NEWSLETTER

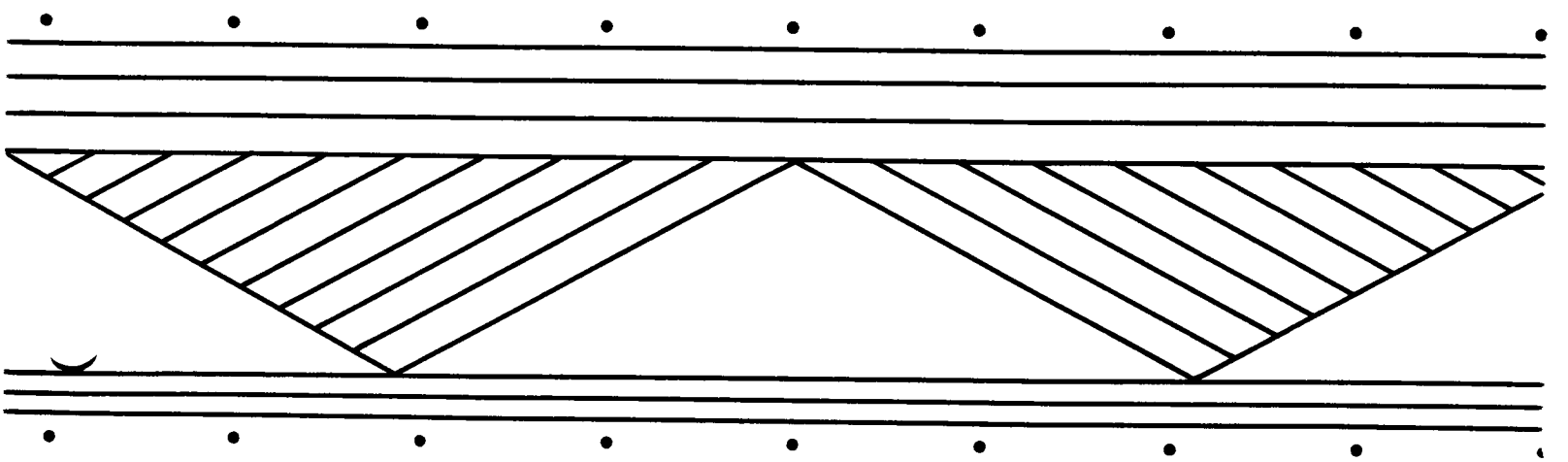
of the

HOUSTON ARCHEOLOGICAL SOCIETY

Number 26 October 1968

"Will I leave only this:
Like the flowers that wither?
Will nothing last in my name --
Nothing of my fame here on earth?
At least flowers! At least songs!"

-- Songs of Huexotzingo



The Newsletter is published four times per year by the Houston Archeological Society. Contributions of news items, short articles and information of archeological significance should be sent to the Editor - Alan R. Duke, 1706 Oaks Drive, Pasadena, Texas 77502.

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Officers 1968-69

Chairmsn - Charles K. Chandler, 1151 Chamboard, Houston, Texas

Sec.-Treas. - Ann Childers, 3915 Swarthmore, Houston, Texas

Directors - Alan R. Duke
Jay W. Sharp
Frank J. Brezik, Jr.

The Nominating Committee for the election was as follows:

Murray Robinson - Chairman
Elaine Burleigh
Shirley Thompson

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Front Cover

This lament is carved into a stone wall of Mexico's National Museum of Anthropology in Mexico City and was composed by Aztecs soon after the the Spanish conquest of Mexico. The fabulous museum is described in the October issue of National Geographic Magazine. The article and map supplement are well worth perusing.

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Past and Future Programs

September 1968 - Jay Sharp, official photographer for the TAS Field School, showed color slides of the school activities this past summer.

October 1968 - Mr. Lowell Collins, former Dean of the School of the Houston Museum of Fine Arts will speak on Pre-Columbian art in Meso-America.

November 1968 - Program to be announced.

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New Members

Raymond Vinson, 1209 Trimm Street, Pasadena (rejoined)
Mrs. Barbara G. Van Wie, 12731 Kingsride, Houston
Steve J. Mouche, 326 N. Wilcrest, Houston
Willie V. Weddley, 8906 Linda Vista, Houston
James D. Rochford, 1543 Sunrise Trail, Humble, Texas
Frank J. Soday, 5709 East 61 St. Court, Tulsa, Oklahoma

WELCOME ABOARD!!

