A Floristic Study of Hone Quarry Watershed, Rockingham County, Virginia

Gerald Francis Roe
College of William & Mary - Arts & Sciences

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A FLORISTIC STUDY OF HONE QUARRY
WATERSHED, ROCKINGHAM COUNTY,
VIRGINIA

A Thesis
Presented to
The Faculty of the Department of Biology
The College of William and Mary in Virginia

In Partial Fulfillment
Of the Requirements for the Degree of
Master of Arts

by
Gerald F. Roe
1977
APPROVAL SHEET

This thesis is submitted in partial fulfillment of the requirements for the degree of

Master of Arts

Gerald F. Roe
Author

Approved,

Gustav W. Hall
Stewart A. Ware
Garnett R. Brooks
Donna M. E. Ware
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Acknowledgements</th>
<th>iv</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>v</td>
</tr>
<tr>
<td>Abstract</td>
<td>vi</td>
</tr>
<tr>
<td>Chapter I. Description of the Watershed</td>
<td>2</td>
</tr>
<tr>
<td>Chapter II. History and Human Use</td>
<td>4</td>
</tr>
<tr>
<td>Chapter III. Topography and Geology</td>
<td>6</td>
</tr>
<tr>
<td>Chapter IV. Climate</td>
<td>8</td>
</tr>
<tr>
<td>Chapter V. Communities</td>
<td>11</td>
</tr>
<tr>
<td>Chapter VI. Methods</td>
<td>17</td>
</tr>
<tr>
<td>Chapter VII. Key to the Families of Vascular Plants Collected</td>
<td>21</td>
</tr>
<tr>
<td>Chapter VIII. Key to the Genera and Species of Vascular Plants Collected</td>
<td>30</td>
</tr>
<tr>
<td>Literature Cited</td>
<td>101</td>
</tr>
</tbody>
</table>
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LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Climatological Data for Timberville 3 E., Virginia</td>
<td>9</td>
</tr>
<tr>
<td>2. Five Year Averages of Monthly Precipitation for Timberville 3 E.,</td>
<td>10</td>
</tr>
<tr>
<td>Virginia</td>
<td></td>
</tr>
</tbody>
</table>
ABSTRACT

A floristic study was completed of the Hone Quarry Watershed, Rockingham County, Virginia. Hone Quarry is located in the George Washington National Forest.

Collecting was done between the fall of 1973 and the spring of 1976. A total of 500 species was obtained, representing 293 genera and 91 families. Keys to the families, genera and species are provided along with abundance and habitat information. Nomenclature follows Radford, Ahles and Bell (1968).

The study yielded 370 county records, one significant physiographic province record and one state record. The specimens are deposited in the Herbarium of the College of William and Mary.
A FLORISTIC STUDY OF HONE QUARRY
WATERSHED, ROCKINGHAM COUNTY,
VIRGINIA
CHAPTER I

DESCRIPTION OF THE WATERSHED

The Hone Quarry Watershed consists of approximately 11 square miles in the Allegheny Mountains of southwestern Rockingham County, Virginia. The western boundary of Hone Quarry is the ridge of Shenandoah Mountain which borders Pendleton County, West Virginia; Slate Springs Mountain ridge forms its northern boundary, Hone Quarry Ridge forms its southern boundary, and the watershed faces and drains in an eastern direction into the Shenandoah Valley. Hone Quarry Watershed is part of the Dry River Ranger District of the George Washington National Forest which encompasses a total of one million acres in Virginia and over 100,000 acres in West Virginia.

Hone Quarry Run, the principal drainage system of the watershed, originates from a number of runnels which flow down Shenandoah and Slate Springs Mountains from above 3000 feet. This main stream flows through a flood-

1. The two U.S. Geological Survey quadrangle maps showing Hone Quarry Watershed are enclosed: Reddish Knob, Virginia - West Virginia and Brandywine, West Virginia - Virginia.
plain averaging one-sixth of a mile wide and four miles long to the end of the watershed. At approximately the midpoint of the floodplain's length, the U. S. Forest Service constructed an earth dam across the stream, thus creating an artificial lake. Past the lake and near the Forest boundary, Hone Quarry Run flows into Briery Branch Run which eventually drains via several more rivers into the South Fork of the Shenandoah River.
CHAPTER II

HISTORY AND HUMAN USE

The Hone Quarry compartment was acquired by the U. S. Forest Service between 1915 and 1919. It received its name from a small, nearby quarry for hone stones, but that location could not be found. Hone Quarry sustained heavy timbering in the late 1800's and early 1900's. A bottomland area located in the eastern portion of the compartment at an elevation of 1900 feet escaped lumbering at the time apparently because the private owner(s) would not permit it. In 1929 the Forest Service established picnic and campgrounds here (Hone Quarry Recreational Area), and this small area of predominantly virgin hemlocks remains as such today.

In the 1920's and the 1930's the Forest Service allowed farmers to graze cattle in the Hone Quarry area. The cattle were driven up from the Valley (east) side until winter forced their return.

The Forest Service at the time of this writing admits no definite future plans for the Hone Quarry com-

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2. This information from personal communication with Raymond K. Mason, District Ranger (Dry River), George Washington National Forest.
partment; at present it is mainly used for recreational purposes and open to the public. Trout are stocked in Hone Quarry Run and in the lake. Fall and winter hunting is open for small game and deer, with a brief spring season for wild turkey. The picnic and camping facilities are popular on weekends during the summer.

An unsuccessful drilling attempt for natural gas was made in the floodplain about two miles northwest of the lake in 1974. A grassy field of several acres created through clearing at that time remains there today. Another drilling attempt was underway at the time of this writing on Meadow Knob.

Past botanical exploration of Hone Quarry has been limited. Perchance eminent botanists such as John Bartram, Fredrick Pursh or Asa Gray crossed through the vicinity as they botanized in the northern Virginia Appalachians and in the Shenandoah Valley. However, the only known field work done prior to this study includes a violet collection, now lost, that was made by Henry Heatwole in May of 1935, and, in recent years, some occasional collecting by C. E. Stevens of Charlottesville.
CHAPTER III

TOPOGRAPHY AND GEOLOGY

The boundaries of the Hone Quarry Watershed are formed by Hone Quarry Ridge, Slate Springs Mountain, and a one-mile section of Shenandoah Mountain connecting the two ridges at their upper ends. This portion of Shenandoah Mountain is oriented in a north-south direction and descends gently from 4000 feet at its junction with Slate Springs Mountain on the north to 3869 feet at Hone Quarry Ridge on the south. Hone Quarry Ridge descends from 3869 feet to 3200 feet in a span of approximately 4 miles and in an east-southeast direction, and then much more abruptly drops down below 2000 feet at the eastern boundary of the watershed. Opposite and more or less north of Hone Quarry Ridge, the higher Slate Springs Mountain gradually ascends for 1.75 miles in a northeast direction to 4320 feet at Flagpole Knob, and then it curves around to the southeast as it descends for 4 miles to 3400 feet at Oak Knob after which it drops more steeply to below 2000 feet at the watershed's eastern boundary. From the eastern slope of Shenandoah Mountain a

moderately flat floodplain, averaging one-sixth of a mile wide, develops between the ridges and descends gently for approximately 4 miles from about 2400 feet to about 1600 feet at the eastern boundary of the watershed.

The principal geologic formation in the Hone Quarry Watershed is the Hampshire formation. Nearly all of the plant collecting was done within this formation. Another type of substrate, known as the Pocono Formation, is found only on the southeast edge of the watershed.

Reddish-colored soil, a distinctive character of the Hampshire Formation, is common in Hone Quarry. This formation is mostly well-drained sandy loam 8-10 inches deep along with some shale and lumpy mudrock. Two different soils occur in association in the Hampshire Formation: the Reddish Knob soils which occupy the lower slopes and coves, and the Lehew soils which are on the upper slopes, noses and ridges.

The Pocono Formation contains the Hazelton-Lee-tonia Association. Both of these soil types occur on high ridges and mountain sideslopes and are well-drained, thick, sandy loams.
CHAPTER IV

CLIMATE

The climatological data contained in Tables 1 and 2 were recorded from 3 miles east of Timberville, Virginia, the nearest area to Hone Quarry having this data available. Timberville is located in the Shenandoah Valley approximately 25 miles northeast of Hone Quarry and is 7 miles east of the mountain range that contains the Hone Quarry Area. Timberville's elevation is approximately 1200 feet whereas Hone Quarry's mountainous elevations range from 1600 to 4320 feet above sea level. These elevation differences should be kept in mind when reading the Timberville weather data.

For the period from 1961 to 1974, the average annual precipitation was 35.18 inches, the average annual number of days between the last spring frost and the first autumn frost was 158 days, and the average annual mean temperature was 53.5 °F. The average annual highest temperature was 96 °F and the average annual lowest temperature was -9 °F.
### TABLE 1

CLIMATOLOGICAL DATA FOR TIMBERVILLE 3 E., VIRGINIA

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<tr>
<th>Year</th>
<th>Annual mean temp. °F</th>
<th>High temp. °F</th>
<th>Low temp. °F</th>
<th>Ppt. total annual inches</th>
<th>Date of last spring min. of 32 °F</th>
<th>Date of first fall min. of 32 °F</th>
<th>No. of days betw. frosts</th>
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<td>1962</td>
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<td>Sept. 21</td>
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<td>1963</td>
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<td>1964</td>
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<td>Oct. 5</td>
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<td>Oct. 5</td>
<td>150</td>
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<td>1969</td>
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<td>May 5</td>
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<td>Avg.</td>
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<td>96</td>
<td>-9</td>
<td>35.18</td>
<td>May 6</td>
<td>Oct. 10</td>
<td>158</td>
</tr>
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*aAdapted from Climatological Data (Annual Summaries 1961-1974 for Virginia). Environmental Data Service, National Oceanic and Atmospheric Administration, U. S. Department of Commerce. 3 E indicates 3 miles east of Timberville.

bData unavailable
TABLE 2

FIVE YEAR AVERAGES OF MONTHLY PRECIPITATION

FOR TIMBERVILLE 3 E., VIRGINIA a

(inches)

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<td>2.69</td>
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<tr>
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<td>2.61</td>
<td>2.27</td>
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<tr>
<td>March</td>
<td>3.76</td>
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<tr>
<td>May</td>
<td>2.28</td>
<td>3.65</td>
<td>3.87</td>
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<tr>
<td>June</td>
<td>2.92</td>
<td>2.08</td>
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<tr>
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<td>2.54</td>
<td>3.56</td>
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<tr>
<td>August</td>
<td>3.33</td>
<td>5.06</td>
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<tr>
<td>September</td>
<td>3.34</td>
<td>3.32</td>
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<tr>
<td>October</td>
<td>1.91</td>
<td>2.42</td>
<td>3.12</td>
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<tr>
<td>November</td>
<td>3.29</td>
<td>1.92</td>
<td>1.97</td>
</tr>
<tr>
<td>December</td>
<td>2.68</td>
<td>1.89</td>
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<tr>
<td>Average Annual Total</td>
<td>32.90</td>
<td>34.41</td>
<td>34.76</td>
</tr>
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</table>

aAdapted from Climatological Data (Annual Summaries 1961-1974 for Virginia). Environmental Data Service, National Oceanic and Atmospheric Administration, U. S. Department of Commerce. 3 E. indicates 3 miles east of Timberville.
CHAPTER V

COMMUNITIES

1. Forest Communities.

a. Stands dominated by oaks and hickories are frequent on the well-drained slopes and ridges throughout the area; *Quercus alba*, *Q. velutina*, *Q. rubra*, *Q. prinus*, *Carya ovalis*, *C. tomentosa* and *C. glabra* are the principal species. *Cornus florida*, *Nyssa sylvatica* and *Amelanchier arborea* make up the common understory trees found in this association, with *Hamamelis virginiana* as a frequent shrub. Herbaceous species that are found commonly in this association include *Hypoxis hirsuta*, *Panicum commutatum*, *Carex platyphylla*, *Arabia canadensis*, *Aralia nudicaulis*, *Aureolaria laevigata*, *Antennaria plantaginifolia*, *Solidago roanensis* and *Hieracium venosum*.

Ericaceous shrub stands dominated by either *Kalmia latifolia* or *Pieris floribunda* occur occasionally on the higher ridges and slopes throughout these deciduous stands. Talus slopes are found scattered throughout the watershed commonly with *Quercus prinus* and/or *Betula lutea* growing in or around them.
b. Mixed mesic woods occur in ravines, on many north-east-facing slopes and in the floodplain, especially near Hone Quarry Run. Typical tree species that may be found in these woods include *Fagus grandifolia*, *Tilia americana*, *T. heterophylla*, *Liriodendron tulipifera*, *Betula lenta*, *Acer pensylvanicum*, *A. saccharum*, *Tsuga canadensis* and a few scattered oak and hickory species. *Hydrangea arborescens* and *Polypodium virginianum* frequently grow in rock crevices along the shaded or wooded streambanks. Herbs found characteristically in this association include *Polystichum acrostichoides*, *Asplenium trichomanes*, *A. platyneuron*, *Poa cuspidata*, *Muhlenbergia tenuiflora*, *Festuca obtusa*, *Arabis laevigata*, *Cardamine concatenata*, *Caulophyllum thalictroides*, *Viola blanda* and *V. rostrata*.

c. Stands dominated by *Tsuga canadensis* with few or no other tree species in association occur along the main stream, along streamlets and on lower slopes where there is abundant ground water. In some cases the hemlocks create so much shade that almost no ground vegetation is present. Small colonies of *Hepatica americana* and *Goodyera repens* are common in this habitat; *Polystichum acrostichoides* is abundant at the borders of these stands.

2. Shrub Communities.

a. Ericaceous stands are frequent on the higher slopes and ridges in well-drained soil; also, they often occur
within the oak-hickory stands. Thick cover of *Kalmia latifolia* or *Pieris floribunda* on the higher ridges occurs mixed with *Rhododendron roseum*, *Vaccinium stamineum*, *V. vacillans* and *Gaylussacia baccata*. Herbaceous species are not abundant in this association; however, a population of *Trillium pusillum* var. *virginianum* thrives under a *Pieris floribunda* thicket on a 4000 foot ridge! This *Trillium* was considered a plant restricted to Coastal Plain swamps until its discovery on this mountain ridge in moderately dry soil.

b. Small stands of *Crataegus flabellata* and *C. coccinea* grow in many of the fields on the ridges and occasionally line the trails on the high wooded ridges.

c. High on the rocky ridge between Pond Knob and Meadow Knob is a more or less continuous stand of *Quercus ilicifolia* with various ericaceous shrubs as associates.

