

**A TAXONOMIC INVESTIGATION OF THE SPRING AND
EARLY SUMMER VASCULAR FLORA OF
MONTGOMERY COUNTY, TENNESSEE**

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July 29, 1966

To the Graduate ^{Committee} Council:

I am submitting herewith a thesis written by Howard Lee Yarbrough entitled "A Taxonomic Investigation of the Spring and Early Summer Vascular Flora of Montgomery County, Tennessee." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts in Education, with a major in Biology.

William H. Ellis
Major Professor

We have read this thesis and
recommend its acceptance.

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Director of Graduate Studies

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EARLY SUMMER VASCULAR FLORA OF

MONTGOMERY COUNTY, TENNESSEE

An Abstract of a Thesis (1965) indicates that

Presented to

the Graduate Council of (1958). A discussion

Austin Peay State College as well as taxa cited

to indicate that the spring and early summer

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

by

Howard Lee Yarbrough

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A taxonomic investigation of the spring and early summer vascular flora of Montgomery County, Tennessee was conducted. Taxa included were limited to those which flower between January 1 and June 30. An annotated checklist was derived from herbarium specimens from the study area at the University of Tennessee, Vanderbilt University, Austin Peay State College, and personal collections of this investigator. Dichotomous keys to the families, genera, and most of the species were included.

Data from this study and that of Duncan (1965) indicates that the flora of Montgomery County only remotely resembles the flora of the Central Basin, as was reported by Shanks (1958). A discussion of taxa with tropical affinities was included, as well as taxa cited from the area for the first time as a result of this investigation. Results of this study indicate that the spring and early summer vascular flora of Montgomery County, Tennessee is composed of at least 105 families, 365 genera, and 642 species.

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The author also wishes to express appreciation to the curators of the following herbaria which permitted use of their Montgomery County specimens in this study. The following abbreviations are used in conjunction with the herbaria: APSC, Austin Peay State College; TENN, University of Tennessee; and VAND, Vanderbilt University.

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I. THE NATURE OF THE STUDY

Many collections representative of the vascular flora of Montgomery County have been made in the last three decades. These collections have been deposited in various herbaria throughout the state with no attempt to obtain an annotated report on the flora of the study area. These collections were made by a large number of individuals, each with his own objectives. For this reason, no one individual has collected specimens exclusively within the county, nor has an attempt been made to construct keys to the local flora.

A. THE PROBLEM

Statement of the Problem

The purpose of this study was to determine the extent of the spring and early summer vascular flora of Montgomery County as to the families, genera, and the majority of the species present in flower or fruit during the period of January 1 to June 30. More specifically, the problem involved the following subproblems:

1. The compilation of an annotated checklist. An annotated checklist includes only those specimens which have been actually cited from the study area.
2. The construction of satisfactory dichotomous keys to the families, genera, and the majority of the species of vascular plants found within the study area excluding those under obvious cultivation. A dichotomous key is a method

of determining the identity of a specimen through a series of alternatives based upon the morphological and anatomical characteristics of the specimen.

Delimitations

This study was limited geographically to the area within the political boundaries of Montgomery County, Tennessee. The study was further limited to include only those taxa which were collected in flower or fruit from January through June. The primary reason for limiting the species included to those in flower or fruit is due to the fact that the most distinguishable characteristics useful in identification are those concerning the reproductive structures. A companion study is presently being conducted within the same study area for those taxa which flower during the latter half of the year.

With the exception of four groups, the plants were keyed through to the species. Due to the problems involved in the taxonomy of the families Graminae, Cyperaceae, Leguminosae, and Compositae, the treatment of these groups was extended only to the generic level.

Significance of the Study

A floristic study of this area has many possible uses. It will prove beneficial to the biology teachers of the schools of Montgomery County. The possibility of error in identification is decreased because the paper is devoted to the local flora, and the user is relieved of the burden of volumes of data contained in manuals which cover a greater area and subsequently treat more taxa. The keys

will be used in beginning field botany courses at the college level.

B. DEFINITION OF TERMS

The terminology of this study follows the accepted meaning as found in the standard reference works within the fields of botanical morphology and taxonomy.

C. BASIC ASSUMPTION

This study is based on the assumption that the collections made by the many workers over the last thirty years and the collections of the author are indicative of the actual flora of the study area within the specified seasons, and that there is no broad gap in the accumulated data.

D. METHODS OF INVESTIGATION

The investigation initially began with an inventory of the herbarium of Austin Peay State College, Clarksville, Tennessee. For each specimen from within the study area the following data were obtained from the herbarium sheet:

1. The scientific name of the specimen.
2. The collector and the collection number.
3. The date of the collection.
4. The location within the study area of the collection.

The same procedure was followed in an inventory of the herbaria of the University of Tennessee at Knoxville, Tennessee;

Vanderbilt University, Nashville, Tennessee; and Murray State University, Murray, Kentucky.

A preliminary list of the families, genera, and species cited from within the study area was obtained from this data. Beginning in February of 1966, field trips were begun in an effort to secure personal collections to add to the data acquired from the various herbaria. Topographic maps were used in an effort to select a variety of habitats. Collections were made each week from February until June 30, 1966.

The individual taxa were arranged by family according to Gray's Manual of Botany (Fernald, 1950) in the construction of dichotomous keys. The morphological and anatomical characteristics used in the construction of the keys to the individual taxa were derived primarily from Gleason (1963), Fernald (1950), and Small (1933). The characteristics of the groups were drawn from the above manuals as well as this investigator's observations of the herbarium material.

E. ORGANIZATION OF THE STUDY

The first chapter contains a statement of the problem, the significance of the study, the limitations, a statement on definition of terms, and the methods of investigation. Chapter II contains a brief geological and climatological description of the county. Chapter III provides keys for the identification of a specimen to the family level. Chapter IV is a broad chapter containing keys to the genera of each family represented in the study, and to the species

present within each genus with the exception of the groups previously presented in the delimitation discussion. It also contains the citation record for each species found within the study area.

Chapter V includes a review of the major findings of the study with the conclusions based on the findings. Chapter VI provides a brief summary of the study.

II. PHYSIOGRAPHY AND CLIMATE

Montgomery county is located on the northwestern portion of the Highland Rim. The political boundaries of the area encircle approximately 347,500 acres. The county is extensively underlain with St. Louis limestone of Mississippian age (Duncan, 1965).

The topography of the area may be described as hilly over the greater part of the county. In the northwestern section near Woodlawn and Oakwood bordering the Stewart County line the topography tends to flatten into gentle rolling hills. There are no major valleys within the area. The county is dissected by both the Cumberland river and its smaller tributary the Red river. Many relatively botanically rich limestone bluffs are associated with these streams.

The average elevation in Montgomery County is 500 feet above sea level while the highest elevation is about 660 feet.

No official weather records for the county are available. The statistics used are for Clarksville, which provide an indication of the general climatic conditions (Duncan, 1965). Clarksville has a mean of 48 inches of rainfall each year. January is the month of highest precipitation (5.6 inches) and September (3 inches) is the lowest. The average length of the growing season is 206 days, from April 3 until October 26; the average dates of the last and the first killing frosts, respectively (Duncan, 1965).

III. KEYS TO THE FAMILIES

In this chapter are found artificial keys to the families of the vascular plants of Montgomery County. There are eight sections of keys to the families. The first section is a general section through which a plant may be referred to another section, or in some instances identified directly to the family. The number immediately preceding the name of the family is the family number assigned by Fernald (1950). The family name is followed by the page number on which may be found the representative genera of the Montgomery County flora.

General Section

1. Plants moss-like, fern-like, or rush-like. No true flowers present. Reproduction by spores produced in sporangia or special structures.
2. Plants rush-like with jointed, hollow stems. Leaves small, scale-like----- 1. Equisetaceae, 27.
2. Plants not rush-like, stems not jointed or hollow.
3. Stem above ground, branching, commonly bearing numerous short green leaves.
4. Sterile leaves with a small membranous ligule sunken in a pit at the base----- 3. Selaginellaceae, 28.
4. Sterile leaves without a ligule, spores uniform-----
----- 4. Lycopodiaceae, 27.

3. Stem below ground, a rhizome. Leaves large in comparison to the stem.
5. Fronds bearing eusporangiate sporangia, fronds not of circinate venation----- 5. Ophioglossaceae, 28.
5. Fronds bearing leptosporangiate sporangia, fronds with circinate venation----- 9, Polypodaceae, 29.
1. Plants reproducing typically by seeds although sometimes by vegetative means.
6. Woody plants with narrow evergreen leaves. Ovules not enclosed within an ovary, seeds borne in a hard woody cone, drupe, or berry----- 13. Pinaceae, 32.
6. Woody or herbaceous plants. Leaves of various shapes and forms when present. True flowers produced, enclosing the ovule or ovules within an ovary which at maturity becomes the fruit.
7. Parts of the flower in threes or sixes, never in fours or fives. Leaves long, grass-like, parallel veined, stem having vascular bundles irregularly distributed, embryo with a single cotyledon----- Key 2.
7. Parts of the flower in fours or fives. Leaves usually net-veined, stem having vascular bundles arranged around a pith; embryo with two cotyledons.
8. Trees, shrubs, or woody vines, growth persisting beyond the first year----- Key 3.
8. Herbaceous plants, secondary growth lacking; plants

typically dying at the end of the first year.

9. Leaves absent, stem fleshy and flattened, spines present----- 118. Cactaceae, 129.
9. Leaves present, stem not fleshy or flattened as above.
10. Plants parasitic by attachment to other plants.
 11. Chlorophyll present, plants attached to the stem and branches of the host; leaves well developed--- 52. Loranthaceae, 71.
 11. Chlorophyll absent, plants attached to the roots of the host; leaves reduced to scales----- 156. Orobanchaceae, 161.
10. Plants free-living, not parasitic upon other plants.
 12. Flowers of highly specialized structure, individual flowers minute; found in dense heads on a common receptacle, corolla ligulate, radiate, or both----- 168. Compositae, 172.
 12. Flowers not as described above.
 13. Perianth absent.
 14. Flowers perfect---- 40. Saururaceae, 58.
 14. Flowers unisexual.
 15. Aquatic herbs, ovary 4-celled, styles 2----- 93. Callitrichaceae, 115.

15. Terrestrial herbs, ovary 3-celled,
styles 3--- 92. Euphorbiaceae, 113.

13. Perianth present.

16. Perianth in one whorl, calyx or corolla
present but not both----- Key 4.

16. Perianth in two whorls, calyx and
corolla both present.

17. Flowers imperfect-----
----- 126. Haloragraceae, 131.

17. Flowers perfect.

18. Sepals represented only as
filiform pappus-like append-
ages--- 164. Valerianaceae, 170.

18. Sepals not as above.

19. Flowers irregular----- Key 5.

19. Flowers regular.

20. Ovary inferior----- Key 6.

20. Ovary superior.

21. Leaves opposite-- Key 7.

21. Leaves alternate- Key 8.

Key 2

The Families of the Monocotyledoneae

1. Perianth lacking.

2. Flowers aggregated on a fleshy spadix.

3. Plants aquatic, leaves and flowers normally submerged-----
----- 16. Zosteraceae, 32.
3. Plants terrestrial, leaves and flowers normally completely
emerged----- 24. Araceae, 46.
2. Flowers solitary or several, in the axil of a bract, forming
several small inflorescences known as spikelets.
4. Leaves usually two ranked, stem rounded or flat, usually
hollow----- 22. Graminae, 33.
4. Leaves usually three ranked, stem triangular, usually with
a pith----- 23. Cyperaceae, 42.
1. Perianth present.
5. Perianth consisting of six short segments.
6. Flowers forming a cylindric or tapering spike-----
----- 24. Araceae, 46.
6. Flowers forming a compact to loosely arranged cyme-----
----- 31. Juncaceae, 48.
5. Perianth consisting of sepals, petals or both.
7. Perianth irregular----- 31. Juncaceae, 48.
7. Perianth regular.
8. Ovary inferior.
9. Plants dioecious----- 34. Dioscoreaceae, 55.
9. Plants with perfect flowers.
10. Stamens 6, anthers introrse-----
----- 35. Amaryllidaceae, 56.
10. Stamens 3, anthers extrose-- 36. Iridaceae, 56.

8. Ovary superior.

11. Flowers unisexual, plants monoecious or dioecious--

----- 32. Liliaceae, 50.

11. Flowers perfect.

12. Ovaries several to many in each flower-----

----- 19. Alismataceae, 32. *or cuttings*.

12. Ovary one in each flower.

13. Sepals green, petals brightly colored.

14. Flowers several or many, fruit a capsule--

----- 29. Commelinaceae, 47. *color*.

14. Flowers solitary, fruit a berry-----

----- 32. Liliaceae, 50.

13. Sepals colored like the petals-----

----- 32. Liliaceae, 50.

Key 3

The Woody Dicotyledoneae

1. Leaves alternate.

2. Leaves simple.

3. Climbing vines.

4. Climbing by means of tendrils----- 107. Vitaceae, 121.

4. Climbing by twining.

5. Leaves longer than wide, not lobed.

6. Stamens opposite the petals, stigmas 2-----

----- 106. Rhamnaceae, 120.

- 6. Stamens alternate with the petals, stigmas 3-----
----- 100. Celastraceae, 117.
- 5. Leaves as long as wide or less, but definitely
lobed----- 66. Minispermaceae, 84.
- 3. Erect trees or shrubs.
- 7. Flowers in spikes, racemes, spherical heads, or catkins,
or plants monoecious and flowers of one sex in
catkins, heads, or racemes.
- 8. Flowers perfect.
- 9. Corolla or calyx present, white or pink in color.
- 10. Stamens 6 or fewer.
- 11. Flowers in terminal racemes, leaves
toothed---- 79. Saxifragaceae, 94.
- 11. Flowers in axillary racemes-----
---- 99. Aquifoliaceae, 116.
- 10. Stamens 10 or more.
- 12. Corolla lobes shorter than the tube-----
----- 133. Ericaceae, 136.
- 12. Corolla absent, or if present the petals
separate----- 82. Rosaceae, 97.
- 9. Corolla absent, calyx not white or pink in color--
----- 47. Ulmaceae, 68.
- 8. Flowers imperfect.
- 13. Flowers of at least one sex in spherical heads.
- 14. Pistillate heads at the base of a staminate

raceme.

15. Leaf scars completely encircling the bud--

----- 81. Platanaceae, 96.

15. Leaf scars not encircling the bud-----

----- 80. Hamamelidaceae, 96.

14. Pistillate heads variously arranged,

staminate heads not racemose.

16. Plants monoecious----- 46. Fagaceae, 63.

16. Plants dioecious.

17. Stamens 5---- 122. Nyssaceae, 129.

17. Stamens 4----- 48. Moraceae, 69.

13. Flowers not in spherical heads.

18. Inflorescence terminal.

19. Perianth present----- 70. Lauraceae, 85.

19. Perianth absent----- 41. Salicaceae, 58.

18. Inflorescence axillary.

20. Corolla white or pinkish-----

----- 99. Aquifoliaceae, 116.

20. Corolla absent, or present and greenish

or yellow.

21. Plants dioecious.

22. Inflorescences in the axils of new

leaves.

23. Stamens 5 or more-----

----- 122. Nyssaceae, 129.

- 23. Stamens 4--- 48. Moraceae, 69.
- 22. Inflorescences in axils of leaves
of preceding year or terminal
on short leafy lateral shoots---
----- 41. Salicaceae, 58.
- 21. Plants monoecious. ----- 138.
- 24. Both pistillate and staminate
flowers in catkins, or not in, 35.
catkins and the pistillate ----- 122.
flowers terminal-----
----- 45. Corylaceae, 61.
- 24. Pistillate flowers not in catkins,
or in catkins and not terminal--
----- 46. Fagaceae, 63.
- 7. Flowers in panicles, cymes, corymbs, fascicles, or
solitary.
- 25. Inflorescence terminal. ----- 97.
- 26. Flowers solitary----- 67. Magnoliaceae, 84. 116.
- 26. Flowers not solitary.
- 27. Stamens more than 10----- 82. Rosaceae, 97.
- 27. Stamens 10 or fewer---- 130. Cornaceae, 135.
- 25. Inflorescence not terminal.
- 28. Leaf scars completely encircling the bud-----
----- 119. Thymelaeaceae, 129.
- 28. Leaf scars not encircling the bud.

29. Stamens 2----- 141. Oleaceae, 138.

29. Stamens 5 or more.

30. Petals united.

31. Stamens 5, petaloid-----

----- 137. Sapotaceae, 138.

31. Stamens 8 or more--- 138. Ebenaceae, 138.

30. Petals separate.

32. Sepals 3----- 69. Annonaceae, 85.

32. Sepals 4 or more---- 108. Tiliaceae, 122.

2. Leaves compound.

33. Leaves compound by three leaflets. ----- 103.

34. Prickles present on stem or branches-----

----- 82. Rosaceae, 97.

34. Prickles absent on all parts of the plant.

35. Stems of vine-like habit. ----- 103.

36. Flowers with more than 20 stamens-----

----- 82. Rosaceae, 97.

36. Flowers with 5 stamens---- 97. Anacardiaceae, 116.

35. Stems upright, shrubs or small trees.

37. Leaflets with transparent dots between the

veins; leaf margins entire-----

----- 88. Rutaceae, 111.

37. Leaflets lacking transparent dots between the

veins; leaf margins serrate-----

----- 97. Anacardiaceae, 116.

33. Leaves compound by five or more leaflets.
38. Prickles present on at least the stems or branches.
39. Leaves palmately compound----- 82. Rosaceae, 97.
40. Leaves 2 or 3 times pinnately compound.
41. Leaflets large, 5 to 15 cm. long, with short-pointed teeth----- 128. Araliaceae, 131.
41. Leaflets small, 1 to 2.5 cm. long, with wavy margins or teeth rounded-----
----- 83. Leguminosae, 103.
40. Leaves once compound.
42. Leaflets without teeth--- 83. Leguminosae, 103.
42. Leaflets with sharp, rounded, or wavy teeth.
43. Leaves with an even number of leaflets, ~~2~~
two leaflets at the tip-----
----- 83. Leguminosae, 103.
43. Leaves with an odd number of leaflets, one
leaflet at the tip-----
----- 82. Rosaceae, 97.
38. Prickles absent on all parts of the plant.
44. Leaves palmately compound---- 107. Vitaceae, 121.
44. Leaves pinnately compound.
45. Leaflets more than once pinnately compound.
46. Leaflets conspicuously toothed-----
----- 107. Vitaceae, 121.
46. Leaflets with wavy margins or the teeth rounded,

blunt, or absent--- 83. Leguminosae, 103.

45. Leaflets once pinnately compound.

47. Plants of vine-like habit, with tendrils---

----- 107. Vitaceae, 121.

47. Plants erect, trees or shrubs, if vines no
tendrils present.

48. Stipules present; calyx a well developed
tube----- 83. Leguminosae, 103.

48. Stipules absent; calyx separate or a short
tube.

49. Bruised leaves and twigs emitting a
spicy odor--- 44. Juglandaceae, 60.

49. Bruised leaves and twigs not emitting a
spicy odor.

50. Leaflets entire, stamens 10-----
----- 89. Simaroubaceae, 111.

50. Leaflets toothed, stamens 5-----
---- 97. Anacardiaceae, 116.

1. Leaves opposite or whorled.

51. Plants of vine-like habit, climbing by twining or tendrils---
----- 162. Caprifoliaceae, 168.

51. Plants erect, trees, shrubs, or woody vines.

52. Leaves compound.

53. Leaves palmately compound-- 103. Hippocastanaceae, 119.

53. Leaves pinnately compound or trifoliate.

54. Flowers with petals well developed, leaflets usually

3.

55. Trailing vines----- 154. Bignoniaceae, 160.

55. Erect shrubs----- 101. Staphyleaceae, 117.

54. Flowers spetalous, leaflets 3 to 5 or more-----

----- 102. Aceraceae, 118.

52. Leaves simple.

56. Leaves sessile----- 111. Guttiferae, 123.

56. Leaves petioled.

57. Flowers perfect.

58. Petals separate---- 100. Celastraceae, 117.

58. Petals fused.

59. Stamens 2, flowers white or yellowish-----

----- 154. Bignoniaceae, 160.

59. Stamens 4, flowers blue or violet-----

----- 153. Scrophulariaceae, 154.

57. Flowers unisexual, or plants polygamo-dioecious----

----- 102. Aceraceae, 118.

Key 4

Herbaceous dicotyledoneae with the

perianth in one whorl.

1. Flowers perfect.

2. Stamens more numerous than calyx lobes.

- 3. Stamens numerous, 15 or more--- 64. Ranunculaceae, 78.
- 3. Stamens 12 or less.
 - 4. Calyx 3-lobed, stamens 6 or 12-----
 - 53. Aristolochiaceae, 71.
 - 4. Calyx of separate sepals.
 - 5. Pistils 10, fused; stamens 10-----
 - 58. Phytolaccaceae, 73.
 - 5. Pistil 1, stamens 4 to 9--- 54. Polygonaceae, 72.
- 2. Stamens equal to or less than the number of calyx lobes.
 - 6. Sepals 5, stamens 5, ovary inferior-- 51. Santalaceae, 71.
 - 6. Sepals 5, stamens 3 or 4, ovary superior-----
 - 59. Aizoaceae, 73.
- 1. Flowers unisexual.
 - 7. Ovaries several in each flower---- 64. Ranunculaceae, 78.
 - 7. Ovary one in each flower.
 - 8. Ovary 1-celled, fruit an achene---- 50. Urticaceae, 70.
 - 8. Ovary 3-celled, fruit a capsule.
 - 9. Inflorescence arising from the stem below the first
 - leaves----- 94. Buxaceae, 116.
 - 9. Inflorescence arising from terminal or lateral leafy
 - branches----- 64. Ranunculaceae, 78.

Key 5

Herbaceous dicotyledoneae with the perianth in two whorls,
flowers perfect and irregular.

1. Ovary inferior.

2. Anthers distinct----- 162. Caprifoliaceae, 168.

2. Anthers united into a tube--- 167. Campanulaceae, 171.

1. Ovary superior.

3. Upper sepal prolonged backward into a long spur, petals 4,
upper 2 prolonged backward into the spurred sepal-----
----- 64. Ranunculaceae, 78.

3. Flowers not as above.

4. Leaves alternate.

5. Sepals 2 or 3.

6. Sepals 3, petals 5----- 105. Balsaminaceae, 120.

6. Sepals 2, petals 4----- 71. Papaveraceae, 86.

5. Sepals 5.

7. Inner 2 sepals colored like the petals, petals 3,
united----- 91. Polygalaceae, 111.

7. Inner sepals not colored like the petals, petals 5.

8. Stamens typically 10---- 83. Leguminosae, 103.

8. Stamens 2, 4, or 5.

9. Stamens 5, ovary 1-celled-----
----- 115. Violaceae, 124.

9. Stamens 2 or 4, Ovary 2-celled-----
----- 153. Scrophulariaceae, 154.

4. Leaves opposite.

10. Ovary 1-celled----- 159. Phrymaceae, 163.

10. Ovary 2-celled.

11. Ovules 1 in each cell.

12. Inflorescence a cyme, a head, or raceme, ovary
deeply 4-lobed, stem square-----
----- 151. Labiatae, 148.

12. Inflorescence spicate, ovary only shallowly
4-lobed, stem square--- 150. Verbenaceae, 148.

11. Ovules more than one in each cell.

13. Seeds borne on hooked projections from the
placentae----- 158. Acanthaceae, 162.

13. Seeds not borne on hooked projections from
placentae----- 153. Scrophulariaceae, 154.

Key 6

Herbaceous dicotyledoneae with the perianth in two whorls,
flowers perfect, regular, with an inferior ovary.

1. Corolla gamopetalous.

2. Stamens 5, leaves alternate----- 167. Campanulaceae, 171.

2. Stamens 4, leaves opposite or whorled--- 161. Rubiaceae, 164.

1. Corolla of distinct petals.

3. Flowers 5-merous, stamens 5, flowers usually with a true or
compound umbel----- 129. Umbelliferae, 131.

3. Flowers 2, 4-merous, stamens 2-4; flowers usually solitary or

forming a terminal raceme----- 125. Onagraceae, 129.

Key 7

Herbaceous dicotyledoneae with the perianth in two whorls,
flowers perfect, regular, ovary superior, leaves opposite.

1. Stamens twice as many as the petals or more.
 2. Stamens numerous, more than twice as many as the petals.
 3. Resin dots conspicuously present--- 111. Guttiferae, 123.
 3. Resin dots absent.
 2. Stamens as many as the petals or less.
 5. Stamens alternate with the petals or corolla lobes.
 6. Ovary 1 in each flower.
 7. Ovary 2-celled----- 142. Loganiaceae, 140.
 7. Ovary 3-celled----- 147. Polemoniaceae, 143.
 6. Ovaries 2 in each flower.
 8. Corona well developed; styles 2-----
----- 145. Asclepidaceae, 141.
 8. Corona lacking, styles 1--- 144. Apocynaceae, 140.
 5. Stamens opposite the petals or corolla lobes.
 9. Foliage consisting of a single pair of opposite leaves--
----- 60. Portulacaceae, 73.
 9. Foliage not consisting of a single pair of opposite
leaves.
 10. Flowers 4-merous----- 143. Gentianaceae, 140.
 10. Flowers 5-merous.

11. Stamens inserted at the base of the ovary-----

----- 61. Caryophyllaceae, 74.

11. Stamens inserted on the corolla lobes-----

----- 135. Primulaceae, 137.

Key 8

Herbaceous dicotyledoneae with the perianth in two whorls,
flowers perfect, regular, ovary superior, leaves alternate.

1. Aquatic plants with long petioled, cordate, floating leaves---

----- 63. Nymphaeaceae, 77.

1. Terrestrial plants with leaves not normally floating.

2. Petals separate or coherent, not fused.

3. Stamens numerous, more than 12.

4. Stamens inserted on or near the margin of a cup or
saucer-shaped hypanthium----- 82. Rosaceae, 97.

4. Stamens not inserted on a cup or saucer-shaped
hypanthium.

5. Juice colored----- 71. Papaveraceae, 86.

5. Juice not colored.

6. Stamens monadelphous----- 109. Malvaceae, 123.

6. Stamens free and distinct-----
----- 64. Ranunculaceae, 78.

3. Stamens not numerous, 12 or less.

7. Stamens not equal to or twice as many as the petals,
flowers cruciform----- 73. Cruciferae, 87.

7. Stamens either equal to or twice the number of petals,
flowers not cruciform.
8. Stamens twice as many as the petals.
 9. Petals 6, stamens 12--- 65. Berberidaceae, 83.
 9. Petals 4 or 5, stamens 8 or 10.
 10. Leaves 3-foliate, compound-----
----- 85. Oxalidaceae, 110.
 10. Leaves simple.
 11. Style 1----- 78. Crassulaceae, 94.
 11. Styles 4 or 5--- 79. Saxifragaceae, 94.
8. Stamens as many as the petals.
 12. Flowers having 5 sepals and 5 petals.
 13. Corona a double or triple fringe-----
----- 116. Passifloraceae, 128.
 13. Corona not present.
 14. Leaves long petioled, toothed or lobed--
----- 79. Saxifragaceae, 94.
 14. Leaves sessile, entire--- 84. Linaceae, 109.
 12. Flowers having either 4 or 6 sepals and 6 or 8
petals, the number of petals not the same as the
number of sepals--- 65. Berberidaceae, 83.
2. Flowers gamopetalous.
 15. Petals 4, sepals 4, stamens 2 or 4-----
----- 160. Plantaginaceae, 163.
 15. Petals 5, sepals 5, stamens 5.

16. Stamens opposite the corolla lobes-----

----- 135. Primulaceae, 137.

16. Stamens alternate the corolla lobes.

17. Ovaries more than 1 per flower.

18. Ovaries 2----- 144. Apocynaceae, 140.

18. Ovary 1, deeply 4-lobed, appearing as 4 ovaries--

----- 149. Boraginaceae, 146.

17. Ovary 1 per flower.

19. Leaves compound---- 148. Hydrophyllaceae, 144.

19. Leaves simple.

20. Ovary 2-celled or loculed.

21. Style 1 with stigmas 3-----

----- 146. Convolvulaceae, 142.

21. Style 1 with stigma 1 or merely 2-lobed.

22. Stigma 1, simple-----

----- 149. Boraginaceae, 146.

22. Stigma 1, distinctly 2-lobed-----

----- 152. Solanaceae, 153.

20. Ovary 3-celled----- 147. Polemoniaceae, 143.

IV. KEYS TO GENERA AND SPECIES

With the exception of four families on which the present treatment is extended only to the generic level, the fourth chapter contains keys for identification of a specimen to the specific rank. No attempt has been made in the identification to infraspecific categories with the exception of some white flowered forms. The chapter also contains the citation data for each species cited from within Montgomery County.

The numbers given the genera and species in the keys of this chapter were assigned arbitrarily by the author and are intended solely for the convenience of the user.

1. EQUISETACEAE

1. Equisetum L.

1. Stem 10-12 ridged----- 1. E. arvense.

1. Stem 18-40 ridged----- 2. E. hymale.

1. Equisetum arvense L. Coke's Creek, 14 May 1949, Floyd Brown et. al. 681, (APSC).

2. Equisetum hymale L. Foster's Cave, 15 July 1949, Herman Silva et. al. 396 (APSC); Parson's Creek, 24 Oct 1949, Alfred Clebsch 682, (APSC).

2. LYCOPODIACEAE

1. Lycopodium lucidulum Michx. Brown farm at Southside, 16 July 1966,

Howard L. Yarbrough and Floyd Brown 255 (APSC).

3. SELAGINELLACEAE

1. Selaginella apoda (L.) Fern. Ravine near Greenwood Cemetery, 29 Oct 1949, Alfred Clebsch s.n. (APSC); Durham's Cave, 9 Nov 1947, Alfred Clebsch 1014 (APSC).

5. OPHIOGLOSSACEAE

1. Sporangia fused with leaf tissue----- 1. Ophioglossum.
1. Sporangia not fused with leaf tissue----- 2. Botrychium.
1. Ophioglossum L.
 1. Sterile blade blunt or rounded----- 1. O. vulgatum.
 1. Sterile blade apiculate----- 2. O. engelmanni.
 1. Ophioglossum vulgatum L. Shelton's Branch, 14 May 1949, H. C. Phillips 388, (APSC).
2. Ophioglossum engelmanni Prantl. Foster's Cave, 18 June 1949, Floyd Brown et. al. 389, (APSC).
2. Botrychium Sw.
 1. Sterile blades sessile----- 1. B. dissectum.
 1. Sterile blades stalked----- 2. B. virginianum.
 1. Botrychium dissectum Spreng. Warfield, 10 Sept 1949, Floyd Brown and Alfred Clebsch 677 (APSC); West of Oakwood, 17 Sept 1949, Floyd Brown and Alfred Clebsch 390 (APSC); M. P. Brother's Farm on Spring Creek, 28 Oct 1949, Alfred Clebsch and Edward Clebsch 313 (APSC); Cunningham Lake, 10 Apr 1949, C. F. Pickering et. al. 676 (APSC).

2. Botrychium virginianum (L.) Sw. North arm of Coke's Creek,
14 May 1949, Floyd Brown and Alfred Clebsch 678 (APSC); Brown Farm nr
Southside, 15 July 1949, Alfred Clebsch 91 (APSC).

