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The information contained in this circular was gathered by a unit of the WPA State-Wide Mineralogical Survey of Texas, a project sponsored by the University of Texas, Bureau of Economic Geology. The purpose of this survey is to assemble information concerning mineral products and to gather other geological data and make it available to the public. With this information in the hands of the public, it is reasonable to suppose that industries of value to the State may be developed. The following report is based on work done in Polk and San Jacinto Counties.

PEAT DEPOSITS IN POLK AND SAN JACINTO COUNTIES, TEXAS*

by George H. Shafer, Supervisor

INTRODUCTION

Bogs from which peat is being produced commercially in Lee County, Texas, have stimulated, in recent months, the search for more such bogs in various parts of the State. These new peat bogs have served to show the possibilities of the industry; also they have revealed in part the geological conditions most necessary for the deposition and accumulation of peat.

No doubt the factors entering into the future of the peat industry will be nearness of the bogs to market, transportation facilities, quality and quantity of the product, ease with which the bogs might be drained to allow gathering of the material, and the price received for the product by the producer.

Geological conditions in Polk and San Jacinto Counties are favorable for peat bogs of two distinct types, namely, old meander scar bogs and "bay-galls."

Additional information on the subject of peat in Texas is contained in circulars of the Bureau of Economic Geology as follows: "Peat Deposits in Texas," by F. B. Plummer, Mineral Resource Circular No. 16, April, 1941; and "Peat Bogs in Gonzales County with Notes on Other Bogs," by Carl Chelf, Mineral Resource Survey Circular No. 34, September 1941.

MEANDER SCAR BOGS

Old meander scar bogs occur about one-quarter of a mile from the present channel of Trinity River and are in a position immediately adjacent to the next highest terrace above the river flood plain. Seep water from the terrace spreads over the scars left by these old meanders and causes a peat bog to form. The underlying bed rock is the Lagarto formation, which consists of thick beds of clay with thin sand breaks. Springs, or seeps from the base of the terrace, supply water to these bogs the year round. Drainage from the bogs is sluggish, and a marshy vegetation establishes itself over the area. Most of the river bogs trend length-wise with the river and are generally a great many times longer than wide. As far as could be determined these river bogs are subject to flooding only in times of extreme floods. During the course of this investigation three old meander scar bogs were discovered along Trinity River. The largest of these, designated Urbana bog, is located in San Jacinto County at Urbana, near the Urbana Gravel Company pit. The next largest is located in Polk County, approximately 2 miles northwest of Blanchard, and for convenience is designated the Blanchard bog. The smallest bog of the old meander scar type is located in Polk County, 3.7 miles southwest of Goodrich, and is designated the Calvin Yates bog. Since these three bogs are very similar in character, except size, only one will be described in this report. Figure 1 shows a sketch of the Calvin Yates bog, described below.

CALVIN YATES BOG

Location. — Directions for reaching the locality are: from the post office at Goodrich go west on Swarthout Road, cross Long King Creek, and take first road leading south. Follow 1.5 miles to road leading to left; follow 2.5 miles to gate leading through fields. Go through gate and follow road along fence trending S. 50° E. Follow to corner of small field (vacant dwelling), then turn right, S. 40° W. on dim road through fields in a S. 35° E. direction to peat bog. Total distance from Goodrich Post Office is 3.7 miles.

The Calvin Yates bog is relatively small. It is 440 feet long, and 250 feet wide at the widest part. It has long been under fence to exclude live stock. Being situated a full quarter of a mile from the present channel of Trinity River, the bog is subject to flooding only in extreme floods. Springs and seeps are numerous from the base of the terrace along the north margin. These continue to flow the year round and provide water to the bog. A very sluggish stream located near the southwest margin affords some drainage from the marshy area. One of the chief properties of the bog is its springiness or property to quake over a considerable area when subjected to a disturbance such as jumping up and down over its surface. Nearby residents, who have been told weird tales about the bog, call it "shaky lake." A rod or stick might easily be run to depths as much as 8 feet into the spongy mass at several places over the bog.

Vegetation covering the bog consists of a variety of water-loving plants such as button willow, weeping willow, tall flaggy grass, water lilies bearing yellow blossoms, smart weed, love-vine, and a variety of ferns and mosses. A variety of vines form a network over some portions of the bog. Being allowed to decay and little disturbed, the vegetation covering the bog is gradually transformed into peat.

General appearance of the peat from the Calvin Yates bog. Vertically over the bog area the peat shows variations in color, texture, and silt content. The upper 6 or 8 inches of the mass is light brown to yellowish gray and is much more fibrous than the peat underlying this zone. Very little silt is present in this upper 6-inch zone. Immediately underlying the fibrous peat zone is a layer or zone of peat

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more brown and less fibrous. This brown to light brown peat is more decayed than the above and contains more silt. It is very spongy and consists of a tangle of twigs, rootlets, leaf particles, and vegetation particles derived from the vegetation covering the surface of the bog. The zone underlying the last mentioned extends from 12 to about 36 inches. At this level the peat is dark brown to almost black. It is more silty than either of the above layers and more finely divided with regard to texture.

