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Bulletin 110 - A Mesophytic Ravine

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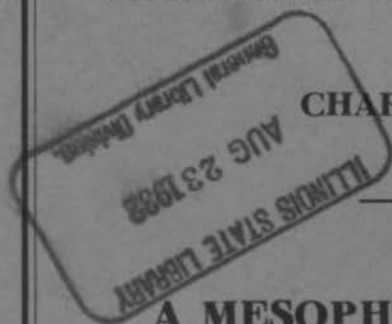
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Eastern Illinois State Teachers College

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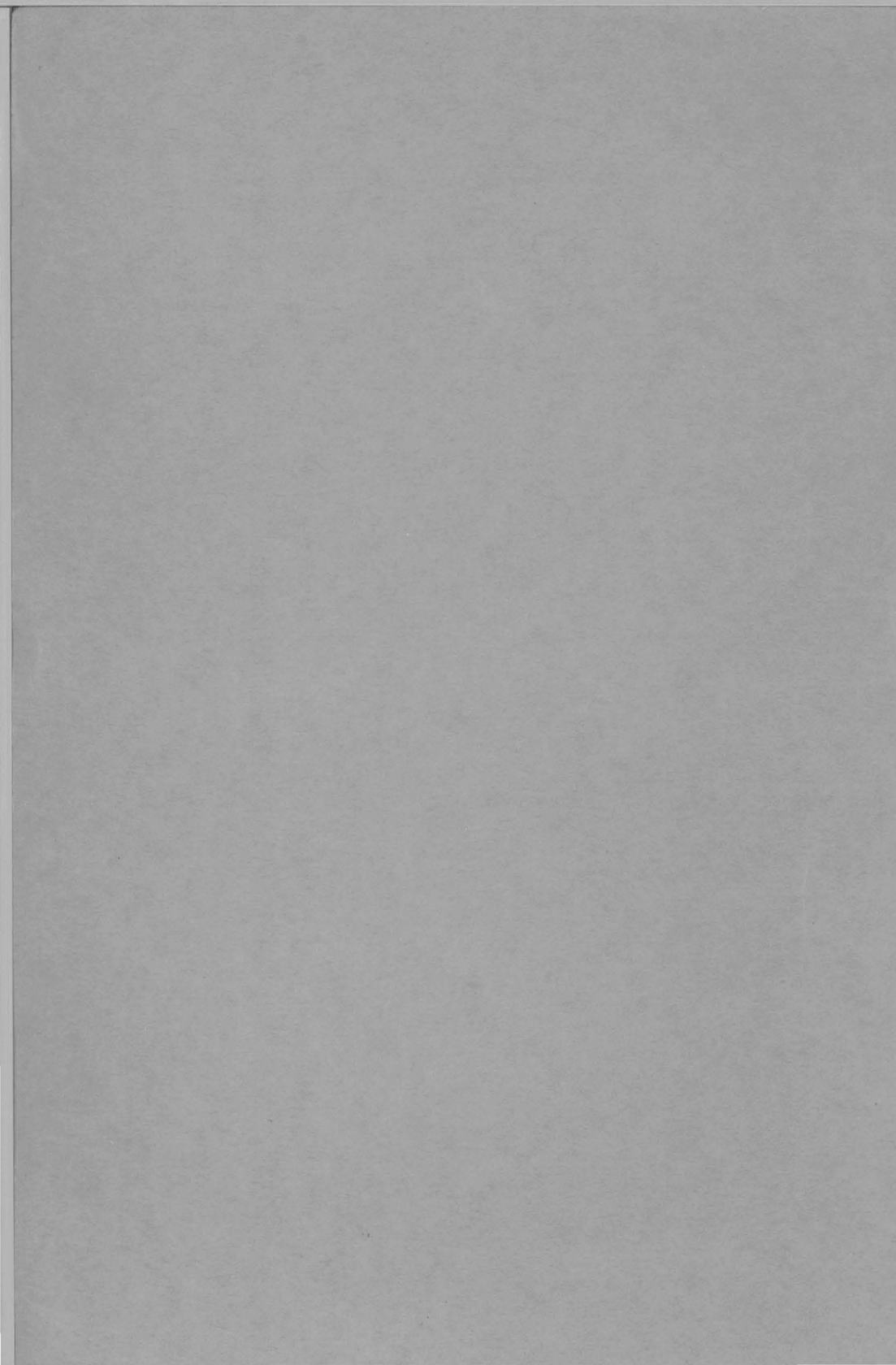
A MESOPHYTIC RAVINE

"Rocky Branch"

A FLORISTIC ACCOUNT

By

E. L. STOVER



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CHARLESTON, ILLINOIS

October 1, 1930

A MESOPHYTIC RAVINE

("ROCKY BRANCH")

A FLORISTIC ACCOUNT

By

E. L. STOVER

Eastern Illinois State Teachers College at Charleston

(Printed by authority of the State of Illinois)

This bulletin is written for the use of students of the Eastern Illinois State Teachers College and of high school teachers in this vicinity.

It is available to others who may be interested.