9. POLYPODIACEAE

1. Rhizomes and fronds pubescent, scaleless----- 1. Pteridium.
1. Rhizomes and fronds with scales, pubescent.
 2. Spores tetrahedral, sori marginal or nearly so; stipe bundle 1.
 3. Sori borne on the reflexed marginal lobe of a vein-----
----- 2. Adiantum.
 3. Sori not borne on the reflexed marginal lobe of a vein.
 4. Frond segments and pinnules articulated at the base-----
----- 3. Pellaea.
 4. Frond segments and pinnules not articulated at the base--
----- 4. Cheilanthes.
 2. Spores bilateral, sori not marginal, stipe bundles 2.
 5. Fertile frond veins wholly or in part anastomosing-----
----- 5. Onoclea.
 5. Fertile frond veins all free and distinct.
 6. Indusium borne under the sporangium---- 6. Woodsia.
 6. Indusium attached to the side of the sporangium, or
centrally, never under, or indusium absent.
 7. Indusium linear.
 8. Stipe bundles X-shaped----- 7. Asplenium.
 8. Stipe bundles U-shaped----- 8. Anthyrium.

7. Indusium attached at a point if present.

9. Indusium present.

10. Indusium hood-like or deeply convex-----

----- 9. Cystopteris.

10. Indusium rotund----- 10. Polystichum.

9. Indusium absent----- 11. Dryopteris.

1. Pteridium aquilinum (L.) Kuhn. 2 mi se of Guthrie, Kentucky, 2 July 1949, Floyd Brown and Alfred Clebsch 395 (APSC).

2. Adiantum pedatum L. 17 mi sw of Clarksville, 23 July 1949, Floyd Brown and Alfred Clebsch 394 (APSC).

3. Pellaea atropurpurea (L.) Link. King and Queen bluff, 24 July 1948, Alfred Clebsch s.n. (APSC).

4. Cheilanthes Sw.

1. Fronds glabrous----- 1. C. alabamensis.

1. Fronds hirsute-villous----- 2. C. vestita.

1. Cheilanthes alabamensis (Buckl.) Kunze. Red Rock bluff 3 mi w of Clarksville, 9 June 1948, Alfred Clebsch 680 (APSC); King and Queen bluff 3 mi se of Clarksville, 30 Mar 1946, Alfred Clebsch 316 (APSC); Bluff below Lynnwood's landing, 9 June 1948, Alfred Clebsch 53 (APSC).

2. Cheilanthes vestita (Spreng.) Sw. Bluff nr Sevier blockhouse, 1 Dec 1945, Alfred Clebsch 318 (APSC).

5. Onoclea sensibilis L. 2 mi n of Clarksville, 16 Sept 1948, Alfred Clebsch 173 (APSC).

6. Woodsia obtusa (Spreng.) Torr. Bluff 3 mi se of Clarksville,

23 May 1948, Alfred Clebsch 51 (APSC).

7. Asplenium L.

1. Rachis green and herbaceous----- 1. A. cryptolepis.

1. Rachis castaneous to purple-blackish--- 2. A. platyneuron.

1. Asplenium cryptolepis Fern. Red Rock bluff 3 mi w of

Clarksville, 9 June 1948, Alfred Clebsch 52 (APSC).

2. Asplenium platyneuron (L.) Oakes. 2 mi e of Clarksville, 25 July 48, Alfred Clebsch 171 (APSC).

8. Anthyrium pycnocarpon (Spreng.) Tidest. Bluff 4 mi e of Clarksville, 21 Oct 1947, Alfred Clebsch 1013 (APSC); Foster's cave 11 mi w of Clarksville, 18 June 1949, Floyd Brown and Alfred Clebsch 393 (APSC).

9. Cystopteris Bernh.

1. Fronds broadest at the base, sterile fronds without vegetative bulblets----- 1. C. fragilis.

1. Fronds broadest above the base, sterile fronds with vegetative bulblets----- 2. C. bulbifera.

1. Cystopteris fragilis (L.) Bernh. Boy Scout camp 5 mi n of Clarksville, 9 May 1948, Alfred Clebsch 95 (APSC).

2. Cystopteris bulbifera (L.) Bernh. Boy Scout camp 5 mi n of Clarksville, 27 May 1948, Alfred Clebsch 93 (APSC); 12 mi sw of Clarksville nr Bellamy's cave, 15 July 1949, Alfred Clebsch 985 (APSC); Shelton's branch 2 mi e of Clarksville, 25 July 1948, Alfred Clebsch 172 (APSC).

10. Polystichum acrostichoides Schott. Creek bank 7 mi n of

Clarksville, 19 Sept 1948, Alfred Clebsch s.n. (APSC).

11. Dryopteris hexagonoptera (Michx.) Christens. Lynnwood's landing $2\frac{1}{2}$ mi w of Clarksville, 17 July 1949, Floyd Brown and Alfred Clebsch 391 (APSC); s of hy 112 at Brown's station $6\frac{1}{2}$ mi s of Clarksville, 15 July 1948, Floyd Brown 679 (APSC).

13. PINACEAE

1. Plants monoecious, seeds borne in a woody cone----- 1. Thuja.

1. Plants dioecious, seeds borne in a drupe or berry-- 2. Juniperus.

1. Thuja occidentalis L. Greenwood Cemetery, 15 Feb 1942, R. E. Shanks 1707 (APSC).

2. Juniperus virginiana L. 2 mi se of Clarksville, 20 Feb 1949, Alfred Clebsch 397 (APSC); Lynnwood's landing nw of Clarksville, 28 Oct 1949, Alfred Clebsch et. al. 684 (APSC); Scout camp nr Peacher's Mill, 2 Apr 1942, R. E. Shanks 1754 (TENN).

16. ZOSTERACEAE

1. Potamogeton diversifolius Raf. Pond 5 mi wnw of Clarksville, 17 June 1950, Alfred Clebsch et. al. 12993 (TENN); Pond 1 mi e of Sango, 3 June 1950, Floyd Brown 12999 (TENN); Pond on Mt. Carmel rd, 29 July 1950, Alfred Clebsch and Floyd Brown 13023 (TENN).

19. ALISMATACEAE

1. Alisma subcordatum Raf. 7 mi e by s of Clarksville, 30 July 1949, Alfred Clebsch and Floyd Brown 401 (APSC).

22. GRAMINAE

1. Culms woody, perennial----- Tribe I. Bambuseae.

1. Culms herbaceous, annual.

2. Spikelets usually laterally compressed or terete.

3. Spikelets 1-flowered----- Tribe V. Agrostideae.

3. Spikelets 2 to many flowered.

4. All spikelets sessile except the terminal one, *converging*
inflorescence a spike----- Tribe III. Hordeae.

4. All spikelets pediceled, inflorescence a raceme or *pan.*
panicle.

5. Glumes as long as the lowest floret, often as long
as the spikelet----- Tribe IV. Aveneae. *Poa.*

5. Glumes shorter than the first floret-----
----- Tribe II. Festuceae.

2. Spikelets usually dorsally compressed.

6. Spikelets all with the central floret perfect-----
----- Tribe X. Paniceae.

6. Spikelets all unisexual----- Tribe XII. Maydeae.

Tribe I. Bambuseae

1. Arundinaria gigantea (Walt.) Chapm. Cumberland river bank nr
Clarksville, 30 June 1966, Howard L. Yarbrough 249 (APSC).

Tribe II. Festuceae.

1. Upper florets appearing as a club-like mass----- 1. Melica.
1. Upper florets not as above.
 2. Lemmas with 3 nerves----- 2. Eragrostis.
 2. Lemmas with 5 or more nerves.
 3. Lemmas with prominent parallel nerves--- 3. Glycera.
 3. Lemmas with nerves not prominent, not parallel, converging at the apex.
 4. Lemmas awned----- 4. Bromus.
 4. Lemmas not awned.
 5. Spikelets awned----- 5. Festuca.
 5. Spikelets not awned----- 6. Poa.
1. Melica L.
 1. Melica mutica Walt. Location not given, 17 Apr 1954, E. Quarterman and R. Stauffer 5292 (VAND); Bluff 3 mi ese of Clarksville, 27 Apr 1946, Alfred Clebsch 325 (APSC).
2. Eragrostis Beauv.
 1. Eragrostis megastachya (Koeler) Link. nr Cumberland 2½ mi e by se of Clarksville, 24 Aug 1947, Alfred Clebsch 205 (APSC); Lookout Drive wooded area, 14 June 1966, Howard L. Yarbrough and Nancy Branson 196 (APSC).
3. Glycera R. Br.
 1. Glycera striata (Lam.) Hitch. Coke's ck nr water, 14 May 1949,

Floyd Brown 647 (APSC); Ravine nr Greenwood Cemetery, 11 June 1949,
Floyd Brown 646 (APSC); Sprink ck, 4 June 1944, R. E. Shanks 2761
 (TENN).

4. Bromus L.

1. Bromus purgans L. Bluff 3 mi e by se of Clarksville, 18 May
 1946, Alfred Clebsch 327 (APSC); Parson ck, 29 May 1949, Alfred
Clebsch 652 (APSC); Bluff $2\frac{1}{2}$ mi se of Clarksville, 5 June 1949,
Alfred Clebsch 653 (APSC).

2. Bromus japonicus Thunb. Gracey Ave, 23 June 1949, Alfred
Clebsch 655 (APSC).

3. Bromus commutatus Schrad. 4 mi se of Clarksville in old
 field, 14 May 1949, Alfred Clebsch and Floyd Brown 654 (APSC).

5. Festuca L.

1. Festuca rubra var. heterophylla (Lam.) Mut. King and Queen
 bluff 3 mi e by se of Clarksville, 11 June 1950, Alfred Clebsch
12908 (VAND).

2. Festuca obtusa Buhler. Coke ck $4\frac{1}{4}$ mi ese of Clarksville, 29
 May 1949, Alfred Clebsch 650 (APSC); Parson's Creek, 29 May 1949,
Floyd Brown and Alfred Clebsch 649 (APSC); 3 mi w of Clarksville, 30
 Apr 1949, Floyd Brown and Alfred Clebsch 651 (APSC); Coke's Creek,
 2 July 1944, R. E. Shanks 1278 (APSC).

3. Festuca octoflora Walt. Oak Ridge, 23 May 1942, R. E.
Shanks 2057 (TENN); King and Queen bluff, 27 Apr 1946, Alfred and
Edward Clebsch 328 (APSC); Coke's creek, 14 May 1949, Floyd Brown

648 (APSC); Stringtown, 14 May 1942, R. E. Shanks 1277 (APSC); Barrens nr Woodlawn, 25 June 1944, R. E. Shanks 1284 (APSC); Shiloh, 23 May 1942, R. E. Shanks 1276 (APSC).

6. Poa L.

1. Poa anrma L. Bluff $2\frac{1}{2}$ mi se of Clarksville, 19 Mar 1949, Alfred Clebsch 638 (APSC).

2. Poa compressa L. Greenwood Cemetery, 11 June 1949, Floyd Brown 639 (APSC).

3. Poa pratensis L. King and Queen bluff, 7 May 1949, Floyd Brown 640 (APSC); nr Heitt's Garden, 14 May 1949, Floyd Brown 641 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1273 (APSC).

4. Poa autumnalis Muhl. Coke's creek, 14 May 1949, Floyd Brown 643 (APSC).

5. Poa sylvestris Gray. Red Rocks bluff, 30 Apr 1949, Floyd Brown 644 (APSC); Porter's bluff, 21 May 1942, R. E. Shanks 1274 (APSC); nr Yellow creek, 30 Apr 1944, Alfred Clebsch et. al. 1275 (APSC).

Tribe III. Hordeae.

1. Spikelets solitary at the rachis joint----- 1. Lolium.

1. Spikelets 2 or 3 at each rachis joint.

2. Spikelets 3 at each joint----- 2. Hordeum.

2. Spikelets 2 at each joint.

3. Spikes dense----- 3. Elymus.

3. Spike loose----- 4. Hystrix.

1. Lolium L.

1. Lolium perenne L. $1\frac{1}{2}$ mi e of Clarksville, 12 June 1949, Alfred Clebsch 656 (APSC).

2. Lolium multiflorum Lam. Gracey Ave., 22 June 1949, Alfred Clebsch 657 (APSC).

2. Hordeum L.

1. Hordeum pusillum Nutt. King and Queen bluff, 7 May 1949, Floyd Brown et. al. 658 (APSC); Stringtown, 14 May 1942, R. E. Shanks 1282 (APSC).

3. Elymus L.

1. Elymus virginicus L. Oakwood, 18 June 1949, Floyd Brown et. al. 659 (APSC); King and Queen bluff, 11 June 1949, Floyd Brown et. al. 650 (APSC); Lyle woods, 6 June 1942, Woodson Oliver 1283 (APSC); nr Yellow creek bridge on Hwy 79, 22 June 1966, Howard L. Yarbrough 161 (APSC).

2. Elymus villosus Muhl. Shelton's branch, 25 June 1949, Floyd Brown et. al. 670 (APSC); bluff $2\frac{1}{2}$ mi s se of Clarksville, 5 June 1949, Alfred Clebsch 672 (APSC).

4. Hystrix Moench.

1. Hystrix patula Moench. Shelton's branch, 25 June 1949, Floyd Brown et. al. 674 (APSC); King and Queen bluff, 11 June 1949, Floyd Brown et. al. 673 (APSC).

Tribe IV. Aveneae.

1. Spikelets articulate above the glumes----- 1. Danthonia.

1. Spikelets articulate below the glumes----- 2. Sphenopholis.

1. Danthonia Lam. & DC.

1. Danthonia spicata (L.) Beauv. 2 mi n of Clarksville, 4 June 1949, Floyd Brown and Alfred Clebsch 626 (APSC); Woodlawn, 25 June 1944, R. E. Shanks 1264 (APSC); nr Yellow creek, 23 May 1942, R. E. Shanks 1265 (APSC); Woodlawn, 25 June 1944, R. E. Shanks 2772 (TENN); Mark's slough, 20 May 1950, Alfred Clebsch and Floyd Brown 12889 (TENN).

2. Sphenopholis Scribn.

1. Sphenopholis nitida (Spreng.) Scribn. King and Queen bluff, 27 Apr 1946, Alfred Clebsch 326 (APSC); Red Rocks bluff, 30 Apr 1949, Floyd Brown et. al. 637 (APSC).

Tribe V. Agrostideae.

1. Rachilla articulate below the glumes----- 1. Alopecurus.

1. Rachilla articulate above the glumes.

2. Glumes longer than the lemma.

3. Glumes compressed-carinate, stiffly ciliate on the

keels----- 2. Phleum.

3. Glumes not compressed-carinate, not ciliate--- 3. Agrostis.

2. Glumes shorter than the lemma----- 4. Brachyelytrum.

1. Alopecurus L.

1. Alopecurus carolinianus Walt. King and Queen bluff, 7 May 1949, Floyd Brown et. al. 613 (APSC); Greenwood Cemetery, 24 Apr 1948, Alfred Clebsch 614 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1255 (APSC).

2. Phleum L.

1. Phleum pratense L. King and Queen bluff, 11 June 1949, Floyd Brown 612 (APSC).

3. Agrostis L.

1. Agrostis hyemalis (Walt.) BSP. $2\frac{1}{2}$ mi se of Clarksville, 18 May 1946, Edward Clebsch 327 (APSC); e of Shiloh, 23 May 1942, R. E. Shanks 1263 (APSC).

2. Agrostis peremans (Walt.) Tuckern. n of Greenwood Cemetery, 14 Sept. 1947, anon s.n. (APSC); 13 mi w of Clarksville, Floyd Brown et. al. 623 (APSC).

3. Agrostis elliottana Schultes. Palmyra, 14 May 1942, R. E. Shanks 1262 (APSC).

4. Agrostis alba L. Oakwood, Floyd Brown et. al. 619 (APSC); Woodard Ave., 12 June 1949, Alfred Clebsch 620 (APSC); King and Queen bluff, 11 June 1949, Floyd Brown et. al. 621 (APSC).

4. Brachyelytrum Beauv.

1. Brachyelytrum erectum (Schreb.) Beauv. Shelton's branch, 25 June 1949, Alfred Clebsch and Floyd Brown 611 (APSC).

Tribe X. Paniceae.

1. Spikelets with an involucre of bristles----- 1. Setaria.

1. Spikelets without an involucre of bristles.

2. Spikelets in panicles or panicle racemes----- 2. Panicum.

2. Spikelets in spikes or spike-like racemes--- 3. Paspalum.

1. Setaria Beauv.

1. Setaria viridis (L.) Beauv. Gracey Ave., 23 June 1949, Alfred Clebsch 538 (APSC).

2. Panicum L.

1. Panicum longiligulatum Nash. Oakwood, 18 June 1949, Floyd Brown et. al. 583 (APSC); King and Queen bluff, 11 June 1949, Floyd Brown s.n. (APSC).

2. Panicum anceps Michx. Woodlawn, 10 Oct 1941, R. E. Shanks 1023 (TENN).

3. Panicum depauperatum Muhl. King and Queen bluff, 27 Apr 1946, Alfred Clebsch 321 (APSC).

4. Panicum laxiflorum Lam. Shelton's branch, 25 June 1949, Floyd Brown et. al. 574 (APSC); Heitt's Garden, 14 May 1949, Floyd Brown et. al. 575 (APSC); e of Shiloh, 23 May 1942, R. E. Shanks 1233 (APSC); Coke's creek, 2 July 1944, R. E. Shanks 1234 (APSC).

5. Panicum microcarpon Muhl. Oakwood, 18 June 1949, Floyd Brown 580 (APSC).

6. Panicum dichotomum L. King and Queen bluff, 27 Apr 1946,

Alfred Clebsch 322 (APSC); e of Shiloh, 23 May 1942, R. E. Shanks 1236 (APSC).

7. Panicum lanuginosum Ell. Stringtown, 14 May 1942, R. E. Shanks 1241 (APSC); Woodlawn, 25 June 1944, R. E. Shanks 1244 (APSC); Greenwood Cemetery, 11 June 1949, Floyd Brown et. al. 332 (APSC); Woodard Ave., 1 June 1949, Alfred Clebsch 587 (APSC).

8. Panicum polyanthes Schultes. Shelton's branch, 25 June 1949, Floyd Brown et. al. 578 (APSC); King and Queen bluff, 11 June 1949, Floyd Brown and Alfred Clebsch 579 (APSC); Woodlawn, 25 June 1944, R. E. Shanks 1235 (APSC).

9. Panicum commutatum Schultes. Coke's creek, 14 May 1949, Floyd Brown and Alfred Clebsch 591 (APSC).

10. Panicum clandestinum L. Oakwood, 19 June 1949, Floyd Brown and Alfred Clebsch 595 (APSC); Greenwood Cemetery, 11 June 1949, Floyd Brown and Alfred Clebsch 596 (APSC).

11. Panicum boscii Poir. 3 mi e by se of Clarksville, 27 Apr 1946, Alfred Clebsch 323 (APSC); West Fork Creek bluff, 4 June 1949, Floyd Brown and Alfred Clebsch 593 (APSC); King and Queen bluff, 25 May 1966, Howard L. Yarbrough 199 (APSC).

3. Paspalum L.

1. Paspalum ciliatifolium Michx. Oakwood, 18 June 1949, Floyd Brown and Alfred Clebsch 559 (APSC); APSC campus, 5 Oct 1942, R. E. Shanks 2230 (TENN); s of Clarksville, 9 Oct 1941, R. E. Shanks 1008 (TENN).

Tribe XII. Maydeae.

1. Tripsachum L.

1. Tripsachum dactyloides L. King and Queen bluff, 30 May 1946,
Alfred Clebsch and Edward Clebsch 319 (APSC).

23. CYPERACEAE

1. Spikelets containing perfect flowers.

2. Spikelets 1 or 2 flowered----- 1. Rynchospora.

2. Spikelets many flowered.

3. Spikelet scales conduplicate----- 2. Cyperus.

3. Spikelet scales not conduplicate, concave.

4. Style base greatly swollen----- 3. Elocharis.

4. Style base not swollen----- 4. Scirpus.

1. Spikelets with unisexual flowers.

5. Achenes enclosed within the perigynium----- 5. Carex.

5. Achenes not enclosed within the perigynium----- 6. Scleria.

1. Rynchospora Vahl.

1. Rynchospora corniculata (Lam.) Gray. Along Hwy 12 w of
 Clarksville, 18 June 1949, Floyd Brown et. al. 905 (APSC).

2. Cyperus L.

1. Cyperus odoratus L. Murphy farm at Dotsonville, 17 June 1966,
Howard L. Yarbrough and Nancy Branson 152 (APSC).

3. Eleocharis R. Br.

1. Eleocharis engelmanni Steud. $2\frac{1}{2}$ mi se of Clarksville, 18 May 1946, Alfred Clebsch 356 (APSC); 2 mi se of Clarksville, 11 June 1949, Floyd Brown and Alfred Clebsch 897 (APSC).

2. Eleocharis obtusa (Willd.) Schultes. 2 mi se of Clarksville, 11 June 1949, Floyd Brown and Alfred Clebsch 896 (APSC).

3. Eleocharis compressa Sulliv. King and Queen bluff, 22 May 1948, Alfred Clebsch 54 (APSC).

4. Scirpus L.

1. Scirpus atrovirens Muhl. 2 mi se of Clarksville, 29 May 1948, Alfred Clebsch 903 (APSC); Lookout Drive in Clarksville, 14 June 1966, Howard L. Yarbrough and Nancy Branson 195 (APSC).

2. Scirpus lineatus Michx. 2 mi se of Clarksville, 29 May 1949, Alfred Clebsch 902 (APSC).

5. Carex L.

1. Carex retroflexa Muhl. Greenwood Ave., 3 June 1945, Alfred Clebsch 367 (APSC); King and Queen bluff, 27 Apr 1946, Alfred Clebsch 374 (APSC); Red Rocks bluff, 30 Apr 1949, Floyd Brown and Alfred Clebsch 369 (APSC).

2. Carex texensis (Torrey) Bailey. Greenwood Cemetery, 24 Apr 1948, Alfred Clebsch 381 (APSC).

3. Carex convoluta Mackenzie. nr Heitt's Garden, 16 May 1948, Alfred Clebsch 383 (APSC); $2\frac{1}{4}$ mi e by ne of Clarksville, Floyd Brown et. al. 911 (APSC); Coke's creek, 14 May 1949, Floyd Brown et. al. 912 (APSC, TENN).

4. Carex cephalophora Muhl. West Fork creek, 4 June 1949, Alfred Clebsch 916 (APSC, TENN); 2 mi se of Clarksville, 24 Apr 1948, Alfred Clebsch 380 (APSC, TENN). Coke's creek, 14 May 1949, Floyd Brown and Alfred Clebsch s.n. (APSC).
5. Carex mesochorea Mackenzie. King and Queen bluff, 7 May 1949, Floyd Brown and Alfred Clebsch 918 (APSC).
6. Carex leavenworthii Dewey. Spring creek, 4 June 1944, R. E. Shanks s.n. (TENN).
7. Carex muhlenbergii Schkuhi. King and Queen bluff, 11 June 1949, Floyd Brown and Alfred Clebsch 917 (APSC).
8. Carex sparganoides Muhl. Coke's creek, 14 May 1949, Alfred Clebsch and Floyd Brown 920 (APSC).
9. Carex tribuloides Wahlenb. 1 mi s by se of Guthrie, Ky in Tenn, 2 July 1949, Floyd Brown et. al. 924 (APSC).
10. Carex albolutescens Schwein. 2 mi se of Guthrie, Ky in Tenn, 27 Mar 1950, Floyd Brown et. al. 12962 (TENN).
11. Carex jamesii Schwein. Spring creek, 11 May 1947, Alfred Clebsch 378 (APSC); 2 mi s by sw of Clarksville, 12 May 1946, Alfred Clebsch 377 (APSC); Shelton's branch, 2 Apr 1949, Alfred Clebsch 925 (APSC).
12. Carex pennsylvanica Lam. King and Queen bluff, 30 Mar 1946, Alfred Clebsch 370 (APSC); 1½ mi e of Clarksville, 23 Apr 1949, Floyd Brown and Alfred Clebsch 950 (APSC).
13. Carex artitecta Mackenzie. Shelton's branch, 2 Apr 1949, Alfred Clebsch 927 (APSC); Cunningham Lake, 10 Apr 49, C. F. Pickering

et. al. 929 (APSC, TENN); Trahern branch bluff, 23 Apr 1949, Floyd Brown et. al. 950 (TENN).

14. Carex torta Boot. Foster's cave, 24 Mar 1946, Alfred Clebsch 372 (APSC).

15. Carex hirsutella Mackenzie. Lynnwood Landing, 11 May 1946, Alfred Clebsch 375 (APSC); Coke's creek, 14 May 1949, Floyd Brown and Alfred Clebsch 938 (APSC); 2 mi se of Clarksville, 11 June 1949, Floyd Brown and Alfred Clebsch 939 (APSC).

16. Carex caroliniana Schwein. Mark's slough, 14 May 1944, Alfred Clebsch 2743 (TENN).

17. Carex oxylepis Torr & Hook. 2 mi se of Clarksville, 29 May 1949, Alfred Clebsch 936 (APSC). *near Oakwood, 18 June*

18. Carex granularis Muhl. nr Hurricane creek, 6 May 1945, Alfred Clebsch 359 (APSC); Mark's slough, 20 May 1950, Floyd Brown and Alfred Clebsch 12954 (TENN).

19. Carex amphibola Steud. 2 mi s by sw of Clarksville on river bluff, 12 May 1946, Alfred Clebsch 376 (APSC); Coke's creek, 14 May 1949, Floyd Brown et. al. 934 (APSC); Foster's cave, 18 June 1949, Floyd Brown et. al. 935 (APSC, TENN); nr Lock B, 13 May 1950 Floyd Brown et. al. 12951 (TENN); Mark's slough, 14 May 1944, Alfred Clebsch s.n. (TENN).

20. Carex flaccorsperma Dew. nr Oakwood, 18 June 1949, Floyd Brown et. al. 953 (APSC).

21. Carex laxiculmis Schwein. West Fork creek bluff, 4 June 1949, Floyd Brown et. al. 931 (APSC).

22. Carex albursina Sheldon. nr Foster's cave, 5 Aug 1945,
Alfred Clebsch 369 (APSC).
23. Carex laxiflora Lam. $2\frac{1}{4}$ mi e of Clarksville, Floyd Brown
et. al. 933 (APSC, TENN).
24. Carex striatula Michx. King and Queen bluff, 24 Apr 1948,
Alfred Clebsch 382 (APSC, TENN).
25. Carex flava Mackenz. nr. Yellow creek, 22 June 1966, Howard
L. Yarbrough et. al. 163 (APSC).
26. Carex frankii Kunth. 2 mi se of Clarksville, 11 June 1949,
Floyd Brown 942 (APSC).
27. Carex squarrosa L. nr Needmore at edge of pond, 18 June
1949, Floyd Brown and Alfred Clebsch 944 (APSC); nr Oakwood, 18 June
1949, Alfred Clebsch and Floyd Brown 945 (APSC).
28. Carex grayii Cary. bluff 3 mi s by se of Clarksville, 8 May
1948, Alfred Clebsch 22 (APSC).
29. Carex lupulina Muhl. nr Needmore at edge of pond, 18 June
1949, Floyd Brown and Alfred Clebsch 948 (APSC).
6. Scleria Bergius.
1. Scleria oligantha Michx. nr Sango in wet woods, 9 July 1949,
Floyd Brown and Alfred Clebsch 908 (APSC, TENN).

24. ARACEAE

1. Spathe absent----- 1. Acorus.
1. Spathe present----- 2. Arisaema.

1. Acorus L.

1. Acorus calamus L. 12½ mi w of Clarksville at edge of pond, 18 June 1949, Floyd Brown and Alfred Clebsch s.n. (APSC).

2. Arisaema Mart.

1. Leaflets 3----- 1. A. triphyllum.

1. Leaflets 7 or more----- 2. A. dracontium.

1. Arisaema triphyllum (L.) Schott. nr Shelton's branch, 9 Apr 1949, Floyd Brown et. al. 405 (APSC); Porter's bluff, 17 Apr 1942, R. E. Shanks 1285 (APSC); nr Asbury church, 30 Apr 1942, R. E. Shanks 1286 (APSC); nr Yellow creek, 30 Apr 1944, R. E. Shanks et. al. 1287 (APSC); Porter's bluff, 21 Apr 1966, Howard L. Yarbrough and Nancy Branson 94 (APSC).

2. Arisaema dracontium (L.) Schott. 3 mi w by s of Clarksville, 30 Apr 1949, Floyd Brown and Alfred Clebsch 404 (APSC); Porter's bluff, 9 May 1942, R. E. Shanks 1288 (APSC); APSC farm, 10 May 1966, Howard L. Yarbrough 93 (APSC).

29. COMMELINACEAE

1. Tradescantia L.

1. Leaf blades broader than the sheath----- 1. T. subaspera.

1. Leaf blades narrower than the sheath.

2. Sepals glandular, pubescent----- 2. T. longipes.

2. Sepals non-glandular.

3. Stem and leaves glabrous, sepals pubescent-----
----- 3. T. virginiana.

3. Stem and leaves pilose, sepals glabrous-----
----- 4. T. ohioensis.

1. Tradescantia subaspera Ker. West Fork creek bluff, 4 June 1949, Alfred Clebsch et. al. 971 (APSC); nr New Providence, 28 June 1942, Woodson Oliver 1290 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1291 (APSC).

2. Tradescantia longipes Anders. & Woodson. Cunningham lake, 10 Apr 1949, H. C. Phillips et. al. 407 (APSC).

3. Tradescantia virginiana L. Hadley farm on West Fork creek, 17 Apr 1948, Alfred Clebsch 969 (APSC); nr Yellow creek, 23 May 1942, R. E. Shanks 1289 (APSC).

4. Tradescantia ohioensis Raf. nr Lynnwood's landing, 30 Apr 1949, Floyd Brown et. al. 968 and 970 (APSC); nr Mark's slough, 15 Oct 1947, Alfred Clebsch 1020 (APSC).

31. JUNCACEAE

1. Seeds many, plants never pubescent----- 1. Juncus.

1. Seeds 3, plants usually pubescent----- 2. Luzula.

1. Juncus L.

1. Individual flowers subtended by small opposite bracts at the base of the perianth.

2. Inflorescence lateral----- 1. J. effusus.

2. Inflorescence terminal----- 2. J. tenuis.
1. Individual flowers not subtended by bracts at the base of the perianth.
3. Leaves with transverse septa, hollow.
4. Capsule about equaling or exceeding the perianth.
5. Inflorescence compact----- 3. J. scirpoides.
5. Inflorescence not compact, narrowly ovoid-----
----- 4. J. acuminatus.
4. Capsule concealed by the perianth--- 5. J. brachycarpus.
3. Leaves without transverse septa, not hollow.
6. Stem 3-5 dm. tall----- 6. J. marginatus.
6. Stem 6-12 dm. tall----- 7. J. biflorus.

1. Juncus effusus L. nr Daniel st, 29 May 1949, Alfred Clebsch 409 (APSC).

2. Juncus tenuis Willd. nr New Providence, 17 July 1949, Floyd Brown et. al. 596 (TENN); APSC campus, 2 Oct 1941, R. E. Shanks 920 (TENN); nr Spring creek, 26 May 1946, Alfred Clebsch and Edward Clebsch 385 (APSC); 2 mi se of Clarksville, 11 June 1949, Floyd Brown and Alfred Clebsch 955 (APSC).

