X. *PLANT COLLECTIONS REPRESENTATIVE OF SOME TYPICAL COMMUNITIES OF EASTERN OKLAHOMA.**

A. I. Ortenburger.

Some of the typical plant communities of parts of eastern Oklahoma are described in this paper from the data and specimens collected by the author with the help of students while on the third Museum of Zoology expedition during June and July, 1927. This paper supplements another in this volume on the plants of western Oklahoma (Ortenburger, 1928, 49). As was pointed out in the introduction of the first paper, the work of the party was largely confined to the collection of specimens of vertebrates, hence little time could be spent collecting plants. These lists therefore are far from complete; nevertheless they should be representative of the typical and common plants of each region. It is hoped that some idea of the flora of each place may thus be presented.

The author is again greatly indebted to Mr. Paul C. Standley who has checked our field identifications of specimens. Actual specimens were collected and preserved, except of some of the trees, and are deposited in the U. S. National Herbarium.

In all, plant habitat descriptions or lists are given for seven localities. These are in order:

1. Comanche County, Wichita National Forest and Game Preserve, Camp Boulder, June 5.
2. Hughes County, 6 miles south of Weleetka, June 15.
3. Latimer County, 3miles north of Red Oak, June 16.
4. Le Flore County, Black Fork River, 6 miles south of Heavener, June 20.
5. Le Flore County, 8 miles west of the Oklahoma-Arkansas line, on the Kiamichi River, June 21 to 24.
   a. The pine-oak association along the high banks of the Kiamichi River.
   b. The lowlands along the Kiamichi River.
   c. Along a typical small feeder of the Kiamichi River.
   d. Kiamichi Mountain just south of Kiamichi River proper.
6. Adair County, Sallisaw Creek, ½ mile north of Bunch, July 7.
7. Adair County, Illinois River, 4 miles northwest of Watts, July 9.

1. Comanche County, Wichita National Forest and Game Preserve, Camp Boulder, June 5.

This list adds to that of 1926 14 species found in flower at about the same date (June 8, 1926 and June 5, 1927). All plants were collected in the immediate vicinity of Camp Boulder.

Achillea millefolium L.
Clitoria mariana L.
Commelina crispa Wooton.
Dianthera americana L.
Diodia virginiana L.
Juncus aristulatus Michx.
Monarda pectinata Nutt.
Plantago aristata Michx.
Plantago Wrightiana Dcne.
Sitilias caroliniana (Walt.) Raf.
Tradescantia virginiana L.
Verbena stricta Vent.
Xanthisma texanum DC.

*Contribution from the Zoological Laboratory of the University of Oklahoma, Second Series. No. 92.

2. **Hughes County,** 6 miles south of Weleetka, June 15. A small collection taken from the open fields and woodland near camp.

Achillea millefolium L.
Amaranthus spinosus L.
Chrysopsis pilosa Nutt.
Crotalaria sagittalis L.
Cuscuta sp. (sterile) on Ambrosia psilostachya DC.
Cyperus ovularis (Michx) Torr.
Delphinium sp.
Gnaphalium purpureum L.
Juncus aristulatus Michx.
Juncus tenuis Willd.
Juncus Torreyi Coville.
Lespedeza striata H. & A.
Linum striatum Walt.
Meibomia sessilifolia (Torr.) Kuntze.
Plantago aristata Michx.
Raimannia laciniata (Hill) Rose.
Rhynchosia latifolia Nutt.
Rudbeckia hirta L.
Sabbatia campestris Nutt.
Torilis anthriscus (L.) Gmel.
Tradescantia virginiana L.
Verbena stricta Vent.

3. **Latimer County,** 3 miles north of Red Oak, June 16. A small collection in open woodland near camp.

