

THE UNIVERSITY OF TEXAS
Bureau of Economic Geology

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THE FIRST QUARTERLY REPORT
Covering The Quarter Ending June 30, 1939
For The
THE STATE-WIDE PALEONTOLOGIC-MINERALOGIC SURVEY
In Texas

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A WORKS PROGRESS ADMINISTRATION PROJECT

1939

PALEONTOLOGICAL-MINERALOGICAL SURVEY
QUARTERLY REPORT
for APRIL, MAY, AND JUNE, 1939

The State-Wide Paleontologic-Mineralogic Project in Texas (Official Project No. 665-66-3-233) which is conducted by the Works Progress Administration with the cooperation of the Bureau of Economic Geology, The University of Texas, began operations with the starting of two field units on March 5, 1939. This report for April, May, and June will cover the activities of the several units of the project from March 5 through June 30, since the short time which the project operated in the first quarter of the year did not warrant a separate quarterly report.

At the close of the second quarter of this year, the headquarters unit, four field units and two laboratory units were operating in the State. A total of 97 certified workers and 7 non-certified workers were employed on the several units. These units were all organized with a minimum of difficulty, and all are operating as successfully as can be reasonably expected. Due to a shortage of available labor some of the units are operating with smaller crews than was indicated in the project proposal. This shortage of labor, however, has not been a serious handicap to the progress of the project, since a large part of the necessary excavating in the first months of a project of this kind is of an exploratory nature, and does not always require a large crew.

The four field units now in operation are all engaged in collecting vertebrate fossils, and the two laboratory units are occupied exclusively with preparing and restoring the fossil material obtained by the field units. The results of the project as a whole have been remarkably good, and especially is this true when considering the comparatively short operating time, and the fact that all the certified workers have required special attention and training in the proper methods of collecting or preparing fossils. Several hundred fossil specimens, some of which have a great deal of scientific importance, have been

collected; a part of the fossils have been prepared and are now ready for study or for exhibition purposes. Most of the fossils were collected from the Pliocene and Pleistocene rock groups, but a few specimens have also been recovered from the Miocene and the Permian. The different field units have discovered and opened several previously unknown fossil beds, thus adding to the knowledge of the distribution of some of the extinct vertebrate forms. In addition to the localities already worked, some additional sites which have good possibilities of yielding fossils have been found, and will be excavated at a future time. One of the field units of the project has developed one of the most prolific and important vertebrate fossil beds to be found in Texas during recent years.

FIELD UNIT NO. 1, WORKS PROJECT NO. 12510:

This field unit which was set up to operate in Victoria, Goliad, Karnes, Bee, Jackson, and Lavaca Counties, started operations on March 5, 1939. From the opening date to June 30, this unit has employed an average of 15.5 certified workers and one project supervisor. The field unit headquarters is at Beeville, Texas, and the operations to date have been exclusively in Bee County with the exception of a few days of reconnaissance on the part of the supervisor in Karnes, Goliad, and Lavaca Counties.

The principal fossil bed to be worked by the Beeville field unit is known as Site - 1, Buckner Ranch locality. This locality is on Blanco Creek about 13.2 miles east of Beeville, and on the east boundary of Bee County. At Site - 1 fossils are being collected from two different horizons in the same excavation. The uppermost of these fossil horizons is from 12 feet to 16 feet below the land surface, and is in a stream terrace of probable late Pleistocene age. The fossils from the terrace horizon are not abundant, but they have a great deal of importance because of associated artifacts in the basal terrace gravels, and because they

give a clue as to the geologic age of the terrace. The fossils recovered from the terrace level include molars and limb bones of Equus, Elephas, and Bison. There were also found a number of fragments of turtle carapace and other bones too fragmentary for identification.

The lower fossil horizon, which is separated by pronounced unconformity from the overlying terrace, is from 20 feet to 22 feet below the present land surface, and is in the Goliad formation. The exact vertical position of the fossil bed in the Goliad (Pliocene) is not known, but the age of the fossil bed is tentatively regarded as late middle or early upper Pliocene. This site has been worked extensively by the project, but at this date the outer limits of the bed have not been reached in any direction. Excavations have demonstrated that the fossil bed extends for more than three hundred feet, at least, in one direction.

