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Vascular Flora of the College Woods, the College of William and Mary, James City County, Virginia

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VASCULAR FLORA OF THE COLLEGE WOODS, THE COLLEGE OF WILLIAM AND MARY, JAMES CITY COUNTY, VIRGINIA

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A very special word of appreciation goes to my husband, Charlie, for his constant support and for enduring the chiggers and enjoying the flora of the College Woods with me.

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VASCULAR FLORA OF THE COLLEGE WOODS

ABSTRACT

The College Woods is a 900 acre tract of land located west of Williamsburg, James City County, Virginia. Collections of the vascular flora were made at weekly intervals during the growing season March 1968 - April 1969. Specimens were identified to species and deposited in the herbarium of the College of William and Mary.

A total of 545 taxa representing 324 genera of 105 families are herein recorded. New state, coastal plain and county records have been noted. Keys to families, genera and species, with data on abundance and habitat for each species are presented.

Five major plant communities were recognized: Matoaka Lake, upland woods, wooded ravines, bottomlands and cleared uplands. Each of these communities is described and ecological data on geology, soil and climate are discussed.

INTRODUCTION

The flora of eastern Virginia was first explored in the early 18th century by John Banister, John Clayton and John Mitchell. The first extensive collections from the state were those of John Clayton who botanized in and around Gloucester County. Gronovius described Clayton's specimens in the first flora of Virginia (Flora Virginica 1739) and later, Linnaeus in Species Plantarum (1753) named many new species from these specimens and from the Gronovian descriptions (Fernald and Griscom, 1935).

Between that time and the mid-1900's little interest was shown in Virginia flora except occasionally by visiting botanists. In 1920-1921 E. J. and Eileen W. Grimes studied the flora of the Virginia peninsula bounded by the York River, James River and Chesapeake Bay (and including James City County). A list of 1052 species which occurred in the area was published by Eileen Grimes after her husband's death and her remarriage to Erlanson. (Erlanson, 1924). M. L. Fernald and his colleagues made several collecting trips to southeastern Virginia during 1934-1950. They explored both the inner and outer coastal plain, but most of their collecting was confined to areas south of the James River.

The recent increase in publications by local botanists on the distribution and occurrence of plant taxa in Virginia indicates renewed interest in the state flora. The first comprehensive work on Virginia flora, published by Massey (1961), is an annotated catalogue of over 3500 taxa and their recorded distribution in the counties of Virginia.

However, herbarium specimens were not always available to support these distribution records. Lack of such voucher specimens and incompleteness of county distribution records in this publication indicates that few areas in Virginia have been thoroughly studied botanically.

The purpose of the present study was to conduct a detailed taxonomic survey of the vascular flora of the College Woods of the College of William and Mary, James City County, in southeastern Virginia. Species listed are supported by specimens deposited in the herbarium of the College of William and Mary. Keys leading to the identification of species have been prepared and annotated with data on frequency and habitat.

Data from this study will be useful in the future to determine distributional and successional changes in the local flora. Locations of rare and interesting species in the Woods will be known for conservation purposes.

The information obtained from this study will be made available to the Flora Committee of the Virginia Academy of Science. This committee is actively promoting floristic studies within the state, and is currently attempting to compile a comprehensive state flora. Duplicate specimens will be contributed to the University of North Carolina through its exchange program with the College of William and Mary.

CHAPTER I

METHODS

Field work for this study began in March 1968 and continued through April 1969. Collections were made at least weekly during the growing season.

Most plants were collected in flower or fruit; however, some sterile specimens were collected if they could be recognized by vegetative characters. Each collection was dated and assigned a collection number in the field. Data on locality, habitat and vegetation association was also noted.

Specimens were brought from the field in plastic bags, placed in a plant press and dried in a heated drying cabinet (110°F) according to standard herbarium techniques. Specimens were then identified and deposited in the herbarium of the College of William and Mary.

On 16 March 1969, soil samples were taken with a tube soil auger in five major habitat areas: mixed woods, pine woods, open bottomland, a ravine and cutover area. Twenty eight-inch samples were collected in each area and combined to form a composite sample. Two half-pint samples were taken from each composite sample and submitted to the Soil Testing Laboratory, Virginia Polytechnic Institute, Blacksburg, Virginia, for analysis.

Nomenclature and sequence of plant taxa correspond to that of Fernald (1950). When possible, species were keyed to variety. In some

instances this was not feasible because of the lack of mature material or extreme variability among specimens collected from a given location.

Common names were derived chiefly from Fernald (1950) and Gleason (1952). The generic common name was applied when popularly used.

The keys presented here have been adapted from Fernald (1950) and Gleason (1952). Keys to Gramineae were derived from Weishaupt (in Braun, 1967). Chapter V is a general key to families; chapter VI provides keys to the genera and species of each family. Following each species are notes on typical habitat, relative abundance and the collection number. The latter represents a specimen (or specimens) of that species which was collected at a specific location on a specific date. Three species were collected in the Woods by persons other than the writer. These species were annotated with the name of the collector, his collection number and the date of collection.

The following categories of abundance were used: abundant, common, occasional, rare. Although this method is subjective, it helps suggest relative number of each species in the Woods.

An asterisk (*) preceding the binomial name indicates that this species was not reported by Erlanson (1924) for the Virginia peninsula; a plus (+) indicates that the species was not reported by Massey (1961) for James City County. New state records, coastal plain records and range extensions are also noted.

CHAPTER II

HISTORICAL BACKGROUND

Pre-colonial forests in Virginia were composed mainly of mature hardwoods. Upland forests were predoninantly of hickory, walnut, yellow poplar, beech, maple, oak and chestnut, while in the lowlands poplars, pine, sweetgum, cedars and cypress were common, (Beverley, 1947). Maxwell (1910) states that, at the time of discovery, pine was confined to the immediate coast and to areas near the mouths of large rivers.

Indians significantly influenced vegetation patterns in Virginia prior to colonization. They consistently burned the forests to eliminate underbrush and to clear large tracts of land, some of which were used for cultivation. Maxwell (1910), in describing the forests of Tidewater Virginia states:

> If any considerable regions of Virginia, except swamps too damp to burn, had escaped repeated visitations by fire, the early explorers failed to make note of them. Complete destruction of forests by fire had already occurred over tracts aggregating hundreds of square miles, and undergrowth had been injured or destroyed almost everywhere in the regions early explored.

This absence of understory and shrub strata was one of the most notable features of early Virginia forests. It was accompanied by an increased growth of grass, nuts, berries and grapes which caused game to congregate and facilitated hunting. At the time of colonization cleared plots of land existed on the Virginia coastal plain; some of these were two to three thousand acres in area (Maxwell, 1910).

The present site of Williamsburg was first settled in 1633 as a

small stockaded settlement called Middle Plantation. It was established as the City of Williamsburg and the capital of Virginia in 1699, and continued as the colonial capitol until 1780 (Stevens, 1938).

Matoaka Lake, a colonial mill pond, was previously called Jones' Mill Pond, and Ludwell's Mill Pond. It is thought to have been constructed by Thomas Ludwell who immigrated to Virginia in 1646 (Greer, 1960). The exact construction date is not known, but Ludwell's Mill was mentioned in a will in 1703 (Tyler, 1905).

Most of the land comprising the College Woods was acquired by the College of William and Mary in sections during the period 1923-1929. Since that time areas of the Woods east of Matoaka Lake have been partially absorbed by the expanding William and Mary campus. In the spring of 1965, much of the natural vegetation in the west, northwest and southwest portions of the Woods was destroyed by a lumber company, on contract with the College, which nonselectively cut and cleared extensive areas. The Department of Biology has now been given jurisdiction over much of the Woods for educational uses.

CHAPTER III

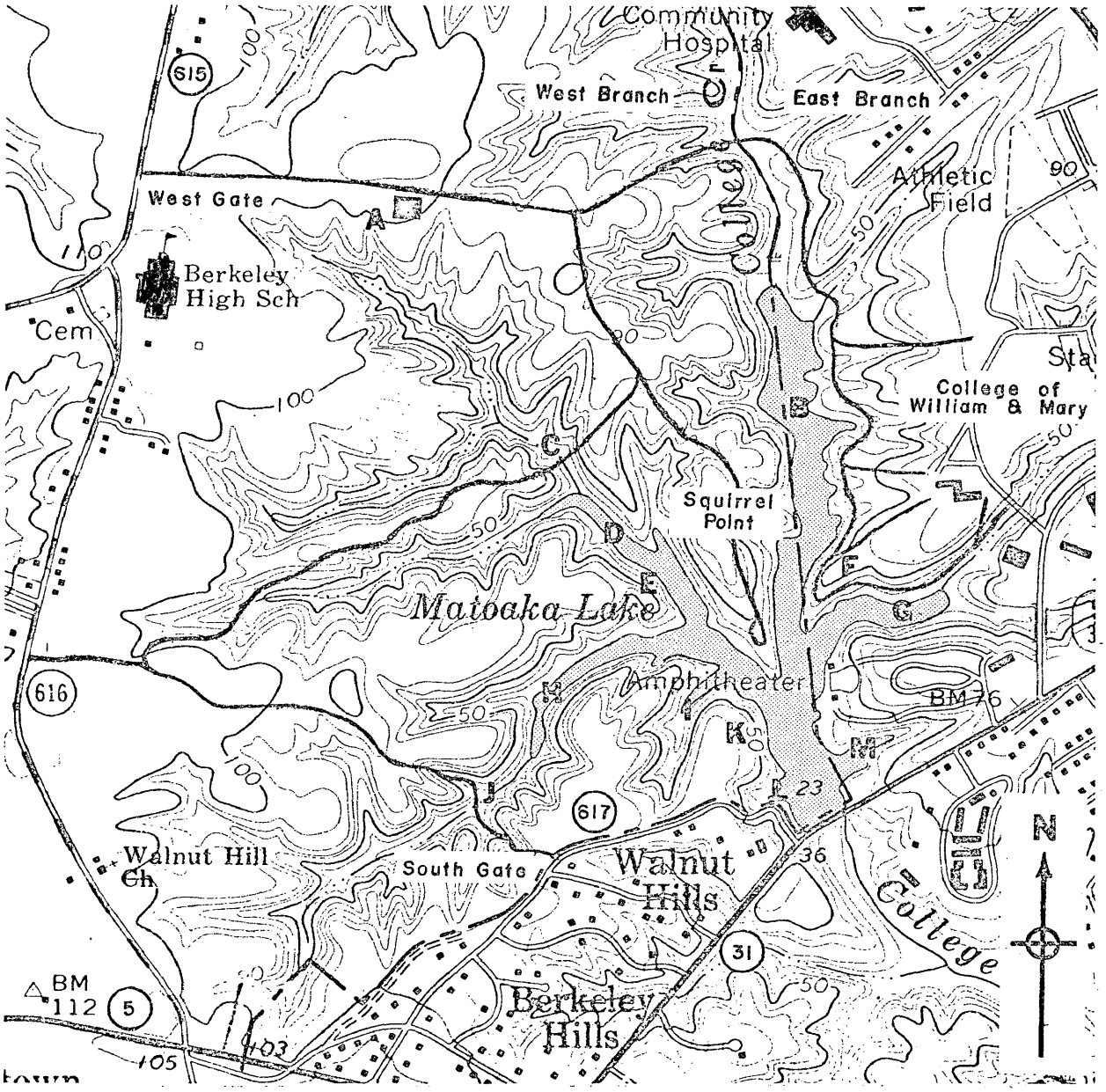
REGIONAL ENVIRONMENTAL CONDITIONS

Location and Description

The College Woods of the College of William and Mary is located west of Williamsburg in James City County, Virginia. The Woods is bounded on the east by the campus of the College of William and Mary, on the southeast by Jamestown Road (Va. Rt. 31) and on the southwest by Mill Neck Road (Va. Rt. 617), Berkeley Lane and Virginia Route 5. The western boundary is formed by Strawberry Plains Road (Va. Rt. 616) and Iron Bound Road (Va. Rt. 615). Because there is no artificial boundary in the northern section, this line is less well defined. The northern boundary is determined by a straight line between Iron Bound Road and a point just south of the Williamsburg Community Hospital, through the West and East Branches of the Main Ravine (Fig. 1).

The Woods, approximately 900 acres in area, is composed of three main habitat types: Matoaka Lake, wooded areas, and cutover sections which are now in various stages of secondary succession. Wooded land in the north, east and southeast is dissected by numerous steep ravines which radiate from the arms of the lake. Cutover areas in the northwest, west, and southwest are relatively level uplands which are characterized by scattered trees and discontinuous shrub-herb vegetation.

Matoaka Lake is an artificial impoundment which was formed by damming College Creek just north of Jamestown Road. It is a shallow


Community Hospital
West Branch
East Branch
615
West Gate
Athletic Field
Berkeley High Sch
Cem
College of William & Mary
Squirrel Point
Matoaka Lake
Amphitheater
BM 76
616
617
Walnut Hill Ch
South Gate
Walnut Hills
College
31
BM 112
5
Berkeley Hills
N
0
1/2
1 mile

eutrophic lake rapidly being filled in by erosion from adjacent cleared areas. It has a surface area of about fifty acres and is a maximum of twenty feet deep. The lake is fed by College Creek and numerous small streams which also drain the surrounding watershed. Below the dam, College Creek shortly becomes estuarine before entering the James River.

Geology and Topography

James City County is located on the Virginia Inner Coastal Plain, a low unglaciated, terraced plain. Coastal Plain deposits are the youngest geological formation in Virginia. They are primarily marine sediments (sand, silt and clay) which were deposited during the Cretaceous, Tertiary and Quaternary periods (Devereux et. al., 1962). The oldest exposed units in the Williamsburg area are the St. Mary's and Yorktown formations. These beds were deposited in the late Tertiary and contain an extensive fossil fauna. The most recent deposit, known as the Elberon formation, is a marine unit 10-20 feet thick. It is basically sand, but contains much silt and clay locally and is thought to be of Pleistocene origin (Geology Dept. publication, 1967).

Fossiliferous shell outcrops occur in the Williamsburg area, including the College Woods. Paleontological evidence indicates that these deposits are probably of Miocene origin (McLean, 1956).

Elevation of the Coastal Plain ranges from sea level in the east to 250 ft. above sea level at the fall line. In the College Woods elevation at the lake shore is 10-20 feet above sea level; in the west and northwest portion it reaches 100 feet above sea level, giving an area relief of 80-90 feet.

Soil

Coastal Plain soils are composed of marine deposits of sand, silt and clay, and of sediments eroded from pre-existing soils in the Piedmont and Blue Ridge areas (Devereux et. al., 1962).

Three principal soil types occur in the Chesapeake Bay Region of Virginia. Sassafras and Woodstown are gray-brown podzolic soils developed from sandy loam materials, and are typically well drained. Othello is a low humic gley soil developed from heavier materials such as clay or sandy clay loam and is generally poorly drained. All three soil types are usually underlain by sandy substrata (Devereux, et. al., 1965).

Samples analyzed from the College Woods show that soils from upland areas, mixed woods, pine woods and cutover sections, were slightly acidic and low in all soil minerals. Soil in mixed woods and cutover areas had a relatively high organic content. Organic content of soil from pine woods was low, probably because pine woods characteristically have a sparse understory and herb layer (Table 1).

Soil from lowland areas, bottomlands and the ravine was less acidic and contained considerably larger concentrations of calcium and magnesium, possibly because these minerals leached from the uplands. Organic debris accumulates in low areas, resulting in soil with a high organic content (Table 1).

Climate

The climate of Virginia is a warm temperate type which is tempered in the eastern part of the state by the Atlantic Ocean and the Chesapeake Bay. Summers are warm and humid, winters are relatively mild. Although freezing temperatures may be expected during the winter season, they rarely occur for extended periods.

TABLE 1.

Results of soil analysis*

		pH	Calcium	Magnesium	Organic Matter	Phosphoric Acid	Potash
Upland	(Mixed Woods	4.9	L	L	2.3	L	L
	(Pine Woods	5.1	L+	M	1.3	L-	L
	(Cutover	4.9	L	L	2.2	L-	L
Lowland	(Bottomlands	7.0	VH	M	3.0	L	L
	(Ravine	5.5	H+	H+	2.6	L	M

Symbol	Minerals	Organic Matter
VH	Very High	Above 3%
H	High	2-3%
M	Medium	1-2%
L	Low	Below 1%

*Average of results from 2 samples analyzed from each habitat.

The average dates of the first and last killing frost are respectively October 30 and April 18; thus the mean length of the growing season is 195 days (Table 2). The twenty-five year annual mean for air temperature is 56.1° with an annual average range of 7.7° to 97.9° (Table 2).

Precipitation is generally well distributed throughout the growing season. Lack of both a summer drought and a winter dry season is typical in this area, and rainfall is slightly heavier during the summer months (Table 3). The twenty-five year annual mean for precipitation is 45.5 in. with an annual variation of 29.6-58.2 in. (Table 3).

TABLE 2.

Summary of the climatological data,
Williamsburg, Virginia*

	TEMPERATURE (°F)			PPT	GROWING SEASON		
	mean	high	low	total annual (in.)	last spring min. of 32°	first fall min. of 32°	# days between these dates
1944	58.4	102	3	41.92	4/6	10/16	195
1945	58.8	99	9	57.78	5/2	10/16	167
1946	59.5	95	10	43.46	4/18	11/14	209
1947	57.9	97	9	33.21	5/11	11/13	186
1948	58.4	97	2	49.48	4/23	10/19	179
1949	60.1	96	16	38.39	4/20	11/6	200
1950		96			5/9	10/27	171
1951		98					
1952		104	9	44.80	4/8	10/20	195
1953	57.6	100	13	45.73	4/22	11/7	199
1954	59.3	103	9	37.30	4/4	11/1	211
1955	58.8	98	6	48.61	4/9	10/25	199
1956	59.1	99	14	48.27	4/25	11/11	200
1957	59.3	99	3	52.95	4/16	10/28	195
1958	56.8	95	3	58.24	4/4	11/8	218
1959	60.0	103	8	44.80	4/5	11/10	219
1960	57.6	98	9	57.73	4/20	11/7	201
1961	58.4	95	8	49.88	4/21	11/9	202
1962	57.6	95	6	48.63	4/17	10/25	191
1963	57.3	97	6	44.82	3/24	10/31	221
1964	58.7	98	8	47.11	4/10	10/12	185
1965	58.3	96	3	29.62	4/5	10/6	184
1966	57.4	98	6	41.04	5/11	10/31	173
1967	57.3	94	10	43.38	4/13	10/29	199
1968	57.9	97	7	40.50	5/7	10/30	176

*Compiled from U. S. Dept. of Commerce, Weather Bureau. 1944-1968. Virginia climatological data. Vol. 54-78.

TABLE 3.

Five year averages of monthly precipitation (in.), Williamsburg, Virginia

	1944-1948	1949-1953	1954-1958	1959-1963	1964-1968
January	3.51	2.82	3.58	3.37	3.97
February	3.55	3.17	4.15	3.61	3.66
March	2.81	3.56	4.15	4.14	3.78
April	2.92	2.94	3.04	3.13	2.38
May	4.29	3.63	4.36	5.98	2.81
June	3.66	2.72	4.88	4.91	4.50
July	5.92	4.75	4.38	5.57	5.71
August	4.23	4.94	6.29	3.29	3.92
September	4.73	3.46	3.57	4.03	2.89
October	2.20	1.84	3.86	3.84	2.29
November	3.81	2.65	2.68	4.04	1.87
December	3.30	2.93	3.71	3.26	3.42

*Compiled from U. S. Dept. of Commerce, Weather Bureau. 1944-1968. Virginia climatological data. Vol. 54-78.

CHAPTER IV

VEGETATION PATTERNS

The present vegetation of the College Woods can be arbitrarily divided into five major categories: Matoaka Lake, wooded uplands, wooded ravines, bottomlands, and cleared areas. Each of the communities typical of these habitats is characterized below.

Matoaka Lake

Matoaka Lake is bordered by a shrub zone dominated by Alnus serrulata and Myrica cerifera. Other woody species occurring in this association are Salix nigra, Carpinus caroliniana and Platanus occidentalis. The only herbaceous species commonly present along the shoreline is the emergent aquatic Decodon verticillatus. This community forms a narrow thicket which is confined to the shore and to the mouths of streams entering the lake. In most situations typical woodland vegetation occurs directly behind the shrub community.

The submerged aquatics Potomogeton crispus, Elodea canadensis, Najas flexilis and Ceratophyllum demersum occur in very shallow water along the shoreline and in the coves. The growth of submerged vegetation is limited by the loosely packed silt substrate and reduced light penetration caused by silt and algae suspended in the water. Floating duckweeds Spirodela polyrhiza, Lemna minor, Wolffia punctata and W. papulifera are abundant around the shoreline, especially in late summer.

A zone of emergent aquatics Hydrocotyle ranunculoides, Myosotis laxa

and Nasturtium officinale occurs in the Main Cove where College Creek enters the lake. Behind this zone is a mat of rice cutgrass, Leersia oryzoides, and a thicket of Salix nigra, Rosa palustris and Alnus serrulata. This association of emergent aquatics occurs only in the Main Cove.

Wooded Uplands

Canopy species in wooded areas east of Matoaka Lake, on Squirrel Point, and in areas adjacent to the lakeshore in the west are predominantly deciduous. Pine is increasingly important in the canopy in upland areas in the extreme west and northwest. North and northeast of Berkeley High School the canopy is exclusively pine.

Dominating the canopy in mixed woods are Quercus alba, Liriodendron tulipifera, Pinus taeda, P. echinata, Fagus grandifolia and Quercus falcata. Other common tree species include: Quercus rubra, Carya spp., Liquidambar styraciflua and Pinus virginiana. Major understory species are: Cornus florida, Acer rubrum and Ilex opaca. Cercis canadensis and Amelanchier canadensis are not as common in the understory, but are conspicuous in early spring. Saplings are predominantly Carya spp., Quercus spp., Liriodendron tulipifera and Liquidambar styraciflua.

A rather sparse shrub layer including Myrica cerifera, Euonymus americanus, Viburnum acerifolium, Vaccinium spp. and Rhus spp. is characteristic of the mixed woods. Common herbaceous species are Podophyllum peltatum, Mitchella repens, Chimaphila maculata, C. umbellata, Anemone virginiana, Geum canadense, G. virginianum, Cynoglossum virginianum. Luzula spp., Erigeron pulchellus, Houstonia caerulea, Hieracium venosum and Antennaria spp. typically occur along trails in the woods. In late summer and fall Tipularia discolor, Goodyera pubescens, Monotropa uni-

flora, Epifagus virginiana and Euphorbia corollata are frequent.

Pinus taeda and Pinus echinata, occasionally in association with Pinus virginiana, form the canopy in the pine woods. An understory layer is not developed, and shrubs and herbs are sparse. Lonicera japonica is abundant along the borders and also extends into the interior. Vaccinium spp., Gaylussacia spp., Chimaphila maculata and C. umbellata are the only other species common in this community. Uncommon herbs found only in pine, or predominantly pine woods include Tephrosia virginiana, Aster gracilis, Andropogon ternarius, Galium uniflorum, Liparis lilifolia and Corallorhiza odontorhiza.

Wooded Ravines

Ferns, such as Adiantum pedatum, Woodwardia areolata, Botrychium dissectum and Polystichum acrostichoides, and vernal herbs are more abundant in wooded ravines than in any other habitat. Examples of the latter are Sanguinaria canadensis, Hepatica americana, Asarum virginicum, Arisaema atrorubens, Smilacina racemosa, Polygonatum biflorum, Osmorhiza longistylis, Cryptotaenia canadensis and Viola spp. Grasses which typically occur on the banks include Melica mutica, Uniola laxa, Sphenopholis nitida and Trisetum pensylvanicum. Among the fall flora Aster cordifolius, A. infirmus, A. prenanthoides and Prenanthes altissima are prominent.

A particularly rich ravine extends southwest from Strawberry Plains Cove. Two colonies of the yellow lady-slipper, Cypripedium calceolus, and the only colony of Asarum canadense in the Woods occur here. Ranunculus hispidus, R. recurvatus, Desmodium nudiflorum, Lobelia siphilitica Viola triloba and Viola sagittata are other uncommon species also found here.

An unusual floral association occurs in the shallow ravines just north of the Route 5 entrance. Sphagnum moss occasionally grows along the stream beds, and Medeola virginiana, Magnolia virginiana and large colonies of Osmunda cinnamomea are common along the banks. Kalmia latifolia, Chionanthus virginicus and Viola pallens were noted only in this area. Unfortunately much of the vegetation in the vicinity was destroyed by lumbering activities and the remaining species are exposed to unusually dry conditions.

Bottomlands

Wooded bottomland communities occur in College Creek, and along the stream which enters Mill Neck Cove. Characteristic canopy species include: Fraxinus americana, Acer rubrum, Populus deltoides, Platanus occidentalis, Quercus alba and Liriodendron tulipifera. Other arborescent species commonly present are Salix nigra, Ulmus americana and Carpinus caroliniana. Occasionally Alnus serrulata and Rosa palustris form dense thickets. Typical herbaceous species in this community include: Senecio aureus, Cardamine bulbosa, Saururus cernuus, Polygonum sagittatum, P. setaceum, Amphicarpa bracteata var. comosa, Cinna arundinacea, Glyceria striata and Juncus spp.

Open bottomlands are confined to intermittent openings in the wooded bottomland and swampy areas in Ice House Cove. Vegetation in these communities is extremely dense because of favorable light and moisture conditions. Bidens laevis, Impatiens capensis, and Mikania scandens are dominant in this habitat; Cephalanthus occidentalis, Leersia oryzoides, Juncus spp. and Carex spp. are also common.

Orontium aquaticum, Chelone glabra, Nuphar advena, Caltha palustris and Onoclea sensibilis are uncommon species occurring only in isolated

colonies in College Creek. Ponthieva racemosa, which reaches the northern limit of its range in southeastern Virginia, occurs at several locations in open and wooded bottomland.

Cleared Uplands

This category includes sections cleared by lumbering, the field adjacent to the Physics Laser Station, a small cleared area on Squirrel Point, and open roadsides.

Vegetation in lumbered areas consists predominantly of small shrub and herbaceous species. Rhus copallina, R. glabra, Castanea pumila, Aralia spinosa and Lespedeza spp. are the most conspicuous shrubs. In many areas Vaccinium spp., Rubus spp. and Gaylussacia spp. form a dense ground cover, almost excluding other vegetation. In other areas, exposed mineral soil is prevalent and small herbs such as Lechea racemulosa, Panicum spp., Plantago spp., Hypericum spp., Duchesnea indica, Potentilla canadensis, Clitoria mariana and Trifolium spp. occur in scattered colonies. Throughout cutover areas the grasses Andropogon virginicus, Agrostis alba, Sorghastrum elliottii, S. nutans, Triodia flava and Panicum spp. and the sedges Carex spp. and Bulbostylis capillaris are prevalent. Later in the season, the composites Erechtites hieracifolia, Sonchus asper, Gnaphalium obtusifolium, G. purpureum, Lactuca canadensis, L. floridana, Ambrosia artemisiifolia, Solidago spp. and Aster spp. are prominent. Sassafras albidum, Oxydendron arboreum, Carya spp., Pinus spp. and Quercus spp. are the most common saplings and seedlings; Paulownia tomentosa also occurs occasionally.

The Physics Department formerly maintained a field laboratory northeast of Berkeley High School, with an adjacent plot of mowed field. Veronica arvensis, Geranium carolinianum, Stellaria media, Cynodon

dactylon and Phleum pratense are common in this area. Ailanthus altissima, Robinia pseudo-acacia, Morus alba, Urtica dioica, Ornithogalum umbellatum and Chrysanthemum leucanthemum were noted only in areas adjacent to the mowed field.

The area at the tip of Squirrel Point was once inhabited. Rhododendron, 'Indian Hybrid' f. kaempferi, Rhododendron, 'Indian Hybrid' cl. 'George Lindley Taber', Calycanthus fertilis and Vinca minor occur there, apparently persisting after cultivation. The weedy species Datura stramonium, Phacelia dubia, Veronica peregrina and Coronopus didymus occur on this point and were not noted elsewhere in the woods.

The following weedy species commonly occur along the roadsides: Rumex acetosella, Arabidopsis thaliana, Brassica spp., Barbarea spp., Prenanthes serpentaria, Aster spp., Solidago spp., Andropogon virginicus, Paspalum dilatatum, Setaria glauca and Triodia flava.

CHAPTER V

KEY TO FAMILIES

This key divides taxa into major groups. Within a group, keys lead to families or individual genera within families.

