

JOURNAL

OF THE

Tennessee Academy of Science

VOL. XLIII

JULY, 1968

No. 3

PRELIMINARY CHECK-LIST OF THE HERBACEOUS VASCULAR PLANTS OF CEDAR GLADES

JERRY M. BASKIN¹,
ELSIE QUARTERMAN AND CAROLE CAUDLE
Vanderbilt University
Nashville, Tennessee 37203

Cedar glades occupy five to six percent of the Central Basin of Middle Tennessee (Safford 1884). There, they have usually, though not always, developed on outcroppings of thin-bedded members of the Lebanon limestone. Soil is shallow where present, precluding permanent invasion by trees, even though tree seedlings advance into the openings and survive until some severe season, usually a dry one, eliminates them. Ultimately, soil may accumulate to such a depth that trees can be supported and a woodland develops. Even in the early stages of succession in a glade, vertical crevices and potholes in the rock provide places in which forest trees grow. *Juniperus virginiana* L. (red cedar) dominates such "glade woods" (Quarterman 1950b), and this dominance has given rise to the term "cedar glade." Glades proper, however, are openings occasioned by the presence of bare rock or shallow soil that occur among rather sparsely wooded areas, a concept that agrees with Webster's (Gore 1966) definition of a "glade." Gravelly soil up to four inches in depth supports annual plant species, the succulent perennial *Talinum*, and many bluegreen algae; soil four to twelve inches deep is usually covered with grasses. Open glades support a typical flora that includes the well-known endemic and near-endemic species of cedar glades; thus, from a botanical point of view, also, restriction of the term to open areas is appropriate. Although lines of demarcation between community types are sometimes not clear, the classification of communities into gravel glade, grass glade, glade-shrub, shrub-cedar, and glade woods (Quarterman 1950b) is convenient and useful.

Limestone glades also occur in northern Alabama (Mohr 1901, Rollins 1963, Lloyd 1965, Baskin 1967). Many of these are floristically and ecologically related to glades in Middle Tennessee, but some exhibit marked differences. Glades near Russellville and Isbell, Alabama, for example, are quite similar to Tennessee glades in substrate characteristics and in vegetation; but many in Morgan and Lawrence Counties, Alabama, are continuous with open areas, often in fields and

pastures that are not rocky and in which the soil is gummy and wet enough to support populations of crayfish, whose "chimneys" are very much in evidence. These non-rocky glades support extensive populations of *Leavenworthia* species, which have been studied by Rollins (1963) and Lloyd (1965). Very few other components of the glade flora are present on them, although many such species may occur in contiguous rocky areas onto which species of *Leavenworthia* also extend.

Other disjunct glades occur in Catoosa County, Georgia (Baskin 1967), Knox County, Tennessee (Sharp *et al.* 1960), and occasionally in Kentucky and Illinois (Rollins 1963). Except for those in Knox County, this entire complex of glades is located within the Interior Low Plateau of Fenneman (1938). They differ both floristically and physiographically from the glades of the Ozark region, which are more typically on hillsides and thus tend to be better drained than the glades of Tennessee and adjacent regions.

Ecology and/or evolution of certain species of cedar glades has been the subject of a number of recent papers (Weiss 1959, Zager 1962, Rollins 1963, Mulcahy 1963, 1964, Waits 1964, Lloyd 1965, Bangma 1966, Turner 1966, Baskin 1967, Baskin and Caudle 1967, Pearson 1967, Ware 1967, Breeden 1968, and Caudle 1968), and the vegetation of glades in Middle Tennessee has been studied by White (1924), Picklesimer (1927), Freeman (1933), and Quarterman (1950a,b). Some floristic information is included in several works of a more general nature (Harper 1926, Jennison 1935, Harger 1937, and Svenson 1940, 1941, 1951), however, no complete floristic survey of cedar glades has been made since Gattinger's *Flora of Tennessee* (1901). In view of the continuing taxonomic and ecological problems in cedar glades, it seems desirable to compile unpublished floristic information from several sources,

¹ Present address: Department of Botany, University of Kentucky, Lexington, Kentucky 40506.

chiefly Quarterman (1948), Baskin (1967), and Caudle (1968), in the form of a preliminary check-list.

This list is restricted to herbaceous vascular plants occurring primarily or entirely in open cedar glades. No effort was made to collect thoroughly along major roadsides, so the weedy group of species may seem incomplete; the list, however, is intended primarily to reflect the unique and distinctive components of the open glade flora.

Annotations are as general as the collections justify; in some cases specific herbarium label information has been used for the less widely distributed species. This is especially true of species collected from outlying glades. The following terms, in descending order of importance, have been used to describe distribution: common, frequent, occasional, infrequent, local, and rare. These terms are used with respect to glades only and are not intended to be indicative of the general distribution of widely ranging species. A, G, and T in annotations indicate collections from Alabama, Georgia, and Tennessee, respectively.

