.
Ostrya virginiana (Mill.) K. Koch
Betula nigra L.
- FAGACEAE
Fagus grandifolia Ehrh. var. *caroliniana* (Loud.) Fern & Rehder
Quercus stellata Wang.
Quercus alba L.
Quercus bicolor Willd.
Quercus prinoides Willd. var. *acuminata* (Michx.) Gl.
Quercus imbricaria Michx.
Quercus marilandica Muench.
 **Quercus borealis* Michx. f. var. *maxima* (Marsh.) Ashe
Quercus velutina Lam.
- ULMACEAE
Ulmus americana L.
Ulmus rubra Muhl.
Ulmus alata Michx.
Celtis laevigata Willd.
- MORACEAE
Morus rubra L.
- URTICACEAE
Parietaria pennsylvanica Muhl.
 **Pilea pumila* (L.) Gray
- SANTALACEAE
Comandra umbellata (L.) Nutt.
- ARISTOLOCHACEAE
 **Asarum canadense* L. var. *reflexum* (Bickn.) Robins
Aristolochia serpentaria L.
- POLYGONACEAE
Rumex acetosella L.
 **Rumex crispus* L.
Polygonum lapathifolium L. var. *nodosum* (Raf.) Wein.
Polygonum pensylvanicum L. var. *laevigatum* Fern.
Polygonum pensylvanicum L. var. *pensylvanicum*
Polygonum orientale L.
Polygonum punctatum Ell. var. *punctatum*
 **Polygonum scandens* L.

- CHENOPODIACEAE
 **Chenopodium standleyanum* Aellen
 **Chenopodium hybridum* L.
- AMARANTHACEAE
Amaranthus hybridus L.
- PHYTOLACCACEAE
Phytolacca americana L.
- PORTULACACEAE
Claytonia virginica L.
- CARYOPHYLLACEAE
 **Paronychia fastigiata* (Raf.) Fern. var. *fastigiata*
 **Cerastium viscosum* L.
 **Cerastium vulgatum* L.
Agrostemma githago L.
Silene stellata (L.) Ait. var. *scabrella* (Nieuw.) Palm. & Steyerl.
Silene antirrhina L.
Dianthus armeria L.
- MAGNOLIACEAE
 **Liriodendron tulipifera* L.
- ANNONACEAE
Asimina triloba (L.) Dunal
- RANUNCULACEAE
Hydrastis canadensis L.
 **Actaea alba* (L.) Mill. forma *rubracarpa* (Killip.) Fern.
Isopyrum biternatum (Raf.) Torr. & Gray
Ranunculus abortivus L. var. *abortivus*
Ranunculus harveyi (Gray) Britt.
 **Ranunculus recurvatus* Poir.
 **Ranunculus hispidus* Michx. var. *hispidus*
Anemone virginiana L.
 **Anemonella thalictroides* (L.) Spach
- BERBERIDACEAE
 **Podophyllum peltatum* L.
- MENISPERMACEAE
Menispermum canadense L.
- LAURACEAE
Sassafras albidum (Nutt.) Nees
Lindera benzoin (L.) Blume
- PAPAVERACEAE
Sanguinaria canadensis L. var. *rotundifolia* (Greene) Fedde
- FUMARIACEAE
Corydalis flavula (Raf.) DC.
- CRUCIFERAE
Lepidium virginicum L. var. *virginicum*
Capsella bursa-pastoris (L.) Medic.
Draba verna L.
Draba brachycarpa Nutt.
 **Cardamine pennsylvanica* Muhl.
Dentaria laciniata Muhl.
Arabis laevigata (Muhl.) Poir.
Barbarea vulgaris R. Br.
Arabidopsis thaliana (L.) Heyn.
- SAXIFRAGACEAE
 **Heuchera parviflora* Bartl. var. *rugelii* (Shuttlw.) R. B. & L.
Heuchera hirsuticaulis (Wheelock) Rydb.
Hydrangea arborescens L. var. *arborescens*
Ribes missouriense Nutt.
- PLATANACEAE
Platanus occidentalis L.
- ROSACEAE
 **Aruncus dioicus* (Walt.) Fern. var. *pubescens* (Rydb.) Fern.
 **Gillenia stipulata* (Muhl.) Trel.
 **Potentilla simplex* Michx.
Geum canadense Jacq.
 **Rubus ostryifolius* Rydb.
Rubus enslenii Tratt.
 **Agrimonia rostellata* Wallr.
 **Agrimonia pubescens* Wallr.
Rosa setigera Michx. var. *to mentosa* T. & G.
Rosa carolina L.
 **Prunus serotina* Ehrh.
 **Prunus munsoniana* Wight and Hedrick
 **Crataegus coccinioides* Ashe
Amelanchier arborea (Michx. f.) Fern.
- CAESALPINIACEAE
Cercis canadensis L.
Gleditsia triacanthos L.
 **Gymnocladus dioica* (L.) K. Koch
Cassia fasciculata Michx. var. *fasciculata*
- FABACEAE
Crotalaria sagittalis L.
Trifolium pratense L.
Trifolium repens L.
Trifolium hybridum L.
 **Trifolium procumbens* L.
Melilotus alba Desr.
Medicago lupulina L.
Psoralea psoraloides (Walt.) Cory var. *eglandulosa* (Ell.) Freeman