KEY TO GROUPS

a. Plants lacking true flowers; reproducing by spores; moss-like or fern-like..... GROUP I

a. Plants with true flowers; reproducing typically by seeds which are enclosed in an ovary or borne on the scales of a woody cone.....b

b. Plants trees, shrubs, or woody vines..... GROUP II

b. Plants herbaceous.....c

c. Floating aquatics, plant body a globose, lens-shaped or flattened thallus; no distinction of stem and leaf; rarely observed in flower..... 15. LEMNACEAE

c. Rooted aquatic or terrestrial plants without the above characters.....d

d. Flower parts usually 3, or in multiples of 3; leaves commonly parallel-veined; vascular bundles scattered in stem; cotyledon 1. (MONOCOTYLEDONEAE)..... GROUP III

d. Flower parts usually in 4 or 5, or multiples of 4 or 5; leaves commonly net-veined; vascular bundles circumscribing the pith; cotyledons 2. (DICOTYLEDONEAE).....e

e. Corolla absent; calyx present or absent..... GROUP IV

e. Corolla and calyx both present.....f

f. Petals separate or barely united at the base... GROUP V

f. Petals united, forming a gamopetalous corolla. GROUP VI

GROUP I

(Plants lacking flowers; reproducing by spores)

a. Stems jointed; scarious leaves united into a sheath covering the nodes; sporangia borne on peltate sporangiophores; sporangiophores in terminal cones. (Equisetum)..... 1. EQUISETACEAE

a. Stems not jointed; leaves or leaf-like fronds present.....b

b. Leaves simple, narrow, less than 1 cm. broad; stems elongate, aerial; leaves numerous, imbricate on stems, 4 ranked.....c

c. Stems prostrate; leaves 1-2 mm. long; leaves with a ligule; strobiles 4-sided; heterosporous. (Selaginella)..... ..... 3. SELAGINELLACEAE

c. Stems ascending; leaves 7-12 mm. long; leaves without a ligule; strobiles terete; homosporous. (Lycopodium).... 2. LYCOPODIACEAE

b. Leaves (fronds) lobed or dissected, often compound, more than 1 cm. broad; stem a subterranean rhizome or compact crown; fronds relatively few.....d

d. Fertile fronds similar to sterile in form and structure, possibly differing in size; sporangia stalked, with a definite annulus..... 6. POLYPODIACEAE

d. Fertile and sterile fronds dissimilar in form and structure....e

e. Fertile portion of frond forming an erect panicle, subtended by leafy portion; rhizome not well developed, with fleshy

roots. (Botrychium)..... 4. OPHIOGLOSSACEAE

e. Fertile portion terminating the frond or fertile and sterile fronds separate; rhizomes well developed.....f

f. Fertile portions of frond terminating sterile; blades bipinnate, sterile pinnules serrulate. (Osmunda). 5. OSMUNDACEAE

f. Fertile fronds separate from sterile; fronds once-pinnate or lobed.....g

g. Sterile fronds pinnately compound; rhizome stout; sporangia cinnamon-brown. (Osmunda)..... 5. OSMUNDACEAE

g. Sterile fronds simple, pinnately lobed; rhizome slender; sporangia dark brown..... 6. POLYPODIACEAE

GROUP II

(Trees, shrubs and woody vines)

a. Ovules and seeds naked; flowers borne in scaly aments; pistillate aments becoming cones or berry-like; trees with evergreen leaves. (GYMNOSPERMAE)..... 7. PINACEAE

a. Ovules and seeds enclosed in an ovary which develops into a fruit. (ANGIOSPERMAE).....b

b. Leaves opposite, subopposite or whorled.....c

c. Leaves compound.....d

d. Plants trailing or climbing vines.....e

e. Corolla none; calyx of 4 while petaloid sepals; pistils and stamens numerous; leaves with 5 leaflets. (Clematis).. ..... 40. RANUNCULACEAE

e. Corolla campanulate or funnelform, scarlet and orange; 1 pistil; 4 stamens; leaves with 7-11 leaflets or with 2

leaflets and a tendril..... 95. BIGNONIACEAE

d. Trees; calyx 4-cleft; petals wanting; fruit a samara; leaves pinnate with 5 or more leaflets. (Fraxinus).... 83. OLEACEAE

c. Leaves simple.....f

f. Plants trailing or climbing vines.....g

g. Stamens 5; corolla gamopetalous; petals 5; fruit a berry; aerial rootlets lacking; stipule scars present. (Lonicera) ..... 102. CAPRIFOLIACEAE

g. Stamens 20-40; corolla polypetalous; petals 7-10; fruit a capsule; climbing by aerial rootlets; stipule scars lacking. (Decumaria)..... 48. SAXIFRAGACEAE

f. Plants erect, trees or shrubs.....h

h. Leaves serrate, dentate or lobed.....i

i. Leaves palmately veined and lobed.....j

j. Trees; leaves whitened beneath, not punctate, the young ones somewhat pilose; twigs reddish, glabrous; fruit a samara. (Acer)..... 62. ACERACEAE

j. Shrubs; leaves velvety hairy and punctate beneath; twigs velvety; fruit a drupe. (Viburnum)..... ..... 102. CAPRIFOLIACEAE

i. Leaves pinnately veined, not lobed.....k

k. Corolla gamopetalous; fruit a drupe.....l

l. Flowers hypogynous; corolla blue; stamens 4; leaves white-tomentose beneath; fruit a drupe, pinkish or violet in color. (Callicarpa)..... ..... 91. VERBENACEAE

l. Flowers epigynous; corolla white; stamens 5;

leaves not tomentose; fruit a drupe, blue-black in color. (Viburnum)..... 102. CAPRIFOLIACEAE

k. Corolla polypetalous; fruit a capsule.....m

m. Calyx hemispherical; stamens 8-10; styles 2-4; leaves long petioled; fruit a ribbed capsule. (Hydrangea)..... 48. SAXIFRAGACEAE

m. Calyx short and flat; stamens 5, very short, style short or none; leaves almost sessile; capsule warty, crimson when ripe. (Euonymus)..... ..... 61. CELASTRACEAE

h. Leaves entire, not lobed.....n

n. Stamens more numerous than the lobes of the corolla.....o

o. Corolla gamopetalous; leaves evergreen; stamens inserted in pockets of the corolla; corolla light pink. (Kalmia)... ..... 79. ERICACEAE

o. Corolla polypetalous; leaves deciduous.....p

p. Style 1; stamens 10; flowers pink or magenta; trees or aquatic shrubs (lower stem and roots submersed)..... ..... 71. LYTHRACEAE

p. Styles 2 or more; stamens more than 10; flowers yellow or maroon; shrubs of dry habitats.....q

q. Sepals and petals 4 or 5; petals yellow; fruit a capsule; bark not aromatic; leaves 1-5 cm. long; small shrubs to 1.2 m. high.....66. GUTTIFERAE

q. Sepals and petals numerous, similar, maroon; fruit an aggregate of achenes enclosed within the hypanthium; bark aromatic; leaves 6-18 cm. long; large

shrubs to 6 m. high. (Calycanthus).....
..... 43. CALYCANTHACEAE

n. Stamens as many as the corolla lobes or fewer.....r

r. Leaves cordate; corolla zygomorphic, bluish-purple; fruit a woody capsule. (Paulownia)..... 94. SCROPHULARIACEAE

r. Leaves not cordate, corolla actinomorphic.....s

s. Corolla polypetalous (petals sometimes slightly united at the base); fruit a drupe.....t

t. Flowers in erect terminal heads or cymes; petals small, less than 1 cm.; bundle scars 3; leaf veins following leaf edge toward the apex. (Cornus).....
..... 77. CORNACEAE

t. Flowers in axillary drooping panicles; petals elongate, white, 2-2.5 cm. long; bundle scars 1; leaf veins extending to leaf edge. (Chionanthus).....
..... 83. OLEACEAE

s. Corolla gamopetalous; fruit separating into 2 indehiscent carpels; flowers epigynous, white, aggregated in dense spherical heads. (Cephalanthus).. 101. RUBIACEAE

b. Leaves alternate.....u

u. Leaves compound.....v

v. Plants with prickles or thorns.....w

w. Leaves once compound.....x

x. Plants with prickles; flowers actinomorphic, polypetalous; stamens and ovaries numerous. (Rosa, Rubus).. 51. ROSACEAE

x. Plants with thorns; flowers zygomorphic, gamopetalous; stamens 10; ovary 1. (Robinia)..... 52. LEGUMINOSAE

w. Leaves twice-compound; flowers white, in a large compound panicle. (Aralia)..... 75. ARALIACEAE

v. Plants without prickles or thorns.....y

y. Leaves once-compound.....z

z. Plants climbing or trailing vines.....a

a. Leaves trifoliate; plant climbing by aerial rootlets; fruit a white drupe. (Rhus)..... 59. ANACARDIACEAE

a. Leaves palmately compound (leaflets usually 5); plant climbing by tendrils; fruit a blue berry.. 65. VITACEAE

z. Plants erect trees or shrubs.....b

b. Leaves trifoliate.....c

c. Flowers yellowish; fruit a drupe; leaflets acute. (Rhus)..... 59. ANACARDIACEAE

c. Flowers purple; fruit a legume; leaflets blunt, the midrib extending slightly beyond leaflet tip. (Lespedeza)..... 52. LEGUMINOSAE

b. Leaflets more than 3.....d

d. Petals absent; fruit large, with woody husks enclosing the nut; leaves glandular dotted beneath..... ..... 26. JUGLANDACEAE

d. Petals present; fruit a legume, drupe or samara; leaves not glandular beneath.....e

e. Leaflets toothed only at the base, a gland on each tooth; terminal bud lacking; fruit a samara. (Ailanthus)..... 56. SIMAROUBACEAE

e. Leaflets dentate or entire, not glandular; terminal bud present; fruit a drupe. (Rhus)..... ..... 59. ANACARDIACEAE

y. Leaves twice compound; flowers pink, in globular clusters; fruit a legume. (Albizzia)..... 52. LEGUMINOSAE

u. Leaves simple.....f

f. Plants climbing or trailing vines.....g

g. Leaves parallel veined, entire; stems green, usually with prickles. (Smilax)..... 18. LILIACEAE

g. Leaves palmately veined, toothed; stems brownish, never with prickles.....h

h. Leaves evergreen, leathery and shiny; climbing by aerial rootlets; pith without woody partitions at the nodes. (Hedera)..... 75. ARALIACEAE

h. Leaves deciduous; climbing by tendrils; pith with woody partitions at the node. (Vitis)..... 65. VITACEAE

f. Plants erect trees or shrubs.....j

j. Flowers in catkins or catkin-like clusters, or globose heads...k

k. Plants dioecious; flowers imperfect.....l

l. Leaves coriaceous, evergreen; leaves and branchlets coated with waxy globules. (Myrica)..... 25. MYRICACEAE

l. Leaves deciduous, waxy granules not present.....m

m. Calyx present; juice milky; bundle scars more than 3; fruit a syncarp composed of juicy calyces, each enclosing an achene..... 30. MORACEAE

m. Calyx absent; juice not milky; bundle scars 3; fruit a capsule..... 24. SALICACEAE

k. Plants monoecious or with perfect flowers.....n

n. Leaves palmately veined and lobed.....o

o. Staminate and pistillate flowers in elongate catkins;

juice milky..... 30. MORACEAE

o. Staminate and pistillate flowers in dense spherical heads; juice not milky.....p

p. Leaves star-shaped, with 5-7 narrowly triangular lobes, serrate; perianth absent; stipule scars lacking. (Liquidambar)..... 49. HAMAMELIDACEAE

p. Leaves not star-shaped; leaves 3-5 lobed, large toothed; perianth present; stipule scars encircle twig. (Platanus)..... 50. PLATANACEAE

n. Leaves pinnately veined.....q

q. Leaves coriaceous, evergreen; leaves and twigs coated with waxy granules; fruit a drupe.(Myrica)..... ..... 25. MYRICACEAE

q. Leaves deciduous; waxy granules not present; fruit a nut or samara.....r

r. Nut enclosed by a foliaceous involucre, or subtended by acrescent bracts; ovary 2-locular. 27. CORYLACEAE

r. Nut enclosed in a scaly cup or bristly 4-valved involucre; ovary 3-locular..... 28. FAGACEAE

j. Flowers not in catkins or dense globose heads.....s

s. Corolla none, calyx present.....t

t. Leaves and young stems covered with brown or silver peltate scales; fruit an achene covered by the persistent base of hypanthium. (Elaeagnus)..... 70. ELAEAGNACEAE

t. Leaves and young stems not covered with scales; fruit a drupe or samara.....u

u. Leaves doubly serrate, oblique; fruit a samara; styles 2..... ..... 29. ULMACEAE

u. Leaves entire, sometimes lobed, symmetrical; fruit a drupe; style 1 or obsolete.....v

v. Plants with aromatic (spicy) twigs and leaves; anthers opening by 2 or 4 uplifted valves; sepals 6. 45. LAURACEAE

v. Plants not aromatic; anthers not opening by uplifted valves; sepals 5. (Nyssa)..... 72. NYSSACEAE

s. Corolla and calyx both present.....w

w. Corolla polypetalous (petals sometimes barely united at the base).....x

x. Leaves evergreen, spiny margined; dioecious; flowers imperfect; fruit a red berry. (Ilex)..... 60. AQUIFOLIACEAE

x. Leaves deciduous or evergreen, not spiny margined; monoecious; flowers perfect.....y

y. Stamens more than twice the number of petals.....z

z. Flowers hypogynous, sepals, petals and stamens attached directly to the receptacle.....a

a. Pistil 1; fruit a drupe; petiole with disc-like glands; leaves serrate, villous beneath along midvein. (Prunus)..... 51. ROSACEAE

a. Pistils 2 or more; fruit not a drupe; petioles without glands.....b

b. Perianth of 9-15 petal-like segments, white or yellowish-green; fruit a conelike aggregate of follicles or samaras; stipule scars encircle the twig..... 42. MAGNOLIACEAE

b. Perianth of 3 sepals, 6 maroon petals; fruit a berry; stipule scars not encircling twig.

(Asimina)..... 44. ANNONACEAE

z. Flowers perigynous, sepals, petals and stamens inserted on a hypanthium; sepals and petals 5; fruit a pome..... ..... 56. ROSACEAE

y. Stamens the same number as, or twice as many as, the petals.....c

c. Stamens the same number as the petals; styles 2-5; flowers actinomorphic; fruit a capsule.....d

d. Leaves pinnately veined, oblique; flowers 4-merous, yellow; fruit an ovoid capsule splitting in two. (Hamamelis)..... 49. HAMAMELIDACEAE

d. Leaves palmately veined, somewhat cordate; flowers 5-merous, white; fruit a 3-lobed capsule, splitting in 3's. (Ceanothus)..... 64. RHAMNACEAE

c. Stamens twice as many as the petals; style 1; flowers zygomorphic, pink; fruit a flattened legume; leaves entire, cordate-ovate. (Cercis)..... 52. LEGUMINOSAE

w. Corolla gamopetalous.....d

d. Flowers hypogynous.....e

e. Styles 2-4; stamens 2-4 times the number of corolla lobes; fruit a berry, yellow to red when ripe. (Diospyros)..... ..... 82. EBENACEAE

e. Style 1; stamens as many as, or twice as many as, the corolla lobes; fruit a capsule..... 79. ERICACEAE

d. Flowers epigynous.....f

f. Flowers in involucrate heads; dioecious; flowers imperfect; stamens 5, syngenesious; fruit an achene; twigs angled.

(Baccharis)..... 105. COMPOSITAE

f. Flowers axillary or in racemes; monoecious; flowers perfect; stamens 8-10, opening by terminal pores; fruit a berry; twigs terete..... 79. ERICACEAE

GROUP III

(Herbaceous monocots)

a. Flowers with perianth absent, or represented by scales or bristles...b

b. Flowers on a fleshy spadix subtended by a spathe; leaves broad.....
..... 14. ARACEAE

b. Flowers not on a spadix with spathe; leaves narrow, grasslike.....c

c. Flowers in the axils of closely imbricated bracts; leaves linear, sheathing..... d

d. Flowers enclosed by 2 bracts; leaf-sheaths split lengthwise on side opposite the blade (Glyceria is sometimes an exception with sheaths closed or partly closed); leaves commonly 2-ranked; stems usually cylindric, often hollow.....
..... 12. GRAMINEAE

d. Flowers in axil of 1 bract; leaf sheaths not split; leaves of stem mostly 3-ranked; stems usually angled, solid.....
..... 13. CYPERACEAE

c. Flowers not in the axils of imbricated bracts.....e

e. Plants submerged aquatics.....f

f. Leaves alternate, sharply serrulate; flowers in a subcapitate spike..... 9. ZOSTERACEAE

f. Leaves opposite, dilated at the base, toothed; flowers solitary in axils of leaves..... 10. NAJADACEAE

e. Plants terrestrial or emergent aquatics.....g

g. Flowers imperfect, crowded in a terminal spike; perianth none; leaves flat, linear..... 8. TYPHACEAE

g. Flowers perfect; in heads, racemes or open clusters; perianth of 6 bract-like segments; leaves terete or grass-like ..... 17. JUNCACEAE

a. Flowers with a typical perianth, at least the inner segments petal-like.....h

h. Plants submerged aquatics; dioecious; imperfect; leaves short, sessile, in whorls of three..... 11. HYDROCHARITACEAE

h. Plants terrestrial; flowers perfect.....i

i. Flowers hypogynous.....j

j. Flowers zygomorphic, lower petal smaller than the upper two; fertile stamens 3; flowers subtended by a folded, cordate spathe..... 16. COMMELINACEAE

j. Flowers actinomorphic; fertile stamens 6; flowers without cordate spathe..... 18. LILIACEAE

i. Flowers epigynous.....k

k. Twining vines; leaves cordate; small white flowers in axillary panicles, racemes or spikes..... 19. DIOSCOREACEAE

k. Erect herbs; leaves linear to elliptic.....l

l. Flowers zygomorphic; stamens 1 or 2, united with the style to form a column; pollen present in masses, the pollinia.. ..... 22. ORCHIDACEAE

l. Flowers actinomorphic; stamens 3 or 6.....m

m. Stamens 3; flowers blue with a yellow eye, in umbel-like clusters from a 2-valved spathe; abbreviated

rhizome with fibrous roots. (Sisyrinchium)..... ..... 21. IRIDACEAE

m. Stamens 6; flowers yellow; 1-several flowered scapes from corm-like rhizome..... 20. AMARYLLIDACEAE

GROUP IV

(Corolla absent, calyx present or absent)

a. Flowers imperfect, either staminate or pistillate.....b

b. Submerged aquatics; leaves compound, whorled and finely dissected; flowers sessile in leaf axils. (Ceratophyllum)..... ..... 30. CERATOPHYLLACEAE

b. Terrestrial plants; leaves simple.....c

c. Joints of stems and racemes covered by stipular sheaths (ocreae); basal leaves hastate; 3-angled achene exserted from calyx. (Rumex)..... 33. POLYGONACEAE

c. Joints without sheaths.....d

d. Both staminate and pistillate flowers lacking a calyx; flowers within a cyathium which sometimes has petaloid appendages; staminate flower consisting of a single stamen, pistillate of 3 united carpels; sap milky. (Euphorbia)... 58. EUPHORBIACEAE

d. Flowers (at least the staminate) with a typical calyx; flowers not in a cyathium; sap not milky.....e

e. Flowers in moniliform or interrupted spikes.....f

f. Leaves opposite; inflorescences axillary, the flowers in remote glomerules and the spikes overtopped by the subtending leaves; achene elliptical, invested by the calyx. (Boehmeria)..... 31. URTICACEAE

f. Leaves alternate.....g

g. Individual flowers bracteate at the base; bracts and sepals scarious or papery; foliage not glandular or farinose. (Amaranthus)..... 35. AMARANTHACEAE

g. Individual flowers not bracteate; sepals herbaceous or fleshy; foliage glandular or farinose. (Chenopodium)..... 34. CHENOPODIACEAE

e. Flowers in continuous spikes.....h

h. Leaves opposite; flowers in spikes from the axils of the upper leaves; foliage beset with stinging bristles; fruit an achene. (Urtica)..... 31. URTICACEAE

h. Leaves alternate; flowers borne in condensed spike-like terminal racemes; foliage with stellate pubescence; fruit a capsule. (Croton)..... 58. EUPHORBIACEAE

a. Flowers perfect.....i

i. Leaves lobed, divided or compound.....j

j. Ovary 1.....k

k. Leaves decompound; sepals petaloid; stamens very numerous; fruit a dehiscent follicle. (Cimicifuga)... 40. RANUNCULACEAE

k. Leaves simple, sometimes lobulate or pinnatifid; sepals not petaloid; stamens 2-5.....l

l. Flowers glomerulate in spikes; calyx commonly 5-parted, fleshy; styles 2; fruit a utricle. (Chenopodium)..... 34. CHENOPODIACEAE

l. Flowers racemose; calyx 4-parted, thin; 4 petals sometimes present; style 1; fruit a flat, rounded, notched silicle. (Lepidium)..... 47. CRUCIFERAE

j. Ovaries 2-8; style 1; stamens numerous; fruit an achene or follicle. ..... 40. RANUNCULACEAE

i. Leaves simple, not strongly lobed or dissected.....m

m. Calyx wanting; white flowers in slender spikes; stem succulent, jointed; leaves cordate-ovate; petioles sheathing at the base. (Saururus)..... 23. SAURURACEAE

m. Calyx present.....n

n. Calyx free from ovary.....o

o. Plants climbing vines; ovaries and stamens numerous; flowers with 4 white petaloid sepals; fruit a long-tailed achene. (Clematis)..... 40. RANUNCULACEAE

o. Plants not climbing; ovary 1; stamens 4-12.....p

p. Joints of stems and racemes covered by stipular sheaths (ocreae); calyx 4-6 parted, sometimes petaloid; fruit a 3-angled or lenticular achene.....33. POLYGONACEAE

p. Joints not covered with sheaths.....q

q. Leaves opposite; low, diffuse, spreading plant (7-12 cm. high); sepals 5, united into an indurated cup; fruit a utricle. (Scleranthus)..... 37. CARYOPHYLLACEAE

q. Leaves alternate; erect herbs (up to 2 m. high).....r

r. Inflorescence of axillary racemes; sepals petal-like, white or pink; fruit a depressed berry. (Phytolacca) ..... 36. PHYTOLACCACEAE

r. Inflorescence axillary or terminal; sepals not petal-like; fruit an achene or utricle.....s

s. Individual flowers bracteate at the base; bracts and sepals scarious or papery; foliage not

glandular or farinose. (Amaranthus).....
..... 35. AMARANTHACEAE

s. Individual flowers not bracteate; sepals herbaceous or fleshy; foliage glandular or farinose. (Chenopodium)..... 34. CHENOPODIACEAE

n. Calyx adnate to ovary, campanulate with 3 broad lobes; stamens 12; flowers at or near the surface of the ground; leaves entire, cordate, petioled..... 32. ARISTOLOCHIACEAE

GROUP V

(Corolla and calyx present; petals separate)

a. Stamens more than twice as many as the petals.....b

b. Ovaries 2-many, separate (sometimes slightly coherent, but not united into compound ovary).....c

c. Flowers hypogynous; hypanthium none; petals, sepals and stamens borne directly on the flat receptacle; leaves without stipules..
..... 40. RANUNCULACEAE

c. Flowers perigynous; hypanthium present, bearing petals, sepals and stamens at its margin; leaves usually with stipules, or plants bearing stipular scars..... 51. ROSACEAE

b. Ovary 1.....d

d. Ovary 1-loculed.....e

e. Leaves opposite, entire with translucent dots; petals 4, yellow; sap not milky; fibrous roots. (Ascyrum)
..... 66. GUTTIFERAE

e. Leaf usually 1, palmate-lobed; petals 8-12, white; sap milky; thick prostrate rhizome present. (Sanguinaria)
..... 46. PAPAVERACEAE

d. Ovary more than 1-loculed.....f

f. Plants aquatic; leaves large, cordate, floating; flowers solitary, long peduncled; fruit a leathery, many-seeded berry. (Nuphar)..... 39. NYMPHAEACEAE

f. Plants terrestrial; leaves opposite, entire, with translucent dots; inflorescence cymose; fruit a dehiscent capsule. (Hypericum)..... 66. GUTTIFERAE

a. Stamens not more than twice as many as the petals.....g

g. Ovary or ovaries superior.....h

h. Ovaries more than 1, not united; fruit a follicle.....i

i. Stamens united with each other and with the large thick stigma; ovaries 2; juice milky; leaves simple. 87. ASCLEPIADACEAE

i. Stamens not united as above; ovaries 5; juice not milky; leaves trifoliate. (Gillenia)..... 51. ROSACEAE

h. Ovary 1.....j

j. Plants with minute peltate or stellate scales; monoecious; only staminate flowers with petals; fruit a capsule. (Croton) ..... 58. EUPHORBIACEAE

j. Plants without scales as above.....k

k. Stamens as many as the petals and opposite them; leaves opposite, entire; flowers pedicelled, axillary; fruit a capsule. (Anagallis)..... 81. PRIMULACEAE

k. Stamens not the same number as the petals; or if the same number, alternate with them.....l

l. Ovary simple.....m

m. Sepals 6; petals 6 or 9; leaves lobed, peltate; flowering stems with a pair of terminal leaves and a

solitary nodding flower in the axil between them; fruit a large, fleshy berry. (Podophyllum)..... ..... 41. BERBERIDACEAE

m. Sepals 5, more or less united; petals 5; leaves not peltate, often compound; fruit a legume..... ..... 52. LEGUMINOSAE

l. Ovary compound.....n

n. Ovary 1-locular.....o

o. Corolla distinctly zygomorphic; sepals and petals 5; flowers axillary, nodding; fruit a capsule. (Viola)..... 68. VIOLACEAE

o. Flowers actinomorphic.....p

p. Vines; corolla with a fringed crown; ovary stalked; styles 3. (Passiflora)..... 69. PASSIFLORACEAE

p. Erect herbs; corolla not fringed.....q

q. Sepals and petals 4; stigma 1; fruit a silique or silicle; stamens 6 (sometimes 4 or 2)..... 47. CRUCIFERAE

q. Sepals and petals 3-5; stigmas 3-5; fruit a capsule.....r

r. Leaves opposite; petals 4-5, equal..... ..... 32. CARYOPHYLLACEAE

r. Leaves alternate; petals 3, reddish; sepals 5 in 2 unéqual series; stigmas plumose. (Lechea)..... ..... 67. CISTACEAE

n. Ovary 2-several loculed.....s

s. Flowers actinomorphic.....t

t. Flowers 4-merous; stamens usually 6 (4 long, 2 short), sometimes 4 or 2; fruit a silique or silicle..... 47. CRUCIFERAE

t. Flowers 5-merous, or with 5 sepals and 3 petals.....u

u. Stamens neither just as many nor twice as many as the petals; leaves opposite, entire, with translucent dots; flowers yellow, cymose; fruit a capsule... 66. GUTTIFERAE

u. Stamens as many or twice as many as the petals.....v

v. Ovules or seeds 1 or 2 per locule.....w

w. Leaves opposite, deeply lobed or compound; fertile stamens 10 (sometimes 5); flowers purple, pink or white; fruit an elongate capsule with a beak..... ..... 55. GERANIACEAE

w. Leaves alternate, entire, simple; fertile stamens 5; flowers yellow; fruit a globose capsule without a beak. (Linum)..... 53. LINACEAE

v. Ovules or seeds many per locule.....x

x. Leaves simple.....y

y. Stamens 5, monadelphous, forming a 10-toothed tube; fruit a capsule; leaves basal, round-cordate, evergreen. (Galax)..... 80. DIAPENSIACEAE

y. Stamens not united.....z

z. Plant prostrate or trailing, scarcely shrubby; leaves pilose on both surfaces; corolla salverform, mostly rose to light pink. (Epigaea) ..... 79. ERICACEAE

z. Plants erect; leaves glabrous, thick and shining or lacking (scales or bracts present); corolla rotate or tubular, white..... ..... 78. PYROLACEAE

x. Leaves compound, with 3 obcordate leaflets; flowers

yellow; styles 5; fruit a capsule. (Oxalis).....
..... 54. OXALIDACEAE

s. Flowers zygomorphic.....a

a. Petals with a spur; sepals 5, the anterior united; petals 2, 2-lobed; fruit a 5-locular, many-seeded capsule. (Impatiens)...
..... 63. BALSAMINACEAE

a. Petals without a spur; sepals 5, 3 of which are petal-like; petals 3, connected with each other and the stamen-tube; fruit a 2-locular, 2-seeded capsule. (Polygala)..... 57. POLYGALACEAE

g. Ovary or ovaries inferior.....b

b. Ovary 1-locular, 2 beaked; leaves round-cordate, principally basal; inflorescence a panicle, flowers in small clusters. (Heuchera)....
..... 48. SAXIFRAGACEAE

b. Ovary 2-many locular.....c

c. Anthers opening by pores at the apex; petals 4, pink; leaves lanceolate, opposite. (Rhexia).....73. MELASTOMATACEAE

c. Anthers not opening by apical pores.....d

d. Stamens inserted in a flat disc which covers the ovary; inflorescence umbellate.....e

e. Styles 2; ovary 2-loculed; fruit dry, separating at maturity into 2 mericarps..... 76. UMBELLIFERAE

e. Style 1 or 4-6; ovaries 4-6 (usually 5)-loculed; fruit a berry..... 75. ARALIACEAE

d. Stamens not inserted on a flat disc which covers the ovary..
.....f

f. Style 1; flowers 2-or 4-merous; stamens wtice as many as the petals; fruit a capsule, dehiscent of indehiscent....

..... 74. ONAGRACEAE

f. Styles 2; flowers 5-merous; stamens 5; fruit dry, separating at maturity into 2 mericarps..... 76. UMBELLIFERAE

GROUP VI

(Calyx and corolla present; corolla gamopetalous)

a. Stamens more numerous than lobes or segments of the corolla.....b

b. Ovary 1-locular; calyx 4- or 5-toothed; petals 3 or usually 5; flowers usually papilionaceous; fruit a legume.... 52. LEGUMINOSAE

b. Ovary 2-many locular.....c

c. Ovary 2-locular; sepals 5, 3 of which are petal-like; petals 3, connected with each other and the stamen tube; flowers zygomorphic. (Polygala)..... 57. POLYGALACEAE

c. Ovary 3-many locular; petals or corolla lobes 4-8; flowers actinomorphic.....d

d. Plants saprophytic, without chlorophyll, purplish brown in color; style short, thick; stigma 5-angled; fruit a capsule (Monotropsis)..... 78. PYROLACEAE

d. Plants not saprophytic, with chlorophyll; anthers opening by apical pores; fruit a drupe or berry..... 79. ERICACEAE

a. Stamens not more numerous than the lobes of the corolla.....e

e. Stamens the same number as the corolla lobes and opposite them; leaves opposite, entire; flowers pediceled, axillary, fruit a capsule. (Anagallis)..... 81. PRIMULACEAE

e. Stamens alternate with the corolla lobes or fewer.....f

f. Ovary superior.....g

g. Flowers actinomorphic.....h

h. Stamens as many as the corolla lobes.....i

i. Ovary more than one, or if one deeply lobed.....j

j. Ovaries 2 or 2-lobed.....k

k. Stamens united with each other and with the large, thick stigma; ovaries 2; fruit a dehiscent follicle; juice milky... 87. ASCLEPIADACEAE

k. Stamens not united.....l

l. Ovary 1, 2-lobed; stipules or stipular membranes or lines present between the opposite leaves; style present, sometimes short; fruit a capsule..... 84. LOGANIACEAE

l. Ovaries 2, subtended by 5 nectaries; stipules none; style none, the stigma large, ovoid; fruit a follicle. (Apocynum). 86. APOCYNACEAE

j. Ovary 1, deeply 4-lobed around the central style..m

m. Leaves alternate; stems terete; stamens 5;..... ..... 90. BORAGINACEAE

m. Leaves opposite; stems usually square; stamens 4 or 2; ..... 92. LABIATAE

i. Ovary 1, not deeply lobed.....n

n. Ovary 1-locular.....o

o. Leaves opposite, entire, glabrous; style 1, if 2 forked, the branches stigmatose down the inner face; fruit a capsule..... 85. GENTIANACEAE

o. Leaves alternate, pinnately cleft, pubescent; styles 2, with terminal stigmas; fruit a capsule. (Phacelia)..... 89. HYDROPHYLLACEAE

n. Ovary 2-many locular.....p

p. Leafless twining parasites without chlorophyll; flowers small, cymose clustered; ovary 2-locular; fruit a capsule. (Cuscuta)..... ..... 88. CONVOLVULACEAE

p. Leafy, with chlorophyll.....q

q. Leaves opposite, connected by stipules or stipular line; ovary 2-locular; fruit a capsule..... 84. LOGANIACEAE

q. Leaves alternate or if opposite, without stipules or a stipular line.....r

r. Flowers 4-merous, in spikes; corolla scarious, nerveless; ovary and capsule 2-locular, circumscissile, 2-many seeded. (Plantago)..... 100. PLANTAGINACEAE

r. Flowers 5-merous; corolla petaloid.....s

s. Fruit indehiscent, of dry nutlets; plants aquatic or semiaquatic; flowers small, in naked racemes. (Myosotis). ..... 90. BORAGINACEAE

s. Fruit a few- to many-seeded capsule or berry; plants terrestrial.....t

t. Style 1, deeply 2-cleft; corolla broadly campanulate, deeply lobed; fruit a globose capsule. (Phacelia)..... ..... 89. HYDROPHYLLACEAE

t. Style 1, not divided.....u

u. Plants twining or trailing; stigma of 2 or 3 globular lobes; corolla convolute or twisted in bud; fruit a 4-seeded capsule..... 88. CONVOLVULACEAE

u. Plants erect; stigma single; corolla valvate or imbricate in bud; fruit a berry or many-seeded cap-

sule..... 93. SOLANACEAE

h. Stamens fewer than the corolla lobes.....v

v. Anthers 4, paired.....w

w. Inflorescence cymose, axillary; flowers lavender-blue; leaves entire; fruit a dehiscent capsule. (Ruellia)..... ..... 98. ACANTHACEAE

w. Inflorescence spicate, terminal; flowers white; leaves serrate; fruit separating into 4 linear-oblong nutlets. (Verbena)..... 91. VERBENACEAE

v. Anthers 2.....x

x. Flowers in dense spikes; corolla scarious, nerveless; ovary and capsule 2-locular, circumscissle, 2- many-seeded..... ..... 100. PLANTAGINACEAE

x. Flowers axillary, racemose or glomerulate in the axils of leaves; corolla petaliferous, with nerves.....y

y. Ovary 4-lobed, forming nutlets; corolla campanulate; leaves opposite; stems usually angled..... 92. LABIATAE

y. Ovary 2-lobed, flattened; corolla rotate; leaves opposite or alternate; stems terete. (Veronica)..... ..... 94. SCROPHULARIACEAE

g. Flowers zygomorphic.....z

z. Anthers 5; corolla rotate, nearly regular; flowers in elongate spikes; fruit a dehiscent 2-valved capsule. (Verbascum)..... ..... 94. SCROPHULARIACEAE

z. Anthers 2 or 4.....a

a. Ovule 1 in each of the 1-4 locules.....b

b. Ovary deeply 4-lobed around the central style; plants usually aromatic; leaves opposite; stems usually square; fruits 4 seedlike nutlets or achenes..... 92. LABIATAE

b. Ovary not lobed; plants not aromatic.....c

c. Ovary 1-locular; corolla light purple; mature flowers and fruit reflexed on the spike; fruit an achene. (Phryma)... ..... 99. PHRYMACEAE

c. Ovary 2-4-locular; corolla white; mature flowers and fruit not reflexed; fruit dry, separating into 4 nutlets..... ..... 91. VERBENACEAE

a. Ovules 2-many in each locule.....d

d. Ovary with 1 locule; plants parasitic or aquatic.....e

e. Plants parasitic, without chlorophyll or leaves; purple or yellow-brown in color; parasitic on roots of Fagus; stamens 4. (Epifagus)..... 96. OROBANCHACEAE

e. Not parasitic; aquatic plants, with chlorophyll; leaves dissected, bearing small bladders; carnivorous; stamens 2. (Utricularia)..... 97. LENTIBULARIACEAE

d. Ovary with 2 locules; plants terrestrial, not parasitic; flowers typically 5-merous; stamens 4 or 2; fruit an ovoid to globose capsule..... 94. SCROPHULARIACEAE

f. Ovary inferior.....f

f. Stamens united by their anthers.....g

g. Flowers crowded on a common receptacle forming a head; calyx tube adnate to the 1-locular ovary, its limb (pappus) variously modified into bristles, scales etc.; fruit an achene..... ..... 105. COMPOSITAE

g. Flowers axillary or in racemes; fruit a 2-locular, many-seeded capsule, opening at the top. (Lobelia)..... 104. CAMPANULACEAE

f. Stamens not united.....h

h. Stamens 1-3, fewer than the corolla lobes; calyx minute or none; stems dichotomously forked; fruit dry, 3-celled, one cell fertile, 2 empty. (Valerianella).... 103. VALERIANACEAE

h. Stamens 4 or 5; calyx well developed.....i

i. Plants twining or trailing vines; leaves opposite, estipulate; ovary 2-3-loculed; fruit a few-seeded berry. (Lonicera)..... 102. CAPRIFOLIACEAE

i. Plants erect herbs; leaves opposite and stipulate or whorled and estipulate; ovary mostly 2-loculed; fruit various..... 101. RUBIACEAE

CHAPTER VI

TREATMENT OF FAMILIES

1. EQUISETACEAE

1. Equisetum L. Horsetail

a. Stems annual, dimorphic, the sterile ones with regularly whorled branches; fertile stems simple, without chlorophyll; sheaths gradually widened, not black-banded at the base and apex.... 1. E. arvense

a. Stems evergreen, not dimorphic, mostly unbranched; sheaths cylindric, appressed, becoming black-banded at the base and apex..... 2. E. hyemale var. affine

1. Equisetum arvense L. Common Horsetail. Rare; one colony in swampy wooded area in College Creek north of Matoaka Lake. 743. Located by Thomas Wieboldt.