Nomenclature follows mainly that of Fernald (1950); occasionally, that of Small (1933), Gleason (1952), or specialists whose recent revisions are cited in annotations of the species involved. Voucher specimens are deposited in the Vanderbilt University Herbarium (VDB), with the exception of a few that are located in the Herbarium of Duke University (Duke).

The authors acknowledge with appreciation the assistance of Dr. Robert Kral in the identification of many specimens.

ISOETACEAE

Isoetes butleri Engelm. In seasonally moist places; rare.
T.

OPHIOGLOSSACEAE

Ophioglossum engelmanni Prantl Frequent; locally abundant at edges of shrub thickets and woods.
A., G., T.

GRAMINEAE

Andropogon scoparius Michx. Occasional in relatively undisturbed glades. T.

A. virginicus L. Frequent; the old field species in glades, as elsewhere. A., G., T.

Aristida longespica Poir. Frequent; co-dominant with *Sporobolus vaginiflorus* in grassy glades. T.

Bouteloua curtipendula (Michx.) Torr. Occasional; often locally abundant. G., T.

Bromus japonicus Thunb. Frequent, especially along roadsides. A., G., T.

B. purgans L. Edge of woods. T.

Cynodon dactylon (L.) Pers. Occasional escape from cultivation. A.

Danthonia spicata (L.) Beauv. Occasional. G., T.

Elymus virginicus L. Occasional; never abundant. T.

Eragrostis spectabilis (Pursh) Sturd. Frequent and widely distributed. A., G., T.

Festuca elatior L. Infrequent, along roadsides. A.

Hystrix patula Moench. Occasional; usually at edge of woods. T.

Melica mutica Walt. Frequent and well distributed. G., T.

Muhlenbergia sobolifera (Muhl.) Trin. Frequent; edge of woods. T.

Panicum annulum Ashe Common. T.

P. boscii Poir. Common, edge of woods. T.

P. capillare L. Frequent. A., G., T.

P. flexile (Gattinger) Scribn. Openings in cedar woods; common. T.

P. helleri Nash Edge of glades. G.

P. lanuginosum Ell. Occasional to frequent. A., T.

P. laxiflorum Lam. Occasional. T.

P. malacophyllum Nash Common. T.

P. philadelphicum Bernh. Occasional. T.

P. sphaerocarpon Ell. Edge of woods. G.

P. tennesseensis Ashe Edge of woods. G.

P. xalepense Gray Common. T.

Paspalum ciliatum Michx. Frequent. T.

Poa pratensis L. Escaped from lawns and pastures; edge of thickets. T.

Setaria glauca (L.) Beauv. Weedy; in openings and along roadsides. T.

S. lutescens Weigel Weedy; in openings and along roadsides. A., G., T.

S. viridis (L.) Scribn. Weedy; common in disturbed areas. T.

Sporobolus vaginiflorus (Torr.) Wood Abundant. A., G., T.

Tridens flava (L.) Smyth Frequent. A., G., T.

Uniola latifolia Michx. Edge of woods and thickets. T.

CYPERACEAE

Carex blanda Dewey Chiefly in openings in woods. T.

C. bushii Mackenzie Chiefly in openings in woods. T.

C. cherokeensis Schwein. Common in both glades and woods. A., G., T.

C. complanata Torr. & Hook. Frequent. T.

C. crawei Desr. Moist open areas. T.

C. frankii Kunth Occasional. T.

C. laxiflora Lam. Infrequent. A.

C. oligocarpa Schkuhr Infrequent. T.

C. varia Muhl. Frequent. T.

Cyperus inflexus Muhl. Frequent and locally abundant in very shallow soil. A., T.

Eleocharis compressa Sulliv. Common in moist areas; abundant. A., G., T.

Scirpus atrovirens Willd. Infrequent; in moist places. T.

Scleria pauciflora Muhl. Infrequent. A.

COMMELINACEAE

Commelina angustifolia Michx. Occasional along roadsides. T.

JUNCACEAE

Juncus dichotomus Ell. Locally moist places. T.

J. dudleyi Wiegand Locally moist places. T.

J. scirpoides Lam. Locally moist places. T.
J. tenuis Willd. Wet roadsides. T.

LILIACEAE

Allium canadense L. Common. A., G., T.
A. cernuum Roth. Locally abundant. G., T.
A. mutabile Michx. Infrequent in locally moist places. T.
A. stellatum Fraser Locally abundant in moist places. T.
Asparagus officinale L. Adventive from cultivation. T.
Camassia scilloides (Raf.) Cory Infrequent in moist situations. T.
Muscari comosum Mill. var. *monstrosum* Hort. X Occasional escape near house sites. T.
Nothoscordum bivalve (L.) Britt. Common and abundant. G., T.
Schoenolirion croceum A. Gray Infrequent; locally abundant in moist areas. A., T.
Smilax bona-nox L. Infrequent. G., T.

