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MINERAL RESOURCE SURVEY
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A mineral resource survey of Texas has been started by the Works Progress Administration, the Bureau of Economic Geology of The University of Texas acting as sponsor. The purpose of the survey is to assemble information and make it available to the public. Through a separate project, sponsored by the State Planning Board, the results of the survey, as they are received in Austin, are being assembled for publication. The mineral resource survey is helping in the location of mineral products, from some of which it is reasonable to suppose industries of value to the State may be developed. The following report is based on work in Falls County.

REPORT ON A RIVER TERRACE INVESTIGATION AS PART OF A MINERAL RESOURCE SURVEY IN FALLS COUNTY, TEXAS

by Jesse Hatch, Supervisor

Cutting its way easily through the marls, soft chalks, and sands of the Taylor, Navarro, and Midway formations, the Brazos River flows through Falls County in a broad, shallow channel. In the western part of the county, its meanders carry it from one side to the other of its valley which in some places is more than 5 miles wide. However, near the entrance of Cow Bayou tributary, the river swings to the right side of the valley. Remnants of channels show that the river formerly meandered through the valley, but at the present time the river channel in this part of its course meanders but little and hugs the right bluff closely.

At higher levels on either side of the river are remnants of former valleys made before the stream had cut its present level. These old valley remnants, together with the present valley, present a fine development of terraces on the river. The primary purpose of this work has been to locate and distinguish between the different terraces of the Brazos River and its tributaries and to determine the location, quantity, and composition, as nearly as possible, of the gravel deposits within these terraces.

The lowest and most recent terrace, still in process of building, is the present valley, the surface level of which is approximately 25 feet above low water level in the river. At high flood stage the river expands as a flood sheet depositing sediments over much of this bottom land, thus building the terrace and adding to the fertility of the soil.

Near the Falls of the Brazos and at several other localities downstream, gravel is exposed in this terrace. At many places a firmly cemented layer of gravel, 6 to 18 inches thick, is found beneath uncemented gravel. The gravel of this terrace is composed of flat oval-shaped or slightly rounded pebbles up to 6 inches in diameter and rounded iron-stained sand. The smaller pebbles, consisting of quartz, chert, limestone, and claystone, are mostly angular. Red alluvial clay overlying the gravel of this terrace makes a very good grade of clay for brick and tile manufacture. This clay is utilized by a brick factory, one mile southwest of Marlin. The ruins of an older factory are located in the Big Creek vicinity south of Marlin.

Other exposures were as follows: A pit on the left bank of the river near Sunset, elevation of top of gravel above water level 28 feet; a pit on the Goode farm on the right bank of the river near Cedar Springs, elevation of the top of the gravel above low water level 30 feet; right bank of the river in the eastern part of the county near Wilderville, elevation of the top of the gravel above water level 25 feet; and an exposure on the Westbrook farm southeast of Satin, where gravel comes to the surface on the right bank of the river and extends below water level in the river.

The second terrace, that is, the first terrace above the river valley, is about 45 to 50 feet above low water level in the river. Due to unequal erosion, the height is not constant at all places. Erosion has, in fact, progressed to such an extent that only scattered remnants of this terrace remain. The gravel deposits in this terrace are very similar in character to those of the first terrace with the exception that more sand is present and the pebbles as a rule are smaller. Clay inclusions measuring as much as 8 to 12 inches in diameter are scattered throughout the deposits. There are also some water-worn boulders of large size.

Remnants of this terrace are found on both sides of the river valley, the largest areas being in the western part of the county. From somewhat below the entrance of Cow Bayou, where the river flows near the right side of the valley, to the east county line, no part of this terrace remains.