The collecting of samples from the bog was made rather difficult due to the super-saturated condition of the bog and to the hand method of collecting. Samples for chemical analysis were collected from points along traverses A-A' and B-B' (fig. 1). The greatest depth from which it was possible to obtain satisfactory samples by hand (trenching and taking cores by hand) was about 36 inches; although it is possible to run a stick into the underlying mass to depth of as much as 80 inches in places. Cores obtained from an open-end $\frac{3}{4}$ " pipe at depths greater than those at which samples were collected by hand showed much more silt contamination.

Chemical analysis. The following table of chemical analysis of samples from the Calvin Yates bog contains analyses made by Paul F. Tapp, Chemist for the State-Wide Mineralogical Survey.

Two lines of data are given for the ash content of each sample. The top line shows the ash content computed on a dry or water-free basis. "Water" listed under the "Remarks" column indicates that the peat sample was super-saturated with water when received in the laboratory, and in some cases the peat was unable to hold this separated water even after a thorough stirring. "Gas" indicates that a definite odor of hydrogen sulfide was noticed when the sample was first opened.

Analyses of samples from Calvin Yates bog.

Traverse	Hole	Depth below surface (inches)	Water content (average) per cent	Ash content (average) per cent	Remarks
A-A'	2	24	91.9	3.7 45.2	Water
C-C'	2	12-18	86.3	7.8 57.6	Water, gas
A-A'	4	18	86.8	5.7 42.8	
A-A'	6	18	91.7	4.0 48.2	Water, gas
A-A'	6	38	88.0	7.8 65.2	Water, gas

Analyses of samples collected from Blanchard bog.

Reference point from east margin of bog (feet)	Depth below surface (inches)	Water content (average) per cent	Ash content (average) per cent	Remarks
25	12	81.6	11.2 61.6	Water, gas
50	12	75.8	17.0 70.0	Water
150	24	85.6	8.3 59.6	Water

"BAY-GALLS"

Marshes, bogs, or low-lying areas supporting a dense growth of shrubby bay trees are known locally as "bay-galls." These are not of river origin but rather owe their existence to perched-water conditions in the Willis formation. Spring water seeping from the Willis formation, which consists chiefly of unconsolidated sands and gravel, spreads over low-lying, impermeable Lagarto clay areas, thereby creating a marshy condition the year round. Vegetation of a water-loving variety adapts itself to the area and later decays to various degrees. Ultimately peat is formed. "Bay-galls" occur as marshy areas along spring branches and as depressions in true pond shape. It is only in the true pond-shape types, however, that peat is allowed to form undisturbed, for flooding of the spring branches tends to destroy the conditions necessary for the formation of peat; also flooding of such areas too frequently tends to render the peat too silty to be of commercial use. The Gerlach-Griffin bog is a true pond-shaped "bay-gall" and is described below.

GERLACH-GRIFFIN BOG

Location. To reach this locality go east from Livingston 7.8 miles (to Soda community); turn southwest, cross Bluff Creek, and take right turn a few hundred feet from Buck Richardson's house. Continue on this road to the Carrie Lee Chambers farm. Take road leading east from Chambers' house and follow .4 mile. The bog is situated about 50 feet south of the road at this point.

The Gerlach-Griffin bog covers approximately eight acres. It is U-shaped and is poorly drained by a number of almost stagnant branches. It is crossed with great difficulty due to the dense thicket of bay trees and other shrubby vegetation. Near the north margin of the bog a test hole was dug to determine the thickness of the Willis formation, which forms the outer slopes of the bog. Quicksand prevented reaching a depth beyond 10 feet. Several large springs and many small seeps feed the marshy area the year round. The surface of the bog is quite springy, especially over those parts where larger trees are not present, for the larger roots of these trees tend to check this property. Over many places it is possible to run a stick into the peaty mass from 4 to 6 feet, but it is a difficult task to

sidetrack the network of larger roots even with a stick small in diameter. Inhabiting the marsh are many snakes and frogs. Some tracks of opossum and raccoon were noted, but it is reported that hogs in the vicinity are not known to venture very far into the marshy area. The danger of "bogging" seems less in comparison with the peat bogs along the Trinity River. This is due to the root entanglement of larger roots. Several large trees that had fallen, perhaps as a result of too little soil support around the roots, bore a thick crust of peaty subsurface together with a light green fluffy sphagnum moss attached to the roots. A part of the moss had decayed and appeared to be about the same color as the underlying brown peat and no doubt is one of the chief plants contributing to the make-up of the peat. In addition to bays and moss covering the bog there are magnolia, "possum haw," tupelo gum, myrtle, holly, and a variety of ferns, mosses, grasses, lillies, and other water-loving plants. The light green fluffy moss is most abundant along the margins of the stagnant branches transversing the bog.