AMARYLLIDACEAE

Agave virginica L. Frequent and locally abundant. A., G., T.
Hymenocallis occidentalis (LeConte) Kunth Infrequent in moist places. T.
Hypoxis hirsuta (L.) Coville Frequent; scattered among grasses. T.

IRIDACEAE

Belamcanda chinensis (L.) DC. Frequent. Gatteringer (1901) suggested that it may be indigenous, rather than introduced as most manuals indicate. T.
Sisyrinchium albidum Raf. Frequent. A., G., T.
S. bermudiana L. (*S. angustifolium* Mill.) Enters glades along roadsides; infrequent. T.

ORCHIDACEAE

Spiranthes cernua (L.) Richards Rare; in moist sites only. G., T.

SANTALACEAE

Comandra umbellata (L.) Vent. Frequent in relatively undisturbed glades; edge of thickets. G., T.

POLYGONACEAE

Rumex spp. Present chiefly as weeds along roadsides and in other disturbed places. T.

NYCTAGINACEAE

Mirabilis linearis (Pursh) Heimerl. Infrequent. T.

PORTULACACEAE

Portulaca oleracea L. Frequent; weedy in shallow soil. T.
Talinum calcaricum Ware Frequent in very shallow soil, and in crevices of rock outcrops. Endemic to glades of Tennessee. Previously incorrectly referred to *T. teretifolium* Pursh (Ware, 1967). T.

CARYOPHYLLACEAE

Arenaria patula Michx. Common and abundant on gravelly glades. A., G., T.

Cerastium brachypodum (Engelm.) Robinson Wide-spread as a roadside weed; frequent in grassy glades. T.

RANUNCULACEAE

Adonis annua L. Occasional escape from cultivation. T.
Anemone caroliniana Walt. Rare; once much more abundant (Gatteringer, 1901). T.
A. virginiana L. Occasional in light shade; more frequent in woods. T.
Anemonella thalictroides (L.) Spach Occasional; usually in light shade. T.
Aquilegia canadensis L. Occasional; abundant in shade. T.
Clematis virginiana L. Frequent at edge of woods. T.
Delphinium ajacis L. Occasional. T.
D. virescens Nutt. Frequent and abundant. G., T.
Isopyrum biternatum (Raf.) T. & G. Occasional. T.
Nigella damascena L. Occasional escape from cultivation. T.
Ranunculus bulbosus L. In glade fields and pastures. T.
R. fascicularis Muhl. Abundant in seasonally moist places. T.
R. micranthus Nutt. Grassy glades and pastures. T.
R. septentrionalis Poir. Flood plains and pastures. T.

CRUCIFERAE

Capsella bursa-pastoris (L.) Medic. Roadside weed. T.
Draba brachycarpa Nutt. Chiefly on roadsides and in disturbed places. T.
D. verna L. Frequent on shallow soil and along roadsides. T.
Leavenworthia alabamica Rollins Abundant. Endemic to glades of northern Alabama (Rollins, 1963); also represented by *L. alabamica* var. *brachystyla* Rollins. (Rollins, 1963). Often on wet plastic clay soil, as well as on rocky glades.
L. exigua Rollins Abundant. Endemic to the Interior Low Plateau. Present in glades in Georgia and Tennessee; represented in Alabama by var. *lutea* Rollins and in Kentucky by var. *laciniata* Rollins (Rollins, 1963).
L. crassa Rollins Abundant. Endemic to glades of Alabama; represented there by vars. *crassa* Rollins and *elongata* Rollins (Rollins, 1963).
L. stylosa Gray Abundant. Endemic to glades of the Central Basin of Tennessee, where both yellow-flowered and white-flowered populations occur (Rollins, 1963).
L. torulosa Gray Abundant. Endemic chiefly to the Central Basin of Tennessee, with one small population recorded from Kentucky (Rollins, 1963).
L. uniflora (Michx.) Britt. Frequent; often occurring on hillside as well as level glades. Usually not in dense populations. More widely distributed in the mid-continent than other species of the genus listed here.
Lepidium campestre (L.) R. Br. Frequent roadside weed. T.
L. virginicum L. Frequent roadside weed. A., T.

- Lesquerella densipila* Rollins Occasional on glades, abundant in fields in the Central Basin. Endemic to the Central Basin, chiefly in the Duck River drainage basin (Rollins, 1955).
- L. perforata* Rollins Endemic to glades and fields in the Spring Creek drainage basin near Lebanon, Tennessee (Rollins, 1955).
- L. lyrata* Rollins Abundant. Endemic to glades of northern Alabama (Rollins, 1955). (Two additional species of *Lesquerella*, *L. lescurii* A. Gray and *L. stonensis* Rollins, are also endemic to the Central Basin of Tennessee, but rarely, if ever, occur on glades.)

