Spring 1936

The Flora of The Tasco Lake Region, Sheridan County, Kansas

Raymond W. Darland

Fort Hays Kansas State College

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THE FLORA OF THE TASCO LAKE REGION, SHERIDAN COUNTY KANSAS

being

A Thesis Submitted to the Department of Botany and the Graduate Council of the Fort Hays Kansas State College in Partial Fulfillment of the Requirements for the Degree of Master of Science.

by

Raymond W. Darland B.S. F.H.K.S.C.

FORT HAYS KANSAS STATE COLLEGE
1935

Approved for the Department:

Professor in charge.

Approved for the Graduate Council:

Chairman of the Graduate Council.

Date of Approval: May 5, 1936
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I. Introduction

It has been customary in writing theses dealing with taxonomic problems to collect data from an entire county. Having had occasion to collect botanical specimens from the Tasco Lake for work in biology at the Sheridan High School, the wealth of plant life to be found here became apparent. The area ranges from xerophytic forms on the uplands to the hydrophytic forms in the lake and marshes. Many of the latter have never been reported from Western Kansas. Collections in preserving fluid were made of the water forms found and specimens of the land forms were mounted on regulation sized sheets properly classified. Duplicate specimens of both were presented to the Botany Department of the Fort Hays Kansas State College.

The investigation covering a period of twenty months, comprising the growing seasons of 1934 and 1935, has made possible a thorough study of the flora of this region. So far as is known, no detailed study has been made of this area; and, moreover, this will hold for most of Western Kansas, which therefore presents a fertile field for the investigator.
II. Purpose

It can be said without question that Western Kansas botanical studies have been very few and that much in the way of valuable botanical research is now needed. The result is that many erroneous ideas are prevalent in other states in regard to our plains region. This is due to the lack of scientific information based upon careful study. In all probability there is no other half section in Western Kansas where plant life would be any more constant and represent so large a number of species as the one reported upon in this thesis. This is due mainly to the topography, types of soil, and abundant water supply as a result of the perpetual springs and the 6.5-acre lake completed in 1925.

The survey of plant life of this particular area was taken for the following reasons: (1) to add to the information concerning the taxonomy of Western Kansas plantlife; (2) to make an intensive study of a small area where there is an abundance and wide variety of xerophytic, mesophytic, and hydrophytic plant life.
III. Acknowledgments

In the preparation of this study the writer has become greatly indebted to the following members of the Fort Hays Kansas State College faculty for many helpful suggestions and much advice: Professor A. W. Barton for direction in the research and writing of the thesis; Professor L. D. Wooster for stimulus and encouragement in the study of biology; and Professor F. B. Streeter for helpful suggestions in the bibliography. Much helpful information has been obtained from the research of the Rev. Clement Weber of Selden, Kansas, who collected plants in Sheridan County during 1930, 1931, and 1932.
IV. Description of Area

1. Location:

The tract of land under consideration consists of approximately 320 acres, being the north-half of section 14, township 8, range 27 west of the 6th principal meridian in Sheridan County, Kansas. The area is approximately a half mile north of the town of Tasco which is on the Salina-Oakley Branch of the Union Pacific Railroad; bounded on the south by the United States Highway North 40 and is seven miles due east of Hoxie, the county seat.

2. History:

The 320 acres comprising the Tasco Lake region were owned by F. W. Houseworth from 1899 up to the time of his death in 1933. Mrs. Houseworth, now living in Hoxie, is the present owner of the land. Cortez Creek flows through the northern portion of the property. A dam was constructed across this creek but later was washed out. In 1925 Mr. Houseworth completed the present dam across the creek at a cost of approximately $2100. The dam formed a 6.5 acre lake around which were set many cottonwood trees. After the completion of the dam a dance hall, a swimming pool, and a baseball park were constructed. These were operated very successfully up to the time of Mr. Houseworth's death, since which time the park has not been operated. In 1934 the Outdoor Life Club,
composed mostly of Hoxie business men and their families, secured a five year lease on the lake and its immediate surroundings for hunting, fishing, and recreational purposes. The lake has been well stocked with fish such as Bass, Blue-gill, etc. Ducks and pheasants have been very abundant.