The fossil bones occur along an erosional contact of a coarse-grained, partly consolidated, calcareous sandstone with an overlying bed of bentonitic clay. The sandstone has an undulating surface forming low, narrow swells and depressions. The bottom of the depressions are seldom more than two or three feet lower than the crests of the intervening swells or ridges. These depressions probably represent shallow ponds of Pliocene times, for they contain large concentrations of fossil bones and several varieties of fresh water mollusks. The crests of the higher ridges are usually barren of vertebrate fossils at and above the contact surface, although some teeth and bones of equids and reptiles were found in the sandstone on the ridges. In the depressions, the fossil bones are found in both the sandstone and clay strata, but are rarely more than one or one and a half feet above or below the contact surface. The bentonitic clay has a strong tendency to expand and contract on becoming wet and dry. The wide cracks which develop as the clay loses its moisture have caused the enclosed bones to break in many places; consequently, the fossils are frequently badly distorted,

and in poor condition of preservation. This condition, together with the fact that fossils are often closely interlocked with each other, makes collecting a difficult and painstaking task.

By far the most abundant of the fossil bones found at the Buckner Ranch locality are those of a long-jawed variety of mastodon. At least nine different individual mastodons are represented in the bones already collected. The specimens collected include two skulls with articulated tusks and lower jaws, one skull with tusks but lower jaw disconnected, five additional nearly complete lower jaws--some of which exceed four feet in length, a large number of vertebrae, ribs, pelvises, scapulae, limb and foot bones.

The mastodon belongs to the genus Tetralophodon or a closely related genus, but has not been specifically identified, as a complete description will require a great deal of study and exhaustive reference to the published literature, and must necessarily await the time when at least one complete skull, as well as other skeletal parts, have been cleaned, prepared, and restored for study. However, a preliminary study of the mastodon bones strongly indicates that this is a new, previously undescribed species of mastodon.

Next in abundance to the mastodon material at the Buckner Ranch locality is the fossil remains of equids. At least two genera of the Pliocene horse, including the three-toed Nehipparion and the smaller Nannippus are represented. At the end of June, 1939, about thirty isolated teeth, two broken mandibles, one skull, two metatarsals complete, and several phalanges had been collected. A number of badly cracked and decomposed bones which probably belong to the horses are found, but more often than not, they are too poorly preserved to be identifiable, and are not worth collecting.

The horses are very important as fossils, and can usually be specifically identified from as little as a single upper molar. As more of the horse remains are collected, it will no doubt be possible to make certain important faunal

correlations with the Pliocene vertebrate beds of Western Texas and Oklahoma where large collections of fossil horses have been made.

The remains of camel are next in abundance to the horse, but like the horse and other smaller animals, most of the bones are badly decomposed. The teeth and a few of the more durable skeletal bones are all that have been preserved well enough for identification. There are two camels which appear to be Altecamelus and Procamelus represented by the two jaws and numerous isolated teeth that have been collected.

In addition to the animals already listed from the Buckner Ranch locality are Prosthennops, a Pliocene peccary; Merycodus (?); and numerous fragments of turtle carapace and alligator teeth.

As this site is being worked more completely, there is every reasonable expectation of getting a very valuable faunal assemblage, and that this site will become the type locality for one or more new species of animals.

The Bee County field unit has also worked to a limited extent two other sites on the Buckner Ranch. Both of these sites, which are designated as Sites 2 and 3, are in the same terrace as the upper fossil horizon at Site 1. These sites have yielded three excellent molars and some broken limb bones of elephant, and a complete radius with articulated ulna of Bison. These two sites have not been worked enough to prove their value. It is hoped that during the next quarter year the sites can be adequately tested, since both have good possibilities of yielding important Pleistocene fossils.



Meander-cut Bluff of Blanco Creek,
Adjacent to Site-1 Buckner Ranch Locality



Excavation Well Advanced at Site-1
Buckner Ranch



Fossil Bones at Site-1
Buckner Ranch Locality

FIELD UNIT NO. 2; WORKS PROJECT NO. 12592

This field unit which is set up to operate in McMullen, Live Oak, and Atascosa Counties, started operations on March 5, 1939. The unit headquarters has been in George West, County-seat of Live Oak County, since the project was started, and all operations have been confined to Live Oak County. The average number of certified workers to June 30 was 12.5.

At the end of the second quarter of this year, the Live Oak County unit had worked in seven different fossil sites, six of which were in Pleistocene terrace deposits, and one in the Catahoula Miocene. None of these work sites have proved especially prolific, but all have yielded some important fossils. All but one of the seven work sites were new discoveries in that they had not been previously worked, and were not recorded in the literature. The aid of this unit has been to excavate a number of the prospective fossil localities recently found in Live Oak County to obtain such specimens as were exposed, and to determine if other fossils were present. The reason for working a number of localities is to get a larger variety of fossils from as many as possible of the different formations exposed in Live Oak County, and to increase the chances of finding an unusually important bone bed.