CRASSULACEAE

- Sedum pulchellum* Michx. Common; abundant in shallow soil. A., T.

ROSACEAE

- Geum canadense* Jacq. Occasional in openings; frequent in woods. T.
- Potentilla recta* L. Frequent in fields and roadsides. T.
- P. simplex* Michx. var. *simplex*. Frequent. A., T.
- P. simplex* Michx. var. *argyrisma* Fern. Frequent. T.
- Rosa carolina* L. Frequent. A., G., T.
- R. setigera* Michx. var. *tomentosa* T. & G. Occasional. T.
- Rubus* spp. Occasional in abandoned fields. T.

LEGUMINOSAE

- Astragalus tennesseensis* Gray. Endemic to the Interior Low Plateau; near edges of thickets and woods. Frequent. A., T.
- Baptisia australis* (L.) R. Br. Occasional as small populations. G., T.
- Cassia fasciculata* Michx. Occasional; sometimes abundant in old fields. T.
- C. fasciculata* Michx. var. *robusta* (Pollard) Macbride Occasionally abundant in old fields. A., G.
- C. marilandica* L. Frequent in disturbed places. G., T.
- Desmanthus illinoensis* (Michx.) MacM. Common in moist places or glades. A., G.
- Desmondium* spp. Frequent but not abundant. T.
- Galactia volubilis* (L.) Britt. Frequent. A., G., T.
- G. mississippiensis* (Vail) Rutgers Occasional. T.
- Lespedeza procumbens* Michx. Occasional. T.
- L. stipulacea* Maxim. Naturalized and often abundant, especially in pastures. A., T.
- L. virginica* (L.) Britt. Occasional; may be locally abundant. A., G.
- Medicago lupulina* L. Occasional along roadsides. G., T.
- Melilotus alba* Desr. Occasional along roadsides. T.
- M. officinale* (L.) Lam. Frequent along roadsides. T.
- Petalostemon foliosum* Gray. Occasional; endemic to glades of the Interior Low Plateau. A., T.
- P. gattereri* Heller. Abundant; endemic to glades of Tennessee, Alabama, and Georgia. A., G., T.
- P. purpureum* (Vent.) Rydb. Infrequent; disjunct from the mid-continent prairie; occurs in glades and similar habitats in Alabama, Kentucky, and Tennessee.
- Psoralea subacaulis* T. & G. Abundant; endemic to glades of Tennessee, Alabama, Georgia.

- Strophostyles umbellata* (Muhl.) Britt. Infrequent. A.
- Stylosanthes biflora* (L.) BSP. Occasional. A., T.
- Trifolium campestre* Schreb. Infrequent. A., G., T.
- T. pratense* L. Frequent along roadsides. T.
- T. repens* L. Frequent along roadsides. T.

OXALIDACEAE

- Oxalis corniculata* L. Frequent, especially in disturbed places. A., T.
- O. cymosa* Small. Frequent. T.
- O. dillenii* Jacq. Frequent. T.
- O. priceas* Small ssp. *priceae*. Frequent and locally abundant; endemic to Interior Low Plateau and adjacent regions. Large clones occur in both open and wooded situations. A., T.
- O. violacea* L. Very common in grassy glades. T.

GERANICEAE

- Geranium carolinianum* L. Common. A., G., T.

POLYGALACEAE

- Polygala alba* Nutt. Infrequent. T.
- P. verticillata* L. Infrequent. T.

EUPHORBIACEAE

- Acalypha gracilens* A. Gray. Occasional weed. T.
- A. ostryaefolia* Riddell. Common weed. T.
- Croton capitatus* Michx. Common. A., G., T.
- C. monanthogynus* Michx. Common. T.
- Euphorbia chamaesyce* L. Common. T.
- E. corollata* L. Frequent. A., G., T.
- E. dentata* Michx. Frequent weed. A., G., T.
- E. dictyosperma* Fish. & Mey. Occasional. A., T.
- E. obtusata* Pursh Weedy, frequent on roadsides and in disturbed areas. T.
- E. maculata* L. Frequent on roadsides and waste areas. T.
- E. serpens* HBK. Frequent on roadsides and waste areas. T.

MALVACEAE

- Sida elliotii* T. & G. Frequent and locally abundant. A.
- S. hispida* (Pursh) Rydb. Occasional. T.
- Sphaeralcea angusta* (Gray) Fern. Occasional. T.

GUTTIFERAE

- Hypericum dolabriforme* Vent. Endemic to glades of the Interior Low Plateau and adjacent regions. G.
- H. frondosum* Michx. Abundant; characteristic of open woods. A., T.
- H. punctatum* Lam. Occasional. T.
- H. sphaerocarpum* Michx. Frequent in large clones in most glades. A., T.