2. Equisetum hyemale L. var. affine (Engelm.) A. A. Eat. (E. prealtum Raf.). Common Scouring-rush. Rare; one colony south of Matoaka Lake dam on moist floodplain. 734.

2. LYCOPODIACEAE

1. Lycopodium L. Club-moss

+1. Lycopodium complanatum L. var. flabelliforme Fern.[L. flabelliforme (Fern.) Blanch.]. Rare; a colony of plants in open woods, east of

Common Glory grounds, and one on the west side of Squirrel Point. 527.

3. SELAGINELLACEAE

1. Selaginella Beauv. Spikemoss

*1. Selaginella apoda (L.) Fern. Spikemoss. Rare; one colony of plants on damp, exposed soil, shore of Matoaka Lake. 11.

4. OPHIOGLOSSACEAE

1. Botrychium Sw. Grape-fern

a. Sterile (leafy) blades evergreen, long stalked from near the base of the fruiting axis, the stipe much shorter than the sterile blade; stipe-base not split..... 1. B. dissectum

a. Sterile blades deciduous, sessile, the stipe equalling or exceeding them; stipe-blade split, exposing the bud..... 2. B. virginianum

+1. Botrychium dissectum Spreng forma dissectum. Grape-fern. Occasional; open woods, wooded slopes, usually in shaded, damp areas. 532, 654.

B. dissectum Spreng forma obliquum (Muhl.) Fern. Divisions of frond merely shallowly toothed or lobed. Rare; same habitats as the typical form. 689.

2. Botrychium virginianum (L.) Sw. Rattlesnake-fern. Common; open woods, wooded slopes, in leaf litter, occasionally in more moist situations. 203.

5. OSMUNDACEAE

1. Osmunda L.

a. Sterile fronds bipinnate, their pinnules serrulate; fertile fronds similar in form, terminated by the fruiting panicle.... 1. O. regalis

a. Sterile fronds once-pinnate, their pinnae pinnatifid; fertile fronds separate, elongate, brownish, densely woolly..... 2. O. cinnamomea

1. Osmunda regalis L. Royal Fern. Occasional; damp wooded areas, especially in rich, peaty soil. 616.

2. Osmunda cinnamomea L. Cinnamon Fern. Relatively common; damp ravines, sometimes forming large colonies in more open ravines. 173.

6. POLYPODIACEAE

a. Both fertile and sterile fronds with flat green blades, similar in shape, sometimes differing in size.....b

b. Indusia totally absent; rhizomes slender, black; stipe 1-6 dm. tall; frond bipinnatifid, commonly wider than long.. 2. Dryopteris

b. Indusia present, at least on young fertile fronds.....c

c. Indusia marginal, cuplike, partially adhering to the reflexed teeth of the frond; fronds mostly bipinnate; rhizomes without scales.....4. Dennstaedtia

c. Indusia not as above.....d

d. Indusia dorsal, or, if marginal, not formed by infolded margin of frond.....e

e. Sori and indusia reniform or circular, peltate or attached at the center.....f

f. Leaves pinnate-pinnatifid; sori not confined to the

upper pinnae of fertile leaves; indusium reniform, with a sinus..... 2. Dryopteris

f. Leaves pinnate, each pinnule with a basal lobe or auricle; sori present only on the reduced upper pinnae; indusium circular, without a sinus..... 3. Polystichum

e. Sori elongate, straight or curved; indusia attached along one edge.....g

g. Fronds herbaceous, membranaceous, pinnate-pinnatifid, 4-9 dm. long, 10-35 cm. wide; pinnules serrate to pinnatifid..... 5. Athyrium

g. Fronds evergreen, somewhat coriaceous, 1-5 dm. long, about 6 cm. wide; pinnae remotely serrulate..... ..... 6. Asplenium

d. Indusia formed by the reflexed margin of the frond.....h

h. Stipe forking at the summit into two divergent branches, each branch bearing several divisions; sori discontinuous, covered by reflexed teeth of pinnules..... 8. Adiantum

h. Stipe not forking; fronds tripinnate; sori continuous, covered by continuous margin of pinnae..... 9. Pteridium

a. Fertile fronds without flat green blades; fertile and sterile fronds strikingly dissimilar in shape.....i

i. Sori globose, more or less covered by inrolled margins of the pinules, forming globose divisions on the fertile frond; sterile blade as broad as or broader than long..... 1. Onoclea

i. Sori oblong, in chain-like rows, parallel to midveins of the pinnae and their divisions; sterile blade longer than broad..... ..... 7. Woodwardia

1. Onoclea L. Sensitive Fern

1. Onoclea sensibilis L. Rare; open bottomland in College Creek, very wet, muddy substrate. 738.

2. Dryopteris Adans. Shield-fern

a. Sori with indusia; lower pinnae gradually reduced, much shorter than the middle pinnae..... 1. D. noveboracensis

a. Sori without indusia; fronds triangular, commonly as broad as, or broader than long..... 2. D. hexagonoptera

1. Dryopteris noveboracensis (L.) Gray New York Fern. Occasional; dry ravines, open woods, especially with pine. 612.

2. Dryopteris hexagonoptera (Michx.) Christens. Broad Beech-fern. Abundant; rich hardwoods, especially damp shaded situations. 716.

3. Polystichum Roth.

1. Polystichum acrostichoides (Michx.) Schott Christmas Fern. Abundant; woods, woodland borders, most abundant in moist areas, but generally ubiquitous. 186.

4. Dennstaedtia Bernh.

1. Dennstaedtia punctilobula (Michx.) Moore Hay-scented Fern. Rare; one colony, dry open woods. 436.

5. Athyrium Roth.

+1. Athyrium filix-femina (L.) Roth. Lady-fern. Rare; one colony of plants, dry open woods. 540.

6. Asplenium L. Spleenwort

1. Asplenium platyneuron (L.) Oakes var. platyneuron. Ebony Spleenwort. Occasional; dry open woods, wooded slopes. 202.

7. Woodwardia Sm. Chain-fern

1. Woodwardia areolata (L.) Moore Netted Chain-fern. Common; open woods, damp shaded situations, moist ravines. 448, 554.

8. Adiantum L. Maidenhair

+1. Adiantum pedatum L. Maidenhair Fern. Occasional; moist, shaded, wooded slopes. 436.

9. Pteridium Gleditsch Bracken

1. Pteridium aquilinum (L.) Kuhn var. latiusculum (Desv.) Underw. Bracken Fern. Common; dry woods, occasionally in cutover areas, disturbed exposed soil. 248.

7. PINACEAE

a. Leaves needle-like, in sheathed fascicles of 2-3; fruit a hard, woody cone; seeds winged..... 1. Pinus

a. Mature leaves scale-like, deltoid, tightly appressed, opposite or in whorls of 3; juvenile leaves subulate, sharp pointed, 5-7 mm. long; fruits berry-like, scaly-bracted underneath; seeds wingless..... ..... 2. Juniperus

1. Pinus L. Pine

a. Open cone 6-12 cm. long; needles 12-25 cm. long, in 3's or sometimes

in 2's..... 1. P. taeda

a. Open cone 4-6 cm. long; needles 4-13 cm. long in 2's or 3's.....b

b. Needles 7-13 cm. long, in 2's or 3's; cone-scales with a minute spine less than 1 mm. long; cone-scale without purple margin..... ..... 2. P. echinata

b. Needles 4-8 cm. long, in 2's; cone-scales with a definite spine 2-3 mm. long; purple margin on inner face of cone-scale..... ..... 3. P. virginiana

1. Pinus taeda L. Loblolly Pine. Abundant; mixed woods throughout, more common in western areas. It occurs with P. echinata in pine woods in the northwest. 741.

+2. Pinus echinata Mill. Yellow or Short-leaf Pine. Common; mixed woods throughout, more common in western sections. It occurs with P. taeda in pine woods in the north. 737, 739.

3. Pinus virginiana Mill. Scrub Pine, Virginia Pine. Common; mixed woods and woodland borders. 487.

2. Juniperus L.

1. Juniperus virginiana L. Red Cedar. Common; dry wooded slopes, woodland borders. 170.

8. TYPHACEAE

1. Typha L. Cat-tail

1. Typha sp. Cat-tail. One small sterile colony near a damp depression in a cutover area. 682.

9. ZOSTERACEAE

1. Potamogeton L. Pondweed

1. Potamogeton crispus L. Uncommon; shallow water, Matoaka Lake, at the mouth of College Creek. 727.

10. NAJADACEAE

1. Najas L. Naiad

*+1. Najas flexilis (Willd.) Rostk. & Schmidt. Common; Matoaka Lake, forming thick beds in shallow water. 497.

11. HYDROCHARITACEAE

1. Elodea Michx. Waterweed

1. Elodea canadensis Michx. Common; shallow water of Matoaka Lake. 93.

12. GRAMINEAE

KEY TO TRIBES

a. Spikelets enclosed in a bur-like involucre. (Cenchrus)..... ..... TRIBE VIII. PANICEAE

a. Spikelets not enclosed in a bur-like involucre.....b

b. Spikelets arranged in distinct rows on the rachis; inflorescence a spike or raceme, or a cluster of spikes or racemes.....c

c. Glumes absent; spikelets compressed laterally; keel hispid or ciliate; lemma boat-shaped; inflorescence an open panicle..... ..... TRIBE VII. ORYZEAE

c. Glumes, or at least one glume, present; spikelet not as above..
.....d

d. Inflorescence a solitary terminal spike, not one-sided; spikelets on opposite sides of the rachis.....
..... TRIBE II. HORDEAE

d. Inflorescence a raceme or a cluster of racemes or spikes or a one-sided spike.....e

e. Articulation above the glumes; spikes digitate; spikelets sessile; both glumes present, not reduced; vestigial florets not present..... TRIBE V. CHLORIDEAE

e. Articulation below the glumes; spikes not digitate, or if digitate, spikelets pediceled; one glume wanting or reduced, or vestigial florets present.....f

f. Glumes membranaceous, lemma and palea firmer; spikelets not paired or, if paired, first glume absent; spikelet with one terminal perfect floret and a sterile floret below it..... TRIBE VIII. PANICEAE

f. Lemma and palea membranaceous, glumes firmer; both glumes present; spikelets paired, one sessile and perfect, the other pediceled and vestigial.....
..... TRIBE IX. ANDROPOGONEAE

b. Spikelets not arranged in definite rows on the rachis; inflorescence a panicle, open or contracted or dense and spike-like.....g

g. Spikelet with 2 or more perfect florets.....h

h. Glumes shorter than the lowest fertile lemma (excluding awn, if present); rachilla not prolonged beyond the upper floret.....
..... TRIBE I. FESTUCEAE

h. Glumes as long as, or longer than, the lowest fertile lemma; rachilla prolonged beyond the upper floret.. TRIBE III. AVENEAE

g. Spikelets with one perfect floret.....i

i. Staminate or vestigial florets absent; articulation above the glumes (in Cinna below the glumes)..... TRIBE IV. AGROSTIDEAE

i. Staminate or vestigial florets present below the perfect floret; articulation usually below the glumes (above the glumes in Anthoxanthum); sometimes rachis disarticulates and joints are attached to the spikelets.....j

j. Spikelets in pairs, one perfect and sessile, the other pediceled and vestigial; lemma and palea membranaceous; glumes firmer than the lemma and palea..... TRIBE IX. ANDROPOGONEAE

j. Spikelets not paired; glumes membranaceous, not firmer than the lemma and palea.....k

k. Spikelets with 1 terminal perfect floret and two sterile lemmas which are awned from the back, one awn being twisted and geniculate; lemma folded about palea, its margins not inrolled..... TRIBE VII. PHALARIDEAE

k. Spikelets with 1 terminal perfect floret and one sterile lemma, usually not awned or, if awned, the awn neither twisted nor geniculate; margins of the lemma inrolled around the palea (except at the tip)... TRIBE X. PANICEAE

TRIBE I. FESTUCEAE

a. Lemmas 5-many-nerved.....b

b. Lemmas flattened, many-nerved; spikelets flattened, nearly sessile, v-shaped with 3-4 fertile florets, and one sterile lemma; panicle

narrow, slender..... 8. Uniola

b. Lemmas and spikelets not as above.....c

c. Rachilla prolonged beyond the perfect florets and bearing 2 or 3 smaller empty lemmas, each enclosing the other, appearing as a knob; spikelets 2-flowered; florets pendulous..... 6. Melica

c. Rachilla not bearing a mass of enfolded, empty lemmas.....d

d. Lemma 2-toothed at the apex, awned from the base of the teeth (awns 3-10 mm. long); sheaths closed..... 1. Bromus

d. Lemma not 2-toothed; awnless or, if awned, awns less than 2 mm.; sheaths open or closed.....e

e. Lemmas keeled.....f

f. Spikelets not in onesided clusters; ligule less than 2 mm. long; leaf blades ending in a boat-shaped tip... ..... 4. Poa

f. Spikelets nearly sessile, in one-sided clusters; ligule 5-7 mm. long; leaf blades flat.....5. Dactylis

e. Lemmas rounded on the back.....g

g. Lemma acute with 5 obscure nerves, 5-7 mm. long; panicle contracted, usually erect; plants of dry habitats..... 2. Festuca

g. Lemma obtuse, prominently 7-nerved; about 2 mm. long; panicle open, nodding; plants of moist habitats..... ..... 3. Glyceria

a. Lemma with 1-3 well-defined nerves.....h

h. Lemma acute, not pubescent, about 1.5 mm. long; panicle diffuse with stiffly spreading branches..... 7. Eragrostis

h. Lemma obtuse, pubescent on callus, keel and margins, about 4 mm.

long; panicle open, the branches drooping..... 9. Triodia

1. Bromus L. Brome-grass

a. Palea 1-2 mm. shorter than lemma; awn 8-10 mm. long, flexuous, somewhat twisted at maturity; hairs of lower sheath soft, somewhat entangled..... 1. B. japonicus

a. Palea about as long as lemma; awn 3-5 mm. long, straight; hairs of lower sheath stiff, sometimes sparse..... 2. B. commutatus

*+1. Bromus japonicus Thunb. Occasional; dry open areas, woodland borders, field near Physics Laser Station, even growing in gravel. 340.

2. Bromus commutatus Schrad. Occasional; dry open areas, woodland borders. 546.

2. Festuca L. Fescue-grass

1. Festuca elatior L. Taller or Meadow Fescue. Realtively rare; usually found along roads or in meadows; however, it was collected in a wooded ravine in the College Woods. 353.

3. Glyceria R. Br. Manna-grass

1. Glyceria striata (Lam.) Hitchc. Fowl Manna Grass. Common; in wet soil, wooded ravines, open bottomlands, occasionally in roadside ditches. 134, 276.

4. Poa L. Meadow-grass

a. Plants with stolons; lower panicle branches 4 or more per node; lemma conspicuously webbed at the base..... 1. P. pratensis

a. Plants tufted, lacking stolons; lower panicle branches 1-3 per node;

lemma without a web..... 2. P. autumnalis

+1. Poa pratensis L. Kentucky Bluegrass. Occasional; open woods, especially along paths, shaded situations. 181.

2. Poa autumnalis Muhl. Relatively rare; moist deciduous woods, occasionally in more open areas. 182.

5. Dactylis L. Orchard Grass

1. Dactylis glomerata L. Relatively rare; roadsides, woodland borders. 736.

6. Melica L. Melic-grass

*1. Melica mutica Walt. Occasional; rich deciduous woods, usually on wooded slopes in damp shaded areas. 106, 137.

7. Eragrostis Beauv. Lovegrass

*+1. Eragrostis spectabilis (Pursh) Steud. Tumble-grass or Purple Lovegrass. Common; dry sandy soil in cutover areas, along woodland borders. 509.

8. Uniola L. Spikegrass

1. Uniola laxa (L.) BSP. Relatively common; in moist deciduous woods, especially on slopes; occasionally in rather large tufts. 402, 446.

9. Triodia R. Br.

1. Triodia flava (L.) Smyth [Tridens flavus (L.) Hitchc.]. Tall Red-top. Common; dry exposed soil, cutover areas, along trails in cleared areas, woodland borders. 418.

TRIBE II. HORDEAE

a. Spikelets solitary, one at each node of the rachis, attached with the edge to the rachis; first glume wanting except on terminal spikelet, the second glume outwardly 3-5-nerved..... 9. Lolium

a. Spikelets 2 or 3 at each node, attached with side to rachis.....b

b. Spikelets 1-flowered, three at each node of the rachis.....
..... 10. Hordeum

b. Spikelets 2-flowered, two at each node of the rachis... 11. Elymus

9. Lolium L. Darnel, Rye-grass

a. Glume shorter than the spikelet; lemmas awnless or nearly so; perennial..... 1. L. perenne

a. Glume as long as, or longer than the spikelet; lemmas usually awned, the awn 6-12 mm. long; annuals..... 2. L. temulentum

1. Lolium perenne L. Perennial Rye-grass or Common Darnel. Occasional; open areas, exposed soil, woodland borders. 278.

2. Lolium temulentum L. Bearded Darnel. Common; open areas, dry exposed soil, field adjacent to Physics Laser Station, cutover areas, woodland borders. 277.

10. Hordeum L. Barley

a. Blades without auricles; rachis disarticulating; lateral spikelets pedicellate, vestigial; glumes of fertile spikelet dilated above the base..... 1. H. pusillum

a. Blades with auricles; rachis continuous; spikelets sessile, each with a fertile floret; glumes not conspicuously dilated.....2. H. vulgare

1. Hordeum pusillum Nutt. Little Barley. Relatively common; dry open areas, field adjacent to Physics Laser Station. 226.

*+2. Hordeum vulgare L. Barley. Rare; one station, relatively large colony of plants on woodland border. 666.

11. Elymus L. Wild Rye

a. Glumes broadened above the base, bowed out at the base leaving a rounded sinus; awn about 1 cm. long..... 1. E. virginicus

a. Glumes subsetaceous, not broadened above the base, only slightly bowed at base; awn 1-3 cm. long..... 2. E. villosus

1. Elymus virginicus L. Virginia Wild Rye. Rare; open woods, dry area (this species typically found in moist habitats). 380.

*+2. Elymus villosus Muhl. forma arkansanus (Scribn. & Ball) Fern. (E. arkansanus Scribn. & Ball) noted as "...a relatively rare form..." by Hitchcock and Chase (1950). Rare; damp, shaded situations along woodland borders; one station, along Mill Neck Road. 510. Specimen determined by Dr. Clara G. Weishaupt.

TRIBE III. AVENEAE

a. Articulation below the glumes; spikelets 3-7 mm. long; at least one glume shorter than the floret just above it.....b

b. Lemmas awnless; second glume much wider than the first..... ..... 12. Sphenopholis

b. First lemma usually awnless, second lemma with a 4-5 mm. awn; glumes not differing greatly in width..... 13. Trisetum

a. Articulation above the glumes; spikelets 10-14 mm. long; each glume overtopping the floret just above it; lemmas awned with a bent awn

which is spiral at the base..... 14. Danthonia

12. Sphenopholis Scribn.

a. Panicle dense, erect or nearly so; second glume about as wide as long; internodes of rachilla about 0.5 mm. long..... 1. S. obtusata

a. Panicle not dense, lax and nodding; second glume 2/5-2/3 as wide as long; internodes of rachilla about 1 mm. long..... 2. S. nitida

1. Sphenopholis obtusata (Michx.) Scribn. Common; dry situations, cut-over areas, along paths in open woods. 245.

2. Sphenopholis nitida (Biehler) Scribn. Occasional; woods, usually moist shaded situations. 208.

13. Trisetum L.

+1. Trisetum pensylvanicum (L.) Beauv. Swamp-oats. Occasional; moist soil, in wooded ravines and more open bottomlands. 133.

14. Danthonia DC.

1. Danthonia spicata (L.) Beauv. Poverty-grass. Occasional; dry upland deciduous woods. 303.

TRIBE IV. AGROSTIDEAE

a. Inflorescence dense, spike-like, mostly 5-8 mm. wide, 5-10 cm. long; glumes about 3.5 mm. long, awned..... 17. Phleum

a. Inflorescence an open or contracted panicle, not spike-like and cylindric.....b

b. Awn scabrous, 4.5-6 cm. long, strongly twisted below, twice geniculate; glumes 1.5 cm. long; lemma dark brown 9-10 mm. long.....

..... 20. Stipa

b. Awn, if present, less than 3 cm. long, not twisted, straight.....c

c. Glumes minute, the first often obsolete, the second 0.5-2 mm. long; awn about 3 cm. long; rachilla prolonged behind the palea ..... 19. Brachyelytrum

c. Both glumes present, not minute; awn, if present, less than 10 mm. long.....d

d. Articulation below the glumes; rachilla prolonged behind the palea; lemma with a minute awn from just below the apex..... ..... 16. Cinna

d. Articulation above the glumes; rachilla not prolonged behind the palea.....e

e. Glumes longer than the lemma; palea wanting, or 1/2-2/3 as long as the lemma; perennial, tufted or with stolons (not scaly rhizomes)..... 15. Agrostis

e. Glumes shorter than, or sometimes equaling, the lemma; palea about as long as the lemma; perennial, with numerous scaly rhizomes..... 18. Muhlenbergia

15. Agrostis L. Bentgrass

a. Palea present, 1/2-2/3 as long as the lemma; plants with creeping stolons; panicle usually purplish..... 1. A. alba

a. Palea absent or minute; plants tufted, without stolons; panicle green ..... 2. A. perennans

1. Agrostis alba L. Redtop. Common; ubiquitous, generally in weedy situations, although noted in open woods also. 277.

2. Agrostis perennans (Walt.) Tuckerm. Upland Bent. Occasional; moist

woods, shaded situations, especially along trails. 539.

16. Cinna L. Wood Reedgrass

1. Cinna arundinacea L. Occasional; shores of Matoaka Lake, especially in the Main Ravine where College Creek enters the Lake. 484.

17. Phleum L. Timothy

+1. Phleum pratense L. Timothy. Relatively rare; weedy situations, dry exposed soil, mostly along woodland borders. 339.

18. Muhlenbergia Schreb.

*+1. Muhlenbergia tenuiflora (Willd.) BSP. Relatively common; dry open woods, paths and woodland borders. 645.

19. Brachyelytrum Beauv.

1. Brachyelytrum erectum (Schreb.) Beauv. Relatively rare; mixed woods, usually dry situations. 577.

20. Stipa L.

1. Stipa avenacea L. Black Oat-grass. Occasional; dry woods, especially along trails, east side of Matoaka Lake. 184.

TRIBE V. CHLORIDEAE

a. Spikelets with 1 perfect floret; spikes 2-3 mm. wide, digitate, all at summit of culms; plants extensively creeping by scaly rhizomes or stolons..... 21. Cynodon

a. Spikelets with 3-6 perfect florets; spikes about 5 mm. wide, digitate

at summit of culms with 1 or 2 a short distance below; plants not creeping, tufted..... 22. Eleusine

21. Cynodon Richard Bermuda Grass

1. Cynodon dactylon (L.) Pers. Bermuda Grass. Common; roadsides, especially common in field near Physics Laser Station. 230.

22. Eleusine Gaertn.

1. Eleusine indica (L.) Gaertn. Yard Grass or Wiregrass. Common; weedy areas along roadsides, along paths in more open areas. 514.

TRIBE VI. PHALARIDEAE

23. Anthoxanthum L. Sweet Vernal Grass

1. Anthoxanthum odoratum L. Relatively common; dry soil, open areas, along trails and woodland borders. 63, 183.

TRIBE VII. ORYZEAE

24. Leersia Sw. Cutgrass

a. Leaves scabrous, not bristly-ciliate; spikelets 3 mm. long; panicle branches solitary at nodes..... 1. L. virginica

a. Leaves spinulose-ciliate, cutting; spikelets 5 mm. long; panicle branches 2 or more per node..... 2. L. oryzoides

1. Leersia virginica Willd. White Grass. Occasional; shady wooded areas. 516.

2. Leersia oryzoides (L.) Sw. Rice-cutgrass. Common; in wet areas, more open ravines and bottomlands; grows in extensive beds in Main

Ravine of Matoaka Lake. 626.

TRIBE VIII. PANICEAE

a. Spikelets subtended by an involucre, bur-like or of bristles.....b

b. Involucre of one or more bristles, longer than the spikelet; inflorescence a cylindric, spike-like panicle..... 29. Setaria

b. Involucre bur-like, the burs arranged in a spike or spike-like raceme..... 30. Cenchrus

a. Spikelets not subtended by an involucre.....c

c. Spikelets awned, stiffly hispid, nearly sessile, crowded along branches of the panicle..... 28. Echinochloa

c. Spikelets awnless, not stiffly hispid.....d

d. Spikelets in two rows on one side of a 3-angled rachis; racemes digitate; lemma with hyaline margins, not inrolled..... ..... 25. Digitaria

d. Rachis not 3-angled, flattened or terete; racemes not digitate; lemma with hard, inrolled margins.....e

e. First glume very minute; spikelets subsessile, in spike-like racemes borne on one side of a flattened rachis..... ..... 26. Paspalum

e. First glume 1/3 to 1/2 as long as the spikelet; spikelets borne in open panicles..... 27. Panicum

25. Digitaria Heist. Finger-grass, Crab Grass

+1. Digitaria sanguinalis (L.) Scop. Occasional; grassy areas along woodland borders. 513.

26. Paspalum L.

1. Paspalum dilatatum Poir. Dallis-grass. Occasional; dry situations, typically along woodland borders. 282.

27. Panicum L. Panic-grass

a. Basal leaves similar to those of the culm, elongate; winter rosettes not formed..... 1. P. anceps

a. Basal leaves usually shorter and wider than those of the culm; winter rosettes present, formed in autumn and overwintering.....b

b. Ligule of conspicuous hairs, 3-5 mm. long; blades and culms velvety-pubescent throughout; autumnal culms widely spreading, usually decumbent..... 3. P. lanuginosum

b. Ligule not developed.....c

c. Spikelets nearly spherical at maturity; blades cordate and ciliate at the base; blades of winter rosette white-margined... ..... 4. P. polyanthes

c. Spikelets obovate or elliptic.....d

d. Leaf blades 1-3 cm. wide, cordate; spikelets pubescent.....e

e. Nodes of culms glabrous or nearly so; spikelets 2.6-2.8 mm. long..... 5. P. commutatum

e. Nodes of culms retrorsely bearded; spikelets 4-4.5 mm. long..... 6. P. boscii

d. Leaf blades 4-8 mm. wide, not cordate; spikelets glabrous, 2-2.2 mm. long; autumnal phase much branched..... ..... 2. P. dichotomum

1. Panicum anceps Michx. var. anceps. Common; moist sandy soil, along woodland trails, shaded situations along woodland borders. 458.

*+ P. anceps Michx. var. rhizomatum (Hitch. & Chase) Fern. (P. rhizomatum Hitch. & Chase). Spikelet not more than 2.8 mm. long; panicle more or less contracted. Occasional; shaded woods. 547.

*+2. Panicum dichotomum L. Occasional; dry exposed soil in open woods, especially in vicinity of pines. 425.

3. Panicum lanuginosum Ell. Common; sandy soils, dry open cutover areas. Decumbent autumnal culms reaching 1 m. in length. 669.

4. Panicum polyanthes Schultes Common; open woods and clearings, usually in moist situations. 297, 688.

+5. Panicum commutatum Schultes Occasional; wooded areas, usually shaded situations. 200A.

6. Panicum boscii Poir. Relatively common; open woods, cutover areas, woodland borders. 200B, 535.

28. Echinochloa Beauv.

a. Papillose-based hairs wanting, or present only along the margins of the spikelet; tip of fertile lemma withering, differentiated from the body of the lemma by a ring of short stiff hairs..... 1. E. crusgalli

a. Papillose-based hairs of spikelet present; tip of fertile lemma not withering nor differentiated from the body by a ring of hairs..... ..... 2. E. pungens

1. Echinochloa crusgalli (L.) Beauv. Barnyard Grass. Occasional; dry areas, woodland borders, cutover areas. 730.

*2. Echinochloa pungens (Poir.) Rydb. var. pungens. Rare; damp soil, wooded ravines, bottomlands. 674. Hitchcock and Chase (1951) include this species in E. crusgalli (L.) Beauv.

29. Setaria Beauv. Bristly Foxtail

1. Setaria glauca (L.) Beauv. [S. lutescens (Weigel) Hubb.]. Foxtail. Common; dry open situations, cutover areas, field near Physics Laser Station, woodland borders. 419, 511, 512, 560.

30. Cenchrus L. Sandbur

1. Cenchrus longispinus (Hack.) Fern. (C. pauciflorus Benth.). Rare; dry exposed soil, woodland border, one specimen. 548.

TRIBE IX. ANDROPOGONEAE

a. Inflorescence of 2-few racemes clustered on a peduncle; sterile pedicels villous, giving entire raceme a gray, feathery appearance... ..... 31. Andropogon

a. Inflorescence a terminal panicle of numerous racemes.....b

b. Pediceled spikelets staminate; spikelets usually tinged with red or purple; stem solid..... 32. Sorgum

b. Pediceled spikelet wanting, only the pedicel present; spikelets tawny when young, brown at maturity; stem hollow.. 33. Sorghastrum

31. Andropogon L. Beardgrass

a. Fertile spikelet 3-4 mm. long; lemma with a straight awn; peduncle less than 1 cm. long..... 1. A. virginicus

a. Fertile spikelet 5-7 mm. long; lemma with a twisted awn; peduncle 2 cm. long or more..... 2. A. ternarius

1. Andropogon virginicus L. Broom-sedge. Common; dry, open situations, cutover areas, woodland borders. 595, 696.

*+2. Andropogon ternarius Michx. Rare; one colony, woodland border near

pines, junction of Route 5 and Berkeley Lane. 719.

32. Sorgum Adans. Sorghum

*+1. Sorgum halepense (L.) Pers. Johnson-grass. Occasional; woodland borders, especially on eastern side, near William and Mary campus. 528.

33. Sorghastrum Nash

a. Awn once geniculate, usually less than 15 mm. long; spikelets yellowish at maturity..... 1. S. nutans

a. Awn twice geniculate, 2.5-3.5 cm. long; spikelets brown at maturity.. ..... 2. S. elliottii

1. Sorghastrum nutans (L.) Nash Indian Grass. Occasional; typically in cutover areas, dry, exposed soil. 576.

*+2. Sorghastrum elliottii (Mohr) Nash Occasional; dry open woods, along paths in wooded areas. 636, 646.