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Missouri Botanical Garden

FOREWORD

To Teachers of High-School Science

The value of laboratory recitation and the place of text-book work in botany are well known, but the importance of field work is not known or is underestimated. Many a student has spent hours of study on laboratory types and materials without the slightest conception of them as living plants. He feels a frank amazement if by accident he runs across the real plant of that name, just as if he had found a friend in a foreign land. Such a gulf fixed between the plants studied in school work and an idea of those plants in their natural surroundings is the result of many things—among them, limited experience and knowledge on the part of the teacher, too crowded schedules for teachers, and an unscientific lack of lively curiosity concerning the subject matter used. Whatever the cause, the effect is to rob the student of a chief source of pleasure in his school course, and, worst of all, to rob him of the future enjoyment which naturally follows from an established habit of observing and appreciating the plant life about him. Besides giving a more complete idea of plants, the study of trees, shrubs, and herbs in their natural habitat is an excellent way to develop powers of observation to a high degree, since it involves sharp looking and close comparisons. The work of identifying plants has become almost obsolete in elementary courses, partly because of the deadly boredom that has arisen from poor teaching. But it is always true that where the teacher has a ready knowledge of names and differences, and an interest in them, the students like to learn to recognize plants. It is possible for an amateur botanist to know four or five hundred plants and name them at sight.

Another point it may be well to mention is the unexpected influence in helping students to see how much there is to learn. For instead of thinking that the study of one slide of a cross section of a woody stem is all there is to learn of trees, he may come to realize that to know trees really well one must (1) recognize species in either winter or summer condition by bark, twigs, leaves, fruits; (2) understand the structure of the plants; (3) know of their processes

in relation to structure; (4) understand fairly well the relation of the tree to its environment and its chances for survival in its locality; and (5) even be able to identify the kind of tree by microscopic examination of a small piece of wood. Nor is any of this, except the identification of the wood, anything which an interested high school student may not achieve. With so much to learn about only one kind of plant, it becomes evident that the parts of the plant kingdom that are accessible to us are not likely to be exhausted of interest.

For those that expect to teach botany, zoology, or nature study, it is of the utmost importance that they know plants and animals in the field, where to find them in the greatest abundance, and at what season they are in the proper stage for class use. Were such knowledge more common one would not find classes studying decolorized, unrecognizable material as devoid of interest as it is possible for a mass to be, when, possibly within twenty minutes' run of that classroom, living material may be in exactly the right stage to study. Certainly one factor of the greatest importance in successful teaching is the use of the very best, most easily seen materials for class use. For advanced students, fairly inferior material may be used with no great harm, but for beginners only the very best is good for any purpose. Hence substitution of living forms for preserved materials should be made wherever possible; for example, fresh green algae actually reproducing, if possible, should be substituted for bottled material or slides. Time and again has a student felt actual thrills at even a chance of seeing gametes swimming. Such material is at hand for the teacher who knows plants in their native habitats around his school.

To be able to conduct a field trip with a class is an art, and requires good technique on the part of the teacher if the trip is to be worth while. A large factor in its success is the teacher's knowledge and his ability to name plants, to find interesting plants, and to map out a route that will accomplish most for the work in hand and include the most unusual plants of the locality visited. A good class which already has a definitely established purpose will show great initiative on a field trip; they will—and should—outshine the teacher in finding interesting specimens. Such a situation is the peak of success in field work, if the student finds his teacher able to tell him something about his find, either naming it, or telling him where he may learn its name. The teacher must of course be a source of ready information for the field class at work, but neither he nor they should feel

his information is inexhaustible. It is well to remember that an occasional, though not too frequent, "I don't know" helps to increase confidence that judgments are worth while. The teacher should have the feeling established that he is one of the group, and such definitely good fellowship that discipline is chiefly a matter of suggestion. Buoyant spirits and displays of surplus energy are to be expected of high school students out of doors. But it is better not to go, or else not call it a field trip, unless each student feels a desire to accomplish some one thing at least to increase his knowledge and comes away with a feeling that he has succeeded.

Another point in conducting field trips is the teaching of conservation and respect of property. It goes without saying that the teacher is using privately owned land and expects to leave everything exactly as he found it, in respect to litter, fences, and crops. A point not apt to arise in the teacher's mind in this part of the state is the necessity of teaching pupils to leave wild plants where they find them, and never to pluck rare flowers or pull up roots. If the teacher knows ahead of time what flowers in the visited area are rare he should warn against the picking of specimens of those plants. An example of this is the partridge berry mentioned in this bulletin. It would take only a few visits of careless classes to make this plant extinct in this location, and that from the writer's point of view would be a much regretted result of this publication.

To secure the right combination of pleasure and learning it is best to have a single object for study and that one easy to concentrate upon and adapted to the time available. In the spring it may be the collecting of new flowers for identification, or for the making of attractive collections of native plants for the school. Whatever it is, that should be the chief subject of interest, although it would be ridiculous to ignore a particularly gorgeous mass of the sulphur poppy, for example, because it was not the subject for the day's study. It will, however, be of definite benefit to limit observation markedly to one topic, except for the unexpected forms that it is unusual luck to find. The following are some suggestions for botany trips:

Fall: Fungus collections (slime molds make especially good fall collections).

Identification of trees, shrubs, vines.

Fall flowers.

Study of fruits, and seed dispersal.

Winter: Study of buds, their contents and coverings.

Identification of trees.

Evergreen herbs of our woods.

