Proceedings of the Iowa Academy of Science

Volume 12 | Annual Issue Article 13

1904

An Ecological Study of the Sabine and Neches Valleys, Texas

James E. Gow

AN ECOLOGICAL STUDY OF THE SABINE AND NECHES VALLEYS, TEXAS.

BY JAMES E. GOW.

During the winter of 1902-3, and again during the winter of 1903-4, the writer was one of a party sent by the United States Bureau of Forestry to take stem analyses and valuation surveys on the holdings of the Kirby Lumber Company preparatory to making a working plan for the use of the company in the future treatment of its timber lands. The holdings of this company lie in Hardin, Orange, Newton, Jasper, Angelina, Sabine and San Augustine counties, and include the largest continuous area of virgin Longleaf pine existing in the United States at the present time. Incidentally to the work in hand, occasion was taken to make a few observations on the ecology of the region, and these observations will be presented in the present article.

From the coast of the Mexican Gulf as far north as Beaumont the country is practically treeless. It is a flat coastal plain, flooded in wet weather, and its only striking feature is its monotony. Only along the banks of the Neches river are a few scattered trees—Gums, and Magnolias, and Cypresses covered with festoons of gray Spanish moss—reminders of the flora which is to be met with on a larger scale further up the stream. The town of Beaumont marks the southern boundary of the pine woods. On the northern edge of the town is to be found young Loblolly and Shortleaf pine, and even a few seedlings of the Longleaf may occasionally be found. From Beaumont to Silsbee, in Hardin county, along the G. B. & K. C. railway, the greater part of the pine timber has been destroyed,

but on all the higher lands the culled trees that the lumbermen have left give a clew as to the original flora. Much of this line, however, runs through swampy country, and there the lumbermen have made but slight inroads.

Except for a strip of two or three miles in width along the Neches river, and for occasional scattered "bay-galls" or inland swamps, that part of Hardin county lying north of Silsbee is covered by an almost pure stand of Longleaf pine. In the western part of the county this gradually shades off into Loblolly and hardwood forests. The region immediately north of Silsbee is so flat as to give the impression of a perfectly level plain. So flat is it that a rise of five feet in a little brook so narrow that one can step across it, will cause it to overflow for many rods on either side. In the northern part of Hardin county the land begins to be slightly rolling, and by the time we get as far north as the middle of Jasper county, we find some inequalities that may fairly be dignified by the name of hills.

The topography of the northern half of Jasper county will illustrate how new the region is geologically. In a gently rolling plain the streams have cut deep, narrow gulleys, with almost vertical banks, ten, twenty or thirty feet in depth. Over an area extending northward from the town of Jasper as far as the limit of our survey, were found many fragments of petrified wood. It is usually to be seen in small pieces lying on the surface of the ground, but some logs of five feet in length were found in stream beds. Several species were noticed, but have not been identified.

The topography of Orange county corresponds in the main with that of the southern part of Hardin county, except that the river swamps occupy relatively a greater area. With the same exception the topography of Newton county corresponds with that of Jasper county. Except near the rivers, Sabine and San Augustine counties are very hilly. Here the yellow, sandy clay of the more southern counties gives place to the so-called "red soil." Scattered every-

where are large fragments of hæmatite, and of soft sandstone deeply colored with iron. The clay itself is of a dark red tint. Simultaneously with the change of soil is an improvement in the character of the people and in the appearance of their homes, which indicate the greater fertility of the red soil. At the same time the character of the forest changes, and the pure Longleaf is succeeded by "High Hammock" Shortleaf pine mixed with hardwoods, on all the higher land, and the typical hardwood types on the lowlands. The last body of pure Longleaf pine of any size is in the southern part of San Augustine county. The species is found in a scattered and usually more or less stunted condition throughout Shelby and Nacogdoches counties.

Ecologically considered, the vegetation of southeastern Texas may be divided into a number of types, as follows:

I. PINE FLATS.

To this type belongs most of the eastern half of Hardin county, much of Orange county and the southern half of Jasper and Newton counties. The leading species is the Longleaf pine, but a few Loblollies, Shortleafs, and hardwoods are occasionally present. The best Longleaf is grown on these low lands. In the typical Longleaf forest there is no underbrush of any description, and as the trees attain a height of a hundred to a hundred and thirty feet, and seldom branch under eighty or ninety feet the effect is very striking. Unfortunately the best of these magnificent forests have already been destroyed and, if the present demand for yellow pine lumber continues, they will soon disappear utterly.