Apios americana Medic.
Petalostemum candidum
 (Willd.) Michx.

Tephrosia virginiana (L.) Pers.

**Desmodium nudiflorum* (L.)
 DC.

**Desmodium canescens* (L.) DC.

**Lespedeza procumbens* Michx.

Lespedeza repens (L.) Bart.

Lespedeza violacea (L.) Pers.

Lespedeza virginica (L.) Britt.

**Lespedeza hirta* (L.) Hornem.

var. *hirta*

Stylosanthes biflora (L.) BSP.

var. *biflora*

Amphicarpa bracteata (L.)

Fern. var. *bracteata*

Strophostyles leiosperma (T. &

G.) Piper

**Strophostyles helvola* (L.) Ell.

OXALIDACEAE

Oxalis stricta L.

Oxalis europaea Jord.

Oxalis violacea L. var. *trichophora* Fassett

GERANIACEAE

Geranium carolinianum L.

Geranium maculatum L.

POLYGALACEAE

Polygala verticillata L. var.
sphenostachya Pennell

EUPHORBIACEAE

Croton glandulosus L. var. *septentrionalis* Muell.-Arg.

Croton capitatus Michx. var.

capitatus

**Acalypha rhomboidea* Raf.

Acalypha virginica L.

**Acalypha gracilens* Gray

Euphorbia maculata L.

Euphorbia corollata L.

**Euphorbia marginata* Pursh.

CALLITRICHACEAE

Callitriche deflexa A. Br. var.

austinii (Engelm.) Hegelm.

ANACARDIACEAE

Rhus radicans L. var. *vulgaris*

(Michx.) DC.

Rhus aromatica Ait.

Rhus glabra L. var. *glabra*

Rhus copallina L.

AQUIFOLIACEAE

Ilex decidua Walt.

STAPHYLEACEAE

**Staphylea trifolia* L.

ACERACEAE

**Acer barbatum* Michx.

Acer negundo L. var. *negundo*

Acer saccharum Marsh var. *saccharum*

Acer rubrum L.

BALSAMINACEAE

Impatiens biflora Walt.

RHAMNACEAE

Ceanothus americanus L. var.

pitcheri T. & G.

VITACEAE

**Vitis cinerea* Engelm. var. *cinerea*

**Vitis lincecumii* Buckl.

Vitis vulpina L.

Parthenocissus quinquefolia

(L.) Planch. var. *saint-paulii*

(Graebn.) Rehd.

MALVACEAE

Sida spinosa L.

HYPERICACEAE

**Ascyrum hypericoides* L. var.
multicaule (Michx.) Fern.

**Hypericum sphaerocarpum*

Michx. var. *sphaerocarpum*

Hypericum punctatum Lam.

Hypericum mutilum L. var. *par-*

viflorum (Willd.) Fern.

Hypericum gentianoides (L.)

BSP

Hypericum drummondii (Grev.

& Hook.) T. & G.

CISTACEAE

Lechea tenuifolia Michx.

VIOLACEAE

Viola pedata L. var. *pedata*

**Viola papilionacea* Pursh

Viola sororia Willd.

Viola triloba Schw. var. *dilatata*

Ell.

**Viola eriocarpa* Schw.

Viola rafinesquii Green

**Viola striata* Ait.

PASSIFLORACEAE

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

LYTHRACEAE

Ammannia coccinea Rothb.