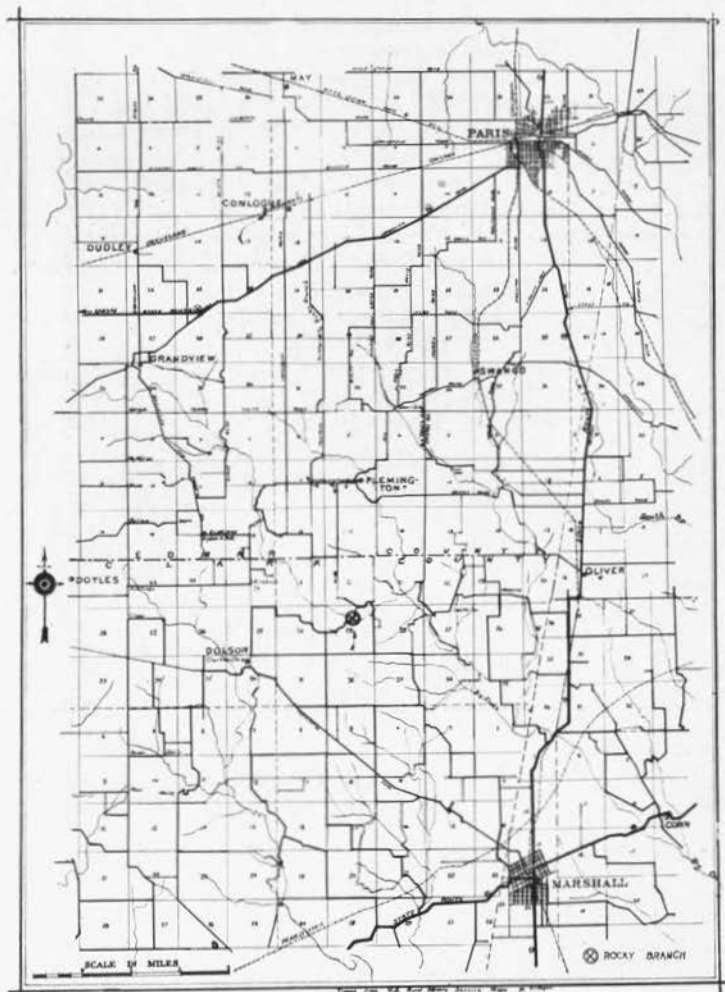
Spring: Identification of spring flowers.
 Unfolding of buds.
 Collecting and identifying of algae and other water plants.
 Mosses and other flowerless plants.
 Study of different kinds of habitats and the plants found in each; hydrophytes, mesophytes, xerophytes, and their characteristics.

There are four great groups of plants. Every student in botany should find himself able to recognize examples of each, and his teacher able to tell him the principal subdivisions of these groups and typical life histories, where they are interesting or important. The approximately 250,000 kinds of plants on earth are divided among these groups as follows:

Thallophytes: plants without leaves, stems, roots.	
Algae—green threads in water and on damp soils.....	14,200
Fungi—non-green plants such as yeasts, molds, bacteria, and mushrooms.....	63,000+
Bryophytes: small plants without roots and seeds, and the absence of veins distinguishing what may appear as leaves from true leaves.	
Liverworts.....	4,000
Mosses.....	12,000
Pteridophytes: plants with true roots, stems, leaves (all marked by veins) but no seeds. Among these are the true ferns and horsetails, also called scouring rushes....	4,500
Spermatophytes: plants with roots, stems, leaves, seeds.	
Conifers—our evergreens, which produce cones	400+
Flowering plants.....	106,300+

For looking up information about these groups the following list of books is suggested as helpful. These books may be found in any fairly complete school library. Those marked * are of the type more easily read by students not familiar with specialized botanical terms. But this warning is timely—to acquire a knowledge of plants or animals one must learn to use scientific terms.

- Algae: West and Fritsch, British Freshwater Algae.
Collins, Algae of North America.
* Ward and Whipple, Fresh Water Biology.
* Smith, Phytoplankton of the Lakes of Wisconsin.
- Fungi: Stevens, Fungi Causing Plant Disease.
Clements, Genera of Fungi.
* Hards, Mushrooms.
* McIlvaine, A Thousand American Fungi.
- Bryophytes: * Grout, Mosses with a Hand Lens.
Grout, Mosses with a Hand Lens and Microscope.
- Ferns: * Clute, Ferns in Their Native Haunts.
Gray, New Manual of Botany.
- Spermatophytes: Gray, New Manual of Botany.
Britton and Brown, Illustrated Flora of N. E. North America, 3 vol.
* Schaffner, Manual of Trees.
* Miller, Trees of Illinois.
* Coulter and Cowles, Spring Flora for High Schools.
* Trelease, Winter Botany.





. Rocky Branch. The steep bank at the right is the habitat of the interrupted fern, the bishop's cap, the walking fern, and many liverworts and mosses.
Photographed by E. H. Hall.



A moist cliff, habitat of liverworts, mosses, ferns, wahoo, hydrangea, and many mesophytic herbs.

A MESOPHYTIC RAVINE

A Floristic Account of Rocky Branch

Rocky Branch is a place located near Marshall, Illinois, on a stream indicated on the map. It is a small stream, a branch of Big Creek, which has carved out a narrow valley from the sandstone rocks that are near the surface in this area. This sandstone is probably carboniferous in origin, and the valley interglacial. The soil is sandy and supports a mesophytic flora similar to like situations in Indiana and eastward. Since this is one of very few rock outcroppings in the prairie vicinity it is of great interest to the botanist, and for this and other reasons to the zoologist and geologist also.