3. Juncus scirpoides Lam. 2 mi se of Clarksville, 29 May 1949, Alfred Clebsch 963 (APSC, TENN).

4. Juncus acuminatus Michx. nr Oakwood, 18 June 1949, Floyd Brown and Alfred Clebsch 964 (APSC).

5. Juncus brachycarpus Engelm. Oakwood barrens, 18 June 1949,

Floyd Brown and Alfred Clebsch 960 (APSC).

6. Juncus marginatus Rostk. 2 mi se of Clarksville, 11 June 1949,
Floyd Brown and Alfred Clebsch 959 (APSC).

7. Juncus biflorus Ell. Oakwood, 18 June 1949, Floyd Brown and
Alfred Clebsch 957 (APSC, TENN); nr Mt. Carmel, 9 July 1949, Floyd
Brown and Alfred Clebsch 958 (TENN).

2. Luzula DC.

1. Luzula campestris (L.) DC. King and Queen bluff, 30 Mar 1946,
Alfred Clebsch 387 (APSC).

32. LILLIACEAE

1. Stems climbing by tendrils----- 1. Smilax.

1. Stems erect.

2. Inflorescence axillary----- 2. Polygonatum.

2. Inflorescence terminal.

3. Flowers solitary.

4. Leaves basal----- 3. Erythronium.

4. Leaves cauline.

5. Flowers yellow, leaves many, alternate-- 4. Uvularia.

5. Flowers not yellow, leaves 3, whorled--- 5. Trillium.

3. Flowers clustered.

6. Leaves cauline.

7. Flowers perfect----- 6. Smilacina.

7. Flowers unisexual----- 7. Chamelirium.

6. Leaves basal.

8. Flowers in an umbel.

9. Foliage with the odor of onion or garlic-----

----- 8. Allium.

9. Foliage without the odor of onion or garlic.

10. Stigma 1, capitate----- 9. Hemerocallis.

11. Stigmas 3, minute----- 10. Nothoscordum.

8. Flowers in a raceme or panicle.

11. Perianth segments fused, tubular----- 11. Muscari.

11. Perianth segments separate or nearly so.

12. Woody evergreens, leaves leathery with shreddy
fibres at the margins----- 12. Yucca.

12. Herbaceous, leaves not as above. B. albidum.

13. Flowers white----- 13. Ornithogalum.

13. Flowers blue----- 14. Camassia.

1. Smilax L.

1. Stem herbaceous, thorns absent----- 1. S. herbacea.

1. Stem woody, thorns present----- 2. S. bona-nox.

1. Smilax herbacea L. nr Shelton's branch, 17 May 1947, Alfred Clebsch 1021 (APSC).

2. Smilax bona-nox L. Trice's landing, 3 June 1948, Ellen Hutchinson 301 (APSC).

2. Polygonatum Mill.

1. Peduncles flattened----- 1. P. canaliculatum.

1. Peduncles terete or nearly so----- 2. P. biflorum.

1. Polygonatum canaliculatum (Muhl.) Pursh. Along Budd's creek,
23 May 1942, R. E. Shanks 1300 (APSC); Billy Dunlop Memorial Park,
20 Apr 1966, Howard L. Yarbrough 100 (APSC).

2. Polygonatum biflorum (Walt.) Ell. Cunningham Lake, 1 May 1948,
Alfred Clebsch 1 (APSC); nr Shelton's spring, 8 May 1942, R. E. Shanks
1301 (APSC); King and Queen bluff, 25 May 1966, Howard L. Yarbrough
and Nancy Branson 206 (APSC).

3. Erythronium L.

1. Perianth yellow----- 1. E. americanum.

1. Perianth white----- 2. E. albidum.

1. Erythronium americanum Ker. Ravine e of Greenwood Cemetery,
19 Mar 1949, Alfred Clebsch 412 (APSC); nr Antioch creek, 13 Apr 1966,
Howard L. Yarbrough and Nancy Branson 111 (APSC); APSC farm, 10 Apr
1966, Howard L. Yarbrough 129 (APSC).

2. Erythronium albidum Nutt. McAdoo creek 6 mi se of Clarksville,
20 Mar 1949, H. C. Phillips and Alfred Clebsch 413 (APSC).

4. Uvularia L.

1. Uvularia grandiflora Sm. 2 mi e of Clarksville along Red river,
9 Apr 1949, Floyd Brown and Alfred Clebsch 419 (APSC).

5. Trillium L.

1. Flower sessile.

2. Petals clawed at the base----- 1. T. recurvatum.

2. Petals not clawed at the base.

3. Stamens about one third as long as the petals-----

----- 2. T. cuneatum.

3. Stamens about one half as long as the petals-----

----- 3. T. sessile.1. Flower peduncled----- 4. T. grandiflorum.1. Trillium recurvatum Beck. Shelton's branch, 9 Apr 1942,Alfred Clebsch 421 (APSC); Cunningham Lake, 1 Apr 1942, R. E.Shanks 1305 (APSC).2. Trillium cuneatum Raf. nr Parson's creek, 2 Apr 1942, R. E.Shanks 1766 (TENN, APSC); 3 mi s by se of Clarksville, 19 Mar 1949,Alfred Clebsch 420 (APSC); s of Greenwood Cemetery, 24 Mar 1942, R.E. Shanks 1303 (APSC); APSC farm, 4 Apr 1966, Howard L. Yarbrough

240 (APSC).

3. Trillium sessile L. Scout camp, 2 Apr 1942, R. E. Shanks

1302 (APSC).

4. Trillium grandiflorum (Michx.) Salisb. bluff $2\frac{1}{2}$ mi e ofClarksville, 23 Apr 1949, Floyd Brown and Alfred Clebsch s.n. (APSC).6. Smilacina Desf.1. Smilacina racemosa (L.) Desf. 2 mi e of Clarksville, 9 Apr1949, Floyd Brown et. al. 416 (APSC); Coke's creek, 14 May 1949, FloydBrown et. al. 417 (APSC); Porter's bluff, 27 Apr 1942, R. E. Shanks

1298 (APSC); Stringtown, 21 Apr 66, Howard L. Yarbrough and Nancy Branson 92 (APSC).

7. Chamaelirium Willd.

1. Chamaelirium luteum (L.) A. Gray. Along Yellow creek nr Hwy 13, 23 May 1942, R. E. Shanks 1293 (APSC).

8. Allium L.

1. Allium canadense L. Vacant lot nr Franklin st along the Cumberland river, 5 May 1948, Alfred Clebsch 258 (APSC); King and Queen bluff, 7 May 1949, Floyd Brown et. al. 687 (APSC); Murphy farm at Dotsonville, 17 June 1966, Howard L. Yarbrough and Nancy Branson 151 (APSC); Salem crossroads along roadside, 22 June 1966, Howard L. Yarbrough et. al. 162 (APSC).

9. Hemerocallis L.

1. Hemerocallis fulva L. nr Rossvie, 13 June 1942, Woodson Oliver 1294 (APSC).

10. Nothoscordum Kunth.

1. Nothoscordum bivalve (L.) Britt. Shelton's branch, 2 Apr 1949, Alfred Clebsch 411 (APSC); nr Parson's creek, 2 Apr 1942, R. E. Shanks 1295 (APSC); along Yellow creek, 11 Apr 1966, Howard L. Yarbrough 91 (APSC).

11. Muscari Mill.

1. Muscari racemosum (L.) Mill. 300 yds n of new high school nr

Richview, 21 Mar 1966, Howard L. Yarbrough and Nancy Branson 130 (APSC); nr Yellow creek, 15 Apr 1966, Howard L. Yarbrough and Nancy Branson 139 (APSC).

12. Yucca L.

1. Yucca filamentosa L. Dry ridge above Yellow creek, 22 June 1966, Howard L. Yarbrough and Nancy Branson 169 (APSC).

13. Ornithogalum L.

1. Ornithogalum umbellatum L. Trahern's branch, 23 Apr 1949, Floyd Brown 415 (APSC); along Red river nr quarry, 24 Apr 1942, R. E. Shanks 1297 (APSC); King and Queen bluff, 2 Apr 1966, Howard L. Yarbrough 104 (APSC).

14. Camassia Lindl.

1. Camassia scilloides (Raf.) Cory. 9 mi s by se of Clarksville, 17 Apr 1949, Floyd Brown and Alfred Clebsch 414 (APSC); nr Shelton's branch, 25 Apr 1948, Alfred Clebsch 23 (APSC); Parson's creek, 8 May 1942, R. E. Shanks 1296 (APSC).

34. DIOSCOREACEAE

1. Dioscorea L.

1. Leaves alternate----- 1. D. villosa.

1. Leaves whorled----- 2. D. quaternata.

1. Dioscorea villosa L. w of Oakwood, 21 June 1948, A. J. Sharp et. al. 165 (APSC).

2. Dioscorea quaternata (Walt.) J. F. Gmel. Cumberland river bluff, 15 May 1948, Alfred Clebsch 24 (APSC).

35. AMARYLLIDACEAE

1. Flowers solitary, perianth segments yellow----- 1. Hypoxis.
 1. Flowers many in a loose, slender spike, corolla greenish-white-----
 ----- 2. Agave.

1. Hypoxis L.

1. Hypoxis hirsuta (L.) Coville. Hadley farm 6 mi nw of Clarksville, 17 Apr 1948, Alfred Clebsch 2 (APSC); nr New Providence, 30 Apr 1942, R. E. Shanks 1307 (APSC).

2. Agave L.

1. Agave virginica L. King and Queen bluff, 24 July 1948, Alfred Clebsch 166 (APSC); same location, 29 June 1966, Howard L. Yarbrough 91 (APSC).

36. IRIDACEAE

1. Flowers solitary, perianth showy----- 1. Iris.
 1. Flowers in umbel-like clusters, perianth small-----
 ----- 2. Sisyrinchium.

1. Iris L.

1. Iris cristata Ait. Lock B, 17 Apr 1949, Floyd Brown 424 (APSC); APSC farm, 20 Apr 1966, Howard L. Yarbrough 91 (APSC).

2. Sisyrinchium L.

1. Sisyrinchium albidum Raf. Palmyra, 14 May 1942, R. E. Shanks 1308 (APSC); 2 mi e of Clarksville, 31 May 1947, Alfred Clebsch 1023 (APSC); King and Queen bluff, 26 Apr 1947, Alfred Clebsch 1022 (APSC); nr Foster's cave, 18 Apr 1948, Alfred Clebsch 3 (APSC).

39. ORCHIDACEAE

1. Plants brownish yellow----- 1. Corallorhiza.

1. Plants with green color.

2. Flowers sessile, white----- 2. Spiranthes.

2. Flowers pediceled, pale purple----- 3. Liparis.

1. Corallorhiza Chatelain.

1. Corallorhiza wisteriana Conrad. Ravine e of Greenwood Cemetery, 24 Apr 1948, Alfred Clebsch 259 (APSC).

2. Spiranthes Richard.

1. Raceme glabrous----- 1. S. gracilis.

1. Raceme finely pubescent----- 2. S. vernalis.

1. Spiranthes gracilis (Bigel.) Beck. Barrens nr Woodlawn, 25 June 1944, R. E. Shanks 2769 (TENN); nr Happy hollow, 31 Aug 1946, R. E. Shanks 1396 (TENN); w of Oakwood, 25 June 1940, R. E. Shanks 7615 (TENN).

2. Spiranthes vernalis Engelm. & Gray. Barrens nr Woodlawn, 25 June 1944, R. E. Shanks 1309 (APSC).

3. Liparis Richard.

1. Liparis lilifolia (L.) Richard. nr Yellow creek, 23 May 1942,
R. E. Shanks 1310 (APSC).

40. SAURURACEAE

1. Saururus L.

1. Saururus cernuus L. nr Neblitt's slough at Lock B, 29 June
1958, Floyd Brown et. al. s.n. (TENN); slough nr Dotsonville, 14 June
1958, Floyd Brown s.n. (TENN).

41. SALICACEAE

1. Bud scale single, stamens 2-10----- 1. Salix.

1. Bud scales many, stamens more than 10----- 2. Populus.

1. Salix L.

1. Stamens 3-10.

2. Leaves green ventrally----- 1. S. nigra.

2. Leaves whitened ventrally----- 2. S. carolina.

1. Stamens 2.

3. Leaves glandular serrate----- 3. S. babylonica.

3. Leaves entire----- 4. S. humilis.

1. Salix nigra Marsh. Cumberland river bank opposite Red river
1 mi below Clarksville, 30 Apr 1949, Floyd Brown and Alfred Clebsch
435 (APSC); nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); nr
Neblitt's slough at Lock B, 29 June 1958, Floyd Brown et. al. s.n. (TENN).

2. Salix caroliniana Michx. Cumberland river bank opposite Red river 1 mi below Clarksville, 30 Apr 1949, Floyd Brown and Alfred Clebsch 436 (APSC); Lynnwood's landing, 9 June 1949, Alfred Clebsch and Edward Clebsch 691 (APSC).

3. Salix babylonica L. APSC campus nr Harned Hall, 1 Apr 1966, Howard L. Yarbrough 119 (APSC).

4. Salix humilis Marsh. Barrens nr Woodlawn school, 9 Oct 1949, R. E. Shanks et. al. 14427 (TENN); nr Jordan springs, 30 Apr 1942, R. E. Shanks 1313 (APSC); nr Woodlawn, 13 Oct 1941, R. E. Shanks 1313 (APSC).

2. Populus L.

1. Terminal bud tomentose----- 1. P. alba.

1. Terminal bud glabrous.

2. Terminal bud viscid----- 2. P. deltoides.

2. Terminal bud not viscid----- 3. P. heterophylla.

1. Populus alba L. Paradise Hill rd, 24 Sept 1949, Alfred Clebsch and Floyd Brown 690 (APSC).

2. Populus deltoides Marsh. Long pond nr Clarksville, 28 June 1958, Floyd Brown s.n. (TENN); nr Neblitt's slough, 29 June 1958, Floyd Brown s.n. (TENN); nr quarry on Hwy 76, 23 Mar 1966, Howard L. Yarbrough and Nancy Branson 141 (APSC).

3. Populus heterophylla L. Swamp 2 mi se of Guthrie in Tennessee, 2 July 1949, Floyd Brown and Alfred Clebsch 432 (APSC).

44. JUGLANDACEAE

1. Leaves with the odor of green walnuts when crushed---- 1. Juglans.
2. Leaves without the odor of green walnuts----- 2. Carya.

1. Juglans L.

1. Juglans nigra L. nr Neblitt's slough, 29 June 1958, Floyd Brown et. al. s.n. (TENN); nr Red river 1 mi below Clarksville, 30 Apr 1942, R. E. Shanks 1886 (TENN); Stringtown, 20 June 1966, Howard L. Yarbrough 90 (APSC).

2. Carya Nutt.

1. Winter bud scales valvate.

2. Leaflets 5-9, staminate aments peduncled-----
----- 1. C. cordiformis.

2. Leaflets 9-17, staminate aments sessile-----
----- 2. C. illinoensis.

1. Winter bud scales not valvate, imbricate.

3. Winter bud 8-12 mm. long.

4. Bark scaley, young leaflets scurfy----- 3. C. ovalis.

4. Bark not scaley, young leaflets not scurfy-- 4. C. glabra.

3. Winter bud 1.3 - 3.5 cm. long.

5. Lower leaflet surfaces pubescent.

6. Bark separating into plates--- 5. C. laciniosa.

6. Bark not separating into plates--- 6. C. tomentosa.

5. Lower leaflet surfaces glabrous----- 7. C. ovata.

1. Carya cordiformis (Wang.) K. Koch. Ravine e of Greenwood Cemetery, 14 Sept 1947, Alfred Clebsch 1024 (APSC, TENN); nr Paradise Hill rd, 24 Sept 1949, Floyd Brown and Alfred Clebsch 12908 (TENN); at Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN).
2. Carya illinoensis (Wang.) K. Koch. 835 Greenwood Ave, 12 May 1948, Alfred Clebsch 25 (APSC).
3. Carya ovalis (Wang.) Sarg. King and Queen bluff, 24 Sept 1949, Floyd Brown and Alfred Clebsch 781 (APSC); e of Greenwood Cemetery, 14 Sept 1943, Alfred Clebsch and Edward Clebsch 1026 (APSC).
4. Carya glabra Gray. nr Fletchers creek n of Oakwood, 17 Sept 1949, Floyd Brown and Alfred Clebsch 431 (APSC).
5. Carya laciniosa (Michx.) Loud. 2 mi n of Clarksville on creek bank, 16 Sept 1948, Alfred Clebsch et. al. 185 (APSC); on flood plain nr Neblitt's slough, 28 June 1958, Floyd Brown et. al. s.n. (TENN).
6. Carya tomentosa Nutt. e of Greenwood Cemetery, 31 Aug 1947, Alfred Clebsch 1027 (APSC, TENN); King and Queen bluff, 24 Sept 1949, Floyd Brown and Alfred Clebsch s.n. (APSC); nr Jordan springs, 30 Apr 1942, R. E. Shanks 1910 (TENN); location not given, 9 Oct 1941, R. E. Shanks et. al. 999 (TENN).

45. CORYLACEAE

1. Pistillate aments small, resembling a leaf-bud, ovoid to short cylindric.
2. Staminate flowers solitary in the axil of a bract-- 1. Corylus.

2. Staminate flowers 2-3 in the axil of a bract.

3. Stamens 4----- 2. Alnus.

3. Stamens 2----- 3. Betula.

1. Pistillate aments enlongate, slender cylindric.

4. Staminate aments solitary, bark smooth----- 4. Carpinus.

4. Staminate aments clustered, bark scaly----- 5. Ostrya.

1. Corylus L.

1. Corylus americanus Walt. n or Oakwood, 17 Sept 1949, Floyd Brown and Alfred Clebsch 442 (APSC); 17 mi sw of Clarksville in Montg co, 13 Mar 1949, H. C. Phillips and Alfred Clebsch 441 (APSC).

2. Alnus B. Ehrh. nr Yellow creek, 21 Aug 1948, Herman Silva and Alfred Clebsch 444 (APSC); Mark's slough, 12 Feb 1949, Alfred Clebsch 443 (APSC).

3. Betula L.

1. Betula nigra L. along Spring creek 14 Sept 1956, Alfred Clebsch and Floyd Brown 21572 (TENN).

4. Carpinus L.

1. Carpinus caroliniana Walt. Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); nr Neblitt's slough, 29 June 1958, Floyd Brown et. al. s.n. (TENN).

5. Ostrya Scop.

1. Ostrya virginiana (Mill) K. Koch. 8½ mi e by s of Clarksville, 9 July 1949, Floyd Brown and Alfred Clebsch s.n. (APSC); Shelton's

branch, 2 Apr 1949, Alfred Clebsch 439 (APSC); on flood plain nr Tobacco Port, 12 Sept 1958, Floyd Brown s.n. (TENN); Scout camp nr Peacher Mill, 2 Apr 1942, R. E. Shanks 1752 (TENN).

46. FAGACEAE

1. Staminate flowers in capitate peduncles----- 1. Fagus.

1. Staminate flowers in tenuous catkins.

2. Ovary 3-celled, 6-ovuled----- 2. Quercus.

2. Ovary 6-celled, 12-ovuled----- 3. Castanea.

1. Fagus L.

1. Fagus grandiflora Ehrh. nr Greenwood Cemetery, 1 Aug 1948, Alfred Clebsch 164 (APSC); Happy hollow, 24 Aug 1947, Alfred Clebsch 6984 (TENN).

2. Quercus L.

1. Stamens 4-6, stigmas above an enlongate style, bark dark but not flaky.

2. Leaves entire or nearly so, teeth few or lacking.

3. Leaves distinctly dilated widest above the middle, leaf base cordate or rounded----- 1. Q. marilandica.

3. Leaves not broadest above the middle.

4. Leaves stellate-pubescent beneath--- 2. Q. imbricaria.

4. Leaves merely tomentose beneath----- 3. Q. phellos.

2. Leaves variously pinnatifid to pinnately lobed.

5. Leaves grayish or brownish pubescent on the ventral

surface.

6. Leaf lobes curved and widest at the base-----

----- 4. Q. falcata.

6. Leaf lobes widest at the upper extremity-----

----- 5. Q. velutina.

5. Leaves glabrous on both sides except for tufts in the
vein axils.

7. Leaves dull, 7-11 lobed----- 6. Q. rubra.

7. Leaves lustrous, 5-9 lobed.

8. Acorn cup distinctly bowl-shaped.

9. Acorn oblong, 2-3 cm. long--- 7. Q. shumardii.

9. Acorn hemispheric----- 8. Q. palustris.

8. Acorn cup merely saucer-shaped-----

----- 9. Q. coccinea.

1. Stamens 6-8, stigmas sessile, bark pale and sometimes flaky.

10. Leaves lobed.

11. Leaves variously pubescent on the ventral surface.

12. Twigs pubescent----- 10. Q. stellata.

12. Twigs glabrous or nearly so.

13. Leaves with 2 deep sinuses---- 11. Q. macrocarpa.

13. Leaves irregularly lobed----- 12. Q. lyrata.

11. Leaves glabrous on the ventral surface---- 13. Q. alba.

10. Leaves merely coarsely toothed but not lobed.

14. Leaves with acute teeth----- 14. Q. muehlenbergii.

14. Leaves with rounded teeth or margins scalloped.

15. Leaves yellowish-green above, petioles yellowish-----

----- 15. Q. prinus. E.

15. Leaves dark green above, petioles green-----

----- 16. Q. michauxii.

1. Quercus merilandica Muench. nr Red river ne of Clarksville,
2 Nov 1941, R. E. Shanks 1323 (APSC); sw of Woodlawn, 11 Oct 1941,
R. E. Shanks 1325 (APSC); ne of Clarksville, 2 Nov 1941, R. E.
Shanks s.n. (TENN).

2. Quercus imbricaria Michx. nr Paradise Hill rd, 11 Oct 1949,
Floyd Brown and Alfred Clebsch 695 (APSC); Brown farm, 11 Aug 1956,
Floyd Brown 20965 (TENN); Boy Scout camp, 26 Oct 1941, R. E. Shanks
1155 (TENN).

3. Quercus phellos L. Sango, 30 July 1949, Floyd Brown and
Alfred Clebsch 447 (APSC); sw of Woodlawn, 10 Oct 1941, R. E.
Shanks 1327 (APSC, TENN).

4. Quercus falcata Michx. 2½ mi se of Clarksville, 1 Aug 1948,
Alfred Clebsch 163 (APSC); Porter's bluff, 24 Sept 1941, R. E. Shanks
s.n. (TENN).

5. Quercus velutina Lam. Shady Grove, 3 Sept 1949, Floyd Brown
and Alfred Clebsch 446 (APSC); APSC campus, 10 Oct 1941, D. Eakin
1041 (TENN).

6. Quercus rubra L. bluffs along Cumberland, 28 Sept 1941, R.
E. Shanks 1319 (APSC); nr Long pond at Dotsonville, 28 June 1958,

Floyd Brown s.n. (TENN).

7. Quercus shumardii Buckl. Lynnwood's landing, 4 Sept 1948, Alfred Clebsch 260 (APSC); upland nr Yellow creek, 22 Oct 1941, R. E. Shanks 1153 (TENN); Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN).

8. Quercus palustris Muenchh. $10\frac{1}{2}$ mi e by s of Clarksville, 3 Sept 1949, Floyd Brown and Alfred Clebsch 445 (APSC); nr Woodlawn, 13 Oct 1941, R. E. Shanks 1317 (APSC); nr Lock B, 13 Oct 1958, Floyd Brown s.n. (TENN); nr Woodlawn, 29 June 1941, R. E. Shanks 1045 (TENN).

9. Quercus coccinea Muenchh. $1\frac{1}{2}$ mi w of Oakwood, 9 Oct 1949, R. E. Shanks et. al. 694 (APSC); Fletcher's fork creek, 6 Oct 1941, R. E. Shanks 1320 (APSC); nr Red river ne of Clarksville, 2 Nov 1944, R. E. Shanks 1321 (APSC).

10. Quercus stellata Wang. Ravine ne of Greenwood Cemetery, 5 Sept 1948, Alfred Clebsch 188 (APSC); 11 mi ese of Clarksville, 3 Sept 1949, Alfred Clebsch and Floyd Brown 448 (APSC); 3 mi se of Clarksville, 24 Sept 1949, Floyd Brown and Alfred Clebsch 696 (APSC).

11. Quercus macrocarpa Michx. Lynnwood landing, 28 Oct 1949, Alfred Clebsch 698 (APSC); $2\frac{1}{2}$ mi se of Clarksville, 18 Sept 1948, Alfred Clebsch 189 (APSC); 3 mi sse of Clarksville, 1 Aug 1948, Alfred Clebsch 162 (APSC); Long slough nr Dotsonville, 28 June 1958, Alfred Clebsch and Floyd Brown s.n. (TENN); nr Lock B, 29 June 1958, Floyd Brown s.n. (TENN).

12. Quercus lyrata Walt. $1\frac{1}{4}$ mi w of Clarksville, 10 Oct 1949,

Floyd Brown and Alfred Clebsch 697 (APSC); nr se corner of Ft. Campbell Res, 11 July 1964, Alfred Clebsch et. al. 32879 (TENN).

13. Quercus alba L. Ravine e of Greenwood Cemetery, 5 Sept 1948, Alfred Clebsch 187 (APSC); nr Oakwood, 19 Aug 1951, A. J. Sharp et. al. 16304 (TENN); nr Lock B, 29 June 1958, Floyd Brown s.n. (TENN).

14. Quercus muhlenbergii Engelm. Peacher's mill, 19 Sept 1948, Alfred Clebsch and Edward Clebsch 191 (APSC); s of Clarksville on bluffs, 16 Apr 1942, R. E. Shanks 1793 (TENN); King and Queen bluff, 27 July 1942, Alfred Clebsch et. al. s.n. (TENN); $\frac{1}{2}$ mi n of Tobacco port, 1 Sept 1958, Floyd Brown 24517 (TENN).

15. Quercus prinus L. King and Queen bluff, 16 Feb 1960, Alfred Clebsch 28457 (TENN); e of Shiloh, 23 May 1942, R. E. Shanks 1331 (APSC, TENN).

16. Quercus michauxii Nutt. 2 mi n of Clarksville along creek, 18 Sept 1948, Alfred Clebsch and Edward Clebsch 190 (APSC); along Spring creek, 10 mi ne of Clarksville, 11 Sept 1949, Floyd Brown et. al. 449 (APSC); below Cunningham bridge over Cumberland, 7 Mar 1948, H. C. Phillips et. al. 1031 (APSC); nr Lock B, 29 June 1958, Floyd Brown s.n. (TENN); Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); flood plain of Cub creek, 5 July 1958, Floyd Brown s.n. (TENN).

3. Castanea Mill.

1. Castanea dentata (Marsh) Borkh. e of Shiloh, 23 May 1942, R. E. Shanks 2076 (TENN); $2\frac{1}{2}$ mi se of Clarksville, 15 Oct 1949, Floyd

Brown and Alfred Clebsch 693 (APSC).

47. ULMACEAE

1. Flowers perfect----- 1. Ulmus.
 1. Flowers unisexual----- 2. Celtis.

1. Ulmus L.

1. Flowers sessile or nearly so----- 1. U. pumila.

1. Flowers long pediceled.

2. Flowers in fascicles----- 2. U. americana.

2. Flowers in racemes.

3. Petioles 3-10 mm. in length, samaras elliptic-----
 ----- 3. U. thomasi.

3. Petioles absent, leaves then sessile or subsessile,
 samaras narrowly ovate----- 4. U. alata.

1. Ulmus pumila L. Lawn in Cumberland Heights, 19 July 1966,
Howard L. Yarbrough 266 (APSC).

2. Ulmus americana L. APSC campus, 7 Apr 1942, R. E. Shanks
 1332 (APSC); nr Neblitt's slough nr Lock B. Floyd Brown s.n. (TENN);
 Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN);
 APSC campus, 10 Oct 1941, D. Eakin 1027 (TENN); 300 yds n of new
 high school at Richview, 21 Mar 1966, Howard L. Yarbrough and Nancy
J. Branson 117 (APSC).

3. Ulmus thomasi Sarg. ne of Greenwood Cemetery, 20 Feb 1949,
Alfred Clebsch 450 (APSC); Sheldon springs, 15 Mar 1942, R. E.

Shanks 1709 (TENN).

4. Ulmus alata Michx. Sheldon springs, 15 Mar 1942, R. E.

Shanks 1710 (TENN); nr Lock B, 29 June 1958, Floyd Brown 1896 (TENN).

2. Celtis L.

1. Leaves lanceolate----- 1. C. laevigata.

1. Leaves ovate or deltoid.

2. Leaves entire----- 2. C. tenuifolia.

2. Leaves serrate----- 3. C. occidentalis.

1. Celtis laevigata Willd. Spring creek, 10 mi ne of Clarks-
ville, 11 Sept 1949, Floyd Brown and Alfred Clebsch 699 (APSC);
Lyle woods, 7 May 1942, R. E. Shanks 1948 (TENN); nr Dotsonville,
14 June 1958, Floyd Brown 1918 (TENN).

2. Celtis tenuifolia Nutt. King and Queen bluff, 1 Sept 1947,
Alfred Clebsch 1030 (APSC).

3. Celtis occidentalis L. Field nr Clarksville, 19 May 1954,
E. B. Harger 7863 (TENN); Lyle woods, 7 May 1942, R. E. Shanks 1947
(TENN); nr Dotsonville, 14 June 1958, Alfred Clebsch and Floyd
Brown 1898 (TENN).

48. MORACEAE

1. Leaf margins entire, fruit orange-size----- 1. Maclura.

1. Leaves toothed or lobed, fruit resembling a blackberry-----

- 2. Morus.

1. Maclura Nutt.

1. Maclura pomifera (Raf.) Schneid. nr Lock B, 29 June 1958, Floyd Brown 1918 (TENN); King and Queen bluff, 7 May 1949, Floyd Brown and Alfred Clebsch 451 (APSC).

2. Morus L.

1. Leaves pubescent on the under surface----- 1. M. rubra.

1. Leaves glabrous on the under surface----- 2. M. alba.

1. Morus rubra L. nr City Cemetery $\frac{1}{2}$ mi n of Clarksville, 4 May 1948, Ellen Hutchison 303 (APSC).

2. Morus alba L. nr City Cemetery $\frac{1}{2}$ mi n of Clarksville, 4 May 1948, Ellen Hutchison 302 (APSC); Murphy farm at Dotsonville, 17 June 1966, Howard L. Yarbrough and Nancy J. Branson 151 (APSC).

50. URTICACEAE

1. Stinging nettles present----- 1. Urtica.

1. Stinging nettles absent.

2. Leaves alternate----- 2. Parietaria.

2. Leaves opposite----- 3. Pilea.

1. Urtica L.

1. Urtica chamaedryoides Pursh. 3 mi w of Clarksville, 30 Apr 1949, Floyd Brown et. al. 700 (APSC); $2\frac{1}{2}$ mi ssw of Clarksville, 7 Mar 1948, Alfred Clebsch 1032 (APSC); 3 mi ssw of Clarksville, 5 May 1947, Alfred Clebsch 1033 (APSC); Lynnwood's landing, 9 June

1948, Alfred Clebsch 1034 (APSC).