3. Natural Features and Climatic Conditions:

The altitude of the Tasco Lake region is approximately 2496 feet above sea level and according to the Kansas Geological Survey the county is covered with a thick deposit of Tertiary Ogallola formation. The area is practically level with the exception of two small hills along the northern boundary and a rather large hill extending along the western boundary. The 80 acres on the west are mostly in pasture while a large portion of the bottom land is under cultivation, the major crop being corn.

In this part of the county the cretaceous chalk beds form the country rock underneath the sandy loam soil. The area has many perpetual springs which are evidently from the Rocky Mountain underflow known to underlie the entire county. Some of these springs are the source of the water forming Cortez Creek which has its origin close to the northern boundary of the half-section. A large spring below the dam produces approximately 7500
gallons per day by actual measurement and has never been known to go dry or even vary in its flow. A well dug about four miles northeast struck an underground river below the surface which river had a depth of 20 feet.

This abundance of underground water and the continual slope of the county toward the east tends somewhat to explain the presence of the many springs. In many places over the area water is only a few feet below the surface. This is very important to plant life in dry years. In the drought year of 1934, plants grew abundantly in most of the area and as a result this area was about the only green place to be found in the county. The rainfall of Sheridan County has varied from 33.13 inches in 1930 to 9.51 inches in 1934 as is shown by the chart for the ten-year period on the following page.

The South Solomon River flows across the east portion of the half-section. The river in this locality is small and only a small portion of the water is at the surface. The major part of the flow seems to be down within the sand of the river bed. Cortez Creek previously mentioned in the History of the region forms the outlet for the lake and empties into the river due east of the lake. The 6.5 acre lake formed by the dam across Cortez Creek has a maximum depth of 15 feet. The still, shallow water at the edge of the lake forms a wonderful habitat for an abundance of plant life.
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Total: 13.26 19.40 27.11 17.44 33.13 19.50 14.81 15.65 9.51 12.75
Fig. 1. A map of Kansas showing the location of Sheridan County.
Fig. 2. A map of Sheridan County showing townships and section numbers. The area under consideration in this thesis is shaded in red.
Fig. 3. A view of the area as seen from the western boundary.
Fig. 4. A view of the dam showing the road formed.
Fig. 5. The big spring.
Fig. 6. A small portion of the vegetation covering the lower side of the dam.
Fig. 7. The lake as viewed from the southeast.
Fig. 8. The lake as viewed from the east.
Fig. 9. The upper portion of the lake as viewed from the west.
Fig. 10. The Solomon River near the eastern boundary.
Fig. 11. The gullies in the west pasture.
Fig. 12. A view of the meadow west of the lake along Cortez Creek.
Fig. 13. Mortar-bed rock in the west pasture.
Fig. 14. Xerophytic vegetation near the western boundary.
1. Previous work:

Clement Weber of Selden reported that previous to 1898 Professor A. S. Hitchcock of the Kansas State Agricultural College of Manhattan published a list of Sheridan County, which contained 146 plants. In the 1932 Transactions of the Kansas Academy of Science, volume 35, Clement Weber reported 476 plants gathered during 1930, 1931, and 1932. Actual specimens of the plants reported were presented to the Kansas State Agricultural College of Manhattan and can be found there at this time catalogued as the Sheridan County herbarium. No mention of the cryptogams was made in either of these reports.