The following species were found in the Pine Flats:

PINUS PALUSTRIS Mill. *Longleaf Pine.*

P. TÆDA Linn. *Loblolly Pine.* In old fields and clearings and on edge of Longleaf area where it adjoins the swamp type. Sometimes the Pine Flats and swamps are separated by a third, or intermediate type, containing Longleaf, Loblolly, and hardwoods. Loblolly occurs rarely in the typical Longleaf country.

P. ECHINATA Mill. *Shortleaf Pine.* Sometimes found in old clearings in drier portion of Pine Flats.

LIQUIDAMBAR STYRACIFLUA Linn. *Sweet Gum.* Along borders of streams and near edges of swamps.

MAGNOLIA FŒTIDA (L.) Sarg. Rare along streams.

M. GLAUCA Linn. *Sweet Bay.* Along streams and edges of swamps.

JUNIPERUS COMMUNIS Linn. *Red Cedar.* Not uncommon in deserted clearings.

ACER NEGUNDO Linn. *Box Elder.* Banks of streams. Rare.

MORELLA CERIFERA (L.) Small. *Wax Myrtle.* Common.

RANUNCULUS TENER Mohr. *Buttercup.* Not uncommon.

VIOLA LANCEOLATA Linn. *White Violet.* Not uncommon.

VIOLA LANGLOISII Greene. *Violet.* Common.

CASSIA CHAMÆCRISTA Linn. *Partridge Pea.* Not uncommon.

SISYRINCHIUM GRAMINOIDES Bicknell. *Blue-eyed Grass.* Not uncommon.

S. MINUS Engelm. & Gray. Not common.

XANTHIUM SPINOSUM Linn. *Cocklebur.* Common in cotton fields and on roadsides,

ASTER TEXANUS Burgess. *Aster.*

A. PURPURATUS Nees.

SASSAFRAS SASSAFRAS (L.) Karst. Along streams.

MALUS SOULAIDI (Bailey.) Britton. *Crab.* In open places in pine woods, where it forms thickets.

ELIONURUS TRIPSACOIDES H. & B. Common.

II. PINE UPLAND.

The flora of this type is so nearly the same as that of the Pine Flats that a separate list is unnecessary. In addition to the foregoing, the following species occur on the high pine land of northern Jasper and Newton counties, Tyler county and Angelina county.

QUERCUS MINOR (Marsh) Sargent. *Post Oak.* Common; increasing northward.

Q. MARYLANDICA Muench. *Black Jack.* Not uncommon.

III. "HIGH HAMMOCK."

This is a local name applied to a very well marked type, and adopted by the Bureau of Forestry as a technical term applicable to that type. In the northern end of Jasper county, and the southern end of San Augustine, as the Longleaf pine begins to thin out, its place, on the higher land, is taken by a mixture of Shortleaf and hardwoods, with occasionally some Loblolly. In appearance the "High Hammock" differs totally from the Pine Upland. It is usually characterized by dense thickets of Shortleaf seedlings, often badly stunted by the shade of the hardwoods under which they grow. The Shortleaf is the typical species, but the following are found in considerable abundance:

NYSSA SYLVATICA Marsh. *Black Gum.* Near streams.

HICORIA ALBA (L.) Britton. *Hickory.*

HICORIA PECAN (Marsh) Britton. *Pecan.*

FRAXINUS AMERICANA L. *White Ash.*

QUERCUS DIGITATA (Marsh) Sudw. *Spanish Oak.*

Q. VELUTINA Lam. *Black Oak.*

Q. MINOR and Q. MARYLANDICA here become very common, but do not attain their maximum size.

Of trees common to Pine Upland and High Hammock are the Sassafras, Sweet Gum, Sweet Bay and Crab.