The first locality to be worked by the Live Oak County field unit was on Largarto Creek on the Dougherty Ranch, in the southern part of the county. Site 1 at this locality yielded a truncated skull, the articulated cervical and dorsal vertebrae, a scapula, tusks, and a number of ribs of a large elephant. The skull of this elephant has not been prepared and restored, and consequently, has not been specifically identified. All the bones collected at Site 1 belong to the same individual, and were in excellent condition of preservation. The fossil bones were found at the base of the second terrace of Largarto Creek in a bed of fairly compact gravelly sand. The age of this terrace is regarded as

late Pleistocene, although much remains to be learned of the age of the various stream terraces and their fauna. The excavations at Site-1 on the Dougherty Ranch demonstrated that at least some of the proboscideans were living at the time of the formation of the lower terraces.



Excavating Elephant Skull at Site-1
on Largarito Creek



Articulated Vertebrae of Elephas at Site-1,
Dougherty Ranch Locality in Southern Live Oak County

Site 2 of the Dougherty Ranch locality, about one-half mile down stream from Site 1 was worked for only a comparatively short time, since the fossil bones were mostly badly broken, and had been secondarily deposited from an indeterminate source. The occurrence of fossils at Site 2 on the Dougherty Ranch is typical of many fossil deposits in fluvatile sediments. In such deposits, it is often impossible to determine whether the fossil material is of primary or secondary deposit without excavating the site. When all of the fossil material is found to be of secondary nature, a site is usually abandoned, because only a primary deposit will give a true picture of the fauna of any given formation.

Site 3 in Live Oak County is on Sulphur Creek, 3 miles north of Ray's Point

and one-half mile north of the new State highway between Three Rivers and Kenedy. Excavations at this site resulted in the discovery of mastodon, elephant and horse fossils; all from the same general horizon in a terrace of Sulphur Creek. A part of the fossils collected had been exposed by weathering in the highly eroded terrace face, and had become badly damaged before they were discovered by the field unit. However, all the fossils which had not been exposed to weathering were in very good condition of preservation. The mastodon material includes one lower jaw with molars in place, a number of ribs, and some articulated vertebrae. The elephant material includes some good limb bones, molars, and other skeletal parts. Enough of the elephant bones were found to show that at least two, and perhaps three, individual animals were represented. The horses found at Site 3 (Equus sp.?) were represented by a number of superior and inferior molars, as well as some rather fragmentary bones.

This site was easily excavated as most of the original overburden had been removed by erosion; the average thickness of the overburden stripped from the fossil bed would hardly exceed three feet. However, the site has the disadvantage of being so deeply eroded that much of the fossil material has been partly or completely ruined by decomposition. Also, the fossils are rather widely scattered and a considerable area must be excavated to recover a representative fauna.



Eroded Terrace at Site-3, Live Oak County



Limb Bones of Elephas at Site-3
Sulphur Creek, Live Oak County



Radius-Ulna (articulated) of Elephas
at Site-3 on Sulphur Creek, Live Oak County



Mastodon Jaw with Molars
Found at Site-3, Sulphur Creek

Site 4 of the Sulphur Creek locality is on the Gilmore Survey, in a bluff of Sulphur Creek and approximately 3 miles downstream from Site 3. This site yielded only one femur and one humerus of elephant, which were found at the base of the stream terrace. The work site was abandoned within a short while because of the scarcity of fossils and the comparatively thick overburden.

Site 5 is located on the Butler Ranch on Elm Creek, $2\frac{1}{2}$ miles southeast of the Magnolia Booster Station in the northern part of Live Oak County. This site, which is also in an eroded stream terrace, showed considerable evidence of vertebrate fossils on the surface, but exploratory excavation revealed that the fossils present were in such fragmentary condition that they were not worth collecting. The only specimen collected at this locality was a molar of Elephas.

Site 6 of the Elm Creek locality is 2 miles east of the Magnolia Booster Station, and about 300 feet below the bridge over Elm Creek on the Pawnee Road. This site was in the Catahoula sandstone of Miocene Age. The fossils recovered included three articulated vertebrae, two ribs, and other skeletal elements of rhinoceros. The fossils all belong to one individual and did not include enough of the diagnostic bones to ascertain the particular genus of the rhinoceros. This site, like practically all other vertebrate fossil occurrences in the Gulf Coast Miocene that have yet been found, contains only a very few poorly preserved fossils. It is to be hoped that future work will uncover a good fossil bed in the Miocene rocks of South Texas.