2. Parietaria L.

1. Parietaria pennsylvanica Muhl. w end of Commerce st, 8 June 1948, Alfred Clebsch 55 (APSC); nr Palmyra, 14 May 1942, R. E. Shanks 1336 (APSC).

3. Pilea Lindl.

1. Pilea pumila (L.) Gray. nr Foster's cave nw of Clarksville, 19 Aug 1951, Alfred Clebsch 16301 (TENN).

51. SANTALACEAE

1. Comandra Nutt.

1. Comandra umbellata (L.) Nutt. King and Queen bluff, 27 Apr 1946, Alfred Clebsch et. al. 2112 (TENN).

52. LORANTHACEAE

1. Phoradendron Nutt.

1. Phoradendron flavescens (Pursh.) Nutt. nr Hemtitte abandoned rr section yds, 30 June 1966, Howard L. Yarbrough and Nancy J. Branson 261 (APSC).

53. ARISTOLOCHIACEAE

1. Stamens 6, calyx irregular----- 1. Aristolochia.
1. Stamens 12, calyx regular----- 2. Asarum.

1. Aristolochia L.

1. Aristolochia tomentosa Sims. Cumberland river bank nr Clarksville, 12 May 1948, Alfred Clebsch 26 (APSC).

2. Asarum L.

1. Asarum canadense L. Porter's bluff e of Clarksville, 9 May 1942, R. E. Shanks 1337 (APSC); Lyle woods, 15 Apr 1942, R. E. Shanks 1338 (APSC); Cunningham Lake, 10 Apr 1949, H. C. Phillips et. al. 452 (APSC); 2 $\frac{1}{4}$ mi e of Clarksville on bluff, 23 Apr 1949, Floyd Brown and Alfred Clebsch 453 (APSC); Billy Dunlop Memorial Park, 2 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 182 (APSC).

54. POLYGONACEAE

1. Inner 3 sepals enlarged in fruit----- 1. Rumex.

1. Inner 3 sepals no larger than the outer sepals in fruit-----

----- 2. Polygonium.

1. Rumex L.

1. Flowers unisexual----- 1. R. acetosella.

1. Flowers perfect.

2. Leaves crisped----- 2. R. crispus.

2. Leaves flattened----- 3. R. altissimus.

1. Rumex acetosella L. 3 mi se of Clarksville, 7 May 1949, Floyd Brown and Alfred Clebsch 454 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1339 (APSC); 3 mi sse of Clarksville, 22 May 1948,

Alfred Clebsch 1036 (APSC).

2. Rumex crispus L. Lyle woods, 7 May 1942, R. E. Shanks 1341 (APSC).

3. Rumex altissimus Wood. nr Stringtown, 14 May 1942, R. E. Shanks 1340 (APSC).

2. Polygonum L.

1. Polygonum hydropiperoides Michx. w of Oakwood, 30 June 1948, Alfred Clebsch et. al. 7617 (TENN); w of Dotsonville, 9 Oct 1949, Alfred Clebsch 14412 (TENN); nr Yellow creek, 22 June 1966, Howard L. Yarbrough et. al. 154 (APSC).

58. PHYTOLACCACEAE

1. Phytolacca L.

1. Phytolacca americana L. Rossview 8 mi ne of Clarksville, 13 June 1942, R. E. Shanks 54 (TENN).

59. AIZOACEAE

1. Mollugo L.

1. Mollugo verticulata L. Lawn nr Greenwood Ave, 21 May 1948, Alfred Clebsch 57 (APSC); APSC campus, 17 Aug 1943, R. E. Shanks 2326 (TENN).

60. PORTULACACEAE

1. Claytonia L.

1. Claytonia virginica L. n of Greenwood Cemetery, 26 Feb 1949, Alfred Clebsch 455 (APSC); Trahern's spring, 1 Feb 1947, Alfred Clebsch 1051 (APSC); location not given, 17 Apr 1954, E. Quarterman 4933 (VAND); Cunningham lake, 1 Apr 1942, R. E. Shanks 1745 (TENN); Antioch creek, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 105 (APSC); nr Oak Plains, 23 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 106 (APSC); 5 mi e of Clarksville, 25 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 142 (APSC).

61. CARYOPHYLLACEAE

1. Calyx united.

2. Styles 3-5.

3. Styles 5.

4. Calyx lobes longer than the calyx tube--- 1. Agrostemma.

4. Calyx lobes much shorter than the calyx tube-----

----- 2. Lychnis.

3. Styles 3----- 3. Silene.

2. Styles 2.

5. Calyx cylindric, nerves 20----- 4. Saponaria.

5. Calyx cylindric, nerves 30 or more----- 5. Dianthus.

1. Calyx composed of separate sepals.

6. Styles 4 or 5.

7. Stamens 10----- 6. Cerastium.

7. Stamens 4 or 5----- 7. Sagina.

6. Styles 3.

8. Petals deeply bifid----- 8. Stellaria.
 8. Petal margins entire----- 9. Arenaria.

1. Agrostemma L.

1. Agrostemma githago L. nr Lock B, 20 May 1965, Kathy Foust
s.n. (APSC).

2. Lychnis L.

1. Lychnis alba Mill. Lawn in Glenmwood, Clarksville, 15 May
 1942, R. E. Shanks 1364 (APSC).

3. Silene L.

1. Corolla white or pink, never red.

2. Corolla white----- 1. S. latifolia.

2. Corolla pink----- 2. S. antirrhina.

1. Corolla deep red or crimson----- 3. S. virginica.

1. Silene latifolia B. & B. 10 mi e by se of Clarksville, 9
 July 1949, Floyd Brown and Alfred Clebsch 2490 (TENN).

2. Silene antirrhina L. nr Shelton's spring e of Clarksville,
 8 May 1942, R. E. Shanks 1363 (APSC).

3. Silene virginica L. 8 mi sse of Clarksville, 17 Apr 1949,
Floyd Brown 458 (APSC); Parson's creek, 2 Apr 1942, R. E. Shanks
1326 (APSC); Cumberland river valley, 17 Apr 1954, E. Quarterman
5400 (VAND); King and Queen bluff, 25 Mar 1966, Howard L.
Yarbrough 121 (APSC).

4. Saponaria L.

1. Saponaria officinalis L. nr Budd's creek, 1 Aug 1942, Woodson Oliver 99 (TENN).

5. Dianthus L.

1. Dianthus ameria L. nr Shelton's branch, 17 June 1947, Alfred Clebsch et. al. 1052 (APSC); nr New Providence, 28 June 1942, Woodson Oliver 1366 (APSC); King and Queen bluff, 11 Apr 1949, Floyd Brown and Alfred Clebsch 459 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough and Nancy J. Branson 177 (APSC).

6. Cerastium L.

1. Plants annuals.

2. Leaves ovate-ovovate----- 1. C. viscosum.

2. Leaves oblong-lanceolate----- 2. C. nutans.

1. Plants perennial----- 3. C. vulgatum.

1. Cerastium viscosum L. APSC campus, 16 Apr 1942, R. E. Shanks 1355 (APSC); King and Queen bluff, 30 Mar 1946, Alfred Clebsch 1764 (TENN); Same location, 25 Mar 1966, Howard L. Yarbrough 89 (APSC).

2. Cerastium nutans Raf. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 6 (APSC).

3. Cerastium vulgatum L. nr Stringtown, 14 May 1942, R. E. Shanks et. al. 1356 (APSC).

7. Sagina L.

1. Sagina decumbens (Ell.) T. & G. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 5 (APSC); same location, 7 May 1949, Floyd Brown and Alfred Clebsch 666 (APSC); nr Stringtown, 14 May 1942, Woodson Oliver et. al. 1357 (APSC); APNS campus, 17 Apr 1942, R. E. Shanks 1358 (APSC).

8. Stellaria L.

1. Cauline leaves sessile----- 1. S. pubera.

1. Cauline leaves petioled----- 2. S. media.

1. Stellaria pubera Michx. Parson's creek, 2 Apr 1942, R. E. Shanks 1768 (TENN); nr Walnut Grove, 12 Apr 1942, R. E. Shanks 1776 (TENN).

2. Stellaria media (L.) Cyril. APSC campus, 7 Apr 1942, R. E. Shanks 1354 (APSC); same location, 10 Apr 1966, Howard L. Yarbrough s.n. (APSC).

9. Arenaria L.

1. Arenaria serpyllifolia L. nr Red river nr New Providence, 30 Apr 1942, R. E. Shanks 1359 (APSC).

63. NYMPHAEACEAE

1. Nuphar Sm.

1. Nuphar advena Ait. Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN).

64. RANUNCULACEAE

1. Fruit a follicle or berry.
 2. Petals present.
 3. Flowers irregular----- 1. Delphinium.
 3. Flowers regular.
 4. Pistil 1----- 2. Actaea.
 4. Pistils 5----- 3. Aquilegia.
 2. Petals absent.
 5. Sepals 3, petal-like----- 4. Hydrastis.
 5. Sepals 4 or 5.
 6. Flowers perfect----- 5. Isopyrum.
 6. Flowers unisexual----- 6. Thalictrum.
1. Fruit an achene.
 7. Petals present.
 8. Pistils crowded on a slender spike-like receptacle-----
----- 7. Myosurus.
 8. Pistils arranged on a globose or cylindric head-----
----- 8. Ranunculus.
 7. Petals absent.
 9. Sepals valvate, leaves opposite----- 9. Clematis.
 9. Sepals imbricate, leaves alternate, basal, or whorled.
 10. Leaves compound, sessile----- 10. Anemonella.
 10. Leaves simple, petioled.
 11. Flowering stem possessing only leaf-like bracts---
----- 11. Anemone.

11. Flowering stem possessing well developed leaves-----

----- 12. Hepatica.

1. Delphinium L.

1. Delphinium tricornes Michx. Cunningham lake, 1 May 1948, Alfred Clebsch 8 (APSC); Shelton's branch, 9 Apr 1949, Floyd Brown and Alfred Clebsch 667 (APSC); King and Queen bluff, 25 Mar 1966, Howard L. Yarbrough 120 (APSC).

2. Actaea L.

1. Actaea pachypoda Ell. Cunningham's lake 8 mi sw of Clarksville, 1 May 1948, Alfred Clebsch 7 (APSC); s of Henrietta, 3 July 1965, Wayne Chester 895 (TENN).

3. Aquilegia L.

1. Aquilegia canadensis L. Porter's bluff, 12 Apr 1942, R. E. Shanks s.n. (TENN); King and Queen bluff 3 mi se of Clarksville, 16 Apr 1949, Alfred Clebsch and Floyd Brown 462 (APSC); same location, 25 Mar 1966, Howard L. Yarbrough 122 (APSC).

4. Hydrastis Ellis.

1. Hydrastis canadensis L. Hayes farm on Red river, 25 May 1952, A. Canton s.n. (TENN); APSC farm, 20 May 1966, Howard L. Yarbrough 245 (APSC).

5. Isopyrum L.

1. Isopyrum biternatum (Raf.) T. & G. Shelton's branch, 2 Apr

1949, Alfred Clebsch 461 (APSC); $2\frac{1}{2}$ mi e of Clarksville, 12 Mar 1949, Alfred Clebsch 508 (APSC); Trahern's spring, 1 Feb 1947 (APSC); Porter's bluff, 9 Apr 1942, Betty M. Shanks 1827 (TENN).

6. Thalictrum L.

1. Leaflets with 4 or more teeth----- 1. T. dioicum.

1. Leaflets 3-toothed or lobed----- 2. T. revolutum.

1. Thalictrum dioicum L. Boy Scout camp, 2 Apr 1942, R. E. Shanks 1375 (APSC); same location, 30 Mar 1952, A. Canton s.n. (TENN).

2. Thalictrum revolutum D. C. nr Lone Oak, 23 May 1942, R. E. Shanks 2088 (TENN); 3 mi s by e of Clarksville, 1 Aug 1948, Alfred Clebsch et. al. 160 (APSC).

7. Myosurus L.

1. Myosurus minimus L. nr Lock C flood plain, 11 Apr 1952, E. Quarterman 2404 (VAND); s of Greenwood Cemetery, 24 Apr 1948, Alfred Clebsch 9 (APSC); nr Lyle farm, 16 Apr 1942, R. E. Shanks 1801 (TENN).

8. Ranunculus L.

1. Plants aquatic, petals white.

2. Free petiole above the stipule as long as the stipule-----
----- 1. R. trichophyllus.

2. Free petiole above the stipule short or none-----
----- 2. R. longirostus.

1. Plants terrestrial, petals yellow.

3. Fruit a turgid achene.

4. Leaves glabrous----- 3. R. abortivus.

4. Leaves villous----- 4. R. micranthus.

3. Fruit a flattened achene.

5. Flowers axillary----- 5. R. parviflorus.

5. Flowers terminal.

6. Beak straight or nearly so----- 6. R. hispidus.

6. Beak hooked or coiled----- 7. R. recurvatus.

1. Ranunculus trichophyllus Chaix. 10 mi ne of Clarksville floating and shallowly rooted in pond, 11 Sept 1949, C. F. Pickering et. al. s.n. (TENN).

2. Ranunculus longirostus Godr. 10 mi ne of Clarksville floating and shallowly rooted in pond, 11 Sept 1949, C. F. Pickering et. al. 465 (APSC).

3. Ranunculus abortivus L. nr Walnut Grove, 12 Apr 1942, R. E. Shanks 1370 (APSC); nr Parson's creek, 19 Mar 1942, R. E. Shanks 1371 (APSC); Lyle farm, 16 Apr 1942, R. E. Shanks 1802 (TENN).

4. Ranunculus micranthus Nutt. 2 mi se of Clarksville, 24 Apr 1948, Alfred Clebsch 11 (APSC); nr Walnut Grove along stream, 12 June 1942, R. E. Shanks 1777 (TENN).

5. Ranunculus parviflorus L. nr Red river at New Providence, 30 Apr 1942, R. E. Shanks 1373 (APSC); Antioch creek bottomland, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 243 (APSC).

6. Ranunculus hispidus Michx. nr Cunningham lake, 1 May 1948,

Alfred Clebsch 97 (APSC); nr Shelton's branch, 2 Apr 1949, Alfred Clebsch 668 (APSC); nr Dunbar cave, 25 Apr 1942, R. E. Shanks 1853 (TENN).

7. Ranunculus recurvatus Poir. nr Foster's cave, 18 Apr 1948, Alfred Clebsch 10 (APSC); nr Asbury church, 30 Apr 1942, R. E. Shanks 1372 (APSC).

9. Clematis L.

1. Sepals thin----- 1. C. virginiana.

1. Sepals thick and leather-like----- 2. C. viorna.

1. Clematis virginiana L. 10 mi e of Clarksville, 13 June 1958, William H. Ellis 24561 (TENN); along bank of Sorghum creek nr Brewer's Chapel, 5 July 1958, William H. Ellis 0197 (TENN); Porter's Cave, 9 July 1946, R. E. Shanks 1942 (TENN).

2. Clematis viorna L. nr Lock B, 12 June 1958, William H. Ellis 24555 (TENN); nr Yellow creek, 22 June 1966, Howard L. Yarbrough 170 (APSC); Red river bluff w of rock quarry, 6 June 1942, Woodson Oliver 1377 (APSC). Bluff on creek above Boy Scout camp, 27 May 1948, Alfred Clebsch 60 (APSC).

10. Anemonella Spach.

1. Anemonella thalictroides (L.) Spach. Cumberland river valley, 17 Apr 1954, E. Quarterman et. al. 4934 (VAND); nr Cumberland river s of Clarksville, 16 Apr 1942, anon 1789 (TENN); Shelton's branch 2 mi se of Clarksville, 2 Apr 1949, Alfred Clebsch 464 (APSC); Antioch

creek bottomland, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 144 (APSC).

11. Anemone L.

1. Anemone virginiana L. s of Clarksville, 9 Oct 1941, D. Eakin 992 (TENN); Cumberland river bluff $3\frac{1}{2}$ mi se of Clarksville, 23 May 1948, Alfred Clebsch 59 (APSC).

12. Hepatica Mill.

1. Hepatica acutiloba D.C. Porter's bluff, 17 Mar 1942, R. E. Shanks 1711 (TENN); nr Hunter's island, 12 Apr 1947, Alfred Clebsch et. al. 1056 (APSC); nr Shelton's branch, 1 Feb 1947, Alfred Clebsch 1057 (APSC); Billy Dunlop Memorial Park, 10 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 89 (APSC).

65. BERBERIDACEAE

1. Stamens twice as many as the petals----- 1. Podophyllum.

1. Stamens as many as the petals.

2. Flowers white----- 2. Jeffersonia.

2. Flowers yellowish green or greenish purple-----

----- 3. Caulophyllum.

1. Podophyllum L.

1. Podophyllum peltatum L. w end of King and Queen bluff, 17 Apr 1949, Alfred Clebsch 467 (APSC); nr Stringtown in woods, 20 Apr 1966, Howard L. Yarbrough 88 (APSC); Cumberland river valley, 17 Apr 1954,

E. Quarterman et. al. 5304 (VAND).

2. Jeffersonia Bart.

1. Jeffersonia diphylla (L.) Pers. nr Vanleer, 24 Apr 1942, Jeanette Jobe and R. E. Shanks 1378 (APSC); King and Queen bluff, 1 Apr 1966, Howard L. Yarbrough 102 (APSC).

3. Caulophyllum Michx.

1. Caulophyllum thalictroides (L.) Michx. Red river bluff $1\frac{1}{2}$ mi e of Clarksville, 9 Apr 1949, Floyd Brown and Alfred Clebsch 466 (APSC).

66. MENISPERMACEAE

1. Petals present----- 1. Menispermum.

1. Petals absent----- 2. Calycocarpum.

1. Menispermum L.

1. Menispermum canadense L. along Budd's creek, 23 May 1942, R. E. Shanks 1382 (APSC).

2. Calycocarpum Nutt.

1. Calycocarpum lyonii (Pursh.) Gray. rd to Porter's cave $1\frac{1}{2}$ mi e of Clarksville, 30 Aug 1947, Alfred Clebsch 1058 (APSC).

67. MAGNOLIACEAE

1. Liriodendron L.

1. Liriodendron tulipifera L. Paradise Hill rd $2\frac{1}{2}$ mi ese of

Clarksville, 16 May 1948, Alfred Clebsch 58 (APSC); APNS campus, 26 Sept 1944, R. E. Shanks 1367 (APSC); APSC farm, 15 Apr 1966, Howard L. Yarbrough 126 (APSC); Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN).

69. ANNONACEAE

1. Asimina Adans.

1. Asimina triloba (L.) Duval. nr Trahern's spring, 23 Apr 1949, Floyd Brown and Alfred Clebsch 460 (APSC).

70. LAURACEAE

1. Anthers 4-celled and 4-valved; pistillate flowers with 6 stamen rudiments----- 1. Sassafras.

1. Anthers 2-celled and 2-valved; pistillate flowers with 15-18 stamen rudiments----- 2. Lindera.

1. Sassafras Nees.

1. Sassafras albidum (Nutt.) Nees. .2 mi se of Clarksville on TC rr track right of way, 2 Apr 1949, Alfred Clebsch 468 (APSC); King and Queen bluff, 13 Aug 1949, Floyd Brown and Alfred Clebsch 469 (APSC); 1 mi e of Shiloh, 15 Apr 1966, Howard L. Yarbrough 133 (APSC); location not given, 17 Apr 1954, E. Quarterman et. al. 4928 (VAND).

2. Lindera Thunb.

1. Lindera benzoin (L.) Blume. Porter's bluff, 20 Sept 1941,

R. E. Shanks 841 (TENN); McAdoo creek, 20 Mar 1949, H. C. Phillips et. al. 470 (APSC); Red river bluff 2 mi e of Clarksville, 21 Aug 1948, Alfred Clebsch 157 (APSC); McAdoo creek bank 6 mi se of Clarksville, 21 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 116 (APSC).

71. PAPAVERACEAE

1. Stamens 6.
 2. Flowers bilateral----- 1. Dicentra.
 2. Flowers zygomorphic----- 2. Corydalis.

1. Stamens numerous.
 3. Petals 8-16, white----- 3. Sanguinaria.
 3. Petals 4, yellowish----- 4. Stylophorum.

1. Dicentra Bernh.

1. Dicentra cucullaria (L.) Bernh. Trahern's branch, 9 Apr 1949, Floyd Brown and Alfred Clebsch 474 (APSC).

2. Corydalis Medic.

1. Corydalis flava (Raf.) DC. location not given, 16 Mar 1946, Alfred Clebsch s.n. (TENN); Lyle woods, 7 May 1942, R. E. Shanks 1384 (APSC); nr Houston co line, 13 Mar 1949, H. C. Phillips et. al. 475 (APSC); nr Yellow creek on Hwy 13, 22 June 1966, Howard L. Yarbrough et. al. 230 (APSC); Antioch creek bottomland, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 146 (APSC).

3. Sanguinaria L.

1. Sanguinaria canadensis L. s of Greenwood Cemetery, 24 Mar 1942, R. E. Shanks 1727 (TENN); Red river bluff $2\frac{1}{4}$ mi e of Clarksville, 12 Mar 1949, Alfred Clebsch 471 (APSC); APSC farm, 14 Apr 1966, Howard L. Yarbrough 87 (APSC).

4. Stylophorum Nutt.

1. Stylophorum diphyllum (Michx.) Nutt. Red river bluff $1\frac{1}{2}$ mi e of Clarksville, 9 Apr 1949, Alfred Clebsch and Floyd Brown 473 (APSC); Porter's bluff e of Clarksville, 27 Apr 1942, R. E. Shanks 1383 (APSC).

73. CRUCIFERAE

For the proper identification of the genera of the Cruciferae specimens with both flower and fruit present are desirable.

1. Petals yellow.

2. Ovary subglobose----- 1. Lesquerella.

2. Ovary cylindric.

3. Stigma truncate----- 2. Barbarea.

3. Stigma capitate.

4. Seeds in one row----- 3. Sisymbrium.

4. Seeds in two rows.

5. Pubescence of simple hairs----- 4. Rorippa.

5. Pubescence of wholly or partly branched hair-----

----- 5. Descurainia.

1. Petals white to pink or purplish.

6. Ovary flattened, ellipsoid or obovoid.

- 7. Ovule 1 in each cell----- 6. Lepidium.
- 7. Ovules 2 to many in each cell.
- 8. Stems glabrous----- 7. Thlaspi.
- 8. Stem pubescent.
- 9. Flowering stem without leaves----- 8. Draba.
- 9. Flowering stem with at least one leaf--- 9. Capsella.
- 6. Ovary cylindric.
- 10. Stigma capitate.
- 11. Seeds in two rows, plants aquatic----- 10. Nasturtium.
- 11. Seeds in one row, plants terrestrial--- 11. Iodanthus.
- 10. Stigma truncate.
- 12. Fruit 4-angled or terete----- 12. Cardamine.
- 12. Fruit somewhat flattened.
- 13. Herbs from a horizontal rhizome---- 13. Dentaria.
- 13. Herbs not from a rhizome.
- 14. Stem pubescent with branched hair-----
----- 14. Arabidopsis.
- 14. Stem glabrous, or hirsute only at the base-----
----- 15. Arabis.
- 1. Lesquerella S. Wats.
- 1. Filaments winged at the base, pods flattened--- 1. L. lescurii.
- 1. Filaments only slightly enlarged at the base, pods globose----
----- 2. L. globosa.
- 1. Lesquerella lescurii (A. Gray) S. Wats. along Hwy 112 nr

Cheatem co line, 4 Apr 1948, H. C. Phillips et. al. 994 (APSC); Lyle farm s of Clarksville, 16 Apr 1942, R. E. Shanks 1796 (TENN); nr Lock B, 21 Mar 1956, E. Quarterman 5387 (VAND).

2. Lesquerella globosa (Desv.) S. Wats. King and Queen bluff 3 mi se of Clarksville, 26 Apr 1947, Alfred Clebsch 1061 (APSC); Lyle farm s of Clarksville, 16 Apr 1942, R. E. Shanks 1386 (APSC).

2. Barbarea R. Br.

1. Basal leaves with 1-4 pairs of lateral lobes-- 1. B. vulgaris.

1. Basal leaves with 4-10 pairs of lateral lobes-- 2. B. verna.

1. Barbarea vulgaris R. Br. River rd s of Clarksville, 16 Apr 1942, R. E. Shanks 1805 (TENN).

2. Barbarea verna (Mill.) Ashers. River rd s of Clarksville, 16 Apr 1942, R. E. Shanks 1394 (APSC).

3. Sisymbrium L.

1. Sisymbrium officinale (L.) Scop. Boy scout camp, 9 May 1948, Alfred Clebsch et. al. 27 (APSC); APNS campus, 21 Mar 1942, R. E. Shanks 2021 (TENN).

4. Rorippa Scop.

1. Rorippa sessiliflora (Walt.) Hitchc. King and Queen bluff, 17 Apr 1949, Alfred Clebsch 479 (APSC); 1 mi below Clarksville on the Cumberland river bank, 1 Oct 1949, Floyd Brown and Alfred Clebsch 671 (APSC); nr Yellow creek, 30 Apr 1944, R. E. Shanks 1388 (APSC).

5. Descurainia Webb & Berthelot

1. Descurainia pinnata (Walt.) Britt. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 12 (APSC); Cumberland river bluff 3 mi w of Clarksville, 30 Apr 1949, Floyd Brown and Alfred Clebsch 481 (APSC).

6. Lepidium L.

1. Petals present and longer than the sepals--- 1. L. virginicum.

1. Petals absent or shorter than the sepals--- 2. L. densiflorum.

1. Lepidium virginicum L. APSC campus, 23 Apr 1942, R. E.

Shanks 1828 (TENN).

2. Lepidium densiflorum Schrad. Shank's lawn, 24 Apr 1942, R. E.

Shanks 1857 (TENN); King and Queen bluff, 24 Apr 1948, Alfred Clebsch 264 (APSC); APSC campus, 30 Sept 1941, D. Eakin et. al. 1390 (APSC).

7. Thlaspi L.

1. Thlaspi arvense L. se of Greenwood Cemetery, 25 Oct 1947,

Alfred Clebsch 1062 (APSC).

8. Draba L.

1. Petals rounded or entire at the margins--- 1. D. brachycarpa.

1. Petals bifid at the summit----- 2. D. verna.

1. Draba brachycarpa Nutt. APSC campus 17 Apr 1942, R. E. Shanks

1385 (APSC).

2. Draba verna L. King and Queen bluff, 26 Feb 1949, Alfred

Clebsch 476 (APSC); Cunningham lake, 2 Apr 1942, R. E. Shanks 1738 (TENN).

9. Capsella Medic.

1. Capsella bursa-pastoris (L.) Medic. 3 mi sw of Clarksville, 2 Apr 1949, Alfred Clebsch 478 (APSC); nr Yellow creek, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 112 (APSC); APNS campus, 17 Apr 1942, R. E. Shanks 1808 (TENN); nr Lock C, E. Quarterman 5405 (VAND).

10. Nasturtium R. Br.

1. Nasturtium officinale R. Br. nr Heitt's garden, 16 May 1948, Alfred Clebsch 61 (APSC); slough nr Cumberland river w of Clarksville, 14 May 1942, R. E. Shanks 1389 (APSC).

11. Iodanthus T. & G.

1. Iodanthus pinnatifidus (Michx.) Steud. Lyle woods, 7 May 1942, R. E. Shanks 1395 (APSC); Hadley farm, 17 Apr 1948, Alfred Clebsch 13 (APSC); Cunningham lake, 1 May 1948, Alfred Clebsch 30 (APSC); King and Queen bluff, 17 May 1966, Howard L. Yarbrough 185 (APSC).

12. Cardamine L.

1. Cauline leaves simple.

2. Flowers pink to purple----- 1. C. douglassi.

2. Flowers white----- 2. C. bulbosa.

1. Cauline leaves with well developed lateral lobes.

3. Stem hispid at the base, cauline leaves 4-8 cm. long, stem

to 6 dm. in length----- 3. C. pennsylvanica.

3. Stem glabrous throughout, cauline leaves 2-4 cm. long,
stem to 3 dm. in length----- 4. C. parviflora.

1. Cardamine douglassii (Torr.) Britton. Mark's slough nr Lock
C, 5 Mar 1949, Alfred Clebsch 486 (APSC).

2. Cardamine bulbosa (Schreb.) B.S.P. nr mouth of Spring creek,
10 Apr 1948, Alfred Clebsch 265 (APSC); s of Lock B, 17 Apr 1949,
Floyd Brown 487 (APSC); nr Sycamore creek, 31 Mar 1946, Alfred
Clebsch s.n. (TENN).

3. Cardamine pennsylvanica Muhl. nr Heitt's garden, 14 May 1949,
Floyd Brown and Alfred Clebsch 484 (APSC).

4. Cardamine parviflora L. nr Budd's creek, 3 Mar 1946, Alfred
Clebsch s.n. (TENN).

13. Dentaria L.

1. Cauline leaves three, whorled----- 1. D. laciniata.

1. Cauline leaves two, rarely three, opposite or nearly so-----

----- 2. D. heterophylla.

1. Dentaria laciniata Muhl. Porter's bluff, 17 Mar 1942, R. E.
Shanks 1715 (TENN); nr Antioch creek, 15 Apr 1966, Howard L.
Yarbrough 242 (APSC).

2. Dentaria heterophylla Nutt. Porter's bluff, 17 Apr 1942, A.
W. Jobe 1396 (APSC).

14. Arabidopsis Heynh.

1. Arabis thaliana (L.) Heynh. Scout camp, 2 Apr 1942, R. E. Shanks 1397 (APSC); Lyle farm, 16 Apr 1942, R. E. Shanks 1392 (APSC, TENN); location not given, 11 Apr 1956, E. Quarterman 5522 (VAND).

15. Arabis L.

1. Plants with basally auricled or sagittate cauline leaves.

2. Cauline leaves glabrous----- 1. A. laevigata.

2. Cauline leaves pubescent----- 2. A. perstellata.

1. Plants with leaves not basally auricled or sagittate.

3. Fruits 1.5-2.5 cm. long----- 3. A. virginica.

3. Fruits 5-11 cm. long.

4. Flowering pedicels erect at anthesis--- 1. A. laevigata.

4. Flowering pedicels reflexed at anthesis-----
----- 4. A. canadensis.

1. Arabis laevigata (Muhl.) Poir. Mark's slough, 5 Mar 1949, Alfred Clebsch 483 (APSC); Parson's creek, 2 Apr 1942, R. E. Shanks 1767 (TENN).

2. Arabis perstellata E. L. Br. Red river bluff $1\frac{1}{2}$ mi e of Clarksville, 18 Apr 1948, Alfred Clebsch 15 (APSC).

3. Arabis virginica (L.) Rollins. $2\frac{1}{2}$ mi ese of Clarksville, 24 Apr 1948, Alfred Clebsch 14 (APSC); ravine se of Greenwood Cemetery, 19 Mar 1949, Alfred Clebsch 482 (APSC); nr Lock C, 11 Apr 1956, E. Quarterman 5523 (VAND).