Achillea millefolium L.
Anthemis Cotula L.
Bellis integrifolia Michx.
Coreopsis tinctoria L.
Cyperus pseudovegetus Steud.
Erigeron ramosus (Walt.) B.S.P.
Juncus aristulatus Michx.
Juncus tenuis Willd.
Lobelia spicata Lam.
Prunella vulgaris L.
Ptilimnium Nuttallii (DC.) Britton.
Rudbeckia hirta L.
Sabbatia campestris Nutt.
Sanicula canadensis L.
Scutellaria cordifolia Muhl.
Silene stellata Ait.
Solanum carolinense L.
Verbascum Thapsus L.

4. **Le Flore County,** Black Fork River, 6 miles south of Heavener, June 20. A collection along the high banks of the river.

Callicarpa americana L.
Celtis occidentalis L.
Fraxnus pennsylvanica Marsh.
Helenium tenuifolium Nutt
Ostrya virginiana (Mill.) Willd.
Phytolacca americana L.
Plantago aristata Michx.
Symphoricarpus orbiculatus Moench.
Tilia americana L. (T. glabra Vent.)
Vernonia Baldwinii Torr.

5. Le Flore County, 8 miles west of the Oklahoma-Arkansas line, on the Kiamichi River, June 21 to 24.

5a. The pine-oak association along the high banks of the Kiamichi River.

(Plate VIII).

The region in which camp was made was entirely typical of this section of the country, an open pine-oak forest with a sandy rocky floor covered in large part by a thick carpet of pine needles (*Pinus echinata* Mill). There was much undergrowth throughout this forest such as low grape vines, very plentiful *Smilax* species, *Azalea viscosa* L., *Amorpha texana* Buckl., *Baptisia* species, and *Lespedeza hirta* (L.) Hornem. Trees and bushes reaching small size only, in the pine-oak association are: *Acer carolinianum* Walt., *Betula nigra* L., *Liquidambar styraciflua* L., *Chionanthus virginica* L., *Cornus florida* L., *Crataegus* species, *Quercus nigra* L., *Quercus phellos* L., *Hamamelis virginiana* L., *Rhus copallina* L., and *Viburnum rufidulum* Raf. The common grasses growing among the pine needles of the forest floor are *Panicum xalapense* HBK. and *Paspalum pubescens* Muhl.

Two typical sections 100 feet square were paced off in this forest and the numbers of different trees therein tabulated. In one of these areas there were 16 pines, 6-12 inches in diameter and 15, 12 inches or over; 3 oaks, 6-12 inches, and 2 larger than 12 inches; and

one 8-inch hickory. In the other square 20 pines between 6 and 12 inches were found and 23 larger than 12 inches; 6 oaks all between 6 and 12 inches; and one hickory. These figures represent all of the large trees in each area.

5b. The lowlands along Kiamichi River.
(Plates IX and X).

A survey was made of a typical low bank of the Kiamichi River at this place on the south side. The soil was a sandy loam mixed with a great many boulders of various sizes. Large quantities of dead wood varying from tree trunks to small branches were scattered about, as the river had recently been in flood stage. In all of the riffles of the stream there were numerous small willows (*Salix discolor* Muhl.). Trees were counted along the bank for a distance of about a quarter of a mile and about 30 feet back from the water's edge. Of all the trees the hornbeam (*Carpinus caroliniana* Walt.) was most common as 29 were counted. Next most plentiful were: shortleaf pine (*Pinus echinata* Mill.), 6 from 2 to 6 inches, and 30 about 1 inch in diameter; sweet gum (*Liquidambar styraciflua* L.) 17; holly (*Ilex opaca* Ait.), 9; black gum (*Nyssa sylvatica* Marsh.), 8; white oak (*Quercus alba* L.) 6; hop hornbeam (*Ostrya virginiana* K. Koch.), 6; maple (*Acer carolinianum* Walt.), 5; sycamore (*Platanus occidentalis* L.), 4; birch (*Betula nigra* L.), 4; elm (*Ulmus americana* L.), 3; redbud (*Cercis canadensis* L.), 2; water oak (*Quercus nigra* L.) 2; linden (*Tilia glabra* Vent.), 1, 12 inches in diameter. In addition to these trees mentioned there was the usual tangle of *Smilax* species, honeysuckle, witchhazel (*Hamamelis virginiana* L.), poison ivy, buttonwood, and willow.