ONAGRACEAE

**Ludwigia glandulosa* Walt.

**Ludwigia alterniflora* L.

Oenothera biennis L.

Oenothera laciniata Hill

**Oenothera pilosella* Raf.

Oenothera linifolia Nutt.

**Circaea quadrisulcata* (Maxim.)

Franch. and Sav. var. *can-*

densis (L.) Hara

UMBELLIFERAE

- Sanicula canadensis* L. var. *canadensis*
 **Sanicula gregaria* Bickn.
 **Erigenia bulbosa* (Michx.) Nutt.
Cryptotaena canadensis (L.) DC.
Cicuta maculata L. var. *maculata*
 **Thaspium trifoliatum* (L.) Gray

CORNACEAE

- Cornus florida* L.
Cornus racemosa Lam.
 **Nyssa sylvatica* Marsh var. *caroliniana* (Poir.) Fern.

ERICACEAE

- Vaccinium arboreum* Marsh.
Vaccinium vacillans Torr.

PRIMULACEAE

- **Dodecatheon meadia* L.
Samolus floribundus HBK.

EBENACEAE

- Diospyros virginiana* L. var. *virginiana*

OLEACEAE

- **Fraxinus pennsylvanica* Marsh. var. *subintegerrima* (Vahl) Fern.
Fraxinus americana L.

GENTIANACEAE

- **Obolaria virginica* L.

APOCYNACEAE

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

ASCLEPIADACEAE

- Asclepias tuberosa* L.
Asclepias verticillata L.
 **Asclepias exaltata* L.
Ampelamus albidus (Nutt.) Britt.

CONVOLVULACEAE

- Ipomoea lacunosa* L.
 **Cuscuta cephalanthi* Engelm.
 **Cuscuta gronovii* Willd.

POLEMONIACEAE

- Phlox divaricata* L.
Phlox bifida Beck
Polemonium reptans L.

BORAGINACEAE

- Lithospermum canescens* (Michx.) Lehm.
Lithospermum arvense L.

- Myosotis virginica* (L.) BSP.
Myosotis micrantha Pall.
Cynoglossum virginianum L.
 **Hackelia virginiana* (L.) Johnst.

- Mertensia virginica* (L.) Pers.

VERBENACEAE

- Verbena urticifolia* L. var. *urticifolia*

LABIATAE

- Teucrium canadense* L. var. *canadense*
Scutellaria incana Biehler var. *incana*
Scutellaria parvula Michx.
 **Glechoma hederacea* L. var. *parviflora* (Benth.) Druce
Prunella vulgaris L. var. *vulgaris*
Prunella vulgaris L. var. *lanceolata* (Bart.) Fern.
Monarda bradburiana Beck
Hedeoma pulegioides (L.) Pers.
Pycnanthemum flexuosum (Walt.) BSP.
Cunila organoides (L.) Britt.
 **Lycopus americanus* Muhl. var. *longii* Benner

SOLANACEAE

- Solanum nigrum* L. var. *vulgare* L.
Solanum carolinense L.

SCROPHULARIACEAE

- Leucospora multifida* (Michx.) Nutt.
 **Mimulus alatus* Ait.
Verbascum thapsus L.
Penstemon pallidus Small
Penstemon calycosus Small
Veronica peregrina L. var. *xalapensis* (HBK.) Pennell
 **Aureolaria grandiflora* (Benth.) Pennell
 **Aureolaria flava* (L.) Farw.
Gerardia tenuifolia Vahl var. *tenuifolia*

BIGNONIACEAE

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

ACANTHACEAE

- Ruella humilis* Nutt. var. *expansa* Fern.
Ruella pedunculata Torr.
Ruella strepens L.
Justicia americana (L.) Vahl

PHRYMACEAE

- Phryma leptostachya* L.

PLANTAGINACEAE

- Plantago rugelii* Dcne.
Plantago pusilla Nutt.
Plantago virginica L.
Plantago aristata Michx.

RUBIACEAE

- Houstonia tenuifolia* Nutt.
Houstonia patens Ell.
Houstonia longifolia Gaertn.
 **Mitchella repens* L.
 **Diodea teres* Walt.
Cephalanthus occidentalis L.
Galium circaezans Michx.
 **Galium aparine* L.
 **Galium pilosum* Ait.
Galium concinnum Torr. & Gray

CAPRIFOLIACEAE

- Sambucus canadensis* L. var.
submollis Rehder

VALERIANACEAE

- Valerianella radiata* (L.) Dufr.