4. Arabis canadensis L. Heitt's garden $3\frac{1}{2}$ mi ese of Clarksville,

14 May 1949, Floyd Brown and Alfred Clebsch 701 (APSC).

78. CRASSULACEAE

1. Sedum L.

1. Annual from a tuft of fibrous roots----- 1. S. pulchellum.

1. Perennial from a creeping rhizome----- 2. S. ternatum.

1. Sedum pulchellum Michx. Boy Scout camp, 27 May 1948, Alfred Clebsch 62 (APSC).

2. Sedum ternatum Michx. Cumberland river valley, 17 Apr 1954,
E. Quarterman et. al. 5397 (VAND).

79. SAXIFRAGACEAE

1. Plants woody, trees or shrubs.

2. Stamens 20 or more, ovary usually 4-celled--- 1. Philadelphus.

2. Stamens 5 to 10, ovary 1 or 2-celled.

3. Stamens 5, ovary 1-celled, fruit a berry--- 2. Ribes.

3. Stamens 8 to 10, ovary 2-celled, fruit a capsule-----

----- 3. Hydrangea.

1. Plants herbaceous.

4. Petals none----- 4. Penthorum.

4. Petals present.

5. Stamens 5----- 5. Heuchera.

5. Stamens 10.

6. Petals entire----- 6. Saxifraga.

6. Petals pinnately cleft----- 7. Mitella.

1. Philadelphus L.

1. Philadelphus pubescens Loisel. 3 mi sse of Clarksville, 8 May 1948, Alfred Clebsch 976 (APSC); $1\frac{1}{2}$ mi wnw of Clarksville, 13 Sept 1947, Alfred Clebsch 1064 (APSC); King and Queen bluff, 18 May 1946, Alfred Clebsch et. al. s.n. (TENN); $2\frac{1}{2}$ mi se of Clarksville, date not given, A. Canton s.n. (TENN).

2. Ribes L.

1. Ribes odoratum Wendland. Red Rocks bluff $2\frac{1}{2}$ mi sw of Shanks Clarksville, 9 June 1948, Alfred Clebsch 99 (APSC). Howard L. Yarbrough

3. Hydrangea L.

1. Hydrangea arborescens L. Porters bluff, 28 June 1942, R. E. Shanks and Woodson Oliver 1398 (APSC, TENN); Blue Rock spring rd, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 95 (APSC).

4. Penthorum L.

1. Penthorum sedoides L. nr Shelton's branch, 24 Aug 1946, R. E. Shanks 2144 (TENN); w of Dotsonville, 9 Oct 1949, R. E. Shanks et. al. 14447 (TENN).

5. Heuchera L.

1. Petioles villous----- 1. H. villosa.

1. Petioles glabrous----- 2. H. americana.

1. Heuchera villosa Michx. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 16 (APSC); bluffs $\frac{1}{2}$ mi above Ashland City bridge, 7

May 1951, R. E. Shanks 15823 (TENN); Porter's cave, 17 July 1948, Alfred Clebsch s.n. (TENN).

2. Heuchera americana L. n arm of Coke's creek, 14 May 1949, Floyd Brown and Alfred Clebsch 702 (APSC, TENN).

6. Saxifraga L.

1. Saxifraga virginensis Michx. $2\frac{1}{2}$ mi se of Clarksville, 19 Mar 1949, Alfred Clebsch 494 (APSC); King and Queen bluff, 26 Feb 1949, Alfred Clebsch 495 (APSC); Porter's bluff, 17 Mar 1942, R. E. Shanks 1397 (APSC); Yellow creek bottomland, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 113 (APSC); nr Antioch creek, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 134 (APSC).

7. Mitella L.

1. Mitella diphylla L. Sheldon's spring 2 mi e of Clarksville, 25 Apr 1948, Alfred Clebsch 266 (APSC).

80. HAMAMELIDACEAE

1. Liquidamber L.

1. Liquidamber styraciflua L. nr Neblitt's slough nr Lock B, 29 June 1958, Floyd Brown s.n. (TENN); nr Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); APSC campus, 30 June 1966, Howard L. Yarbrough 267 (APSC).

81. PLATANACEAE

1. Platanus L.

1. Platanus occidentalis L. nr Neblitt's slough at Lock B, 29 June 1958, Floyd Brown et. al. s.n. (TENN); nr Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); APSC farm, 30 June 1966, Howard L. Yarbrough 268 (APSC).

82. ROSACEAE

1. Trees, shrubs, or woody vines.
2. Trees.
3. Fruit a 1-seeded drupe----- 1. Prunus.
3. Fruit a fleshy pome.-----
4. Flowers in umbels or corymbs.-----
5. Stamens 5-20----- 2. Crataegus.
5. Stamens numerous----- 3. Pyrus.
4. Flowers in leafy racemes----- 4. Amelanchier.
2. Shrubs or woody vines.
6. Thorns absent.
7. Flowers in an elongate panicle----- 5. Spiraea.
7. Flowers in a short leafy raceme----- 4. Amelanchier.
6. Thorns present.
8. Hypanthium flat to hemispheric, fruit a cluster of
drupelets or a berry----- 6. Rubus.
8. Hypanthium globose to urceolate, fruit a bony
achene----- 7. Rosa.
1. Herbaceous plants, or woody only at the base.
9. Petals white to pale pink.

10. Pistils 5----- 8. Gillenia.
10. Pistils numerous.
11. Hypanthium turbinate or hemispheric--- 9. Geum.
11. Hypanthium saucer-shaped----- 10. Fragaria.
9. Petals yellow.
12. Pistils 2----- 11. Agrimonia.
12. Pistils numerous.
13. Hypanthium saucer-shaped.
14. Bractlets entire----- 12. Potentilla.
14. Bractlets 3-toothed at the margin-----
----- 13. Duchesnea.
13. Hypanthium turbinate or hemispheric.
14. Styles elongate, filiform----- 9. Geum.
14. Styles short, inconspicuous----- 12. Potentilla.
1. Prunus L.
1. Flowers numerous, racemose----- 1. P. serotina.
1. Flowers few or solitary, umbel or in corymbs.
2. Petals 10-12 mm. in length----- 2. P. americana.
2. Petals 3-6 mm. in length----- 3. P. angustifolia.
1. Prunus serotina Ehrh. Long pond nr Dotsonville, 28 June
1958, Floyd Brown 3396 (TENN); Trahern springs, 23 Apr 1948, Floyd
Brown et. al. 500 (APSC); nr tunnel at Palmyra, 30 Apr 1944, R. E.
Shanks 2737 (TENN).
2. Prunus americana Marsh. Cunningham lake, 10 Apr 1949, Alfred

Clebsch et. al. 499 (APSC); nw of Woodlawn, 12 Apr 1942, R. E. Shanks 1771 (TENN); nr old bridge at Port Royal, 23 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 108 (APSC).

3. Prunus angustifolia Marsh. nr tunnel at Palmyra, 30 Apr 1944, R. E. Shanks 1411 (APSC).

2. Crataegus L.

1. Leaves ovate or cordate----- 1. C. phaenopyrum.

1. Leaves variable, not cordate.

2. Floral leaves narrowed at the base.

3. Leaves glossy on the upper surface----- 2. C. mohri.

3. Leaves dull on the upper surface----- 3. C. viridis.

2. Floral leaves broad at the base----- 4. C. mollis.

1. Crataegus phaenopyrum (L. f.) Medic. nr Greenwood Cemetery, 8 May 1948 and 5 Sept 1948, Alfred Clebsch 196 and 29 (APSC, TENN); nr Dotsonville, 14 June 1948, Floyd Brown and Alfred Clebsch s.n. (TENN).

2. Crataegus mohri Beadei. along Spring creek, 14 Sept 1956, Floyd Brown et. al. s.n. (TENN).

3. Crataegus viridis L. n of Greenwood Cemetery, 3 May 1948, Alfred Clebsch 706 (APSC).

4. Crataegus mollis T. & G. Schelle. nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN).

3. Pyrus L.

1. Leaves lanceolate to ovate, acutely tipped----- 1. P. coronaria.

1. Leaves oblong or elliptic, round tipped--- 2. P. angustifolia.

1. Pyrus coronaria L. nr Warfield in ne corner of county, 10 Sept 1949, Floyd Brown et. al. 983 (APSC); w of Oakwood, 29 June 1948, Alfred Clebsch s.n. (TENN).

2. Pyrus angustifolia Ait. w of Woodlawn, 10 Oct 1941, R. E. Shanks 936 (TENN); nr Warfield, 9 Oct 1949, Floyd Brown s.n. (TENN); w of Oakwood, 20 June 1948, Alfred Clebsch 7614 (TENN).

4. Amelanchier Medic.

1. Leaves oblong-obovate, acute to acuminate, petals narrowly oblong to narrowly cuneate----- 1. A. arborea.

1. Leaves elliptic or elliptic-oblong, rounded to subacute, petals oblong-obovate----- 2. A. canadensis.

1. Amelanchier arborea (Michx.) Fern. King and Queen bluff, 16 Apr 1949, Floyd Brown et. al. 498 (APSC).

2. Amelanchier canadensis (L.) Medic. Red river bluff n of Clarksville, 22 Mar 1942, R. E. Shanks 1721 (TENN).

5. Spiraea L.

1. Spiraea tomentosa L. Barrens nr Woodlawn, 10 Oct 1941, R. E. Shanks et. al. 1067 (TENN).

6. Rubus L.

1. Rubus alleganiensis Porter. Billy Dunlop Memorial Park, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 125 (APSC).

7. Rosa L.

1. Styles united into a column----- 1. R. setigera.

1. Styles free and distinct.

2. Leaflets dull above.

3. Prickles hooked----- 2. R. palustris.

3. Prickles straight----- 3. R. carolina.

2. Leaflets lustrous above----- 4. R. virginiana.

1. Rosa setigera Michx. Paradise Hill rd, 5 June 1948, Alfred Clebsch 268 (APSC).

2. Rosa palustris Marsh. nr Oakwood, 11 Sept 1949, Floyd Brown and Alfred Clebsch 978 (APSC).

3. Rosa carolina L. Hughes farm 3 mi se of Clarksville, 22 May 1948, Alfred Clebsch 269 (APSC); nr Fletcher's creek, 17 Sept 1949, Floyd Brown et. al. s.n. (APSC); nr Woodlawn school, 9 Oct 1949, Alfred Clebsch 982 (APSC); w of Oakwood, 30 June 1948, Alfred Clebsch et. al. 7629 (TENN); King and Queen bluff, 15 Oct 1949, Floyd Brown 981 (APSC); nr Gum Springs church, 13 June 1966, Howard L. Yarbrough and Nancy Branson 213 (APSC).

4. Rosa virginiana Mill. 1 mi sse of Guthrie in Montgomery co, 14 May 1942, R. E. Shanks 1403 (APSC); nr Stringtown, 12 July 1949, Floyd Brown et. al. 979 (APSC).

8. Gillenia Moench.

1. Gillenia stipulata (Muhl.) Baill. King and Queen bluff, 22 May 1948, Alfred Clebsch 63 (APSC); Blue Rock Spring rd, 13 June 1966,

Howard L. Yarbrough and Nancy J. Branson 222 (APSC); nr Woodlawn, 13 Oct 1941, R. E. Shanks 1060 (TENN); nr Yellow creek, 23 May 1942, R. E. Shanks 2059 (TENN).

9. Geum L.

1. Basal leaves pinnately compound with several laciniate divisions----- 1. G. vernum.

1. Basal leaves trifoliate----- 2. G. canadense.

1. Geum vernum (Raf.) T. & G. nr stone quarry ne of Clarksville, 24 Apr 1942, R. E. Shanks 1839 (TENN).

2. Geum canadense Jacq. Lyle woods, 20 June 1942, R. E. Shanks 60 (TENN).

10. Fragaria L.

1. Fragaria virginiana Duchense. nr Shelton's branch $2\frac{1}{4}$ mi e of Clarksville, 9 Apr 1949, Floyd Brown and Alfred Clebsch 497 (APSC).

11. Agrimonia L.

1. Agrimonia rostella Wallr. King and Queen bluff, 29 July 1946, Alfred Clebsch s.n. (TENN).

12. Potentilla L.

1. Flowers solitary----- 1. P. canadensis.

1. Flowers not solitary.

2. Leaves 3-foliate----- 2. P. norvegica.

2. Leaves with 5-7 leaflets----- 3. P. recta.

1. Potentilla canadensis L. $2\frac{1}{2}$ mi ese of Clarksville in low field, 24 Apr 1948, Alfred Clebsch 17 (APSC); nr Red river, 30 Apr 1942, R. E. Shanks 1401 (APSC).

2. Potentilla norvegica L. nr Mark's slough, 31 July 1947, Alfred Clebsch 1066 (APSC); nr rock quarry nr Red river, 6 June 1942, Woodson Oliver 1402 (APSC, TENN).

3. Potentilla recta L. Front st in Clarksville, 11 May 1948, Alfred Clebsch 28 (APSC); Pollard place, 26 May 1946, Alfred Clebsch et. al. s.n. (TENN); $2\frac{1}{4}$ mi nw of Clarksville, 17 July 1949, Floyd Brown and Alfred Clebsch 496 (APSC); nr Porter's bluff rd on open roadside nr dense woods, 14 June 1966, Howard L. Yarbrough and Nancy J. Branson 193 (APSC).

13. Duchesnea Sm.

1. Duchesnea indica (Andre) Focke. w Commerce st in Clarksville, 22 Aug 1947, Alfred Clebsch 1065 (APSC); APNS campus, 2 Oct 1941, R. E. Shanks 924 (TENN).

83. LEGUMINOSAE

1. Trees, shrubs, or woody vines.

2. Flowers greenish yellow----- 1. Gleditsia.

2. Flowers pink, blue, or white.

3. Flowers pink----- 2. Cercis.

3. Flowers blue or white.

4. Flowers blue----- 3. Amorpha.

4. Flowers white----- 4. Robinia.
1. Herbaceous plants, or woody only at the base.
6. Leaves pinnately compound with more than three leaflets, or leaves bipinnately compound.
7. Leaves bipinnately compound----- 5. Desmanthus.
7. Leaves once-pinnately compound with more than three leaflets.
8. Leaves odd-pinnate.
9. Calyx tube hemispheric----- 6. Tephrosia.
9. Calyx tube campanulate to cylindric-----
----- 7. Astragalus.
8. Leaves even-pinnate.
10. Terminal leaflet modified into a tendril-----
----- 8. Vicia.
10. Terminal leaflet not conspicuously different from the others----- 9. Apios.
6. Leaves trifoliate.
11. Stamens distinct----- 10. Baptista.
11. Stamens not distinct, united.
12. Stamens monadelphous----- 11. Stylosanthes.
12. Stamens diadelphous.
13. Fruit a loment.
14. Leaflets stipellate----- 12. Desmodium.
14. Leaflets not stipellate----- 13. Lespedeza.
13. Fruit not a loment.

15. Foliage glandular dotted.

16. Leaflets serrulate.

17. Inflorescence capitate----- 15. Trifolium.

17. Inflorescence racemose.

18. Pod straight----- 16. Melilotus.

18. Pod curved or coiled--- 17. Medicago.

16. Leaflets entire.

19. Calyx with 5 lobes----- 18. Rhynchosia.

19. Calyx with 4 lobes---- 19. Strophostyles.

1. Gleditsia L.

1. Gleditsia tricanthos L. Brown farm nr Lock B, 11 Aug 1956, Floyd Brown 20595 (APSC); Long pond nr Dotsonville, 28 June 1958, Floyd Brown 3544 (APSC); nr Lock B, 29 June 1958, Floyd Brown 3544 (APSC).

2. Cercis L.

1. Cercis canadensis L. nr mouth of Red river 1 mi n of Clarksville, 4 May 1948, Ellen Hutchison 304 (APSC); 1627 Eastern Hills, 1 Apr 1966, Nancy J. Branson and Howard L. Yarbrough 109 (APSC); nr rock quarry on Hwy 76, 23 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 110 (APSC); nr Lock B, 29 June 1958, Floyd Brown 3526 (TENN); nr Dotsonville, 28 June 1958, Floyd Brown 3526 (TENN).

3. Amorpha L.

1. Amorpha fruticosa L. King and Queen bluff, 22 May 1948, Alfred Clebsch 6722 (APSC).

4. Robinia L.

1. Robinia pseudo-acacia L. nr Dotsonville, 28 June 1958, Floyd Brown 3733 (TENN); Cumberland Heights on lawn, 24 June 1966, Howard L. Yarbrough 269 (APSC).

5. Desmanthus Willd.

1. Desmanthus illinoensis (Michx.) MacM. nr country club 2 mi e of Clarksville, 6 Sept 1948, Alfred Clebsch et. al. 197 (APSC).

6. Tephrosia Pers.

1. Tephrosia virginiana (L.) Pers. King and Queen bluff, 18 May 1946, Alfred Clebsch et. al. 3718 (TENN); dry ridge above Yellow creek, 22 June 1966, Howard L. Yarbrough 178 (APSC); King and Queen bluff, 11 June 1949, Floyd Brown 503 (APSC).

7. Astragalus L.

1. Astragalus canadensis L. Lynnwood's landing, 17 July 1949, Floyd Brown et. al. 504 (APSC).

8. Vicia L.

1. Vicia angustifolia Roth. nr Palmyra, 13 May 1942, R. E. Shanks 1437 (APSC); w end of King and Queen bluff, 17 Apr 1949, Alfred Clebsch 711 (APSC).

2. Vicia micrantha Nutt. King and Queen bluff, 17 Apr 1949, anon s.n. (TENN).

3. Vicia caroliniana Walt. Hadley farm, 17 Apr 1948, Alfred Clebsch 270 (APSC); Shelton's branch, 2 Apr 1949, Alfred Clebsch 710

(APSC); nr Yellow creek, 23 May 1942, R. E. Shanks 1436 (APSC).

4. Vicia dasycarpa Ten. nr Yellow creek, 22 June 1966, Howard L. Yarbrough et. al. 88 (APSC).

9. Apios Medic.

1. Apios americana Medic. w of Oakwood, 20 June 1948, Alfred Clebsch and Edward Clebsch 7618 (TENN).

10. Baptista Vent.

1. Baptista leucantha T. & G. nr Oakwood, 18 June 1949, Floyd Brown and Alfred Clebsch 501 (APSC).

11. Stylosanthes Sw.

1. Stylosanthes biflora L. nr Woodlawn, 25 June 1944, R. E. Shanks 2783 (TENN).

2. Stylosanthes riparia Kearney. nr New Providence, 28 June 1942, Woodson Oliver 73 (TENN); King and Queen bluff, 30 May 1946, Alfred Clebsch and Edward Clebsch 3802 (TENN).

12. Desmodium Desv.

1. Desmodium pauciflorum (Nutt.) DC. Shelton's branch 2 mi e of Clarksville, 25 July 1948, Alfred Clebsch 152 (APSC); nr Heitt's garden, 1 Sept 1947, Alfred Clebsch 1073 (APSC).

13. Lespedeza Michx.

1. Lespedeza repens (L.) Bart. along Fletcher's creek, 9 Oct 1941, R. E. Shanks et. al. 1429 (APSC).

2. Lespedeza violacea (L.) Pers. nr Oak Ridge, 23 May 1942, R. E. Shanks 1430 (APSC); 3 mi s of Clarksville, 5 Sept 1949, Alfred Clebsch 507 (APSC).

14. Psoralea L.

1. Psoralea psoraloides (Walt.) Cory. King and Queen bluff, 27 Apr 1946, Alfred Clebsch 3703 (APSC, TENN).

15. Trifolium L.

1. Trifolium arvense L. Boy Scout camp, 27 May 1948, Alfred Clebsch 65 (APSC).

2. Trifolium incarnatum L. Peacher Mill rd along side of rd, 5 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 124 (APSC); nr Oak Ridge, 23 May 1942, R. E. Shanks 1417 (APSC).

3. Trifolium pratense L. n of Greenwood Cemetery, 18 July 1949, Alfred Clebsch 502 (APSC); nr entrance to Boy Scout camp, 20 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 191 (APSC).

4. Trifolium repens L. Lyle woods, 7 May 1942, R. E. Shanks 1939 (TENN); nr mouth of Red river 1 mi below Clarksville, 25 Sept 1948, Alfred Clebsch 201 (APSC).

5. Trifolium hybridum L. Lyle woods, 7 May 1942, R. E. Shanks 1418 (APSC).

6. Trifolium procumbens L. nr city cemetery, 4 May 1948, Ellen Hutchison 305 (APSC); Lyle woods, 7 May 42, R. E. Shanks 1415 (APSC); nr Billy Dunlop Memorial Park, 2 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 183 (APSC); nr Red river nr New Providence, 30 Apr

1942, R. E. Shanks 1416 (TENN).

16. Melilotus Mill.

1. Melilotus officinalis (L.) Lam. Paradise Hill rd, 16 May 1948, Alfred Clebsch 64 (APSC); nr Woodlawn, 17 June 1966, Howard L. Yarbrough and Nancy J. Branson 90 (APSC); 1 mi from Baggett store on Marion rd, 13 June 1966, Howard L. Yarbrough et. al. 215 (APSC); APNS campus, 15 May 1942, R. E. Shanks 2018 (TENN).

2. Melilotus alba Desv. Woodlawn in fence row, 17 June 1966, Howard L. Yarbrough and Nancy J. Branson 91 (APSC).

17. Medicago Medick.

1. Medicago sativa L. nr Paradise Hill rd, 24 July 1948, Alfred Clebsch 154 (APSC); Lyle woods, 20 June 1942, Woodson Oliver 1414 (APSC).

18. Rhynchosia Lour.

1. Rhynchosia tomentosa (L.) H. & A. Rocky slope nr New Providence, 28 June 1942, Woodson Oliver 1439 (APSC).

19. Strophostyles Ell.

1. Strophostyles helvola (L.) Ell. rd into Fort Campbell from Oakwood, 17 Sept 1949, Floyd Brown and Alfred Clebsch 512 (APSC).

84. LINACEAE

1. Linum L.

1. Linum medium (Planch.) Britt. nr Woodlawn, 25 June 1944,

R. E. Shanks 1451 and 2778 (APSC, TENN); King and Queen bluff, 30 May 1946, Alfred Clebsch et. al. 3945 (TENN); King and Queen bluff, 24 July 1948, Alfred Clebsch 714 (APSC); nr Woodlawn, 12 Aug 1948, Alfred Clebsch et. al. 1078 (APSC).

85. OXALIDACEAE

1. Oxalis L.

1. Leaves basal, flowers rose purple----- 1. O. violacea.

1. Leaves alternate, flowers yellow.

2. Flowers 5-10 mm. long----- 2. O. stricta.

2. Flowers 14-18 mm. long----- 3. O. grandis.

1. Oxalis violacea L. King and Queen bluff, 17 Apr 1949, Alfred Clebsch 513 (APSC); nr Yellow creek, 20 May 1934, E. B. Harger 7835 (TENN); Cumberland river valley, 17 Apr 1954, E. Quarterman et. al. 5294 (VAND).

2. Oxalis stricta L. nr city cemetery, 4 May 1948, E. Hutchison 307 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1446 (APSC); Porter's bluff, 27 Apr 1942, R. E. Shanks 1449 (APSC); Billy Dunlop Memorial Park, 5 May 1966, Howard L. Yarbrough et. al. 186 (APSC).

3. Oxalis grandis Small. nr Shelton's branch, 25 Apr 1948, Alfred Clebsch 19 (APSC); Yellow creek bank, 30 Apr 1944, R. E. Shanks 1450 (APSC).

86. GERANIACEAE

Geranium L.

1. Petals 12-25 mm. long, rose purple----- 1. G. maculatum.

1. Petals about 1 mm. long, pink----- 2. G. carolinianum.

1. Geranium maculatum L. Cunningham lake, 1 May 1948, Alfred Clebsch 18 (APSC); 2½ mi n of Clarksville, 4 June 1949, Floyd Brown et. al. 713 (APSC); Porter's bluff, 23 May 1942, R. E. Shanks 1443 (APSC).

2. Geranium carolinianum L. APSC campus, 28 May 1942, Woodson Oliver 1 (TENN); nr city cemetery, 4 May 1948, E. Hutchison 306 (APSC); APNS campus, 29 Apr 1942, R. E. Shanks 1445 (APSC).

88. RUTACEAE

1. Ptelea L.

1. Ptelea trifoliata L. Lynnwood's landing, 9 June 1948, Alfred Clebsch 273 (APSC); nr Yellow creek, 21 Aug 1949, Alfred Clebsch et. al. 517 (APSC); nr Palmyra, 14 May 1942, R. E. Shanks 1453 (APSC).

89. SIMAROUBACEAE

1. Ailanthus Desf.

1. Ailanthus altissima Swingle. APNS campus, 10 Oct 1941, D. Eakin 1026 (TENN).

91. POLYGALACEAE

1. Polygala L.

1. Corolla three times as long as the inner two sepals-----
----- 1. P. incarnata.

1. Corolla only equal to or less than the length of the inner two sepals.

2. Plants annual from a small taproot.

3. Leaves whorled----- 2. P. verticillata.

3. Leaves alternate----- 3. P. sanguinea.

2. Plants perennial with several stems arising from the same base----- 4. P. senega.

1. Polygala incarnata L. nr Oakwood, 19 Aug 1951, Alfred Clebsch 16315 (TENN); same location, 20 June 1948, Alfred Clebsch et. al. 7623 (TENN).

2. Polygala verticillata L. $7\frac{1}{2}$ mi se of Clarksville, 9 July 1949, Floyd Brown et. al. 518 (APSC); nr Woodlawn, 3 July 1943, R. E. Shanks 1454 (APSC); same location, 25 June 1944, R. E. Shanks 1455 (APSC); woods $9\frac{1}{4}$ mi e of Clarksville, 10 Aug 1952, A. D. Heuser 518 (TENN); w of Oakwood, 20 June 1948, Alfred Clebsch et. al. 7626b (TENN).

3. Polygala sanguinea L. Central ave, 17 July 1948, Alfred Clebsch 101 (APSC); nr Sango $7\frac{1}{2}$ mi e by s of Clarksville, 30 July 1949, Floyd Brown et. al. 992 (APSC); nr Oakwood 13 mi w of Clarksville, 18 June 1949, Floyd Brown and Alfred Clebsch 519 (APSC).

4. Polygala senega L. nr Boy Scout camp, 27 May 1948, Alfred Clebsch 68 (APSC); nr Heitt's garden, 22 July 1947, Alfred Clebsch 1080 (APSC); nr Yellow creek, 23 May 1942, R. E. Shanks 2053 (TENN).

92. EUPHORBIACEAE

1. Juice milky----- 1. Euphorbia.
1. Juice not milky.
2. Plants with stellate or branched pubescence----- 2. Croton.
2. Plants with simple pubescence, or plants glabrous.
3. Flowers 3 or less in each axil, leaves toothed-----
- 3. Phyllanthus.
3. Flowers many in axillary or terminal spikes, racemes,
or panicles----- 4. Acalypha.
1. Euphorbia L.
1. Petals absent.
2. Cauline leaves linear to ovate----- 1. E. dentata.
2. Cauline leaves oblanceolate to obovate--- 2. E. commutata.
1. Petals present.
3. Leaves alternate----- 3. E. corollata.
3. Leaves opposite.
4. Leaves 1-3.5 cm. long----- 4. E. supina.
4. Leaves 5-15 mm. long----- 5. E. maculata.

1. Euphorbia dentata Michx. location not given, 7 Oct 1941,
Lloyd Denning s.n. (TENN).
2. Euphorbia commutata Engelm. Bluff $2\frac{1}{4}$ mi wnw of Clarksville,
30 Apr 1949, Alfred Clebsch 522 (APSC); nr Houston co line, 13 Mar
1949, H. C. Phillips et. al. 991 (APSC); nr New Providence, 30 Apr
1942, R. E. Shanks et. al. 1866 (TENN).

3. Euphorbia corollata L. nr Palmyra, 1 Aug 1942, Woodson Oliver 91 (APSC, TENN); $3\frac{1}{2}$ mi se of Clarksville, 23 May 1948, Alfred Clebsch 69 (APSC); nr Mark's slough, 23 Sept 1949, Alfred Clebsch 721 (APSC); along Budd's creek, 1 Aug 1942, Woodson Oliver 100 (TENN); King and Queen bluff, 18 May 1946, Alfred Clebsch et. al. s.n. (TENN); nr Yellow creek, 22 June 1966, Howard L. Yarbrough et. al. 181 (APSC).

4. Euphorbia supina Raf. APSC campus, 17 Sept 1943, R. E. Shanks 2327 (TENN); King and Queen bluff, 27 July 1946, Alfred Clebsch and Edward Clebsch s.n. (TENN); Mark's slough, 23 Sept 1949, Alfred Clebsch 718 (APSC).

1. Euphorbia maculata L. nr mouth of Red river, 25 Sept 1948, Alfred Clebsch 210 (APSC); nr Mark's slough, 23 Sept 1949, Alfred Clebsch 720 (APSC); nr Greenwood Cemetery, 25 Oct 1947, Alfred Clebsch 1087 (APSC); King and Queen bluff, 24 Aug 1947, Alfred Clebsch 1088 (APSC); APNS campus, 30 Sept 1941, D. Eakin 146 (APSC).

2. Croton L.

1. Styles 3, stigmas 12-24----- 1. C. capitatus.

1. Styles 2, stigmas 4----- 2. C. monanthogynus.

1. Croton capitatus Michx. 2 mi s of Guthrie, Ky, in Mont co, 8 Oct 1949, R. E. Shanks 716 (APSC); 2 mi se of Clarksville, 15 Oct 1949, Floyd Brown and Alfred Clebsch 717 (APSC).

2. Croton monanthogynus Michx. APSC campus, 2 Oct 1941, R. E. Shanks 921 (TENN); same location, 30 Sept 1941, D. Eakin 1456 (APSC); nr Mark's slough, 23 Sept 1949, Alfred Clebsch 719 (APSC).

3. Phyllanthus L.

1. Phyllanthus caroliniensis Walt. nr mouth of Red river, 25 Sept 1948, Alfred Clebsch 206 (APSC); nr Sango, 30 July 1949, Alfred Clebsch et. al. 521 (APSC); e of Greenwood Cemetery, 25 Oct 1947, Alfred Clebsch 1081 (APSC).

4. Acalypha L.

1. Pistillate flowers in terminal spikes----- 1. A. ostryaefolia.

1. Pistillate flowers axillary.

2. Bracts 5-7 lobed----- 2. A. rhomboidea.

2. Bracts 9-15 lobed----- 3. A. virginica.

1. Acalypha ostryaefolia Riddell. APSC campus, 30 Sept 1941, D. Eakin 865 (TENN).

2. Acalypha rhomboidea Raf. APSC campus, 30 Sept 1941, D. Eakin 864 (TENN).

3. Acalypha virginica L. Barrens nr Woodlawn school, 10 Sept 1949, R. E. Shanks et. al. 14423 (TENN); same location, 30 June 1943, R. E. Shanks 2320 (TENN); King and Queen bluff, 8 Aug 1946, Alfred Clebsch s.n. (TENN).

93. CALLITRICHACEAE

1. Callitriche L.

1. Callitriche heterophylla Pursh. nr Spring creek, pond in creek bottomland, 11 Sept 1949, Alfred Clebsch et. al. 523 (APSC).

94. BUXACEAE

1. Pachysandra Michx.

1. Pachysandra procumbens Michx. nr Coke's creek, 25 Mar 1957,
Alfred Clebsch et. al. 21836 (TENN).

97. ANACARDIACEAE

1. Rhus L.

1. Leaflets 3.

2. Fruits grayish white, flowers panicled----- 1. R. radicans.

2. Fruits red, flowers on short spikes forming a panicle-----

----- 2. R. aromatica.