There follows a list of plants other than those mentioned above (5b) collected in the same place.

Alnus rugosa (DuRoi) Spreng.
Asplenium platyneuron (L.) Oakes.
Athyrium asplenioides (Michx.) Desv.
Batodendron arboreum (Marsh.) Nutt.
Callicarpa americana L.
Cephalanthus occidentalis L.
Chionanthus virginica L.
Coreopsis tinctoria Nutt.
Echinacea purpurea (L.) Moench.
Erigeron ramosus (Walt.) BSP.
Helenium nudiflorum Nutt.
Hypericum prolificum L.
Koellia flexuosa (Walt.) MacM.
Monarda mollis L.
Passiflora lutea L.
Pentstemon laevigatus Soland.
Polystichum acrostichoides (Michx.) Schott.
Rhus copallina L.
Rudbeckia hirta L.
Steironema lanceolatum (Walt.) Gray.
Trachelospermum difforme (Walt.) Gray.
Verbesina helianthoides Michx.

5c. Along a typical small feeder of the Kiamichi River.
(Plate XI).

Another typical habitat of this region is found along the small spring-fed streams which flow into the Kiamichi River. Along one of these, called by us "Three Fish Creek," a census was taken of the herbaceous plants and of the shrubs over 6 feet in height within 20 feet on both sides of the stream and for 300 feet of its length. The ground was very rocky, covered with rotting branches and dead leaves washed down by the stream. A tangle of low-growing grape vines, poison ivy, *Smilax*, and woodbine follows the creek. The common grasses of this habitat were *Panicum xalapense* HBK. and

Paspalum pubescens Muhl. Small herbaceous vegetation was relatively scanty. Many of the tree trunks were covered with moss, and one hop hornbeam *(Ostrya virginiana* K. Koch.) had ferns (*Polypodium polypodioides* (L.) Hitchc.) growing in with the moss.

Of all the trees along the small creek, the sweet gum *(Liquidambar styraciflua* L.*)* was the commonest as in the census taken 20 trees were counted, most of them of good size. The following numbers of trees and bushes were also found—*Viburnum rufidulum* Raf. 8 large, 20 small; *Pinus echinata* Mill. (2-6 inches)11; *Hicoria* sp. 11; *Ostrya virginiana* K. Koch. 10; *Quercus alba* L. 9; *Acer carolinianum* Walt. 9; *Chionanthus virginica* L. 8; *Hamamelis virginiana* L. 6 *Quercus nigra* L. 5; *Ulmus americana* L. 4; *Carpinus caroliniana* Walt. 3; *Ulmus alata* Michx. 2; *Ilex opaca* Ait, (6 inches) 2: *Juniperus virginiana* L. 2; *Rhus copallina* L. 2; *Nyssa sylvatica* Marsh. 2; *Platanus occidentalis* L. 1; *Cornus florida* L. 1; *Cercis canadensis* L.1.

A list of the commoner plants found in this area follows:

Amorpha texana Buckl.	Juncus diffusissimus Buckl.
Clitoria mariana L.	Juncus effusus L.
Coreopsis verticillata L.	Koellia flexuosa (Walt.) MacM.
Erigeron ramosus (Walt.) BSP.	Monarda fistulosa L.
Euphorbia corollata L.	Rudbeckia hirta L.
Helianthus microcephalus T. & G.	Scleria triglomerata Michx.
Helenium nudiflorum L.	

5d. Kiamichi Mountain just south of the river. **(Plate XII).**

A short distance south of the Kiamichi River the north slopes of Kiamichi Mountain rise. The pine-oak association was found to follow up the sides for some distance but soon was replaced by a different mixture of trees and shrubs. This region had been burned over many times and had also been logged over, so that many of the trees left were represented by merely small bushy second growth. The species are mainly: red oak (*Quercus rubra* L.), black locust *(Robinia pseudoacacia* L.*)*, chinquapin *(Castanea pumila* (L.) Mill.*)*, maple (*Acer carolinianum* Walt.), and sassafras (*Sassafras officinale* N. & E.). The ground was almost literally covered a good part of the distance up the mountain side with blueberry *(Vaccinium vacillans* Kalm.*)*. Wild black cherry *(Prunus serotina* Ehrh.*)* was also very common on the sides of the mountain.