As the plants in the previous studies were gathered at random over the entire county and no study of any particular locality was made the survey of the Tasco Lake region seemed justified.
2. Taxonomix List of Species:
   a. Cryptogams

   Chlamydomonas tingens
   Cladophora glomerata
   Closterium striolatum
   Conferva bambycina
   Conferva fontanalis
   Drepanaldia plumosa
   Encyonema ventricosa
   Equisetum fluviatile
   Equisetum laevigatum
   Gleocapsa magma
   Navicula gracilis
   Navicula viridis
   Nitzschia lanceolata
   Oscillatoria anguina
   Oscillatoria leptotricha
   Oscillatoria major
   Oscillatoria princeps
   Pandorinan morum
   Pleurosigma intermedium
   Spirogyra adnata
   Spirogyra calospora
   Spirogyra decimina
   Spirogyra flavescens
  Spirogyra mirabile
   Spirogyra punctata
Spirogyra quinina
Spirogyra tenuissima
Spirogyra varians
Stigeoclonium fastigiata
Synedra biceps
Synedra valens
Zygnema leiospermum
b. Phanerogams

Alismaceae--Water-Plantain Family
Sagittaria cuneata--------------------------Arum-leaved Arrow-head

Alsinaceae--Chickweed Family
Alsine media---------------------------------Common Chickweed
Arenaria texana-----------------------------Texas Sandwort

Amaranthaceae--Amaranth Family
Amaranthus blitoides-------------------------Prostrate Amaranth
Amaranthus graecizans------------------------Tumbleweed
Amaranthus hybridus-------------------------Spleen Amaranth
Amaranthus retroflexus-----------------------Red Root

Ambrosiaceae--Ragweed Family
Ambrosia psilostachya------------------------Western Ragweed
Ambrosia trifida------------------------------Giant Ragweed
Gaertneria tormentosa------------------------Woolly Ragweed
Iva xanthiifolia-------------------------------Burweed Marsh Elder
Xanthium commune-------------------------------Cocklebur

Ammiaceae--Carrot Family
Apium petroselinum---------------------------Common Parsley
Berula erecta-------------------------------Water Parsnip
Cogswellia orientalis----------------------White Flowered Parsley
Sanicula canadensis------------------------Snake-root
Amygdalaceae--Plum Family

Padus nana---------------------------------Choke Cherry
Prunus americana-------------------------Wild Yellow or Red Plum

Anacardiaceae--Sumac Family

Schmaltzia trilobata---------------------Ill-scented Sumac
Toxicodendron radicans------------------Poison Ivy

Apocynaceae--Dogbane Family

Apocynum cannabinum----------------------Indian Hemp

Asclepiadaceae--Milkweed Family

Acerates angustifolia---------------------Narrow-leaved Milkweed
Acerates viridiflora---------------------Green Milkweed
Asclepias arenaria-----------------------Sand Milkweed
Asclepias incarnata---------------------Swamp Milkweed
Asclepias latifolia----------------------Broad-leaved Milkweed
Asclepias pumila------------------------Low Milkweed
Asclepias speciosa----------------------Showy Milkweed
Asclepias syriaca------------------------Common Milkweed

Boraginaceae--Borage Family

Cryptantha crassispala------------------Thick Sepaled Cryptantha
Lappula heterosperma-------------------Hairy Stickweed
Lithospermum linearifolium-----------------Narrow-leaved Puccoon
Onosmodium occidentale-----------------Western False Gromwell
Cactaceae—Cactus Family

Coryphanta missouriensis-------------------Nipple Cactus
Coryphanta viuipara----------------------Purple Cactus
Opuntia fragilis------------------------Brittle Opuntia
Opuntia humifusa----------------------Western Prickly Pear

Campanulaceae—Bellflower Family

Specularia perfoliata-------------------Venus’ Looking-glass

Capparidaceae—Caper Family

Cleome serrulata-------------------------Pink Cleome
Polanisia trachysperma-------------------Clammy Weed

Caprifoliaceae—Honeysuckle Family

Symphoricarpos occidentalis-----------------Wolfberry

Ceratophyllaceae—Hornwort Family

Ceratophyllum demersum-------------------Hornweed

Chenopodiaceae—Goosefoot Family

Chenopodium album----------------------Lamb’s Quarters
Chenopodium hybridum-------------------Maple-leaved Goosefoot
Chenopodium incanum---------------------Mealy Goosefoot
Chenopodium leptophyllum----------------Narrow-leaved Goosefoot
Kochia scoparia------------------------Fireball
Salsola pestifer------------------------Russian Thistle
Cichoriaceae--Chicory Family