1. Leaflets 7-21----- 3. R. copallium.

1. Rhus radicans L. APSC campus nr greenhouse, 20 June 1966,
Howard L. Yarbrough 248 (APSC).

2. Rhus aromatica Ait. King and Queen bluff, 24 Apr 1948,
Alfred Clebsch 20 (APSC).

3. Rhus copallina L. nr Porter's bluff, 20 Sept 1941, R. E.
Shanks 842 (TENN).

99. AQUIFOLIACEAE

1. Ilex L.

1. Leaves deciduous----- 1. I. decidua.

1. Leaves evergreen----- 2. I. opaca.

1. Ilex decidua Walt. nr Greenwood Cemetery, 29 Oct 1949, Alfred Clebsch and Floyd Brown 722 (APSC, TENN); nr Oakwood nw of Clarksville, 19 Aug 1957, A. J. Sharp et. al. 16312 (TENN); 2 mi e of Clarksville, 9 Sept 1949, Alfred Clebsch 14473 (TENN).

2. Ilex opaca Ait. APSC campus nr new library, 28 June 1966, Howard L. Yarbrough 238 (APSC).

100. CELASTRACEAE

1. Euonymus L.

1. Flowers 4-merous----- 1. E. atropurpureus.

1. Flowers 5-merous.

2. Stem erect----- 2. E. americanus.

2. Stem prostrate----- 3. E. obovatus.

1. Euonymus atropurpureus Jacq. King and Queen bluff, 24 July 1948, Alfred Clebsch 146 (APSC); nr Parson's creek, 29 May 1949, Alfred Clebsch 723 (APSC); King and Queen bluff, 30 June 1946, Alfred Clebsch and Edward Clebsch s.n. (TENN).

2. Euonymus americanus L. B. A. Hughes farm, 16 May 1948, Alfred Clebsch 70 (APSC); ne of Greenwood Cemetery, 28 Aug 1948, Alfred Clebsch 212 (APSC); nr Yellow creek, 23 May 1942, R. E. Shanks 2048 (TENN).

101. STAPHYLEACEAE

1. Staphylea L.

1. Staphylea trifoliata L. Porter's bluff, 17 Apr 1942, R. E. Shanks 1815 (TENN); Lyle woods, 7 May 1942, R. E. Shanks 1946 (TENN); Porter's cave, 17 July 1948, Alfred Clebsch 102 (APSC); Shelton's branch, $2\frac{1}{4}$ mi e of Clarksville, 9 Apr 1949, Floyd Brown and Alfred Clebsch 524 (APSC).

102. ACERACEAE

1. Acer L.

1. Petals present.

2. Flowers yellow----- 1. A. platanoides.

2. Flowers red----- 2. A. rubrum.

1. Petals absent.

3. Sepals separate, leaves compound----- 3. A. negundo.

3. Sepals connate, leaves simple. Floyd Brown s.p. (TENN).

4. Pedicels scarcely exerted, very short-----

----- 4. A. saccharinum.

4. Pedicels elongated. Shanks 2945 (TENN).

5. Bark deeply furrowed, leaves yellowish-green

ventrally----- 5. A. nigrum.

5. Bark not deeply furrowed, leaves not yellowish----

----- 6. A. saccharum.

1. Acer platanoides L. APSC campus, 30 June 1966, Howard L. Yarbrough 250 (APSC).

2. Acer rubrum L. Boy scout camp, 11 Oct 1941, R. E. Shanks

1469 (APSC); nr Woodlawn, 12 Apr 1942, R. E. Shanks 1470 (APSC); Oak Plains in woodlot on Baggett farm, 23 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 103 (APSC); nr Sango school, 21 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 118 (APSC); nr Lock C, 29 June 1948, Floyd Brown s.n. (TENN); sw of Woodlawn, 10 Oct 1941, R. E. Shanks 940 (TENN).

3. Acer negundo L. Richardson st in Clarksville, 2 Apr 1949, Alfred Clebsch 525 (APC); nr Mark's slough, 23 Sept 1949, Alfred Clebsch 724 (APSC); Brown farm nr Southside, 11 Aug 1956, Floyd Brown 20597 (TENN); nr Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); Lyle farm, 16 Apr 1948, R. E. Shanks 1803 (TENN).

4. Acer saccharinum L. APNS campus, 10 Oct 1941, R. E. Shanks 1040 (TENN); Neblitt's slough nr Lock B, 29 June 1958, Floyd Brown s.n. (TENN); nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN).

5. Acer nigrum Michx. Porter's bluff e of Clarksville, 9 May 1942, R. E. Shanks 1476 (APSC); nr Foster's cave, 19 Aug 1951 (TENN); Porter's bluff, 28 Sept 1943, R. E. Shanks 2348 (TENN).

6. Acer saccharum Marsh. Along Red river nr quarry ne of Clarksville, 24 Apr 1942, R. E. Shanks 1473 (APSC); APSC campus, 10 Oct 1941, R. E. Shanks 1475 (APSC); Mericourt park, 17 July 1948, Alfred Clebsch 103 (APSC); nr old bridge at Port Royal, 23 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 107 (APSC).

103. HIPPOCASTANACEAE

1. Aesculus L.

1. Aesculus glabra Willd. nr mouth of Spring creek, 10 Apr 1948, Alfred Clebsch 21 (APSC); nr Asbury church, 30 Apr 1942, R. E. Shanks 1909 (TENN); nr Palmyra, 14 May 1942, R. E. Shanks 1988 (TENN); nr Walnut Grove, 12 Apr 1942, R. E. Shanks 1775 (TENN).

105. BALSAMENACEAE

1. Impatiens L.

1. Flowers orange-yellow with brown spots----- 1. I. capensis.

1. Flowers pale yellow with red spots----- 2. I. pallida.

1. Impatiens capensis Meerb. Robins swamp nr Cumberland $4\frac{1}{2}$ mi se of Clarksville, 6 Sept 1948, Alfred Clebsch 205 (APSC); nr Yellow creek, 22 June 1966, Howard L. Yarbrough 159 (APSC); Porter's bluff, 28 June 1942, Woodson Oliver 82 (TENN).

2. Impatiens pallida Nutt. Porter's cave $1\frac{1}{2}$ mi e of Clarksville, 14 July 1948, Alfred Clebsch et. al. 100 (APSC); nr Porter's bluff e of Clarksville, 28 June 1942, Woodson Oliver 1452 (APSC).

106. RHAMNACEAE

1. Leaves 3-nerved, flowers white----- 1. Ceanothus.

1. Leaves not 3-nerved, flowers green or greenish white-----

----- 2. Rhamnus.

1. Ceanothus L.

1. Ceanothus americanus L. nr Rossvie, 13 June 1942, Woodson

Oliver 1477 (APSC); opposite Woodlawn school, 9 Oct 1949, R. E. Shanks et. al. 725 (APSC); barrens nr Woodlawn, 31 July 1943, R. E. Shanks 2318 (TENN); King and Queen bluff, 18 May 1946, Alfred Clebsch et. al. s.n. (TENN); e of Oakwood, 20 June 1948, Alfred Clebsch 7621 (TENN); nr Woodlawn school, 9 Oct 1949, Alfred Clebsch et. al. 14422 (TENN); Blue Rock Spring rd nr Marion, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 98 (APSC).

2. Rhamnus L.

1. Rhamnus caroliniana Walt. Cumberland river valley, 17 Apr 1954, E. Quarterman 5290 (VAND); woods 3 mi s of Clarksville, 1 Aug 1948, Alfred Clebsch 144 (APSC); Trice's landing, 3 June 1948, Ellen Hutchison 308 (APSC); King and Queen bluff, 24 Aug 1947, Alfred Clebsch 1089 (APSC).

107. VITACEAE

1. Leaves simple.

2. Calyx present, 4-lobed----- 1. Ampelopsis.
 2. Calyx absent----- 2. Vitis.

1. Leaves compound.

3. Leaves pinnately compound----- 1. Ampelopsis.
 3. Leaves palmately compound----- 3. Parthenocissus.

1. Ampelopsis Michx.

1. Leaves simple----- 1. A. cordata.
 1. Leaves compound----- 2. A. arborea.

1. Ampelopsis cordata Michx. Bluffs along Cumberland river, 9 Oct 1941, R. E. Shanks and D. Eakin 997 (APSC).

2. Ampelopsis arborea (L.) Koehne. West Fork creek, 16 Sept 1948, Alfred Clebsch 213 (APSC).

2. Vitis L.

1. Vitis aestivalis Michx. Blue Rock Spring rd nr Gum Spring church, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 99 (APSC).

3. Parthenocissus Planch.

1. Parthenocissus quinquefolia (L.) Planch. nr Mark's slough, 6 Sept 1948, Alfred Clebsch 214 (APSC).

108. TILIACEAE

1. Tilia L.

1. Ventral leaf surfaces glabrous----- 1. T. americana.

1. Ventral leaf surfaces stellately pubescent-----

----- 2. T. heterophylla.

1. Tilia americana L. APNS campus, 22 May 1942, R. E. Shanks 1480 (APSC); nr Mericourt Park, 7 June 1948, Alfred Clebsch 71 (APSC).

2. Tilia heterophylla Vent. 3 mi sse of Clarksville, 1 Aug 1948, Alfred Clebsch 43 (APSC); King and Queen bluff, 24 Aug 1947, Alfred Clebsch 6986 (TENN); Red river bluff 2 mi e of Clarksville, 2 June 1956, A. Canton s.n. (TENN); nr Porter's bluff, 21 May 1942, Alfred

109. MALVACEAE

1. Petals yellow----- 1. Sidia.

1. Petals pink, varying to white----- 2. Hibiscus.

1. Sidia L.

1. Sidia spinosa L. Cumberland river bank nr Clarksville, 4 Sept 1948, Alfred Clebsch 215 (APSC); location not given, 14 Oct 1941, R. E. Shanks 1108 (TENN); APSC campus, 17 Aug 1943, R. E. Shanks 2323 (TENN).

2. Hibiscus L.

1. Hibiscus moscheutos L. $1\frac{1}{2}$ mi wnw of Clarksville at edge of swamp on L & N right of way, 1 Oct 1949, Alfred Clebsch et. al. 727 (TENN).

111. GUTTIFERAE

1. Flowers 4-merous----- 1. Ascyrum.

1. Flowers 5-merous----- 2. Hypericum.

1. Ascyrum L.

1. Ascyrum hypericoides L. Pond w of Dotsonville rd on Dover rd, 9 Oct 1949, Alfred Clebsch and R. E. Shanks 11435 (APSC, TENN); w of Oakwood, 20 June 1948, Alfred Clebsch et. al. 7630 (APSC, TENN); w of Ringgold, 10 June 1941, R. E. Shanks 960 (TENN).

2. Hypericum L.

1. Styles united, stigmas minute.

2. Plants herbaceous----- 1. H. sphaerocarpum.2. Plants shrubby----- 2. H. frondosum.

1. Styles separate, stigmas capitate.

3. Petals black-dotted only near the margins-----
----- 3. H. perforatum.3. Petals black-dotted copiously----- 4. H. punctatum.

1. Hypericum sphaerocarpum Michx. King and Queen bluff, 5 June 1948, Alfred Clebsch 729 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough 156 (APSC).

2. Hypericum frondosum Michx. King and Queen bluff, 5 June 1948, Alfred Clebsch 72 (APSC); nr New Providence on bluffs, 10 Oct 1943, R. E. Shanks et. al. 1483 (APSC).

3. Hypericum perforatum L. 2 $\frac{1}{4}$ mi ese of Clarksville, 12 July 1949, Alfred Clebsch 529 (APSC); nr New Providence on rocky slope, 28 June 1942, Woodson Oliver 1484 (APSC); ridge s of Clarksville, 9 Oct 1941, R. E. Shanks et. al. 1485 (APSC).

4. Hypericum punctatum Lam. Shelton's branch, 11 Oct 1947, Alfred Clebsch 1096 (APSC); nr New Providence on rocky slope, 28 June 1942, Woodson Oliver 72 (TENN).

115. VIOLACEAE

1. Sepals without posterior auricles----- 1. Hybanthus.

1. Sepals with posterior auricles----- 2. Viola.

1. Hybanthus Jacq.

1. Hybanthus concolor (T. F. Forst.) Spreng. Trahern's spring,
23 Apr 1949, Floyd Brown and Alfred Clebsch 536 (APSC); Porter's
bluff e of Clarksville, 17 Apr 1942, R. E. Shanks 1494 (APSC, TENN).

2. Viola L.

1. Flowers yellow, white, or bluish-white.

2. Flowers rich yellow----- 1. V. pensylvanica.

2. Flowers white or bluish white.

3. Flowers creamy to white----- 2. V. striata.

3. Flowers bluish white, purple outside-----

----- 3. V. rafinesquii.

1. Flowers blue, violet, lavender, or purple, white if present
found only in the center.

4. Flowers with a broad white center.

5. Leaves not lobed, merely serrate or entire-----

----- 4. V. papilionacea.

5. Leaves lobed or deeply incised.

6. Leaves incised near the base, stem glabrous-----

----- 5. V. sagittata.

6. Leaves deeply lobed, usually 3, stem densely

villous----- 6. V. triloba.

4. Flowers without a white center, or only sparsely white, not
broad in proportion to the size of the petals.

7. Stamens extending well beyond the petals, cleistogamous
flowers absent----- 7. V. pedata.

7. Stamens not protruding beyond the petals, cleistogamous
flowers present.

8. Leaves lobed or incised.

9. Leaves incised or toothed at the base-----

----- 8. V. emarginata.

9. Leaves deeply lobed----- 9. V. lovelliana.

8. Leaves uncut, merely serrate or crenate.

10. Cleistogamous flower peduncles prostrate.

11. Plants glabrous----- 10. V. missouriensis.

11. Plants pubescent.

12. Leaves villous primarily above-----

----- 11. V. sororia.

12. Leaves villous primarily beneath-----

----- 12. V. hersutula.

10. Cleistogamous flower peduncles ascending or

upright----- 13. V. cucullata.

1. Viola pensylvanica Michx. nr mouth of Spring creek, 10 Apr
1948, Alfred Clebsch 275 (APSC); s of Greenwood Cemetery, 24 Mar
1942, R. E. Shanks 1492 (APSC); 1627 Eastern Hills, 20 Apr 1966,
Howard L. Yarbrough 149 (APSC).

2. Viola striata Ait. 6 mi nnw of Clarksville, 17 Apr 1948,
Alfred Clebsch 104 (APSC); Shelton's branch, 25 Apr 1948, Alfred

Clebsch 105 (APSC); $4\frac{1}{4}$ mi ese of Clarksville, 14 May 1949, Floyd Brown et. al. 734 (APSC).

3. Viola rafinesquii Greene. nr Lyle woods, 24 Mar 1942, R. E. Shanks 1493 (APSC); Budd's creek, 3 Mar 1946, Alfred Clebsch et. al. 5274 (TENN).

4. Viola papilionacea Pursh. McAdoo creek 5 mi e of Clarksville, 15 Apr 1966, Howard L. Yarbrough 143 (APSC); nr Oak Plains, 23 Mar 1966, Howard L. Yarbrough and Nancy J. Branson 131 (APSC).

5. Viola sagittata Ait. Roadside nr Oakwood, 30 Apr 1942, R. E. Shanks 1491 (APSC).

6. Viola triloba Schwein. nr Red river, 30 Apr 1942, R. E. Shanks 1489 (APSC); bluffs s of Clarksville, 14 Apr 1942, R. E. Shanks 1487 (APSC); King and Queen bluff, 17 Apr 1949, Alfred Clebsch 534 (APSC); Lyle woods, 15 Apr 1942, R. E. Shanks 1488 (APSC); Antioch creek bottomland, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 135 (APSC); e of Shiloh, 23 May 1942, R. E. Shanks 2074 (TENN); nr Oakwood, 30 Apr 1942, R. E. Shanks 1904 (TENN).

7. Viola pedata L. King and Queen bluff, 17 Apr 1949, Alfred Clebsch 533 (APSC); same location, 23 Mar 1946, Alfred Clebsch 5274 (TENN); same location, 30 Mar 1946, Alfred Clebsch 2923 (TENN); same location, 25 Mar 1966, Howard L. Yarbrough 123 (APSC).

8. Viola emarginata Nutt. nr Red river, 30 Apr 1942, R. E. Shanks 1873 (TENN); nr Oakwood, 30 Apr 1942, R. E. Shanks 1908 (TENN).

9. Viola lovelliana Brainerd. Lyle woods, 15 Apr 1942, R. E. Shanks 1787 (TENN).

10. Viola missouriensis Greene. location not given, 13 Apr 1946, Alfred Clebsch et. al. 5274 (TENN).

11. Viola sororia Willd. McAdoo creek, 20 Mar 1949, H. C. Phillips et. al. 535 (APSC); w of Oakwood, 24 June 1950 (?), A. Canton 5374 (TENN); Cunningham lake, 1 Apr 1942, R. E. Shanks 1747 (TENN).

12. Viola hirsutula Brainerd. Shelton's branch, 13 Apr 1946, Alfred Clebsch 5274 (TENN); e of Shiloh, 23 May 1942, R. E. Shanks 2075 (TENN).

13. Viola cucullata Ait. along Parson's creek, 19 Mar 1942, R. E. Shanks 1490 (APSC); nr Antioch creek, 4 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 141 (APSC).

116. PASSIFLORACEAE

1. Passiflora L.

1. Flowers greenish yellow, 1.5-2.5 cm. broad----- 1. P. lutea.

1. Flowers nearly white with a triple purple corona, 5-8 cm.

broad----- 2. P. incarnata.

1. Passiflora lutea L. Paradise Hill rd $2\frac{1}{4}$ mi ese of Clarksville, 13 Aug 1949, Floyd Brown and Alfred Clebsch 537 (APSC).

2. Passiflora incarnata L. King and Queen bluff, 24 July 1948, Alfred Clebsch 138 (APSC); Cunningham lane in Cumberland Heights, 28 June 1966, Howard L. Yarbrough 236 (APSC); Rossvie, 13 June 1942, Woodson Oliver 42 (TENN).

118. CACTACEAE

1. Opuntia Mill.

1. Opuntia humifusa Raf. Trice's landing, 30 May 1948, H. C. Phillips and Alfred Clebsch 106 (APSC).

119. THYMELAEACEAE

1. Dirca L.

1. Dirca palustris L. Scout camp nr Peacher's Mill, 2 Apr 1943, R. E. Shanks 1753 (TENN).

122. NYSSACEAE

1. Nyssa L.

1. Nyssa sylvatica Marsh. $1\frac{1}{2}$ mi w of Oakwood, 9 Oct 1949, R. E. Shanks 745 (APSC).

125. ONAGRACEAE

1. Petals none----- 1. Ludwigia.

1. Petals present.

2. Leaves opposite----- 2. Circaea.

2. Leaves alternate.

3. Hypanthium much prolonged above the ovary-- 3. Oenothera.3. Hypanthium not prolonged above the ovary--- 4. Jussiaea.1. Ludwigia L.

1. Leaves alternate----- 1. L. alternifolia.

1. Leaves opposite----- 2. L. palustris.

1. Ludwigia alternifolia L. Barton's branch, 15 Aug 1948,
Alfred Clebsch 277 (APSC).

2. Ludwigia palustris (L.) Ell. nr mouth of Red river, 25 Sept
1948, Alfred Clebsch 218 (APSC); nr Dotsonville rd, 9 Oct 1949, R. E.
Shanks 736 (APSC).

2. Circaea L.

1. Circaea quadrisulcata (Maxim.) Franch. & Sav. var.
canadensis (L.) Hara. Trahern's spring, 14 July 1948, Alfred Clebsch
107 (APSC); same location 15 June 1947, Alfred Clebsch 106 (APSC);
Yellow creek, 22 June 1966, H. L. Yarbrough 175 (APSC).

3. Oenothera L.

1. Petals white or pink----- 1. O. speciosa.

1. Petals yellow.

2. Stamens unequal----- 2. O. fruticosa.

2. Stamens equal.

3. Flowers in a terminal raceme----- 3. O. biennis.

3. Flowers few in the axils of the upper leaves-----

----- 4. O. laciniata.

1. Oenothera speciosa Nutt. King and Queen bluff, 25 May 1966,
Howard L. Yarbrough 200 (APSC).

2. Oenothera fruticosa L. nr Woodlawn, 25 June 1944, R. E.

Shanks 1500 (APSC).

3. Oenothera biennis L. nr Woodlawn, 13 Oct 1941, D. Eakin et. al. 1497 (APSC); $3\frac{1}{2}$ mi e of Clarksville, 1 Sept 1947, Alfred Clebsch 1102 (APSC).

4. Oenothera laciniata Hill. nr Stringtown, 14 May 1942, R. E. Shanks 1499 (APSC); nr Glenwood in Clarksville, 24 Apr 1942, R. E. Shanks 1498 (APSC).

4. Jussiaea L.

1. Jussiaea decurrens (Walt.) DC. Robin's swamp nr river, 6 Sept 1948, Alfred Clebsch et. al. 737 (APSC); Cumberland river bank just below Clarksville, 4 Sept 1948, Alfred Clebsch et. al. 219 (APSC).

126. HALORAGRACEAE

1. Myriophyllum L.

1. Myriophyllum pinnatum (Walt.) BSP. Mark's slough, 6 Sept 1948, Alfred Clebsch and Edward Clebsch 220 (APSC).

128. ARALIACEAE

1. Aralia L.

1. Aralia spinosa L. APSC farm, 30 June 1966, Howard L. Yarbrough and Nancy J. Branson 201 (APSC).

129. UMBELLIFERAE

1. Inflorescence not umbellate----- 1. Eryngium.

1. Inflorescence umbellate.

2. Fruit without ribs----- 2. Sanicula.

3. Carpels with prominent secondary ribs----- 3. Daucus.

3. Carpels without secondary ribs.

4. Fruit many times as long as wide.

5. Fruit covered by soft slender hair.

6. Leaf blades 3-foliate----- 4. Cryptotaenia.

6. Leaf blades decompound----- 5. Chaerophyllum.

5. Fruit bristly or spiny----- 6. Osmorhiza.

4. Fruit less than two times as long as wide.

7. Fruit flattened dorsally----- 7. Angelica.

7. Fruit terete or flattened laterally.

8. Carpels flattened laterally----- 8. Erigenia.

8. Carpels terete or nearly so.

9. Corolla white, or greenish, or pinkish----

----- 9. Circuta.

9. Corolla yellow to greenish yellow, sometimes
purple.

10. Fruit not flattened----- 10. Thaspium.

10. Fruit flattened.

11. Central perfect flower and fruit

sessile----- 11. Zizia.

11. Central perfect flower and fruit

pediceled----- 12. Taenidia.

1. Eryngium L.

1. Eryngium prostratum Nutt. corner Hwy 76 and Dotsonville rd,
9 Oct 1949, R. E. Shanks et. al. 739 (APSC).

2. Sanicula L.

1. Sanicula gregarina Bickn. Shelton's branch, 15 June 1946,
Jesse Shaver 9250 (TENN); Coke's creek, 14 May 1949, Floyd Brown et.
al. 740 (APSC); nr Greenwood Cemetery, 24 Apr 1948, Alfred Clebsch
741 (APSC); Shelton's spring, 31 May 1947, R. E. Shanks 1104 (APSC);
Porter's bluff, 21 May 1942, R. E. Shanks 1502 (APSC).

3. Daucus L.

1. Daucus carotina L. Cunningham lane 3 mi sw of Clarksville,
20 June 1966, Howard L. Yarbrough 216 (APSC).

4. Cryptotaenia DC.

1. Cryptotaenia canadensis (L.) DC. Red river bluff nw of rock
quarry, 6 June 1942, Woodson Oliver 1505 (APSC); Porter's bluff, 2
May 1942, R. E. Shanks 1506 (APSC); Spring creek, 4 June 1944, R. E.
Shanks 1507 (APSC).

5. Chaerophyllum L.

1. Stem densely pilose----- 1. C. tainturieri.

1. Stem glabrous----- 2. C. procumbens.

1. Chaerophyllum tainturieri Hook. Bluffs along Cumberland river
s of Clarksville, 16 Apr 1942, R. E. Shanks 1504 (APSC).

2. Chaerophyllum procumbens (L.) Crantz. Parson's creek, 2 Apr 1942, R. E. Shanks 1503 (APSC); nr Yellow creek bridge on Hwy 79 in damp bottomland, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 115 (APSC).

6. Osmorrhiza Raf.

1. Stem glabrous----- 1. O. longistylis.

1. Stem villous-pubescent----- 2. O. claytoni.

1. Osmorhiza longistylis (Torr.) DC. Trahern's spring, 9 Apr 1949, Floyd Brown and Alfred Clebsch 542 (APSC); 2 mi n of Clarksville on bluff, 4 June 1949, Floyd Brown and Alfred Clebsch 742 (APSC); Porter's bluff, 17 Apr 1942, R. E. Shanks 1814 (TENN).

2. Osmorhiza claytoni (Michx.) C. B. Clark. Red river bluff e of Clarksville, 18 Apr 1948, Alfred Clebsch 32 (APSC); nr Yellow creek, 22 June 1966, Howard L. Yarbrough 157 (APSC).

7. Angelica L.

1. Angelica venenosa (Greenway) Fern. Woodlawn, 25 June 1944, R. E. Shanks 1508 (APSC).

8. Erigenia Nutt.

1. Erigenia bulbosa Nutt. nr mouth of Spring creek, 10 Apr 1948, Alfred Clebsch 33 (APSC); Shelton's branch, 20 Feb 1949, Alfred Clebsch et. al. 543 (APSC); 5 mi e of Clarksville, 25 Mar 1966, Howard L. Yarbrough 141 (APSC).

9. Cicuta L.

1. Cicuta maculata L. Woodlawn, 25 June 1944, R. E. Shanks 1512 (APSC); nr Oakwood on banks of shallow creek, 18 June 1949, Floyd Brown and Alfred Clebsch 544 (APSC).

10. Thaspium Nutt.

1. Terminal leaf-segments ovate to lanceolate--- 1. T. barbinode.
 1. Terminal leaf-segments linear or oblong--- 2. T. pinnatifidum.
 1. Thaspium barbinode (Michx.) Nutt. Porter's bluff e of Clarksville, 4 Sept 1942, R. E. Shanks 1509 (APSC).
 2. Thaspium pinnatifidum (Buckl.) Gray. nr Lynnwood's landing, 9 June 1948, Alfred Clebsch 74 (APSC); 1½ mi wnw of Clarksville, 13 Sept 1947, Alfred Clebsch et. al. 1108 (APSC); nr Red river at New Providence, 13 May 1942, R. E. Shanks 1510 (APSC).

11. Zizia Koch.

11. Zizia trifoliata (Michx.) Fern. King and Queen bluff, 25 May 1966, Howard L. Yarbrough 204 (APSC).

12. Taenidio Drude.

1. Taenidio integerrima (L.) Drude. nr Boy Scout camp, 27 May 1948, Alfred Clebsch 73 (APSC); King and Queen bluff, 24 July 1948, Alfred Clebsch 141 (APSC).

130. CORNACEAE

1. Cornus L.

1. Petaliferous bracts present, conspicuous----- 1. C. florida.

1. Petaliferous bracts absent.

2. Lower leaf surfaces with appressed pubescence-----

----- 2. C. foemina.

2. Lower leaf surfaces with villosulous pubescence-----

----- 3. C. drummondii.

1. Cornus florida L. ne of Greenwood Cemetery, 17 Apr 1949, Alfred Clebsch 545 (APSC); CCC pine planting on Hwy 112 ese of Clarksville, 3 Sept 1949, Floyd Brown and Alfred Clebsch 744 (APSC); APSC campus, 28 June 1966, Howard L. Yarbrough 237 (APSC).

2. Cornus foemina Mill. Mark's slough, 15 Oct 1947, Alfred Clebsch 1111 (APSC); $3\frac{1}{2}$ mi sw of Clarksville, 5 Sept 1949, Alfred Clebsch 996 (APSC).

3. Cornus drummondii Meyer. nr Lynnwood's landing, 4 Sept 1948, Alfred Clebsch 221 (APSC); Trice's landing, 9 June 1948, Alfred Clebsch et. al. 995 (APSC); $1\frac{1}{2}$ mi wnw of Clarksville, 13 Sept 1947, Alfred Clebsch et. al. 1109 (APSC).

133. ERICACEAE

1. Flowers in a short raceme or solitary, shrub to 5 mm.-----

----- 1. Vaccinium.

1. Flowers in several enlongate racemes forming a panicle, tree to 20 mm.-----

----- 2. Oxydendron.

1. Vaccinium L.

1. Vaccinium arboreum Marsh. Cumberland river bluff, 23 May 1948, Alfred Clebsch 75 (APSC); King and Queen bluff, 24 Sept 1949, Floyd Brown and Alfred Clebsch 746 (APSC).

2. Oxydendron DC.

1. Oxydendron arboreum (L.) DC. e of Shiloh, 23 May 1942, R. E. Shanks 1516 (APSC); APSC campus, 28 June 1966, Howard L. Yarbrough 239 (APSC).

135. PRIMULACEAE

1. Leaves all basal----- 1. Dodecathion.

1. Leaves chiefly cauline.

2. Flowers white----- 2. Samolus.

2. Flowers yellow----- 3. Lysimachia.

1. Dodecathion L.

1. Connective body lanceolate----- 1. D. media.

1. Connective body ovate----- 2. D. hugeri.

1. Dodecathion media L. Foster's cave, 18 Apr 1948, Alfred Clebsch 109 (APSC); Cunningham lake, 1 May 1948, Alfred Clebsch 108 (APSC); Porter's bluff e of Clarksville, 17 Apr 1942, R. E. Shanks 1522 (APSC); King and Queen bluff, Howard L. Yarbrough 235 (APSC).

2. Dodecathion hugeri Small. Porter's bluff, 16 Apr 1942, R. E. Shanks 1820 (APSC).

2. Samolus L.

1. Samolus parviflorus Raf. nr Heitt's garden, 22 July 1947, Alfred Clebsch 1112 (APSC).

3. Lysimachia L.

1. Leaves ovate to broadly lanceolate----- 1. L. ciliata.

1. Leaves linear to narrowly lanceolate----- 2. L. lanceolata.

1. Lysimachia ciliata L. Shelton's branch, 25 June 1949, Floyd Brown et. al. 747 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough 174 (APSC).

137. SAPOTACEAE

1. Bumelia Sw.

1. Bumelia lycoides (L.) Gaertn. Long slough nr Dotsonville, 14 June 1958, Alfred Clebsch et. al. 6374 (TENN); Porter's bluff, 5 Nov 1949, Floyd Brown et. al. 749 (APSC); ne corner of county, 10 Sept 1949, Floyd Brown and Alfred Clebsch 966 (APSC); $3\frac{1}{2}$ mi e of Clarksville, Floyd Brown et. al. s.n. (APSC).

138. EBENACEAE

1. Diospyros L.

1. Diospyros virginiana L. Porter's bluff, 25 May 1944, Alfred Clebsch and R. E. Shanks 1523 (APSC); Central Ave, 16 May 1948, Alfred Clebsch 76 (APSC).

141. OLEACEAE

1. Fruit a one seeded samara, leaves compound----- 1. Fraxinus.
1. Fruit a one seeded drupe, leaves simple----- 2. Forestiera.