Near the top of the mountain the vegetation was much more dense as the actual number of bushes as well as the number of species of bushes increased markedly. Ferns were also plentiful, especially the maiden hair (*Adiantum pedatum* L.), the Christmas fern *(Polystichum acrostichoides* (Michx.) Schott.), and beech fern *(Dryopteris hexagonoptera* (Michx.) C. Chr.). As is indicated by the presence of the above species the soil was rich, black, and moist near the top of the mountain, a distinct change from the dry sand and rock of the base. The trees near the top, to within 100 feet of the flat open summit, were much more plentiful than lower on the sides of the mountain, and in general much larger. For example near the top white oaks (*Quercus alba* L.), were found over 2½ feet in diameter. Sassafras *(Sassafras officinale* N. & E.*)* and hop hornbeam *(Ostrya virginiana* K. Koch) grow to a height of between 20 and 30 feet; veritable thickets of dogwood (*Cornus florida* L.), sassa-

fras (*Sassafras officinale* N. & E.), redbud (*Cercis canadensis* L.), witchhazel (*Hamamelis virginiana* L.), and black locust in bush size (*Robinia pseudoacacia* L.) were also found near the top. It was in these damp thickets with their thick black humus that the ferns mentioned above were found in greatest abundance.

The top of the mountain was quite open with relatively few trees. The soil was very different, changing rather suddenly from the black, damp, thick humus of a hundred feet below to a dry, very stony, sandy soil. On this flat top were elderberry (*Sambucus canadensis* L.) great number of snowdrop trees (*Halesia carolina* L.) sassafras (*Sassafras officinale* N. & E.), redbud (*Cercis canadensis* L.), coral berry (*Symphoricarpos orbiculatus* Moench.), green brier (*Smilax* species.) linden (*Tilia glabra* Vent.) and dogwood (*Cornus florida* L.), which was probably the largest of these on top, reaching a diameter of 7 inches. These species with woodbine (*Psedera* sp.) formed small scattered dense thickets.

6. Adair County, Sallisaw Creek, ½ mile north of Bunch, July 7.

The two most common shrubs along the banks of this beautifully clear stream were the black haw (*Virburnum rufidulum* Raf.) and the buckthorn (*Bumelia lanuginosa* (Torr.) Pers.). The common trees were *Ulmus americana* L., *Quercus alba* L., *Acer Negundo* L., *Fraxinus americana* L., and *Sassafras officinale* N. & E.

7. Adair County, Illinois River, 4 miles northwest of Watts, July 9. **(Plate XIII).**

The trees growing on the high banks of the river were mainly *Ulmus americana* L., *Platanus occidentalis* L., *Betula nigra* L., *Acer carolinianum* Walt., *Acer Negundo* L., *Cornus florida* L., *Fraxinus americana* L., *Juglans nigra* L., *Quercus alba* L., *Cercis canadensis* L., *Ostrya virginiana* K. Koch., and *Gleditsia triacanthos* L.

A list of the common herbaceous plants follows:

Anthemis Cotula L.
Callirrhoe involucrata (T. & G.) Gray.
Campanula americana L.
Cassia fasciculata Michx.
Coreopsis auriculata L.
Erigeron annuus (L) Pers.
Helenium tenuifolium Nutt.
Ipomoea pandurata (L.) Mey.
Monarda mollis L.
Rudbeckia hirta L.
Scutellaria cordifolia Muhl.
Silphium asteriscus L.
Solidago ulmifolia Muhl.
Solidago digitata Nutt.
Stylosanthes elatior (L.) BSP.
Torilis anthriscus (L.) Gmel.
Verbascum Thapsus L.
Vernonia Baldwinii Torr.