CAMPANULACEAE

- Specularia perfoliata* (L.) A.
 DC.

LOBELIACEAE

- **Lobelia siphilitica* L. var. *siphilitica*
 **Lobelia puberula* Michx.
 **Lobelia inflata* L.

COMPOSITAE

- Eclipta alba* (L.) Hassk.
Rudbeckia hirta L.
Rudbeckia triloba L. var. *triloba*
Bidens aristosa (Michx.) Britt.
Bidens coronata (L.) Britt.
 **Bidens vulgata* Green var. *vulgata*
 **Polymnia canadensis* L.
 **Silphium integrifolium* Michx.
Silphium perfoliatum L.
Ambrosia bidentata Michx.
Ambrosia trifida L.
Ambrosia artemisiifolia L.
 **Helenium nudiflorum* Nutt.
 **Anthemis nobilis* L.
Achillea millefolium L.
Matricaria chamomilla L.
Senecio glabellus Poir.
Cacalia atriplicifolia L.
Solidago nemoralis Ait. var.
nemoralis
Solidago caesia L.
Solidago buckleyi Torr. & Gray
Solidago ulmifolia Muhl. var.
ulmifolia
Solidago rugosa Mill.
 **Solidago gigantea* Ait. var.
leiophylla Fern.

Solidago altissima L.

- **Aster sagittifolius* Willd.
 **Aster patens* Ait. var. *potentissimus* (Lindl.) T. & G.
Aster pilosus Willd.
 **Aster turbinellus* Lindl.
Aster lateriflorus (L.) Britt.
 **Aster simplex* Willd. var. *interior* (Wieg.) Cron.
Erigeron strigosus Muhl. var.
strigosus
Erigeron annuus (L.) Pers.
 var. *annuus*
Conyza canadensis (L.) Cron.
 var. *canadensis*
 **Antennaria plantaginifolia* (L.)
 Richards var. *plantaginifolia*
Antennaria plantaginifolia (L.)
 Richards var. *arnoglossa*
 (Green) Cron.
Gnaphalium purpureum L.
Gnaphalium obtusifolium L.
Eupatorium serotinum Michx.
Eupatorium rugosum Houtt.
Eupatorium coelestinum L.
Vernonia missurica Raf.
Elephantopus carolinianus
 Willd.
Prenanthes altissima L. var.
cinnamomea Fern.
 **Hieracium gronovii* L.
Lactuca scariola L.
 **Lactuca canadensis* L. var. *canadensis*
 **Lactuca floridana* (L.) Gaertn.
Krigia dandelion (L.) Nutt.
Krigia biflora (Walt.) Blake
 **Krigia oppositifolia* Raf.

DISCUSSION

Over a period of forty-four weeks the author collected 441 taxa in the region of Piney Creek Ravine, among which were 136 not previously recorded from Randolph County. Moreover, twenty-nine of the taxa are considered to be of unusual occurrence at Piney Creek and are here placed into two categories.

The first of these contains twenty taxa which are of rare occurrence within the study area and are at the same time considered rare elements in the flora of southern Illinois. This group includes the following taxa:

Asplenium trichomanes
Poa paludigena
Carex annectens
Carex normalis
Carex torta
Carex aquatilis
Commelina communis
Commelina virginica
Spiranthes gracilis
Cerastium viscosum
Vitis linccumii
Passiflora lutea var. *glabriflora*
Ludwigia glandulosa
Obolaria virginica
Asclepias exaltata
Mitchella repens
Silphium integrifolium
Solidago buckleyi
Solidago rugosa
Aster turbinellus

The second of these categories contains those species which are of common or occasional occurrence at Piney Creek, but are considered rare in other areas of southern Illinois. Included in this group are the following nine taxa:

Pinus echinata
Bromus ciliatus var. *intonus*
Panicum perlongum
Carex umbellata
Salix sericea
Ranunculus harveyi
Viola pedata
Asplenium bradleyi
Agave virginica

Generally speaking, five plant communities may be recognized in the area immediately adjacent to Piney Creek. The following is a designation and brief description of each of these, including a listing of some of the plants most commonly found in them.

Exposed Dry Bluff Community

The tops of bluffs throughout the area, particularly near the source of Piney Creek, are mostly exposed sandstone, although a number of these areas is covered by a very thin layer of fine soil. Growing in

this exposed situation is a vegetation that is predominantly xerophytic and usually exhibits the entire successional history of the bluff.