IV. SWAMP.

On either side of the Sabine, Neches and Angelina rivers, and extending back from one to six miles are dense Cypress swamps. Usually, the line dividing the swamp area from the Pine Flats, or Pine Upland, is extremely well marked. The dense underbrush of the swamp does not gradually thin out, as we approach the upland, the soil does not become noticeably dryer, nor do we see any scattered pines to indicate that we are approaching the Longleaf country. At a single step we pass from mud to grassy ground, from dense brush to much less obstructed view, from a forest of deciduous trees to a forest of conifers. In rare instances there is a shading off from one to the other, and an intermediate type of forest is formed, containing deciduous trees, Longleaf and Loblolly. For the most part the only conifers found within the swamp limits are Cypress and Loblolly.

During most of the year the swamps are overflowed and water stands in them to a depth of from a few inches to four or five feet. They are traversed by many small streams, and broken by some open bayous into which the water of the river backs during flood time.

V. LOW HAMMOCK.

The swamps are broken by low ridges of dry land varying in width from a few rods to half or three quarters of a mile. These ridges are known locally as 'Low Hammock." They bear a type of forest peculiar to themselves, but have many species in common with the surrounding swamp.

VI. HARDWOOD BOTTOM.

Along portions of the Sabine, the Neches, and the Angelina (more especially the latter) the swamp gives place to broad stretches of flat, dry land of slightly higher elevation. This is described as "Hardwood Bottom," because of the prevalence upon it of deciduous-leaved trees, or "hardwood." Frequently a broad Hardwood Bottom is found

next the river. Back of this comes a stretch of swamp, broken by occasional Low Hammock, and beyond this, in turn, lies the pine country. The difference between the Hardwood Bottom and Low Hammock is physical only. Their flora is identical.

TYPICAL TREES OF SWAMP, LOW HAMMOCK, AND HARDWOOD BOTTOM.

TAXODIUM DISTICHUM (Linn.) Rich. *Cypress.* Swamp. Abundant.

PINUS TÆDA Linn. *Loblolly Pine.* Frequent on border of swamp near Longleaf pine area, and on Low Hammock.

P. ECHINATA Mill. *Shortleaf Pine.* Occasional in same surroundings as foregoing species.

PINUS PALUSTRIS Mill. *Longleaf Pine.* Very rare in Low Hammock or Hardwood Bottom. Never in swamps.

HICORIA AQUATICA (Michx.) Britton. *Water Hickory.* Hardwood Bottom. Common.

HICORIA OVATA (Mill.) Britton. *Shagbark.* Hardwood Bottom. Common.

HICORIA GLABRA (Mill.) Britton. *Pignut.* Bottoms. Common.

HICORIA ALBA (L.) Britton. *Mocker Nut.* Bottoms. Common.

OSTRYA VIRGINIANA (Mill.) Koch. *Ironwood.* Bottoms Not very common.

FAGUS ATROPUNICEA (Marsh.) Sudw. *Beech.* Bottoms. Very common.

BETULA NIGRA Linn. *River Birch.* Bottoms. Uncommon.

QUERCUS ALBA Linn. *White Oak.* Bottoms. Common.

Q. LYRATA Walt. *Overcup Oak.* Bottoms. Rare.

Q. MICHAUXII Nutt. *Cow Oak.* Bottoms. Common.

Q. DIGITATA (Marsh.) Sudw. Bottoms and uplands. Edge of pine area. Common.

Q. NIGRA Linn. *Water Oak.* Swamps and bottoms. Abundant.

Q. LAURIFOLIA Michx. *Laurel Oak.* Not uncommon in Sabine river bottoms.

Q. BREVIFOLIA (Lam.) Sargent. Bottoms. Rare.

MAGNOLIA FŒTIDA (Linn.) Sargent. *Bull Bay.* Swamps and bottoms. Common.

M. GLAUCA Linn. *Sweet Bay.* Bottoms. Very common.

SASSAFRAS SASSAFRAS (Linn.) Karst. *Sassafras.* Bottoms. Rare

LIQUIDAMBAR STYRACIFLUA Linn. *Sweet Gum.* Swamps and bottoms. Very common.

CERCIS CANADENSIS Linn. *Redbud.* Clearings in hardwood bottom lands.

XANTHOXYLUM CLAVA-HERCULIS Linn. *Prickly Ash.* Bottoms. Common.