VIOLACEAE

- Viola egglestoni* Brainerd. Abundant; endemic to glades of Tennessee and Kentucky. T.
- V. rafinesquii* Greene. Abundant on roadsides and waste areas. T.

CACTACEAE

- Opuntia rafinesquii* Engelm. Common and abundant. A., G., T.

LYTHRACEAE

Cuphea petiolata (L.) Koehne. Occasional weed in waste areas. T.

ONAGRACEAE

Oenothera biennis L. Weed; frequent. T.
O. linifolia Nutt. Occasional in shallow soil. T.
O. triloba Nutt. Abundant and widely distributed. T.

UMBELLIFERAE

Buplerum rotundifolium L. Frequent. T.
Chaerophyllum procumbens (L.) Crantz. In deeper soil at edge of thickets. T.
C. tainturieri Hook. Frequent weed. T.
Daucus carota L. Common weed of waste areas. G., T.
Torilis japonica (Houtt.) DC. Frequent in rocky roadsides and disturbed areas. T.

PRIMULACEAE

Dodecatheon meadia L. Occasional large populations occur in glades often continuing into open woods. A., G., T.

GENTIANACEAE

Sabattia angularis (L.) Pursh. Occasional; locally abundant. T.

APOCYANACEAE

Amsonia tabernaemontana Walt. var. *gatingeri* Woodson. Infrequent in stream beds. T.
Apocynum cannabinum L. Occasional near edge of woods. G., T.

ASCLEPIADACEAE

Asclepiodora viridis (Walt) Gray. Frequent in deep soil. A., G., T.
Asclepias syriaca L. Occasional along roadsides. T.
A. verticillata L. Scattered in rocky glades. A., G., T.
A. viridiflora Raf. Frequent. G., T.
Gonolobus carolinensis (Jacq.) Schultes. Occasional upon shrubs. T.

CONVOLVULACEAE

Cuscuta sp. Infrequent. G., T.
Evolvulus pilosus Nutt. Rare. T.
Ipomoea pandurata (L.) G. F. W. Mey. Roadsides and disturbed areas. G., T.

HYDROPHYLLACEAE

Phacelia dubia (L.) Trel. Locally abundant in shallow soil in glades. T.
P. purshii Buckl. Never as frequent or as abundant in glades as *P. dubia*; always in deeper soil. T.

POLEMONIACEAE

Phlox bifida Beck var. *cedaria* (Brand) Fern. Endemic to the Interior Low Plateau; locally abundant in rocky places. T.

BORAGINACEAE

Heliotropium tenellum (Nutt.) Torr. Frequent in gravelly glades. A., G., T.

Lithospermum canescens (Michx.) Lehm. Occasional and sparse. A., T.

Onosmodium molle Michx. Endemic to glades of the Interior Low Plateau, especially Tennessee and Kentucky. T.

VERBENACEAE

Verbena canadensis (L.) Britt. Frequent and abundant; especially large populations often follow disturbance of the habitat. T.
V. simplex Lehm. Frequent along roadsides. A., G., T.

LABIATAE

Blephilia ciliata (L.) Raf. Frequent. T.
Isanthus brachiatus (L.) BSP. Frequent and abundant. A., G., T.
Monarda fistulosa L. Occasional, edge of glade. G., T.
Physostegia virginiana Benth. Edge of woods. G.
Prunella vulgaris L. Widely distributed weed. G., T.
Pycnanthemum flexuosum (Walt.) BSP. Occasional. T.
Salvia lyrata L. Frequent; often quite abundant. A., G., T.
Satureja glabella (Michx.) Brig. Endemic to Interior Low Plateau. Abundant especially near shrubs. T.
S. nepeta (L.) Scheele. Occasional. T.
Scutellaria parvula Michx. Frequent in moderate shallow soil. A., T.

SOLANACEAE

Physalis heterophylla Nees. Weed. T.
Solanum carolinense L. Weed. T.
S. nigrum L. Weed. T.

SCROPHULARIACEAE

Bacopa acuminata (Walt.) Robins. Occasional in wet places, such as gravel pits. A.
Gerardia tenuifolia Vahl. var. *tenuifolia*. Occasional in gravelly soil. G., T.
Gratiola neglecta Torr. Occasional in moist disturbed places. T.
Penstemon hirsutus (L.) Willd. Occasional T.
P. tenuiflorus Pennell. Abundant and frequent. A., G., T.
Verbascum blattaria L. Occasional weed. T.
V. thapsus L. Occasional weed. T.
Veronica officinalis L. Infrequent. T.
V. arvensis L. Frequent. A., T.