Site 7 worked by the Live Oak County field unit is on Largarto Creek on the Dougherty Ranch, some $3\frac{1}{4}$ miles upstream from Site 2. This site produced a number of bones of both horse and elephant, but all were in rather poor condition of preservation, and were badly broken and scattered. The site helps to demonstrate the abundance of elephants and horses of the late Pleistocene times, but is not considered as worth working for more than a limited time.

FIELD UNIT NO. 9; WORKS PROJECT NO. 13129

This field unit, which is proposed to operate in Henderson and Anderson Counties, started operations on April 17, 1939. This unit has employed an average of 13.66 certified workers from its opening date to June 30. The field unit headquarters are at Athens, Texas, the County-seat of Henderson County, and all operations have been confined to one general locality in Henderson County.

The Henderson County field unit has excavated in only one work site during its operating time, but some reconnaissance has been done in various parts of the county. The object of this unit has been to locate and collect vertebrate fossils from a high terrace of Trinity River. This particular terrace known as Terrace "C" from which collections are being made is an important stratigraphic unit in that it covers a considerable areal extent, and is unusually well developed. This terrace is composed primarily of sand and gravel with lentils of alluvial clay; it has an average thickness of at least 50 feet. The river terraces present several unsolved problems in geology, particularly as pertains to their age and the conditions responsible for their accumulations. It is, therefore, desirable to obtain a complete or nearly complete fauna from such of the terraces as are well defined and are mapable units because from the fossils a great deal of the history of the enclosing sediments can be interpreted. Fortunately one or more fossil localities are known in Terrace "C".

Site 1 on the Leo Boatwright farm locality is about 3 miles north and west of Trinidad in the western part of Henderson County. This site is on the eroded slope of the riverward margin of Terrace "C". The site was first opened as a prospect for sand and gravel, but was not developed due to the presence of clay and other foreign material detrimental to the value of the gravel. Some fossil bones were discovered when the pit was first opened, but it was not until the Paleontological field unit started operations that any systematic search was

made for the fossils.

The field unit has enlarged the area of the original pit, and has deepened it to the extent of reaching bedrock beneath the terrace gravels. Since the work site is on a long slope, it was necessary to dig trenches around the uphill margin to prevent surface water from filling the pit during rains.

This site has produced a number of unusually well preserved fossil bones and teeth. The horses (Equus complicatus ?) are by far the most abundant faunal element found in the Boatwright pit; they are represented by a large number of superior and inferior cheek teeth and limb bones. Next in abundance to the horses are the camels and deer; two groups which occur in about equal abundance in the pit. The camels are represented by teeth, limb bones, and fragments of jaws. The fossils of deer include jaw fragments with teeth, isolated teeth, fragments of antlers, and other skeletal parts. The most striking fossils to be obtained from the Boatwright pit were two very good skulls, one of the ground sloth Megalonyx, and one of the Columbian elephant. These two skulls because of their rarity and their exceptional preservation are among the most important fossils to be collected by the Paleontological survey during the first quarter year of its operation. In addition to the vertebrate forms already listed, remains of beaver, turtle, bird, and mastodon have also been found in the Boatwright site.

All of the fossils occur in the basal ten or twelve feet of the terrace material, with the largest concentration in the basal five or six feet. The material enclosing the fossils is a stream-laid sandy gravel with included clay lenses. The gravel is locally partly consolidated by secondarily deposited calcium-carbonate, but for the most part, it is unconsolidated and easy to work.

It is planned for the Henderson County field unit to continue excavating at the Boatwright pit until the fossil bed has been worked out, or until a fairly complete fauna has been collected.



Pit at Boatwright Locality



Views of Excavated Portions of Boatwright Pit



Section in Boatwright Gravel Pit
showing the section of cross-bedded
gravel which contains vertebrate fos-
sils. Note bed of alluvial clay at
base of gravel.



Section of East Side of
Boatwright Gravel Pit



Skull of Elephas from Boatwright
Pit (in Plaster Cast)

FIELD UNIT NO. 7; WORKS PROJECT NO. 13107

This field unit began operations on April 18, 1939 and is proposed to operate in Taylor and Nolan Counties. The unit headquarters are in Abilene, and the work to June 30 has been confined to several localities in Taylor County. The unit has employed an average of 19.33 certified workers.