Several gravel pits are operating in this terrace. Among these are the Boui, Kaiser, and Sloan pits west of Marlin; the Scott and Levy pits on the right side of the river valley north of the Belton-Chilton public road; and the Meyers pit on the left side of the river valley in the southeast part of the county near the east county line. Elevations from low water level in the river to the top of the gravel in these pits vary from 40 to 48 feet. At the Boui and Kaiser pits, bed rock under the gravel is found at a depth of 25 feet above low water level in the river. The thickness of the gravel at these pits is from 10 to 15 feet. In the Marlin city pit 10 to 12 feet of red clay overlie most of the gravel.

The third terrace reaches a height of 90 to 100 feet above low water level in the river and has a wide areal extent. It is cut by numerous ravines and small streams. This terrace is the source of most of the gravel used in road construction throughout the county. The gravel in most places is from 10 to 15 feet thick with a hard cemented conglomerate layer at the base as much as 3 feet thick. Flat, water-worn boulders of sandstone and fossiliferous limestone are found in this terrace, some of which reach a diameter of 3 or 4 feet.

Among gravel pits which are being operated on this terrace are the following: pit on Thigpen farm just southwest of Cow Bayou on the north side of bridge along Satin-Marlin road, elevation above low water level in the river 103 feet; pit belonging to the city along the Belton road on the Belton land, northwest of Marlin, elevation above low water level in the river 80 feet; pit on R. Stevens farm east of Highbank, elevation above low water level in the river 90 feet; pits on Labarberra farm which joins Stevens farm, elevation above low water level in the river 90 feet; pits on the Goode farm southeast of Cedar Springs, elevation above low water level in the river 85 feet; and pits on Heyer farm northwest of Marlin on Rock Dam road.

Remnants of a fourth terrace are found from 150 to 200 feet above low water level in the river. This high gravel is characterized by an abundance of large rounded flint and chert nodules in a matrix of very small quartz and chert pebbles. The gravel deposits are located in shallow pockets scattered about the hill tops. They are non-calcareous in all places studied except in a small gravel pit on the Miller farm about 3 miles north of Perry and 1 mile east of the Waco-Marlin highway, where about 8 inches of gravel in the lower part of the deposit is cemented by calcium carbonate. Above this is 3 feet or more of gravel composed of small chert, quartz, and igneous pebbles without any calcium carbonate whatsoever. This deposit is found on the highway near Perry.

Reworked Cretaceous fossils are abundant in terraces one, two, and three. These fossils were absent from terrace four at all localities examined except on the Miller farm, where a very few well-worn shells were found in the lower part of the pit. Fossil remains of vertebrate animals including elephants were found in terraces one, two, and three but not in terrace four.

Springs and shallow wells in the first, second, and third terraces furnish an abundance of good water. In this county, these gravels are the only source of potable water other than streams. Wells 1500 to 3000 feet deep furnish an abundance of hot mineral water. Because of this, Marlin has become widely known as a health resort. Marlin obtains water from Lake Stalworth on Big Sandy Creek.

Economic Results

The examination of the terraces resulted in the location of gravel deposits, some of which will be utilized in road building. Deposits now being worked contain enough gravel and sand to last for years, but in many cases the distance the gravel must be hauled is so far that their use is uneconomical. The purpose of the present investigation was to locate gravel deposits close to sites where they are needed. One important result of this work was the discovery of high-grade gravel for surfacing the St. Paul road. This gravel, which is a part of the high terrace deposit, was found on the Charles Schraeder farm south of the Alexander school. Previous to the finding of this deposit, gravel was being hauled 10 miles, and now a haul of less than 1 mile is necessary. A deposit in the third terrace was found on the W. E. Derden farm west of the river near Deer Creek. Plans are being made to use this gravel on part of the new highway from Lott to Marlin. The deposit is within one-half mile of the highway and much closer than any other known gravel. A deposit found in the high terrace deposits on the Silverman farm, about 5 miles from Marlin along the Waco highway, if used in this area, will reduce the distance gravel must be hauled, thereby creating a substantial saving. A deposit found in the second terrace on the Jackson farm east of Wilderville is now inaccessible, but may be utilized in the future.