The valley contains an unusual aggregation of plants, some of which are near the extreme limits of their geographical distribution, and one or two of which seem to be beyond limits formerly known for them. The tulip trees, a southern and eastern species, are the only unplanted specimens in this



The ravine floor, a mesophytic forest of beech, maple, butternut, sugarberry, and elms.

area of the state, so far as is known by the writer, and they are reproducing. Tupelo, a southern and eastern species also, is found here; it is also found in adjoining forests on the upland where the original forest seems fairly undisturbed. The beech, a common tree in Indiana and eastward, stops abruptly at the Wabash Valley in this latitude, and only a few specimens have been located in one or two uncut strips of forests; but in this ravine they are abundant. Sphagnum, a light green moss highly absorptive of water, is most common only in the cold bog swamps of northern states; yet it has been found here reproducing itself on the steep rock surface of a north-facing cliff. Partridge berry and ground pine are also natives in more northern states underneath evergreen forests, but they are both found here close to sphagnum and evidently spreading since they were first observed. Other plants rather rare for this region are interrupted fern, arrow-wood, and hobble-bush. Thus the ravine is a meeting place of southern and northern forms, all of them aliens in a prairie vicinity.

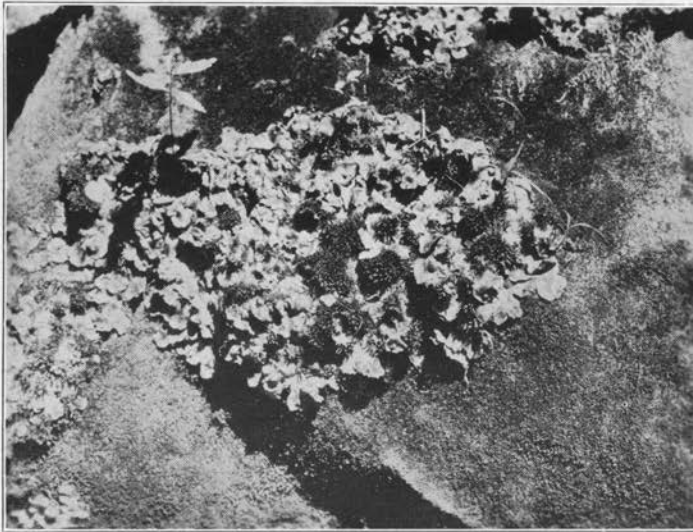


Bog Moss (*Sphagnum*).

Photographed by E. H. Hall.

This ravine is a mesophytic habitat, and the plants in it are the plants of the mesophytic forest rather than the plants of the oak-hickory forest that dominates the upland of this region of the state. The botanist recognizes four

kinds of plant habitats based upon water supply: mesophytic, hydrophytic, xerophytic, epiphytic. A mesophytic habitat is one where the water supply is sufficient to allow for the large amount of water lost by plants to the air in transpiration, and still leave a balance within the plant for its own processes. Examples of mesophytes are the beech, the maple, ferns, and common herbs. A hydrophytic habitat is one in which the water supply is in great excess of the

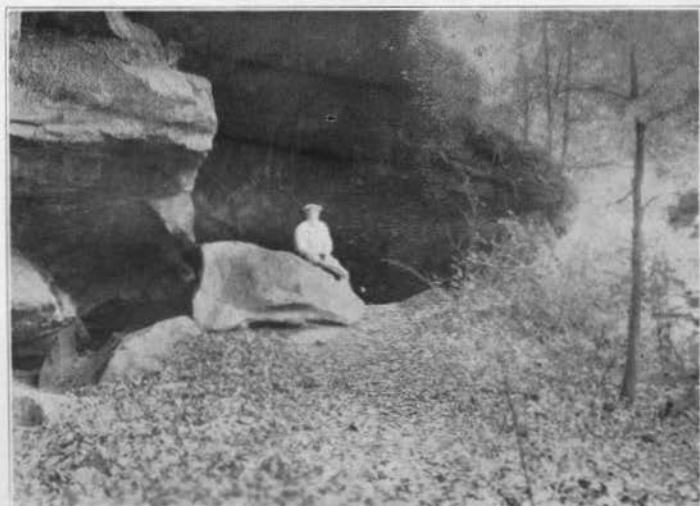


The liverwort (*Conocephalus*) with young plants of the bog moss.
Photographed by E. H. Hall.

amount lost by plants to the air, such as a pond, a stream, or a marsh. A xerophytic habitat is a place where the water supply is less than either of the above and the air is dry, causing high evaporation. Under these conditions all plants that exist there have some structural modifications which prevent excessive water loss, or else have water storage tissues. These plants have thick cuticle and other structures which make their leaves feel leathery. An epiphytic habitat is a place where plants grow perched upon a substratum with which they have no organic connection; for example, the bark of trees, fences, etc. These plants absorb water and minerals from the air, and have special structures which make this possible. Epiphytes in many cases are really xerophytes because such situations are dry; and consequently

epiphytes have structures which cut down the loss of water or else store water.