ACANTHACEAE

Ruellia humilis Nutt. f. *grisea* Fern. Abundant. A., G., T.

PLANTAGINACEAE

Plantago aristata Michx. Widespread and abundant. T.
P. lanceolata L. Occasional. T.
P. rugelii Dcne. Occasional. T.
P. virginica L. Widespread and abundant. A., T.

RUBIACEAE

Diodia teres Walt. Abundant. A., G., T.
Galium parisiense L. Occasional. T.
G. pilosum Ait. Occasional at edge of woods. A., G.
G. virgatum Nutt. Common. T.
Houstonia lanceolata (Poir.) Britt. Frequent. A., G., T.

- H. patens* Ell. Locally abundant. A., T.
H. purpurea L. var. *calycosa* Gray. Abundant in early spring. Small stream banks and bluffs. T.
Sherardia arvensis L. Locally abundant. T.

VALERIANACEAE

- Valerianella radiata* Dufr. Common. T.
V. umblicata (Sulliv.) Wood. Common. A., G., T.

CAMPANULACEAE

- Lobelia gattingeri* A. Gray. Endemic to glades of Middle Tennessee; frequent and abundant in a few counties only. T.
L. leptostachys A. DC. Occasional; populations small. A., T.
Specularia perfoliata (L.) A. DC. Widely scattered. T.

COMPOSITAE

- Achillea millefolium* L. Occasional weed. T.
Ambrosia artemisiifolia L. var. *elatior* (L.) Descourtils Common weed. A., T.
Antennaria plantaginifolia (L.) Richards. Occasional. T.
Anthemis cotula L. Infrequent, in over-pastured places. T.
Aster ericoides L. Occasional. T.
A. pilosus Willd. The "old field" aster; common. A., G., T.
A. ptarmicoides (Nees.) T. & G. Locally abundant. G.
Astranthium integrifolia (Michx.) Nutt. Occasional; near edge of woods, T.
Bidens bipinnata L. Widely distributed weed. T.
Carduus nutans L. Common. T.
Chrysanthemum leucanthemum L. var. *pinnatifidum* Lecoq and Lamotte. Frequent. G., T.
Chrysopsis villosa (Pursh) Walt. Frequent. T.
Cirsium discolor (Muhl.) Spreng. Occasional. T.
Coreopsis tinctoria Nutt. Infrequent. G.
Crepis pulchra L. Occasional in open glades and along roadsides. T.
Echinacea tennesseensis (Beadle) Small Uncommon. T.
Erigeron strigosus Muhl. Common. A., G., T.
Eupatorium album L. Frequent in relatively deep soil. T.
E. altissimum L. Common. T.
E. incarnatum Walt. Roadside ditches; occasional. T.
Gnaphalium obtusifolium L. Weed. T.
G. purpureum L. Weed. T.
Grindelia lanceolata Nutt. Common and abundant; principally in disturbed areas. A., T.
Helenium amarum (Raf.) Rock. Chiefly in overgrazed pastures; rarely on natural glades. A., T.
Helianthus divaricatus L. Occasional in deeper soils. G., T.
Hypochaeris radicata L. Infrequent. T.
Krigia dandelion (L.) Nutt. Uncommon; on deeper soil only. T.
K. virginica (L.) Willd. Infrequent. T.
Kuhnia eupatorioides L. Abundant. T.
Lactuca scariola L. Common weed. Abundant. T.
L. saligna L. Occasional Weed. T.
Liatris aspera Michx. Rocky glade. G.
L. squarrosa (L.) Michx. Rocky glade. G.
Pyrrhopappus carolinianus (Walt.) DC. T.

- Ratibida pinnata* (Vent.) Barnh. Sporadic; locally abundant. G., T.
Rudbeckia hirta L. Frequent. T.
R. triloba L. Common. A., T.
Silphium trifoliatum L. Occasional in deep soil. G., T.
Serinia oppositifolia (Raf.) Kuntze. Only in Pulaski area. T.
Senecio smallii Britt. Common. A., G., T.
S. obovatus Muhl. Moist places and roadsides. T.
Tragopogon pratensis L. Infrequent weed. T.
Verbesina virginica L. In light shade at margins of woods. A., T.

