

## OBSERVATIONS UPON SOME OKLAHOMA PLANTS. BY E. W. OLIVE.

The botany of Oklahoma is exceedingly interesting, because this territory is a borderland region between the Gray's Manual and Western Texas Manual regions. Until about five years ago the plants of this district were but little known to botanists, and the results of recent collections disclose a flora rich in interesting forms. Especially valuable is a "List of Plants Collected by C. S. Sheldon and M. A. Carleton in the Indian Territory in 1891," published as contributions from the National Herbarium in 1892.

The months of July and August, 1893, were spent in and about Payne County, in the very northeast of Oklahoma, about ninety miles south of the Kansas line through the Cherokee strip and about 150 miles west of Arkansas. This is in latitude about 37° west, and is but a few miles south of the parallel bounding on the north Tennessee and North Carolina, so that the collections were made just south of the line of the extreme southwestern limit of Gray's Man., 6th ed. About 175 species of Phanerogams and Pteridophytes were collected, about sixty of them being new to Messrs. Sheldon and Carleton's lists, most of these, however, the commoner plants; and thirteen of which are not reported in Gray's Manual. Of this thirteen four are not included in Dr. Coulter's Manual of the Texas Flora, nor nine of them in his Botany of the Rocky Mountain Region; but only *one* of the thirteen fails to be reported in *all* of these manuals of the surrounding regions. This is *Oenothera trifida*, L., determined by Prof. John M. Coulter and pronounced by him "probably *var. integrifolia*, Torr. and Gr., although the species and variety show various stages of intergradation." This plant was somewhat abundant in cultivated fields near Cimarron City.

These thirteen plants are *Galium calycinum*, Engelm., found abundantly on the red sandstone rocks outcropping in ravines and along the Cimarron River; *Galactia mollis*, Michx., in dry sand along the river banks; *Acacia julicina*, Willd., abundant in the sandy woods; *Oenothera trifida*, L., *var. integrifolia*, Torr. and Gray; *Gaura villosa*, Torr., showing gradations into "forms;" *Sesuvium Portulacastrum*, L., in sand along the saline banks of the river; *Cynoseadium pinnatum*, D. C., but one plant collected along a roadside; *Aster patens*, Ait., *var. gracilis*, Hooker, the variety not in Gray's Manual, very abundant in rich, sandy grounds near the river; *Baccharis glutinosa*, Pers., the fertile plant conspicuous by its very long and white pappus along the sandy river banks; *Eriogonum longifolium*, Nutt., on dry prairies; *Cooperia Drummondii*, Hook., near Stillwater on rich prairies; *Desmanthus Jamesii*, T. and G., very abundant on dry prairies; *Aphanostephus ramosissimus*, ? D. C. (Professor Coulter thinks this is probably this species, though

the fruit is immature), found in abundance in sand and in the river bottoms; and *Marsilia vestita*, Hook. and Grev., in and along the mucky banks of a pond near Perkins. This marsilia was two to three inches larger than the type.

Probably all of these thirteen plants ought to be included in Gray's Manual, because of the great similarity of the flora of this region to that of southern Kansas. The climatic and geologic conditions are furthermore so very similar in both regions, and this, combined with the fact of the proximity of the Cimarron and Arkansas rivers, flowing southward through the Territory from Kansas, would tend to make the floras very alike.

If it is true, as has been said, that the Indian word *Oklahoma* means the "home of the red earth," then it is a very appropriate name, since the first thing that strikes the traveler's eye is this redness of the soil. A large part of north-eastern Oklahoma is distinguished by out-cropping "red beds," which also extend northward into several counties of Southern Kansas, while salt marshes and gypsum hills are associated with the red beds in both regions. Much of the uplands is thus distinguished, while the lowlands are very sandy, some of the fertile river bottoms, however, bearing a rich and diversified flora.

Many of the plants collected show strikingly the transition from the eastern to the western plains flora. Many show also the special characters peculiar to the plants of sandy regions. They have to contend generally with an adverse environment—a dry, sandy or gravelly soil—from which the water is rapidly drained away.

Rainfall in this extreme eastern district of Oklahoma is extremely local. For example, during the summer of 1893, the crops along the river bottoms and in limited spots on the uplands thrived under the influence of the local rains, while but a few miles to the west, about Guthrie, the corn crops were much injured by the drought. The flora seems to reflect such local characteristics. The drier districts present singularly dwarfed forms and show the gradual assumption of protective characters. The plants are "protected against too rapid transpiration by thickened leaves and epidermis, sunken stomata, absence or narrowness of leaves, or an unusual amount of wooliness or hairiness."

There is excellent timber in some portions of this eastern part, but the trees look dwarfed compared with our Indiana trees. There is quite a number of the common oaks—Spanish oak, post oak, but most abundant in the upland reduced forests is *Quercus nigra*, L., the dwarfed, gnarled "black jack." There are some hickories, black walnuts, tall cotton-woods and elms along the river and creeks, the elms bearing abundantly large bunches of mistletoe.