Thus it can be seen that plants grow only where they are fitted by structure to survive, and this makes natural plant associations significant. There are four of these associations at Rocky Branch—the ravine floor, the moist slopes, the dry slopes, and the upland. The abundant water supply and the protection from winds and excessive evaporation afforded by the high cliffs are the factors determining the occurrence of many plants in these groups. The transition to xerophytic upland is so distinct in some places at the top of the ravine walls that it can almost be marked off by a line.



An overhanging cliff.

Listing first the plants of the ravine floor, the trees are:

Sugar and black maple	White ash
Box elder	Basswood
Hackberry	Tulip tree
Butternut and black walnut	Tupelo (black gum)
American, river, and red elm	Black cherry
Sycamore	Beech



A high rock cliff at the top of which is the oak-hickory forest and in the ravine the mesophytic forest.

The vines and shrubs under these trees are:

Trailing wahoo	Roses
Bittersweet	Shadbush
Smilax	New Jersey tea
Virginia creeper	Spice bush
Moonseed vine	Elder
Passion flower	Coral-berry

The herbaceous plants include many of the species typical of the mesophytic forest of more eastern localities. The complete list of these is given at the end of this bulletin.

The moist slopes are of particular interest to the botanist because of the great abundance and diversity of their plant coverings. It is here that the great number of beech trees are growing. The other trees of these slopes are:

Sugar maple	Redbud
Blue beech	Mulberry
Hop hornbeam	Service berry
Dogwood	Red maple

The shrubs are hydrangea, hobble-bush, arrow-wood, and wahoo. On the rock surfaces of moist slopes are abundant plant forms, such as:

Liverworts: *Conocephalus*, *Reboulia*, *Anthoceros*, *Blasia*, *Marchantia*, etc.

Mosses: *Mnium*, *Bryum*, *Climacium*, *Catharinea*, *Thuidium*, *Sphagnum*, and others not identified.

Foliose lichens.

Ferns: Interrupted fern (*Osmunda*), Maiden hair fern (*Adiantum*), Walking fern (*Camptosorus*), Fragile fern (*Cystopteris*), Christmas fern (*Polystichum*).

Club moss (*Lycopodium*)

Bishop's cap (*Mitella*)

Wild ginger (*Asarum*)

Partridge berry (*Mitchella*)

Bellwort (*Uvularia*)

Solomon seal (*Polygonatum*)

False Solomon seal (*Smilacina*)

Blood root (*Sanguinaria*)

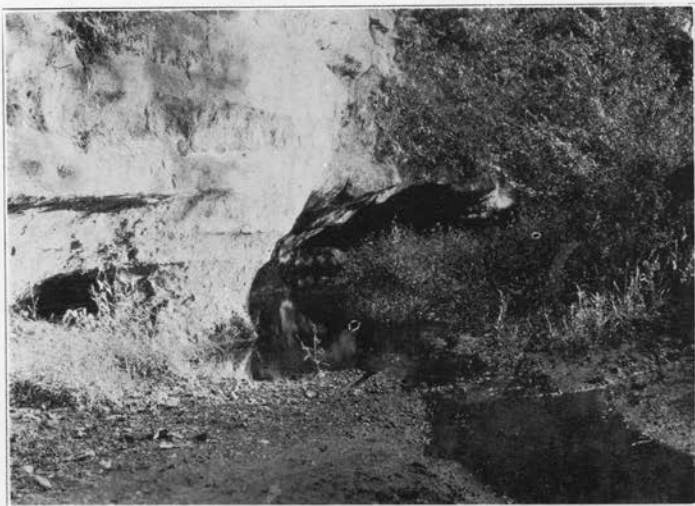
Hepatica (*Hepatica*)

The dryer slopes and the exposed rocks have a different plant population. The trees are mostly oaks and hickories with a few sugar maples, and the ground is covered with a dense carpet of more xerophytic mosses, such as *Leucobryum*, *Polytrichum*, *Catharinea*, and others. The herbs are poverty grass (*Danthonia*), triple awned grass (*Aristida*), everlasting (*Antennaria*), lousewort (*Pedicularis*), pennyroyal (*Hedeoma*),



A rock face covered with lichens on the exposed surface and liverworts on the receding surface.

ipecac (*Gillenia*). Various species of the crustose foliose, and fruticose lichens are found here also.



The cliff in the background is the habitat of the club moss, bog moss, and partridge berry.

Rocky Branch is an excellent place for collecting fungi, both those kinds that cause plant diseases, and those that bring about decay. The latter return to the soil water-holding humus and mineral compounds which are essential to the growth of green plants. Some of the fungi are:

Myxomycetes: *Stemonitis*, *Arcyria*, *Fuligo*, *Trichia*. (These are found as a thin slime, often bright colored, in rotting wood and leaves, and when they fruit, form tiny, delicate bodies of intricate structure, many together).

Ascomycetes: *Morchella*, *Peziza*, *Leotia*, *Helvella*, *Ustilina*, *Epichloa*, and others. Numerous kinds of leaf spots were also collected.

Basidiomycetes: Various rusts (*Puccinia*) jelly fungi (*Auricularia*), tooth fungi (*Hydnum*), gill fungi (*Amanita*, *Coprinus*, *Flavolus*, *Pleurotus*, *Russula*), pore fungi (*Polyporus*, *Boletus*), coral fungi (*Clavaria*), bird's nest fungi (*Crucibulum*, *Cyathus*), puff balls (*Lycoperdon*).