Agoseris cuspidata--------------Prairie False Dandelion
Lactuca ludoviciana-------------------Western Lettuce
Lactuca pulchella---------------------Blue Lettuce
Lactuca virosa-----------------------Wild Lettuce
Leontodon taraxacum------------------Dandelion
Lygodesmia juncea-------------------Rush-like Lygodesmia

Commelinaceae--Spiderwort Family

Tradescantia occidentalis---------Western Spiderwort

Compositaeae--Thistle Family

Artemisia dracunculoides---------Linear-leaved Wormwood
Artemisia filifolia-----------------Silvery Wormwood
Artemisia frigida-----------------Wormwood Sage
Aster multiflorus-----------------White Wreath Aster
Aster salicifolius-----------------Willow Aster
Bidens frondosa------------------Beggarticks
Boebera papposa-------------------Fetid Marigold
Cirsium ochrocentrum---------------Yellow Spined Thistle
Cirsium undulatum-----------------Wavy-leaved Thistle
Echinacea angustifolia------------Purple Coneflower
Gaillardia pulchella---------------Showy Gaillardia
Grindelia squarrosa----------------Gum Plant
Gutierrezia sarothrae---------------Broom Weed
Helianthus annus-------------------Common Sunflower
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<thead>
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<th>Scientific Name</th>
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<td>Convolvulus arvensis</td>
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Convolvulus sepium-------------------Hedge Bindweed
Evolvulus nuttallianus---------Small Silky Morning Glory
Ipomoea leptophylla------------------Bush Morning Glory

Corrigiolaceae--Whitlowwort Family

Paronychia jamesii-----------------------James' Whitlowwort

Cruciferaceae--Mustard Family

Bursa bursa-pastoris-----------------Shepherd's Purse
Cheirinia aspera----------------------Western Wallflower
Draba caroliniana---------------------Carolina Whitlow Grass
Lepidium virginicum------------------Wild Peppergrass
Radicula sinuata----------------------Spreading Yellow Cress
Stanleya pinnata----------------------Stanleya
Sisymbrium nasturtium-aquaticum-------True Water Cress
Thlaspi arvense-----------------------Field Penny-cress

Cucurbitaceae--Gourd Family

Pepo foetidissima---------------------Missouri Gourd

Cuscutaceae--Dodder Family

Cuscuta arvensis---------------------Field Dodder

Cyperaceae--Sedge Family

Carex gravis------------------------Heavy Sedge
Carex hystricina---------------------Porcupine Sedge
Cyperus houghtonii-------------------Houghton's Cyperus
Cyperus inflatus--------------------------Awned Cyperus
Cyperus strigosus---------------------Straw-colored Cyperus
Fimbristylis puberula------------------Hairy Fimbristylis
Scirpus americanus-------------------Three-square Rush
Scirpus validus----------------------American Great Bulrush

Euphorbiaceae--Spurge Family
Chamaesyce preslii---------------------Upright Spotted Spurge
Chamaesyce serpens--------------------Round-leaved Spreading Spurge
Croton texensis------------------------Texas Croton
Dichrophyllum marginatum--------------Snow-on-the-Mountain
Poinsettia cuphosperma-----------------Warty Spurge
Poinsettia dentata---------------------Toothed Spurge
Tithymalus missouriensis-------------Reticulate Seeded Spurge
Zygophyllidium hexagonum---------------Angled Spurge