1. Fraxinus L.

1. Branchlets sharply 4-angled----- 1. F. quadrangulata.
1. Branchlets not sharply 4-angled.

2. Wing of the samara extending to the middle of the
body----- 2. F. pennsylvanica.

2. Wing of the samara extending about one third the length
of the body----- 3. F. americana.

1. Fraxinus quadrangulata Michx. Porter's bluff, 13 July 1958,
William H. Ellis 24560 (TENN); Big West Fork creek, 16 June 1958,
William H. Ellis 24565 (TENN); $1\frac{1}{2}$ mi wnw of Clarksville, 13 Sept
1947, Alfred Clebsch 1116 (APSC).

2. Fraxinus pennsylvanica Marsh. Spring creek, 11 Sept 1949,
Floyd Brown and Alfred Clebsch 752 (APSC); $1\frac{1}{2}$ mi wnw of Clarksville,
13 Sept 1949, Alfred Clebsch 1114 (APSC); 3 mi e of New Providence,
16 June 1958, William H. Ellis 24568 (TENN); location not given, 21
May 1942, R. E. Shanks 2035 (TENN).

3. Fraxinus americana L. Shady Grove, 3 Sept 1949, Floyd Brown
et. al. 750 (APSC); Greenwood Ave, 4 Apr 1949, Alfred Clebsch 751
(APSC); 1 mi w of Clarksville on bluff, 12 June 1958, William H. Ellis
24553 (TENN); 8 mi se of Clarksville, 17 June 1958, William H. Ellis
24574 (TENN).

2. Forestiera Poir.

1. Forestiera acuminata (Michx.) Poir. Lynnwood's landing, 30 Apr 1949, Floyd Brown et. al. 753 (APSC); 1 mi ne of Clarksville, Floyd Brown and Alfred Clebsch 755 (APSC).

142. LOGANIACEAE

1. Spigelia L.

1. Spigelia marilandica L. B. A. Hughes farm, 16 May 1948, Alfred Clebsch 34 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough 116 (APSC); Blue Rock Springs rd nr Marion, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 223 (APSC).

143. GENTIANACEAE

1. Flowers in large terminal cymes----- 1. Swertia.

1. Flowers terminal and solitary----- 2. Obolaria.

1. Swertia L.

1. Swertia carolinensis (Walt.) Ktze. nr Yellow creek, 23 May 1942, R. E. Shanks 1526 (APSC).

2. Obolaria L.

1. Obolaria virginica L. Cunningham lake, 10 Apr 1949, Alfred Clebsch et. al. 158 (APSC).

144. APOCYNACEAE

1. Leaves alternate----- 1. Amsonia.
1. Leaves opposite----- 2. Apocynum.

1. Amsonia Walt.

1. Amsonia tabernaemontana Walt. Lynnwood's landing, 4 Sept 1948, Alfred Clebsch 223 (APSC); King and Queen bluff, 23 May 1948, Alfred Clebsch 278 (APSC); nr Yellow creek, 30 Apr 1944, R. E. Shanks et. al. 1579 (APSC); Cumberland river valley, 17 Apr 1954, E. Quarterman 5293 (VAND).

2. Apocynum L.

1. Apocynum cannabinum L. Cumberland river bluff $2\frac{1}{2}$ mi w by n of Clarksville, 9 June 1948, Alfred Clebsch et. al. 279 (APSC); nr New Providence on Dover rd, 17 July 1949 (APSC); nr Hadley farm 6 mi nnw of Clarksville, 4 June 1948, Alfred Clebsch et. al. 282 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough 160 (APSC).

145. ASCLEPIADACEAE

1. Stem erect----- 1. Asclepias.
 1. Stem twining----- 2. Gonolobus.

1. Asclepias L.

1. Hoods with incurved horns present.

2. Juice not milky, corolla bright orange---- 3. A. tuberosa.

2. Juice milky, corolla white or greenish.

3. Hoods equaling the gynostegium----- 2. A. verticillata.

3. Hoods extending beyond the gynostegium-----

----- 3. A. variegata.

1. Hoods with horns absent, flowers greenish---- 4. A. hirtella.

1. Asclepias tuberosa L. e of Greenwood Cemetery, 5 Sept 1948, Alfred Clebsch 280 (APSC); King and Queen bluff, 11 June 1949, Alfred Clebsch 760 (APSC); Rossvie, 13 June 1942, Woodson Oliver 1530 (APSC); nr Woodlawn, 12 Sept 1942, R. E. Shanks 1531 (APSC); nr Marion, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 218 (APSC).

2. Asclepias verticillata L. King and Queen bluff, 24 July 1948, Alfred Clebsch 140 (APSC); nr Lock C, 22 Aug 1943, R. E. Shanks 1533 (APSC).

3. Asclepias variegata L. King and Queen bluff, 22 May 1948, Alfred Clebsch 77 (APSC); Woodlawn, 25 June 1944, R. E. Shanks 1532 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough et. al. 96 (APSC); Blue Rocks spring nr Marion, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 167 (APSC).

4. Asclepias hirtella (Pennell) Woodson. ne corner of the county, 2 July 1949, Floyd Brown et. al. 761 (APSC).

2. Gonolobus gonocarpos (Walt.) Perry. e of Greenwood Cemetery, 6 Oct 1948, Alfred Clebsch 1009 (APSC).

146. CONVULVULACEAE

1. Stigmas 1----- 1. Ipomoea.
1. Stigma 2----- 2. Convolvulus.

1. Ipomoea L.

1. Ipomoea hederacea (L.) Jacq. Garden 4 mi w of Clarksville,
23 July 1966, Howard L. Yarbrough 265 (APSC).

2. Convolvulus L.

1. Convolvulus arvensis L. $2\frac{1}{2}$ mi se of Clarksville, 1 Aug 1948,
Alfred Clebsch 139 (APSC); APNS campus, 28 May 1942, Woodson Oliver
1536 (APSC).

147. POLEMONIACEAE

1. Leaves simple and opposite----- 1. Phlox.
1. Leaves compound and alternate----- 2. Polemonium.

1. Phlox L.

1. Style not reaching the lowest anthers.

2. Corolla tube pubescent, pale reddish purple- 1. P. pilosa.

2. Corolla tube glabrous, blue-purple or white.

3. Corolla tube blue-purple-- 2. P. divaricata var.

divaricata.

3. Corolla tube white-- 3. P. divaricata var. albiflora.

1. Style extending well beyond the lowest anthers.

4. Stem with deep red or purple dots----- 4. P. maculata.

4. Stem green----- 5. P. glaberrima.

1. Phlox pilosa L. King and Queen bluff, 23 May 1948, Alfred
Clebsch 283 (APSC); Antioch creek, 15 Apr 1966, Howard L. Yarbrough

147 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough 172 (APSC).

2. Phlox divaricata var. divaricata L. Shelton's branch, 12 Mar 1949, Alfred Clebsch 764 (APSC); nr Houston co line, 13 Mar 1949, Alfred Clebsch et. al. 769 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1544 (APSC); Cunningham lake, 1 Apr 1942 (APSC); King and Queen bluff, 1 Apr 1966, Howard L. Yarbrough 126 (APSC).

3. Phlox divaricata L. var. albiflora Farw. Shelton's branch, 2 Apr 1949, Alfred Clebsch 765 (APSC); nr Hemittite section yards of L & N railroad, 14 June 1966, Howard L. Yarbrough 86 (APSC).

4. Phlox maculata L. Yellow creek, 23 July 1949, Floyd Brown et. al. 763 (APSC).

5. Phlox glaberrima L. nr Woodlawn, 18 June 1944, R. E. Shanks 1540 (APSC).

2. Polemonium L.

1. Polemonium reptans L. $7\frac{1}{2}$ mi sse of Clarksville, 5 Mar 1949, Alfred Clebsch 768 (APSC); Trahern's spring, 9 Apr 1949, Floyd Brown et. al. 769 (APSC); nr Walnut Groves, 12 Apr 1942, R. E. Shanks 1545 (APSC).

148. HYDROPHYLLACEAE

1. Ovary 2-celled, axis of the cyme unbranched----- 1. Phacelia.
1. Ovary 1-celled, axis of the cyme branched----- 2. Hydrophyllum.
1. Phacelia Juss.

1. Corolla tubular-campanulate or almost funnelform, 4-5 mm

long----- 1. P. ranunculacea.

1. Corolla almost rotate, 10-13 mm long--- 2. P. bipinnatifida.

1. Phacelia ranunculacea (Nutt.) Const. nr mouth of Spring creek, 10 Apr 1948, Alfred Clebsch 110 (APSC); Red river bluff, 23 Apr 1949, Floyd Brown et. al. 772 (APSC); Red river bluff nr stone quarry, 24 Apr 1942, R. E. Shanks 1548 (APSC).

2. Phacelia bipinnatifida Michx. $1\frac{1}{2}$ mi e of Clarksville, 18 Apr 1948, Alfred Clebsch 35 (APSC); Lyle woods s of Clarksville, 7 May 1942, R. E. Shanks 1549 (APSC); Porter's bluff, 17 Apr 1942, R. E. Shanks 1550 (APSC).

2. Hydrophyllum L.

1. Cauline leaves palmately lobed.

2. Peduncles glabrous----- 1. H. canadense.

2. Peduncles densely pubescent----- 2. H. appendiculatum.

1. Cauline leaves pinnately lobed----- 3. H. macrophyllum.

1. Hydrophyllum canadense L. Trahern's spring $1\frac{1}{2}$ mi e of Clarksville, 15 June 1947, Alfred Clebsch 1122 (APSC); 5 mi s of Clarksville, 2 June 1966, Howard L. Yarbrough 188 (APSC).

2. Hydrophyllum appendiculatum Michx. Trahern's spring, 23 Apr 1949, Floyd Brown et. al. 771 (APSC); Porter's bluff, R. E. Shanks 1546 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1547 (APSC).

3. Hydrophyllum macrophyllum Nutt. Trahern's spring, 23 Apr 1949,

149. BORAGINACEAE

1. Flowers solitary or in leafy racemes----- 1. Lithospermum.
1. Flowers in racemes or panicled cymes becoming racemes after anthesis.
 2. Corolla tubular to tubular-campanulate---- 2. Mertensia.
 2. Corolla salverform to broadly funnelform.
 3. Fruit bearing strongly hooked bristles.
 4. Corolla much longer than the calyx--- 3. Cynoglossum.
 4. Corolla little if any longer than the calyx-----
 - 4. Hackelia.
 3. Fruit never with hooked bristles----- 5. Myosotis.- 1. Lithospermum L.
 1. Corolla bright yellow----- 1. L. canescens.
 1. Corolla white, bluish-white, or yellowish-white.
 2. Corolla yellowish-white, leaves with lateral veins-----
 - 2. L. latifolium.
 2. Corolla bluish-white, leaves without lateral veins-----
 - 3. L. arvense.- 1. Lithospermum canescens (Michx.) Lehm. Foster's cave, 18 Apr 1948, Alfred Clebsch 38 (APSC).
- 2. Lithospermum latifolium Michx. nr Peacher's mill, 9 May 1948, Alfred Clebsch 78 (APSC); 2½ mi sse of Clarksville, 5 June 1949,

Alfred Clebsch 777 (APSC).

3. Lithospermum arvense L. River rd s of Clarksville, 16 Apr 1942, R. E. Shanks 1553 (APSC).

2. Mertensia Roth.

1. Mertensia virginica (L.) Pers. McA'doo creek, 20 Mar 1949, Alfred Clebsch et. al. 775 (APSC); Boy Scout camp, 2 Apr 1942, R. E. Shanks 1552 (APSC); Yellow creek, 15 Apr 1966, Howard L. Yarbrough 140 (APSC).

3. Cynglossum L.

1. Flowers dull red----- 1. C. officinale.

1. Flowers blue----- 2. C. virginianum.

1. Cynglossum officinale L. Cumberland river valley, 17 Apr 1954, E. Quarterman 5396 (VAND).

2. Cynglossum virginianum L. Cunningham lake, 1 May 1948, Alfred Clebsch 36 (APSC).

4. Hackelia Opiz.

1. Hackelia virginiana (L.) I. M. Johnston. n of Greenwood Cemetery, 28 Aug 1948, Alfred Clebsch 56 (APSC).

5. Myosotis L.

1. Myosotis macrosperma Engelm. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 37 (APSC); $2\frac{1}{2}$ mi se of Clarksville, 5 May 1947, Alfred Clebsch 1124 (APSC).

150. VERBENACEAE

1. Verbena L.

1. Corolla deep lavender or purple----- 1. V. simplex.

1. Corolla white----- 2. V. urticifolia.

1. Verbena simplex Lehm. King and Queen bluff; 22 May 1948,
Alfred Clebsch 79 (APSC); nr Palmyra, 14 May 1942, R. E. Shanks
 1556 (APSC); nr Yellow creek, 23 May 1942, R. E. Shanks 1557 (APSC);
 Murphy farm nr Woodlawn, 14 June 1966, Howard L. Yarbrough and Nancy
J. Branson 92 (APSC).

2. Verbena urticifolia L. w of Oakwood; 9 Oct 1949, Alfred
Clebsch et. al. 778 (APSC); APSC campus, 11 July 1942, Woodson
Oliver 1554 (APSC); Lyle woods s of Clarksville, 20 June 1942, Woodson
Oliver 1555 (APSC).

151. LABIATAE

1. Stamens 2.

2. Calyx regular----- 1. Monarda.

2. Calyx 2-lipped.

3. Connective of the anther enlongate----- 2. Salvia.

3. Connective of the anther short----- 3. Blephilia.

1. Stamens 4.

4. Upper lip of the calyx bearing a conspicuous crest-----

----- 4. Scutellaria.

4. Upper lip of the calyx not as above.

5. Ovary 4-lobed, or 4 united carpels----- 5. Teucrium.
5. Ovary with 4 distinct or nearly distinct carpels. Glechoma
6. Corolla distinctly 2-lipped, the upper lip concave.
7. Upper 2 stamen filaments longer than the lower 2-----
----- 6. Glechoma.
7. Upper 2 filaments shorter than the lower 2.
8. Calyx very irregular----- 7. Prunella.
8. Calyx almost regular. L. b. ciliata.
9. Inflorescence axillary. L. b. hirsuta.
10. Calyx lobes bearing stiff spines-----
----- 8. Leonurus.
10. Calyx lobes not bearing stiff spines-----
----- 9. Lamium.
9. Inflorescence terminal----- 10. Stachys.
6. Corolla nearly regular, or two lipped and the upper
lip flat.
11. Corolla nearly regular----- 11. Mentha.
11. Corolla 2-lipped.
12. Filaments curved toward the upper lip-----
----- 12. Satureja.
12. Filaments straight----- 13. Pycnanthemum.

1. Monarda L.

1. Monarda fistulosa L. Yellow creek, 22 June 1966, Howard L.

Yarborough 171 (APSC).

2. Salvia L.

1. Salvia lyrata L. Cunningham lake, 1 May 1948, Alfred Clebsch et. al. 39 (APSC); e of Greenwood Cemetery, 25 Oct 1947, Alfred Clebsch 1131 (APSC); 4 mi se of Clarksville, 1 May 1966, Howard L. Yarbrough 189 (APSC).

3. Blephilia Raf.

1. Leaves almost sessile----- 1. B. ciliata.
 1. Leaves long petioled----- 2. B. hirsuta.

1. Blephilia ciliata (L.) Benth. Boy Scout camp, 27 May 1948, Alfred Clebsch 81 (APSC); 2 mi n of Clarksville, 4 June 1949, Alfred Clebsch et. al. 788 (APSC); nr Shiloh, 23 May 1942, R. E. Shanks 1566 (APSC).

2. Blephilia hirsuta (Pursh) Benth. Lookout drive wooded area, 14 June 1966, Howard L. Yarbrough and Nancy J. Branson 197 (APSC).

4. Scutellaria L.

1. Flowers in racemes.
 2. Racemes terminal----- 1. S. elliptica.
 2. Racemes axillary----- 2. S. lateriflora.
 1. Flowers solitary.
 3. Stem densely pubescent along the entire length-----
 ----- 3. S. parvula.
 3. Stem pubescent only near the base----- 4. S. nervosa.

1. Scutellaria elliptica Muhl. 2 mi n of Clarksville, 4 June

1949, Floyd Brown and Alfred Clebsch 783 (APSC); nr Gum Springs church on Blue Rock Spring rd, 3 June 1966, Howard L. Yarbrough and Nancy J. Branson 94 (APSC); Shelton's branch, 17 June 1947, Alfred Clebsch 1130 (APSC); Porter's bluff, 6 June 1942, Woodson Oliver 1563 (APSC).

2. Scutellaria lateriflora L. Mark's slough, 6 Sept 1948, Alfred Clebsch 224 (APSC); King and Queen bluff, 18 Sept 1948, Alfred Clebsch et. al. 225 (APSC); ne corner of the county, 13 Sept 1947, Alfred Clebsch 1128 (APSC); Shelton's branch, 11 Oct 1947, Alfred Clebsch 1129 (APSC).

3. Scutellaria parvula Michx. King and Queen bluff, 22 May 1948, Alfred Clebsch 80 (APSC).

4. Scutellaria nervosa Pursh. Boy scout camp, 9 May 1948, Alfred Clebsch 285 (APSC); nr Coke's creek, 14 May 1949, Floyd Brown and Alfred Clebsch 784 (APSC).

5. Teucrium L.

1. Teucrium canadense L. nr Red river $2\frac{1}{2}$ mi e of Clarksville, 21 Aug 1948, Alfred Clebsch 136 (APSC); Oakwood, 18 June 1949, Floyd Brown and Alfred Clebsch 792 (APSC); $1\frac{1}{2}$ mi w of Clarksville, 13 Sept 1947, Alfred Clebsch 1125 (APSC); Rossvie, 13 June 1942, Woodson Oliver 1558 (APSC).

6. Glechoma L.

1. Glechoma hederacea L. nr Greenwood Cemetery, 17 Apr 1949, Alfred Clebsch 785 (APSC); Billy Dunlop Memorial Park, 2 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 184 (APSC); Yellow creek,

15 Apr 1966, Howard L. Yarbrough 246 (APSC).

7. Prunella L.

1. Prunella vulgaris L. Paradise Hill rd, 24 July 1948, Alfred Clebsch 287 (APSC).

8. Leonurus L.

1. Leonurus cardiaca L. College and First st., 23 May 1942, R. E. Shanks 1565 (APSC).

9. Lamium L.

1. Upper leaves sessile----- 1. L. amplexicaule.

1. Upper leaves petioled----- 2. L. purpureum.

1. Lamium amplexicaule L. nr Lock C, 5 Mar 1949, Alfred Clebsch 786 (APSC).

2. Lamium purpureum L. $2\frac{1}{2}$ mi e of Clarksville, 2 Apr 1949, Alfred Clebsch 787 (APSC).

10. Stachys L.

1. Stachys tenuifolia Willd. Floyd Brown farm cave nr Lock B, 15 July 1948, Alfred Clebsch 135 (APSC).

11. Mentha L.

1. Mentha piperita L. e of Greenwood Cemetery, 28 Aug 1948, Alfred Clebsch 288 (APSC).

12. Satureja L.

1. Satureja vulgaris (L.) Fritsch. 2 mi se of Clarksville, 31 Aug 1947, Alfred Clebsch 1138 (APSC).

13. Pycnanthemum Michx.

1. Pycnanthemum tenuifolium Schrad. Oakwood, 20 June 1948, Alfred Clebsch 111 (APSC).

152. SOLANACEAE

1. Plants woody----- 1. Lycium.

1. Plants herbaceous.

2. Corolla rotate or nearly so, widely spreading, fruit a

capsule----- 2. Solanum.

2. Corolla campanulate, funnellform or tubular, fruit a berry.

3. Corolla white or yellow----- 3. Physalis.

3. Corolla blue----- 4. Solanum.

1. Lycium L.

1. Lycium chinense Mill. King and Queen bluff, 24 July 1948, Alfred Clebsch 1008 (APSC).

2. Solanum L.

1. Stem glabrous----- 1. S. americanum.

1. Stem pubescent----- 2. S. carolinense.

1. Solanum americanum Mill. nr mouth of Red river, 25 Sept 1948, Alfred Clebsch 229 (APSC).

2. Solanum carolinense L. APNS campus, 28 May 1942, Woodson

Oliver 1580 (APSC); Lookout drive, 14 June 1966, Howard L. Yarbrough and Nancy J. Branson 194 (APSC).

3. Physalis L.

1. Pubescence on upper stem villous.

2. Corolla about 8 mm. long----- 1. P. missouriensis.

2. Corolla 15-20 mm. long----- 2. P. heterophylla.

1. Pubescence on upper stem of stiff hair--- 3. P. subglabrata.

1. Physalis missouriensis Mackenz. & Bush. e of Greenwood Cemetery, 25 Oct 1947, Alfred Clebsch 1144 (APSC).

2. Physalis heterophylla Nees. APNS campus, 28 May 1942, Woodson Oliver 4 (APSC).

3. Physalis subglabrata Mackenz. & Bush. e of Greenwood Cemetery, 10 Sept 1947, Alfred Clebsch 1145 (APSC).

4. Nicandra Adans.

1. Nicandra physalodes (L.) Pers. Lynnwood's landing, 4 Sept 1948, Alfred Clebsch et. al. 228 (APSC); nr Lock B, 16 Oct 1948, Alfred Clebsch 289 (APSC).

153. SCROPHULARIACEAE

1. Plants woody----- 1. Paulownia.

1. Plants herbaceous.

2. Leaves chiefly alternate or basal.

3. Corolla nearly regular----- 2. Verbascum.

3. Corolla strongly zygomorphic.
 4. Flowers solitary----- 3. Kickxia.
 4. Flowers in spikes or racemes----- 4. Pedicularis.
2. Leaves chiefly opposite or whorled.
 5. Fertile stamens 2.
 6. Leaves whorled----- 5. Veronicastrum.
 6. Leaves opposite.
 7. Stamens inserted at the orifice of the corolla-----
 - 6. Veronica.
 7. Stamens inserted near the middle of the corolla tube.
 8. Upper lip of the corolla shallowly 2-lobed-----
 - 7. Lindernia.
 8. Upper lip of the corolla united to the summit----- 8. Gratiola.
 5. Fertile stamens 4.
 9. Stamens equal----- 9. Seymeria.
 9. Stamens didynamous.
 10. Corolla yellow throughout, not just in the throat.
 11. Sepals separate----- 10. Bacopa.
 11. Sepals united into a tube.
 12. Stigma 1----- 11. Aureolaria.
 12. Stigmas 2----- 12. Dasystoma.
 10. Corolla reddish brown, white, blue, pale lavender, pink, or purple but if yellow only at the throat.

13. Corolla reddish brown, white, or blue.
 14. Corolla reddish brown----- 13. Scrophularia.
 14. Corolla white or blue.
 15. Stigma 1, capitate----- 14. Penstemon.
 15. Stigmas 2, plate-like---- 15. Mimulus.
 13. Corolla pale lavender, pink, or purple.
 16. Corolla pink or purple----- 16. Gerardia.
 16. Corolla pale lavender----- 17. Conoclea.

1. Paulownia Sieb. & Zucc.

1. Paulownia tomentosa (Thumb.) Steud. nr Greenwood cemetery, 24 Apr 1948,
 Apr 1949, Alfred Clebsch et. al. 797 (APSC).

2. Verbascum L.

1. Verbascum blattaria L. nr City cemetery, 4 May 1948, Ellen Hutchison 309 (APSC); Porter's bluff, 6 June 1942, Woodson Oliver 1581 (APSC); nr Palmyra, 14 May 1942, R. E. Shanks 1993 (TENN); APNS campus, 30 Sept 1941, D. Eakin 885 (TENN).

3. Kickxia Dumort.

1. Kickxia elatine (L.) Dumort. nr Lock B, 16 Oct 1948, Alfred Clebsch 290 (APSC).

4. Pedicularis L.

1. Pedicularis canadensis L. Cunningham lake, 1 May 1948,
Alfred Clebsch 1114 (APSC).

5. Veronicastrum Fabricius.

1. Veronicastrum virginicum (L.) Farw. $3\frac{1}{2}$ mi sw of Clarksville,
5 Sept 1949, Alfred Clebsch 800 (APSC).

6. Veronica L.

1. Alternate leaves greatly reduced----- 1. V. serpyllifolia.
1. Alternate leaves well developed.
2. Corolla white----- 2. V. peregrina.
2. Corolla blue----- 3. V. agrestis.
1. Veronica serpyllifolia L. nr Greenwood cemetery, 24 Apr 1948,
Alfred Clebsch 41 (APSC).
2. Veronica peregrina L. APNS campus, 23 Apr 1942, R. E. Shanks
1829 (TENN).
3. Veronica agrestis L. nr City cemetery, 17 May 1948, Ellen
Hutchison 311 (APSC).

7. Lindernia All.

1. Lower pedicels longer than the subtending leaves-----
----- 1. L. anagallidea.
1. Lower pedicels shorter than the subtending leaves-----
----- 2. L. dubia.
1. Lindernia anagallidea (Michx.) Pennell. nr Oakwood, 15 July
1949, Herman Silva et. al. 799 (APSC); w of Dotsonville, 9 Oct 1949,
R. E. Shanks et. al. 11450 (TENN).
2. Lindernia dubia (L.) Pennell. ne corner of county, 2 July

1949, Floyd Brown and Alfred Clebsch 798 (APSC); bluff opposite mouth of Red river, 13 Sept 1947, Alfred Clebsch and Edward Clebsch 1150 (APSC).

8. Gratiola L.

1. Gratiola neglecta Torr. Lyle woods, 7 May 1942, R. E. Shanks 1588 (APSC).

9. Seymeria Pursh.

1. Seymeria macrophylla Nutt. $3\frac{1}{4}$ mi s of Clarksville, 1 Aug 1948, Alfred Clebsch 801 (APSC); nr Porter's cave, 17 July 1948, Alfred Clebsch 113 (APSC).

10. Bacopa Aubl.

1. Stem erect, leaves serrate----- 1. B. acuminata.

1. Stem creeping, leaves entire----- 2. B. rotundifolia.

1. Bacopa acuminata (Walt.) Robins. beyond Oakwood nw of Clarksville, 19 Aug 1951, Alfred Clebsch et. al. 16305 (TENN).

2. Bacopa rotundifolia (Michx.) Wettst. between Woodlawn and Oakwood 9 mi w of Clarksville, 15 July 1949, Alfred Clebsch et. al. s.n. (APSC); Woodlawn, 18 June 1944, R. E. Shanks 1587 (APSC, TENN); location not given, 25 June 1944, R. E. Shanks 2776 (TENN).

11. Aureolaria Raf.

1. Aureolaria patula ? Red river bluff below Shelton's branch, 24 Aug 1946, R. E. Shanks 3813 (TENN).

1. Dasystoma macrophylla ? Porter's bluff, 4 Oct 1942, R. E. Shanks 2175 (TENN).

13. Scrophularia L.

1. Scrophularia marylandica L. Shelton's branch, 25 July 1948, Alfred Clebsch 133 (APSC); $2\frac{1}{2}$ mi sse of Clarksville, 31 Dec 1949, Floyd Brown and Alfred Clebsch 965 (APSC); nr Mark's slough, 15 Oct 1947, Alfred Clebsch 1146 (APSC).

14. Penstemon Mitchell.

1. Corolla white externally----- 1. P. digitalis.
 1. Corolla pale purple externally.-----
 2. Corolla 1.5-2.5 cm. long----- 2. P. laevigatus.
 2. Corolla 3.5-5 cm. long----- 3. P. grandiflorus.
1. Penstemon digitalis Nutt. Limestone ledge w of Clarksville, 19 May 1934, E. B. Harger 7508 (TENN); Yellow creek, 22 June 1966, Howard L. Yarbrough 164 (APSC).
2. Penstemon laevigatus Ait. nr Steele springs 4 mi sw of Clarksville, 20 June 1966, Howard L. Yarbrough 93 (APSC):
3. Penstemon grandiflorus Nutt. nr tunnel at Palmyra, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 211 (APSC); King and Queen bluff, 25 May 1966, Howard L. Yarbrough 205 (APSC).

15. Mimulus L.

1. Mimulus alatus Ait. Shelton's branch, 20 July 1948, Alfred

16. Gerardia L.

- 1. Corolla yellow----- 1. G. flava.
- 1. Corolla purple or pink.
- 2. Corolla pubescent within----- 2. G. purpurea.
- 2. Corolla glabrous within----- 3. G. tenuifolia.

1. Gerardia flava (L.) Wood. King and Queen bluff, 31 Aug 1946,
R. E. Shanks 3813 (TENN).

2. Gerardia purpurea L. Oakwood, 17 Sept 1949, Floyd Brown and
Alfred Clebsch 803 (TENN).

3. Gerardia tenuifolia Vahl. Barrens nr Woodlawn, 10 Sept 1949,
R. E. Shanks et. al. 14375 (TENN); King and Queen bluff 18 May 1946,
Alfred Clebsch s.n. (TENN).

17. Conobea Aubl.

- 1. Conobea multifida (Michx.) Benth. quarry nr Heitt's garden,
22 July 1947, Alfred Clebsch 11149 (APSC); Lynnwood's landing, 4 Sept
1948, Alfred Clebsch et. al. 230 (APSC); nr Woodlawn, 12 Sept 1942,
R. E. Shanks 2188 (TENN).

154. BIGNONIACEAE

- 1. Trees with white or yellowish flowers----- 1. Catalpa.
- 1. Woody vines, flowers reddish orange or yellow.
- 2. Leaves 2-foliate, flowers yellow----- 2. Bignonia.

2. Leaves pinnately compound with 5-13 leaflets, flowers reddish orange----- 3. Campsis.

1. Catalpa Scop.

1. Catalpa speciosa Warder. Crossland Ave, 3 Sept 1949, Alfred Clebsch 807 (APSC); Hwy 79 about $\frac{1}{2}$ mi w of New Providence, 9 June 1966, Howard L. Yarbrough and Nancy J. Branson 85 (APSC).

2. Bignonia L.

1. Bignonia capreolata L. Cumberland river bluff below mouth of Red river, 30 Apr 1949, Floyd Brown and Alfred Clebsch 806 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1941 (TENN).

3. Campsis Lour.

1. Campsis radicans (L.) Seem. Lyle woods s of Clarksville, 20 June 1942, Woodson Oliver 1595 (APSC, TENN); nr Dotsonville, 17 June 1966, Howard L. Yarbrough and Nancy J. Branson 89 (APSC).

156. OROBANCHACEAE

1. Stem freely branched, flowers in a panicle----- 1. Epifagus.

1. Stem unbranched, flowers in a dense spike or solitary.

2. Flower solitary----- 2. Orobanche.

2. Flowers in a dense spike----- 3. Conopholis.

1. Epifagus Nutt.

1. Epifagus virginiana (L.) Bart. Porter's bluff, 17 Mar 1942, R. E. Shanks 1713 (TENN).

1. Orobanche uniflora L. King and Queen bluff, 17 Apr 1946, Alfred Clebsch 804 (APSC); same location, 23 Mar 1946, Alfred Clebsch s.n. (TENN).

3. Conopholis Wallr.

1. Conopholis americana (L.) Wallr. nr mouth of Shelton's branch, 23 Apr 1949, Floyd Brown and Alfred Clebsch 805 (APSC).