13. CYPERACEAE

a. Flowers perfect, not enclosed in a perigynia.....b

b. Base of style persistent on the achene, appearing as a beak or tubercle.....c

c. Culms lacking leaf-blades; spikelet terminal, solitary..... ..... 2. Eleocharis

c. Leaf-blades present on culms; spikelets in terminal umbels..... ..... 3. Bulbostylis

b. Base of style not persistent on the achene.....d

d. Scales of the spikelet strictly 2-ranked; spikelets clustered

or in a terminal umbel, mostly erect..... 1. Cyperus

d. Scales of the spikelet spirally arranged; inflorescence mostly umbelliform, drooping..... 4. Scirpus

a. Flowers imperfect; carpellate flowers enclosed in a perigynium.....
..... 5. Carex

1. Cyperus L. Galingale

a. Stigmas 3; achenes trigonous.....b

b. Annuals with fibrous roots.....c

c. Scales 1-1.5 mm. long, rounded, yellowish in color; rachilla continuous, not disarticulating at maturity; achenes 3-angled..
..... 1. C. iria

c. Scales 2-3.5 mm. long, oblong, brownish in color; rachilla jointed, breaking into pieces at maturity; achenes ellipsoid or obovoid..... 2. C. odoratus

b. Perennials with rhizomes or tubers.....d

d. Spikelets strongly reflexed, 1-3 flowered, yellow-brown at maturity; scales lanceolate..... 3. C. dipsaciformis

d. Spikelets not strongly reflexed, but spreading or ascending; scales oblong.....e

e. Heads globose; lowest flowering scale 3.5-4.2 mm. long.....
..... 4. C. ovularis

e. Heads cylindric; lowest flowering scale 2-2.5 mm. long.....
..... 5. C. retrorsus

a. Stigmas 2; achenes lenticular; spikelets 1-flowered; tufted annual...
..... 6. C. tenuifolius

*+1. Cyperus iria L. Occasional; open cutover areas, typically in dry

soil. 542.

+2. Cyperus odoratus L. (C. ferax Richard). Relatively rare; damp soil, roadside ditches. 569.

*+3. Cyperus dipsaciformis Ferr. Occasional; cutover areas, typically in dry soil. 396.

4. Cyperus ovularis (Michx.) Torr. Relatively common; wet soil, open bottomlands and ditches. 281.

5. Cyperus retrorsus Chapm. Occasional; cutover areas, edge of woods; typically in dry soil. 623.

+6. Cyperus tenuifolius (Steud.) Dandy Rare; a few plants in short grass near South Gate entrance. 515.

2. Eleocharis R. Br. Spike-rush

1. Eleocharis obtusa (Willd.) Schultes Occasional; wet soil, open areas along shores of Matoaka Lake. 491.

3. Bulbostylis (Kunth) C. B. Clarke

1. Bulbostylis capillaris (L.) C. B. Clarke Occasional to common; dry open soil in cutover areas, edge of woods. 399, 718.

4. Scirpus L. Bulrush

a. Bristles retrorsely barbed above the middle; scales elliptic or obovate, conspicuously mucronate; achene pale to white..... ..... 1. S. atrovirens

a. Bristles smooth, not barbed.....b

b. Bristles scarcely exceeding the scales, somewhat crooked or contorted.....c

c. Bristles little longer than the achene; scales obtuse; achene pale to nearly white; panicles frequently proliferating..... ..... 2. S. divaricatus

c. Bristles almost twice as long as the achene; scales acuminate, sometimes conspicuously mucronate; achene purple-brown..... ..... 3. S. lineatus

b. Bristles greatly exceeding scales, strongly contorted and curled; scales and bristles red-brown..... 4. S. rubricosus

+1. Scirpus atrovirens Willd. Common; wet soil, open ravines, wet ditches. 275.

*+2. Scirpus divaricatus Ell. Occasional; sterile plants relatively common; wet soil, open bottomlands and ravines. Specimen collected producing plantlets from inflorescences. 628.

3. Scirpus lineatus Michx. Relatively common; wet soil in wooded ravines and bottomlands. 194, 282.

4. Scirpus rubricosus Fern. (S. eriophorum Michx.). Relatively common; typically in damp soil; depressions in cutover areas. 594.

5. Carex L. Sedge

a. Stigmas 2; achenes lenticular to plano-convex.....b

b. Some or all of the spikes androgynous i.e. staminate flowers produced at the summit of the spikes.....c

c. Spikes in simple heads, usually 10 or fewer; perigynia greenish at maturity, nerveless or obscurely nerved, spongy and somewhat swollen at the base..... 1. C. rosea

c. Spikes in a compound inflorescence, usually numerous; perigynia straw-colored at maturity, with 3-4 sharp nerves on the outer

face..... 2. C. vulpinoidea

b. Some or all of the spikes gynecandrous, i.e. staminate flowers produced at the base of the spikes.....d

d. Perigynia lanceolate, plano-convex, without wings on the margins, 4-5.5 mm. long, 1/6 to 1/4 as wide; spikes narrowly oblong..... 3. C. bromoides

d. Perigynia elliptic to rhombic, appressed, with thin marginal wings, 3.3-4.2 mm. long, 3/5 to 4/5 as wide; spikes ovoid..... ..... 4. C. longii

a. Stigmas 3; achenes trigonous to nearly round.....e

e. Overwintering leaves persistent, overtopping the culms; pistillate scales with deep purple markings; pistillate spikes 4-8 mm. long.. ..... 5. C. nigromarginata

e. Overwintering leaves not persistent; pistillate scales without purple markings; pistillate spikes more than 1 cm. long.....f

f. Perigynia sharply trigonous, 2.7-3.5 mm. long; beak very short, without teeth; plants of dry woods..... 6. C. digitalis

f. Perigynia ovoid, 6-9 mm. long; beak elongate with 2 terminal teeth; plants of wet areas.....g

g. Teeth of perigynia 1.3-2 mm. long, curved-divergent; style not contorted; pistillate spikes usually drooping..... ..... 7. C. comosa

g. Teeth of perigynia 0.5-1 mm. long, not conspicuously divergent; style contorted above the base; pistillate spikes erect..... 8. C. lurida

1. Carex rosea Schkuhr. Occasional; open woods, dry wooded slopes. 256.

+2. Carex vulpinoidea Michx. Common; open cutover areas, field near

Physics Laser Station. 229.

3. Carex bromoides Schkuhr. Relatively common; wet soil and shallow water in wooded ravines. 124.

*+4. Carex longii Mackenz. Occasional; open woods, field near Physics Laser Station. 228.

*+5. Carex nigromarginata Schwein. Occasional; dry wooded slopes, open woods. 17.

*+6. Carex digitalis Willd. Occasional; dry woods, open cutover areas. 131.

7. Carex comosa Boott. Relatively common; in shallow water, shores of Matoaka Lake, open bottomlands, especially College Creek. 726.

8. Carex lurida Wahlenb. Occasional; damp soil, open bottomlands. 162.

9. Carex sp. Occasional; dry open areas, field adjacent to Physics Laser Station. Specimens are immature and could not be satisfactorily identified. 9.

10. Carex sp. Occasional; woods, rich moist soil. Specimens are immature and could not be satisfactorily identified. 52.

14. ARACEAE

a. Spadix subtended by a well developed, green or purplish spathe; leaves compound; fruit a cluster of red berries; terrestrial.... 1. Arisaema

a. Spathe obscure; leaves simple; fruit a green or brown utricle; aquatic ..... 2. Orontium

1. Arisaema Mart. Indian-turnip

1. Arisaema triphyllum (L.) Schott. Jack-in-the-Pulpit. Common; damp wooded ravines. 82.

2. Orontium L. Golden Club

1. Orontium aquaticum L. Rare; one colony in shallow water, College Creek. 73.

15. LEMNACEAE

a. Roots present, arising from lower side of flattened thallus.....b
b. Roots 2-several; thallus red-purple beneath..... 1. Spirodela
b. Root 1; thallus green beneath..... 2. Lemna
a. Roots absent; thallus thick, ellipsoid to ovoid, somewhat flattened above..... 3. Wolffia

1. Spirodela Schleid. Duckweed

*+1. Spirodela polyrhiza (L.) Schleid. Common; floats on Matoaka Lake in large beds, with Lemna and Wolffia. 492.

2. Lemna L. Duckweed

*+1. Lemna minor L. Duckweed. Common; floats on Matoaka Lake in large beds, with Spirodela and Wolffia. 493.

3. Wolffia Horkel Water-meal

a. Upper surface of thallus with a prominent central papilla.....
..... 1. W. papulifera
a. Upper surface of thallus almost flat..... 2. W. punctata

*+1. Wolffia papulifera C. H. Thompson Water-meal. Common; both species of Wolffia float on Matoaka Lake in large beds with Spirodela and Lemna. 494.

*2. Wolffia punctata Griseb. Water-meal. Common; both species of Wolffia float on Matoaka Lake in large beds with Spirodela and Lemna. 495.

16. COMMELINACEAE

1. Commelina L. Dayflower

*+1. Commelina communis L. Dayflower. Common; disturbed areas, edge of woods, dry open areas. 249.

17. JUNCACEAE

a. Seeds several to many; capsule perfectly or imperfectly 3-locular; plants without hairs..... 1. Juncus

a. Seeds 3; capsule 1-locular; plants hairy..... 2. Luzula

1. Juncus L. Rush

a. Individual flowers prophyllate, i.e. subtended by 2 small bracteoles at the base of the perianth; leaves non-septate.....b

b. Sheaths at the base of the stem bearing blades.....c

c. Leaves flat, becoming involute when dry; auricles delicate, tongue-like, prolonged (1-3 mm.) beyond the base of the blade.. ..... 1. J. tenuis

c. Leaves terete; auricles if present, not prolonged.....d

d. Inflorescence appearing terminal, little exceeded by the involucral leaf; leaves numerous; seeds without white beaks... ..... 2. J. dichotomus

d. Inflorescence appearing lateral, greatly exceeded by involu-

cral leaf; leaves few; seeds coarsely ribbed and cross-ribbed, with white beaks..... 3. J. coriaceus

b. Sheaths at the base of the stem without blades; inflorescence apparently lateral, somewhat spreading..... 4. J. effusus

a. Individual flowers eprophyllate, without subtending bracteoles; leaves septate.....e

e. Inflorescence of globose heads; capsule subulate; stems from a thick, white rhizome; auricles ovate-oblong, 2-3 mm. long..... ..... 5. J. scirpoides

e. Inflorescence of hemispheric heads; capsule ovoid, pointed; plants lacking rhizomes; leaves without auricles..... 6. J. acuminatus

1. Juncus tenuis Willd. Common; dry open areas, along trails, field adjacent to Physics Laser Station. 225, 383, 400.

2. Juncus dichotomus Ell. Occasional; open cutover areas, woods. 347.

+3. Juncus coriaceus Mackenz. Relatively rare; damp wooded ravines, in wet soil. 731.

4. Juncus effusus L. Soft Rush. Occasional to common; shores of Matoaka Lake, roadside ditches. 733.

5. Juncus scirpoides Lam. Occasional; open bottomlands, roadside ditches; wet sand and clay substrates. 732.

6. Juncus acuminatus Michx. Occasional; damp soil, ravines and bottomlands. 279.

2. Luzula DC. Woodrush

a. Flowers solitary at the tips of spreading rays of the inflorescence; plants somewhat rhizomatous; seed subglobose, with a large, curved caruncle..... 1. L. acuminata

a. Flowers in spike-like clusters on the rays of the inflorescence; plants with numerous bulb-like tubers borne at the base; seed ovoid with a conically tapering caruncle..... 2. L. bulbosa

1. Luzula acuminata Raf. Woodrush. Relatively common; open deciduous woods, uplands and slopes. 6, 47.

2. Luzula bulbosa (Wood) Rydb. Woodrush. Relatively common; open deciduous woods, uplands and slopes. 30, 130, 244.

18. LILIACEAE

a. Flowers or inflorescence terminal.....b

b. Flowers solitary.....c

c. Stem with numerous alternate leaves; flowers yellow, sepals petaloid; fruit a 3-angled capsule..... 2. Uvularia

c. Stem with a terminal whorl of 3 leaves; flowers white, sometimes turning pink; fruit a berry..... 9. Trillium

b. Flowers in clusters.....d

d. Flowers orange-yellow, about 10 cm. wide, clustered on a leafless scape; leaves elongate, basal.....4. Hemerocallis

d. Flowers white, pale pink or yellow; less than 4 cm. wide.....e

e. Flowers in umbels.....f

f. Leaves basal; umbel with numerous flowers, terminating a scape; plants bulbous; fruit a capsule..... 3. Allium

f. Leaves not basal, in 2 whorls, one at the middle of the stem, one at the summit; plant with a horizontal white, tuber; fruit a berry.....8. Medeola

e. Flowers in racemes or panicles.....g

g. Principal leaves cauline, alternate; flowers borne in a

panicle; stem from a creeping rhizome; fruit a red berry. ..... 6. Smilacina

g. Principal leaves at or near the base of the plant; flowers borne in a scape-like panicle; stem from a bulb.....h

h. Styles 3; ovary deeply 3-lobed; flowers numerous, in a dense raceme; fruit a 3-lobed capsule... 1. Amianthium

h. Style 1; ovary obtusely 3-angled, not lobed; flowers 5-6, on long pedicels in an open raceme; fruit a capsule..... 5. Ornithogalum

a. Flowers or inflorescences in the axils of leaves.....i

i. Flowers perfect, solitary or in pairs, drooping from leaf axils; erect herbs.....j

j. Perianth of distinct sepals and petals; flowers yellow; fruit a capsule; flowers actually terminal, later appearing axillary as a result of prolongation of the main axis..... 2. Uvularia

j. Perianth tubular, sepals and petals free only at the tip; flowers white or greenish; fruit a berry..... 7. Polygonatum

i. Flowers imperfect, numerous in ascending umbels; climbing vines with tendrils; leaves net-veined; fruit a berry..... 10. Smilax

1. Amianthium Gray

*+1. Amianthium muscaetoxicum (Walt.) Gray Fly-poison. Rare; one colony, open oak-hickory woods. 425.

2. Uvularia L. Bellwort

1. Uvularia perfoliata L. Rare; one colony of plants on a steep wooded bank along College Creek. Located by Thomas Wieboldt. 742.

3. Allium L. Onion

1. Allium vineale L. Wild Onion. Common; open cutover areas. 451.

4. Hemerocallis L. Day-lily

1. Hemerocallis fulva L. Common Orange Day-lily. Rare; one colony in open cutover area. 433.

5. Ornithogalum L. Star-of-Bethlehem

1. Ornithogalum umbellatum L. Occasional; open cutover areas. 437.

6. Smilacina Desf. False Solomon's-seal

1. Smilacina racemosa (L.) Desf. Solomon's-zigzag or Solomon's-plume. Occasional; deciduous woods, moist slopes and ravines. 439.

7. Polygonatum Mill. Solomon's-seal

1. Polygonatum biflorum (Walt.) Ell. Solomon's-seal. Occasional; deciduous woods, moist slopes and ravines. 422.

8. Medeola L. Indian Cucumber-root

+1. Medeola virginiana L. Indian Cucumber-root. Relatively rare; in rich ravines in the south-west section. 237.

9. Trillium L. Trillium, Wakerobin

*1. Trillium pusillum Michx. var. virginianum Fern. Rare, introduced; 6-8 rhizomes were transplanted into an open, damp ravine by the author and Dr. Stewart A. Ware in late May, 1968. They were obtained from a similar habitat near Williamsburg which is in danger of

destruction. This species did not previously occur in the College Woods. 728.

10. Smilax L. Greenbrier

a. Stems unarmed; ovules 2 per locule..... 1. S. herbacea

a. Stems armed with prickles; ovules solitary.....b

b. Stems glabrous, terete or 4-angled; leaves thin, ovate, rotund or triangular-ovate, without a thickened leaf margin, veins and veinlets slender..... 2. S. rotundifolia

b. Stems stellate-scurfy at the base, 4-angled; leaves subcoriaceous, deltoid or hastate, with a distinctly thickened margin, veins and veinlets prominent..... 3. S. bona-nox

1. Smilax herbacea L. Carrion-flower. Occasional; wooded slopes in deciduous woods. 267, 605.

2. Smilax rotundifolia L. Common Greenbrier. Abundant; open woods, cutover areas, edge of woods. 695.

3. Smilax bona-nox L. Bullbrier. Abundant; cutover areas, edge of woods, open woods. 588.

19. DIOSCOREACEAE

1. Dioscorea L. Yam

a. Leaves cordate-ovate, with convex sides; perianth segments oblong to elliptic; plants without axillary tubers.....b

b. Leaves all alternate, the lowest sometimes subopposite but not whorled; stem twining..... 2. D. villosa

b. Leaves, at least the lower, in whorls of 4-7, upper leaves oppo-

site, sometimes subopposite; stem erect, or twining only at the summit..... 1. D. quaternata

a. Leaves halberd-shaped, sides concave above the widened base; plants with large fleshy root; bearing axillary tubers late in the season... ..... 3. D. batatas

1. Dioscorea quaternata (Walt.) J. F. Gmel. Occasional; deciduous woods, usually uplands. 268.

2. Dioscorea villosa L. Occasional; rich wooded slopes or ravines. 317, 357.

+3. Dioscorea batatas Dcne. Chinese Yam. Rare; one colony, along edge of mixed woods along Mill Neck Road. 520.

20. AMARYLLIDACEAE

1. Hypoxis L. Stargrass

1. Hypoxis hirsuta (L.) Coville Stargrass. Common; dry uplands in deciduous woods, open cutover areas. 108, 476.

21. IRIDACEAE

1. Sisyrinchium L. Blue-eyed Grass

1. Sisyrinchium angustifolium Mill. (S. graminoides Bickn.). Blue-eyed Grass. Occasional; edge of woods, along trails, open woods. 148, 172, 238.

22. ORCHIDACEAE

a. Leaves absent at anthesis, or reduced to sheathing scales; plants

without green color.....b

b. Flowers with a distinct, slender, elongate spur, greenish-purple, racemose; basal leaf solitary, purple beneath, developing in autumn and overwintering; rhizome with tubers..... 9. Tipularia

b. Flowers spurless.....c

c. Lip bearing 1-3 longitudinal ridges.....d

d. Stem arising from a coralline rhizome; brown fleshy stem without leaves; perianth 3-4 mm. long; flowers purplish, lip white with 2 purple dots..... 5. Corallorhiza

d. Stem arising from a globose corm; single basal leaf overwintering, shrivelling before anthesis; perianth 10-15 mm. long; flowers brownish purple, the lip white marked with purple..... 8. Aplectrum

c. Lip without ridges; stem somewhat fleshy, white, arising from a tuber; flowers white, in a spiral spike-like raceme..... ..... 2. Spiranthes

a. Foliage leaves present at anthesis; leaves with green color.....e

e. Fertile anthers 2, one on each side of column; lip a showy inflated pouch 1.5-7cm. long; flowers pink or deep yellow..... ..... 1. Cypripedium

e. Fertile anther 1; lip various, if pouch like, much smaller than above; flowers white or somewhat greenish.....f

f. Leaves chiefly basal, in a rosette or paired.....g

g. Leaves spreading in a basal rosette; roots fibrous or of thick fibers from a creeping rhizome; scape terete.....h

h. Flowers in a spiciform raceme; pollen masses 2; leaves fleshy, evergreen with white reticulations; roots from a

rhizome..... 3. Goodyera

h. Flowers pedicelled in a lax raceme; pollen masses 4; leaves membranaceous, deciduous, without white markings; roots fibrous..... 4. Ponthieva

g. Leaves 2 from a large bulb or corm; scape angled; flowers pale mauve-purple and green..... 7. Liparis

f. Leaf 1, cauline, about midway the stem; stem arising from a tuber; flowers greenish, racemose..... 6. Malaxis

1. Cypripedium L. Lady's Slipper

a. Flowers yellow; stem leafy almost to summit; lip not cleft..... ..... 1. C. calceolus var. pubescens

a. Flowers pink, from a naked scape with 2 basal leaves; lip cleft on the dorsal side..... 2. C. acaule

1. Cypripedium calceolus L. var. pubescens (Willd.) Correll Yellow Lady's Slipper. Rare; a few small colonies are present on slopes of wooded ravines. 71.

2. Cypripedium acaule Ait. Moccasin Flower. Occasional; open mixed woods, dry upland areas. 55, 128.

2. Spiranthes Richard Ladies'-tresses

*+1. Spiranthes tuberosa Raf. Little Ladies'-tresses. Rare; one depauperate plant collected in mixed woods east of Matoaka Lake. 621.

3. Goodyera R. Br. Rattlesnake-plantain

1. Goodyera pubescens (Willd.) R. Br. Downy Rattlesnake-plantain. Common; mixed or deciduous woods, mostly in drier upland areas. 421.

4. Ponthieva R. Br. Ponthieva

1. Ponthieva racemosa (Walt.) Mohr Shadow-witch. Occasional; stream banks in mixed deciduous woods. 584.

5. Corallorhiza Chatelain Coral-root

1. Corallorhiza odontorhiza (Willd.) Nutt. Autumn Coral-root. Relatively rare; dry woods, especially near pines. 657.

6. Malaxis Sw. Adder's-mouth

1. Malaxis unifolia Michx. Green Adder's-mouth. Occasional; mixed, open woods. 573.

7. Liparis Richard. Twayblade

1. Liparis lilifolia (L.) Richard. Lilia-leaved Twayblade. Rare; sandy soil, mixed woods. 598.

8. Aplectrum (Nutt.) Torr. Putty-root

1. Aplectrum hyemale (Muhl.) Torr. Putty-root. Rare; one small colony in sandy soil along north bank, mixed deciduous woods, northeast corner of Matoaka Lake. Dr. G. W. Hall, 3767, 9 April 1966. Because this species is very rare in the College Woods it was not collected by the author.

9. Tipularia Nutt. Cranefly Orchis

1. Tipularia discolor (Pursh) Nutt. Cranefly Orchis. Common; deciduous woods, especially upland areas. 433.

23. SAURURACEAE

1. Saururus L.

1. Saururus cernuus L. Lizard's-tail, Water-dragon. Abundant in shallow streams and College Creek. 271.

24. SALICACEAE

a. Buds with one scale; leaves linear; stamens 1-12; style 1 (or none); stigmas 2, short, simple or bifid..... 1. Salix

a. Buds with several imbricated scales; leaves deltoid; stamens 8-30; styles 2-4; stigmas 2-4, elongate..... 2. Populus

1. Salix L. Willow

a. Petioles glandular above at the apex.....b

b'. Branches flexible, not brittle at the base; leaves with 7-9 serrations per cm. of margin; capsules sessile, tufted in whorls along the axis of the ament..... 3. S. alba

b. Branches very brittle at the base, easily broken; leaves with 4-6 serrations per cm. of margin; capsules short-pediceled, spirally arranged..... 2. S. fragilis

a. Petioles not glandular.....c

c. Leaves glabrous; sprouts with auricled stipules; capsules glabrous; mostly trees..... 1. S. nigra

c. Leaves silvery-silky beneath; sprouts without auricled stipules; capsules sericeous; shrubs..... 4. S. sericea

1. Salix nigra Marsh. Black Willow. Common; shores of Matoaka Lake, especially where streams enter the lake, open bottomlands. 196, 210,

713.

*+2. Salix fragilis L. Crack Willow. Occasional; a few shrubby plants at edge of woods along Iron Bound Road. 725.

3. Salix alba L. White Willow. Occasional; woodland borders. 590.

*+4. Salix sericea Marsh. Silky Willow. Rare; one shrub along shore of Matoaka Lake, near Common Glory grounds. 38.

2. Populus L. Poplar

1. Populus deltoides Marsh. Cottonwood. Common; bottomlands, College Creek and on shores of Matoaka Lake. 591.

25. MYRICACEAE

1. Myrica L.

1. Myrica cerifera L. Wax Myrtle. Abundant; mixed woods, especially bordering Matoaka Lake, College Creek and small streams. 68.

26. JUGLANDACEAE

a. Pith of branches chambered; stamens 8-40; staminate and pistillate flowers with 4 sepals; nut with an indehiscent husk; median lateral leaflets usually the largest..... 1. Juglans

a. Pith of branches not chambered; stamens 3-8; staminate and pistillate flowers usually without sepals; nut with a dehiscent or partly dehiscent husk; terminal leaflets usually largest..... 2. Carya

1. Juglans L. Walnut

1. Juglans nigra L. Black Walnut. Rare; only a few mature trees noted

in mixed woods. 638.

2. Carya Nutt. Hickory

a. Scales of the terminal bud 4-6, valvate; buds permanently yellow-scurfy; fruit with winged sutures; husk not splitting to the base.... ..... 1. C. cordiformis

a. Scales of the terminal bud 6-12, imbricate; fruit wingless.....b

b. Terminal bud 1.3-3.5 cm. long, of 10-12 scales; young branchlets and foliage tomentose with curly fascicled hairs; leaflets usually 7-9..... 2. C. tomentosa

b. Terminal bud 8-12 mm. long, of 6-10 scales; branchlets and foliage glabrous, or sometimes slightly pilose; leaflets usually 5..... ..... 3. C. glabra

*+1. Carya cordiformis (Wang.) K. Koch Pignut or Bitternut. Occasional; throughout mixed woods, especially in the eastern areas and Squirrel Point. 640.

2. Carya tomentosa Nutt. (C. alba K. Koch). Mockernut. Common; throughout mixed woods, especially in the eastern areas and on Squirrel Point. 334, 413, 489.

*+3. Carya glabra (Mill.) Sweet Pignut. Occasional; throughout mixed woods, especially in the eastern areas and on Squirrel Point. 601, 613.

27. CORYLACEAE

a. Pistillate flowers in heads, few; nuts 1-1.5 cm. long, enclosed in a leafy involucre; twigs, petioles and involucre commonly glandular-bristly..... 1. Corylus

a. Pistillate flowers in aments; nuts less than 1 cm. long; plants not glandular-bristly.....b

b. Nut subtended by a large leafy bract; small tree with smooth gray bark..... 2. Carpinus

b. Nuts in a cone-like ament, with woody long-persistent bracts; large shrub with dark bark..... 3. Alnus

1. Corylus L. Hazel

1. Corylus americana Walt. American Hazelnut. Occasional; upland slopes and ravines, deciduous woods, especially on Squirrel Point. 602, 661.

2. Carpinus L. Hornbeam, Ironwood

1. Carpinus caroliniana Walt. Blue Beech. Relatively common; wooded bottomlands, ravines, bordering Matoaka Lake. 352.

3. Alnus B. Ehrh. Alder

1. Alnus serrulata (Ait.) Willd. Alder. Abundant; on shores of Matoaka Lake, in College Creek and in open bottomlands. 1.

28. FAGACEAE

a. Staminate flowers in peduncled, pendulous, spherical clusters; nut sharply triangular; fruit 4-valved; pith not 5-angled; bark smooth... ..... 1. Fagus

a. Staminate flowers in slender aments; nut compressed or circular in cross-section; fruit 2-4-valved or indehiscent; pith 5-angled; bark rough.....b

b. Involucre of pistillate flowers 2-4-valved, prickly; pistillate

flowers 2-4 per involucre; staminate aments erect..... 2. Castanea

b. Involucre of pistillate flower a cup-shaped capsule of prickleless imbricated scales; pistillate flowers solitary; staminate aments pendulous..... 3. Quercus

1. Fagus L. Beech

1. Fagus grandifolia Ehrh. American Beech. Common; mixed woods, abundant in some areas, especially on Squirrel Point. 614.

2. Castanea Mill. Chestnut

a. Mature leaves glabrous on both sides, long acuminate; nuts broader than long, flattened on one or two sides..... 1. C. dentata

a. Mature leaves gray-tomentose beneath, oblong, often obtuse or rounded; nuts ovoid, terete, longer than broad..... 2. C. pumila

1. Castanea dentata (Marsh.) Borkh. Chestnut. Occasional; sterile sprouts are present about the bases of former trees which were killed by the chestnut bark disease; no fertile shoots observed. 412.

2. Castanea pumila (L.) Mill. Chinquapin. Relatively common in open, cutover areas. 204, 309.

3. Quercus L. Oak

a. Leaves or leaf lobes not bristle-tipped; nut shell smooth on inside.. .....b

b. Leaves lobed.....c

c. Leaves regularly, deeply 7-9-lobed, glabrous below; branchlets glabrous, becoming reddish; nut 1.5-2.5 cm. long.... 1. Q. alba

c. Leaves usually cross-shaped, 5-lobed, red woolly below; branch-

lets tomentose; nut 1-1.5 cm. long..... 2. Q. stellata

b. Leaves coarsely toothed, not lobed.....d

d. Pubescence of lower leaf surface of erect, few-branched hairs, usually yellow or brownish in color; acorn cup 2.5-3 cm. broad, its scales free to the base..... 3. Q. michauxii

d. Pubescence of lower leaf surface of short, appressed, spreading, stellate hairs, usually white in color; acorn cup at most 2.5 cm. broad, only the tips of the scales free..... ..... 4. Q. muehlenbergii

a. Leaves bristle-tipped; nut shell woolly on inside.....e

e. Leaves deeply lobed.....f

f. Mature leaves tomentose or pubescent below.....g

g. Buds ovoid; leaves usually 3-lobed at apex, sometimes deeply 5-11 lobed, the lobes narrowly triangular; nut 1-1.5 cm. long, 1-1.8 cm. broad..... 8. Q. falcata

g. Buds 4-angled, densely pubescent; leaves usually 5-7-lobed, the lobes mostly oblong; nut 1.5-2.5 cm. long, 2-2.5 cm. broad..... 7. Q. velutina

f. Mature leaves glabrous below.....h

h. Leaf sinuses extending about half way to the midrib; acorn cups shallow, saucer-shaped; leaves mostly 7-11 lobed..... ..... 5. Q. rubra

h. Leaf sinuses extending more than half way to the midrib; acorn cups turbinate or cupuliform; leaves mostly 5-7-lobed. i

i. Terminal buds 4-angled, densely pubescent, 7-10 mm. long; acorn cup with loosely imbricated scales; acorn without a

ring at the apex..... 7. Q. velutina

i. Terminal buds ovoid, somewhat white-hairy, not densely pubescent, 3-5 mm. long; acorn cup with tightly imbricated scales; acorn marked with a ring near the apex..... ..... 6. Q. coccinea

e. Leaves shallowly and broadly 3-lobed across the summit, triangular-ovate in outline; acorns 1.5-2 cm. long, the cap turbinate, enclosing about half of the nut..... 9. Q. marilandica

1. Quercus alba L. White Oak. Abundant; one of the most important species in the canopy. 593.

2. Quercus stellata Wang. Post Oak. Occasional; dry uplands, edge of wooded areas. 655, 699.

3. Quercus michauxii Nutt. (Q. prinus L.). Basket Oak. Occasional; in and along ravines, generally in lower ground, although also along borders of wooded areas. 579, 702.

4. Quercus muehlenbergii Engelm. Yellow or Chestnut Oak. Occasional; dry slopes, along ridges of ravines, uplands. 610, 656.

*5. Quercus rubra L. [Q. maxima (Marsh.) Ashe.]. Northern Red Oak. Common; dry upland woods; an important canopy species. 479, 600.

6. Quercus coccinea Muenchh. Scarlet Oak. Relatively rare; dry woods; a few trees left in cutover areas. 686.

7. Quercus velutina Lam. Black Oak. Relatively rare; dry woods; a few trees left in cutover areas. 685.

+8. Quercus falcata Michx. Spanish or Southern Red Oak. Common; an important canopy species. 553.

9. Quercus marilandica Muenchh. Black Jack Oak. Rare; sandy soil, woodland border, near mixed woods. 697.

29. ULMACEAE

1. Ulmus L. Elm

a. Leaves rough on both surfaces; buds with rusty hairs; flowers sessile or very short-pedicelled; samara pubescent over seed cavity..... ..... 1. U. rubra

a. Leaves rough only on the upper surface; buds glabrous; flowers long pedicelled, soon pendulous; samara ciliate only on margins..... ..... 2. U. americana

1. Ulmus rubra Muhl. Slippery or Red Elm. Occasional to common; shrub-sapling layer in dry, open deciduous and mixed woods. 578.

2. Ulmus americana L. American Elm. Occasional; open bottomlands, especially along College Creek. 647.

30. MORACEAE

a. Buds with 3-6 scales; style divided nearly to the base; pistillate catkins short cylindric; leaves glabrous or softly pubescent beneath. ..... 1. Morus

a. Buds with 2-3 scales; style undivided; pistillate catkins globose; leaves densely pubescent beneath..... 2. Broussonetia

1. Morus L. Mulberry

a. Leaves pubescent beneath, scabrous above; fruit dark purple..... ..... 1. M. rubra

a. Leaves glabrous on both sides, or hairy only in the axils of the veins beneath; fruit pink or pale purple..... 2. M. alba

1. Morus rubra L. Red Mulberry. Occasional to common; shrub-sapling

layer in deciduous and mixed woods. 478, 502.