Fabaceae--Pea Family
Amorpha fruticosa----------------------False indigo
Astragalus missouriensis-------------Missouri Milk Vetch
Astragalus mollissimus---------------Woolly Loco
Astragalus pectinatus----------------Narrow-leaved Milk Vetch
Astragalus racemosus-----------------Racemose Milk Vetch
Geoprumnon mexicanum----------------Larger Ground Plum
Glycyrrhiza lepidota------------------Wild Licorice
Medicago sativa-----------------------Alfalfa
Melilotus alba------------------------White Sweet Clover
Melilotus officinalis----------------Yellow Sweet Clover
Oxytropis lamberti-----------------------Stemless Loco
Parosela aurea--------------------------Golden Parosela
Parosela enneandra---------------------Slender Parosela
Petalostemum oligophyllum---------------White Prairie Clover
Petalostemum purpureum-----------------Purple Prairie Clover
Psoralia argophylla---------------------Silverleaf Psoralia
Psoralia cuspidata---------------------Large Bracted Psoralia
Psoralia esculenta---------------------Indian Breadroot
Psoralia tenuiflora-------------------Few-flowered Psoralia
Strophostyles pauciflora-----------------Small Wild Bean

Graminaceae--Grass Family
Agropyron smithii---------------------Western Wheat-grass
Andropogon furcatus-------------------Big Blue-stem
Aristida purpurea----------------------Aristida
Atheropogon curtipendulus-----------------Tall Grama-grass
Bouteloua oligostachya-----------------Grama-grass
Bromus arvensis-----------------------Field Chess or Brome
Bromus tectorum----------------------Downy Brome-grass
Bulbilus dactyloides--------------------Buffalo-grass
Cenchrus pauciflorus------------------Cenchrus
Chaetochloa glauca---------------------Yellow Foxtail
Chaetochloa viridis--------------------Green Foxtail grass
Eatonia obtusata-----------------------Early Bunch Grass
Echinochloa crus-galli--------------------Barnyard-grass
Elymus canadensis---------------------Nodding Wild Rye
Elymus virginicus---------------------Virginia Wild Rye
Eragrostis curtipedicellata---Short-stalked Love-grass
Eragrostis frankii------------------Frank's Love-grass
Eragrostis major------------------Strong-scented Love-grass
Homalocenchrus orzoides----------Rice Cut-grass
Hordeum jubatum--------------------Squirrel-tail Grass
Hordeum pusillum---------------------Little Barley
Koeleria cristata--------------------Koeler's-grass
Munroa squarrosa-------------------False Buffalo-grass
Muhlenbergia racemosa-------------Wild Timothy
Panicum capillare-------------------Witch-grass
Panicum virgatum--------------------Wild Red-top
Poa pratensis----------------------Kentucky Blue-grass
Schizachyrium scoparium--------------Broom Beard-grass
Setaria viridis---------------------Foxtail
Sorghastrum nutans-----------------Indian Grass
Spartina michauxiana--------------Tall Marsh-grass
Sporobolus asperifolius-----------Rough-leaved Dropseed
Sporobolus cryptandrus-----------Sand Dropseed

Grossulariaceae--Gooseberry Family
Ribes odoratum---------------------Golden Currant

Haloragidaceae--Water-Milfoil Family
Myriophyllum pinnatum-------------Pinnate Water Milfoil

Hydrophyllaceae--Water-leaf Family
Nyctelea nyctelea------------------Nyctelea
Juncaceae--Rush Family

Juncus tenuis-----------------------------Slender Rush
Juncus torreyi-----------------------------Torrey's Rush
Juncus scirpoides------------------------Scirpus-like Rush

Lemnaceae--Duckweed Family

Spirodela polyrhiza------------------------Greater Duckweed
Wolffia columbiana------------------------Columbia Wolffia

Labiatae--Mint Family

Lycopus americanus-----------------------Water Hoarhound
Marrubium vulgare------------------------Common Hoarhound
Salvia lanceifolia-----------------------Lance-leaved Salvia
Salvia pitcheri--------------------------Pitcher's Sage
Scutellaria lateriflora--------------------Blue Skullcap

Liliaceae--Lily Family

Allium nuttallii--------------------------Nuttall's Wild Onion
Yucca glauca-----------------------------Soapweed