Lichens and mosses are characteristic near the edges of the bluffs and contribute to the accumulation of soil. As a thin layer of soil is built up further back, a variety of shallow rooted herbs, such as *Festuca octoflora*, *Poa chapmaniana*, and *Plantago pusilla*, become established. Next in the line of successional stages may be observed the shrub zone, well represented by farkleberry (*Vaccinium arboreum*), highbush blueberry (*Vaccinium vacillans*), and fragrant sumac (*Rhus aromatica*). This stage finally gives way to a scrub oak type of vegetation composed almost entirely of post oak (*Quercus stellata*), black-jack oak (*Quercus marilandica*), red cedar (*Juniperus virginiana*), and winged elm (*Ulmus alata*). Throughout this community a number of herbaceous species occur, most of which are summer flowering species characteristic of rocky surfaces. These include *Tephrosia virginiana*, *Stylosanthes biflora*, *Agave virginica*, *Viola pedata*, *Phlox bifida*, and *Hypericum gentianoides*. Also characteristic of the area are a large number of grass species, as well as the hairy lipfern (*Cheilanthes lanosa*).

Below the margins of these bluff tops are many dry, rocky ledges which provide a microhabitat suitable for Bradley's spleenwort (*Asplenium bradleyi*). This fern is very characteristic of Piney Creek, although its occurrence is infrequent in similar situations in other parts of Illinois.

Dry Slope Community

The most extensive plant cover in the Piney Creek area is found on the dry slopes adjacent to sandstone bluffs. Seemingly intermediate between the mesophytic ravine forests and the exposed dry bluff community, these hillside slopes are predominantly of an oak-hickory composition. They are characterized by an almost homogeneous aggregation of white oak (*Quercus alba*), black oak (*Quercus velutina*), red oak (*Quercus borealis*), bitternut hickory (*Carya cordiformis*), and small-fruited hickory (*Carya ovalis*). Although not one of the dominant species, the shortleaf pine (*Pinus echinata*) is also characteristic of this community at Piney Creek. Those shrubs most abundant in the understory are the shadbush (*Amelanchier arborea*) and the flowering dogwood (*Cornus florida*). Of the herbaceous species found here, fewer flower in the spring than in the summer and autumn. One of the earliest of these non-woody plants to flower is Harvey's buttercup (*Ranunculus harveyi*). It is one of the most notable plants of the area because, although it is rare in Illinois, it is very abundant in the area of Piney Creek.

Mesophytic Ravine Community

As Piney Creek descends from its source, it passes through a narrow, high-walled valley that eventually widens into a lowland with many slightly elevated areas between high bluffs and steep slopes. Dispersed within this area are numerous boulders, separated from the face of the bluff through many years of gradual erosion. Favorable environmental conditions have allowed for the development of a relatively rich community and it is in these mesic woodland ravines that the most luxurious vegetation of Piney Creek is found. Here are locations which exhibit rapid succession into excellent forest lands because of favorable soil-moisture conditions.

In these lowlands between the bluffs occur forests of beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), southern sugar maple (*Acer barbatum*), and tulip tree (*Liriodendron tulipifera*). On slightly elevated areas sour gum (*Nyssa sylvatica*) and species of hickory (*Carya spp.*) become important along with sugar maple. Characteristic shrubs are spicebush (*Lindera benzoin*), blue beech (*Carpinus caroliniana*), and hop hornbeam (*Ostrya virginiana*). The herbaceous plants consist of a large variety of grasses, sedges, and other flowering plants which are mostly vernal in their flowering aspect.

On vertical walls and ledges at the base of the bluffs, and on boulders separated from them, are many varieties of mosses and liverworts in addition to some flowering plants requiring moist, shaded habitats. Two plants of unusual occurrence in southern Illinois grow in this situation at Piney Creek and should be mentioned. One is sphagnum moss (*Sphagnum capillaceum*), characteristic of sphagnum bogs of the north; the other is the partridge berry (*Mitchella repens*), also with a northern affinity.