2. Morus alba L. White Mulberry. Rare; one tree near edge of field at Physics Laser Station. 116.

2. Broussonetia L'Her

1. Broussonetia papyrifera (L.) Vent. Paper-mulberry. Rare in the woods; one small plant at edge of woods. 729.

31. URTICACEAE

a. Plants with stinging hairs; calyx of pistillate flowers of 4 nearly separate sepals; inflorescences branched..... 1. Urtica

a. Plants without stinging hairs; calyx of pistillate flowers tubular, 2-4-toothed at the summit; inflorescences unbranched.... 2. Boehmeria

1. Urtica L. Nettle

*+1. Urtica dioica L. Stinging Nettle. Rare; one large colony of plants in field adjacent to Physics Laser Station. 218.

2. Boehmeria Jacq. False Nettle

1. Boehmeria cylindrica (L.) Sw. Bog-hemp. Common; moist soil and shallow water, shores of Matoaka Lake and College Creek. 391.

32. ARISTOLOCHIACEAE

1. Asarum L. Wild Ginger

a. Leaves deciduous; ovary wholly inferior ; styles united; stigma 6-lobed..... 1. A. canadense

a. Leaves evergreen; ovary partially inferior; styles 6, separate, each bearing a stigma..... 2. A. virginicum

1. Asarum canadense L. Wild Ginger. Relatively rare; one colony of plants along the bank north of Strawberry Plains crossing; wooded area, shaded. 83.

2. Asarum virginicum L. Heartleaf Ginger. Common; ravine banks, ridges and upland woods; more common in moist habitats. 4.

33. POLYGONACEAE

a. Calyx with the 3 outer sepals reflexed or spreading, persistent; inner sepals erect and enlarged in fruit; achene 3-angled... 1. Rumex

a. Calyx of 4-6 ascending sepals, more or less petaloid.....b

b. Style single but bifid, persistent as two hooked beaks on the achene; flowers scattered on an elongate inflorescence.. 2. Tovara

b. Styles 2 or 3, deciduous, not hooked; infloresence a dense spike or head-like raceme..... 3. Polygonum

1. Rumex L. Dock, Sorrel

a. Leaves not hastate; plants slightly if at all acid; flowers commonly perfect.....b

b. Valves of the fruiting calyx entire or nearly so.....c

c. Leaves entire, flat; grains on calyx narrow... 1. R. altissimus

c. Leaves with a crenulate, crisped margin; grains on calyx obtuse ..... 2. R. crispus

b. Valves of the fruiting calyx toothed; basal leaves ovate, usually red veined; grain on calyx usually 1..... 3. R. obtusifolius

a. Leaves, at least the lower, hastately lobed; acid to taste; flowers

commonly imperfect; plant spreading by slender rootstocks.....
..... 4. R. acetosella

1. Rumex altissimus Wood Pale Dock. Occasional; damp soil, shores of Matoaka Lake. 280.
2. Rumex crispus L. Yellow Dock. Common; open, cutover areas, field near Physics Laser Station, edge of woods. 191, 220, 327.
3. Rumex obtusifolius L. Bitter or Red-veined Dock. Common; open cutover areas, fields, edge of woods. 336, 338.
4. Rumex acetosella L. Sheep Sorrel. Common; cutover areas, edge of woods. 31.

2. Tovara Adans. Jumpseed

1. Tovara virginiana (L.) Raf. Jumpseed. Occasional; moist woods, slopes and ravines. 459.

3. Polygonum L. Knotweed, Smartweed

a. Stems without prickles, erect; inflorescence an elongate spike or spike-like raceme; leaves not sagittate.....b
   b. Borders of ocreae not fringed with bristles; racemes many, terminal and lateral; summit of stem and peduncles with stipitate glands; flowers pink..... 1. P. pensylvanicum
   b. Borders of ocreae fringed with bristles.....c
      c. Calyx pink or purple; leaves often purple blotched; racemes stout, compact..... 2. P. persicaria
      c. Calyx white; leaves not purple-blotched.....d
         d. Mature calyx punctate or dotted with glands, 3.5-4 mm. long; achene 3-3.6 mm. long..... 3. P. punctatum

d. Mature calyx not punctate or glandular-dotted, 3-3.5 mm. long; achene 2-3 mm. long..... 4. P. setaceum

a. Stems prickly, weak, reclining, usually angled; inflorescence short-capitate; leaves sagittate..... 5. P. sagittatum

1. Polygonum pensylvanicum L. Pinkweed. Occasional; cutover areas, field near Physics Laser station. 663.

2. Polygonum persicaria L. Lady's-thumb. Common; open cutover areas, edge of woods, field near Physics Laser Station. 343, 427.

*3. Polygonum punctatum Ell. Water-smartweed, Common; shores of Matoaka Lake, wet ravines and bottomlands, roadside ditches. 501.

4. Polygonum setaceum Baldw. Common; shores of Matoaka Lake, bottomlands, roadside ditches. 483.

+5. Polygonum sagittatum L. Arrow-vine, Tear-thumb. Occasional; open bottomlands, low damp areas. 651.

34. CHENOPODIACEAE

1. Chenopodium L. Pigweed

a. Plants farinose, not aromatic; inflorescence not leafy, a spike or cyme..... 1. C. album

a. Plants with resinous sessile glands, aromatic; inflorescence leafy, of densely flowered spikes forming a panicle..... 2. C. ambrosioides

1. Chenopodium album L. Pigweed or Lamb's-quarters. Occasional; open cutover areas, edge of woods. 594.

2. Chenopodium ambrosioides L. Mexican-tea. Occasional; edge of woods, in open weedy areas. 595.

35. AMARANTHACEAE

1. Amaranthus L. Amaranth

a. Terminal spike slender, 1 cm. or less thick; calyx of carpellate flowers acute, 2 mm. long or less; bracts slightly longer to twice as long as calyx..... 1. A. hybridus

a. Terminal spike stout, 1.5 cm. thick; calyx of carpellate flowers oblong or oblanceolate, 3 mm. long; bracts 2-3 times as long as calyx ..... 2. A. retroflexus

*+1. Amaranthus hybridus L. Pigweed. Rare; one plant collected at edge of woods, east of the Main Ravine. 624.

2. Amaranthus retroflexus L. Pigweed. Occasional; open cutover areas, field adjacent to Physics Laser Station. 717.

36. PHYTOLACCACEAE

1. Phytolacca L. Pokeweed

1. Phytolacca americana L. Pokeweed. Fairly common; in open cutover areas. 241.

37. CARYOPHYLLACEAE

a. Sepals distinct or nearly so; petals without claws.....b

b. Capsule globose to ovoid, opening by valves; stems puberulent in lines..... 1. Stellaria

b. Capsule cylindric, opening by teeth; stems viscid-pubescent..... ..... 2. Cerastium

a. Sepals united, forming a cup or tube; petals clawed.....c

c. Petals white; calyx without foliaceous bracts at the base; styles 3..... 3. Silene

c. Petals roseate; calyx with foliaceous bracts at the base; styles 2 ..... 4. Dianthus

1. Stellaria L. Chickweed

1. Stellaria media (L.) Cyrillo Common Chickweed. Common; open cutover areas, edge of woods, along trails. 26.

2. Cerastium L. Mouse-ear Chickweed

1. Cerastium viscosum L. Mouse-ear Chickweed. Common; open cutover areas, edge of woods, along trails. 25.

3. Silene L.

+1. Silene stellata (L.) Ait. f. Starry Campion. Rare; one small colony of plants at edge of woods north of South Gate entrance. 499.

4. Dianthus L. Pink

1. Dianthus armeria L. Deptford Pink. Occasional; field near Physics Laser Station, in grassy areas along trails. 313, 366.

38. CERATOPHYLLACEAE

1. Ceratophyllum L. Hornwort

*+1. Ceratophyllum demersum L. Occasional to common; shallow water in Matoaka Lake. Specimens collected fruiting. 359.

39. NYMPHAEACEAE

1. Nuphar Sm. Yellow Pond-lily

1. Nuphar advena (Ait.) Ait. f. Yellow Pond-lily. Rare; one small colony in shallow water in College Creek. 176.

40. RANUNCULACEAE

a. Sepals and petals present or petals absent and sepals showy, petaloid, not caducous.....b

b. Flowers yellow.....c

c. Sepals and petals present; fruit an achene; leaves deeply 3-5-cleft..... 1. Ranunculus

c. Petals absent; sepals petaloid; fruit a follicle; leaves rounded or reniform, not cleft..... 5. Caltha

b. Flowers white or lavender to pink.....d

d. Plants woody climbers, trailing or climbing; petals none; sepals 4, white, petaloid; fruit an achene..... 4. Clematis

d. Plants erect herbs, not climbing or trailing.....e

e. Leaves basal, cordate, 3-lobed; lobes entire, broader than long, rounded at the summit; pistils not in a cylindric head; flowers lavender to pink..... 2. Hepatica

e. Leaves opposite, cauline, mostly 5-lobed; lobes dentate, longer than broad, acute at the summit; pistils in a cylindric head; flowers white..... 3. Anemone

a. Sepals small, inconspicuous, caducous; petals modified stamens; inflorescence a dense elongate raceme; stamens white..... 6. Cimicifuga

1. Ranunculus L. Crowfoot

a. Achenes turgid, without wing-like margins; basal leaves frequently undivided or merely lobed.....b

b. Achenes corky-thickened at the base; lower and middle cauline leaves long-petioled..... 1. R. sceleratus

b. Achenes not corky-thickened; cauline leaves short-petioled to sessile..... 2. R. abortivus

a. Achenes flattened, usually wing-margined; basal leaves usually compound.....d

d. Petals 2-5 mm. long, barely exceeding the sepals; beak of achene strongly hooked; plants with thick rhizomes..... 3. R. recurvatus

d. Petals 6-15 mm. long, definitely exceeding the sepals.....e

e. Style elongate, stigmatose only at the apex; achenes with a dorsal keel and a subulate beak; pubescence spreading..... ..... 4. R. hispidus

e. Style short and stout, stigmatose along the inner side.....f

f. Sepals spreading; terminal segment of cauline leaves not stalked; rhizome present..... 5. R. acris

f. Sepals tightly reflexed; terminal segment of principal leaves stalked; subglobose corm present..... 6. R. bulbosus

1. Ranunculus sceleratus L. Celery-leaved Crowfoot. Rare; open, swampy bottomlands, in wet soil or shallow water. 213.

2. Ranunculus abortivus L. Occasional; grassy open alluvial bottom. Dr. G. W. Hall, 3807, 23 April 1966.

3. Ranunculus recurvatus Poir. Rough Crowfoot. Occasional; damp soil in wooded ravines, shaded areas. 103.

4. Ranunculus hispidus Michx. Occasional; rich wooded ravines, typically

in damp shaded areas. 45, 76, 102.

*+5. Ranunculus acris L. Common or Tall Buttercup. Occasional; woodland borders, along trails. 191.

6. Ranunculus bulbosus L. Bulbous Buttercup. Occasional; open woods, ravines; occasionally in damp soil but typically in drier habitats. 180.

2. Hepatica Mill Hepatica

1. Hepatica americana (DC.) Ker. Liverleaf or Hepatica. Common; on slopes of damp, wooded ravines, occasionally in drier wooded areas. 5, 19.

3. Anemone L. Anemone

1. Anemone virginiana L. Thimbleweed. Common; dry wooded slopes and along trails. 265, 290, 373.

4. Clematis L. Clematis

+1. Clematis dioscoreifolia Levl. & Vaniot Rare; one vine near West Gate entrance, probably spread from cultivation. 471.

5. Caltha L. Marsh Marigold

1. Caltha palustris L. Cowslip or Marsh Marigold. Relatively rare; a colony of plants in swampy area in Main Ravine. 69.

6. Cimicifuga L. Bugbane

1. Cimicifuga racemosa (L.) Nutt. Black Snakeroot, Black Cohosh. Occasional; woods, especially along ravine banks and on slopes. 311, 603.

41. BERBERIDACEAE

1. Podophyllum L. May-apple

1. Podophyllum peltatum L. May-apple. Relatively common; open, moist woods. 72, 85.

42. MAGNOLIACEAE

a. Leaves oval to lanceolate; petals white; fruits coherent in a cone, dehiscent at maturity..... 1. Magnolia

a. Leaves 4-lobed, truncate; petals greenish-yellow, with orange markings; fruits indehiscent, samara-like, falling singly..... 2. Liriodendron

1. Magnolia L. Magnolia

a. Leaves thick-coriaceous, leathery, brown-hairy below; cones 8-12 cm. long..... 1. M. grandiflora

a. Leaves thin-coriaceous, not leathery, glaucous beneath; cones 3-5 cm. long..... 2. M. virginiana

1. Magnolia grandiflora L. Southern Magnolia. Occasional, introduced; along trails in wooded areas; a few large trees in cleared area west of the Physics Laser Station which was formerly used as a nursery. 318.

+2. Magnolia virginiana L. Sweet Bay, Laurel Magnolia. Occasional; in damp ravines in southwestern area of the woods; not observed flowering. 332.

2. Liriodendron L. Tulip-tree

1. Liriodendron tulipifera L. Tulip Poplar. Abundant; an important canopy tree throughout the deciduous and mixed woods. 154.

43. CALYCANTHACEAE

1. Calycanthus L. Carolina Allspice

*1. Calycanthus fertilis Walt. Carolina Allspice. Rare; a few large shrubs near abandoned cabin on Squirrel Point. These plants, presumably persisting after cultivation, were badly damaged when the area burned about 2 years ago. 545.

44. ANNONACEAE

1. Asimina Adans. Pawpaw

1. Asimina triloba (L.) Dunal. Pawpaw. Occasional; saplings are relatively common in open, cutover areas and along trails and are occasionally found in more mature woods. 634.

45. LAURACEAE

a. Leaves palmately veined, some of them 2- or 3-lobed; flowers in peduncled racemes; drupes blue..... 1. Sassafras

a. Leaves pinately veined, not lobed; flowers in dense clusters, almost sessile; drupes red..... 2. Lindera

1. Sassafras Nees Sassafras

*1. Sassafras albidum (Nutt.) Nees var. albidum. White Sassafras.

Common; open situations, cutover areas, woodland borders. 740.

\+ S. albidum (Nutt.) Nees var. molle (Raf.) Fern. Red Sassafras. Twigs pubescent, leaves densely pubescent when young, permanently so beneath. Occasional; cutover areas, woodland borders. 59.

2. Lindera Thunb. Wild Allspice

1. Lindera benzoin (L.) Blume Spicebush. Common; wet, wooded ravines. 3.

46. PAPAVERACEAE

1. Sanguinaria L. Bloodroot

1. Sanguinaria canadensis L. Bloodroot. Common; moist woods, especially along slopes of ravines. 21.

47. CRUCIFERAE

a. Fruits flattened at right angles to the septum, no more than 3 times as long as broad (silicle).....b

b. Fruits wrinkled and tuberculate; locules plump, not strongly flattened; racemes short, spreading or drooping..... 2. Coronopus

b. Fruits smooth; locules flattened; racemes elongate, erect.....c

c. Seed one in each locule; silicle rounded, cordate at base..... ..... 1. Lepidium

c. Seeds 10-12 in each locule; silicle triangular-obcordate, narrowed to the base..... 3. Capsella

a. Fruits flattened parallel to the septum; fruits more than 3 times as long as broad (silique).....d

d. Flowers yellow.....e

e. Fruit with a stout indehiscent beak at least 1 cm. long; seeds globose..... 4. Brassica

e. Fruit beakless, or with a short beak less than 3 mm. long; entire fruit dehiscent; seeds elongate.....f

f. Stem not arising from a basal rosette of leaves; flowers relatively small, petals 3-6 mm. long; fruits 1-1.5 mm. long, without a beak..... 5. Sisymbrium

f. Stem arising from a basal rosette; flowers larger, petals 6-8 mm. long; fruits 1.5-7 cm. long, with a short beak..... ..... 8. Barbarea

d. Flowers white.....g

g. Leaves simple, not deeply lobed.....h

h. Basal rosette of leaves present at anthesis; pubescence of forked hairs; petals 2-3 mm. long; plants of dry habitats... ..... 6. Arabidopsis

h. Basal rosettes wanting; pubescence of simple hairs; petals 7-12 mm. long; plants of wet habitats..... 9. Cardamine

g. Leaves, at least the lower, compound or deeply cleft.....i

i. Plants succulent, aquatic; fruit with 2 rows of seeds per locule; perennials with creeping bases, rooting at the nodes ..... 7. Nasturtium

i. Plants not succulent, terrestrial; fruit with one row of seeds per locule; annuals or biennial, neither with creeping bases nor rooting at the nodes..... 9. Cardamine

1. Lepidium L. Pepperwort

a. Cauline leaves sagittate-clasping; plants densely pubescent; silicles 5-6 mm. long..... 1. L. campestre

a. Cauline leaves tapering to the base; plants minutely pubescent or glabrous; silicles 2.5-4 mm. long..... 2. L. virginicum

1. Lepidium campestre (L.) R. Br. Cow-cress. Common; cutover areas, clearing on Squirrel Point, field near Physics Laser Station. 166.

2. Lepidium virginicum L. Poor Man's Pepper or Pepper-grass. Common; cutover areas, roadsides, field near Physics Laser Station. 224, 345.

2. Coronopus Trew Wart-cress

1. Coronopus didymus (L.) Sm. Wart-cress. Relatively rare; a small colony of plants on Squirrel Point in an open area which was previously bulldozed. 152.

3. Capsella Medic. Shepherd's-purse

1. Capsella bursa-pastoris (L.) Medic. Relatively rare; woodland borders. Specimens were collected near Rt. 5 entrance and not noted elsewhere. 466.

4. Brassica L. Mustard

a. Leaves petioled, not clasping at the base; plants glabrous or nearly so; siliques 1-2 cm. long..... 1. B. nigra

a. Leaves sessile, at least the upper with clasping, auricled bases; plants hirsute; siliques 3-7 cm. long..... 2. B. rapa

1. Brassica nigra (L.) Koch Black Mustard. Common; woodland borders, open cutover areas. 217.

2. Brassica rapa L. (B. campestris L.). One small specimen collected from field adjacent to Physics Laser Station; probably occurs elsewhere. 168.

5. Sisymbrium L.

*+1. Sisymbrium officinale (L.) Scop. Relatively rare; one specimen collected from field near Physics Laser Station. 221.

6. Arabidopsis Heynh. Mouse-ear-cress

1. Arabidopsis thaliana (L.) Heynh. Mouse-ear-cress. Common; woodland borders, open cutover areas, typically in dry soil. 28, 35, 150.

7. Nasturtium R. Br. Watercress

+1. Nasturtium officinale R. Br. Watercress. Common; shores of Matoaka Lake, especially in Main Ravine, occasionally in streams and College Creek. 177, 215.

8. Barbarea R. Br. Winter-cress

a. Lower leaves with 1-4 pairs of lateral lobes; beak of fruit slender, 1.5-3 mm. long; upper leaves somewhat lobed, rarely pinnatifid..... ..... 1. B. vulgaris

a. Lower leaves with 4-8 pairs of lateral lobes; beak of fruit stout, 0.5-1 mm. long; upper leaves usually pinnatifid..... 2. B. verna

1. Barbarea vulgaris R. Br. Common Winter-cress, Yellow Rocket. Occasional; woodland borders. 113.

2. Barbarea verna (Mill.) Aschers Early Winter-cress. Occasional; field near Physics Laser Station, woodland borders. 61.

9. Cardamine L. Bitter Cress

a. Leaves simple; plants with a tuberous base; petals 7-16 mm. long; plants of wet habitats..... 1. C. bulbosa

a. Leaves pinnate; plants with fibrous roots, tuberous base lacking; petals 1.5-4 mm. long; plants of dry habitats.....b

b. Leaves membranaceous; cauline leaves with ovate leaflets, similar to the basal leaves; stamens 6; stem flexuous..... 2. C. flexuosa

b. Leaves firm; cauline leaves with narrow, linear leaflets, very different from those of the basal rosette; stamens usually 4; stem stiffly ascending..... 3. C. hirsuta

1. Cardamine bulbosa (Schreb.) BSP. Spring-cress. Relatively common; open bottomlands, in wet soil. 70.

*+2. Cardamine flexuosa With. Rare; one small colony of plants in disturbed area on the tip of Squirrel Point. 151.

3. Cardamine hirsuta L. Common; in open areas, along roads, in Physics Laser Station Field. 27.

48. SAXIFRAGACEAE

a. Plants high-climbing vines, somewhat woody; stamens 20-30; capsule 7-10-locular; inflorescence a compound terminal cyme with numerous flowers..... 2. Decumaria

a. Plants erect shrubs or herbs; stamens 5-10; capsule 1-2-locular.....b

b. Plants herbaceous; leaves cordate to round-ovate; stamens 5; capsule 1-locular; flowers borne in small clusters in a narrow panicle..... 1. Heuchera

b. Plants shrubs; leaves ovate-oblong; stamens 8-10; capsule 2-

locular; inflorescence a compound cyme..... 3. Hydrangea

1. Heuchera L. Alumroot

1. Heuchera americana L. Rock Geranium. Occasional; damp shaded slopes. 201.

2. Decumaria L. Climbing Hydrangea

+1. Decumaria barbara L. Wood-vamp. Not uncommon on Squirrel Point on trees overhanging Matoaka Lake. 216.

3. Hydrangea L. Hydrangea

1. Hydrangea arborescens L. Wild Hydrangea. Occasional; wooded slopes, especially in more open areas, along trails. 284.

49. HAMAMELIDACEAE

a. Leaves pinnately veined, toothed; petals present; flowers in small axillary clusters; shrubs..... 1. Hamamelis

a. Leaves palmately veined, deeply lobed; petals absent; flowers in dense globose heads; trees..... 2. Liquidambar

1. Hamamelis L. Witch-hazel

1. Hamamelis virginiana L. Witch-hazel. Relatively rare; one colony of shrubs in peaty soil on a wooded slope. 408.

2. Liquidambar L. Sweet Gum

1. Liquidambar styraciflua L. Sweet Gum. Occasional; mixed woods; seedlings and saplings relatively common in cutover areas. 576.

50. PLATANACEAE

1. Platanus L. Sycamore

1. Platanus occidentalis L. Sycamore. Common; bottomlands, occasionally along shores of Matoaka Lake. 486.

51. ROSACEAE

a. Trees or shrubs.....b

b. Pistil 1, compound or simple; fruit a pome or drupe.....c

c. Pistil compound, enclosed by and adnate to the calyx tube; fruit a pome.....d

d. Shrubs; inflorescence a compound corymb; leaves glandular-serrate; fruit bright red..... 2. Pyrus

d. Trees; inflorescence a raceme; leaves serrate, not glandular; fruit dark purple..... 3. Amelanchier

c. Pistil simple, free from the calyx tube; fruit a drupe; inflorescence racemose, with numerous flowers..... 11. Prunus

b. Pistils several; fruit achenes or drupelets.....e

e. Leaves palmately compound or tri-foliate; flowers hypogynous, ovaries borne on the receptacle; fruit an aggregate of drupelets..... 8. Rubus

e. Leaves pinnately compound, leaflets 5-9; flowers perigynous; fruit a group of achenes enclosed in a fleshy receptacle..... ..... 10. Rosa

a. Herbaceous plants (occasionally with a woody caudex below basal leaves).....f

f. Fruit a follicle, 2-4-seeded; petals linear, 1-2 cm. long, white;

leaves trifoliate..... 1. Gillenia

f. Fruit an achene; petals 2-10 mm. long, rotund to ovate, white or yellow.....g

g. Styles filiform, elongating in fruit, the upper part deciduous, the lower persistent as a hook; lower leaves usually pinnate, upper leaves simple..... 7. Geum

g. Styles short, inconspicuous; leaves alike in form, sometimes differing in size.....h

h. Leaves pinnately compound; hypanthium turbinate, armed with hooked prickles around the summit..... 9. Agrimonia

h. Leaves trifoliate or palmately compound; hypanthium unarmed. i

i. Receptacle enlarged in fruit, pulpy; leaflets 3.....j

j. Flowers white; receptacle becoming juicy (strawberry); bractlets similar in shape and size to calyx lobes.... ..... 4. Fragaria

j. Flowers yellow; receptacle spongy; bractlets broader and longer than calyx lobes..... 5. Duchesnea

i. Receptacle not enlarged in fruit, dry; leaflets mostly 5; flowers yellow..... 6. Potentilla

1. Gillenia Moench Indian-physic

1. Gillenia trifoliata (L.) Moench Bowman's root. Rare; open slope adjacent to a cutover area. 205.

2. Pyrus L.

1. Pyrus arbutifolia (L.) L. f. (Aronia arbutifolia Ell.). Red Choke-

berry. Occasional; open woods, usually in areas with pine. 57, 720.

3. Amelanchier Medic.

1. Amelanchier canadensis (L.) Medic. Shadbush or Serviceberry. Occasional; woods bordering Matoaka Lake. 22, 39, 211.

4. Fragaria L. Strawberry

1. Fragaria virginiana Duchesne. Wild Strawberry. Common; cutover areas, along trails, borders of woods, field adjacent to Physics Laser Station. 37, 50.

5. Duchesnea Sm. Indian Strawberry

1. Duchesnea indica (Andr.) Focke Indian Strawberry. Common; cutover areas, field near Physics Laser Station, along trails, borders of woods. 62, 223.

6. Potentilla L. Cinquefoil

1. Potentilla canadensis L. Cinquefoil. Common; cutover areas, field near Physics Laser Station, along trails, borders of woods. 14, 31, 51.

7. Geum L. Avens

a. Flowers white; petals 5-9 mm. long; cauline leaves distinctly smaller at the summit of the stem..... 1. G. canadense

a. Flowers greenish-yellow; petals 2-4 mm. long; cauline leaves not reduced in size toward the summit of the stem..... 2. G. virginianum

1. Geum canadense Jacq. White Avens. Common; rich woods, especially in

moist soil along ravines. 289.

+2. Geum virginianum L. Avens. Common; woods, wooded slopes, ravines. 382.

8. Rubus L. Bramble

The taxonomy of this group is difficult because of introgression, polyploidy and apomixis. The number of species recognized, and the types of characters used to delimit species, vary considerably with the author.

Three main types of Rubus occur in the College Woods: Black Raspberry, Dewberry, Blackberry. The following species are thought to represent some of the more common species, but certainly not all the species present.

a. Fruit separating from receptacle, which remains on the pedicel (raspberries).....b

b. Stems covered with long (3-5 mm.), purple, glandular hairs; leaves densely white-tomentose beneath; fruit red... 1. R. phoenicolasius

b. Stems not glandular, glaucous or glabrous; leaves sparingly gray-tomentose beneath; fruit black..... 2. R. occidentalis

a. Fruit falling intact (receptacle included).....c

c. Stems trailing or creeping; flowers in corymbs or solitary (dewberries).....d

d. Flowers solitary; pedicels spreading-villous and glandular; stems slender, flexible..... 3. R. leviculus

d. Flowers 2-8 in a leafy corymb; pedicels glandless, essentially glabrous; stems stout..... 4. R. imperiorum

c. Stems erect or arched-ascending; inflorescence racemiform or corymbiform; fruit subglobose to ellipsoid, 1-3 cm. long (black-

berry)..... 5. R. philadelphicus

*+1. Rubus phoenicolasius Maxim. Wineberry. Occasional; woodland borders, occasionally forming thickets in open areas. 632.

*+2. Rubus occidentalis L. Black Raspberry. Realtively common; woodland borders, cutover areas. 247, 386.

*+3. Rubus leviculus Bailey Common; open cutover areas, field adjacent to Physics Laser Station. 66, 136. Specimens identified by Dr. and Mrs. H. A. Davis.

*+4. Rubus imperiorum Fern. Rare; collected at one location, open cutover area. 336. Incomplete specimen identified tentatively by Dr. and Mrs. H. A. Davis.

*+5. Rubus philadelphicus Blanch. (included in R. pensilvanicus Poir. by Fernald, 1950). Common; open cutover areas, thickets along woodland borders. 206, 325. Incomplete specimens identified tentatively by Dr. and Mrs. H. A. Davis.

9. Agrimonia L. Agrimony

+1. Agrimonia rostellata Wallr. Agrimony. Occasional to common; open woods, wooded slopes, along trails. 398.

10. Rosa L. Rose

a. Petals white; stems trailing; styles united into a column exerted from the receptacle; planted along roadsides..... 1. R. multiflora

a. Petals pink; stems erect; styles free, not united; native plants of marshy habitats..... 2. R. palustris

*+1. Rosa multiflora Thunb. A few large bushes planted along Jamestown Road. 171.

2. Rosa palustris Marsh. Swamp Rose. Common; open thickets around shores of Matoaka Lake and in College Creek. 270.

11. Prunus L. Cherry, Plum

1. Prunus serotina Ehrh. Black Cherry. Relatively common; sapling-shrub layer in mixed woods; a few fertile trees bordering Physics Laser Station. 109, 117, 604.

52. LEGUMINOSAE

a. Trees and shrubs.....b
  b. Flower actinomorphic, in dense heads; leaves twice-pinnate; flowers pale pink or lilac; introduced trees..... 1. Albizzia
  b. Flowers zygomorphic, not arranged in heads; leaves simple or once-pinnate; native trees or shrubs.....c
    c. Leaves simple, cordate; flowers appearing before the leaves; corolla deep pink; small trees..... 3. Cercis
    c. Leaves compound; flowers appearing with or after the leaves; corolla white or purple.....d
      d. Leaves pinnately compound, with 3-10 pairs of leaflets; flowers white, fragrant, 1.5-2.3 cm. long; legume many-seeded, flattened, linear..... 11. Robinia
      d. Leaves trifoliate; flowers purple or pink, smaller; legume one-seeded, oval or round..... 13. Lespedeza

a. Herbaceous plants.....e
  e. Flowers actinomorphic or nearly so; sepals 5, separate or scarcely united at the base; leaves pinnate; leaflets sensitive to touch; petals yellow..... 2. Cassia

e. Flowers zygomorphic; sepals 5, united; leaflets not sensitive....f

f. Stamens 10, distinct; leaves trifoliate, with entire margins; flowers yellow, in terminal racemes; perennials with thick rhizomes..... 4. Baptisia

f. Stamens monadelphous or diadelphous.....g

g. Leaves all simple; flowers yellow, in racemes; pods inflated, seeds many..... 5. Crotalaria

g. Leaves compound.....h

h. Leaves odd-pinnate, palmate or trifoliate.....i

i. Leaflets on principal leaves 3.....j

j. Leaflets serrulate.....k

k. Inflorescence a head; terminal leaflet sessile, or nearly so; flowers withering, but persistent in fruit..... 7. Trifolium

k. Inflorescence an elongate raceme; terminal leaflet distinctly stalked; flowers deciduous.....l

l. Legume ovoid, somewhat reticulate; flowers white or yellow, 4-7 mm. long; stems erect, 5-15 dm. tall..... 8. Melilotus

l. Legume reniform, spiral at the summit; flowers yellow, 2-4 mm. long; stems prostrate, spreading..... 9. Medicago

j. Leaflets entire.....m

m. Flowers yellow or cream color.....n

n. Legume oval, indehiscent, 1-seeded; leaves sericeous beneath; stems pubescent on the angles; leaflets linear-cuneate.. 13. Lespedeza

n. Legume elongate, dehiscent, usually 2-seeded; leaves and stems densely tomentose; leaflets obovate or oblong..... 20. Rhynchosia

m. Flowers blue, purple to pink, or white.....o

o. Stems erect or prostrate and spreading.....p

p. Legume of 2-many segments, these covered with hooked hairs; calyx 2-lipped; leaflets usually with stipellules..... ..... 12. Desmodium

p. Legume 1-seeded, of one segment, lacking hooked hairs; calyx subequally 5-toothed; leaflets lacking stipellules..... ..... 13. Lespedeza

o. Stems twining, trailing or climbing, vines..q

q. Calyx lobes 5.....r

r. Flowers purple, 10-12 mm. long, borne in racemes; keel spirally coiled..... ..... 15. Phaseolus

r. Flowers pale blue, 5-6 cm. long; peduncles of axillary inflorescences 1-2 flowered; keel not spirally coiled..... ..... 17. Clitoria

q. Calyx lobes 4.....s

s. Style bearded on the upper surface; keel petals strongly curved upward; flowers in long-peduncled heads..... ..... 16. Strophostyles

s. Style beardless on the upper surface (sometimes bearded at the base), keel petals almost straight.....t

t. Leaflets acute; calyx not subtended by bracts; pedicels subtended by broad bracts with a truncate summit. ..... 18. Amphicarpa

t. Leaflets obtuse or rounded; calyx subtended by 2 bracts; pedicels subtended by narrow pointed bracts..... ..... 19. Galactia

i. Leaflets of principal leaves more than 3.....u

u. Leaflets 7-11, palmately arranged; flowers blue; inflorescence a raceme 1-2 dm. long..... 6. Lupinus

u. Leaflets 9-27, pinnately arranged; standard yellow, wings pink to purple..... 10. Tephrosia

h. Leaves evenly pinnate, or the terminal leaf represented by a tendril; style bearded; wing and keel petals united..... 14. Vicia

1. Albizzia Durazzini

1. Albizzia julibrissin Durazzini Silk-tree or "Mimosa". A few trees in an open area west of Physics Laser Station, persisting from when the area was used as a nursery. 361.