Linaceae--Flax Family

Linum lewisii-----------------------------Lewis' Wild Flax

Loasaceae--Evening Star Family

Mentzelia oligosperma---------------------Stick Leaf
Lobeliaceae--Lobelia Family

Lobelia cardinalis---------------------Cardinal Flower
Lobelia syphilitica-------------------Great Blue Lobelia

Lythraceae--Loosestrife Family

Lythrum alatum-------------------------Loosestrife

Malvaceae--Mallow Family

Callirhoe involucrata-------------Purple Poppy Mallow
Malva rotundifolia-----------------Dwarf Mallow
Malvastrum coccineum---------------Red False Mallow

Martyniaceae--Unicorn-Plant Family

Martynia louisiana-------------------Devil's Claws

Mimosaceae--Mimosa Family

Acuan illinoensis-------------------Illinois Mimosa
Morongia uncinata-------------------Sensitive Brier

Moraceae--Mulberry Family

Morus rubra----------------------------Red Mulberry

Nyctaginaceae--Four-o'clock Family

Allionia linearis-------------------Narrow-leaved Umbrellawort
Allionia nyctaginea-----------------Heart-leaved Umbrellawort
Oleaceae--Olive Family

Fraxinus americana---------------------------------Ash

Onagraceae--Evening-Primrose Family

Epilobium coloratum---------Purple-leaved Willow Herb
Epilobium lineare------------------------Willow Herb
Galpinsia lavendulacefolia-----Lavender-leaved Primrose
Gaura coccinea-------------------Scarlet Gaura
Gaura parviflora------------------Small-flowered Gaura
Gaurella canescens-------------------Spotted Spurge
Meriolix serrulata--------------Tooth-leaved Primrose
Oenothera biennis---------------Common Evening Primrose
Stenosiphon linifolium---------Flax-leaved Stenosiphon

Oxalidaceae--Wood-sorrel Family

Xanthoxalis stricta---------------Yellow Wood Sorrel

Papaveraceae--Poppy Family

Argemone intermedia--------------------Prickly Poppy

Plantaginaceae--Plantain Family

Plantago purshii-------------------Pursh's Plantain

Polygalaceae--Milkwort Family

Polygala alba----------------------White Milkwort
Polygonaceae--Buckwheat Family

Persicaria lapathifolia---------Dock-leaved Persicaria
Persicaria persicaria----------------Lady's Thumb
Polygonum neglectum----------Narrow-leaved Knotweed
Polygonum ramosissimum---------Bushy Knotweed
Rumex crispus-----------------Curled or Narrow Dock
Tinaria scandens-------------Climbing False Buckwheat

Portulacaceae--Purslane Family

Portulaca oleracea--------------Purslane

Primulaceae--Primrose Family

Androsace occidentalis----------Primrose

Ranunculaceae--Crowfoot Family

Anemone decapetala-------------Kansas Anemone
Delphinium virginsens----------Prairie Larkspur
Myosurus minimus----------------Mousetail

Rosaceae--Rose Family

Rosa pratinaeola---------------Prairie Rose

Rubiaceae--Madder Family

Galium aparine-----------------Cleavers, Bedstraw
Galium concinnum----------------Bedstraw
Houstonia angustifolia---------Narrow-leaved Houstonia
Salicaceae--Willow Family
Populus sargentii------------------------Cottonwood
Salix amygdaloides---------------------Peach-leaved Willow
Salix longifolia------------------------Sandbar Willow

Scrophulariaceae--Figwort Family
Mimulus geyeri---------------------Geyer's Yellow Monkeyflower
Pentstemon albidus----------------White Flowered Beard-tongue

Solanaceae--Nightshade Family
Physalis heterophylla------------------Clammy Ground Cherry
Physalis longifolia--------------------Long-leaved Ground Cherry
Solanum nigrum------------------------Deadly Nightshade
Solanum rostratum---------------------Buffalobur