3. Vegetated Clearings.

Vegetated clearings, tracts of land which have the trees removed, occur occasionally throughout. Apparently all were created as a result of man's interference through such activities as lumbering, clearing for recreational purposes, clearing to encourage the growth of certain wildlife foods or clearing for commercial reasons such as in the case of the abandoned drilling site. The largest open area (field) surrounds the artificial lake; its vicinity, including the earth dam, bears a thick cover of *Lespedeza cuneata* planted by the Forest Service.
Festuca pratensis, Setaria glauca, Echinochloa crus-galli, Trifolium repens, T. pratense, Epilobium coloratum and Barbarea vulgaris are commonly found in the open areas around the lake. Small clearings (meadows) in the floodplain northwest of the lake typically have Asclepias syriaca, Rudbeckia hirta, Trifolium arvense, Panicum depauperatum, Eragrostis capillaris, Dennstaedtia punctilobula, Nepeta cataria, and Daucus carota. Some meadows just north of the lake have Spiranthes cernua and S. gracilis. Vitis aestivalis and Rubus allegheniensis often grow in thickets at the edges of many of these clearings. The ridges typically have clearings (meadows) with Chrysanthemum leucanthemum, Hieracium pratense, H. pilosella, Setaria faberi, Phleum pratense, Bromus tectorum, Rumex acetosella, Dianthus armeria, Veronica officinalis and Fragaria virginiana. A clearing near Flagpole Knob is thick with Osmunda claytoniana. Secale cereale, probably planted by the Forest Service, dominates one clearing on Hone Quarry Ridge.

4. Stream and Lake Communities.

a. Hone Quarry Run and its feeder streams form the drainage for the Hone Quarry Watershed. Senecio aureus, Polygonum persicaria, Lycopus virginicus, L. uniflorus, and, less commonly, Tussilago farfara grow in the wet mud or gravel along the main stream. Ludwigia palustris and Callitriche heterophylla are found occasionally growing
in the stream. In only one location a small colony of Sparganium americanum was noted in a quiet pool in Hone Quarry Run between the lake and the campgrounds.

b. Anacharis nuttallii colonies commonly grow in the lake; many are visible as they grow not far from shore.

5. Marsh, Pond and Seepage Communities.

a. A marsh occurs on the north side of Hone Quarry Lake where the stream occasionally overflows after heavy rains. The ground remains marshy and wet more or less throughout the year. Groups of frogs call at night from this area in the spring. Typical plants found there include Typha latifolia in several small colonies, Juncus effusus, J. marginatus, Carex scabrata, C. vulpinoidea, Scirpus polyphyllus and S. cyperinus.

b. Several small ponds occur on the high ridges; at least one is on Hone Quarry Ridge and one occurs on Pond Knob. The pond on Pond Knob has Juncus effusus, Carex lurida, Scirpus polyphyllus and S. atrovirens growing on its margin.

c. Two very small seepage areas with standing water exist in open woods in the floodplain. Chrysosplenium americanum, Equisetum arvense and Callitriche heterophylla have been found at these sites.

6. Forest Plantations.

a. A stand of Abies fraseri encompassing several acres was planted by the Forest Service in 1935 on Shenandoah
Mountain at approximately 4000 feet in elevation. The heavy shade caused by this thick stand has eliminated almost all ground cover.

b. A stand of *Pinus resinosa* of about one acre occurs on Shenandoah Mountain at an elevation of approximately 3900 feet. The pines are more or less evenly spaced through a grassy opening and seem to be between 20 and 40 years of age.

7. Roadsides, Trails and Other Disturbed Sites.

a. Weedy species commonly found at the sides of the dirt jeep roads (no paved roads in Hone Quarry) include *Cichorium intybus*, *Bromus japonicus*, *Barbarea vulgaris*, *Arctium minus*, *Taraxacum officinale* and *Eupatorium purpureum*.

b. A small number of *Epipactis helleborine* individuals grow at the jeep roadside between the campgrounds and the lake. This species is reported as new to the state.

c. Plants often found in the trails include *Bromus purgans*, *Poa compressa*, *Juncus tenuis*, *Plantago rugelii*, *P. lanceolata*, *Lespedeza hirta* and *Vicia dasycarpa*.

d. Other disturbed areas include the picnic grounds where *Solanum carolinense* and *Eleusine indica* are found. *Plantago virginica* and *Solanum americanum* occur in disturbed soil at the abandoned drilling site.
CHAPTER VI

METHODS

Plants were collected from July 1973 to August 1975, with one additional collecting trip made in April 1976. The specimens were placed in plastic bags with a little moisture until they could be pressed at the end of the day. Most of the collections were identified after drying.

Specimens generally were obtained in either duplicate or triplicate, but a few taxa were collected singly because they appeared to be rare. A complete set of voucher specimens is deposited in the Herbarium of the College of William and Mary; a partial set has been given to the Herbarium of the U. S. Forest Service in Atlanta, Georgia, and another partial set has been sent to the Herbarium of the University of North Carolina on exchange.

All plants were identified to species except for several in which only the genus could be determined because of the lack of reproductive structures. Some taxa were keyed to variety or forma if it seemed appropriate.

The keys are adapted from Strausbaugh and Core (1958, 1970, 1971, 1973), Gleason and Cronquist (1963),
Radford, Ahles and Bell (1968), and Fernald (1950).

The entry for each taxon is basically structured in the following order:
1. Scientific name which follows Radford, Ahles and Bell (1968) unless otherwise stated.
3. Relative abundance as determined from the author's personal encounters and observations of each taxon. The scale used is "Common", "Occasional", "Uncommon" or "Rare".
4. Habitat.
5. The author's collection number(s).

An asterisk (*) at the beginning of an entry denotes that the taxon has been previously recorded for Rockingham County in Carr (1936), Massey (1961), Nessler (1972), Mazzeo (1972), Johnson (1972, 1974) or Roane (1975). Those entries not marked with an asterisk are considered records new to Rockingham County. The symbol (#) indicates a taxon reported new to Virginia and a plus (+) indicates a physiographic province record within the state. A taxon that has been introduced into eastern North America within the last several hundred years has its continent of origin in parentheses at the end of the entry.

Nomenclature for *Festuca pratensis* Hudson follows Gould (1975).
KEYS TO THE FAMILIES, GENERA AND SPECIES
OF VASCULAR PLANTS COLLECTED
CHAPTER VII
KEY TO THE FAMILIES OF VASCULAR PLANTS

A. Plant reproducing by spores borne in sporangia on leaf surfaces or on highly modified leaves resembling a spike or panicle.......................I. Pteridophyta
A. Plant reproducing by seeds borne in fruits or naked on woody cones or in berry-like cones of fused scales.... .............................................II. Spermatophyta

I. PTERIDOPHYTA

A. Stem conspicuously jointed, with a whorl of filiform leaves at each sheathed joint.......Equisetaceae, p.30
A. Stem not conspicuously jointed; leaves various.......B
B. Stems above ground, elongate, with numerous, usually imbricated, scale-like leaves...................... .................Lycopodiaceae, p.30
B. Stems underground; leaves broad, not at all scale-like......................................................C
C. Fertile fronds or fertile portions thereof very different in form and structure from the sterile
.................................................................D
D. Fertile portion of the frond a panicle subtended by the leafy, sterile portion............
.........................Ophioglossaceae, p.30
D. Fertile portion of the frond midway on the sterile frond or a separate frond altogether.
.................................................................E
E. Rachis of sterile frond broadly winged except at base; pinnules of fertile fronds rolled into bead-like segments (Onoclea)...
.........................Aspidiaceae, p.31
E. Rachis of sterile frond not winged; fertile segments bladeless, not bead-like....
.........................Osmundaceae, p.31
C. Fertile and sterile fronds essentially alike...F
F. Sori on the leaf margin; indusia not reniform
.................................................................Pteridaceae, p.31
F. Sori not on the leaf margin, or if so, then the indusia reniform......................G
G. Scales on the tip of the rhizome with black, thick cell walls.Aspleniaceae, p.33
G. Scales on the tip of the rhizome with unmodified cell walls..............................H
H. Indusia present............Aspidiaceae, p.31
H. Indusia absent....................... I
I. Leaves coriaceous and evergreen; mature sori 1 mm or more broad............ Polypodiaceae, p. 34
I. Leaves thin; sori 0.5 mm broad.................. Aspidiaceae, p. 31

II. SPERMATOPHYTA

A. Seeds naked on woody cones or in berry-like cones of fused scales...................... Gymnospermae
A. Seeds borne in fruits, either thin and dry or fleshy............................ Angiospermae

GYMNOSPERMAE

A. Seeds borne in fleshy, berry-like cones of fused scales........................... Cupressaceae, p. 35
A. Seeds borne on woody cones............. Pinaceae, p. 34

ANGIOSPERMAE

A. Flower parts usually in 3's or multiples thereof; leaf veins parallel (except Arisaema); plants herbaceous (except Smilax)......................... Monocotyledoneae
A. Flower parts usually in 4's or 5's or multiples thereof; leaf veins palmate, pinnate, or net-veined; plants herbaceous or woody..................... Dicotyledoneae

MONOCOTYLEDONEAE

A. Plant a woody vine (Smilax)............. Liliaceae, p. 46
A. Plant an herb or herbaceous vine.............. B
B. Inflorescence a spadix subtended by a spathe.............. Araceae, p. 44
B. Inflorescence various, not a spadix.................. C
C. Flowers and fruits enclosed in or subtended by scales; fruit 1-seeded.................. D
D. Leaf sheaths split (except Glyceria); leaves 2-ranked; fruit a grain or utricle.............. Poaceae, p. 36
D. Leaf sheaths not split; leaves 3-ranked; fruit a nutlet...................... Cyperaceae, p. 42
C. Flowers and fruits not subtended by scales, or if so, fruit more than 1-seeded.............. E
E. Corolla absent; fruit an achene.............. F
F. Flowers in spikes...................... Typhaceae, p. 35
F. Flowers in globose heads...................... Sparganiaceae, p. 35
E. Corolla present; fruit a capsule or berry...G
G. Ovary superior............................H
   H. Calyx and corolla scale-like and per-
       sistent.........................Juncaceae, p.45
   H. Calyx and corolla not scale-like, green
       or colored..................Liliaceae, p.45
G. Ovary inferior..........................I
I. Plants aquatic, submersed.............
   ..................................Hydrocharitaceae, p.36
I. Plants terrestrial.....................J
   J. Flower highly zygomorphic; fertile
       stamens 1 or 2, forming a column
       with the pistil............Orchidaceae, p.49
   J. Flower not highly zygomorphic; col-
       umn absent...................K
K. Flowers unisexual........................K
   .....................Dioscoreaceae, p.48
   K. Flowers perfect.........................L
L. Stamens 6. Amaryllidaceae, p.48
L. Stamens 3.....Iridaceae, p.49

DICOTYLEDONEAE

A. Trees, shrubs or woody vines................Key 1
A. Herbs........................................B
   B. Flowers unisexual..........................Key 2
   B. Flowers perfect...........................C
   C. Perianth caducous......................Ranunculaceae, p.58
   C. Either calyx or corolla present or both......D
   D. Either calyx or corolla present but not
       both........................................E
   E. Ovary inferior......................Key 3
   E. Ovary superior......................Key 4
   D. Calyx and corolla both present...............F
   F. Ovaries 2 or more per flower........Key 5
   F. Ovaries 1 per flower......................G
   G. Ovary inferior........................Key 6
   G. Ovary superior........................H
   H. Stamens more numerous than the cor-
       olla divisions...........................I
   I. Flowers irregular.....................Key 7
   I. Flowers regular.....................Key 8
   H. Stamens as many as the corolla div-
       isions or fewer.....................J
   J. Corolla of separate petals...Key 9
   J. Corolla gamopetalous...................K
   K. Corolla regular; the stamens
       as many as the corolla lobes...
       .........................................Key 10
   K. Corolla irregular or the sta-
       mens fewer than the corolla
       lobes.............................Key 11
KEY 1

A. Leaves opposite or whorled ......................................... E
B. Leaves not expanded at anthesis ................................ Oleaceae, p. 82
C. Leaves expanded at anthesis ........................................... Oleaceae, p. 82
E. Leaves compound; plant a vine (Clematis) ....................... Ranunculaceae, p. 58
C. Flowers with calyx and corolla not differentiated ........... Aceraceae, p. 73
D. Flowers with distinct calyx and corolla, calyx sometimes inconspicuous ............... E
E. Stamens more numerous than the corolla lobes or petals ............... F
F. Corolla gamopetalous (Kalmia) ................................Ericaceae, p. 81
F. Petals distinct ................................Aceraceae, p. 73
G. Petals separate; fruit a 1-seeded drupe ........................... Cornaceae, p. 79
G. Petals united; fruit a berry ........................................ Caprifoliaceae, p. 91

A. Leaves alternate ......................................................... H
K. Plants dioecious ....................................................... I
M. Leaves compound ....................................................... N
N. Perianth not differentiated into calyx and corolla in the pistillate flowers ............ Nyssaceae, p. 79
N. Perianth differentiated into calyx and corolla in the pistillate flowers ............... Aquifoliaceae, p. 73
O. Style entire; peduncles of inflorescences much shorter than the leaves ............... Aquifoliaceae, p. 73
O. Style split above the middle; peduncles of inflorescences often equaling or exceeding leaves ........................................ Rhamnaceae, p. 74
H. Plants monoecious, the flowers either perfect or unisexual ......................... P
P. Flowers or at least the staminate ones in catkins or dense globose heads ............. Q
Q. Staminate flowers in ellipsoid to elongate-cylindric catkins..........................R
R. Pistillate flowers solitary or in small clusters.............................................S
S. Leaves pinnate.........Juglandaceae, p.51
S. Leaves simple........Fagaceae, p.53
R. Pistillate flowers in catkins.................................................................Betulaceae, p.52
Q. Staminate flowers in dense, globose heads...T
T. Leaves pinnately veined with a single mid-vein (Fagus).........................Fagaceae, p.53
T. Leaves palmately veined with 3-5 principal veins..........................Platanaceae, p.64
P. Flowers not in catkins..........................................................U
U. Perianth not differentiated into calyx and corolla...................................V
V. Stamens more numerous than the divisions of the perianth......................W
W. Climbing vines...Aristolochiaceae, p.55
W. Erect shrubs or trees..........................X
X. Pistils numerous; perianth divisions 9-12.................Magnoliaceae, p.60
X. Pistil 1; perianth divisions 4-6...Y
Y. Sepals 4; stamens 4.................................................................Elaeagnaceae, p.77
Y. Sepals 6; stamens 9.............................................................Lauraceae, p.61
V. Stamens as numerous as the divisions of the perianth..........................Z
Z. Style 1; fruit fleshy.........................a
a. Tree or shrub.......................Cornaceae, p.79
a. Climbing vine........Vitaceae, p.74
Z. Styles 2; fruit a samara..Ulmaceae, p.54
U. Perianth differentiated into calyx and corolla..................................b
b. Ovaries 3-many................Rosaceae, p.64
b. Ovary 1...........................................c
b. Ovary 1...........................................c
c. Corolla irregular.......................................................d
d. Stamens 4 or 5........Ericaceae, p.80
d. Stamens 10..........Fabaceae, p.68
c. Corolla regular.................................e
e. Ovary inferior.............................f
f. Stamens as numerous as the petals..................................................g
g. Flowers 4-merous......................Hamamelidaceae, p.64
g. Flowers 5-10 merous.............Saxifragaceae, p.63
f. Stamens twice as many as the petals............Ericaceae, p.80
e. Ovary superior.........................h
h. Flowers produced before leaf expansion.............Rosaceae, p.80
h. Flowers and leaves present together......................i
  i. Inflorescence attached to a leaf-like bract; leaves simple........Tiliaceae, p.74
  i. Inflorescence not attached to leaf-like bracts; leaves compd........Anacardiaceae, p.72