LIST OF TREES

<i>Fagus americana</i>	Beech
<i>Liriodendron tulipifera</i>	Tulip tree
<i>Nyssa sylvatica</i>	Sour gum
<i>Juglans cinerea</i>	Butternut
<i>Juglans nigra</i>	Black walnut
<i>Celtis mississippiensis</i>	Sugar berry or hack- berry
<i>Tilia americana</i>	Basswood
<i>Fraxinus americana</i>	White ash
<i>Platanus occidentalis</i>	Sycamore
<i>Prunus virginiana</i>	Wild cherry
<i>Quercus alba</i>	White oak
<i>Quercus velutina</i>	Black oak
<i>Quercus imbricaria</i>	Laurel oak
<i>Quercus rubra</i>	Red oak
<i>Quercus coccinea</i>	Scarlet oak
<i>Morus rubra</i>	Mulberry
<i>Acer negundo</i>	Box elder
<i>Acer saccharum</i>	Sugar maple
<i>Acer saccharinum</i>	Silver maple
<i>Acer nigrum</i>	Black maple
<i>Acer rubrum</i>	Red maple
<i>Hicoria cordiformis</i>	Bitternut
<i>Hicoria alba</i>	Mockernut
<i>Hicoria glabra</i>	Pignut
<i>Sassafras sassafras</i>	Sassafras
<i>Salix</i> spp.....	Willows
<i>Cercis canadensis</i>	Redbud
<i>Ostrya virginiana</i>	Hop hornbeam
<i>Carpinus caroliniana</i>	Blue beech
<i>Amelanchier canadensis</i>	Service berry
<i>Asimina triloba</i>	Papaw
<i>Crataegus</i> spp.....	Hawthorn

LIST OF SHRUBS AND WOODY VINES

<i>Evonymus atropurpureus</i>	Wahoo
<i>Evonymus obovatus</i>	Wahoo
<i>Celastrus scandens</i>	Bittersweet
<i>Smilax hispida</i>	Smilax
<i>Rubus nigrobaccus</i>	Blackberry
<i>Ceanothus americanus</i>	New Jersey tea
<i>Symphoricarpos orbicula</i>	Coral-berry
<i>Rhus toxicodendron</i>	Poison ivy
<i>Rhus glabra</i>	Smooth sumac

Benzoin benzoin.....	Spice bush
Viburnum alnifolium.....	Hobble-bush
Viburnum acerifolium.....	Arrow wood
Psedera quinquefolia.....	Virginia creeper
Vitis sp.....	Grape
Staphylea trifolia.....	Bladdernut
Hydrangea arborescens.....	Hydrangea
Sambucus canadensis.....	Elder
Menispermum canadense.....	Moonseed vine
Rosa spp.....	Wild roses

HERBACEOUS FLOWERING PLANTS

This is not a complete list, but is a list of the plants occurring in greatest numbers. These names are arranged by families in the order used in Gray's *New Manual of Botany*.

<i>Gramineae</i>	<i>Grasses</i>
Glyceria nervata.....	Nerve grass
Panicum clandestinum.....	Panic grass
Panicum spp.	
*Poa pratensis.....	Kentucky blue grass
Poa compressa.....	Canadian blue grass
Poa trivialis.....	Woodland blue grass
Bromus secalinus.....	Cheat grass
*Bromus ciliatus.....	Soft chess grass
Danthonia spicata.....	Poverty grass
Elymus canadensis.....	Nodding wild rye
Hystrix hystrix.....	Bottle-brush grass
*Setaria glauca.....	Foxtail grass
*Setaria viridis.....	Foxtail grass
Muhlenbergia diffusa.....	Dropseed grass
Aristida oligantha.....	Triple-awned grass
Sorghastrum nutans.....	Indian grass
Echinochloa crusgalli.....	Barnyard grass
*Digitaria sanguinalis.....	Finger grass
Tridens flavus.....	Purple top
*Agrostis alba.....	Red top
<i>Cyperaceae</i>	<i>Sedges</i>
*Carex spp.....	Sedge
*Cyperus spp.....	Sedge
*Juncus tenuis.....	Nut sedge
<i>Araceae</i>	
*Arisaema triphyllum.....	Jack-in-pulpit
*Arisaema dracontium.....	Green dragon
<i>Commelinaceae</i>	
*Tradescantia pilosa.....	Spiderwort
*Tradescantia virginica.....	Spiderwort