ILEX OPACA Ait. *Holly.* Bottoms. Very common.

CORNUS FLORIDA Linn. *Dogwood.* Bottoms. Rare.

NYSSA SYLVATICA Marsh. *Black Gum.* Swamps and bottoms. Very common.

NYSSA AQUATICA Linn. *Tupelo Gum.* Swamps only. Very common. Noticeable for the very marked taper of its trunk in the first ten feet. This peculiarity distinguishes all the species growing in the swamps, but is especially noticeable in the Tupelo.

FRAXINUS AMERICANA Linn. *White Ash.* Bottoms. Not common.

FRAXINUS LANCEOLATA Borkh. *Green Ash.* Bottoms. Not common.

F. CAROLINIANA Mill. *Water Ash.* Swamps. Common.

ULMUS ALATA Michx. *Wing Elm.* Swamps. Rare.

CELTIS OCCIDENTALIS Linn. *Hackberry.* Bottoms. Not common.

SAMBUCUS CANADENSIS Linn. *Elderberry.* Bottoms. Not common.

SMILAX RENIFOLIA Small. *Greenbriar.* Swamps. Very common, in places forming thickets that are absolutely impenetrable.

RUBUS CUNEIFOLIUS Pursh. *Blackberry.* Forms dense, often impenetrable, thickets in bottoms. Common also in old clearings.

R. NIGROBACCUS Bailey. *Blackberry.* Common in bottoms and all clearings.

ARUNDINARIA MACROSPERMA Michx. *Cane Reed.* Abundant in a few localities. Dense cane brakes occur at remote intervals in the bottom lands of the Sabine and Neches rivers and a few of their smaller tributaries.

ALNUS RUGOSA (Du Roi) K. Koch. *Alder.* Very common in swamps, forming dense thickets.

In probably few regions are the types of vegetation more sharply contrasted than in the Texan forests, a slight account of which I have here attempted to give. The ecology of this region merits a more thorough study than it was, in the nature of things, possible to give it in connection with the forestry survey. Such a study may, it is hoped, prove possible at some future time.

FIG. 1. Bottom land along Angelina river. Angelina county, Texas.

FIG. 2. View on bottom land along Angelina river. Angelina county, Texas

FIG. 1. Cut-over pine land. A view of what all the pine country is rapidly coming to.

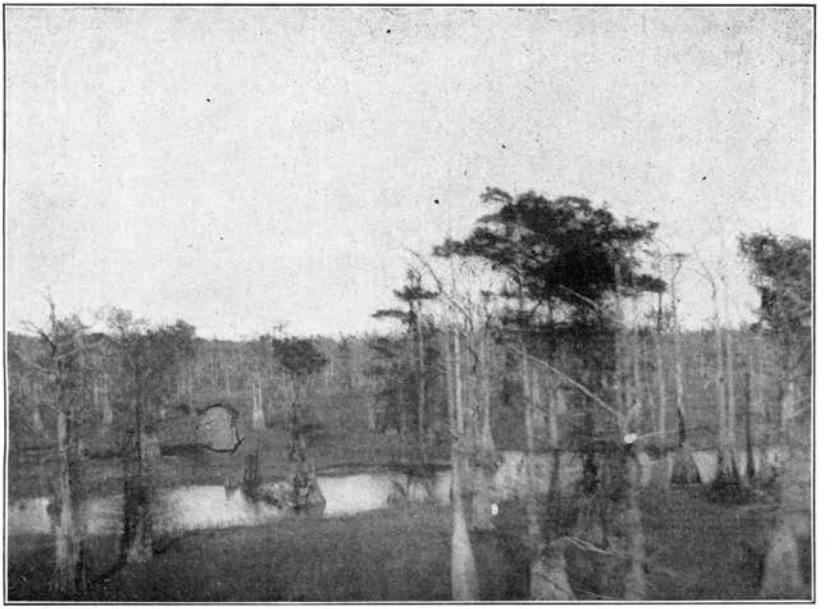

FIG. 2. Louisiana Cypress swamp, near Red river, in very low water; showing great taper of Cypress and Tupelos.

FIG. 1. Virgin Longleaf Pine. Jasper county, Texas.

FIG. 2. Cypress swamp. Jasper county, Texas.