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MEMBERS ACTIVITIES

The following HAS members attended the TAS Seventh Summer Field School in June: Nancy Jircik and family, Jay Sharp, the Lou Fullen family, Tommy and Cynthia Medlin, the Charles Chandler family, Elaine Burleigh and Shirley Thompson.

Frank Brezik visited Mesa Verde, Chaco Canyon, Aztec Ruins and several mission sites while on vacation.

Lawrence Aten surprised us by getting married. He and his wife Aura now reside at 1205 E. 52nd St. (Apt. 101), Austin, Texas. Lawrence is working toward an advanced degree in anthropology.

Frank Hole and family headed back to Iran in August. The Holes will remain in Iran for a year while Frank makes an intensive survey of the Khuzistan area on the Mesopotamian Plain in southwestern Iran. More than 350 archeological sites are known in this area including sites showing a cross-section of the rise of man. The survey and excavations will be sponsored by the National Science Foundation and Rice University. Frank is on sabbatical leave from Rice.

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SOCIETY WEEK-END DIG

HAS members excavated several more squares at 41MQ14 (near Conroe) on September 28th and 29th. The weather was beautiful and eleven adults and four youngsters were active each day. Those attending the "Dig" included the Jim Rochford family, Wayne Meddley, Don Moore, Mark Moore, Frank Brezik, Tommy Medlin, Elaine Burleigh, Shirley Thompson, the Charles Chandler family, Louise and Bill Caskey, Gary Saunders, Angela Saunders and Lawrence and Aura Aten.

Charlie Chandler will be coming up with a full report on the site. that will combine information from the previous "Dig" with the new information uncovered in September.

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NEW LIBRARIAN

Our new librarian is Gary Saunders. See him at our monthly meeting or call or write him if you want to check out some of the fine archeological reports or texts available. His address is 3719 Darlinghurst, Houston, Texas ID 3-9903.

Our thanks to John Halick, our retiring librarian for the fine job he did for the Society as "keeper of the books".

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Here is an interesting and informative article from Chemical and Engineering News on the role now being played by chemistry and physics in assisting the archeologist:

Archaeology—a growing role for chemistry

Modern instruments add scope to the answers chemistry can supply to the mysteries of the past

The popular notion of the bearded archaeologist—pith helmet on head, shovel in hand—breaking into some musty ancient tomb is long overdue for updating. While the lowly shovel is still an important part of the archaeologist's kit, a growing number of far more sophisticated tools—instruments and methods based on chemical and physical principles—are making archaeology more of a science, less of an art.

"Archaeology is no longer limited to the what of prehistory, but is now making use of heretofore unsuspected methods of gleaning the when, the how, and, we hope, the why of man's prehistory," notes Dr. Froelich Rainey, director of the Applied Science Center for Archaeology (ASCA) at the University Museum, University of Pennsylvania.

All the techniques available to the analytical chemist—x-ray fluorescence, emission spectroscopy, spark-source mass spectroscopy, not to mention the classical wet and volumetric methods—are available to the archaeologist as he probes into long-forgotten prehistorical recesses.

Earlier this month in Atlantic City, scientists had a chance to familiarize themselves with the variety of ways in which chemistry and physics can be used in archaeological studies at the Symposium on Archaeological Chemistry, 156th ACS National Meeting.

Dating is probably the most important and best-known example of chemistry coming to the aid of archaeology. The most widely used technique—radiocarbon dating—was introduced in 1949 by Dr. William F. Libbey. The method is based on measuring the radioactive carbon-14 content of the sample.

The system is not fully satisfactory, however, for some kinds of artifacts. Because the method can't be used with inorganic objects such as pottery or coins, these objects are often dated through carbon-containing material found alongside them. The item being dated, then, often is not the object of prime interest to the archaeologist.

There are several other dating techniques being used today. Most of them rely in one way or another on radioactive decay of certain elemental isotopes. One such method—thermoluminescence—is used mainly to date pottery. It has the advantage of dating the artifact itself rather than dating presumably associated materials, as with the radiocarbon technique, according to ASCA associate director Elizabeth K. Ralph and head chemist Mark C. Han.