<i>Liliaceae</i>	<i>Lily Family</i>
* <i>Polygonatum biflorum</i>	Solomon seal
* <i>Smilacina racemosa</i>	False Solomon seal
* <i>Trillium sessile</i>	Trillium
* <i>Smilax rotundifolia</i>	Smilax
* <i>Smilax hispida</i>	Smilax
* <i>Uvularia perfoliata</i>	Bellwort
* <i>Erythronium americanum</i>	Yellow adder's tongue
* <i>Allium cernuum</i>	Wild onion
<i>Dioscoreaceae</i>	<i>Yam Family</i>
<i>Dioscorea villosa</i>	Wild yam-root
<i>Urticaceae</i>	<i>Nettle Family</i>
<i>Laportea canadensis</i>	Wood nettle
<i>Pilea pumila</i>	Clear weed
<i>Aristolochiaceae</i>	
* <i>Asarum canadense</i>	Wild ginger
<i>Polygonaceae</i>	<i>Buckwheat or Smartweed Family</i>
* <i>Rumex acetosella</i>	Red sorrel
<i>Rumex crispus</i>	Curly dock
<i>Polygonum aviculare</i>	Knot-weed
<i>Polygonum hydropiper</i>	Smartweed
<i>Polygonum persicaria</i>	Smartweed
<i>Polygonum convolvulus</i>	Bindweed
<i>Polygonum sagittatum</i>	Tear-thumb
<i>Phytolaccaceae</i>	
<i>Phytolacca decandra</i>	Poke-berry
<i>Caryophyllaceae</i>	<i>Pink Family</i>
* <i>Stellaria media</i>	Chick weed
* <i>Cerastium vulgatum</i>	Mouse-ear chickweed
<i>Silene stellata</i>	Catch fly
<i>Saponaria officinalis</i>	Bouncing Bet
<i>Ranunculaceae</i>	<i>Buttercup Family</i>
* <i>Ranunculus abortivus</i>	Small flowered buttercup
* <i>Ranunculus septentrionalis</i>	Swamp buttercup
* <i>Ranunculus</i> spp.....	Buttercups
* <i>Isopyrum bitermatum</i>	Wind flower
* <i>Aquilegia canadensis</i>	Columbine
* <i>Delphinium tricornis</i>	Dwarf lark spur
* <i>Hepatica triloba</i>	Hepatica
* <i>Thalictrum dioicum</i>	Early meadow rue
<i>Cimicifuga racemosa</i>	Black cohosh
* <i>Clematis viorna</i>	Leather flower
<i>Berberidaceae</i>	
* <i>Podophyllum peltatum</i>	May-apple

<i>Papaveraceae</i>	
* <i>Sanguinaria canadensis</i>	Blood root
<i>Cruciferae</i>	
<i>Mustard Family</i>	
* <i>Cardamine bulbosa</i>	Cardamine
* <i>Capsella bursa-pastoris</i>	Shepherd's purse
<i>Lepidium virginicum</i>	Pepper grass
<i>Saxifragaceae</i>	
<i>Heuchera americana</i>	Alum root
* <i>Mitella diphylla</i>	Bishop's cap
<i>Ribes</i> spp.....	Wild currants
<i>Rosaceae</i>	
<i>Rose Family</i>	
<i>Geum canadense</i>	Avens
<i>Gillenia stipulata</i>	Ipecac
* <i>Fragaria virginiana</i>	Wild strawberry
* <i>Potentilla canadensis</i>	Cinquefoil
<i>Potentilla</i> spp.....	Cinquefoil
<i>Rubus</i> spp.....	Blackberry
<i>Agrimonia gryposepala</i>	Agrimony
<i>Rosa</i> spp.....	Wild roses
<i>Leguminosae</i>	
<i>Pea Family</i>	
<i>Schrankia angustata</i>	Sensitive brier
* <i>Psoralea onobrychis</i>	Psoralea
<i>Desmodium</i> spp.....	Tick trefoil
* <i>Trifolium repens</i>	White clover
* <i>Melilotus alba</i>	Sweet clover
<i>Oxalidaceae</i>	
<i>Wood Sorrel Family</i>	
* <i>Oxalis stricta</i>	Wood sorrel
* <i>Oxalis violacea</i>	Violet wood sorrel
<i>Geraniaceae</i>	
<i>Impatiens fulva</i>	Touch-me-not
<i>Impatiens pallida</i>	Touch-me-not
* <i>Geranium maculatum</i>	Wild crane's bill
<i>Polygalaceae</i>	
* <i>Polygala senega</i>	Seneca snake root
<i>Euphorbiaceae</i>	
<i>Euphorbia corollata</i>	Flowering spurge
<i>Acalypha virginica</i>	Three-seeded mercury
<i>Violaceae</i>	
<i>Violets</i>	
* <i>Viola palmata</i>	(blue)
* <i>Viola cucullata</i>	(blue)
* <i>Viola scabriuscula</i>	(yellow)
* <i>Viola pallens</i>	(blue and white)
* <i>Viola blanda</i>	(white)
* <i>Hybanthus concolor</i>	Green violet
<i>Passifloraceae</i>	
<i>Passiflora lutea</i>	Passion flower