KEY 2

A. Leaves lacking chlorophyll; scale-like (Epifagus)...........Orobanchaceae, p.89
A. Leaves with chlorophyll, not scale-like......................B
  B. Leaves compound........................................C
  C. Leaves palmately compound..................................Apiaceae, p.78
  C. Leaves pinnately or ternately compound......................D
    D. Flowers with either calyx or corolla but not both..............Ranunculaceae, p.58
    D. Flowers with both calyx and corolla.........................Rosaceae, p.64
  B. Leaves simple............................................E
  E. Leaves all basal (Rumex).................................Polygonaceae, p.55
  E. Leaves cauline or at least mostly so.......................F
    F. Fruit an achene........................................Urticaceae, p.54
    F. Fruit a capsule.........................................G
      G. Fruit 3-locular..........................Euphorbiaceae, p.72
      G. Fruit 4-locular..........................Callitrichaceae, p.72

KEY 3

A. Stamens more numerous than the perianth divisions........B
B. Perianth divisions 3; stamens 12..............................Aristolochiaceae, p.55
B. Perianth divisions 2 or 4; stamens 4-8.......................Saxifragaceae, p.63
A. Stamens as many as or fewer than the perianth divisions........C
  C. Leaves opposite or whorled............................................D
  D. Flowers in umbels.............................................Araliaceae, p.78
  D. Flowers not in umbels...........................................E
    E. Leaves whorled...........................................Rubiaceae, p.90
    E. Leaves opposite..........................................Onagraceae, p.77
  C. Leaves alternate...............................................F
    F. Styles 2; fruit dry........................................Araliaceae, p.78
    F. Styles 5; fruit fleshy.....................................Araliaceae, p.78

KEY 4

A. Ovaries 2-many per flower........................................B
B. Pistils separate and distinct from each other; fruit dry..........Ranunculaceae, p.58
B. Pistils united nearly to their middle; fruit a berry........Phytolaccaceae, p.56
A. Ovary 1 per flower..................................................C
C. Stamens more than twice the number of perianth divisions...........................................D
D. Perianth well-developed, white...........................................Papaveraceae, p.61
D. Perianth small, inconspicuous...........................................E
E. Leaves compound, alternate...........................................Ranunculaceae, p.58
E. Leaves simple, whorled...........................................Aizoaceae, p.56
C. Stamens twice as many as the perianth divisions, or fewer...........................................F
F. Styles 2 or more...........................................G
G. Leaves opposite or whorled (Paronychia)...........................................Caryophyllaceae, p.57
G. Leaves alternate...........................................H
H. Stipules sheathing the stem above the base of each leaf...........................................Polygonaceae, p.55
H. Stipules none...........................................Chenopodiaceae, p.56
F. Style 1 or absent...........................................I
I. Stamens more numerous than the perianth divisions...........................................J
J. Chlorophyll absent...........................................Ericaceae, p.80
J. Chlorophyll present...........................................K
K. Perianth divisions 5...........................................Fabaceae, p.68
K. Perianth divisions 4...........................................Brassicaceae, p.61
I. Stamens as many as the perianth divisions or fewer...........................................Berberidaceae, p.60

KEY 5

A. Style 1 per flower; leaves opposite...........................................Lamiaceae, p.84
A. Styles none or 2 per flower, or more...........................................B
B. Flowers irregular...........................................Saxifragaceae, p.63
B. Flowers regular...........................................C
C. Sepals 3...........................................Ranunculaceae, p.58
C. Sepals 4 or more...........................................D
D. Petals united into a tubular corolla...........................................E
E. Pollen in masses; mature follicle 5 mm in diameter or more...........................................Asclepiadaceae, p.83
E. Pollen granular; mature follicle 5 mm in diameter or less...........................................Apocynaceae, p.82
D. Petals separate...........................................F
F. Cauline leaves opposite or whorled...........................................G
G. Petals deeply pinnatifid...........................................Saxifragaceae, p.63
G. Petals entire...........................................Crassulaceae, p.63
F. Cauline leaves alternate or leaves all basal...........................................H
H. Hypanthium none; sepals separate to the base...........................................Ranunculaceae, p.58
H. Hypanthium present, bearing the sepals and petals at its margin...........................................Rosaceae, p.64
KEY 6

A. Stamens twice as many as the petals...Onagraceae, p.77
A. Stamens equal to the petal number or fewer...............B
B. Petals separate..........................................C
C. Petals 2 or 4......................................Onagraceae, p.77
C. Petals 5.............................................Apiaceae, p.78
B. Petals united into a gamopetalous corolla...........D
D. Flowers in dense, involucrate heads.................E
F. Stamens united by their anthers to form a ring or tube surrounding the pistil............Asteraceae, p.92
E. Stamens separate........................ Dipsacaceae, p.91
D. Flowers not in dense, involucrate heads..........F
F. Stem leaves alternate...Campanulaceae, p.91
F. Stem leaves opposite or whorled................Rubiaceae, p.90

KEY 7

A. Sepals petal-like in size and color or prolonged into a spur..............................................B
B. Stamens 6; flowers not spurred...Polygalaceae, p.72
B. Stamens 5; flowers spurred....Balsaminaceae, p.73
A. Sepals not petal-like, often green........................C
C. Lower 2 petals connivent............Fabaceae, p.68
C. Lower 2 petals separate.............Lythraceae, p.77

KEY 8

A. Leaves reduced to scales; plants without chlorophyll.. Ericaceae, p.80
A. Leaves not reduced to scales; chlorophyll present....B
B. Stamens more than twice the petal number.........C
C. Leaves compound..............Ranunculaceae, p.58
C. Leaves simple..........................Hypericaceae, p.74
B. Stamens twice as many as the petals or fewer......D
D. Leaves compound or divided nearly to the base.E
E. Leaves opposite....................Geraniaceae, p.71
E. Leaves alternate..................Oxalidaceae, p.71
D. Leaves simple..........................F
F. Style 1............................................Ericaceae, p.80
F. Styles 2 or more........Caryophyllaceae, p.57

KEY 9

A. Leaves compound or dissected.............Violaceae, p.75
A. Leaves entire to deeply lobed..................B
B. Leaves opposite.................................Primulaceae, p.82
B. Leaves alternate or basal....................C
C. Styles 2 or more................................Linaceae, p.71
C. Style 1 or none................................D
D. Flowers irregular; petals 5...Violaceae, p.75
D. Flowers regular; petals 4. Brassicaceae, p.61

KEY 10

A. Ovary deeply 4-lobed, resembling 4 separate ovaries. B
B. Leaves alternate. Boraginaceae, p.83
B. Leaves opposite. Lamiaceae, p.84
A. Ovary not conspicuously lobed. C
C. Ovary 1-celled; fruit a 2-valved capsule. D
D. Leaves simple. Gentianaceae, p.82
D. Leaves compound. Hydrophyllaceae, p.83
C. Ovary 2- or 4-celled. E
E. Plant essentially acaulescent, leaves all in a basal rosette. Plantaginaceae, p.89
E. Plant with alternate cauline leaves, the latter sometimes (Cuscuta) reduced to scales. F
F. Fruit a berry. Solanaceae, p.86
F. Fruit a capsule. G
G. Seeds 4; plants usually twining. Convolvulaceae, p.83
G. Seeds many; plants not twining. Scrophulariaceae, p.87

KEY 11

A. Anther-bearing stamens 5. B
B. Ovary deeply 4-lobed. Boraginaceae, p.83
B. Ovary not conspicuously 4-lobed (Verbascum). Scrophulariaceae, p.87
A. Anther-bearing stamens 2 or 4. C
C. Corolla prolonged at the base into a sac. Scrophulariaceae, p.87
C. Corolla not saccate at the base. D
D. Plants without green foliage. Orobancheae, p.89
D. Plants with green foliage. E
E. Leaves alternate or basal. Scrophulariaceae, p.87
E. Leaves opposite or whorled. F
F. Ovary deeply 4-lobed. Lamiaceae, p.84
F. Ovary at most shallowly 4-lobed; coarse herb with paniculate spikes of minute white flowers. Verbenaceae, p.84
CHAPTER VIII

KEY TO THE GENERA AND SPECIES OF VASCULAR PLANTS

Pteridophyta

Equisetaceae - Horsetail Family

1. Equisetum L., Horsetail.

1. E. arvense L., Common Horsetail. Uncommon. Several small colonies around streamlets and seepage areas in the floodplain. 687.

Lycopodiaceae - Clubmoss Family

1. Lycopodium L., Clubmoss.

A. Sporangia borne on terminal, compact spikes.......B
B. Running rhizomes above ground, usually covered with litter; spikes peduncled....................

...............1. L. flabelliforme
B. Running rhizomes deeply subterranean; spikes sessile........   2. L. obscurum
A. Sporangia borne in the leaf axils...3  

1. L. flabelliforme (Fern.) Blanchard, Ground Cedar. Occasional. Open woods and clearings. 566, 701.

Ophioglossaceae - Adder's Tongue Family

1. Botrychium Swartz, Grapefern.

A. Leaf blade evergreen, with a long petiole attached well-below the middle of the common axis............

.............................................1. B. dissectum
A. Leaf blade deciduous, sessile, attached near the middle of the common axis........2. B. virginianum

Osmundaceae - Royal Fern Family

1. Osmunda L., Royal Fern.
   A. Sporangia borne on pinnae midway on the vegetative frond; sterile pinnae not tomentose at the base.
      ..............................1. O. claytoniana
   A. Sporangia borne on a separate frond from the vegetative ones; sterile pinnae brown-tomentose at the base.
      ..............................2. O. cinnamomea

1. O. claytoniana L., Interrupted Fern. Locally abundant in several small clearings on Slate Springs Mountain near Flagpole Knob. 478, 535.

Pteridaceae - Brake Family

A. Rachis forking above the stipe..................B
   B. Rachis shiny black, wiry..................1. Adiantum
   B. Rachis green, not wiry..................2. Pteridium

A. Rachis continuing singly above the stipe..............................3. Dennstaedtia

1. Adiantum L., Maidenhair Fern.
   1. A. pedatum L., Maidenhair Fern. Occasional. In rich, moist soil in woods. 175, 562.
2. Pteridium Gleditsch, Bracken.
3. Dennstaedtia Bernh.
   *1. D. punctilobula (Michx.) Moore, Hay-Scented Fern. As small colonies in damp clearings and in open woods. 75, 707, 918.

Aspidiaceae - Wood Fern Family

A. Sterile and fertile fronds very dissimilar, fertile fronds with ultimate segments forming ball-like structures (sporangia in rolled-up leaf segments)......
   ..............................1. Onoclea
A. Sterile and fertile fronds alike or nearly so, fertile fronds never with rolled-up segments..................B
B. Indusium suppressed or absent; frond widely triangular..................2. Thelypteris
B. Indusium present; frond narrowly triangular to lanceolate.............................C
C. Indusium attached beneath the sporangia and surrounding them with lacerated strips...3. Woodsia
C. Indusium attached to one side of the sorus or centrally attached by a stalk and peltate......D
D. Indusium linearly attached along one side of the sorus..................................4. Athyrium
D. Indusium attached at a point...............E
E. Indusium attached to the side of the sorus and arching over it in a hood-like manner.
........................................5. Cystopteris
E. Indusium peltate and centrally attached or reniform and laterally attached, not arching over the sorus as a hood.........F
F. Indusium reniform, attached to the leaf at the sinus.......................................G
G. Frond segments with ciliate hairs..................................................2. Thelypteris
G. Frond segments lacking ciliate hairs, rachis scaly...6. Dryopteris
F. Indusium peltate and centrally attached by a stalk through the sorus....................7. Polystichum

1. Onoclea L., Sensitive Fern.


2. Thelypteris Schmidel

A. Rachis winged.........................1. T. hexagonoptera
A. Rachis not winged....................2. T. noveboracensis


3. Woodsia R. Brown


4. Athyrium Roth

5. **Cystopteris** Bernh., Bladder Fern.


6. **Dryopteris** Adanson, Shield Fern.

A. Sori forming regular rows close along the margin of the pinnules..................1. **D. marginalis**

A. Sori not close along the margin of the pinnules...B
B. Innermost pinnule on the first pinna longer than adjacent outer pinnule........2. **D. spinulosa**
B. Innermost pinnule on the first pinna equal to or shorter than adjacent outer pinnule............

........................

3. **D. intermedia**


7. **Polystichum** Roth


**Aspleniacaeae – Spleenwort Family**

1. **Asplenium** L., Spleenwort.

A. Fronds entire or nearly so........1. **A. rhizophyllum**
A. Fronds pinnately divided.........................B
B. Pinnae lanceolate or more or less oblong, alternate, sessile, larger ones auriculate basally on upper side......................2. **A. platyneuron**
B. Pinnae oval or round-oblong, opposite, stalked, not auricled......................3. **A. trichomanes**

1. **A. rhizophyllum** L., Walking Fern. Rare. One colony on steep, rocky, wooded slope near floodplain. 767.
Polypodiaceae - Polypody Family

1. Polypodium L.


Spermatophyta

Gymnospermae

Pinaceae - Pine Family

A. Leaves scattered, not in fascicles....................B
B. Leaves flat with white lines beneath...............C
C. Leaves sessile, cones upright......................1. *Abies*
   C. Leaves on short stalks, cones pendulous on ends of branches...............................2. *Tsuga*
B. Leaves 4-sided, not flat..........................3. *Picea*
A. Leaves in fascicles................................4. *Pinus*

1. *Abies* Miller, Fir.