LITERATURE CITED

- Bangma, G. S. 1966. Temperature and related actors affecting germination and flowering in *Leavenworthia stylosa* (Cruciferae). M. A. Thesis, Vanderbilt University, Nashville, Tennessee. 52 pp.
Baskin, J. M. 1967. Ecological studies of *Psoralea subcaulis* (Leguminosae): a cedar glade endemic. Ph. D. Thesis, Vanderbilt University, Nashville, Tennessee. 115 pp.
Baskin, J. M. and C. Caudle. 1967. Germination and dormancy in cedar glade plants. I. *Aristida longespica* and *Sporobolus vaginiflorus*. Jour. of Tenn. Acad. Sci. 42: 132-133.
Breedon, J. E. 1968. Ecological tolerances in the seed and seedling stages of two species of *Petalostemon* (Leguminosae). Ph.D. Thesis. Vanderbilt University, Nashville, Tennessee. 198 pp.
Caudle, C. F. 1968. Studies on the life history and hydroeconomy of *Astragalus tennesseensis* (Leguminosae). Ph.D. Thesis, Vanderbilt University, Nashville, Tennessee. 182 pp.
Fenneman, N. M. 1938. *Physiography of Eastern United States*. McGraw-Hill, New York. 714 pp.
Fernald, M. L. 1950. 8th Ed. *Gray's Manual of Botany*. Amer. Book Company, New York. 1632 pp.
Freeman, C. P. 1933. Ecology of cedar glade vegetation near Nashville, Tennessee. Jour. Tenn. Acad. Sci. 8: 143-228.
Gattinger, Augustin. 1901. *The Flora of Tennessee and a Philology of Botany*. Gospel Advocate Publishing Co., Nashville, Tennessee. 296 pp.
Gleason, H. A. 1952. *The New Britton and Brown Illustrated Flora of The Northeastern United States and Adjacent Canada*. The New York Botanical Garden. Lancaster Press, Inc., Lancaster, Penn. Vol. I 492 pp., Vol. II 652 pp., Vol. III 589 pp.
Gore, P. B. (Editor) 1966. *Websters Third International Dictionary of the English Language*, Unabridged. 2662 pp.
Harger, E. B. 1937. Some noteworthy plants of Tennessee. *Rhodora* 39: 428-432.
Harper, R. M. 1926. The cedar glades of Middle Tennessee. *Ecology* 7: 48-54.
Jennison, H. M. 1935. Notes on some plants of Tennessee. *Rhodora* 37: 309-323.
Lloyd, D. G. 1965. Evolution of self-compatibility and racial differentiation in *Leavenworthia* (Cruciferae). *Contr. Gray Herb.* 195.
Mohr, Charles. 1901. *Plant Life of Alabama*. *Contr. U. S. Nat. Herb.* Vol. 6. 921 pp.
Mulcahy, D. L. 1963. Evolution in *Oxalis* Section *Corniculatae* with particular reference to heterostyly. Ph.D. Thesis, Vanderbilt University, Nashville, Tennessee. 98 pp.
———. 1964. The reproductive biology of *Oxalis priceae*. *Amer. Jour. Bot.* 51: 1045-1050.
Pearson, Patricia B. 1967. Germination and dormancy in five species of *Lesquerella* (Cruciferae). M.A. Thesis, Vanderbilt University, Nashville, Tennessee. 98 pp.
Picklesimer, B. C. 1927. A quantitative study of the plant succession of the cedar glades of Middle Tennessee. M.A. Thesis, George Peabody College for Teachers, Nashville, Tennessee. 120 pp.
Quarterman, Elsie. 1948. Plant communities of cedar glades in Middle Tennessee. Ph.D. Thesis, Duke University, Durham, N. C. 119 pp.
Quarterman, Elsie. 1950 a. Ecology of cedar glades. I. Distribution of glade flora in Tennessee. *Bull. Torr. Bot. Club.* 77: 1-9.
———. 1950 b. Major plant communities of Tennessee cedar glades. *Ecology* 31: 234-254.
Rollins, R. C. 1955. The auriculate-leaved species of *Lesquerella* (Cruciferae). *Rhodora* 57: 241-264.
———. 1963. The evolution and systematics of *Leavenworthia*. (Cruciferae). *Contr. Gray Herb.* 192: 1-98.

- Safford, J. M. 1884. Part I. Cotton Production in the Mississippi Valley and Southwestern States. Tennessee and Kentucky. United States Census 5: 383-416. Washington U. S. Census Office, Bureau of Printing.
- Sharp, A. J., R. E. Shanks, H. L. Sherman, and D. H. Norris. 1960. A preliminary checklist of dicots of Tennessee. Ms
- Small, J. K. 1933. *Manual of The Southwestern Flora*. Univ. of N. C. Press, Chapel Hill. 1554 pp.
- Svenson, H. K. 1940. Plants of the southern United States. *Rhodora* 42: 7-19.
- . 1941. Notes on the Tennessee flora. *Jour. Tenn. Acad. Sci.* 16: 111-160.
- . 1951. Notes on the Tennessee flora. *Contr. Brooklyn Bot. Gard.* 93: 111-160.
- Turner, B. H. 1966. An ecological comparison of two populations of *Dodecatheon meadia* (Primulaceae) with emphasis on seed germination stage of life cycle. M.A. Thesis, Vanderbilt University, Nashville, Tennessee. 80 pp.
- White, Betty. 1924. Plant succession on a horizontal rock face. M.A. Thesis, George Peabody College for Teachers, Nashville, Tennessee. 44 pp.
- Waits, E. D. 1964. Autecological studies of *Leavenworthia stylosa* a cedar glade endemic. M.A. Thesis, Vanderbilt University, Nashville, Tennessee. 57 pp.
- Ware, S. A. 1967. Responses and adaptations of a cedar glade endemic (*Talinum calcaricum*, *Portulacaceae*) to factors of its habitat. Ph.D. Thesis, Vanderbilt University, Nashville, Tennessee. 160 pp.
- Weiss, N. J. 1959. An autecological study of three mosses important in xerarch succession in the cedar glades of Middle Tennessee. M.A. Thesis, Vanderbilt University, Nashville, Tennessee. 63 pp.
- Zager, R. D. 1962. Studies on seed dormancy and germination in *Leavenworthia stylosa* (Cruciferae). M.A. Thesis, Vanderbilt University, Nashville, Tennessee. 30 pp.