<i>Onagraceae</i>	
<i>Oenothera biennis</i>	Evening primrose
* <i>Circaea lutetiana</i>	Enchanter's night shade
<i>Umbelliferae</i>	
<i>Parsley Family</i>	
* <i>Pastinaca sativa</i>	Wild parsnip
* <i>Osmorhiza claytoni</i>	Sweet Cicely
<i>Sanicula canadensis</i>	Black snake root
<i>Primulaceae</i>	
<i>Primrose Family</i>	
* <i>Lysimachia nummularia</i>	Loose strife
* <i>Steironema ciliatum</i>	Steironema
* <i>Dodecatheon meadia</i>	Shooting star
<i>Asclepiadaceae</i>	
<i>Milkweed Family</i>	
<i>Asclepias syriaca</i>	Milkweed
<i>Asclepias phytolaccoides</i>	Poke milkweed
<i>Polemoniaceae</i>	
<i>Phlox Family</i>	
* <i>Phlox maculata</i>	Wild phlox
<i>Phlox paniculata</i>	Wild phlox
* <i>Phlox divaricata</i>	Wild phlox
* <i>Polemonium reptans</i>	Jacob's ladder
<i>Hydrophyllaceae</i>	
<i>Water-leaf Family</i>	
* <i>Hydrophyllum macrophyllum</i>	Water-leaf
* <i>Hydrophyllum virginianum</i>	Water-leaf
* <i>Hydrophyllum canadense</i>	Water-leaf
* <i>Hydrophyllum appendiculatum</i>	Water-leaf
<i>Boraginaceae</i>	
<i>Borage Family</i>	
<i>Cynoglossum officinale</i>	Hound's tongue
<i>Mertensia virginica</i>	Blue bells
<i>Lappula virginiana</i>	Beggar's lice
<i>Verbenaceae</i>	
<i>Vervain Family</i>	
<i>Verbena urticaefolia</i>	White vervain
<i>Verbena hastata</i>	Blue vervain
<i>Verbena stricta</i>	Hoary vervain
<i>Labiatae</i>	
<i>Mint Family</i>	
* <i>Monarda bradburiana</i>	Horse mint
* <i>Monarda clinopodia</i>	Horse mint
* <i>Nepeta hederacea</i>	Ground ivy
<i>Prunella vulgaris</i>	Self-heal
<i>Hedeoma pulegioides</i>	Pennyroyal
<i>Pycnanthemum</i> spp.....	Mountain mint
<i>Solanaceae</i>	
<i>Nightshade Family</i>	
<i>Solanum carolinense</i>	Horse nettle
<i>Scrophulariaceae</i>	
<i>Figwort Family</i>	
<i>Pentstemon gracilis</i>	Beard-tongue
<i>Veronica virginica</i>	Culver's root
<i>Verbascum thapsus</i>	Mullein
* <i>Pedicularis canadensis</i>	Wood betony

<i>Bignoniaceae</i>	
<i>Tecoma radicans</i>	Trumpet creeper
<i>Acanthaceae</i>	
* <i>Ruellia strepens</i>	Ruellia
<i>Phrymaceae</i>	
* <i>Phryma leptostachya</i>	Lopseed
<i>Plantaginaceae</i>	
<i>Plantago aristata</i>	Plantain ribwort
<i>Rubiaceae</i>	
* <i>Galium asprellum</i>	Rough bed-straw
* <i>Galium</i> spp.....	Bed-straw
* <i>Houstonia caerulea</i>	Bluets
* <i>Houstonia patens</i>	Houstonia
<i>Mitchella repens</i>	Partridge berry
<i>Caprifoliaceae</i>	
* <i>Triosteum perfoliatum</i>	Tinker's coffee
<i>Campanulaceae</i>	
<i>Campanula americana</i>	Tall bellflower
<i>Lobeliaceae</i>	
<i>Lobelia siphilitica</i>	Great lobelia
<i>Compositae</i>	
<i>Sunflower Family</i>	
<i>Silphium perfoliatum</i>	Cup plant
<i>Silphium integrifolium</i>	Rosin weed
<i>Eupatorium purpureum</i>	Joe Pye weed
* <i>Erigeron pulchellus</i>	Fleabane
<i>Erigeron ramosus</i>	Fleabane
<i>Ambrosia trifida</i>	Horseweed
<i>Ambrosia artemesiifolia</i>	Ragweed
<i>Aster ericoides</i>	Aster
<i>Aster</i> spp.....	Aster
<i>Actinomeris squarrosa</i>	Actinomeris
<i>Solidago canadensis</i>	Golden rod
<i>Bidens bipinnata</i>	Spanish needles
<i>Rudbeckia hirta</i>	Black-eyed Susan
* <i>Achillea millefolium</i>	Milfoil
<i>Sonchus arvensis</i>	Sow thistle
<i>Lactuca</i> spp.....	Lettuce
* <i>Antennaria plantaginifolia</i>	Pussy toes
* <i>Senecio aureus</i>	Golden ragwort
<i>Prenanthes alba</i>	Lion's foot

LIST OF FERNS AND THEIR RELATIVES

<i>Adiantum pedatum</i>	Maiden-hair fern
<i>Cystopteris fragilis</i>	Fragile fern
<i>Aspidium marginale</i>	Shield fern
<i>Botrychium virginianum</i>	Rattlesnake fern

Camptosorus rhizophyllum.....	Walking fern
Equisetum sp.....	Horsetail
Lycopodium lucidulum.....	Ground pine
Onoclea sensibilis.....	Sensitive fern
Osmunda claytoniana.....	Interrupted fern
Phegopteris hexagonoptera.....	Beech fern
Polystichum acrostichoides.....	Christmas fern

LIST OF LIVERWORTS

Conocephalus sp.	Blasia sp.
Reboulia sp.	Marchantia sp.
Pellia sp.	Anthoceros sp.
Several kinds of leafy liverworts.	

LIST OF MOSSES

Polytricum sp.....	Hairy cap moss
Thuidium sp.	
Catharinea sp.	
Mnium sp.	
Sphagnum sp.....	Bog moss
Climacium sp.	
Bryum sp.	
Leucobryum sp.	

*Flower in spring and early summer.