2. Cassia L. Senna

a. Petals 1-2 cm. long; stamens 10; calyx 9 mm. or longer; pedicels 1 cm. or more in length..... 1. C. fasciculata

a. Petals 4-8 mm. long; stamens 5; calyx less than 4 mm. long; pedicels less than 5 mm. long..... 2. C. nictitans

1. Cassia fasciculata Michx. Partridge-pea. Common; dry, exposed soils; open cutover areas and woodland borders. 430.

2. Cassia nictitans L. Wild Sensitive Plant. Common; dry, exposed soils; open cutover areas and woodland borders. 439.

3. Cercis L. Redbud

1. Cercis canadensis L. Redbud. Occasional to common; shrub-sapling layer in mixed woods. 36.

4. Baptisia Vent. False Indigo

1. Baptisia tinctoria (L.) R. Br. Wild Indigo. Common; open cutover areas, typically in dry soil. 306, 401.

5. Crotalaria L. Rattlebox

a. Peduncles 1-4 cm. long; legume 1.5-2.7 cm. long; pubescence villous, rather dense..... 1. C. sagittalis

a. Peduncles 3-12 cm. long; legume 2.5-4 cm. long; pubescence minutely strigose..... 2. C. purshii

1. Crotalaria sagittalis L. Rattlebox. Occasional; open cutover areas, typically in dry sandy soil. 395.

2. Crotalaria purshii DC. Rattlebox. Occasional; open cutover areas, typically in dry sandy soil. 394.

6. Lupinus L. Lupine

1. Lupinus perennis L. Wild Lupine. Relatively rare; open cutover

areas, which are usually rather overgrown with herbaceous vegetation. 56, 198.

7. Trifolium L. Clover

a. Flowers white to pink or purple.....b
  b. Flowers sessile in the heads.....c
    c. Corolla white to pink; calyx densely villous, exceeding and partly concealing the corolla; heads ovoid to cylindric; flowers 3-5 mm. long..... 1. T. arvense
    c. Corolla purple; calyx glabrous to sparsely pilose, not exceeding the corolla; heads globose or round ovoid; flowers 13-20 mm. long..... 2. T. pratense
  b. Flowers pedicellate.....d
    d. Stems creeping, with basal runners; calyx teeth shorter than the tube..... 3. T. repens
    d. Stems erect or ascending, without basal runners; calyx teeth slightly longer than the tube..... 4. T. hybridum
a. Flowers yellow.....e
  e. Heads 20-30-flowered; corolla striate; flowers 3.5-4.5 mm. long..... 5. T. procumbens
  e. Heads 5-15-flowered; corolla not striate; flowers 2.5-3.5 mm. long..... 6. T. dubium

1. Trifolium arvense L. Rabbit-foot Clover. Occasional; open cutover areas, sometimes in relatively large colonies. 295.

2. Trifolium pratense L. Red Clover. Occasional; borders of woods. 189.

3. Trifolium repens L. White Clover. Common; open, cutover areas,

along trails, woodland borders. 90, 364.

+4. Trifolium hybridum L. Alsike Clover. Occasional; woodland borders, probably other dry, open areas. 431.

5. Trifolium procumbens L. Low Hop-clover. Common; woodland borders, along trails, occasionally in cutover areas. 145, 234.

*+6. Trifolium dubium Sibth. Occasional; woodland borders, along trails. 365.

8. Melilotus Mill. Sweet Clover

a. Petals yellow, 5-6 mm. long; fruit 2.5-3.5 mm. long, prominently reticulate..... 1. M. officinalis

a. Petals white, 4-5 mm. long; fruit 3-4 mm. long, somewhat reticulate.. ..... 2. M. alba

1. Melilotus officinalis (L.) Lam. Yellow Sweet Clover. Occasional; along trails and in cleared, open areas. 292.

2. Melilotus alba Desr. White Sweet Clover. Occasional; cleared areas, along trails. 263.

9. Medicago L. Medic

+1. Medicago lupulina L. Black Medic. Occasional; cutover areas, along trails, woodland borders. 450.

10. Tephrosia Pers.

1. Tephrosia virginiana (L.) Pers. Goat's-rue. Relatively rare; one colony of plants along woodland border, predominantly pine woods, Strawberry Plains Rd. 239.

11. Robinia L. Locust

1. Robinia pseudo-acacia L. Black Locust. Rare; a few large shrubs along trail north of Physics Laser Station field. 92.

12. Desmodium Desv. Tick-trefoil or Beggar-ticks

a. Stipe of fruit 3 or more times the length of the calyx and greatly exceeding remains of stamens; calyx scarcely bilabiate.....b
   b. Flowers rose, 4-6 mm. long; flowering stem leafless, arising from base of plant..... 1. D. nudiflorum
   b. Flowers white, 6-8 mm. long; flowering stem leafy, axillary or terminal..... 2. D. pauciflorum

a. Stipe less than twice the length of the calyx, exceeded in length by remains of stamens; calyx distinctly bilabiate.....c
   c. Stems prostrate or trailing; leaflets orbicular; stipules ovate, persistent; flowers purple, 7-11 mm. long..... 3. D. rotundifolium
   c. Stems erect; leaflets ovate-lanceolate.....d
      d. Stipules conspicuous, ovate-attenuate; petioles 0.8-2.5 cm.; leaflets pubescent beneath..... 4. D. canescens
      d. Stipules lanceolate; petioles 4-9.7 cm.; leaflets essentially glabrous beneath..... 5. D. cuspidatum

1. Desmodium nudiflorum (L.) DC. Occasional; open wooded slopes, occasionally along trails. 371.

2. Desmodium pauciflorum (Nutt.) DC. Common; woods, especially damp, shaded ravines. 414.

3. Desmodium rotundifolium DC. Occasional; dry open woods, occasionally along trails. 635.

4. Desmodium canescens (L.) DC. Common; dry woods, woodland borders. 374.

+5. Desmodium cuspidatum (Muhl.) Loud. Common; cutover areas, woodland borders, along trails, occasionally in open woods. 472.

13. Lespedeza Michx. Bush-clover

a. Stipules narrowly linear, subulate or setaceous; calyx lobes slender, acute; perennials.....b

b. Flowers violet or purple; calyx lobes shorter than the fruit.....c

c. Stems trailing, procumbent.....d

d. Pubescence of short spreading hairs; leaflets downy-pubescent..... 1. L. procumbens

d. Pubescence appressed, often appearing glabrate; leaflets minutely hairy below..... 2. L. repens

c. Stems erect.....e

e. Shrubby plants 1-3 m. tall; racemes long (up to 7 cm.), forming showy terminal clusters; flowers about 1 cm. long... ..... 7. L. bicolor

e. Herbs, stems less than 1 m. tall; racemes short.....f

f. Leaflets linear to narrowly oblong; calyx, legume and lower leaf surfaces strigose to glabrate; flowers in few-flowered racemes..... 4. L. virginica

f. Leaflets ovate-oblong to elliptic; calyx, legume and lower leaf surfaces pilose; flowers in dense racemes..... ..... 3. L. stuevei

b. Flowers white marked with purple, solitary or in 2-4-flowered clusters exceeded by subtending leaves; leaflets narrowly cuneate. ..... 5. L. cuneata

a. Stipules broad, ovate-lanceolate, scarious; calyx lobes broad, blunt;

stems antrorsely pubescent; flowers in elongate spiciform racemes....
..... 6. L. stipulacea

+1. Lespedeza procumbens Michx. Occasional; dry exposed soil in cutover areas. 585.

2. Lespedeza repens (L.) Bart. Common; open woods, along trails, woodland borders. 506.

3. Lespedeza stuevei Nutt. Relatively rare; dry open woods, especially under pines. 426.

4. Lespedeza virginica (L.) Britt. Occasional; dry open woods, especially on borders of pine woods. 550.

+5. Lespedeza cuneata (Dumont) G. Don Occasional; along trails in open cutover areas, especially just west of Physics Laser Station field. 639.

*6. Lespedeza stipulacea Maxim. Korean Clover. Relatively rare; woodland borders, especially in the vicinity of pines. 565.

*7. Lespedeza bicolor Turcz. Occasional; open cutover areas, especially along trail west of Physics Laser Station, where it grows in dense stands. 367, 570.

14. Vicia L. Vetch

a. Peduncle lacking or many times shorter than the leaves.....b

b. Flowers 6-8 mm. long, usually solitary; tendrils simple; calyx tube less than 3 mm. long; low tufted annual.... 1. V. lathyroides

b. Flowers 1-3.5 cm. long, mostly in clusters of 2-5; tendrils, or at least some of them, forked; calyx tube more than 4 mm. long.....c

c. Flowers 1.8-3 cm. long; corolla purple with violet wings; legumes and seeds compressed..... 2. V. sativa

c. Flowers 1-1.8 cm. long; corolla uniformly purple; legume terete; seeds subglobose..... 3. V. angustifolia

a. Peduncles longer than the leaves; racemes dense, bearing 10-30 flowers; corolla white and violet; calyx lobes (and usually the rest of the plant) villous..... 4. V. villosa

+1. Vicia lathyroides L. Rare; weedy area along trail near cutover area; one specimen collected. 469.

+2. Vicia sativa L. Spring Vetch. Common; along trails, especially in moist areas. 78, 179.

3. Vicia angustifolia Reichard Common Vetch. Common; dry open areas, woodland borders. 465.

+4. Vicia villosa Roth Hairy or Winter Vetch. Common; dry, open areas; along trails in cutover areas. 165, 365.

15. Phaseolus L.

*+1. Phaseolus polystachios (L.) BSP. Wild Bean. Occasional; dry woods and wooded slopes; twining on shrubs. 531.

16. Strophostyles Ell. Wild Bean

*+1. Strophostyles helvola (L.) Ell. Rare; edge of woods; one specimen collected. 416.

17. Clitoria L. Butterfly Pea

+1. Clitoria mariana L. Butterfly Pea. Common; open cutover areas, typically trailing on dry, exposed soil. 385.

18. Amphicarpa Ell. Hog Peanut

1. Amphicarpa bracteata (L.) Fern. var. bracteata. Occasional; open woods, along trails; twining on shrubs and herbs. 552.

\+ A. bracteata (L.) Fern. var. comosa (L.) Fern. (A. pitcheri T. & G.). Pitcher's Hog Peanut. Stems and petioles densely villous; leaflets more coarsely pubescent and larger (5-10 cm. long) than the above; legumes villous, flowers deeper purple. Usually in wet habitats, open bottomlands; twining on vegetation. 649.

19. Galactia P. Br. Milk Pea

1. Galactia volubilis (L.) Britt. Occasional; dry open areas, woodland borders and cutover areas. 440.

20. Rhynchosia Lour.

+1. Rhynchosia tomentosa (L.) H. & A. Relatively rare; dry woods, usually along trails or in open sunny areas. 457.

53. LINACEAE

1. Linum L. Flax

1. Linum virginianum L. Relatively rare; dry, open cutover areas. 470.

54. OXALIDACEAE

1. Oxalis L. Wood-sorrel

a. Inflorescence umbellate; fruiting pedicels horizontal or deflexed; stipules oblong..... 1. O. stricta

a. Inflorescence cymose; fruiting pedicels erect or ascending; stipules obsolete or nearly so..... 2. O. europaea

+1. Oxalis stricta L. Common; dry, sunny areas, along trails, woodland borders, occasionally in cutover areas. 144, 233.

+2. Oxalis europaea Jord. Occasional; along shady wooded trails in rich soil. 428.

55. GERANIACEAE

a. Leaves palmately lobed; stamens 10; carpels dehiscent on the inner suture, coiling upward and outward; styles recurving..... 1. Geranium

a. Leaves several times pinnate; stamens 5; carpels separating, tardily dehiscent; styles spiraling..... 2. Erodium

1. Geranium L. Cranesbill

a. Petals 1-2 cm. long; cauline leaves 2, paired; perennial from a rhizome..... 1. G. maculatum

a. Petals up to 1 cm. long, usually shorter; cauline leaves numerous; annual from a taproot..... 2. G. carolinianum

1. Geranium maculatum L. Wild Cranesbill. Occasional; damp wooded ravines. 160.

2. Geranium carolinianum L. Common; open cutover areas, borders of woods, field near Physics Laser Station. 110, 222.

2. Erodium L'Her. Storksbill

1. Erodium cicutarium (L.) L'Her. Storksbill. Rare; a few small plants, sandy soil, woodland border. 744.

56. SIMAROUBACEAE

1. Ailanthus Desf. Tree-of-heaven

1. Ailanthus altissima (Mill.) Swingle. Tree-of-heaven. Occasional; a number of tall saplings in field near Physics Laser Station, scattered areas around Common Glory Grounds. 643.

57. POLYGALACEAE

1. Polygala L. Polygala, Milkwort

1. Polygala mariana L. One small colony of plants in an open, cutover area. 444.

58. EUPHORBIACEAE

a. Flowers without a perianth, one pistillate, several staminate surrounded by the involucre (cyathium) and appearing as one flower; pubescence, if any, of simple hairs..... 3. Euphorbia

a. Calyx present, corolla present or absent.....b

b. Calyx and corolla present; hairs stellate; pistillate flowers not subtended by a bract..... 1. Croton

b. Corolla absent; hairs simple; pistillate flowers subtended by a persistent bract..... 2. Acalypha

1. Croton L. Croton

1. Croton glandulosus L. var. septentrionalis Muell. Arg. Occasional; open cutover areas, borders of woods. 563.

2. Acalypha L. Three-seeded Mercury

a. Principal leaves ovate to ovate-rhombic; leaves and stems glabrous or slightly hairy; petioles almost as long as the blades..... ..... 1. A. rhomboidea

a. Principal leaves oblong-lanceolate to linear; leaves and stems pubescent; petioles seldom more than 1/4 the length of the blade..... ..... 2. A. gracilens

*+1. Acalypha rhomboidea Raf. Occasional; woodland borders, roadsides. 619.

+2. Acalypha gracilens Gray. Occasional; disturbed, exposed soil; woodland borders, tip of Squirrel Point. 424.

3. Euphorbia L. Spurge

a. Leaves entire, symmetrical at the base.....b

b. Flowers long-stalked, solitary; bracteal leaves little reduced in size; cyathia, including white appendages, 3-6 mm. broad..... ..... 1. E. marilandica

b. Flowers in terminal umbelliform cymes; bracteal leaves greatly reduced in size; cyathia, including white appendages, 7-10 mm. broad..... 2. E. corollata

a. Leaves serrate, asymmetrical at base.....c

c. Ovaries and capsules pubescent; plant usually prostrate..... ..... 3. E. supina

c. Ovaries and capsules glabrous; plant erect..... 4. E. maculata

+1. Euphorbia marilandica Greene Relatively rare; typically in sandy, dry soil, cutover areas, woodland borders. 235, 262.

2. Euphorbia corollata L. Flowering Spurge. Common; dry woods and

wooded slopes. 328, 423.

+3. Euphorbia supina Raf. (E. maculata L.). Occasional; dry open soil, cutover areas and along trails. 481.

4. Euphorbia maculata L. (E. nutans Lag.). Common; dry, open soil, typically along woodland borders. 564.

59. ANACARDIACEAE

1. Rhus L. Sumac

a. Leaflets 7-29; inflorescence a terminal panicle.....b

b. Rachis of leaf not wing-margined; branches and petioles glabrous or glaucous; leaves regularly serrate..... 1. R. glabra

b. Rachis of leaf wing-margined; branches and petioles puberulent; leaves entire or few-toothed..... 2. R. copallina

a. Leaflets 3; inflorescence an axillary panicle.....c

c. Stems strongly woody, trailing, leaning or climbing with aerial roots; leaflets acute or acuminate; drupes usually glabrous..... ..... 3. R. radicans

c. Stems only woody at the base, erect; leaflets elliptic or obovate, blunt tipped; drupes usually pubescent..... 4. R. toxicodendron

1. Rhus glabra L. Smooth Sumac. Common; open cutover areas, borders of woods, typically in dry, weedy areas. 308.

2. Rhus copallina L. Winged, Dwarf or Shining Sumac. Common; open cutover areas, borders of woods, typically in dry soil. 452.

3. Rhus radicans L. Poison Ivy. Relatively common; climbing on trees, especially in damp ravines and bottomlands. 700.

+4. Rhus toxicodendron L. Poison Oak. Occasional; open woods, dry wooded

slopes, along trails. 480.

60. AQUIFOLIACEAE

1. Ilex L. Holly

1. Ilex opaca Ait. American Holly. Abundant; important tree or shrub in sapling-shrub layer, mixed woods. 10, 57.

61. CELASTRACEAE

1. Euonymus L.

1. Euonymus americanus L. Strawberry Bush. Common; open woods and slopes, especially along trails. 188.

62. ACERACEAE

1. Acer L. Maple

1. Acer rubrum L. Red Maple. Abundant; important understory tree in shrub-sapling layer of mixed woods, especially common in wet soil, open bottomlands. 2, 13, 592.

63. BALSAMINACEAE

1. Impatiens L. Jewelweed

1. Impatiens capensis Meerb. Spotted Touch-me-not. Common; wet ravines and open bottomlands. 464.

64. RHAMNACEAE

1. Ceanothus L.

1. Ceanothus americanus L. New Jersey Tea. Occasional; dry open woods, occasionally along trails and woodland borders. 302, 316.

65. VITACEAE

a. Leaves palmately compound, 3- to 7-foliate; petals separate and spreading at anthesis..... 1. Parthenocissus

a. Leaves simple; inflorescence paniculate; petals connate above, deciduous before anthesis..... 2. Vitis

1. Parthenocissus Planch. Virginia Creeper

1. Parthenocissus quinquefolia (L.) Planch. Virginia Creeper. Occasional to common; open woods, woodland borders. 518.

2. Vitis L. Grape

a. Mature leaves with a rusty or red tomentose pubescence below; leaves broadly cordate-ovate, usually shallowly 3-5 lobed.. 1. V. aestivalis

a. Mature leaves glabrous or nearly so beneath.....b

b. Bark exfoliating, lenticels lacking; leaves cordate-acuminate; berries 3-9 mm. in diameter..... 2. V. vulpina

b. Bark not exfoliating, abundantly dotted with lenticels; leaves rotund to cordate-ovate; berries 1.2-2.5 cm. in diameter..... ..... 3. V. rotundifolia

1. Vitis aestivalis Michx. Summer Grape. Common; dry open areas, along trails, cutover areas, woodland borders. 609.

2. Vitis vulpina L. (V. cordifolia Michx.). Winter or Frost Grape. Common; on trees bordering Matoaka Lake, occasionally around ravines. 197.

3. Vitis rotundifolia Michx. Muscadine or Scuppernong. Common; damp shaded areas in woods, woodland borders, typically in dense colonies. 517, 608.

66. GUTTIFERAE

a. Petals 4; sepals 4, in 2 unequal pairs..... 1. Ascyrum

a. Petals 5; sepals 5, more or less equal..... 2. Hypericum

1. Ascyrum L. St. Peter's-wort

1. Ascyrum hypericoides L. St. Andrew's Cross. Occasional; open cut-over areas, typically dry sandy soil. 349.

2. Hypericum L. St. John's-wort

a. Stamens numerous (15-40); flowers more than 7 mm. wide.....b

b. Much branched; upper stem leaves numerous; sepals narrow, not black-dotted; petals dotted only on the margins.. 1. H. perforatum

b. Simple, or with simple branches; upper stem leaves few; sepals ovate or oblong, black-dotted; petals lined and dotted with black. ..... 2. H. punctatum

a. Stamens few (5-12); flowers less than 7 mm. wide.....c

c. Leaves lanceolate to elliptic, 3-5-nerved; inflorescence branched, many flowered..... 3. H. mutilum

c. Leaves appressed, scale-like, 1-nerved; flowers sessile, mostly solitary at the nodes..... 4. H. gentianoides

1. Hypericum perforatum L. Common St. John's-Wort. Common; dry soil, cutover areas. 342, 620.

+2. Hypericum punctatum Lam Common; dry soil, cutover areas. 321, 351.

3. Hypericum mutilum L. Common; dry soil, cutover areas. 403, 443.

4. Hypericum gentianoides (L.) BSP. Orange-grass. Occasional; dry exposed soil, woodland borders, cutover areas. 530.

67. CISTACEAE

1. Lechea L. Pinweed

1. Lechea racemulosa Michx. Pinweed. Very common; exposed, dry sandy soil of open cutover areas. 397.

68. VIOLACEAE

1. Viola L. Violet

a. Plants stemless, leaves arising from rhizomes or runners.....b

b. Flowers commonly purple or violet; rhizome not producing stolons..
.....c

c. Flowers flat, nearly rotate, with protruding stamens; leaves pedately cleft..... 1. V. pedata

c. Flowers with some or all of the petals protruding forward, the stamens included; leaves not pedately cleft.....d

d. Leaves merely crenate-serrate, not lobed or toothed at the base; corolla violet with a pale center; plants glabrous....
..... 2. V. papilionacea

d. Leaves lobed, or toothed at the base.....e

e. Leaf-blades lanceolate, lobed or toothed at the base; expanding leaves and petioles glabrous to puberulent..... ..... 3. V. sagittata

e. Leaf-blades cordate-ovate, palmately lobed; expanding leaves and petioles pubescent..... 4. V. triloba

b. Flowers white with purple lines; rhizomes producing stolons; leaves cordate-ovate..... 5. V. pallens

a. Plants with leafy stems; lower leaves orbicular, upper spatulate; stipules foliaceous, palmately pectinate..... 6. V. kitaibeliana

1. Viola pedata L. Bird's-foot Violet. Rare; two small colonies of plants, one along a woodland border, one in cutover area. 114.

2. Viola papilionacea Pursh. Common Blue Violet. Common to abundant; woods, especially in shaded ravines and along trails. 143.

3. Viola sagittata Ait. Occasional; dry woods, occasionally in cutover areas. 29, 53.

4. Viola triloba Schwein. Occasional; moist shaded situations and along wooded ravines. 48, 86.

*+5. Viola pallens (Banks) Brainerd. Rare; one colony in open area northeast of Rt. 5 entrance. 58.

6. Viola kitaibeliana R. & S. var. rafinesquii (Greene) Fern. Rare; a few small plants along edge of woods, near William and Mary Campus. 735.

69. PASSIFLORACEAE

1. Passiflora L.

1. Passiflora lutea L. Occasional; along trails in wooded areas. 456.

70. ELAEAGNACEAE

1. Elaeagnus L.

*+1. Elaeagnus pungens Thunb. Rare; one shrub along trail south of Ice House Cove. 526. Another collection, 633, possibly representing an additional species was made along a trail east of Matoaka Lake. The material was sterile and could not be satisfactorily determined.

71. LYTHRACEAE

a. Aquatic shrubs, submersed part of stem spongy, thickened; leaves lanceolate; flowers in dense axillary clusters..... 1. Decodon

a. Small trees, introduced; leaves oval to obovate; inflorescence paniculate..... 2. Lagerstroemia

1. Decodon J. F. Gmel. Swamp-loosestrife

1. Decodon verticillatus (L.) Ell. Water Willow. Common; shallow water around shores of Matoaka Lake. 482.

2. Lagerstroemia L.

1. Lagerstroemia indica L. Crape-myrtle. A few trees persisting in an open area west of Physics Laser Station, formerly a nursery. 417.

72. NYSSACEAE

1. Nyssa L. Tupelo

1. Nyssa sylvatica Marsh. Black Gum. Occasional; mixed woods, common along woodland borders. 324.

73. MELASTOMATACEAE

1. Rhexia L. Meadow Beauty, Deergrass

1. Rhexia mariana L. Meadow Beauty. Common; open areas in woods and woodland borders, typically in sandy soil. 447.

74. ONAGRACEAE

a. Leaves alternate; flower parts in 4's, petals yellow.....b
   b. Calyx tube not prolonged beyond the ovary; capsule square; flowers solitary in the axils of upper leaves..... 1. Ludwigia
   b. Calyx tube prolonged beyond the ovary; capsule cylindrical; inflorescence a terminal raceme..... 2. Oenothera

a. Leaves opposite; flower parts in 2's, petals white; inflorescence a terminal raceme; fruits bristly..... 3. Circaea

1. Ludwigia L. False Loosestrife

1. Ludwigia alternifolia L. Seedbox. Occasional; open cutover areas, sometimes near damp depressions. 350.

2. Oenothera L. Evening Primrose

1. Oenothera biennis L. Evening Primrose. Common; open cutover areas, along trails, woodland borders. 544, 566, 727.

3. Circaea L. Enchanter's Nightshade

1. Circaea quadrisulcata (Maxim.) Franch. & Sav. var. canadensis (L.) Hara (C. lutetiana of American authors, not L.). Occasional; damp, shaded, wooded areas; open ravines. 257.

75. ARALIACEAE

a. Leaves decompound, deciduous, leaflets pinnately veined; upright herbs or shrubs..... 1. Aralia

a. Leaves simple, evergreen, palmately veined; vines trailing or climbing by aerial rootlets..... 2. Hedera

1. Aralia L.

a. Stem woody; large shrubs; stem and leafstalks prickly; umbels very numerous, in a large panicle..... 1. A. spinosa

a. Plants herbaceous; not prickly .....b

b. Cauline leaves present; rhizome absent; umbels numerous in a compound, terminal panicle..... 2. A. racemosa

b. Stem subscapose, a single long-stalked leaf at the base; rhizome elongate; inflorescence of 2-7 umbels..... 3. A. nudicaulis

1. Aralia spinosa L. Hercules'-club or Devil's-walking-stick. Common; open cutover areas, woodland borders. 477.

2. Aralia racemosa L. Spikenard. Relatively rare; moist wooded slopes. 583.

*+3. Aralia nudicaulis L. Wild Sarsaparilla. Rare; one sterile specimen was collected along the trail, open wooded area. 415.

2. Hedera L. Ivy

1. Hedera helix L. English Ivy. Occasional; open woods, along the trails. 572.

76. UMBELLIFERAE

a. Leaves all simple, reniform; plants aquatic; umbels dense; fruit hemispheric, stalked..... 1. Hydrocotyle

a. Leaves compound, plants terrestrial.....b

b. Ovary and fruit with bristles.....c

c. Ovary and fruit less than twice as long as wide.....d

d. Leaves palmately once compound, 3-7-foliate; fruits with hooked bristles; roots fibrous; flowers all greenish-white to greenish-yellow..... 2. Sanicula

d. Leaves pinnately decompound; bristles of fruits not hooked; large taproot present; central flower usually purple, others white..... 7. Daucus

c. Ovary and fruit more than twice as long as wide, appressed-bristly; leaves twice ternately compound; umbellets few-flowered..... 3. Osmorhiza

b. Ovary and fruit ribbed or winged, without bristles.....e

e. Leaves trifoliate; fruit laterally flattened, broader than thick; flowers white; umbels irregular..... 4. Cryptotaenia

e. Leaves decompound; fruit terete or slightly flattened dorsally. .....f

f. Petals yellow; umbels 3-6 cm. wide; fruit glabrous, prominently winged..... 5. Thaspium

f. Petals white; umbels 5-15 cm. wide; fruit pubescent along the prominent ribs, not winged..... 6. Angelica

1. Hydrocotyle L. Water-pennywort

1. Hydrocotyle ranunculoides L. f. Water-pennywort. Common; shallow

water of Matoaka Lake, especially in the Main Ravine, where it grows in extensive colonies. 214.

2. Sanicula L. Black Snakeroot

a. Styles exceeding bristles of the fruit, recurved-spreading, conspicuous; fertile flowers sessile; fruits 5-8 mm. long. 1. S. marilandica

a. Styles shorter than bristles of fruit, inconspicuous; fertile flowers on short pedicels; fruits 3-4 mm. long..... 2. S. canadensis

1. Sanicula marilandica L. Black Snakeroot. Common; open woods, occasionally along streams. 135, 163.

2. Sanicula canadensis L. Black Snakeroot. Common; open woods, wooded slopes, typically in dry habitats. 252.

3. Osmorhiza Raf. Sweet Cicely

1. Osmorhiza longistylis (Torr.) DC. var. villicaulis Fern. [O. villicaulis (Fern.) Rydb.]. Relatively common; woods, shaded slopes and damp areas. 123.

4. Cryptotaenia DC. Honewort

1. Cryptotaenia canadensis (L.) DC. Common; rich wooded ravines and woodland slopes, usually in damp shaded areas. 315, 389, 631.

5. Thaspium Nutt. Meadow-parsnip

1. Thaspium barbinode (Michx.) Nutt. Meadow-parsnip. Common; shaded woods, commonly along stream banks, in ravines. 77, 105, 312.

6. Angelica L. Angelica

1. Angelica venenosa (Greenway) Fern. Angelica. Occasional; dry open woods, cutover areas. 368.

7. Daucus L. Carrot

1. Daucus carota L. Queen Anne's Lace or Wild Carrot. Common; open, weedy areas, along trails, woodland borders, cutover areas. 291.

77. CORNACEAE

1. Cornus L. Dogwood

a. Trees; flowers in dense heads, surrounded by large white petal-like bracts; fruit red..... 1. C. florida

a. Shrubs; flowers in round-topped cymes, without petal-like bracts; fruit blue to blue-black.....b

b. Leaves opposite; petioles 0.5-1.5 cm. long; plant of moist habitats..... 2. C. foemina

b. Leaves alternate; petioles 2-5 cm. long; plant of dry habitats.... ..... 3. C. alternifolia

1. Cornus florida L. Flowering Dogwood. Common to abundant; very important tree in shrub-sapling layer, mixed woods. 80.
2. Cornus foemina Mill. (C. stricata Lam.). Stiff Dogwood. Occasional; open bottomlands and in ravines along streams. 580, 611.
3. Cornus alternifolia L. Green Osier or Alternate-leaved Dogwood. Occasional; open woods and wooded slopes, occasionally along trails. 164.

78. PYROLACEAE

a. Suffrutescent, green-leaved plants with subterranean rootstocks; leaves opposite or whorled, evergreen; corolla spreading..... ..... 1. Chimaphila

a. Fleshy-stemmed saprophytes without chlorophyll; leaves alternate, scaly; corolla tubular.....b

b. Petals 4-6, separate; calyx of 2-5 bracts, usually waxy-white, sometimes pinkish..... 2. Monotropa

b. Petals 5, gamopetalous; sepals 5, erect, usually purplish-brown... ..... 3. Monotropsis

1. Chimaphila Pursh Pipsissewa

a. Leaves uniform green, oblanceolate, tapering to the base..... ..... 1. C. umbellata

a. Leaves variegated with white, lanceolate, obtuse at the base..... ..... 2. C. maculata

1. Chimaphila umbellata (L.) Bart. Wintergreen. Common; dry mixed woods, also common in pine woods. 258.

2. Chimaphila maculata (L.) Pursh Spotted Wintergreen. Common; dry mixed woods, also common in pine woods. 259.

2. Monotropa L. Indian-pipe

1. Monotropa uniflora L. Indian-pipe. Occasional; dry woods, in leaf litter, rich soil. 411.

3. Monotropsis Schwein. Sweet Pinesap

1. Monotropsis odorata Ell. Pygmy-pipes. Rare; heavy oak leaf-litter

on slight bank in oak-beech-pine woods, ravine below William and Mary Cafeteria. Plants are typically hidden by fallen leaves and could have been overlooked by the author. Dr. G. W. Hall, 3761, 9 April 1966.