1. *P. abies* (L.) Karst., Norway Spruce. Rare. A small number scattered on the high ridges of Shenandoah and Slate Springs Mountains. 204. (Europe).


A. 5 leaves in a fascicle......................1. *P. strobus*
A. 2-3 leaves in a fascicle..........................B
B. Cone scales unarmed..............................2. *P. resinosa*
B. Cone scales armed...............................C
C. All fascicles with 3 leaves...3. *P. rigida*
C. Either all fascicles with 2 leaves or some with 2 and some with 3 on same tree......D
D. All fascicles with 2 leaves; cone scale spines 2-3 mm...........4. *P. virginiana*
D. Fascicles with 2 or 3 leaves, but mostly in 2's, on same tree; cone scale spines 5-6 mm. 4. P. pungens


Cupressaceae - Cypress Family


Spermatophyta

Angiospermae

Monocotyledoneae

Typhaceae - Cattail Family

1. Typha L., Cattail.

1. T. latifolia L., Common Cattail. Several colonies in marshy, open floodplain near the lake. 493.

Sparganiaceae - Bur-reed Family


1. S. americanum Nuttall, American Bur-reed. Rare. Small colony at fork in Hone Quarry Run just upstream from the cement bridge. 691, 749.
Hydrocharitaceae - Frog’s bit Family


Poaceae - Grass Family

Key to the Tribes

A. Spikelets disarticulating above the glumes, glumes persisting; spikelets flattened laterally.................B
B. Glumes reduced or absent......................I. Oryzeae
B. Glumes present..................................................C
C. Spikelets with 3 florets, the lower two sterile, the upper one perfect...........II. Phalarideae
C. Spikelets 1-many-flowered, no sterile flowers below the perfect ones......................D
D. Inflorescence spicate (digitately branched in Eleusine)..................................................E
E. Spikelets in 1-sided spikes.................................III. Chlorideae
E. Spikelets sessile on opposite sides of a zigzag rachis.........................IV. Hordeae
D. Inflorescence paniculate.................................F
F. Spikelets 1-flowered......................V. Agrostideae
F. Spikelets 2-many flowered....................VI. Festuceae
G. Glumes relatively short, shorter than the florets; spikelets many-flowered..
..................................................VI. Festuceae
G. Glumes relatively long, longer than the florets; spikelets few-flowered...........VII. Aveneae
A. Spikelets falling as entire unit including the glumes; spikelets flattened dorsally.........................H
H. Spikelets in pairs, one sessile and perfect, the other stalked and staminate or rudimentary..............VIII. Andropogoneae
H. Spikelets single..........................IX. Paniceae

I. Oryzeae

1. Leersia Swartz

II. Phalarideae

1. **Anthoxanthum** L.


III. Chlorideae

1. **Eleusine** Gaertner, Yard Grass.


IV. Hordeae

A. Glumes bristle-like, often absent........1. **Hystrix**

A. Glumes 1-nerved............................2. **Secale**

1. **Hystrix** Moench


2. **Secale** L.


V. Agrostideae

A. Inflorescence in a tight, symmetrical, spike-like panicle..............................1. **Phleum**

A. Inflorescence in a loose or asymmetrical spike or panicle........................................B

B. Lemmas indurate or thick....................2. **Stipa**

B. Lemmas membranaceous........................................C

C. Lemmas subtended at the base by a callus beard.........................3. **Calamagrostis**

C. Lemmas not subtended by a callus beard........D

D. Lemmas awnless or rarely awned from the back......................4. **Agrostis**

D. Lemmas awned from the tip......5. **Muhlenbergia**

1. **Phleum** L., Timothy.


2. **Stipa** L., Feathergrass.

3. *Calamagrostis* Adanson, Reed Bentgrass.


A. Glumes less than 1/3 length of floret or body of the lemma
   1. *M. schreberi* (Gmelin) Kükenthal
   B. Glumes at least 1/3 length of floret or body of the lemma
      2. *M. tenuiflora* (Willd.) BSP
      3. *M. frondosa* (Poiret) Fernald
      4. *M. sylvatica* (Torrey) Torrey ex Gray


VI. Festuceae

A. Lemmas with 3 prominent nerves
   1. *Tridens*
   2. *Eragrostis*
   3. *Dactylis*
   4. *Poa*

C. Lemmas keeled on the back
   D. Spikelets in dense, 1-sided clusters
      3. *Dactylis*
      4. *Poa*

C. Lemmas convex on the back
   E. Lemmas with prominent nerves
      5. *Glyceria*
   F. Lemmas awned from between the 2 teeth at the tip
      6. *Bromus*
   F. Lemmas awned from the tip
      7. *Festuca*
1. **Tridens Roemer & Schultes**


2. **Eragrostis Beauvois, Love Grass.**


3. **Dactylis L.**


4. **Poa L., Meadow Grass.**

A. Culms strongly flattened.........1. *P. compressa*

A. Culms round or nearly so................B

B. Lower panicle branches in fascicles of 2 or 3 or solitary................2. *P. cuspidata*

B. Lower panicle branches in fascicles of 4 or more.......................3. *P. pratensis*


5. **Glyceria R. Brown, Manna Grass.**


6. **Bromus L., Brome Grass.**

A. Lower glume 1-nerved; 2nd glume 3-nerved........B

B. Lemma body 7.5 - 9 mm long, awn 10 - 15 mm...

...............................1. *B. tectorum*

B. Lemma body 10 - 11 mm long, awn 5 - 6 mm long.

...............................2. *B. purgans*

A. Lower glume 3 - 5 nerved; 2nd glume 5 - 7 nerved........................3. *B. japonicus*


7. **Festuca** L., Fescue Grass.

A. Spikelets 8-15 mm long, 6-11 flowered; leaf blades auriculate at the base... 1. *F. pratensis*

A. Spikelets 4-6 mm long, 1-4 flowered; leaf blades not auriculate at the base.........2. *F. obtusa*


VII. **Aveneae**

A. Spikelets with 2 florets, one perfect, the other staminate..........................B

B. Lowest lemma with a long, bent, twisted awn........

1. **Arrhenatherum**

B. Lowest lemma with no awn, but upper lemma with a hooked awn....................2. **Holcus**

A. Spikelets with 2 or more florets, all similar........C

C. Glumes falling with the spikelets... 3. **Sphenopholis**

C. Glumes persisting after the fall of the spikelets.D

D. Spikelets 2-flowered; awn dorsally located......

1. **Arrhenatherum** Beauvois


2. **Holcus** L.


3. **Sphenopholis** Scribner


4. **Deschampsia** Beauvois, Hairgrass.

5. *Danthonia* DC., Wild Oat Grass.


VIII. Andropogoneae

1. *Andropogon* L., Beardgrass


IX. Paniceae

A. Spikelets subtended by bristles............ 1. *Setaria*

A. Spikelets not subtended by bristles............ B

1. B. Sterile lemmas or glumes cuspidate or with awns...

B. Sterile lemmas and glumes awnless......... 2. *Echinochloa*

C. Spikelets stalked, in panicles........ 3. *Panicum*

C. Spikelets sessile or nearly so, in 1-sided racemes......... 4. *Digitaria*

1. *Setaria* Beauvois, Bristly Foxtail

1. A. Spike erect; sheath margins smooth.... 1. *S. glauca*

A. Spike recurving; sheath margins ciliate near summit

............................................ 2. *S. faberi*


2. *Echinochloa* Beauvois

1. *E. crusgalli* (L.) Beauvois, Barnyard Grass. Locally common in openings around the lake. 683, 772. (Europe and Asia).

3. *Panicum* L., Panic Grass

A. No winter rosette formed; basal and stem leaves similar............................. B

B. Primary cauline leaves less than 6 mm wide;

leaves with stiff hairs........ 1. *P. philadelphicum*

B. Primary cauline leaves 6 mm wide or more;

leaves glabrous or nearly so.... 2. *P. virgatum*

A. Winter rosette formed; basal and stem leaves different in shape.......................... C
C. Spikelets 2.8 mm or more long...............D
D. Blades 2-5 mm wide.........................3. P. depauperatum
D. Larger blades 15-30 mm wide................E
E. Spikelets 3 mm long.........................4. P. clandestinum
E. Spikelets 3.5-4 mm long......................5. P. bos Sicium
F. Lower nodes densely bearded................5. P. clandestinum
F. Lower nodes not densely bearded..............6. P. latifolium

C. Spikelets less than 2.8 mm long................G
G. Spikelets glabrous..........................7. P. dichotomum
G. Spikelets pubescent..........................8. P. commutatum
H. Ligule to 0.5 mm long or absent................
H. Ligule 2-5 mm long............................9. P. lanuginosum


4. Digitaria Heister


Cyperaceae - Sedge Family

A. Achene enclosed in a sac (perigynium); flowers unisexual...............................1. Carex
A. Achene not enclosed in a sac; flowers perfect..................B
B. Scales of spikelet distichous..........................2. Cyperus
B. Scales of spikelet spirally imbricate......................C
C. Spikelets solitary without obvious subtending bracts........................3. Eleocharis
C. Spikelets subtended by 2 or more bracts......................4. Scirpus
1. Carex L., Sedge

A. Spikes nearly all alike, staminate and pistillate flowers in the same spike; achenes lenticular, stigmas two.................B
B. Staminate flowers at the top of the spike.......C
C. Spikes few, green when mature.......1. C. rosea
C. Spikes very numerous, yellow to brown when mature..................2. C. vulpinoidea
B. Staminate flowers at the bottom of the spike....

A. Some of the spikes strictly pistillate, the staminate flowers in separate or mixed spikes; achenes 3-angled, stigmas 3, or achenes lenticular, stigmas 2..................D
D. Achenes lenticular..................4. C. crinita
D. Achenes 3-angled..................E
E. Perigynium orifice distinctly 2-toothed......

E. Perigynium orifice entire...............F
F. Terminal spike with at least some pistillate flowers...........6. C. virescens
F. Terminal spike with staminate flowers only........................G
G. Lowest bract of inflorescence with a green sheath................H
H. Leaves 10-30 mm wide; perigynia sharply angled........7. C. platyphylla
H. Leaves usually less than 10 mm wide; perigynia obtusely angled........

G. Lowest bract of inflorescence with no green sheath........................I
I. Basal leaves present, culms usually leafless or sparsely so........J
J. Most culms short and hidden in the leaves; stolons absent...........9. C. nigromarginata
J. None of the culms short and hidden in the leaves; stolons present.....10. C. pensylvanica
I. Culms leafy................11. C. scabrata

4. C. crinita Lam. var. gynandra (Schweinitz) Schweinitz and Torrey. Uncommon. In small spring on wooded trail below Pond Knob. 423.

2. Cyperus L.

3. Eleocharis R. Br., Spikerush

4. Scirpus L., Bulrush
A. Bristles up to twice the achene length and retroserly barbed........................................B
B. Stem leaves fewer than 10 per culm; bristles shorter than or equaling the achene...............1. S. atrovirens
B. Stem leaves more than 10 per culm; bristles twice as long as the achene...2. S. polyphyllus
A. Bristles many times the achene length and smooth..................................................3. S. cyperinus


Araceae - Arum Family

1. Arisaema Martius, Indian Turnip

Juncaceae - Rush Family

A. Plants glabrous; capsules producing numerous seeds; leaf sheaths open..........................1. Juncus

A. Plants usually with some degree of pubescence; capsules producing 3 seeds; leaf sheaths closed.2. Luzula

1. Juncus L., Rush

   A. Inflorescence appearing lateral......1. J. effusus
   B. Flowers single on the branches of the inflorescence, each flower subtended by a pair of bracteoles..............................C
   C. Lowest involucral bract longer than the inflorescence......................2. J. tenuis
   C. Lowest involucral bract shorter than the inflorescence...................3. J. secundus

   B. Flowers in glomerules of 2-12, individual flowers not subtended by a pair of bracteoles...

2. Luzula DC., Woodrush


Liliaceae - Lily Family

A. Leaves only cauline......................................................B
   B. Leaves whorled..........................................................C
   C. Leaves in one whorl of 3; sepals and petals not similar..............................1. Trillium
   C. Leaves in two whorls, the lowermost of 5-9; sepals and petals similar................2. Medeola

   B. Leaves alternate........................................................D
   D. Woody vines with armature on stems......3. Smilax
   D. Herbaceous plants with unarmed stems..............E
   E. Stem forked or branching above.......................F
   F. Flowers axillary, yellow or orange; fruit a capsule................................4. Uvularia
   F. Flowers terminal, green or white; fruit a berry..............................5. Disporum
E. Stem not branched or forked. ..........................G
G. Flowers axillary..........................G
G. Flowers in terminal panicles or racemes. ..........................H
H. Larger mature leaves over 2 dm long..........................J
I. Stem pubescent above..........................J
J. Perianth segments clawed and glandular at the base................7. Melanthium
J. Perianth segments neither clawed nor glandular at the base.. ..........................8. Veratrum
I. Stem glabrous........................9. Stenanthium
H. Larger mature leaves not over 1.5 dm long..........................K
K. Sepals 3, petals 3; leaves cuneate to rounded at the base. ..........................10. Smilacina
K. Sepals 2, petals 2; leaves cordate at the base..........................11. Maianthemum
A. Leaves mostly basal..........................L
L. Inflorescence an umbel..........................M
M. Leaves 3-8 mm wide; fruit a capsule ..........................12. Allium
M. Leaves 3 cm wide or more; fruit a berry..........................13. Clintonia
L. Inflorescence a raceme.............................N
N. Leaves numerous, filiform, 1-2 mm wide, mostly basal but smaller ones cauline ..........................14. Xerophyllum
N. Leaves linear, 4-30 mm wide, almost all basal..........................15. Amianthium

1. Trillium L., Trillium
A. Flower peduncled; leaves broad, rhombic................1. T. erectum
A. Flower sessile or sub-sessile; leaves lanceolate......2. T. pusillum
* 1. T. erectum L., Purple Trillium. Rare. Only a few plants on a slope in rich woods. 321.
+ 2. T. pusillum Michx. var. virginianum Fernald. A small population local to a north-facing ericaceous slope on Shenandoah Mountain. 1067, 1270, 1271.