NOTICE TO MEMBERS

Sharply increased postage rates have created a crisis. Original mailing to correct addresses costs about one cent per copy per member, but it now takes 22¢ to get a *Journal* back from an incorrect address. Assuming the same rate to remail, each incorrect address costs 44¢ per mailing. Obviously, mailing to a great many incorrect addresses will lead to disaster. From this time forward returned *Journals* will not be forwarded except by written request, accompanied by payment for the full postage for return and remailing.

ANNOUNCEMENT

The 19th Fisk Institute of short courses in Infrared Spectroscopy; Gas Chromatography; and Ultraviolet, Fluorescence and Atomic Absorption Spectroscopy will be held on August 19 through 30, 1968. Due to construction on the Fisk University campus, the Institute will be held on the Vanderbilt University campus this summer.

NEWS OF TENNESSEE SCIENCE

Memphis State University—Clark Neal, Director of Research Administration at MSU has announced that research grants totaling \$186,634 have been received during April. Included are: \$22,230 from NSF to support MSU's second annual 'Summer Studies in Chemistry for College Seniors' under the direction of Dr. Robert W. Zuber, Jr., Assistant Professor of Chemistry; \$13,390 from NSF to support an In-Service Institute in Science and Mathematics for Secondary School Teachers under the direction of Prof. J. W. Fox, Chairman of the Chemistry Department; \$6,648 to the Department of Biology by HEW, bringing the total grant to over \$23,000 for support of individuals who have satisfactorily completed their basic professional preparation for employment as medical technologists under the direction of Paul R. Simonton, Associate Professor of Biology; \$5,000 from the Research Corporation, New York, to Dr. M. M. Garland and Dr. J. O. Thomson, both Associate Professors of Chemistry, to support their research entitled 'Substrate Effects Upon the Superconductive Transition Temperatures of Thin Superconducting Films.'

Carson-Newman College — On April 13, Dr. Carl Tabb Bahner, Director of Research at CN, reported on

his work in the synthesis of compounds for chemotherapy in cancer research to the American Association for Cancer Research in Atlantic City, N. J.

Assistant Professor of Physics Charles E. Magnuson of CN will participate in a summer research program at Texas A and M in the field of high energy physics with emphasis on the study of spark chambers.

Southwestern-at-Memphis—The Frazier Jelke Science Center has recently been completed at Southwestern at Memphis.

University of Tennessee Medical Units—Dr. Roland H. Aldern, Dean of the College of Basic Medical Sciences, has announced that Dr. John L. Wood, Professor of Biochemistry, has asked for relief from the departmental administrative duties so he may devote full time to teaching and research. His research interests center around the production of cancer by coal tar products.

Dr. William L. Byrne, now of the faculty of Duke University School of Medicine, will assume the departmental chairmanship as of September 1, 1968. Dr. Byrne's major research interest is in the field of memory transfer and involves the study of the central nervous system in an attempt to establish a molecular basis for memory.

The Rockefeller Foundation has recently allocated \$165,000 for a three-year extension of a cooperative educational program in the medical sciences between several US medical schools, including UT, and the Universidad del Valle in Cali, Colombia. Dr. Richard R. Overman, Associate Dean of Medicine, serves as administrator of UTMU's participation in the plan. The program has consisted of faculty members taking time out from duties in the US to spend teaching time at Cali to assist Colombian educators in bringing more modern methods to the teaching of medical students. Present plans call for the establishment of the first true graduate school of medical sciences in South America.

The USPHS recently awarded a grant of \$64,556 to UTMU for the third and final year of a study aimed at more effective discovery and control of uterine cancer. The experiment is under the direction of Dr. Cyrus C. Erickson, Professor of Pathology, with Dr. Sidney Coleman and Mrs. Irma Rube of the Department of

(Continued on Page 78)