This unit has been used to excavate several localities in the terraces and valley-fill of some of the larger creeks in Taylor County, and to investigate a reported fossil plant locality on the north side of Abilene. These sites had not been previously worked for fossils; so all excavations to date have been of exploratory nature. The sites which were opened were at places where evidence of fossils had been found, and where the possibilities of obtaining other fossils seemed good.

The first two sites to be worked were near small gravel pits in the terraces of Elm and Lytle Creeks on the south and east side of Abilene, and near the city limits. Both of these sites contained fragmentary bones of elephant and bison. A few skeletal remains of bison were collected in the first site, but neither produced enough worthwhile material to justify extensive excavations.

Another site, at the brick kiln yards on the north side of Abilene was worked for a short while on the basis of some fossil leaf imprints which had been found in the Clear Fork Permian sandstones at that locality. A few leaf impressions were recovered, but they were found to be too scattered and in too poor a condition of preservation to warrant the opening of a quarry.

The fourth site to be worked by the Taylor County unit was at Castile Peak, approximately 9 miles south of Merkel in the western part of the county. This site was worked only a few days, since a considerable number of the Permian reptile tracks which occur at Castile Peak can be collected in a short while. The tracks are found in thin-bedded sandstone which is exposed in a ravine on the north slope of Castile Peak.

Site 5 on the Guitar farm locality is located on Lytle Creek, about .4 miles south of the Guitar farm house, and about $4\frac{1}{2}$ miles south of the Taylor County Courthouse. This site was excavated rather extensively in an effort to obtain a good collection of fossil elephant remains. Parts of tusks, teeth, and limb bones were recovered at different places in the excavation, but due to the fact that the enclosing material had been reworked by stream action, the bones were either lost or broken. This pit was abandoned at the close of June, 1939.

In addition to the excavations at the above listed sites, some 15 additional potential fossil sites were given preliminary investigation. At least three of these sites, one about 4 miles west of the View Community on the Parmally farm, and two in the Permian beds in the southern part of the county, show good surface evidence of being important fossil localities. At one of the Permian localities some two hundred separate bone fragments were collected within a few hours. There can be but little doubt that some or all of these sites will yield important fossils when they are excavated.

SAN ANTONIO LABORATORY UNIT; WORKS PROJECT NO. 12511

The San Antonio Laboratory Unit was started on March 15, 1939; it employed an average of 11.5 certified workers and the chief preparator who is the Project Supervisor. This unit is located at 331 East Market Street, San Antonio, where adequate space and equipment are provided for a small preparators' laboratory.

This unit has been engaged in cleaning, preparing, and restoring vertebrate fossils collected by the Bee County and Live Oak County field units. Considering that none of the certified workers in the laboratory had any previous training in preparing fossil bones, and that most of the specimens on which they were required to work were in poor condition of preservation, the San Antonio Laboratory

unit has made remarkable progress in both the quality and amount of work accomplished.

On June 30, 1939, a total of 174 fossil specimens had been prepared by the San Antonio unit and 21 additional specimens were in the process of preparation. Most of the prepared bones were of the proboscideans, and included some of practically all the skeletal parts with the exception of skulls. However, some bones and teeth of both the fossil horse and bison were also prepared in the laboratory. Approximately 20 per cent of the prepared specimens are the larger skeletal elements such as scapulae, pelvises, mandibles, and the larger limb bones. The remaining 80 per cent of the specimens consists largely of vertebrae, foot bones, and ribs.

The prepared and restored fossils are transferred to the University of Texas where they are given their accession number, and are then available for study and for exhibit in the Texas Memorial Museum.

THE AUSTIN LABORATORY UNIT; WORKS PROJECT NO. 13419

The Austin Laboratory unit was started on June 15, 1939, and is located at the Bureau of Economic Geology at 18th and Red River Streets. This unit employed an average of 20 certified workers and one chief preparator, the project supervisor, during the two week period which it operated in the second quarter of this year. This unit was established because the various field units are collecting several times as many fossils as can be prepared by the small San Antonio unit, and especially because such large specimens as skulls can not practically be transported after they have been prepared and restored. This unit, being located in Austin where the fossils are to be kept in permanent storage and where all mounted specimens must be assembled, has a distinct advantage in its location.

The Austin laboratory has adequate space and equipment for about thirty