79. ERICACEAE

a. Ovary superior.....b
  b. Corolla salverform, campanulate or rotate.....c
    c. Plants low, prostrate, creeping; each flower subtended by 2 bracteoles at the base of the calyx; leaves leathery, evergreen; flowers fragrant..... 5. Epigaea
    c. Erect trees or shrubs; flowers not bracteolate.....d
      d. Corolla campanulate to funnel-form, deeply 5-lobed, not saccate; stamens 5 or 10.....1. Rhododendron
      d. Corolla rotate, very shallowly lobed, 10-saccate; stamens 10, the anthers fitting into the corolla-sacs in bud..... 2. Kalmia
  b. Corolla globose to ovoid.....e
    e. Shrubs; pedicels ebracteolate, or bracteolate at the base; flowers in lateral umbelliform clusters..... 3. Lyonia
    e. Trees; pedicels 2-bracteolate near the middle; flowers in leafless racemes forming a terminal panicle.....4. Oxydendrum
a. Ovary inferior.....f
  f. Ovary 10-locular, 10-ovuled; leaves glandular-dotted; fruit a fleshy drupe..... 6. Gaylussacia
  f. Ovary 5-locular, ovules many; leaves glandless, nonpunctate; fruit a berry..... 7. Vaccinium

1. Rhododendron L. Rhododendron

a. Corolla pale pink with a slender funnel-form tube which is longer than the lobes; flowering before the leaves expand; native shrubs.... ..... 1. R. nudiflorum

a. Corolla violet-red or white marked with purple; tube broader, shorter than the lobes; flowering with or after the leaves expand; introduced shrubs.....b

b. Flowers 5-6 cm. long, 5-7 cm. wide, solitary or in pairs.....c

c. Flowers white, flushed with red-violet, with a darker blotch of the same color; upright shrubs of medium height..... ... 2. Rhododendron, 'Indian Hybrid' cl. 'George Lindley Taber'

c. Flowers red-violet with a darker blotch; tall upright shrubs... ..... 3. Rhododendron, 'Indian Hybrid' cl. 'Formosa'

b. Flowers 2-3 cm. long, 2 cm. wide; uniformly red-violet; in clusters of 2-6..... 4. R. obtusum f. kaempferi

1. Rhododendron nudiflorum (L.) Torr. Pinxter-flower, Purple Honeysuckle. Relatively common; dry woods, thickets in cutover areas. 43.

2. Rhododendron, 'Indian Hybrid' cl. 'George Lindley Taber'. Rare; one very small shrub in predominantly deciduous woods on Squirrel Point. 54.

3. Rhododendron, 'Indian Hybrid' cl. 'Formosa'. Rare; one tall shrub, tree-like, mixed woods just east of Physics Laser Station. 169.

4. Rhododendron obtusum f. kaempferi. 'Purple King'. Occasional; mixed woods, especially on Squirrel Point and in woods southeast of Matoaka Lake. 40. This collection, and numbers 54 and 169 were identified by Mrs. Robert E. Jack, Norfolk Botanical Gardens.

2. Kalmia L. Laurel

1. Kalmia latifolia L. Mountain-laurel. Rare; one colony of large shrubs on an open slope, north of Route 5 entrance; one small sterile shrub noted along trail. 175.

3. Lyonia Nutt.

a. Corolla cylindric-ovoid, 0.8-1.3 cm. long; inflorescence an umbellate raceme..... 1. L. mariana

a. Corolla globose; 2.5-5 mm. long; inflorescence a terminal panicle.... ..... 2. L. ligustrina

+1. Lyonia mariana (L.) D. Don Stagger-bush. Occasional; thicket areas in and along borders of pine woods. 138, 240.

+2. Lyonia ligustrina (L.) DC. Maleberry. Occasional; thickets along woodland borders, occasionally in cutover areas. 331, 445.

4. Oxydendrum DC.

1. Oxydendrum arboreum (L.) DC. Sourwood. Occasional in mixed woods; somewhat more common as shrubs or small saplings in open, cutover areas. 310.

5. Epigaea L. Trailing Arbutus

1. Epigaea repens L. Mayflower or Trailing Arbutus. Rare; a few plants exist on a bank along the trail in a relatively open area. 12.

6. Gaylussacia HBK. Huckleberry

a. Leaves glandular only on the lower surface; pedicels usually longer than the flowers; fruit blue, glaucous..... 1. G. frondosa

a. Leaves glandular on both upper and lower surfaces; pedicels shorter than the flowers; fruit black, not glaucous..... 2. G. baccata

1. Gaylussacia frondosa (L.) T. & G. Dangleberry. Abundant in cutover areas; common in pine woods, and mixed woods. 112, 142.

2. Gaylussacia baccata (Wang.) K. Koch Black Huckleberry. Abundant in cutover areas; common in pine woods and mixed woods. 88, 95, 141.

7. Vaccinium L. Blueberry

a. Corolla open-campanulate; stamens exserted; anthers awned; flowers pendulous on filiform pedicels, in loose-bracted racemes..... ..... 1. V. stamineum

a. Corolla urceolate or globose; stamens included; anthers awnless.....b

b. Leaves glabrous or slightly pubescent beneath, half grown at flowering time.....c

c. Leaves glaucous beneath, 2-4 cm. long, 0.5-1.5 cm. broad; low shrub 2-9 dm. high..... 2. V. vacillans

c. Leaves pubescent along the nerves beneath, 4-8 cm. long, 2-4 cm. broad; shrub up to 4 m. high..... 3. V. corymbosum

b. Leaves downy to woolly beneath, not expanded at flowering time; corolla tinged with purple; berries polished black..... ..... 4. V. atrococcum

1. Vaccinium stamineum L. var. stramineum. Deerberry. Common to abundant; dry woods and wooded slopes, occasionally in more open areas. 97, 101, 125, 139.

\+ V. stamineum L. var. neglectum (Small) Deam [V. neglectum (Small) Fern.]. With branchlets and leaves glabrous, characters distinct from those of the species; habitats and abundance the same. 87, 93, 99, 140.

2. Vaccinium vacillans Torr. Low Blueberry. Common to abundant; dry woods, cutover areas, woodland borders. 94, 96, 98, 100.

3. Vaccinium corymbosum L. Highbush-blueberry. Occasional; moist woods, along ravines. 60.

4. Vaccinium atrococcum (Gray) Heller Black Highbush-blueberry. Rare; cutover area which was previously predominantly pine-oak. 16.

80. DIAPENSIACEAE

1. Galax L. Wandflower, Galax

1. Galax aphylla L. Beetleweed. Rare; wooded slopes, sandy, peaty soil. 407.

81. PRIMULACEAE

1. Anagallis L. Pimpernel

1. Anagallis arvensis L. Scarlet Pimpernel. Occasional; disturbed soil at tip of Squirrel Point, occasionally in cutover areas. 254.

82. EBENACEAE

1. Diospyros L. Persimmon

1. Diospyros virginiana L. Common Persimmon. Occasional; mixed woods. Saplings occur in open cutover areas; fruiting trees were not observed. 607.

83. OLEACEAE

a. Leaves pinnately compound; flowers apetalous; fruit a samara..... ..... 1. Fraxinus

a. Leaves simple, oblong; flowers with white petals 2-2.5 cm. long; fruit a drupe..... 2. Chionanthus

1. Fraxinus L. Ash

1. Fraxinus americana L. White Ash. Relatively common; damp soil, open bottomlands, occasionally more upland areas. 577, 648.

2. Chionanthus L. Fringe-tree

1. Chionanthus virginicus L. Fringe-tree. Rare; one small tree (flowering) in a moist ravine northwest of Route 5 entrance. 174.

84. LOGANIACEAE

a. Climbing vines with evergreen lanceolate to elliptic leaves; corolla yellow, 2.5-4 cm. long..... 1. Gelsemium

a. Diffuse, much branched herb; leaves narrowly linear or subulate; corolla white, 3 mm. long..... 2. Polypremum

1. Gelsemium Juss. Yellow Jessamine

1. Gelsemium sempervirens (L.) Ait. f. Yellow Jessamine. Rare; one small colony in tree, edge of woodland area along Strawberry Plains Rd. 84.

2. Polypremum L.

1. Polypremum procumbens L. Common; dry sandy areas, woodland borders, cutover areas. 409, 442, 599.

85. GENTIANACEAE

a. Corolla rotate; flowers 5-merous, pink; stems sharply wing-angled, not fleshy, 3-8 dm. tall; cauline leaves ovate-lanceolate. 1. Sabatia

a. Corolla funnelform; flowers 4-merous, white; plants with fleshy stems 1-2 dm. tall; lower cauline leaves scale like, the upper with expanded blades..... 2. Obolaria

1. Sabatia Adans. Sabatia

1. Sabatia angularis (L.) Pursh Rose-pink. Common; open woods, woodland borders. 420.

2. Obolaria L. Pennywort

1. Obolaria virginica L. Pennywort. Occasional; moist wooded slopes and woods, rich soil with leaflitter. 7.

86. APOCYNACEAE

a. Plants creeping or trailing; flowers blue-violet, solitary, axillary, 1.5-3 cm. broad..... 1. Vinca

a. Plants erect; flowers white, cymose, less than 1 cm. broad..... ..... 2. Apocynum

1. Vinca L. Periwinkle

*1. Vinca minor L. Common Periwinkle. Rare; one colony of plants, disturbed soil, tip of Squirrel Point, possibly persistent after cultivation. 49.

2. Apocynum L. Dogbane

*+1. Apocynum cannabinum L. Indian Hemp. Occasional; woodland borders, especially near William and Mary Campus. 288.

87. ASCLEPIADACEAE

a. Stem erect; leaves short-petioled, oblong or lanceolate; corona of 5 conspicuous hoods; corolla 7-10 mm. long..... 1. Asclepias

a. Stem twining; leaves long-petioled, triangular-lanceolate, deeply cordate; corona of 5 membranaceous, lanceolate segments; corolla 6 mm. long..... 2. Ampelamus

1. Asclepias L. Milkweed

a. Corolla orange or yellow; leaves irregularly alternate; plants hirsute..... 1. A. tuberosa

a. Corolla white or purplish; leaves opposite; plants glabrous..... ..... 2. A. variegata

1. Asclepias tuberosa L. Butterfly-weed. Occasional; open cutover areas, woodland borders. 322.

2. Asclepias variegata L. Occasional; open woods, and woodland borders. 243, 283.

2. Ampelamus Raf. Sandvine

+1. Ampelamus albidus (Nutt.) Britt. Rare; one vine, southeast of Matoaka Lake, open area near road. 698.

88. CONVOLVULACEAE

a. Green-leaved plants, not parasitic; corolla 1.5-8 cm. long..... ..... 1. Ipomoea

a. Plants lacking chlorophyll, parasitic; leaves reduced to scales; corolla 2-5 mm. long..... 2. Cuscuta

1. Ipomoea L. Morning-glory

a. Stigma 3-lobed; ovary 3-loculed; leaves usually deeply 3-lobed; corolla blue-purple, 4-6 cm. long..... 1. I. hederacea

a. Stigma 2-lobed or entire; ovary 2-loculed; leaves cordate-ovate.....b

b. Corolla white with red center, 4.5-8 cm. long; perennial from a deep tuber-like root; sepals glabrous..... 2. I. pandurata

b. Corolla white, 1.5-2 cm. long; slender annual lacking a tuber; sepals hirsute..... 3. I. lacunosa

1. Ipomoea hederacea (L.) Jacq. Relatively common; woodland borders, field adjacent to Physics Laser Station. 521.

2. Ipomoea pandurata (L.) G. F. W. Mey. Wild Potato-vine. Rare; dry open cutover areas, typically trailing on exposed soil. 449.

*+3. Ipomoea lacunosa L. Occasional; woodland borders. 559.

2. Cuscuta L. Bindweed, Dodder

a. Calyx gamosepalous; flowers not subtended by bracts, in loosely to

densely panicled cymes..... 1. C. gronovii

a. Calyx of separate sepals; flowers subtended by 2-5 bracts, sessile in dense clusters..... 2. C. compacta

1. Cuscuta gronovii Willd. Dodder. Common; on a variety of plants in damp soil, shores of Matoaka Lake, open bottomlands. 652.

*+2. Cuscuta compacta Juss. Dodder. Common; on a variety of plants in damp soil, shores of Matoaka Lake, open bottomlands. 574.

89. HYDROPHYLLACEAE

1. Phacelia Juss. Scorpion-weed

*+1. Phacelia dubia (L.) Trel. Rare; one depauperate specimen collected in open disturbed soil, tip of Squirrel Point. 255.

90. BORAGINACEAE

a. Lobes of ovary and fruit bearing barbed prickles; corolla blue, 1 cm. broad or more; nutlets strongly divergent; plants of dry habitats.... ..... 1. Cynoglossum

a. Lobes of ovary and fruit not bearing prickles; corolla blue with yellow eye, 3-6 mm. broad; nutlets erect; aquatic or semi-aquatic plants..... 2. Myosotis

1. Cynoglossum L. Hound's-tongue

1. Cynoglossum virginianum L. Wild Comfrey. Occasional; dry open woods and wooded slopes, typically in rich soil with leaf litter. 107, 192.

2. Myosotis L. Forget-me-not

+1. Myosotis laxa Lehm. Forget-me-not. Occasional; shallow water of Matoaka Lake, especially in the Main Ravine. Usually growing with Hydrocotyle ranunculoides. 212.

91. VERBENACEAE

a. Herbs; flowers white, in terminal spikes; fruit splitting into 4 nutlets..... 1. Verbena

a. Shrubs; flowers blue, in axillary cymes; fruit a drupe. 2. Callicarpa

1. Verbena L. Vervain

1. Verbena urticifolia L. White Vervain. Common; open woods, woodland borders, cutover areas. 383.

2. Callicarpa L.

1. Callicarpa americana L. Beauty-berry or French Mulberry. Occasional; open woods, occasionally along trails. 642.

92. LABIATAE

a. Calyx with a protuberance on the upper side of the tube; calyx closed over the fruit..... 2. Scutellaria

a. Calyx without a protuberance, not closed in fruit.....b

b. Stamens 2.....c

c. Calyx distinctly 2-lipped; flowers blue, in verticels subtended by reduced bracteal leaves, forming a terminal spike; leaves pinnately lobed..... 6. Salvia

c. Calyx regular; flowers white or pale yellow; leaves not lobed..
.....d

d. Corolla white, nearly regular, less than 5 mm. long; flowers in small, dense, axillary clusters, not subtended by bracts..
..... 9. Lycopus

d. Corolla pale yellow, distinctly 2-lipped, over 15 mm. long; flowers in dense head-like clusters, subtended by numerous purplish bracts..... 7. Monarda

b. Stamens 4.....e

e. Inflorescence axillary.....f

f. Flowers blue, pediceled, usually borne 3 per axil; calyx essentially glabrous, 15-nerved..... 3. Glecoma

f. Flowers red or purple, sessile, usually borne 6-12 per axil; calyx densely villous, 5-nerved..... 5. Lamium

e. Inflorescence terminal.....g

g. Stamens long-exserted beyond the corolla tube; inflorescences forming a loose, irregularly branched panicle; corolla blue; calyx 2-lipped..... 1. Trichostema

g. Stamens not exserted beyond corolla tube; inflorescence a dense head or spike.....h

h. Inflorescence a spike; leaves broad.....i

i. Three-flowered clusters borne in the axils of bracteal leaves; leaves ovate to lanceolate, entire or usually so; flowers mostly blue, occasionally white.....
..... 4. Prunella

i. Flowers borne singly in the axils of small bracteal leaves; leaves ovate, blunt-dentate; flowers white....

..... 10. Perilla

h. Inflorescence of head-like cymes; leaves narrow, linear; corolla white to pinkish, 4.5-7 mm. long. 8. Pycnanthemum

1. Trichostema L. Bluecurls

1. Trichostema dichotomum L. Bluecurls. Occasional; along woodland trails. 537.

2. Scutellaria L. Skullcap

a. Cauline leaves dentate or dentate-serrate, ovate.....b

b. Principal leaves rhombic-ovate; calyx glandular-pubescent; racemes usually 3 or fewer..... 1. S. elliptica

b. Principal leaves ovate; calyx pubescent, not glandular; racemes usually more than 3..... 2. S. incana

a. Middle and upper cauline leaves entire, lanceolate; corolla blue, 18-28 mm. long ..... 3. S. integrifolia

1. Scutellaria elliptica Muhl. (S. pilosa Michx.). Hairy Skullcap. Common; shaded situations, woods, especially along trails. 261.

2. Scutellaria incana Biehler. (S. canescens Nutt.). Occasional; dry woods, occasionally in cleared areas. 370.

3. Scutellaria integrifolia L. Common; open areas, borders of woods, along trails. 250.

3. Glechoma L. Ground-ivy

1. Glechoma hederacea L. [Nepeta hederacea (L.) Trevisan]. Ground-ivy. Occasional; woodland borders, along trails, usually shaded areas. 79.

4. Prunella L. Self-heal

1. Prunella vulgaris L. forma vulgaris. Carpenter-weed or Self-heal. Relatively common; along trails, woodland borders, open areas. 266, 326.

*+ P. vulgaris L. forma albiflora (Bogenhard) Britt. Flowers white. Rare; one colony along trail on Squirrel Point, wooded area. 410.

5. Lamium L. Dead Nettle

1. Lamium amplexicaule L. Henbit. Common; roadsides, occasionally in cutover areas. 468.

6. Salvia L. Sage

1. Salvia lyrata L. Lyre-leaved Sage. Common; cutover areas, woodland borders, along trails. 129, 159.

7. Monarda L. Horsemint

1. Monarda punctata L. Horsemint. Occasional; open sunny areas, along trails. 536.

8. Pycnanthemum Michx. Mountain Mint

1. Pycnanthemum flexuosum (Walt.) BSP. Occasional; dry soil, cutover areas, woodland borders. 362.

9. Lycopus L. Water-horehound

1. Lycopus virginicus L. Water-horehound. Occasional; roadside ditches, damp soil in ravines. 500.

10. Perilla L.

1. Perilla frutescens (L.) Britt. Occasional; along shaded paths, especially on Squirrel Point. 575.

93. SOLANACEAE

a. Corolla rotate; fruit a berry.....b
   b. Anthers converging and forming a tube around the style, opening by terminal pores; calyx not inflated, not enclosing fruit..... ..... 1. Solanum
   b. Anthers separate, longitudinally dehiscent; calyx inflated, enclosing the fruit..... 2. Physalis
a. Corolla funnelform; fruit a short-spined capsule, 4-valved, 3-5 cm. long; calyx tubular, circumscissile..... 3. Datura

1. Solanum L. Nightshade

a. Plants not prickly, lacking stellate pubescence.....b
   b. Leaves pinnately compound; perennial with tubers.. 3. S. tuberosum
   b. Leaves simple, entire or sinuate-dentate; annual without tubers... ..... 1. S. nigrum
a. Plants prickly, with stellate pubescence; leaves elliptic-oblong, sinuate and toothed; berry yellow..... 2. S. carolinense

1. Solanum nigrum L. One depauperate specimen collected, appears intermediate between S. nigrum L. and S. villosum Michx. Squirrel Point, disturbed, exposed soil. Vigorous specimens should be collected for positive identification. 429.

2. Solanum carolinense L. Horse Nettle. Common; dry exposed soil,

cutover areas, woodland borders. 286, 543.

3. Solanum tuberosum L. Potato. Rare; one specimen collected from a wooded area where trash had previously been deposited, probably relic from cultivation. 432.

2. Physalis L. Ground-cherry

1. Physalis pruinosa L. Strawberry-tomato. Occasional; dry open soil in cutover areas. 393.

3. Datura L. Jimsonweed

+1. Datura stramonium L. Jimsonweed. Rare; one colony of plants in disturbed soil, weedy area at tip of Squirrel Point. 246.

94. SCROPHULARIACEAE

a. Corolla rotate, nearly actinomorphic.....b
  b. Stamens 4; plants with basal rosette; corolla yellow, 1-2.5 cm. wide; capsule ovoid to globose..... 1. Verbascum
  b. Stamens 2; plants lacking a basal rosette; corolla blue or white, less than 1 cm. wide; capsule flattened..... 7. Veronica
a. Corolla tubular, zygomorphic.....c
  c. Trees; corolla purple, 5-7 cm. long; leaves cordate, up to 3-4 dm. broad, densely felted beneath..... 4. Paulownia
  c. Herbs; leaves and flowers considerably smaller.....d
    d. Corolla spurred at the base; cauline leaves narrowly linear, 1-3 cm. long; corolla blue, with two white ridges... 2. Linaria
    d. Corolla not spurred at the base.....e

e. Corolla predominantly yellow.....f

f. Upper lip of corolla strongly arched, concave, enclosing the stamens; calyx 2-lobed or essentially entire; corolla sometimes marked with yellow; leaves pinnatifid..... ..... 9. Pedicularis

f. Upper lip of corolla flat or slightly concave, never enclosing the stamens; calyx 5-lobed; leaves lanceolate, usually with one or two pairs of basal lobes. 8. Gerardia

e. Corolla predominantly white or blue.....g

g. Bracteal leaves greatly reduced, inflorescence appearing terminal; flowers closely subtended by 2 or 3 sepal-like bracts; corolla white, marked with pink..... 3. Chelone

g. Bracteal leaves gradually reduced, inflorescence appearing axillary.....h

h. Sepals separate nearly to the base; corolla white, about 10 mm. long; pedicels with 2 bractlets at the base..... 6. Bacopa

h. Sepals united, forming a tube; corolla blue, 2.5-3 cm. long, nearly closed by the elevated palate of the lower lip..... 5. Mimulus

1. Verbascum L. Mullein

a. Stem and leaves woolly-pubescent with stellate hairs; inflorescence a dense spike; flowers sessile or nearly so..... 1. V. thapsus

a. Stem and leaves glabrous or with simple gland-tipped hairs; inflorescence a loose raceme; flowers with pedicels 1-1.5 cm. long..... ..... 2. V. blattaria

1. Verbascum thapsus L. Common Mullein. Occasional; cutover areas, woodland borders, disturbed soil. 384.

+2. Verbascum blattaria L. Moth Mullein. Relatively rare; a few small plants in field adjacent to Physics Laser Station. 335.

2. Linaria Mill. Toadflax

1. Linaria canadensis (L.) Dumont Old-field-toadflax. Occasional; dry soil, cutover areas. 115.

3. Chelone L. Turtlehead

1. Chelone glabra L. var. glabra. Turtlehead. Occasional; bottomlands, wet ravines. 622.

4. Paulownia Sieb. & Zucc.

1. Paulownia tomentosa (Thunb.) Steud. Princess-tree. Occasional; a few mature trees along woodland borders; saplings occasional in cut-over areas. 390.

5. Mimulus L. Monkey-flower

1. Mimulus alatus Ait. Relatively rare; open swampy ravines. 524.

6. Bacopa Aubl. Water-hyssop

1. Bacopa acuminata (Walt.) Robins. [Mecardonia acuminata (Walt.) Small]. Water-hyssop. Rare; cutover area west of Physics Laser Station. 455.

7. Veronica L. Speedwell

a. Pedicels shorter than the sepals, 1-1.5 mm. long.....b

b. Leaves narrowly oblong; style short, the stigma nearly sessile; flowers white..... 1. V. peregrina

b. Leaves ovate with a few rounded teeth; style reaching the summit of the capsule; flowers blue..... 2. V. arvensis

a. Pedicels longer than sepals, 6-10 mm. long; corolla blue, slightly longer than calyx; style reaching summit of capsule... 3. V. agrestis

+1. Veronica peregrina L. Neckweed. Occasional; disturbed soil; rather abundant at tip of Squirrel Point. 153.

2. Veronica arvensis L. Corn-speedwell. Common; dry open soil, woodland borders, Physics Laser Station. 42, 89.

3. Veronica agrestis L. Field-speedwell. Occasional; dry open soil and at the tip of Squirrel Point. 467.

8. Gerardia L. Gerardia

+1. Gerardia virginica (L.) BSP. [Aureolaria flava (L.) Pennell.]. Occasional; dry open woods and wooded slopes, occasionally along woodland borders. 269.

9. Pedicularis L. Lousewort, Wood-betony

a. Calyx 2-lobed; leaves opposite or subopposite; capsule ovoid, less than twice as long as the calyx; flowering in autumn..... ..... 1. P. lanceolata

a. Calyx nearly entire, split; leaves alternate; capsule flat, twice as long as calyx; flowering in spring..... 2. P. canadensis

1. Pedicularis lanceolata Michx. Relatively common; wet soil, ravines and open bottomlands. 625.

2. Pedicularis canadensis L. Wood-betony or Lousewort. Common; open

woods, especially damp wooded slopes. 44.

95. BIGNONIACEAE

a. Leaves composed of 5 or more toothed leaflets; calyx 5-toothed; flowers in terminal clusters..... 1. Campsis

a. Leaves composed of 2 oblong, entire leaflets and a terminal tendril; calyx slightly toothed; flowers in axillary clusters..... 2. Bignonia

1. Campsis Lour. Trumpet-flower

1. Campsis radicans (L.) Seem. Trumpet-creeper. Common; open woods, especially in low damp areas. 377.

2. Bignonia L.

1. Bignonia capreolata L. [Anisostichus capreolata (L.) Bureau]. Relatively rare; wooded areas, typically climbing tall trees. 637.

96. OROBANCHACEAE

1. Epifagus Nutt. Beech-drops

1. Epifagus virginiana (L.) Bart. Beech-drops. Common; parasitic on beech trees, typically in rich soil. 597.

97. LENTIBULARIACEAE

1. Utricularia L. Bladderwort

1. Utricularia sp. Bladderwort. Occasional; sterile material floats in masses with Chara, Ceratophyllum and Elodea in shallow water, along

shores of Matoaka Lake. 496.

98. ACANTHACEAE

1. Ruellia L. Ruellia

+1. Ruellia caroliniensis (Walt.) Steud. Occasional; dry soil, cutover areas, woodland borders. 369.

99. PHRYMACEAE

1. Phryma L. Lopseed

1. Phryma leptostachya L. Lopseed. Relatively common; cutover areas, along trails, occasionally in wooded areas. 375.

100. PLANTAGINACEAE

1. Plantago L. Plantain

a. Bracts and sepals glabrous or inconspicuously ciliate.....b

b. Bracts and sepals keeled; leaves broadly elliptic, 5-20 cm. long, half to two-thirds as wide; corolla lobes less than 1 mm. long.... ..... 1. P. rugelii

b. Bracts and sepals not keeled; leaves narrowly lanceolate, up to 12 cm. long, less than a sixth as wide; corolla lobes 2-3 mm. long..... 2. P. lanceolata

a. Bracts and sepals conspicuously pubescent to long-villous.....c

c. Leaves obovate; bracts mostly shorter than the calyx; corolla lobes acute, erect after anthesis..... 3. P. virginica

c. Leaves linear; bracts up to 2 cm. long; corolla lobes round-ovate, spreading after anthesis..... 4. P. aristata

1. Plantago rugelii Dcne. Common Plantain. Common; grassy areas along trails, woodland borders and in more open dry areas. 376.
2. Plantago lanceolata L. Ribgrass, English Plantain. Common; grassy areas along trails, woodland borders, occasionally in drier areas. 119, 149.
3. Plantago virginica L. Hoary Plantain. Relatively common; dry exposed soil, cutover areas and woodland borders. 65, 120.
4. Plantago aristata Michx. Long-bracted Plantain. Relatively common; dry exposed soil of cutover areas. 346.

101. RUBIACEAE

a. Herbs; inflorescence not a head.....b
  b. Principal leaves whorled; corolla rotate or subrotate; flowers cymose; stems 4-angled..... 1. Galium
  b. Principal leaves opposite.....c
    c. Stems ascending to erect; flowers separate; fruits dry.....d
      d. Flowers sessile, solitary in the axils; stipules fringed with bristles; ovules solitary in the locules..... 2. Diodia
      d. Flowers on terminal peduncles or in terminal cymes; stipules without bristles; ovules numerous in each locule..... ..... 5. Houstonia
    c. Stems creeping or trailing; flowers paired, united by their hypanthia; fruit a fleshy berry; leaves evergreen. 3. Mitchella
a. Shrubs; inflorescence a large, terminal naked head; corolla tubular; fruits inversely pyramidal; plants of wet habitats... 4. Cephalanthus

1. Galium L. Bedstraw

a. Fruit dry; ovary and fruit bristly; inflorescence many-flowered.....b

b. Principal stem leaves in whorls of 5-8; stems weak, prostrate....c

c. Leaves mostly in whorls of 8; leaves bristle-tipped; stems retrorsely bristly; annual..... 1. G. aparine

c. Leaves mostly in whorls of 6; leaves cuspidate; stems smooth, occasionally scabrous; perennial..... 2. G. triflorum

b. Principal stem leaves in whorls of 4; stems erect or ascending...d

d. Flowers pediceled, terminating branches of the inflorescence; stems usually pilose..... 3. G. pilosum

d. Flowers sessile or subsessile along the side of the inflorescence; stems usually glabrous..... 4. G. circaezans

a. Fruit a succulent berry, blue-black; ovary and fruit smooth; inflorescence 1-few flowered; leaves usually evergreen.... 5. G. uniflorum

1. Galium aparine L. Cleavers or Goosegrass. Common; shaded open woods, woodland borders, moist areas. 118.

2. Galium triflorum Michx. Sweet-scented Bedstraw. Occasional; shaded open woods, along trails. 422.

+3. Galium pilosum Ait. Occasional; dry wooded areas, occasionally along woodland borders. 519.

4. Galium circaezans Michx. Wild Licorice. Common; open woods, along trails, occasionally dry weedy areas. 252, 388, 392.

*+5. Galium uniflorum Michx. Rare; a few small plants located in dense woods, predominantly pine. 661.

2. Diodia L. Buttonweed

a. Corolla 7-10 mm. long; sepals 2; style 2-cleft..... 1. D. virginiana

a. Corolla 4-6 mm. long; sepals 4; style not divided..... 2. D. teres

1. Diodia virginiana L. Buttonweed. Occasional; damp soil, in grassy areas along woodland borders, occasionally forming large mats. 505.

2. Diodia teres Walt. Buttonweed. Common; dry exposed soil, woodland borders. 549.

3. Mitchella L. Partridge-berry

1. Mitchella repens L. Partridge-berry. Common; creeping on ground, woods. 23.

4. Cephalanthus L. Buttonbush

1. Cephalanthus occidentalis L. Buttonbush. Occasional; shores of Matoaka Lake and in more open ravines. 272, 274.

5. Houstonia L.

a. Flowers solitary on slender peduncles; corolla salverform, pale blue with a yellow eye; capsule flattened..... 1. H. caerulea

a. Flowers in cymes; corolla funnelform, pale purple to white, without an eye; capsule globose..... 2. H. purpurea

1. Houstonia caerulea L. Bluets, Quaker-ladies. Abundant in early spring; along paths, ravine banks, woodland borders; even relatively common in dry soil, cutover areas. 236.

2. Houstonia purpurea L. Occasional; along woodland paths, ravines, especially in damp soil. 199, 434.

102. CAPRIFOLIACEAE

a. Erect herbs or vines; corolla tubular or funnelform; style elongate;

inflorescence axillary or of terminal few-flowered cymules.....b

b. Climbing or trailing vines; corolla 3-5 cm. long; fruit a black or red berry..... 1. Lonicera

b. Erect herbs; corolla 0.8-2 cm. long; fruit an orange or orange-red drupe crowned by persistent sepals..... 2. Triosteum

a. Shrubs; corolla rotate; style short or none; flowers numerous in flat-topped cymes; fruit a 1-seeded drupe..... 3. Viburnum

1. Lonicera L. Honeysuckle

a. Leaves all distinct; flowers terminating axillary peduncles; corolla funnelform, zygomorphic, white to pink, turning yellow..... ..... 1. L. japonica

a. Upper leaves perfoliate; flowers in sessile cymules; corolla trumpet-shaped, nearly actinomorphic, red..... 2. L. sempervirens

1. Lonicera japonica Thunb. Japanese Honeysuckle. Abundant; woodland borders, especially in vicinity of pine; along trails, in open thicket areas. 122, 363.