158. ACANTHACEAE

1. Stamens 4----- 1. Ruellia.

1. Stamens 2.

2. Leaves sessile or subsessile----- 2. Justicia.

2. Leaves long petioled----- 3. Dicliptera.

1. Ruellia L.

1. Ruellia strepens L. nr Fletcher's creek w of Ringgold, 6 Oct 1941, R. E. Shanks 956 (TENN); nr Porter's bluff, 5 Sept 1942, R. E. Shanks 1596 (APSC); $3\frac{1}{2}$ mi ese of Clarksville, 16 May 1948, Alfred Clebsch 984 (APSC); bluff $3\frac{1}{4}$ mi se of Clarksville, 23 May 1948, Alfred Clebsch 998 (APSC); King and Queen bluff, 24 Aug 1947, Alfred Clebsch 999 (APSC); nr Yellow creek, 22 June 1966, Howard L. Yarbrough 180 (APSC).

2. Justicia L.

1. Justicia americana (L.) Vahl. Lynnwood's landing, 8 June 1948,

Alfred Clebsch et. al. 82 (APSC); West Fork creek, 29 May 1944, R. E. Shanks 1598 (APSC); nr Yellow creek, 22 June 1966, Howard L. Yarbrough 155 (APSC).

3. Dicliptera Juss.

1. Dicliptera brachiata (Pursh) Spreng. flood plain of Cumberland river, 20 Sept 1941, R. E. Shanks 832 (TENN).

159. PHRYMACEAE

1. Phryma L.

1. Phryma leptostachya L. barrens w of Oakwood, 9 Oct 1949, R. E. Shanks 14460 (TENN).

160. PLANTAGINACEAE

1. Plantago L.

1. Bracts and sepals densely pubescent to villous. 2. Woodson

2. Leaves linear----- 1. P. aristata.

2. Leaves oblanceolate to obovate----- 2. P. virginica.

1. Bracts and sepals glabrous. Providence, 22 June 1961, Woodson

3. Leaves narrowly lanceolate to linear, never ovate-----

----- 3. P. pusilla.

3. Leaves lanceolate to ovate.

4. Leaves lanceolate to oblanceolate, spikes 1-10 cm.

long----- 4. P. lanceolata.

4. Leaves broadly elliptic to oval, spikes up to 3 dm. long.

5. Bracts broadly ovate----- 5. P. major.
 5. Bracts triangular-lanceolate----- 6. P. rugelii.

1. Plantago aristata Michx. King and Queen bluff, 22 May 1948, Alfred Clebsch 83 (APSC); Trice's landing, 30 May 1948, Alfred Clebsch et. al. 84 (APSC); APNS campus, 11 July 1942, Woodson Oliver 1601 (APSC, TENN).

2. Plantago virginica L. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 42 (APSC); nr Red river at New Providence, 30 Apr 1942, R. E. Shanks 1603 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1942 (TENN).

3. Plantago pusilla Nutt. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 43 (APSC); nr Oakwood, 30 Apr 1942, R. E. Shanks 1604 (APSC); nr Red river at New Providence, 30 Apr 1942, R. E. Shanks 1605 (APSC).

4. Plantago lanceolata L. APNS campus, 28 May 1942, Woodson Oliver 3 (TENN); nr Marion, 13 June 1966, Howard L. Yarbrough 214 (APSC).

5. Plantago major L. nr New Providence, 28 June 1942, Woodson Oliver 1599 (APSC).

6. Plantago rugelii Deene. nr New Providence, 28 June 1942, Woodson Oliver 78 (TENN).

161. RUBIACEAE

1. Plants of a shrub or tree-like form----- 1. Cephalanthus.

1. Plants herbaceous.
2. Leaves whorled.
 3. Corolla funnelform, style 2-cleft----- 2. Sherardia.
 3. Corolla rotate, styles 2----- 3. Galium.
2. Leaves opposite.
 4. Stigmas 4----- 4. Mitchella.
 4. Stigmas 2 or 1.
 5. Stigma 1----- 5. Diodia.
 5. Stigmas 2.
 6. Flowers peduncled----- 6. Houstonia.
 6. Flowers sessile or nearly so.
 7. Hypanthium ellipsoid to obovoid----- 5. Diodia.
 7. Hypanthium turbinate to subglobose-----
 - 7. Spermacoce.

1. Cephalanthus L.

1. Cephalanthus occidentalis L. Long pond nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); Spring creek, 14 Sept 1956, Alfred Clebsch 21567 (TENN); Neblitt's slough nr Lock B, 29 June 1958, Floyd Brown s.n. (TENN).

2. Sherardia L.

1. Sherardia arvensis L. Trice's landing, 30 May 1948, Alfred Clebsch et. al. 86 (APSC, TENN).

3. Galium L.

1. Leaves 4-whorled.

2. Flowers sessile or subsessile----- 1. G. circaezans.

2. Flowers distinctly pediceled----- 2. G. pilosum.

1. Leaves 6-8 whorled.

3. Leaves 6-whorled----- 3. G. triflorum.

3. Leaves 8-whorled----- 4. G. aparine.

1. Galium circaezans Michx. King and Queen bluff, 24 July 1948, Alfred Clebsch 292 (APSC); nr Yellow creek, 23 May 1942, R. E. Shanks 1019 (APSC).

2. Galium pilosum Ait. King and Queen bluff, 24 July 1948, Alfred Clebsch 291 (APSC); Rossview, 13 June 1942, Woodson Oliver 1616 (APSC); Fletcher's creek, 10 June 1941, R. E. Shanks 974 (TENN); nr Woodlawn, 31 July 1943, R. E. Shanks 1617 (APSC).

3. Galium triflorum Michx. w of Oakwood, 10 Sept 1949, R. E. Shanks et. al. 14462 (TENN).

4. Galium aparine L. Lyle woods, 15 Apr 1942, R. E. Shanks 1615 (APSC); Billy Dunlop Memorial Park, 2 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 187 (APSC).

4. Mitchella L.

1. Mitchella repens L. Fletcher's creek, 17 Sept 1949, Floyd Brown and Alfred Clebsch 809 (APSC).

5. Diodia L.

1. Sepals 2, stigma capitate----- 1. D. teres.

1. Sepals 4, stigmas linear----- 2. D. virginiana.

1. Diodia teres Walt. King and Queen bluff, 24 July 1948, Alfred Clebsch 129 (APSC); Rossvie, 13 June 1942, Woodson Oliver 1613 (APSC, TENN); along Palmyra rd, 1 Aug 1942, Woodson Oliver 1614 (APSC, TENN).

2. Diodia virginiana L. King and Queen bluff, 10 Sept 1947, Alfred Clebsch 1161 (APSC); w of Dotsonville, 9 Oct 1949, R. E. Shanks 141444 (TENN).

6. Houstonia L.

1. Stamens extending beyond the funnelform corolla.

2. Flowers distinctly pediceled.

3. Stem leaves rounded to subcordate at the base-----

----- 1. H. purpurea.

3. Stem leaves narrowed at the base--- 2. H. tenuifolia.

2. Flowers sessile or partly so----- 3. H. angustifolia.

1. Stamens included within the salverform corolla.

4. Plants with creeping stems or rhizomes--- 4. H. caerulea.

4. Plants with erect stems----- 5. H. patens.

1. Houstonia purpurea L. Spring creek, 4 June 1944, R. E. Shanks 2753 (TENN); King and Queen bluff, 25 May 1966, Howard L. Yarbrough 203 (APSC); nr tunnel at Palmyra, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 210 (APSC).

2. Houstonia tenuifolia Nutt. King and Queen bluff, 24 July 1948,

Alfred Clebsch 130 (APSC); same location, 24 Aug 1947, Alfred Clebsch 1159 (APSC); $3\frac{1}{2}$ mi se of Clarksville, 1 Sept 1947, Alfred Clebsch 1158 (APSC).

3. Houstonia angustifolia Michx. King and Queen bluff, 27 July 1946, Alfred Clebsch et. al. s.n. (TENN).

4. Houstonia caerulea L. nr Woodlawn, 12 Apr 1942, R. E. Shanks 1607 (APSC); 6 mi nmw of Clarksville, 17 Apr 1948, Alfred Clebsch 44 (APSC).

5. Houstonia patens Ell. Sycamore creek, 31 Mar 1946, Alfred Clebsch and Edward Clebsch 3914 (TENN).

7. Spermacoce L.

1. Spermacoce glabra Michx. Cumberland river bank below Clarksville, 4 Sept 1948, Alfred Clebsch et. al. 237 (APSC); King and Queen bluff, 10 Sept 1947, Alfred Clebsch 1160 (APSC).

162. CAPRIFOLIACEAE

1. Leaves pinnately compound----- 1. Sambucus.

1. Leaves simple.

2. Corolla zygomorphic----- 2. Lonicera.

2. Corolla regular or nearly so.

3. Style none----- 3. Virburnum.

3. Style present, slender.

4. Sepals 5, distinct, enlongate----- 4. Triosteum.

4. Sepals united, calyx then 4 or 5 toothed, short-----

----- 5. Symphoricarpos.

1. Sambucus canadensis L. nr Greenwood Ave, 15 June 1948, Alfred Clebsch 116 (APSC); nr Rossvie, 13 June 1942, Woodson Oliver 46 (TENN).

2. Lonicera L.

1. Flowers paired, white or yellow with age.

2. Plants twining----- 1. L. japonica.

2. Plants upright shrubs----- 2. L. maackii.

1. Flowers whorled, bright red----- 3. L. sempervirens.

1. Lonicera japonica Thunb. nr City cemetery, 4 May 1948, Ellen Hutchison s.n. (APSC); nr Dotsonville, 28 June 1958, Floyd Brown s.n. (TENN); King and Queen bluff, 27 Apr 1946, Alfred Clebsch et. al. s.n. (TENN); nr Yellow creek, 22 June 1966, Howard L. Yarbrough 173 (APSC).

2. Lonicera maackii Maxim. nr Shelton's branch, 25 Apr 1948, Alfred Clebsch 1000 (APSC, TENN).

3. Lonicera sempervirens L. nr mouth of McAdoo creek, 9 May 1948, John Y. Hutchison 45 (APSC).

3. Virburnum L.

1. Petioles wingless, glabrous----- 1. V. prunifolium.

1. Petioles winged, red-brown tomentose----- 2. V. rufidulum.

1. Virburnum prunifolium L. nr Big Barton's creek, 20 Aug 1949, Floyd Brown 810 (APSC); King and Queen bluff, 24 July 1948, Alfred

2. Virburnum rufidulum Raf. nr Yellow creek, 30 Apr 1944, Alfred Clebsch et. al. 1620 (APSC); nr Greenwood cemetery, 14 Sept 1947, Alfred Clebsch 1162 (APSC); 3 mi w of Clarksville, 30 Apr 1949, Floyd Brown and Alfred Clebsch 811 (APSC); nr Foster's cave, 19 Aug 1951, Alfred Clebsch and A. J. Sharp 16298 (TENN).

4. Triosteum L.

1. Triosteum angustifolium L. King and Queen bluff, 13 Aug 1949, Floyd Brown and Alfred Clebsch 813 (APSC); nr Shelton's branch, 17 May 1947, Alfred Clebsch 1163 (APSC).

5. Symphoricarpos Duham.

1. Symphoricarpos orbiculatus Moench. 1 mi se of Guthrie, Ky in Mont co, 10 Aug 1949, R. E. Shanks 14342 (TENN); Floyd Brown farm nr Lock B, 11 Aug 1956, Floyd Brown 20958 (TENN); Fletcher's creek w of Ringgold, 6 Oct 1941, R. E. Shanks 977 (TENN).

164. VALERIANACEAE

1. Cauline leaves pinnately compound----- 1. Valeriana.

1. Cauline leaves simple----- 2. Valerianella.

1. Valeriana L.

1. Valeriana pauciflora Michx. Quarry nr Clarksville, 13 Apr 1946, Alfred Clebsch s.n. (TENN); Ringgold creek, 7 May 1966, Howard Yarbrough 127 (APSC).

2. Valerianella Mill.

1. Valerianella radiata (L.) Dufr. $2\frac{1}{4}$ mi wnw of Clarksville,
30 May 1948, H. C. Phillips et. al. 87 (APSC); nr mouth of Spring
creek, 11 May 1947, Alfred Clebsch et. al. 1164 (APSC); nr Red river
at New Providence, 30 Apr 1942, R. E. Shanks 1870 (TENN).

167. CAMPANULACEAE

1. Flowers regular.

2. Corolla rotate, campanulate, or funnelform--- 1. Campanula.

2. Corolla merely subrotate----- 2. Specularia.

1. Flowers irregular----- 3. Lobelia.

1. Campanula L.

1. Campanula americana L. King and Queen bluff, 24 July 1948,
Alfred Clebsch 127 (APSC); nr New Providence, 28 June 1942, Woodson
Oliver 71 (TENN).

2. Specularia Fabricius.

1. Cleistogamous flowers with 5 sepals----- 1. S. perfoliata.

1. Cleistogamous flowers with 3 or 4 sepals----- 2. S. biflora.

1. Specularia perfoliata (L.) A. DC. Boy Scout camp, 27 May 1948,
Alfred Clebsch 88 (APSC); Lyle woods, 7 May 1942, R. E. Shanks 1936
(TENN).

2. Specularia biflora (R. & P.) Fisch. & Mey. APNS campus, 28
May 1942, Woodson Oliver 1621 (APSC).

3. Lobelia L.

1. Stem glabrous except for chaffy basal hair-----

----- 1. L. appendiculata.1. Stem long hirsute or villous----- 2. L. inflata.

1. Lobelia appendiculata A. DC. $3\frac{1}{2}$ mi ese of Clarksville, 23 May 1948, Alfred Clebsch 117 (TENN); King and Queen bluff, 22 May 1948, Alfred Clebsch and Julia Clebsch 118 (TENN).

2. Lobelia inflata L. Gracey Ave, 2 Aug 1948, Alfred Clebsch 126 (APSC); barrens nr Woodlawn, 13 Oct 1941, R. E. Shanks et. al. 1065 (TENN); APSC campus, 30 Sept 1941, D. Eakin 892 (TENN).

168. COMPOSITAE

1. Ligulate flowers absent.

2. Receptacle bristly or chaffy.

3. Pappus composed of capillary bristles----- 1. Cirsium.3. Pappus composed of 2-3 enlongate awns--- 2. Parthenium.

2. Receptacle naked.

4. Some flowers or all unisexual, pistillate-----

----- 3. Antennaria.

4. All flowers perfect.

5. Pappus simple.

6. Leaves opposite or whorled----- 4. Eupatorium.6. Leaves alternate----- 5. Cacalia.5. Pappus double----- 6. Vernonia.

1. Ligulate flowers present.

7. Ligulate flowers blue, purple, pink, or white. 17. Lactuca.
8. Disk flowers absent, ligulate flowers blue--- 7. Cichorium.
8. Disk flowers present, yellow. 18. Senecio.
9. Receptacle chaffy. 19. Krigia.
10. Leaves alternate. 19. Krigia.
11. Heads large, terminal----- 8. Anthemis.
11. Heads small, inflorescence corymbiform-----
----- 9. Achillea.
10. Leaves opposite----- 10. Galinsoga.
9. Receptacle naked.
12. Pappus chaffy. 22. Silphium.
13. Leaves entire----- 11. Astranthium.
13. Leaves not entire, toothed or dissected-----
----- 12. Chrysanthemum.
12. Pappus of capillary-like bristles. 24. Veronica.
14. Heads many flowered----- 13. Erigeron.
14. Heads 12-20 flowered----- 14. Sericocarpus.
7. Ligulate flowers yellow or orange.
15. Inflorescence of ligulate flowers only, disk absent.
16. Pappus of simple bristles.
17. Achenes terete, not flattened.
18. Achenes columnar, or thickly fusiform-----
----- 15. Taraxacum.
18. Achenes oblong or linear--- 16. Pyrrhopappus.
17. Achenes strongly flattened.

19. Achenes with beaks at the summit--- 17. Lactuca.
19. Achenes without beaks at the summit-----
----- 18. Sonchus.
16. Pappus of capillary bristles and scales, or pappus
none----- 19. Kriga.
15. Inflorescence of both ligulate and disk flowers.
20. Receptacle naked.----- 20. Helenium.
21. Pappus of scales or awns----- 21. Senecio.
21. Pappus of capillary bristles----- 21. Senecio.
20. Receptacle chaffy.----- 22. Silphium.
22. Disk flowers sterile----- 22. Silphium.
22. Disk flowers fertile.
23. Leaves opposite.
24. Receptacle flattened----- 23. Coreopsis.
24. Receptacle convex----- 24. Verbesina.
23. Leaves alternate.
25. Rays neutral.
26. Anthers entire or saggitate at the base---
----- 23. Coreopsis.
26. Anthers subtruncate at the base-----
----- 25. Rudbeckia.
25. Rays pistillate----- 8. Anthemis.

1. Cirsium Mill.

1. Cirsium vulgare (Savi) Tenore. Palmyra rd nr Budd's creek, 1

2. Parthenium L.

1. Parthenium integrifolium L. barrens nr Woodlawn, 25 June 1944, R. E. Shanks 1661 (APSC).

3. Antennaria Gaertn.

1. Antennaria plantaginifolia (L.) Hook. nr Red river at New Providence, 30 Apr 1942, R. E. Shanks 1653 (APSC); King and Queen bluff, 16 Apr 1949, Floyd Brown and Alfred Clebsch 852 (APSC).

2. Antennaria solitaria Rydb. 16 $\frac{1}{2}$ mi sw of Clarksville, 13 Mar 1949, Alfred Clebsch et. al. 851 (APSC).

4. Eupatorium L.

1. Eupatorium hyssopifolium L. dry ridge nr Yellow creek, 22 June 1966, Howard L. Yarbrough et. al. 179 (APSC).

5. Cacalia L.

1. Cacalia atriplicifolia L. Yellow creek nr bridge, 23 July 1949, Floyd Brown and Alfred Clebsch 874 (APSC).

6. Vernonia Schreb.

1. Veronia missurica Raf. barrens nr Woodlawn school, R. E. Shanks et. al. 14384 (TENN); nr Lock C, 22 July 1943, R. E. Shanks 2328 (TENN).

7. Cichorium L.

1. Cichorium intybus L. Edmondson Ferry rd, 1 Aug 1948,

8. Anthemis L.

1. Anthemis cotula L. nr Greenwood cemetery, 11 June 1949, Floyd Brown and Alfred Clebsch 871 (APSC).
2. Anthemis tinctoria L. Murphy farm at Dotsonville, 17 June 1966, Howard L. Yarbrough and Nancy J. Branson 153 (APSC).

9. Achillea L.

1. Achillea millefolium L. nr Paradise Hill rd $2\frac{1}{2}$ mi ese of Clarksville, 7 May 1949, Alfred Clebsch and Floyd Brown 870 (APSC); King and Queen bluff, 25 May 1966, Howard L. Yarbrough 202 (APSC); Yellow creek, 22 June 1966, Howard L. Yarbrough et. al. 158 (APSC).

10. Galinsoga R. & P.

1. Galinsoga ciliata (Raf.) Blakes. w Commerce st, 17 July 1948, Alfred Clebsch 121 (APSC).

11. Astranthium Nutt.

1. Astranthium integrifolium (Michx.) Nutt. Cunningham lake 8 mi sw of Clarksville, 1 May 1948, Ellen Hutchison and Alfred Clebsch s.n. (APSC).

12. Chrysanthemum L.

1. Chrysanthemum leucanthemum L. nr Paradise Hill rd, 7 May 1949, Floyd Brown and Alfred Clebsch 872 (APSC); King and Queen bluff, 25 May 1966, Howard L. Yarbrough 201 (APSC); Blue Rock Springs

rd nr Marion, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 224 (APSC).

13. Erigeron L.

1. Erigeron pulchellus Michx. Cunningham lake 8 mi sw of Clarksville, 2 Apr 1949, H. C. Phillips et. al. 848 (APSC); Shelton's branch, 10 Apr 1949, Alfred Clebsch 849 (APSC).

2. Erigeron philadelphicus L. Shelton's branch, 25 Apr 1948, Alfred Clebsch 49 (APSC); King and Queen bluff, 24 Apr 1948, Alfred Clebsch 297 (APSC).

3. Erigeron annuus (L.) Pers. 1 mi from Baggett's store on 1948, Marion rd, 13 June 1966, Howard L. Yarbrough and Nancy Branson 192 (APSC); Billy Dunlop Memorial Park, 10 May 1966, Howard L. Yarbrough and Nancy J. Branson 180 (APSC).

14. Sericocarpus Nees

1. Sericocarpus linifolius (L.) BSP. Oakwood barrens 20 June 1948, Alfred Clebsch 120 (APSC); nr Woodlawn, 25 June 1944, R. E. Shanks 1640 (APSC).

15. Taraxicum Zinn.

1. Taraxicum officinale Weber. APSC campus, 3 Feb 1966, Howard L. Yarbrough 101 (APSC).

16. Pyrrhopappus DC.

1. Pyrrhopappus carolinianus (Walt.) DC. Cedar st, 25 May 1942, R. E. Shanks 1628 (APSC); Cunningham lane in Cumberland Hgts, 20 June

1966, Howard L. Yarbrough 220 (APSC).

17. Lactuca L.

1. Lactuca canadense L. nr New Providence, 28 June 1942, Woodson Oliver 1626 (APSC).

18. Sonchus L.

1. Sonchus asper (L.) Hill. nr Rossview, 13 June 1942, Woodson Oliver 1625 (APSC).

19. Krigia Schreb.

1. Krigia oppositifolia Raf. King and Queen bluff, 24 Apr 1948, Alfred Clebsch 46 (APSC); nr Trice's landing, 30 May 1948, Alfred Clebsch et. al. 89 (APSC).

2. Krigia dandelion (L.) Nutt. nr Peacher's Mill, 9 May 1948, Alfred Clebsch 48 (APSC); Hwy 13 w of Cunningham, 30 Apr 1944, Alfred Clebsch et. al. 1624 (APSC).

3. Krigia biflora (Walt.) Blake. Cunningham lake, 1 May 1948, Alfred Clebsch 47 (APSC); along Yellow creek nr Hwy 13, R. E. Shanks 1623 (APSC).

20. Helenium L.

1. Helenium nudiflorum Nutt. nr Sango, 30 July 1949, Floyd Brown and Alfred Clebsch 869 (APSC).

21. Senecio L.

1. Senecio glabellus Poir. nr Greenwood Cemetery, 24 Apr 1948,

Alfred Clebsch 50 (APSC); $\frac{1}{2}$ mi e of Shiloh on Bryant Branch, 15 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 137 (APSC); nr Antioch creek, 17 Apr 1966, Howard L. Yarbrough and Nancy J. Branson 241 (APSC).

2. Senecio pauperculus Michx. King and Queen bluff, 26 Apr 1947, Alfred Clebsch and Edward Clebsch 1212 (APSC).

3. Senecio obovatus Muhl. Shelton's branch, 2 Apr 1949 Alfred Clebsch 876 (APSC); Red river bluff nr Shelton's branch, Floyd Brown and Alfred Clebsch 875 (APSC); along Red river nr quarry ne of Clarksville, 24 Apr 1942, R. E. Shanks 1680 (APSC).

22. Silphium L.

1. Silphium asteriscus L. nr Budd's creek, 1 July 1942, Woodson Oliver 1659 (APSC).

23. Coreopsis L.

1. Coreopsis lanceolata L. Cumberland river bluff nr mouth of Red river, 30 Apr 1949, Floyd Brown and Alfred Clebsch 865 (APSC).

2. Coreopsis major Walt. Oak Ridge, nr Yellow creek, 23 May 1942, R. E. Shanks 1677 (APSC); nr Gum Springs Church, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 212 (APSC); King and Queen bluff, 18 May 1946, Alfred Clebsch 122 (APSC).

24. Verbesina L.

1. Verbesina helianthoides Michx. nr Hadley farm on West Fork creek, 4 June 1948, Alfred Clebsch and Edward Clebsch 300 (APSC); nr

Rossvie, 13 June 1941, Woodson Oliver 1673 (APSC).

25. Rudbeckia L.

1. Rudbeckia serotina Nutt. Rossvie, 13 June 1942, Woodson Oliver 1666 (APSC); nr Shelton's branch, 25 June 1949, Floyd Brown and Alfred Clebsch 857 (APSC).

2. Rudbeckia triloba L. along Budd's creek, 1 July 1942, Woodson Oliver 1662 (APSC).

3. Rudbeckia hirta L. 1 mi from Baggett's store on Marion rd, 13 June 1966, Howard L. Yarbrough and Nancy J. Branson 217 (APSC).

V. DISCUSSION

In addition to the present investigation, extensive collecting within the study area has been done since 1940 by many workers, as evidenced by the citations. It is believed that very few taxa present within the study area have escaped detection by these workers.

The primary vegetation pattern is that of mixed mesophytic forest (Braun, 1950). Beech, Fagus grandiflora, is often dominant on many slopes. In the more xeric areas the oak-hickory association is dominant. Braun (1950) in discussing the Highland Rim describes large areas of prairie referred to as "barrens" by the early settlers because of the absence of trees in these regions. In the opinion of this investigator the regions of Montgomery County known as Woodlawn and Oakwood fit this description. Originally covered by grasses, these areas show the effect of disturbance by cultivation in the large thickets of post oak, Quercus stellata, and black oak, Quercus velutina, with dogwood, Cornus, often found in the understory.

Fernald (1950), recognizes one hundred and sixty-eight families of vascular plants constituting the flora of the north-eastern United States and Canada. In this study one hundred and seven of these families have been cited from Montgomery County. In addition, three hundred sixty-five genera and six hundred forty-two species have been recognized.

Shanks (1958) in a study of the floristic regions of Tennessee recognizes the flora of Montgomery County as being similar

to the flora of the Central Basin, which is extensively underlain with limestone. Shanks bases his comparison on twelve indicator species which represent the "limestone flora." These indicator species are:

Aristolochia tomentosa Sims.

Bumelia lycoides (L.) Gaertn.

Cladrastis lutea (Michx. f.) K. Koch.

Forestiera ligustrina Poir.

Fraxinus quadrangulata Michx.

Gymnocladus dioica (L.) K. Koch.

Philadelphus pubescens Loisel.

Ptelea trifoliata L.

Quercus macrocarpa Michx.

Quercus prinoides Willd.

Rhamnus lanceolata var. glabrata Gleason.

Ulmus serotina Sarg.

Three of these, Cladrastis lutea, Gymnocladus dioica, and Rhamnus lanceolata have not been cited growing native within the county in any of the herbaria utilized in the present study. The remainder of the species used by Shanks are not significant contributors to the floristic composition of the various communities. Although seven of the twelve species are trees, only Ulmus serotina Sarg. was cited by Duncan (1965) as being a recognizable constituent of the woody flora based on the plotless sampling technique. She recognizes the following communities within the county:

White oak - Northern red oak - Hickory *hacese*, represented
 Post oak - Black oak, by *Smilax* *lyallii*; *innocense*, by
 Beech - Maple *viridis*, by *Myrica* *americana*; *Loranthaceae*,
 Red cedar - Hardwood *acese*, by *Viola* *trifoliata*;
 Bottomlands *by Comandra* *umbellata*; and the *Loganiaceae*,
 Streambank communities *landica*.

The oaks and hickories represent 50 per cent of the total basal area and 35 per cent of the total density of the entire population (Duncan, 1965). They are the *Bioscoraceae*, represented

In contrast, Quarterman (1950) reports the Central Basin as being an area of 300 miles of Ordovician limestone fairly well distributed over the area. In many places it is at or very close to the surface. In these regions the vegetation develops in the cracks of the rocks into a cedar subclimax which remains until the weathering process produces sufficient soil to maintain more mesophytic species. *of this group include the* *Marispermaceae*,

On the basis of such data it is evident that the flora of Montgomery County only remotely resembles that of the Central Basin.

Sharp (1955) describes some of the elements of the Tennessee flora with tropical relationships. His work indicates that there are many Montgomery county taxa whose ranges at the family, generic, or specific level center in tropical regions. Families occurring within Montgomery County which are tropical in origin and represented only by a single species include the *Saururaceae*, represented by *Saururus cernuus*; *Thymelaceae*, by *Dirca*

palustris; Ebenaceae, by Diospyros virginica; Cactaceae, represented by Opuntia humifusa; Sapotaceae, by Bumelia lycoides; Annonaceae, by Asimina triloba; Phytolaccaceae, by Phytolacca americana; Loranthaceae, by Phoradendron flavescens; Rutaceae, by Ptelea trifoliata; within Santalaceae, represented by Comandra umbellata; and the Loganaceae, represented here by Spigelia marilandica.

Three families whose center of distribution is in tropical regions, each have a single genus with more than one species present within Montgomery County. They are the Dioscoreaceae, represented by Dioscorea villosa and Dioscorea quaternata; the Balsaminaceae, represented by Impatiens capensis and Impatiens pallida; and the Passifloraceae represented by Passiflora incarnata and Passiflora lutea.

There are also three families of the tropics that are represented in Montgomery County by more than one genus of one species each. Families of this group include the Menispermaceae, represented by Menispermum canadense and Calyccarpum lyoni; the Bignoniaceae, represented by Campsis radicans, Bignonia capreolata, and Catalpa speciosa; and the Amaryllidaceae, represented in Montgomery County by Agave virginica and Hypoxis hirsuta.

The presence of these tropical forms may be explained in three ways (Sharp, 1955). Some of the taxa are probably invading the north for the first time. Others are probably reinvading the area after becoming extinct during the Pleistocene. Others are probably remnants of the subtropical population present during the Tertiary.

Due to the present gaps in the paleobotanical data it is impossible to determine which of the explanations is the correct one at this time.

Although extensive previous collecting had been done within the study area, the field work of this investigation has added a number of new representatives to the list of taxa previously cited from within the county. Two new families have been added, the Lycopodiaceae, represented by Lycopodium lucidulum; and the Loranthaceae, represented by Phoradendron flavescens.

In addition, eleven genera were added to the herbarium which belonged to families already known to occur in the county. These include Arundinaria of the Gramineae; Cyperus, of the Cyperaceae; the genera Muscari and Yucca of the Liliaceae; the genus Rubus, of the Rosaceae; Vitis, of the Vitaceae; the genera Daucus and Zizia of the Umbelliferae; Ipomoea, of the Convolvulaceae; Monarda, of the Labiatae; and the genus Taraxacum to the Compositae.

Thirteen species were added to the lists of various genera previously cited from the study area, making a total of twenty-seven taxa collected during this investigation for the first time.

VI. SUMMARY

A study of the spring and early summer vascular flora of Montgomery County, Tennessee was made. Specimens were cited from the herbaria of Austin Peay State College, the University of Tennessee, and Vanderbilt University. No specimens from the present study area are found in the herbarium of Murray State University. In addition, field collections were made throughout the spring and early summer of 1966 by this investigator.

Dichotomous keys were constructed for the identification of the families, genera, and most of the species of the specified flora of the study area. Citation data for all species were included.

On the basis of data collected during this investigation and that of Duncan (1965) and Quarterman (1950) it was concluded that the flora of Montgomery County only remotely resembles the flora of the Central Basin as was reported by Shanks (1958). A brief resume of the members of the local flora with tropical affinities was included.

Results of this investigation indicate that the spring and early summer vascular flora is composed of at least one hundred and seven families, three hundred and sixty-five genera, and six hundred and forty-two species. Of this total, two families, eleven genera, and twenty-seven species were reported for the first time as a result of this investigation.

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