A few observations as to the occurrence and habitat of a few plants may be interesting. In the rich sandy land along the river bottoms the commonest shrubs are the button-bush, or *Cephalanthus occidentalis*, L., *Stillingia sylvatica*, L., *Rhus copallina*, L., and others. On *Stillingia* was found an *Ecidium* which has not been reported on this host, as far as can be determined. Somewhat abundant in similar places were *Argemone platyceras*, Link and Otto, *Callirhoe involucrata*, Gray, *Dalea laxiflora*, Pursh., *Eriochloa floridana*, Moq., *Indigofera leptosepala*, Nutt., and *Aphanostephus ramosissimus*, D. C. In wet and salty sand near the river, were *Pluchea camphorata*, D. C., *Sesuvium portulacastrum*, L., and in dry sand, *Cyrtoloma platyphyllum*, Moq., *Baccharis glutinosa*, Pers., and *Dalea lanata*, Spreng. The latter is reported in Gray's Man., to have "3-4 pairs" of leaflets, while 6-7 pairs were more usual on the specimens collected. On the high bluffs of the river *Yucca angustifolia*, Pursh., was occasionally met with.

In the woods which extend back from the river bottoms two or three miles are *Cassia Chamerista*, R., and *C. nitida*, L., or "sensitive plant," flowering especially abundantly during July and August; *Clitoria mariana*, L., *Gaura villosa*, Torr., *Eurotia biennis*, L., var. *grandiflora*, Lindl., a beautiful passion flower, *Passiflora incarnata*, L., *Liatris squarrosa*, Willd., *Chrysopsis villosa*, Nutt., in many of its variable forms, *Asclepias verticillata*, L., and *A. stenophylla*, Gray, and low shrubs of buckthorn, *Bumelia lanuginosa*, Pers. One perhaps noteworthy point was the occurrence of *Ludwigia alternifolia* in sandy but perfectly dry ravines. Gray's manual reports the habitat of this as "swamps."

The whole prairie region is characterized by an abundance of plants belonging to the orders *Leguminosae* and *Compositae*. Particularly abundant on the prairies are *Petalostemon multiflorus*, Nutt., *P. ciliarens*, Mx., *Amorpha canescens*, Nutt., *Desmanthus Jamesii*, T. and G., *Dalea aurea*, Nutt., *Solidago Missouriensis*, Nutt., *Helianthus mollis*, Lam., *Hieracium longipilum*, Torr. The fact is significant that of the 175 species collected, 33 were *Leguminosae* and 32 were *Compositae*. *Sabbatia angularis*, Pursh., *S. campestris*, Nutt., and *Buchnera Americana*, L., give a great deal of color to the prairies during June and July. *Linum sulcatum*, Riddell, *Ceanothus Americanus*, L., *Jatropha stimulosa*, Michx., *Euphorbia corollata*, L., *E. petaloidea*, Eng., *E. marginata*, Pursh., occur on the richer prairies, while *Eurotia Missouriensis*, Sims., *Houstonia angustifolia*, Mx., *Stenopisyon virgatus*, Spach., *Opuntia Missouriensis*, D. C., and *Gerardia densiflora*, Benth., are found on dry, sterile prairies. A very severe case of poisoning was incurred from collecting *Euphorbia corollata*, L. This, I believe, has been mentioned in the Botanical Gazette as one of our poisonous plants.

A very paradise for a collector of aquatic vegetation is a large shallow pond near Perkins, Oklahoma. Several *Sagittarias*, *Nelumbo lutea*, Pers., *Potamogeton ilitans*, Roth., the latter growing "rarely in ponds" (Gray's Man.), *P. hybridus*, Michx., are most abundant throughout, while near the edges *Heteranthera limosa*, Vahl., *Ludwigia cylindrica*, Ell., *Herpestis rotundifolia*, Pursh, and *Marsilia vestita*, Hook. and Grev., grow ripe.

As before suggested, the special interest of this region lies in the fact of the meeting of two floras and the sometimes abrupt but generally gradual transition of one into the other. The flora can not be studied comprehensively except by an extended period of field work and carefully noting all the environmental conditions. The farther west one goes into the territory, the more sandy and desert the regions become, and such are the variations from some of the more eastern forms, no doubt the result of a change in habitat, that many are classed as varieties. According to Mr. Coville's suggestions in his "Botany of Death Valley Expedition," the shrubs and trees and, on the prairies, the *perennials*, should especially be noted to determine characteristic plants of the flora.

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REDISCOVERY OF HOY'S WHITE FISH, OR MOON EYE. BY BARTON W. EVERMANN.

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SAXIFRAGACEÆ IN INDIANA. BY STANLEY COULTER.

Represented in Indiana by nine genera, as follows: *Saxifraga* L., *Saxifragaria* Torr. and Gray, *Tiarella* L., *Mitella* Tourn., *Heuchera* L., *Parassia* Tourn., *Hydrangæa* Gronov., *Philadelphus* L. and *Ribes* L.

The representatives of *Philadelphus* are evident escapes, and their inclusion in former lists is doubtless due to the youthful ebullience of the collectors. Both *P. inodorus* L. and *P. grandiflorus* L. are eastern and southern forms, the former ranging along the mountains from Virginia to Georgia and Alabama, the other along streams from Virginia to Florida. Both are of easy cultivation and escape readily in favorable localities, but so far as I have record have failed to maintain themselves. Until further evidence the genus and included forms should be excluded from state catalogue.

*Saxifraga* is certainly represented in the state by *S. Pennsylvanica* L., which has a fair distribution in the central and northern portions of the state, and which