2. Medeola L.

3. Smilax L., Greenbrier
A. Stem herbaceous, without prickles..........................1. S. ecirrhata
A. Stem woody, with prickles..............................B
B. Leaves glaucus beneath..........................2. S. glauca
B. Leaves green beneath..........................3. S. hispida

4. *Uvularia* L., Bellwort

A. Leaves sessile............................1. *U. pudica*
A. Leaves perfoliate........................2. *U. perfoliata*


5. *Disporum* Salisbury


6. *Polygonatum* Miller, Solomon's Seal

A. Leaves pilose or minutely downy on the nerves beneath............................1. *P. pubescens*
A. Leaves glabrous beneath........................2. *P. biflorum*


7. *Melanthium* L., Bunchflower


8. *Veratrum* L., False Hellebore


9. *Stenanthium* (Gray) Kunth


12. *Allium* L., Onion

  1. *A. cernuum* Roth ex Roemer, Wild Onion. Locally common in grassy field on Shenandoah Mountain. 642.


14. *Xerophyllum* Michaux


15. *Amianthium* Gray


**Dioscoreaceae - Yam Family**

1. *Dioscorea* L., Yam


**Amaryllidaceae - Amaryllis Family**

1. *Hypoxis* L., Stargrass

Iridaceae - Iris Family

A. Sepals and petals similar to each other in shape and size.........................1. Sisyrinchium
A. Sepals and petals not similar..................2. Iris

1. Sisyrinchium L., Blue-eyed Grass

A. Scapes less than 3 mm wide, bearing a single spathe..................1. S. mucronatum
A. Scapes more than 3 mm wide, bearing several peduncled spathes..........2. S. angustifolium


2. Iris L.


Orchidaceae - Orchid Family

A. Plants scapose, bearing a single terminal flower......1. Cypripedium
A. Plants with flowers in racemes or spikes...................B
B. Plants without green leaves at anthesis..............C
C. Flowers white, stems green................2. Spiranthes
C. Flowers brown or yellow, stems not green...........

3. Corallorhiza
B. Plants with green leaves at anthesis................D
D. Flowers with spurs......................4. Habenaria
D. Flowers without spurs....................E
E. Leaves with white reticulate venation pattern

5. Goodyera
E. Leaves without white venation pattern........................F
F. Flowers purple and/or green....................G
G. Stem not leafy.........................6. Liparis
G. Stem leafy...........................7. Epipactis
F. Flowers white.......................2. Spiranthes

1. Cypripedium L., Lady's Slipper

* 1. *C. acaule* Aiton, Pink Lady's Slipper. Rare. Dry, open woods in Big Hollow. 315.

2. Spiranthes Richard

A. Flowers forming a single spiral rank, often second................1. S. gracilis
A. Flowers forming several spiral ranks which forms a dense cylindrical spike......2. S. cernua

3. Corallorhiza Chatelain, Coral Root
   A. Lip distinctly 3-lobed.................1. C. maculata
      A. Lip not 3-lobed, but notched or wavy-margined at most............2. C. odontorhiza


4. Habenaria Willd., Fringed Orchis

5. Goodyera R. Brown, Rattlesnake Plantain
   A. Raceme loosely flowered and mostly 1-sided; leaf veins confluent................1. G. repens
      A. Raceme densely flowered, not 1-sided; leaf veins not confluent.............2. G. pubescens


6. Liparis Richard, Twayblade
   * 1. L. lilifolia (L.) Richard, Lily-leaved Twayblade. Rare. Hemlock woods and wet field at lower elevations. 486.

7. Epipactis Sw., Helleborine
   * 1. E. helleborine (L.) Crantz. Rare. Roadside in small area between recreation area and lake. 1139. (Europe)
Salicaceae - Willow Family

1. Salix L., Willow
   A. Leaves green, glabrous to sparsely pubescent beneath......................1. S. nigra
   A. Leaves sericeous beneath...........................................2. S. sericea


Myricaceae - Wax Myrtle Family

1. Comptonia L'Her

Juglandaceae - Walnut Family

A. Husk indehiscent; pith chambered..................1. Juglans
   A. Husk splitting at least at the apex; pith continuous.............2. Carya

1. Juglans L., Walnut

2. Carya Nuttall, Hickory
   A. Bark exfoliating in long strips; leaflets usually 5, serrations with persistent tufts of trichomes...
   ...............................................................1. C. ovata
   A. Bark not exfoliating in long strips; leaflets 5-9, serrations without persistent tufts of trichomes..B
   B. Branchlets stout; young branchlets tomentose with brown pubescence........2. C. tomentosa
   B. Branchlets slender; young branchlets glabrous..C
   C. Bark tight; nut dark brown, shining, splitting tardily at the apex if at all; leaflets usually 5.................3. C. glabra
   C. Bark in small plates or scales; nut light brown, warty, splitting to the base; leaflets usually 7................4. C. ovalis

Betulaceae - Birch Family

A. Pistillate flowers in small spikes or heads; staminate flowers in aments with no calyx; nuts without wings...B
B. Shrub; nut surrounded by a foliaceous involucre or husk..................................................2. Corylus
B. Tree; nut not surrounded by an involucre...........C
C. Trunk ridged, giving muscular appearance, bark tight; leaves slightly pubescent beneath; nut with 3-lobed bract.........................1. Carpinus
C. Trunk terete, young trees with cherry tree-like bark, bark on older trees scaly; leaves downy-pubescent beneath; nut in bladder-like sac which is not lobed..........................3. Ostrya

A. Pistillate and staminate flowers in aments, the staminate ones with a calyx; nuts winged...............D
D. Fruiting bracts 3-lobed or entire and deciduous.....4. Betula
D. Fruiting bracts 5-toothed or erose, woody and persistent..........................5. Alnus

1. Carpinus L., Hornbeam


2. Corylus L., Hazelnut


3. Ostrya Scopoli, Hop Hornbeam


4. Betula L., Birch

A. Bark dark, tight, with lenticels; pistillate ament bracts glabrous........................1. B. lenta
A. Bark of mature trees yellowish-silver, tending to peel; pistillate ament bracts ciliate...2. B. lutea


5. Alnus Ehrhart, Alder


Fagaceae - Beech Family

A. Fruits in a bur; terminal bud single..................B
B. Bur 2 cm wide or less.............................1. Fagus
B. Bur 4 cm wide or more...........................2. Castanea
A. Fruits not in a bur, but subtended by a cup-like involucre; terminal buds clustered...........3. Quercus

1. Fagus L., Beech


2. Castanea Miller, Chestnut.


3. Quercus L., Oak

A. Leaf lobes without bristle tips, rounded; bark usually light in color..........................B
B. Leaves lobed.....................................1. Q. alba
B. Leaves coarsely sinuate toothed, but not lobed.................................2. Q. prinus
A. Leaf lobes with bristle tips, acute................................C
C. Leaves mostly obovate, mostly lobed above the middle...........................................D
D. Mature leaves white-downy beneath; twigs glabrous.................................3. Q. ilicifolia
D. Mature leaves rusty-pubescent beneath; twigs pubescent.................................4. Q. marilandica
C. Leaves pinnately lobed, base to apex..............E
E. Lateral lobes of the leaves much longer than the undivided portion of the blade...........5. Q. coccinea
E. Lateral lobes of the leaves about as long as the undivided portion of the blade...........F
F. Leaves dark green and lustrous above; cup covering 1/3 or more of acorn. 6. *Q. velutina*
F. Leaves dull green above; cup covering less than 1/3 of acorn...................7. *Q. rubra*


**Ulmaceae - Elm Family**

1. *Ulmus* L., Elm


**Urticaceae - Nettle Family**

A. Plants with stinging hairs.................1. *Laportea*
A. Plants without stinging hairs..................B
B. Leaves opposite........................................2. *Pilea*
B. Leaves alternate.......................................3. *Parietaria*

1. *Laportea* Gaudin, Wood Nettle


2. *Pilea* Lindley, Clearweed


3. *Parietaria* L.

Aristolochiaceae - Birthwort Family

A. Acaulescent herbs; calyx regular............1. *Asarum*
A. High climbing vines; calyx with strongly bent tube..................2. *Aristolochia*

1. *Asarum* L., Wild Ginger

2. *Aristolochia* L., Birthwort

Polygonaceae - Buckwheat Family

A. Three inner sepals larger than the outer in fruit.....
   ____________________________1. *Rumex*
A. Three inner sepals smaller than or equal to the outer ones............2. *Polygonum*

1. *Rumex* L., Sorrel
   A. Leaves hastate or sagitate........1. *R. acetosella*
   A. None of the leaves hastate or sagitate........B
      B. Margins of inner sepals entire or nearly so.....
      ____________________________B. *R. crispus*
      B. Margins of inner sepals with spiny teeth........3. *R. obtusifolius*


2. *Polygonum* L., Knotweed
   A. Stems armed with retrorse barbs....1. *P. sagittatum*
   A. Stems unarmed..........................B
      B. Petioles jointed at the base.....2. *P. aviculare*
      B. Petioles not jointed at the base........C
      C. Plants twining................................D
      D. Calyx strongly winged in fruit........3. *P. scandens* var. *cristatum*
      D. Calyx barely winged or simply keeled in fruit........4. *P. convolvulus*
      C. Plants erect................................E
E. Ocreolae of the raceme strongly overlapping; roots fibrous...5. P. persicaria
E. Ocreolae of the raceme separated or reaching to the base of the next one above;
Rootstock woody and elongated..............
..........................6. P. hydropiperoides

   Thickets, streamsides and open areas in damp soil. 882.

Chenopodiaceae - Goosefoot Family

1. Chenopodium L., Goosefoot

Phytolaccaceae - Pokeweed Family

1. Phytolacca L., Pokeweed

Aizoaceae - Carpetweed Family

1. Mollugo L.
Caryophyllaceae – Pink Family

A. Fruit a one-seeded utricle; petals absent................
   1. Paronychia

A. Fruit a capsule with few to many seeds; petals present................B
B. Sepals separate........................................C
C. Petals entire..............................................2. Arenaria
C. Petals 2-cleft..........................D
   D. Fruit ovoid, dehiscent by valves.3. Stellaria
   D. Fruit cylindric, dehiscent by terminal teeth.....4. Cerastium
B. Sepals united........................................E
E. Styles 3..............................................5. Silene
E. Styles 2..............................................F
F. Calyx not subtended by bracts...6. Saponaria
F. Calyx subtended by 1-3 pairs of bracts........7. Dianthus

1. Paronychia Miller, Whitlow Wort
      Occasional. Wooded trailsides and borders. 728.

2. Arenaria L., Sandwort

3. Stellaria L., Chickweed
      Fields and openings. 1054. (Eurasia).

4. Cerastium L., Mouse-ear Chickweed
   1. C. holosteoides var. vulgare (Hartman) Hylander.

5. Silene L., Catchfly
   A. At least some of the leaves in whorls of four......
      1. S. stellata
   A. Leaves opposite, not whorled......2. S. caroliniana
6. **Saponaria L.**


7. **Dianthus L.**, Pink


**Ranunculaceae - Crowfoot Family**

A. Herbs..................1. **Clematis**

B. Fruit an achene..................2. **Hepatica**

C. Plants acaulescent..................3. **Ranunculus**

D. Petals yellow..................4. **Thalictrum**

E. Leaves alternate; sepals not petaloid....

F. Leaves opposite or whorled; sepals petaloid..................5. **Anemone**

G. Leaves opposite or whorled; sepals petaloid..................6. **Aquilegia**

H. Leaves opposite or whorled; sepals petaloid..................7. **Cimicifuga**

I. Leaves opposite or whorled; sepals petaloid..................8. **Actaea**

1. **Clematis L.**, Clematis

A. Flowers white, in racemes........1. *C. virginiana*

B. Flowers pink-purple, solitary...2. *C. verticillaris*


2. **Hepatica Miller, Hepatica**


3. **Ranunculus L.**, Buttercup

A. Mature achenes not winged; basal leaves often undivided.................B

B. Achenes 1.5 mm long and beaked.............................1. *R. allegheniensis*
B. Achenes 1.0 - 1.5 mm long and barely beaked

A. Mature achenes winged; basal leaves mostly compound.
C. Sepals spreading; leaves palmately divided

......................... 2. R. abortivus

C. Sepals reflexed; leaves pinnately divided

......................... 4. R. bulbosus


4. Thalictrum L., Meadow Rue

A. Upper leaves sessile; flowering in early autumn.

......................... 1. T. coriaceum
A. Upper leaves petiolate; flowering in early spring.

......................... 2. T. dioicum


5. Anemone L., Windflower

A. Achenes densely wooly; plants 6-9 dm high

......................... 1. A. virginiana
A. Achenes glabrous or thinly pubescent; plants 1-4 dm high

......................... 2. A. minima
B. Sepals 8 mm long

......................... 3. A. lancifolia
B. Sepals 15-20 mm long


6. Aquilegia L., Columbine

7. *Cimicifuga L.*, Bugbane

8. *Actaea L.*, Baneberry

**Berberidaceae - Barberry Family**

A. Leaves simple, lobed, and peltate; flowers solitary...
   ........................... 1. *Podophyllum*
A. Leaves compound; flowers racemose...... 2. *Caulophyllum*

1. *Podophyllum L.*, May Apple

2. *Caulophyllum* Michaux, Blue Cohosh

**Menispermaceae - Moonseed Family**

1. *Menispermum L.*, Moonseed

**Magnoliaceae - Magnolia Family**

A. Leaves entire and acute.................. 1. *Magnolia*
A. Leaves 4-lobed and broadly retuse...... 2. *Liriodendron*

1. *Magnolia L.*, Magnolia

2. *Liriodendron L.*, Tulip Tree
Lauraceae - Laurel Family

A. Tree with some of the leaves lobed..........1. Sassafras
A. Shrub with all of the leaves entire..........2. Lindera

1. Sassafras Trew ex Blackwell, Sassafras

2. Lindera Thunberg, Wild Allspice

Papaveraceae - Poppy Family

1. Sanguinaria L., Bloodroot

Brassicaceae - Mustard Family

A. Flowers yellow.................................B
   B. Cauline leaves auriculate or clasping at the base.............1. Barbarea
   B. Cauline leaves not auriculate nor clasping at the base........2. *Sisymbrium*

A. Flowers white.................................C
   C. Fruit a silicle..............................D
   D. Silicle obovoid to nearly orbicular; seed one in each cell..........3. *Lepidium*
   D. Seed more than one in each cell; silicle obcordate to triangular.....4. *Capsella*

C. Fruit a silique...............................E
   E. Cauline leaves pietioled and pinnatifid or palmately lobed........5. *Cardamine*
   E. Cauline leaves sessile, entire or dentate..........F
      F. Plants 6-12 dm high; silique 8 cm long...........
         6. *Arabis*
      F. Plants 5 dm or less high; silique 2 cm or less long........7. *Arabidopsis*


   A. Pedicels more slender than the siliques; basal leaves with not more than 4 pairs of segments..
      ...............1. B. vulgaris
   A. Pedicels nearly as thick as the siliques; basal leaves with 5-8 pairs of leaf segments.2. B. verna

2. **Sisymbrium** L.