2. Lonicera sempervirens L. Trumpet- or Coral-honeysuckle. Occasional; open woods, along trails. 158, 195.

2. Triosteum L. Horse-gentian

1. Triosteum perfoliatum L. Tinker's-weed. Rare; a few individuals in wooded ravines. 358.

3. Viburnum L. Viburnum

a. Leaves ovate to lanceolate, unlobed, pinnately veined, scurfy or minutely hairy beneath.....b

b. Cyme peduncled; petioles, buds and lower leaf surfaces not red-tomentose.....c

c. Leaves commonly dentate or crenate, dull above, smooth or scurfy beneath..... 1. V. cassinoides

c. Leaves entire, lustrous above, minutely pilose beneath..... ..... 2. V. nudum

b. Cyme sessile; petioles, buds and lower leaf surfaces obviously red-tomentose..... 3. V. rufidulum

a. Leaves mostly 3-lobed (maple-like), palmately veined, stellate-pubescent beneath..... 4. V. acerifolium

+1. Viburnum cassinoides L. Witherod or Wild-raisin. Occasional; damp soil, wooded ravines or more open bottomlands. 67, 104.

2. Viburnum nudum L. Possum-haw. Occasional; usually damp soil, rich woods, along slopes or ravines. 329.

3. Viburnum rufidulum Raf. Southern Blackhaw. Occasional; predominantly deciduous woods, especially on Squirrel Point. 534, 606.

4. Viburnum acerifolium L. Arrow-wood, Maple-leaved Viburnum. Common; open woods and wooded slopes, dry situations. 155, 251.

103. VALERIANACEAE

1. Valerianella Mill. Corn-salad

1. Valerianella olitoria (L.) Poll. (V. locusta Betcke). Corn-salad. Common; woodland borders, in open weedy areas. 91.

104. CAMPANULACEAE

a. Corolla actinomorphic, rotate; stamens distinct..... 1. Specularia

a. Corolla zygomorphic, 2-lipped; stamens united into a tube around the style..... 2. Lobelia

1. Specularia Fabricius

+1. Specularia perfoliata (L.) A. DC. Venus's Looking-glass. Occasional; dry exposed soil in cutover areas. 219, 232.

2. Lobelia L. Lobelia

a. Corolla longer than 1 cm., its tube with lateral openings.....b

b. Corolla bright red, 3-4.5 cm. long; filament tube 2.4-3.3 cm. long, much exceeding the corolla tube..... 1. L. cardinalis

b. Corolla blue, 1.5-3.3 cm. long; filament tube less than 1.5 cm. long.....c

c. Lobes of calyx with auricles 2-5 mm. long at the base; pedicels bracteolate above the base; plants essentially glabrous..... ..... 2. L. siphilitica

c. Calyx without auricles; pedicels bracteolate near the base; plants pubescent throughout..... 3. L. puberula

a. Corolla 7-10 mm. long, white to pale blue; corolla tube lacking lateral openings; capsules becoming inflated, included within the calyx. ..... 4. L. inflata

1. Lobelia cardinalis L. Cardinal Flower. Rare; shores of Matoaka Lake, in shallow water. 490.

2. Lobelia siphilitica L. Great Lobelia. Occasional; moist soil, wooded ravines, occasionally in drier situations. 581, 615, 629, 683.

3. Lobelia puberula Michx. var. puberula. Occasional; open woods, along paths. 474, 587.

4. Lobelia inflata L. Indian-tobacco. Common; woodland borders, along trails, in open areas. 404, 406.

105. COMPOSITAE

a. Corollas all or partly tubular; ligulate flowers, when present, either pistillate or neuter.....b

b. Ligulate flowers absent, heads discoid.....c

c. Leaves and involucre spiny; flowers rose-purple, in large terminal heads; pappus of numerous plumose bristles... 29. Cirsium

c. Neither leaves nor involucre spiny.....d

d. Plants trees or climbing or trailing vines.....e

e. Shrubby trees; leaves obovate, coarsely toothed; flowers dioecious, white..... 11. Baccharis

e. Vines; leaves cordate or hastate, toothed at the base; flowers perfect, pink or lilac, sometimes white..... ..... 4. Mikania

d. Plants erect herbs.....f

f. Pappus of capillary bristles.....g

g. Pappus double, the outer of short scale-like bristles, the inner of longer capillary bristles; flowers purple..... 1. Vernonia

g. Pappus bristles all about the same length.....h

h. Pappus bristles strongly barbellate; plants with an evident corm; flowers rose-purple..... 5. Liatris

h. Pappus bristles not barbellate; plants without a corm.....i

i. Leaves opposite or whorled (occasionally the

upper leaves are alternate); achenes mostly 5-angled..... 3. Eupatorium

i. Leaves alternate or basal.....j

j. Principal phyllaries in one series.....k

k. Leaves obovate to lanceolate, dentate, pinnately veined; phyllaries more than 5.. ..... 26. Erechtites

k. Leaves reniform, irregularly dentate and shallowly lobed, palmately veined; phyllaries usually 5..... 27. Cacalia

j. Principal phyllaries in several series.....l

l. Phyllaries not scarious; flowers pink to purple; stems and leaves not white-tomentose..... 12. Pluchea

l. Phyllaries scarious; flowers white; stems white-tomentose; leaves felted beneath...m

m. Plants dioecious; with a basal rosette of leaves..... 13. Antennaria

m. Inner flowers perfect, outer flowers pistillate; leaves all cauline..... ..... 14. Gnaphalium

f. Pappus none, or of scales or awns.....n

n. Staminate and carpellate flowers in separate heads on the same plant; involucre of carpellate flower hard, resembling an achene, enclosing the fruit; pappus none..... 15. Ambrosia

n. Flowers perfect, not enclosed by a hard involucre; pappus present.....o

o. Pappus of triangular scales prolonged into bristles; heads 2-5 flowered; flowers purple..... 2. Elephantopus

o. Pappus of retrorsely barbed awns; heads usually many-flowered; flowers yellow..... 22. Bidens

b. Marginal flowers ligulate, central flowers tubular (heads radiate)..p

p. Pappus of capillary bristles.....q

q. Ligules yellow.....r

r. Phyllaries of involucre imbricated in several series; cauline leaves entire to dentate, not pinnatifid.....s

s. Pappus of disc flowers double, of long inner bristles and short outer ones; plants with long, hairy pubescence..... 6. Chrysopsis

s. Pappus of all flowers single; plants not conspicuously long-hairy..... 7. Solidago

r. Principal phyllaries imbricated in one series, sometimes with a few bractlets at the base; cauline leaves deeply pinnatifid..... 28. Senecio

q. Ligules not yellow.....t

t. Ligules 5-9.....u

u. Heads in a slender panicle; achenes not covered with silky hairs..... 7. Solidago

u. Heads in a corymb; achenes covered with silky hairs..... 10. Sericocarpus

t. Ligules more numerous.....v

v. Phyllaries imbricated in several series; heads usually on leafy branchlets..... 8. Aster

v. Phyllaries arranged in a single series or with a long

inner series and a short outer series; heads usually on naked peduncles or scapes..... 9. Erigeron

p. Pappus none, or a short crown or of awns or scales.....w

w. Receptacle chaffy, sometimes only in the center.....x

x. Achenes forming in either the disc or the ray flowers, but not both.....y

y. Achenes forming only in the disc flowers.....z

z. Stems winged by decurrent leaf bases; pappus of 2 awns; phyllaries in several series..... 21. Verbesina

z. Stems not winged.....a

a. Receptacle conical in fruit.....b

b. Ligules white; disc flowers yellow; leaves pinnately dissected into fine segments..... 24. Anthemis

b. Ligules yellow; disc flowers dark brown; leaves not finely dissected..... 19. Rudbeckia

a. Receptacle flat or somewhat convex.....c

c. Pappus of 2 thin, deciduous scales; phyllaries imbricated in several series..... 20. Helianthus

c. Pappus of rigid, retrorsely barbed awns, persistent; phyllaries in 2 series..... 22. Bidens

y. Achenes forming only in ray flowers.....d

d. Rays 5, white; achenes tipped by persistent corolla..... ..... 17. Parthenium

d. Rays more than 5, in 2 series, yellow; corolla not persistent..... 16. Silphium

x. Achenes forming in both disc and ray flowers.....e

e. Stems winged by decurrent leaf bases; pappus of two awns;

phyllaries in several series..... 21. Verbesina

e. Stems not winged; pappus none or a minute crown.....f

f. Leaves opposite, lanceolate, serrate; rays minute; achenes 3-4-angled..... 18. Eclipta

f. Leaves alternate, pinnately dissected; rays 2-3 mm. long; achenes compressed..... 23. Achillea

w. Receptacle naked; heads solitary, 4-6 cm. wide; ligules white; disc flowers yellow..... 25. Chrysanthemum

a. Corollas all ligulate, the flowers perfect; plants with milky juice.. .....g

g. Pappus of scales and bristles; heads small, terminating a naked scape..... 30. Krigia

g. Pappus of capillary bristles only.....h

h. Achenes mucronate above; leaves all basal; heads solitary on hollow scapes..... 31. Taraxacum

h. Achenes not mucronate; stems solid, with cauline leaves.....i

i. Achenes flattened.....j

j. Achenes beakless; involucre ovoid or campanulate..... ..... 32. Sonchus

j. Achenes contracted into a beak; involucre cylindrical, slender..... 33. Lactuca

i. Achenes columnar, not flattened.....k

k. Achenes beaked; pappus brownish-red, surrounded at the base by a soft-villous ring..... 34. Pyrrhopappus

k. Achenes beakless; pappus tawny or brownish.....l

l. Corolla white or creamy; heads slender, cylindrical, drooping; leaves cleft or lobed..... 35. Prenanthes

1. Corolla yellow; heads campanulate, erect; leaves not cleft..... 36. Hieracium

1. Vernonia Schreb. Ironweed

*+1. Vernonia glauca (L.) Willd. Occasional; rich woods, open wooded slopes. 437, 461.

2. Elephantopus L. Elephant's-foot

a. Stems leafy; plants without a definite basal rosette..... ..... 1. E. carolinianus

a. Stems scapose or with a few small leaves; plants with a definite basal rosette..... 2. E. tomentosus

1. Elephantopus carolinianus Willd. Occasional; dry woods, ravines and wooded slopes. 529.

2. Elephantopus tomentosus L. Tobaccoweed. Common; dry open woods, especially along trails. 463.

3. Eupatorium L. Thoroughwort

a. Leaves whorled in 3's or 4's, 2.5-15 cm. wide; corolla pale pink to purple; inflorescence convex..... 1. E. purpureum

a. Leaves opposite, occasionally the upper ones alternate (especially in E. capillifolium).....b

b. Flowers 5 (3-7) per head.....c

c. Principal leaves pinnately divided into filiform divisions; heads numerous, in a large panicle..... 2. E. capillifolium

c. Leaves entire or dentate; inflorescence flat-topped.....d

d. Leaves oblong to linear, glandular-punctate; involucral

bracts acuminate, with white scarious tips.....
.....3. E. leucolepis

d. Leaves ovate or subrotund, not glandular-punctate; involucral bracts obtuse, not white-scarious.. 4. E. rotundifolium

b. Flowers 12-70 per head.....e

e. Flowers white; receptacle flat; roots fibrous, rhizomes lacking
..... 5. E. rugosum

e. Flowers blue or violet; receptacle conic; plants with rhizomes.
..... 6. E. coelestinum

1. Eupatorium purpureum L. Sweet or Green-stemmed Joe-Pye-weed. Occasional; damp wooded areas, along streams, in bottomlands. 294, 378.

2. Eupatorium capillifolium (Lam.) Small Dog-fennel. Common; weedy situations, cutover areas, woodland borders. 670.

*3. Eupatorium leucolepis (DC.) T. & G. Occasional; dry sandy soil, open woods and cutover areas. 571, 687.

4. Eupatorium rotundifolium L. Occasional; dry open woods, especially with pines. 473.

*5. Eupatorium rugosum Houtt. White Snakeroot. Occasional; open mixed woods and clearings. 672, 678.

6. Eupatorium coelestinum L. Mistflower. Common; woods; moist, shaded situations, along trails, in ravines. 498.

4. Mikania Willd. Climbing Hempweed

1. Mikania scandens (L.) Willd. Common; open bottomlands, thickets and along banks; occasionally forming dense colonies. 522.

5. Liatris Schreb. Blazing-star

1. Liatris graminifolia (Walt.) Willd. var. graminifolia. Rare; one colony in dry soil, pine-oak woods, along Strawberry Plains Road. 707.

6. Chrysopsis Ell. Golden Aster

a. Leaves linear, parallel veined; achenes linear; involucre turbinate.. ..... 1. C. graminifolia

a. Leaves obovate, pinnately veined; achenes obovate; involucre hemispherical..... 2. C. mariana

1. Chrysopsis graminifolia (Michx.) Ell. Silkgrass. Occasional; dry, open pine-oak woods. 562.

2. Chrysopsis mariana (L.) Ell. Common; dry exposed soil, cutover areas, woodland borders. 538, 551, 667.

7. Solidago L. Goldenrod

a. Inflorescence of axillary clusters, or an erect, narrow terminal thyrse.....b

b. Basal leaves well developed, petiolate; cauline leaves much reduced, sessile; inflorescence terminal and thyrsoid.....c

c. Rays silvery-white; leaves pubescent..... 2. S. bicolor

c. Rays yellow; leaves essentially glabrous..... 3. S. erecta

b. Basal leaves considerably smaller than cauline and deciduous by anthesis; inflorescence an elongate series of axillary clusters... ..... 1. S. caesia

a. Inflorescence paniculiform, usually nodding at the summit.....d

d. Basal and lower cauline leaves the largest, persistent; cauline

leaves considerably smaller, much reduced toward stem summit.....e

e. Herbage essentially glabrous throughout; rays 8-12, deep yellow ..... 4. S. juncea

e. Herbage densely and finely puberulent throughout; rays 5-9, pale yellow..... 5. S. nemoralis

d. Basal and lower cauline leaves smaller than the middle and upper ones; lower leaves soon deciduous.....f

f. Leaves not conspicuously triple-nerved.....g

g. Leaves entire, translucent-punctate; rays 3-5... 6. S. odora

g. Leaves serrate-dentate, not translucent-punctate; rays 6-11. ..... 7. S. rugosa

f. Leaves conspicuously triple-nerved; stem densely spreading-puberulent at least above the middle; rays 9-15..... ..... 8. S. altissima

1. Solidago caesia L. Blue-stem or Wreath Goldenrod. Common; woods and woodland borders, usually in moist situations. 523, 660, 709.

2. Solidago bicolor L. White Goldenrod. Occasional; dry open woods, commonly along trails. 677, 714, 715.

3. Solidago erecta Pursh Occasional; dry woods, woodland borders. 690, 710.

*+4. Solidago juncea Ait. Occasional; dry soil, cutover areas, woodland borders. 451.

5. Solidago nemoralis Ait. Occasional; dry woods, woodland borders. 630, 681.

6. Solidago odora Ait. Sweet Goldenrod. Common; dry exposed soil, cutover areas, woodland borders. 533, 680.

7. Solidago rugosa Ait. Occasional; dry woods, in moist shaded situ-

ations. 691.

8. Solidago altissima L. Common; open weedy situations, field near Physics Laser Station. 671.

8. Aster L. Aster

a. Basal or lower cauline leaves petioled and cordate to subcordate at the base.....b

b. Cauline leaves with slender petioles which are sometimes slightly winged, never auriculate-clasping; achenes glabrous..... ..... 1. A. cordifolius

b. Cauline leaves either sessile and cordate-clasping or with the petioles enlarged and auriculate-clasping at the base; achenes hairy..... 2. A. undulatus

a. None of the leaves cordate and petioled.....c

c. Cauline leaves with cordate-auriculate clasping bases.....d

d. Involucre glandular-hairy; principal leaves oblong, entire, sessile..... 3. A. patens

d. Involucre glabrous; principal leaves with an ovate, serrate blade tapering into a broadly winged petiole..... ..... 5. A. prenanthoides

c. Cauline leaves without cordate-auriculate clasping bases.....e

e. Involucre glandular, 1-1.5 cm. high; rays deep purple, 1.5-2.5 cm. long..... 4. A. grandiflorus

e. Involucre not glandular, less than 1 cm. high; rays white or violet, less than 1 cm. long.....f

f. Pappus in a single series.....g

g. Rays white; perennials with a short caudex or rhizome...h

h. Rays 16-35; phyllaries with subulate, marginally inrolled green tips..... 7. A. pilosus

h. Rays 7-14; phyllaries acute or obtuse with broad green tips, margins not inrolled..... 8. A. lateriflorus

g. Rays violet; perennial with a thickened corm-like base; leaves thick, entire or nearly so..... 6. A. gracilis

f. Pappus double, inner series of long bristles, outer series of shorter bristles (1 mm. long or less); rays 5-9, white, broad and showy..... 9. A. infirmus

1. Aster cordifolius L. Common; mixed woods, wooded slopes. 684, 701.

2. Aster undulatus L. Common; dry wooded slopes, occasionally in more open areas and along trails. 693, 704, 705, 721.

3. Aster patens Ait. Occasional; dry open woods; woodland borders. 668, 692.

4. Aster grandiflorus L. Rare; dry soil, edge of pine-oak woods. 706.

*+5. Aster prenanthoides Muhl. Occasional; shaded situations, mixed woods, along banks and in ravines. 582, 589, 653.

6. Aster gracilis Nutt. Rare; one colony of plants, dry soil, edge of pine-oak woods. 561.

*+7. Aster pilosus Willd. Common; weedy situations, cutover areas, woodland borders. 618, 708.

8. Aster lateriflorus (L.) Britt. Rare; dry wooded slopes. 675.

9. Aster infirmus Michx. Occasional; open woods, usually in dry situations. 460.

9. Erigeron L. Fleabane

a. Involucre saucer-like, over 5 mm. broad; ligules showy; leaves lan-

ceolate to oblong.....b

b. Stem soft, flattened in pressing; inflorescence a loose corymb, 2-5-flowered; heads 2.5-4 cm. broad..... 1. E. pulchellus

b. Stem firm; inflorescence corymbose, many-flowered; heads less than 2.5 cm. broad.....c

c. Principal cauline leaves coarsely toothed, bristly-ciliate; ligules distinctly longer than the breadth of the disc..... ..... 2. E. annuus

c. Principal cauline leaves entire, minutely strigose to glabrous; ligules about as long as the breadth of the disc..... ..... 3. E. strigosus

a. Involucre campanulate, less than 5 mm. broad; ligules minute, not showy; leaves narrowly oblanceolate to linear..... 4. E. canadensis

1. Erigeron pulchellus Michx. Robin's-plantain. Common; open mixed woods, frequent on banks along trails, usually in moist situations. 41, 75.

2. Erigeron annuus (L.) Pers. Daisy-fleabane. Common; dry open areas, woodland borders, cutover areas. 341.

*+3. Erigeron strigosus Muhl. Daisy-fleabane. Common; dry open areas, woodland borders, cutover areas. 287.

*+4. Erigeron canadensis L. [Conyza canadensis (L.) Cron.]. Horseweed. Common; cutover areas, woodland borders. 454, 617.

10. Sericocarpus Nees White-topped Aster

1. Sericocarpus asteroides (L.) BSP. Occasional; dry woods and wooded slopes. 260, 405.

11. Baccharis L. Groundsel-tree

1. Baccharis halimifolia L. Sea-myrtle. Rare; one small tree (mature, pistillate) along Strawberry Plains Road, border of mixed woods. 711.

12. Pluchea Cass. Marsh-fleabane

1. Pluchea camphorata (L.) DC. Camphorweed. Rare; a few plants in damp soil along shore of Matoaka Lake. 488.

13. Antennaria Gaertn. Pussy's-toes

a. Heads in corymbs; stolons leafy..... 1. A. parlinii

a. Heads solitary; stolons filiform, not leafy..... 2. A. solitaria

1. Antennaria parlinii Fern. Common; dry open woods, wooded slopes, along trails. 81.

2. Antennaria solitaria Rydb. Rare; one colony of plants, dry hardwood slope just south of Williamsburg Community Hospital. 74.

14. Gnaphalium L. Cudweed, Rabbit Tobacco

a. Pappus bristles distinct, falling separately; inflorescence a corymb. ..... 1. G. obtusifolium

a. Pappus bristles united at the base, falling as a unit; inflorescence a spike..... 2. G. purpureum

1. Gnaphalium obtusifolium L. Catfoot. Occasional; dry sterile soil, cutover areas. 453.

2. Gnaphalium purpureum L. Purple Cudweed. Common; dry exposed soil, woodland borders, cutover areas. 146.

15. Ambrosia L. Ragweed

1. Ambrosia artemisiifolia L. Common Ragweed. Occasional; weedy situations, cutover areas, field near Physics Laser Station. 503.

16. Silphium L. Rosinweed

a. Stem leafy to the summit; leaves in whorls of 3-5, lanceolate to oblong-ovate, shallowly toothed to subentire; plants with a stout caudex and rhizomes..... 1. S. trifoliatum

a. Principal leaves at the base of the stem; leaves as broad as long, often reniform, toothed to deeply lobed; plants with a woody taproot. ..... 2. S. compositum

1. Silphium trifoliatum L. Occasional; dry woods, especially along trails and in clearings. 381, 462.

*+2. Silphium compositum Michx. Rare; one colony of plants, dry, open wooded slope, north of Strawberry Plains crossing. 372.

17. Parthenium L.

1. Parthenium integrifolium L. Wild-quinine. Occasional; dry open woods, cutover areas, woodland borders. 242.

18. Eclipta L.

1. Eclipta alba (L.) Hassk. Yerba-de-Tago. Relatively rare; moist soil, along stream banks and in bottomlands. 627.

19. Rudbeckia L. Coneflower, Black-eyed Susan

a. Pappus a minute crown; basal leaves 3-lobed or 5-7-parted; stems glabrous to hispid..... 1. R. triloba

a. Pappus none; basal leaves ovate; stems coarsely hirsute.. 2. R. hirta

1. Rudbeckia triloba L. Rare; one colony of plants, moist wooded ravine, near the trail, north Squirrel Point. 644.

2. Rudbeckia hirta L. Common; dry open areas, woodland borders, along trails. 264, 293, 296.

20. Helianthus L. Sunflower

a. Disc corollas purple; leaves with broadly winged petioles, hirsute on both surfaces..... 1. H. atrorubens

a. Disc corollas yellow; leaves sessile, scabrous above, hirsute below.. ..... 2. H. divaricatus

1. Helianthus atrorubens L. Occasional; open woods. 508.

2. Helianthus divaricatus L. Relatively common; dry situations, cutover areas, along trails, woodland borders. 307, 441, 664.

21. Verbesina L. Crown-beard

a. Leaves opposite; rays yellow..... 1. V. occidentalis

a. Leaves alternate; rays white..... 2. V. virginica

1. Verbesina occidentalis (L.) Walt. Rare; one colony of plants west of Physics Laser Station, dry open cutover area. 567.

2. Verbesina virginica L. Tickweed. Occasional; dry woods and cutover areas. 556.

22. Bidens L. Bur-marigold, Stick-tights

a. Leaves simple, serrate; achenes with convex, cartilaginous summit; awns often 4; plants of wet habitats..... 1. B. laevis

a. Leaves pinnate or bipinnate; achenes more or less truncate at summit. .....b

b. Achenes flat, cuneate or obovate, the inner 5-10 mm. long; awns 2 or none.....c

c. Ligules wanting or shorter than the outer involucre; achenes cuneate..... 2. B. frondosa

c. Ligules 1-2.5 cm. long; achenes obovate, commonly slightly winged..... 3. B. aristosa

b. Achenes linear-tetragonal, the inner 1.2-1.8 cm. long; awns several; leaves 2-3 times pinnate; ligules small..... 4. B. bipinnata

1. Bidens laevis (L.) BSP. Smooth Bur-marigold. Common; wet soil, open ravines, bottomlands, especially in College Creek. 650.

2. Bidens frondosa L. var. frondosa. Beggar-ticks. Occasional; dry open areas, woodland borders. 558.

*+3. Bidens aristosa (Michx.) Britt. var. aristosa. Tickseed-sunflower. Rare; one colony of plants along Ironbound Road, woodland border, low woods. 665.

*+4. Bidens bipinnata L. Spanish-needles. Common; weedy situations, woodland borders and along trails in open areas. 555.

23. Achillea L. Yarrow

1. Achillea millefolium L. Common Yarrow. Occasional; dry weedy situations. 285.

24. Anthemis L. Chamomile

1. Anthemis arvensis L. Occasional; dry weedy situations, woodland borders. 190.

25. Chrysanthemum L.

+1. Chrysanthemum leucanthemum L. var. pinnatifidum Lecoq & Lamotte Ox-eye Daisy. Occasional; dry weedy situations, cutover areas, woodland borders. 121.

26. Erechtites Raf. Fireweed

1. Erechtites hieracifolia (L.) Raf. Common; exposed sterile soil in cutover areas, woodland borders. 348, 541, 586.

27. Cacalia L. Indian-plantain

1. Cacalia atriplicifolia L. Pale Indian-plantain. Rare; dry sandy soil, open woods and woodland borders. 301.

28. Senecio L. Ragwort, Groundsel

a. Basal leaves narrowly spatulate-oblanceolate; stems densely hairy at the base; achenes hispidulous..... 1. S. Smallii

a. Basal leaves cordate to ovate; stems glabrous; achenes glabrous..... ..... 2. S. aureus

1. Senecio Smallii Britt. Rare; dry soil, along woodland borders. 207.

2. Senecio aureus L. Golden Ragwort. Common to abundant; typically in moist soil, ravines and bottomlands but also common in dryer wooded areas and along trails. 178.

29. Cirsium Mill. Thistle

1. Cirsium discolor (Muhl.) Spreng. Rare; a few plants in cutover area, west of Physics Laser Station. 568.

30. Krigia Schreb. Dwarf Dandelion

1. Krigia virginica (L.) Willd. Occasional; dry sterile soil, cutover areas. 231.

31. Taraxacum Zinn. Dandelion

1. Taraxacum officinale Weber Common Dandelion. Common; weedy areas, along trails, cutover areas. 305.

32. Sonchus L. Sow-thistle

1. Sonchus asper (L.) Hill Spiny-leaved Sow-thistle. Common; dry situations, exposed soil, cutover areas and woodland borders. 304, 344.

33. Lactuca L. Lettuce

a. Flowers yellow; achenes with a filiform beak 5-6 mm. long, a median nerve on each face..... 1. L. canadensis

a. Flowers blue; outer achenes with a thick, short beak, inner achenes beakless; several-nerved on each face..... 2. L. floridana

1. Lactuca canadensis L. var. canadensis. Relatively common; dry soil, cutover areas and woodland borders. 438.

2. Lactuca floridana (L.) Gaertn. Occasional; dry woods, woodland borders. 525.

34. Pyrrhopappus DC. False Dandelion

1. Pyrrhopappus carolinianus (Walt.) DC. Occasional; dry exposed soil, cutover areas, woodland borders. 147, 221.

35. Prenanthes L. Rattlesnake-root

a. Involucre pubescent, with 6-8 long primary phyllaries; heads 8-12-flowered..... 1. P. serpentaria

a. Involucre glabrous, with 5 long primary phyllaries; heads 5-6-flowered..... 2. P. altissima

1. Prenanthes serpentaria Pursh Lion's-foot. Occasional; dry sandy soil, woodland borders. 679, 712.

*+2. Prenanthes altissima L. Occasional; dry wooded slopes, occasionally in cutover areas. 658, 703.

36. Hieracium L. Hawkweed

a. Inflorescence corymbiform; stem essentially glabrous; leaves with purple midrib and main veins..... 1. H. venosum

a. Inflorescence elongate, cylindric; stem conspicuously hairy toward the base; leaves without purple veins..... 2. H. gronovii

1. Hieracium venosum L. Rattlesnake-weed. Common; mixed woods, especially frequent in shaded situations on banks along trails. 126, 156, 355.

2. Hieracium gronovii L. Occasional; dry open situations, typically in exposed soil in cutover areas. 507, 676.

CHAPTER VII

SUMMARY

A total of 545 taxa representing 324 genera of 105 families were recorded from the College Woods of the College of William and Mary.

Five major plant communities were recognized and described: Matoaka Lake, upland woods, wooded ravines, bottomlands and cleared uplands.

Elymus villosus forma arkansanus and Prunella vulgaris forma albiflora have not previously been reported from Virginia. Decumaria barbara and Cyperus iria have not previously been noted north of the James River. The following species are new records for the Virginia coastal plain: Spiranthes tuberosa, Cardamine flexuosa, Rosa multiflora Vicia lathyroides, Viola pallens, Veronica peregrina and Aster pilosus. There are 115 new county records.

Keys to the families, genera and species have been constructed, and data on habitat and frequency for each species included. Over 1500 specimens have been deposited in the herbarium of the College of William and Mary.

BIBLIOGRAPHY

Beverley, Robert. 1705. The history and present state of Virginia. The University of North Carolina Press, Chapel Hill, N. C. (published 1947). 366 p.

Bloomquist, H. L. and H. J. Oosting. 1959. A guide to the spring and early summer flora of the Piedmont, North Carolina. 6th ed. Published by the authors, Durham, North Carolina. 181 p.

Braun, E. Lucy. 1967. The vascular flora of Ohio. Vol. 1. The Monocotyledoneae, with Gramineae by Clara G. Weishaupt. The Ohio State University Press, Columbus, Ohio. 464 p.

Department of Geology, The College of William and Mary. 1967. Geology of the Middle Coastal Plain, Virginia. The College of William and Mary, Williamsburg, Virginia. 16 p.

Devereux, R. E., S. S. Obenshain, H. C. Porter and G. R. Epperson. 1965. Soils of Virginia. Virginia Agr. Ext. Service Bull. 203. Rev. ed. 26 p.

Devereux, R. E., G. H. Robinson and S. S. Obenshain. 1962. Genesis and morphology of Virginia soils. Virginia Agr. Exp. Sta. Bull. 540. 39 p.

Erlanson, Eileen Whitehead. 1924. The flora of the peninsula of Virginia. Papers of the Michigan Acad. of Sci., Arts and Letters 4: 115-182.

Fassett, Norman C. 1966. A manual of aquatic plants. Univ. of Wisconsin Press, Madison, Wisconsin. 405 p.

Fernald, M. L. 1950. Gray's manual of botany. 8th ed. American Book Co., New York. 1632 p.

Fernald, M. L. and Ludlow Griscom. 1935. Three days of botanizing in southeastern Virginia. Rhodora 37: 129-157.

Gilman, Elizabeth M. 1957. Grasses of the Tidewater-Piedmont region of northern Virginia and Maryland. Castanea 22: 1-105.

Gleason, Henry A. 1952. The new Britton and Brown illustrated flora of the northeastern United States and adjacent Canada. Hafner Publ. Co., Inc., New York. 3 v.

Greer, George Cambell. 1960. Early Virginia immigrants. Baltimore Genealogical Publ. Co. 376 p.

Hitchcock, A. S. 1950. Manual of the grasses of the United States, 2nd ed., revised by Agnes Chase. U. S. Dept. of Agr., Misc. Publ. 200. Government Printing Office Washington. 1051 p.

Lee, Frederic P., Fred O. Coe, B. Y. Morrison, Milo Perkins and Freeman Weiss. 1953. The azalea handbook. Monumental Printing Co., Baltimore, Maryland. 160 p.

Mackenzie, Kenneth Kent. 1940. North American Cariceae. New York Botanical Garden. 2 v.

Massey, A. B. 1944. Ferns and "fern allies" of Virginia. Virginia Agr. Ext. Service Bull. 256 p.

Massey, A. B. 1961. Virginia flora. Virginia Agr. Exp. Sta. Bull. 155. 258 p.

Maxwell, Hu. 1910. The use and abuse of forests by Virginia Indians. William and Mary Quart. Hist. Mag. Ser. 1, 19: 72-103.

McLean, J. D., Jr. 1956. The foraminifera of the Yorktown formation in the York-James Peninsula of Virginia with notes on the associated molluscs. Bull. Amer. Paleont. 36: 261-394.

Rehder, Alfred. 1947. Manual of cultivated trees and shrubs. 2nd ed. The Macmillan Company, New York. 996 p.

Stevens, William Oliver. 1938. Old Williamsburg and her neighbors. Dodd, Mead and Co., New York. 337 p.

Steyermark, Julian A. 1940. Spring flora of Missouri. Missouri Botanical Garden, St. Louis, Missouri and Field Museum of Natural History, Chicago, Illinois. 582 p.

Tyler, Lyon G., ed. 1905-1906. Will of William Broadribb of James City County, Virginia. William and Mary College Quart. Hist. Mag. Ser. 1, 14: 35-37.

U. S. Dept. of Commerce, Weather Bureau. 1944-1963. Virginia climatological data. Vol. 54-78.

Weishaupt, Clara G. 1960. Vascular plants of Ohio. Harold L. Hedrick, Columbus, Ohio. 309 p.

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