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Stream Bank Community

Along the banks of Piney Creek is found a very distinct community characterized by such trees as black willow (*Salix nigra*), cottonwood (*Populus deltoides*), sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), and red maple (*Acer rubrum*). Typical herbaceous species to be found in the gravelly beds and sandy shores of Piney Creek are *Commelina virginica*, *Hypericum mutilum*, *Lobelia cardinalis*, *Lobelia siphilitica*, *Justicia americana*, *Dianthus armeria*, *Equisetum hyemale*, *Bidens coronata*, *Polygonum lapathifolium*, *Polygonum pennsylvanicum*, numerous grasses, and a few sedges. One sedge, *Carex torta*, is very common in this area, but is uncommon elsewhere in Illinois. Near the mouth of Piney Creek is found a single patch of giant cane (*Arundinaria gigantea*). Here it is so abundant that it forms a dense thicket.

Waste Ground Community

Roadsides, pastures, and abandoned fields constitute three temporary situations, all in such proximity to Piney Creek that they were included in the study of this area and were grouped together into the waste ground community. A large number of the weeds in the area, a few species of previous cultivations, and a variety of species native to the region normally become established on such sites. Woody species most commonly found on these sites include such examples as sassafras (*Sassafras albidum*), trumpet creep-

er (*Campsis radicans*), catalpa (*Catalpa bignonioides*), persimmon (*Diospyros virginiana*), smooth sumac (*Rhus glabra*), dwarf sumac (*Rhus copallina*), blackberries (*Rubus spp.*), and wild rose (*Rosa carolina*). These plants are not considered dominants here for in these areas the vegetation lacks the structure or organization found in older stabilized associations.

After further consideration of the taxa recorded for the area of this investigation, it was evident that a few of the plants collected have affinities characteristic of other areas of the United States. Thus, another aspect of this paper is an attempt to explain the occurrence of some of these plants at Piney Creek.

When small colonies or single individuals of plants are found within an area that belong to some more distant formation, they are usually referred to as relics (Braun, 1928). Examples of such relics are frequently found near the southern boundary of continental glaciation where vegetation was affected either directly or indirectly by the changing climate.

Since Piney Creek lies just north of the southern boundary of Illinoian glaciation, and since some of the plants here are not successional related to the surrounding vegetation, it is necessary to consider them in the light of past migrations of the glacial epoch and early post-glacial period.

During Pleistocene times a series of glacial advancements and recessions occurred several times, with the third advance reaching its southern limit in Illinois, a few miles

south of Piney Creek. This advance is known as the Illinoian glacier and during the early interglacial period that followed, Piney Creek and the surrounding areas of southern Illinois probably were almost entirely covered with a northern type forest. However, as the glacier receded northward, the vegetation of pre-glacial times became re-established in the glaciated area, with the exception of a few of these northern plants which remained in peculiarly protected or favored spots.

Most notable of these at Piney Creek are two species of the Bryophyta. One, *Sphagnum capillaceum*, occurs a short distance below the source of Piney Creek. Here it forms a large colony on a north-facing slope just above a moist sandstone ledge. In this situation there is a seepage of water between the soil and the bedrock creating a very hydrophytic condition. Since sphagnum is characteristic of bogs in colder climates to the north, the accumulation of moisture from seepage is evidently necessary for this species to continue to exist here.

Growing in association with this sphagnum moss, another relic bryophyte can be found. This species is a leafy hepatic. However, because of the sterile condition of the specimen collected, its determination was limited to a choice of two species. This choice was between *Cephalozia subdentata* or *C. elachistata*, and was determined by R. E. MacMahon and later verified by R. M. Schuster. Schuster (1953) describes *C. elachistata* as "widely distributed throughout the Coniferous Region, becoming rare in isolated bogs in the northern edge of the Deciduous

Zone." As for *C. subdentata* he writes: "It is closely allied to *C. elachistata*, but has an essentially more northern largely Arctic-Alpine range." Thus the specimen discovered at Piney Creek is definitely northern in its distribution. Further study of the bryophytes in this area would perhaps be of great value, for these plants with their micro-environmental requirements might contribute more to the study of glacial distribution than the vascular plants which are less likely to remain in a suitable environment and therefore appear as glacial relics.

Besides these plants of northern affinity, many plants of southern and southeastern distribution reach their northwestern limit within the deep ravines and atop the high bluffs at Piney Creek. Examples of these are: *Pinus echinata*, *Agave virginica*, *Asplenium bradleyi*, *Arundinaria gigantea*, *Panicum agrostoides*, and *Obolaria virginica*.