3. **Lepidium** L., Peppergrass

A. Stem leaves clasping................1. **L. campestre**
A. Stem leaves not clasping..........2. **L. virginicum**


4. **Capsella** Medicus, Shepherd's Purse


5. **Cardamine** L.

A. Leaves palmately lobed.............1. **C. concatenata**
A. Leaves pinnatifid..................2. **C. pensylvanica**

2. **C. pensylvanica** Muhlenberg, Pennsylvania Bittercress. Common. In wet soil and in water along streams. 244, 495, 586.

6. **Arabis** L., Rock Cress

A. Leaves auricled and clasping the stem..............

.................................1. **A. laevigata**
A. Leaves not auricled and not clasping................

.................................2. **A. canadensis**

7. *Arabidopsis* Heynhold, Mouse-ear Cress


Crassulaceae - Orpine Family

1. *Sedum* L., Stonecrop

   A. Stems decumbent; leaves rounded to truncate at apex........................................1. *S. ternatum*
   
   A. Stems erect; leaves acute to obtuse at apex, not rounded..............................2. *S. telephioides*


Saxifragaceae - Saxifrage Family

A. Shrubs.........................................................B
B. Leaves opposite........................................1. *Hydrangea*
B. Leaves alternate.........................................2. *Ribes*

A. Herbs..........................................................C
C. Stamens 10, petals 5......................................D
   D. Calyx 5-merous, petals present......................E
   E. Petals entire or nearly so.........................3. *Saxifraga*
   E. Petals pinnatifid or fimbriata....................4. *Mitella*
   D. Calyx 4-merous, petals absent.................5. *Chrysosplenium*
C. Stamens 5, petals 5......................................6. *Heuchera*

1. *Hydrangea* L., Hydrangea


2. *Ribes* L.

   A. Peduncles few-flowered; stems with spines at the base of the leaf clusters........1. *R. rotundifolium*
   A. Flowers in several elongated racemes; stems unarmed or bristly.......................2. *R. lacustre*

3. *Saxifraga* L., Saxifrage


4. *Mitella* L., Bishop's Cap


5. *Chrysosplenium* L., Golden Saxifrage


6. *Heuchera* L., Alumroot


**Hamamelidaceae - Witch Hazel Family**

1. *Hamamelis* L., Witch Hazel


**Platanaceae - Plane Tree Family**

1. *Platanus* L., Sycamore

1. *P. occidentalis* L. Occasional at the low elevations in vicinity of Hone Quarry Run. 919.

**Rosaceae - Rose Family**

A. Carpels only one; fruit a drupe.................1. *Prunus*

A. Carpels more than one..............................B

B. Carpels united and enclosed and adnate to the hypanthium; fruit a pome.............................C

C. Carpels papery or leathery when ripe; plant unarmed..................................................D

D. Fleshy pome when ripe less than 1 cm broad..E

E. Leaves simple.................................2. *Amelanchier*

E. Leaves pinnately compound.................3. *Sorbus*

D. Fleshy pome when ripe over 1 cm broad......

..................................................4. *Malus*

C. Carpels hard and bony when ripe; plant armed with long, rigid thorns.............5. *Crataegus*
B. Carpels distinct, not united; fruits follicles, achenes or drupelets
F. Fruit a follicle
G. Shrubs
H. Leaves pinnately compound
H. Leaves trifoliolate
F. Fruits achenes or drupelets
I. Pistils enclosed in a fleshy hypanthium
I. Pistils not enclosed in a fleshy hypanthium
J. Pistils developing into an aggregate; fleshy fruit
J. Pistils developing into dry achenes
K. Pistils 1-4, completely enclosed in a dry, firm hypanthium
K. Pistils few-many, not enclosed in an hypanthium at maturity
L. Styles persistent and elongating after flowering
L. Styles not elongating after flowering
M. Flowers white; receptacle fleshy at maturity
M. Flowers yellow; receptacle dry at maturity

1. Prunus L., Cherry
A. Flowers arranged racemosely
A. Flowers arranged corymbosely

Open woods, thickets and clearings. 339
2. P. pensylvanica

2. Amelanchier Medicus, Serviceberry

1. A. arborea (Michaux f.) Fernald
A. Leaves pilose when unfolding
A. Leaves nearly glabrous when unfolding

1. var. arborea. Common. Woods, especially at the mid and high elevations. 145, 200, 228, 374, 408, 437
2. var. laevis (Wiegand) Ahles. Common. Woods, usually at the high elevations. 331, 1049
3. **Sorbus L.**


4. **Malus Miller**


5. **Crataegus L., Hawthorn**

A. Leaf veins leading to the points of the lobes and to the sinuses. ................. 1. *C. phaenopyrum*

A. Leaf veins leading to the points of the lobes only, not to the sinuses. .................. B

B. Sepals evenly glandular-serrate. 2. *C. flabellata*

B. Sepals entire or remotely glandular-serrate. ........

................... 3. *C. coccinea*


3. *C. coccinea* L. Common. Open woods and clearings on the high ridges. 730, 945.

6. **Spiraea L.**


7. **Aruncus Adanson, Goat's Beard**


8. **Gillenia Moench**


9. **Rosa L., Rose**

A. Flowers few to many, styles exerted beyond the receptacle; prickles recurved. .... 1. *R. multiflora*

A. Flowers one to few, styles not exerted; prickles straight. .................. 2. *R. carolina*

10. Rubus L.

A. Plant shrubby, unarmed; leaves simple
   ...................................................... 1. R. odoratus
A. Plant forming canes with thorns or stiff hairs; leaves compound
   ...................................................... B
B. Leaves green on both sides. 2. R. allegheniensis
B. Leaves white or silvery beneath. ............................. C
C. Canes bristly with glandular hairs
   ...................................................... 3. R. phoenicolasius
C. Canes smooth but with thorns
   ...................................................... 4. R. occidentalis


11. Agrimonia L., Agrimony

A. Mature fruits 6-10 mm long; principal leaflets
   5-11. ................................................ 1. A. gryposepala
A. Mature fruits 5 mm long or less; principal leaflets 9-17,
   .............................. 2. A. parviflora


12. Geum L., Avens

A. Petals yellow. .............................. 1. G. virginianum
A. Petals white. .............................. 2. G. canadense

13. *Fragaria* L., Strawberry


14. *Potentilla* L., Cinquefoil

A. Flowers in cymose clusters.................................B
B. Leaflets 3..............................................1. *P. norvegica*
B. Leaflets 5 or more........................................C
C. Leaflets 7-9; flowers 2 cm or more broad....
..........................................................2. *P. recta*
C. Leaflets 5; flowers 1.0 - 1.5 cm broad....D
D. Leaves white-tomentose beneath; margins revolute...........3. *P. argentea*
D. Leaves green beneath, margins not revolute............4. *P. intermedia*
A. Flowers single in leaf axils.........................E
E. Stem at flowering time ascending or erect; first flower at second node.....5. *P. simplex*
E. Stem at flowering time prostrate; first flower at first node........6. *P. canadensis*


**Fabaceae - Bean Family**

A. Stamens entirely free; flowers yellow.....1. *Baptisia*
A. Stamens monadelphous or diadelphous......................B
B. Leaves with tendrils.....................................C
C. Style bearded all around the summit.....2. *Vicia*
C. Style bearded along only one side....3. *Lathyrus*
B. Leaves not tendril-bearing..........................D
D. Twining or trailing herbs..................4. *Amphicarpa*
D. Erect herbs, shrubs or trees.....................E
E. Fruit a loment........................................F
F. Loment composed of one article..............
..........................................................5. *Lespedeza*
F. Loment composed of two or more articles...
..........................................................6. *Desmodium*
E. Fruit a legume........................................G
G. Herbs.................................................H
H. Flowers in heads.............7. Trifolium
H. Flowers in long racemes...8. Melilotus
G. Trees.................................................9. Robinia

1. Baptisia Vent.


2. Vicia L., Vetch

A. Calyx slightly gibbous at the base................1. V. caroliniana
A. Calyx very gibbous at the base........2. V. dasycarpa


3. Lathyrus L., Wild Pea

* 1. L. venosus Muhlenberg ex Willd., Veiny Peavine. Locally occasional on weedy slope overlooking the lake. 245.

4. Amphicarpa Ell. ex Nuttall, Hog Peanut


5. Lespedeza Michaux, Bushclover

A. Plants trailing........................................1. L. repens
A. Plants erect........................................B
B. Flowers yellow-white or white with purple........C
C. Flowers yellow-white; leaflets oval to obovate..........2. L. hirta
C. Flowers white with purple; leaflets long-cuneate.........3. L. cuneata
B. Flowers purple..................................4. L. intermedia

1. L. repens (L.) Barton, Creeping Bushclover. Occasional; fields in vicinity of the lake. 1196-A.
3. L. cuneata (Dumont) G. Don, Sericea. Locally very abundant in open areas in vicinity of the lake, obviously planted by the Forest Service. 897. (East Asia).

6. Desmodium Desvaux, Tick-Trefoil

A. Flowering stems leafless..............1. D. nudiflorum
A. Flowering stems leafy..........................B
    B. Medial part of stem densely uncinate-puberulent, not pilose........2. D. glabellum
    B. Medial part of stem pilose........3. D. perplexum

2. D. glabellum (Michaux) DC. Rare. Wooded jeep roadside near Hone Quarry recreation area. 623-A.

7. Trifolium L., Clover

A. Flowers sessile in heads........................B
    B. Heads white or silvery in appearance........1. T. arvense

    B. Heads with pink to red flowers...2. T. pratense

A. Flowers pedicellate in the heads...............C
    C. Flowers yellow..........................3. T. campestre
    C. Flowers white or pink..................D
        D. Flowers white, stem creeping....4. T. repens
        D. Flowers pink, stem erect.......5. T. hybridum


8. Melilotus Miller, Sweet Clover

A. Flowers white; mature legume dark brown to blackish........................1. M. alba

    A. Flowers yellow; mature legume light brown.........................2. M. officinalis


9. **Robinia L.**, Locust

   A. Twigs glabrous; flowers white...1. **R. pseudoacacia**
   A. Twigs densely hispid; flowers pink to purple........
   ........................................................................2. **R. hispida**

2. **R. hispida** L., Rose Acacia. Occasional in fields near the Lake. 288, 1149.

**Linaceae** - **Flax Family**

1. **Linum L.**, Flax


**Oxalidaceae** - **Wood Sorrel Family**

1. **Oxalis L.**, Wood Sorrel

   A. Plants with creeping stems..........1. **O. corniculata**
   A. Plants more or less erect............2. **O. stricta**


**Geraniaceae** - **Geranium Family**

1. **Geranium L.**, Cranesbill

   A. Flowers 2.5 - 4.0 cm wide............1. **G. maculatum**
   A. Flowers much smaller....................B
   B. Pedicels with glandless pubescence........
   ...................................................2. **G. columbinum**
   B. Pedicels densely glandular-villous........
   ...................................................3. **G. bicknellii**

* 1. **G. maculatum** L., Wild Cranesbill. Common. Open woods. 230, 342,
Simaroubaceae - Quassia Family

1. Ailanthus Desf., Tree of Heaven
   1. A. altissima (Miller) Swingle. Occasional at the lower elevations in the floodplain. 1140. (Asia).

Polygalaceae - Milkwort Family

1. Polygala L., Polygala

Euphorbiaceae - Spurge Family

A. Flowers enclosed in a cyathium; plant juice milky......

A. Flowers not enclosed in a cyathium, pistillate flowers encircled by a leafy bract; plant juice not milky......

1. Euphorbia L., Spurge
   A. Leaves oblique at the base, opposite.1. E. maculata
   A. Leaves symmetrical, alternate below.2. E. corollata

2. Acalypha L., Three-Seeded Mercury

Callitrichaceae - Water Starwort Family

1. Callitriche L., Water Starwort
   * 1. C. heterophylla Pursh. Common. Streams and seepage areas. 578, 748.

Anacardiaceae - Cashew Family

1. Rhus L.
A. Leaves trifoliolate; climbing woody vine or erect shrub.......................... 1. R. radicans
A. Leaves with 9 or more leaflets; shrub. 2. R. typhina


Aquifoliaceae - Holly Family

1. Ilex L., Holly


Aceraceae - Maple Family

1. Acer L., Maple

A. Flowers in terminal panicles or racemes.............. B
B. Inflorescence a drooping raceme; leaves finely serrate............. 1. A. pensylvanicum
B. Inflorescence an erect panicle; leaves coarsely serrate............. 2. A. spicatum
A. Flowers in lateral or terminal corymb or clusters.

C. Petals present; leaf sinuses V-shaped......................... 3. A. rubrum
C. Petals absent; leaf sinuses U-shaped........................... 4. A. saccharum


Balsaminaceae - Touch-Me-Not Family

1. Impatiens L., Touch-Me-Not

A. Flowers orange........................................... 1. I. capensis
A. Flowers yellow........................................... 2. I. pallida

Rhamnaceae - Buckthorn Family

1. Ceanothus L.

Vitaceae - Grape Family

A. Leaves 5-foliolate.......................... 1. Parthenocissus
   A. Leaves simple to deeply lobed.................. 2. Vitis

1. Parthenocissus Planchon

2. Vitis L., Grape

Tiliaceae - Linden Family

1. Tilia L., Basswood
   A. Leaves lighter green and glabrous beneath............
      .................................................. 1. T. americana
   A. Leaves strongly whitened beneath with appressed stellate hairs.................... 2. T. heterophylla


Hypericaceae - St. John's Wort Family

1. Hypericum L., St. John's Wort
   A. Stamens 12 or fewer.......................... 1. H. mutilum
   A. Stamens more than 12........................................B
      B. Plant much branched; leaves pellucid punctate...
      .................................................. 2. H. perforatum
      B. Plant unbranched or sparingly so; leaves dark-punctate.......................... 3. H. punctatum
   Common. Wet soil of open areas. 739.

   Fields and openings. 452. (Europe).

   Fields and woods borders. 497.