General appearance of the peat from Gerlach-Griffin bog. Peat underlying the Gerlach-Griffin bog is dark brown. By comparison it contains less silt than the old meander scar bogs along Trinity River. At depths beyond 3 feet the peat becomes more finely divided and thoroughly saturated. A large sample was collected from a 2-foot depth and allowed to dry to a barely damp condition. After two days it was mixed with some of the dry, partially decayed sphagnum moss, which also was collected from the bog. The resulting mixture was found to resemble the type of peat moss used by many florists to protect plant roots in shipping. Separate samples of the moss and of the peat were collected for chemical analysis, the results of which are shown in the tables below.

Analysis of samples from Gerlach-Griffin bog.

<i>Reference point</i>	<i>Depth below surface (inches)</i>	<i>Water content (average) per cent</i>	<i>Ash content (average) per cent</i>
		<i>Moss</i>	
Central portion of bog	0	85.0	1.4 10.1
		<i>Peat</i>	
Central portion of bog	6	76.9	7.1 30.5
Central portion of bog	12	86.3	3.9 28.2

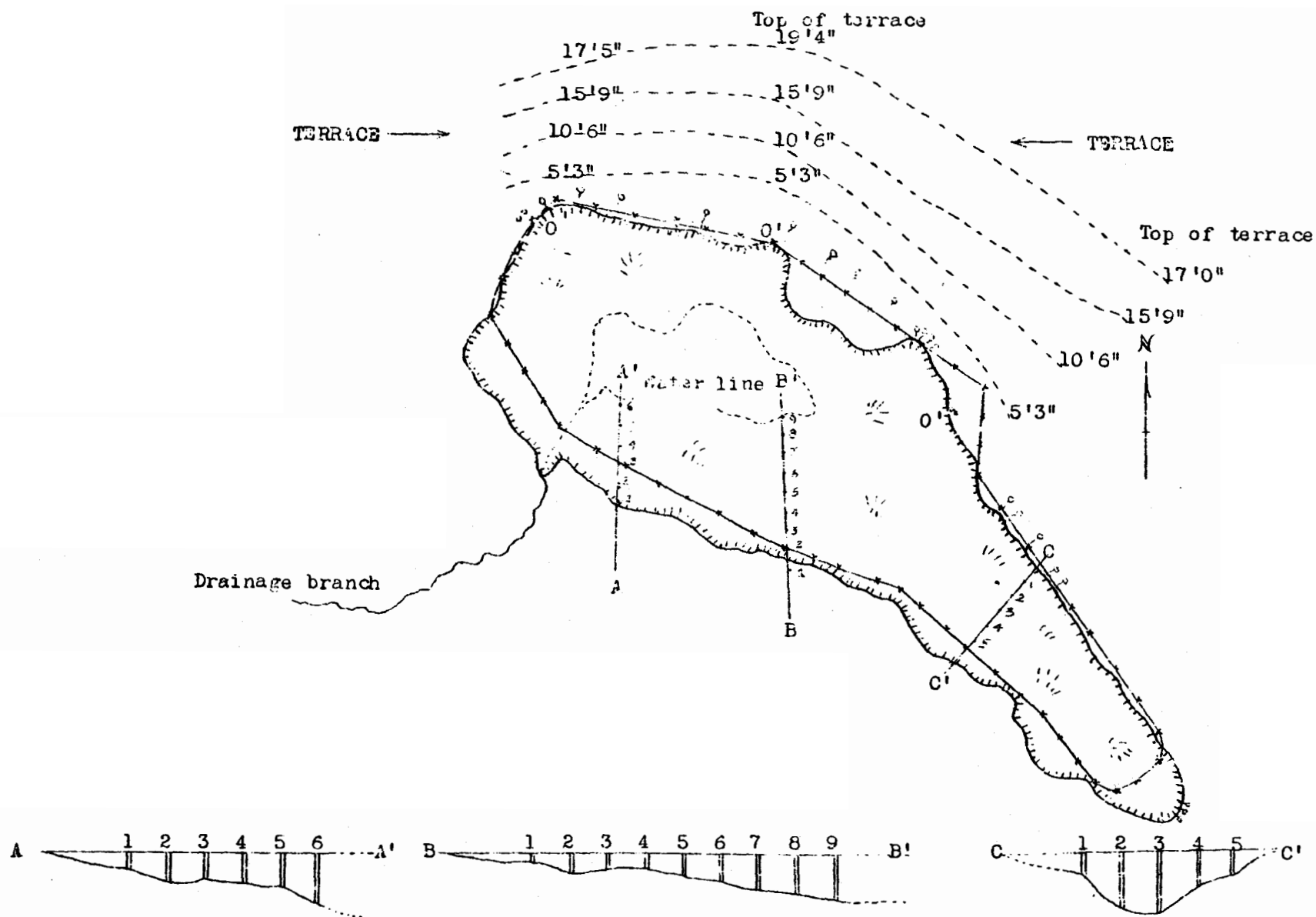


Figure 1. Map and cross section of Calvin Yates peat bog, Polk County. Scale of map: 1 inch - 80 feet. Scale of cross section: horizontal, 1 inch - 40 feet; vertical, inch - 200 inches.