During the Pleistocene Epoch, vegetation was forced southward and became concentrated in the Southern United States. Following recession of the glacier, plants subsequently migrated northward again from a center of distribution believed to be the Southern Appalachians (Cain, 1930).

With regard to the migration of these plants from the south, Braun (1928) noted that certain species have reached a northern limit in their dispersal at the southernmost glacial boundary. As an explanation she comments that these plants may belong to one of three categories: (1) plants which have reached their northern climatic lim-

it; (2) plants still migrating, which have not had time to spread far across the glacial boundary; and (3) passive species restricted in range by glaciation, and not showing any disposition to spread. She goes on to say that *Pinus echinata* probably belongs in the second category, whereas *Agave virginica* may be one of the species in the third group.

It is interesting to note that many of the southern species listed at Piney Creek are also a very characteristic part of the Missouri Ozark flora. Examples of these are *Pinus echinata*, *Commelina virginica*, *Celtis laevigata*, *Vaccinium arboreum*, *Ilex decidua*, *Oenothera linifolia*, *Asplenium bradleyi*, *Ruellia pedunculata*, and *Eupatorium coelestinum*.

In contrast to the opinion that the southern United States was the center of origin for these species, Palmer and Steyermark (1935) have quite an opposite point of view. They present the possibility that these species may have persisted in the Ozark region since pre-glacial times, for this area has been a continuous land surface since late Paleozoic. If this is true, the possibility should not be overlooked that some of these species, as well as others, may have been developed in the Ozark region and may have been dispersed from this center. In their arguments supporting this possibility, they presented the idea that it is highly unlikely that extensive immigration could have taken place from the southeast after the development of wide floodplains of the Mississippi River, for this offers an effective barrier to many upland species.

Whether or not this point of view is correct, the Ozarks seem to be an important contributor to the Piney Creek flora. Other species, such as *Viola pedata* and *Ranunculus harveyi*, show no southern affinity, although they are characteristic members of both the Missouri Ozark and Piney Creek regions. Of further significance is the fact that Mill Creek, of which Piney Creek is a tributary, is similar in many respects to the topography of the Ozarks and also supports many of the same species.

Although the Mississippi Valley may serve as a barrier to the spread of many upland species across the great expanse of floodplain from the Appalachians to the Ozarks, it may not prevent the migration of these plants in other areas where the floodplains of the Mississippi are not as wide. Thus it seems possible that many species have crossed the relatively short distance from the Missouri Ozarks to bluffs on the Illinois side of the river. Here they continued to migrate along bluffs that were formed by tributaries of the Mississippi and have become established in Ozark-like areas such as Piney Creek.

SUMMARY

Over a period of 44 weeks, 441 taxa were collected in the region of Piney Creek Ravine, including 136 Randolph County records. After a general survey of the plant communities of this area, a more specific study of each of its individual elements was made. As a result of this, the following conclusions were drawn with regard to the plants of Piney Creek.

(1) Consideration of the vegetation of Piney Creek with regard to the geographic distribution of each species collected made apparent the fact that a number of the taxa present in these communities have affinities characteristic of other areas of the United States. These were explained in three ways.

(a) Those plants showing northern affinities probably were brought into the area under compulsion of continental glaciation and left as relic species. Examples of such plants are *Sphagnum capillaceum* and *Cephaloziella subdentata*, or *C. elachistata*.

(b) Many other species found at Piney Creek are plants which appear to have reached a northern limit in their dispersal from a southern or southeastern center of distribution. Braun (1928) has offered possible explanations concerning this restriction in distribution.

(c) Finally, quite a number of taxa represented in the flora of Piney Creek were found to be very characteristic of the Ozarks of Missouri. Palmer and Steyermark (1935) presented the idea that many of these species probably had their center of origin in the Ozarks because of its long period of continuous

land surface. They support this idea with the assumption that the wide floodplains of the Mississippi Valley between the southeastern United States and the Ozarks of Missouri have served as a barrier to the spread of many upland species. Therefore, extensive immigration could not have taken place from the east. However, this author believes that because of the relative proximity of the Missouri Ozarks to southern Illinois, many of these species may have continued to migrate and have become established in areas such as Piney Creek.

(2) Of a more specific nature, some species collected at Piney Creek were placed into special categories regarding their occurrences there. These include plants rare to Piney Creek as well as other areas of southern Illinois and plants common or occasional in occurrence at Piney Creek, but rare elsewhere in southern Illinois.

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