**Violaceae - Violet Family**

1. *Viola* L., Violet

A. Plants without stems; petioles and peduncles arising directly from the rhizomes.................B
B. All petals beardless; no cleistogamous flowers; leaves pedately cleft...............1. *V. pedata*
B. At least some of the petals bearded; cleistogamous flowers present at least in the summer..C
C. Flowers blue, violet, purple or lilac (albino individuals occur in some species); rhizome with no stolons (except in *V. pallens*)......D
D. Leaves variously toothed or crenate, but not lobed........................................E
E. Plant glabrous or nearly so..................F
   F. Leaves cordate at the base.............2. *V. papilionacea*
   F. Leaves lance-oblung or narrowly lanceolate........3. *V. sagittata*

E. Plant pubescent, at least the early growth.................................................G
G. Sepals ciliate.....4. *V. fimbriatula*
G. Sepals glabrous.....3. *V. sagittata*
D. Leaves lobed or divided..........................H
H. Leaves pubescent........................................I
   I. Leaves lanceolate or oblong..............J
   J. Sepals ciliate,..4. *V. fimbriatula*
   J. Sepals glabrous..3. *V. sagittata*
I. Leaves cordate-ovate, divided into 5-11 lobes.............5. *V. palmata*
H. Leaves glabrous.....3. *V. sagittata*
C. Flowers white or yellow..................K
K. Flowers yellow...............6. *V. rotundifolia*
K. Flowers white..........................L

L. Leaves lance-ovate to widely lanceolate some petioles with winged margins......
   7. *V. primulifolia*
L. Leaves cordate, none of the petioles with winged margins..........................M
M. Leaves acute with scattered hairs above.......................8. *V. blanda*
M. Leaves obtuse or rounded, glabrous..9. *V. macloskeyi* var. *pallens*
   (Banks) C. L. Hitchcock
A. Plants with leafy stems..........................N
   N. Flowers yellow......................................O
      O. Leaves hastate, stipules less than 3 mm
         long............................................10. V. hastata
      O. Leaves cordate, stipules 5 mm or more long..P
         P. Plants softly pubescent; basal leaves
            absent........................................11. V. pubescens
         P. Plants glabrous or nearly so................
                         ......................................12. V. eriocarpa
   N. Flowers white, violet or purple...............Q
      Q. Flowers white with conspicuously long spurs,
         8-12 mm long...................................13. V. rostrata
      Q. Flowers not with conspicuously long spurs....R
         R. Stipules lanceolate, sharp-pointed........
                         ......................................14. V. canadensis
         R. Stipules lyrate-pinnatifid..................
                         ......................................15. V. rafinesquii

* 1. V. pedata L., Bird-foot Violet. Occasional. In dry
   soil at trailsides and in open woods. 179, 314.
2. V. papilionacea Pursh, Common Blue Violet. Common.
   Woods and woods borders. 251, 273, 340.
   Rich woods. 159.
   Woods and fields. 167, 178, 214.
   Woods. 835.
6. V. rectundifolia Michaux, Round-leaf yellow Violet.
   Uncommon. Wooded slopes below Hone Quarry Ridge. 
   192.
   Open areas. 1056.
   woods. 190, 210, 274.
9. V. macloskeyi var. pallens (Banks) C. L. Hitchcock,
   Northern White Violet. Occasional. Rich woods. 183, 
   1072.
10. V. hastata Michaux, Halberd-leaf Yellow Violet.
    Common. Woods. 1097, 1250.
* 11. V. pubescens Aiton, Downy Yellow Violet. Occasional.
    Woods. 1251.
12. V. eriocarpa Schweinitz, Smooth Yellow Violet.
    Common. Woods and openings. 170, 202, 320.
    Rich woods. 142, 158.
    296.
    Grassy openings. 1051.
Elaeagnaceae - Oleaster Family

1. Elaeagnus L., Oleaster
   1. E. umbellata Thunberg. Locally planted by the Forest Service on the hillside overlooking the lake. 174, 584. (East Asia).

Lythraceae - Loosestrife Family

1. Cuphea P. Brown

Onagraceae - Evening Primrose Family

A. Floral parts in twos..........................1. Circaea
A. Floral parts in fours..................................B
B. Petals over 1 cm long......................2. Oenothera
B. Petals 1 cm long or less......................C
   C. Calyx persisting in fruit..........3. Ludwigia
   C. Calyx deciduous.........................4. Epilobium

1. Circaea L., Enchanters' Nightshade
   A. Stem firm; fruit 3-6 mm thick.........................1. C. lutetiana ssp. canadensis
   A. Stem rather weak; fruit 1-1.5 mm thick.2. C. alpina

2. Oenothera L., Evening Primrose
   A. Capsules obovoid, short and 4-sided.1. O. tetragona
   A. Capsules lance-cylindric........................B
   B. Capsules in bractless, exposed spikes; apices of calyx lobes connivent or parallel in unexpanded bud......................2. O. biennis
   B. Capsules with long, subtending, leaf-like bracts; apices of calyx lobes separate in unexpanded bud..........................3. O. parviflora


3. *Ludwigia* L., False Loosestrife


4. *Epilobium* L., Willow Herb


Araliaceae - Ginseng Family

A. Leaves palmately compound..........................1. *Panax*

A. Leaves pinnately compound..........................2. *Aralia*

1. *Panax* L., Ginseng


2. *Aralia* L.


Apiaceae - Parsley Family

A. Staminate flowers mixed with the perfect flowers......

.................................................................1. *Sanicula*

A. Flowers all perfect; none strictly staminate..............B

B. Fruits covered with prickles.......................2. *Daucus*

B. Fruits not covered with prickles....................C

C. Leaflets 3..............................................D

D. Flowers white........................................3. *Cryptotaenia*

D. Flowers yellow........................................4. *Thaspium*

C. Leaflets more than 3..................................E

E. Fruit barbed at the base.........................5. *Osmorhiza*

E. Fruit not barbed..............................6. *Angelica*

1. *Sanicula* L., Black Snakeroot


2. *Daucus* L., Carrot

3. Cryptotaenia DC., Henewort


4. Thaspium Nuttall, Meadow Parsnip

A. Leaflets crenate; plant glabrous...1. T. trifoliatum
A. Leaflets incised or lobed; plant pubescent on the
joints..........................2. T. barbinode

1. T. trifoliatum (L.) Gray. Occasional. Woods. 259,
737.
1256.

5. Osmorhiza Raf., Sweet Cicely

A. Stems villous-pubescent; plant not anise-scented...
.........................1. O. claytonii
A. Stems glabrous; plant anise-scented...............2. O. longistylis

2. O. longistylis (Torrey) DC., Aniseroot. Common.
Woods. 346, 481.

6. Angelica L., Angelica

A. Fruit pubescent; larger leaf segments less than 6 cm
long..................1. A. venenosa
A. Fruit glabrous; larger leaf segments more than 6 cm
long.....................2. A. triquinata

* 1. A. venenosa (Greenway) Fernald, Hairy Angelica.
Occasional. Wooded slopes. 529, 873.
2. A. triquinata Michaux, Filmy Angelica. Occasional;
thickets on Shenandoah Mountain. 659.

Nyssaceae - Sour Gum Family

1. Nyssa L.

731.

Cornaceae - Dogwood Family

1. Cornus L.
A. Leaves alternate
B. Leaves opposite

B. Flower clusters surrounded by 4 large, showy, white or pink bracts; mature fruit red

A. Flower clusters without showy involucre; fruit white

2. C. florid a


2. C. florid a L., Flowering Dogwood. Common. Woods, especially at the lower elevations. 311


Ericaceae - Heath Family

A. Plants devoid of chlorophyll
B. Plants with chlorophyll

C. "Berry" containing 10 nutlets; ventral leaf surfaces with golden resin dots

D. Petals separate to the base

E. Flowers 4-merous
F. Flowers 5-merous

G. Leaves glabrous, with wintergreen odor

H. Corolla open at the mouth, rotate or funnelform

I. Leaves evergreen; capsule globose

J. Leaves deciduous; capsule elongate

K. Kalmia

L. Rhododendron

M. Pieris

N. Lyonia

1. Monotropa L.

A. Flowers one to a stem
B. Flowers several to a stem

2. *Gaylussacia* HBK., Huckleberry

3. *Vaccinium* L.
   A. Corolla campanulate; stamens strongly exerted......
   1. *V. stamineum*
   A. Corolla cylindric to urceolate; stamens included.....
   2. *V. vacillans*
   * 2. *V. vacillans* Torrey, Low Blueberry. Common. Dry woods. 310, 1205-B.

4. *Chimaphila* Pursh

5. *Menziesia* Smith


7. *Gaultheria* L.

8. *Kalmia* L., Laurel

9. *Rhododendron* L.
   A. Leaves canescent or pilose beneath......1. *R. roseum*
   A. Leaves glabrous or only pilose on the nerves beneath.................2. *R. nudiflorum*

10. \textit{Pieris} D. Don


11. \textit{Lyonia} Nuttall


**Primulaceae - Primrose Family**

1. \textit{Lysimachia} L., Loosestrife

A. Leaves elliptic, in whorls of 4...1. \textit{L. quadrifolia}
A. Leaves lanceolate, opposite........2. \textit{L. lanceolata}


**Oleaceae - Olive Family**

1. \textit{Fraxinus} L., Ash


**Gentianaceae - Gentian Family**

1. \textit{Gentiana} L., Gentian


**Apocynaceae - Dogbane Family**

1. \textit{Apocynum} L.

Asclepiadaceae - Milkweed Family

1. Asclepias L., Milkweed
   A. Leaves thick, heavily tomentose........1. A. syriaca
   A. Leaves thin, sparingly pubescent...2. A. quadrifolia


Convolvulaceae - Morning-glory Family

A. Plants without chlorophyll................1. Cuscuta
A. Plants with chlorophyll...................2. Calystegia

1. Cuscuta L., Dodder

2. Calystegia R. Brown, Bindweed

Hydrophyllaceae - Waterleaf Family

1. Hydrophyllum L., Waterleaf

Boraginaceae - Borage Family

A. Corolla irregular, blue......................1. Echium
A. Corolla regular, white or reddish-purple........B
   B. Raceme without bracts; corolla reddish-purple........
   ........................................................2. Cynoglossum
   B. Raceme with some leaf-like bracts; corolla white...
   ........................................................3. Hackelia

1. Echium L., Viper's Bugloss

2. Cynoglossum L.
   Trailsides and openings. 375. (Eurasia).

3. Hackelia Opiz., Stickseed

   Open woods and clearings. 796.

Verbenaceae - Vervain Family

1. Verbena L., Vervain

   Trailsides and clearings. 614.

Lamiaceae - Mint Family

A. Corolla and calyx nearly regular........1. Lycopus
A. Corolla irregular; calyx regular or irregular........B
B. Calyx tube with a projection on its upper side.....
   .................................................................2. Scutellaria
B. Calyx tube without such projection..................C
C. Calyx regular or nearly so.........................D
D. Flowers in compact axillary whorls, terminal
   heads or terminal clusters.........................E
E. Inflorescence bracts broad and conspicuous.
   .................................................................3. Monarda
E. Inflorescence bracts small, not conspicuous........F
F. Stamens strongly exerted; plant more
   than 1.4 m tall..................4. Agastache
F. Stamens not strongly exerted; plant
   1 m tall or less............................G
G. Leaves reniform to reniform-cordate..............5. Glechoma
G. Leaves ovate to ovate-lanceolate.................6. Nepeta
D. Flowers in loose racemes or spikes, solitary,
   or few in the leaf axils..................7. Cunila
C. Calyx irregular, distinctly 2-lipped.............H
H. Stamens 2..............................I
I. Flowers in small clusters in the leaf
   axils, blue...............................8. Hedeoma
I. Flowers in terminal inflorescences.............J
   J. Principal leaves in a basal rosette,
      cauline leaves few, in pairs........9. Salvia
   J. Basal rosette absent, cauline leaves
      numerous, opposite........10. Collinsonia
H. Stamens 4..............................K
K. Stamens not exerted from the corolla........L
L. Bracts of inflorescence broadly rounded, apiculate..............11. Prunella
L. Bracts of inflorescence setaceous............
..........................................................12. Satureja
K. Stamens exerted from the corolla............
..........................................................13. Pycnanthemum

1. Lycopus L., Bugleweed
   A. Base of stem not thickened; filaments not exceeding the corolla tube..............1. L. virginicus
   A. Base of the stem tuberous-thickened; filaments protruding beyond the corolla tube........2. L. uniflorus

1. L. virginicus L. Common. In damp soil of open woods and along streams. 740.

2. Scutellaria L., Skullcap
   A. Racemes one-sided..............1. S. lateriflora
   A. Racemes not one-sided............2. S. integrifolia


3. Monarda L., Horsemint

4. Agastache Clayton, Giant Hyssop

5. Glechoma L., Ground Ivy

6. Nepeta L., Catmint
7. *Cunila* L., Dittany


8. *Hedeoma* Persoon, Mock Pennyroyal


9. *Salvia* L., Sage


10. *Collinsonia* L., Horsebalm


11. *Prunella* L., Self Heal


12. *Satureja* L.


13. *Pycnanthemum* Michaux


Solanaceae - Nightshade Family

A. Fruit a berry, not enclosed by the calyx; corolla white to purple.....................1. *Solanum*

A. Fruit enclosed in an inflated calyx; corolla yellow...

.........................2. *Physalis*

1. *Solanum* L., Nightshade

A. Plants armed with short spines....1. *S. carolinense*

A. Plants not armed.....................2. *S. americanum*

* 1. *S. carolinense* L., Horse Nettle. Local to grassy openings in the picnic grounds. 1230.

2. **Physalis L., Ground Cherry**


Scrophulariaceae - Figwort Family

A. Stamens 5..................................................1. **Verbascum**
A. Stamens 2 or 4..............................................B
B. Stamens 2....................................................C
C. Fruits notched at the apex.......................2. **Veronica**
C. Fruits not notched at the apex......................D
D. Calyx 2-bracteolate...............................3. **Gratiola**
D. Calyx not subtended by bracts............4. **Lindernia**
B. Stamens 4..................................................E
E. Leaves alternate.................................5. **Pedicularis**
E. Leaves opposite..................................F
F. Upper corolla lip enclosing and concealing the stamens......................6. **Melampyrum**
F. Upper corolla lip never enclosing the stamens............................................G
G. Flowers yellow..............................7. **Aureolaria**
G. Flowers not yellow...............................H
H. Flowers green to brown..................8. **Scrophularia**
H. Flowers lavender to blue......9. **Penstemon**

1. **Verbascum L., Mullein**

A. Flowers yellow; plant densely woolly.1. **V. thapsus**
A. Flowers white; plant glabrous........2. **V. blattaria**


2. **Veronica L., Speedwell**

A. Flowers solitary in the leaf axils..............B
B. Leaves and stem glabrous or glandular-puberulent; flowers white........1. **V. peregrina**
B. Leaves and stem pilose; flowers violet-blue........2. **V. arvensis**
A. Flowers in bracted racemes......................C
C. Racemes terminal..................................3. **V. serpyllifolia**
C. Racemes on lateral branches........4. **V. officinalis**


3. **Gratiola** L., Hedge Hyssop
   

4. **Lindernia** All., False Pimpernel
   
   A. Pedicels obviously surpassing the subtending leaves........................1. *L. anagallidea*
   
   A. Pedicels more or less equal to their subtending leaves........................2. *L. dubia*
   
   

5. **Pedicularis** L., Lousewort
   

6. **Melampyrum** L.
   