Typhaceae--Cattail Family
Typha latifolia------------------------Broad-leaved Cattail

Ulmaceae--Elm Family
Ulmus americana-----------------------American Elm
Celtis occidentalis--------------------Hackberry

Verbenaceae--Vervain Family
Lippia cuneifolia----------------------Wedge-leaved Fog Fruit
Verbena bipinnatifida-----------------Large-flowered Verbena
Verbena bracteosa---------------------Large-bracted Vervain
Verbena hastata---------------------------Blue Vervain
Verbena stricta--------------------------Hoary Vervain

Violaceae--Violet Family

Viola nuttallii------------------Yellow Prairie Violet
Viola papilionacea-------------------------Blue Violet
Viola rafinesquii--------------------------Field Pansy

Vitaceae--Grape Family

Vitis vulpina--------------------------Riverside Grape

Zannichelliaceae--Pondweed Family

Potamogeton natans------------Common Floating Pondweed
Potamogeton obtusifolius---------Blunt-leaved Pondweed

Zygophyllaceae--Caltrop Family

Tribulus terrestris--------------------------Mexican Sandbur
3. New Species in County:
   a. Cryptogams

   Chlamydomonas tingens
   Cladophora glomerata
   Closterium striolatum
   Conferva bambycina
   Conferva fontanalis
   Draparnaldia plumosa
   Encyonema ventricosa
   Equisetum fluviatile
   Equisetum laevigatum
   Gleocapsa magma
   Navicula gracilis
   Navicula viridis
   Nitzschia lanceolata
   Oscillatoria anguina
   Oscillatoria leptotricha
   Oscillatoria major
   Oscillatoria princeps
   Pandorian morum
   Pleurosigma intermedium
   Spirogyra adnata
   Spirogyra calospora
   Spirogyra decimina
   Spirogyra flavescens
   Spirogyra mirabile
   Spirogyra punctata
Spirogyra quinina
Spirogyra tenuissima
Spirogyra variens
Stigeoclonium fastigiata
Synedra biceps
Synedra valens
Zygmena leiospermum
Crepusula avanciea
Crepusula multilineata
Entaia obtusa
Genardia caespitosa
Haplosporina crassula
Unguiculata major
Valdivia inconstans
Vades acer
Verina piceari
Microsporinae aspersa
Oedogonium uninucleatum
Oedogonium lineatissimum
Oedogonium unilaterale
Voskod pseudocarolina
b. Phanerogams:

Apium petroselinum
Aristida purpurea
Artemisia frigida
Asclepias arenaria
Aster salicifolius
Chenopodium leptophyllum
Cuscuta arvensis
Cyperus inflexus
Eatonia obtusata
Eragrostis curtipedicellata
Eragrostis frankii
Eragrostis major
Galium concinnum
Padus nana
Salvia pitcheri
Schizachyrium scoparium
Silphium laciniatum
Solidago lindheimeriana
Spartina michauxiana
Wolffia columbiana
Xanthium commune
VI. Conclusion

The work has revealed that the study of the Tasco Lake region was certainly justified and the preliminary generalizations in regard to the area were very true. The survey has fulfilled the purpose stated in the forepart of the thesis in that it has made available additional knowledge in regard to western Kansas plant life and has been a thorough study of a small area where xerophytic, mesophytic, and hydrophytic plants are abundant.

Fresest, Gerald V. Iowa Alumni, Iowa City, 1922, 1928. [University of Iowa studies in natural history, Vol. II, No. 3, July, 1931]

Useful in study of plants.


Useful in field for preliminary classification. Very useful in this study.


Authority on alates.

VII. Bibliography


Bethlehem, Pa., Moravian Publication Office, 1892. 182p. and LXIV page plates.

Authority on desmids.


Volume one is text; volume two plates.

Authority on algae.


Very useful in determining previous work in the county.

Personal Interview

Houseworth, Mrs. F. W. July 5, 1935.

Owner of tract of land under consideration.

Supplied history of area.