7. **Aureolaria** Raf., False Foxglove
   

8. **Scrophularia** L., Figwort
   

9. **Penstemon** Mitchell, Beardtongue
   
Orobanchaceae - Broomrape Family

A. Stems much branched..................1. Epifagus
A. Stems single or few-branched..................B
B. Single flower per stem; calyx equally 2-lipped.....
   2. Orobanche
B. Numerous flowers on a fleshy spike; calyx with larger upper lip than lower..........3. Conopholis

1. Epifagus Nuttall, Beechdrops

2. Orobanche L., Broomrape

3. Conopholis Wallroth, Squawroot

Plantaginaceae - Plantain Family

Plantago L., Plantain

A. Leaves linear..........................1. P. aristata
A. Leaves lanceolate to broadly ovate..................B
B. Spikes cylindrical................................C
   C. Leaves elliptic or ovate, glabrous; pyxis 4-18 seeded........2. P. rugelii
   C. Leaves spatulate or obovate, hirsutulous; pyxis 2-seeded..........3. P. virginica
B. Spikes ellipsoid..................................4. P. lanceolata

Rubiaceae - Madder Family

A. Principal cauline leaves opposite. .................. B
B. Fruit a red berry; plant a trailing evergreen herb. .......................... 1. Mitchella
A. Principal cauline leaves opposite. .................. B
B. Fruit a red berry; plant a trailing evergreen herb. .......................... 1. Mitchella
B. Fruit a capsule; plant deciduous. .................. 2. Houstonia
A. Principal cauline leaves whorled. .................. 3. Galium

1. Mitchella L., Partridge Berry

2. Houstonia L.
   A. Upper cauline leaves narrowly linear, to 3 cm long. .................. 1. H. tenuifolia
   A. Upper cauline leaves oblong to elliptic, rarely over 1 cm long. .................. 2. H. caerulea

3. Galium L., Bedstraw
   A. Fruit bristly or pubescent. .................. B
   B. Principal cauline leaves in whorls of 6. .................. 1. G. triflorum
   .......................................................... 1. G. triflorum
   B. Principal cauline leaves in whorls of 4. .................. 2. G. circaeans
   .......................................................... 2. G. circaeans
   A. Fruit smooth. .......................... C
   C. Leaves blunt, without a terminal bristle. .................. 3. G. tinctorium
   C. Leaves cuspidate. .................................. 4. G. concinnum

Caprifoliaceae - Honeysuckle Family

A. A vine; corolla strongly bilabiate.........1. Lonicera
A. Shrubs; corolla urceolate or rotate ............. B
B. Leaves simple ...................................2. Viburnum
B. Leaves compound .................................3. Sambucus

1. Lonicera L., Honeysuckle


2. Viburnum L.


3. Sambucus L., Elder


Dipsacaceae - Teasel Family

1. Dipsacus L., Teasel

1. D. sylvestris Hudson. Rare. Among thick Lespedeza on the dam. 771. (Europe).

Campanulaceae - Bluebell Family

A. Corolla zygomorphic ..............................1. Lobelia
A. Corolla regular .................................. B
B. Flowers in axils of clasping leaves ...2. Specularia
B. Flowers terminal or in axils of petiolate or base-tapered leaves .........................3. Campanula

1. Lobelia L., Lobelia

A. Hypanthium much inflated in fruit; flowers 6-10 mm long ..................1. L. inflata
A. Hypanthium not inflated; flowers 4-6 mm long ..............2. L. spicata

2. Specularia Heister, Venus' Looking Glass


3. Campanula L., Bellflower

A. Inflorescence a loose panicle.....1. C. divaricata
A. Inflorescence spiciform.........2. C. americana


Asteraceae - Aster Family

A. Heads ligulate; plant juice milky.........................B
  B. Pappus mostly of chaff or scales.....................C
      C. Flowers yellow or orange......................1. Krigia
      C. Flowers blue....................................2. Cichorium
  B. Pappus of bristles or capillary hairs...............D
      D. Pappus plumose..................................3. Tragopogon
      D. Pappus not plumose..............................E
          E. Achenes spinulose.........................4. Taraxacum
          E. Achenes not spinulose......................F
          F. Achenes flat................................5. Lactuca
          F. Achenes not flat............................G
              G. Flowers white or creamy................6. Prenanthes
              G. Flowers yellow..........................7. Hieracium
  A. Heads radiate or discoid...............................H
    H. Heads discoid....................................I
      I. Disc flowers yellow............................8. Bidens
      I. Disc flowers white, cream or purple............9. J
          J. Receptacle bristly or chaffy................K
          K. Pappus of scales, awns or broistles.....L
              L. Stem and/or leaves armed with spines...
                      .....................................9. Carduus
              L. Stem and leaves without spines..........M
                  M. Involucral bracts hooked at the tip...
                          ......................................10. Arctium
                  M. Involucral bracts pectinate at the tip
                          .......................................11. Centaurea
          K. Pappus none................................12. Ambrosia
          J. Receptacle naked..............................N
              N. Plants with white, woolly pubescence....O
                  O. Stem leafy; plants monoecious..........13. Gnaphalium
                  O. Leaves mostly basal; plants dioecious...
                          .....................................14. Antennaria
              N. Plants without white, woolly pubescence..P
P. Involucral bracts imbricate..............15. Eupatorium

P. Involucral bracts in a single series....

..........................16. Erechtites

H. Heads radiate........................................Q
Q. Rays yellow or orange..................................R

R. Receptacle chaffy........................................S

S. Leaves opposite.........................................T

T. Receptacle conic.......................................17. Heliopsis

T. Receptacle flat........................................U

U. Involucral bracts in one similar series.........18. Helianthus

U. Involucral bracts in two dissimilar series......8. Bidens

S. Leaves alternate........................................19. Rudbeckia

R. Receptacle naked........................................V

V. Pappus of scales.......................................20. Helenium

V. Pappus of capillary bristles.........................W

W. Involucral bracts uniseriate and equal.

X. Heads on scapes in the early spring
with the large basal leaves developing later........21. Tussilago

X. Heads on leafy stems...22. Senecio

W. Involucral bracts imbricate in several series....23. Solidago

Q. Rays white or creamy....................................Y

Y. Receptacle chaffy....................................Z

Z. Leaves opposite........................................24. Galinsoga

Z. Leaves alternate.......................................AA

AA. Ligules 6-13 mm long.................................25. Anthemis

AA. Ligules 1-5 mm long.................................26. Achillea

Y. Receptacle naked........................................BB

BB. Pappus chaffy...................................27. Chrysanthemum

BB. Pappus of capillary bristles......................CC

CC. Phyllaries imbricate.................................28. Aster

CC. Phyllaries in a single, equal series
or calyculate..........................29. Erigeron

1. Krigia Schreber, Dwarf Dandelion

* 1. K. virginica (L.) Willd., Dwarf Dandelion. Rare.
   In soil of anthill at the stream by the picnic area. 207.

2. Cichorium L., Chicory

3. *Tragopogon* L., Goatsbeard


4. *Taraxacum* Wiggers, Dandelion

A. Achenes reddish; leaves dissected nearly to the midrib. .......................... 1. *T. erythrospermum*

A. Achenes brown; leaves usually not dissected to the midrib. .......................... 2. *T. officinale*


5. *Lactuca* L., Lettuce

A. Flowers blue; achenes without long, filiform beaks. ........................................ 1. *L. floridana*

A. Flowers yellow; achenes with long, filiform beaks ........................................ B

B. Margins and midribs of leaves prickly ................................................................. 2. *L. scariola*

B. Margins of leaves not prickly ................................................................. C

C. Achenes with at least 3 prominent ribs .............................................................. 3. *L. saligna*

C. Achenes with only one prominent median nerve ...................................................... 4. *L. canadensis*


6. *Prenanthes* L., Rattlesnake Root


7. *Hieracium* L., Hawkweed

A. Plants without a basal rosette of leaves; stem leafy ........................................ 1. *H. paniculatum*

A. Plants with a basal rosette persisting through anthesis; scapose ........................................ B
B. Stems glabrous; plants of deciduous woods

2. H. venosum

B. Stems pubescent, at least near the base; plants of fields and meadows

C. Heads solitary, rarely two per scape; plants not more than two dm tall

3. H. pilosella

C. Heads several to many; plants frequently taller than two dm

4. H. pratense


8. Bidens L., Beggar Ticks

A. Heads conspicuously radiate with rays well-developed and 1 cm long or more

1. B. polylepis

A. Heads discoid or with ligules 6 mm long or less

B. Leaves simple

2. B. tripartita

B. Leaves 1 or 2-pinnate

C. Leaflets toothed; achenes broad and flattened

3. B. frondosa

C. Leaflets pinnate; achenes linear-cylindric

4. B. bipinnata


2. B. tripartita L. Occasional. Fields, especially in damp soil. 800.


9. Carduus L., Thistle

A. Pappus bristles not plumose

B. Heads several, ascending

1. C. acanthoides

B. Heads solitary, nodding

2. C. nutans

A. Pappus bristles plumose

C. Leaves green on both sides

D. Stems arachnoid; heads including corollas more than 3.5 cm long

3. C. pumilus

B. Stems glabrate; heads including corollas less than 3 cm long

4. C. arvensis

C. Leaves white-tomentose below

D. Stems winged by decurrent leaf bases

5. C. lanceolatus
E. Stem not winged................6. C. discolor


10. Arctium L., Burdock


11. Centaurea L., Star Thistle

* 1. C. maculosa Lam., Spotted Knapweed. Rare. Grassy field on Shenandoah Mountain. 650. (Europe).

12. Ambrosia L., Ragweed

1. A. artemisiifolia L. Occasional. Open areas. 914.

13. Gnaphalium L., Everlasting


14. Antennaria Gaertner, Pussy Toes

A. Basal leaves 1-nerved.............1. A. virginica
A. Basal leaves 3-5 nerved.......2. A. plantaginifolia

1. A. virginica Stebbins. Uncommon. Open, rocky slopes at the higher elevations. 1053.

15. Eupatorium L., Thoroughwort

A. Flowers purple; leaves whorled........1. E. fistulosum
4. Flowers white; leaves opposite........2. E. rugosum

16. **Erechtites** Raf., Fireweed


17. **Heliopsis** Persoon, Ox Eye


18. **Helianthus** L., Sunflower


19. **Rudbeckia** L., Coneflower


20. **Helenium** L., Sneezeweed


21. **Tussilago** L., Coltsfoot


22. **Senecio** L., Groundsel

A. Basal leaves cordate.........................1. **S. aureus**
A. Basal leaves obovate.......................2. **S. obovatus**


A rayless form was found in dry, deciduous woods near the picnic grounds. Rare. 1261.
23. *Solidago* L., Goldenrod

A. Rays white, or predominately so........1. *S. bicolor*
B. Rays yellow...........................................B
C. Heads secund...........................................C
D. Basal leaves significantly larger than the upper cauline leaves........................D
E. Stem glabrous, at most sparingly pubescent above..............................................E
F. Upper leaves entire...............................2. *S. juncea*
G. Upper leaves serrate.............................3. *S. arguta*
H. Stems cinereous-puberulent....................4. *S. nemoralis*
I. Basal leaves barely exceeding the upper cauline leaves...............................F
J. Leaves pinnately veined.................5. *S. rugosa*
K. Leaves 3-nerved.................................6. *S. altissima*
L. Heads not secund..............................7. *S. curtisii*
M. Stem leaves gradually reduced in size up the stem...........................................G
N. Stem glabrous......................................7. *S. puberula*
O. Stem minutely puberulent..................8. *S. curtisii*
P. Stem leaves very unequal, not gradually reduced upward.................................9. *S. roanensis*


24. *Galinsoga* R. & P.

A. Ligules with pappus scales; plants copiously pubescent................1. *G. ciliata*
B. Ligules without pappus scales; plants sparsely pubescent.............2. *G. parviflora*


25. **Anthemis L.**, Chamomile


26. **Achillea L.**, Yarrow


Forma rosea Rand. & Redf. was found trailside on Hone Quarry Ridge. Rare. 706.

27. **Chrysanthemum L.**, Chrysanthemum


28. **Aster L.**, Aster

A. Basal leaves both cordate and petioled..............B
B. Inflorescence corymbiform..........................C
C. Bracts and peduncles glandular....................1. *A. macrophyllus*
C. Bracts and peduncles not glandular...............2. *A. divaricatus*
B. Inflorescence paniculiform.......................D
D. Stem leaves cordate-clasping; leaf margins wavy .....................3. *A. undulatus*
D. Stem leaves not cordate-clasping..................4. *A. cordifolius*
A. Basal leaves not both cordate and petioled....E
E. Achenes glandular...............................5. *A. acuminatus*
E. Achenes not glandular, but glabrous or hairy..F
F. Leaves strongly auriculate-clasping.............G
G. Stem leaves toothed...6. *A. prenanthoides*
G. Stem leaves entire...........................7. *A. laevis*
F. Stem leaves scarcely or not auriculate-clasping...........................................H
H. Phyllaries cartilaginous; achenes densely sericeous................8. *A. paternus*
H. Phyllaries not cartilaginous; achenes glabrous or sparingly pubescent........I
I. Phyllaries subulate.........9. *A. pilosus*
I. Phyllaries acute to obtuse......................10. *A. vimineus*


29. *Erigeron* L., Fleabane

A. Heads approximately 0.5 cm broad. 1. *E. canadensis*

B. Pappus of ray flowers of long bristles. 2. *E. pulchellus*

C. Heads few (1-5); rays about 50. 3. *E. philadelphicus*

D. Stems spreading-pubescent below; leaves usually more than 1 cm wide. 4. *E. annuus*

D. Stems glabrous or appressed pubescent below; leaves usually less than 1 cm wide. 5. *E. strigosus*


VITA

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