Thermoluminescence is based on the fact that in many clays natural radiation from trace elements, such as uranium and thorium, excite electrons in other constituents of the clay to metastable levels. When the clay is fired, such as in making pottery, each electron falls back into its stable position, emitting a photon. By reheating the pottery later (in this case in the laboratory), the amount of thermoluminescence observed is representative of the accumulated radiation damage, and hence of the time that has elapsed since the original firing of the pottery, Miss Ralph explains.

Age determination is based upon the measurement of the natural glow curve (the object's light output *vs.* temperature upon rapid heating), the artificial glow curve obtained after irradiation with x-rays or other sources, and the inherent radioactivity which is approximately proportional to the rate of alpha bombardment.

Unfortunately, Miss Ralph says, a complete age determination requires at least three grams of sample. This is easy to arrange from potsherds, or pieces of pottery, often found in abundance at excavation sites. It's often difficult, however, to get that amount of sample from an exhibitable object, she says.

Nuclear track studies can also be applied to dating archaeological artifacts, say General Electric research scientists R. L. Fleischer and P. B. Price. Dr. R. M. Walker, a physicist at the Laboratory for Space Physics at Washington University, St. Louis, Mo., agrees with this conclusion. Most insulating materials, including crystal or glass, register radiation-damage tracks of two types caused by natural radioactive processes. One type results from spontaneous fission of uranium-238 after solidification of the material. The other type takes the form of very short tracks (about 100 A.) from the recoil nuclei accompanying the emission of alpha particles. Selective etching with hydrofluoric acid reveals the tracks which are studied with optical and electron microscopes, Dr. Walker explains.

To determine the rate of bombardment, the uranium content of the sample is determined indirectly but with great sensitivity by fission of uranium-235 induced by neutron irradiation. The age of a sample is a function of the ratio of the number of observed tracks resulting from natural fission to the number of those resulting from the induced fission.

Dr. Fleischer and Dr. Price have dated glass in volcanic pumice from Bed I at Olduvai Gorge, Africa, at 2.03 ± 0.28 million years. This date agrees closely (archaeologically speaking) with the 1.76 to 1.85 million years obtained from the potassium-argon method for the same deposits.

One dating technique that doesn't rely on radioactive decay is obsidian hydration analysis. This method is based on the assumption that hydration occurs at a constant rate on the surface of obsidian. The thickness of the hydration layer is measured under a microscope and is indicative of the time elapsed since the surface of the obsidian object (often an arrow head or trinket) was chipped and formed by man.

But dating, important as it is, represents only a portion of the archaeological chemist's work. Much of his work involves analyzing ancient materials, and it's here that he makes use of the arsenal of the analytical chemist. Chemical analysis, besides answering obvious questions regarding composition of artifact, can yield a variety of other information too, notes Dr. Earle R. Caley, professor of chemistry at Ohio State University. Thus, analytical results can tell much about the source of materials (and consequently the existence of commerce and possible direction of trade routes), use of objects, details of ancient technical processes, cultural levels, and economic conditions.

One analytical method that has gained special prominence for archaeological use because of its nondestructive nature and its rapidity is neutron activation analysis. At the University of Michigan, Ann Arbor, Dr. Adon Gordus has studied silver content of ancient and medieval coins by the activation method. Such analyses, he says, point out how silver content in coins changed within certain historic periods. For example, a slight decline in silver content of coins may indicate economic stress such as war, famine, or floods, and thus point out

to the historian specific periods of tir for intensified studies.

e problem Dr. Gordus faced in silver detection by activation analysis was that if silver coins are irradiated in a nuclear reactor for even a few seconds the coins will remain radioactive for a year or more because of the formation of a silver isotope with a half-life of 270 days. A radiation with a much less intense beam consisting of plutonium mixed with beryllium forms the short-lived isotopes of silver: ^{108}Ag (half-life of 2.4 minutes) and ^{203}Ag (half-life of 24 seconds).

Dr. Gordus, along with Dr. James Griffin and Dr. Gary Wright, both of the Museum of Anthropology at the University of Michigan, have also used neutron activation analysis to help determine the geologic origins of prehistoric obsidian artifacts. Such a determination is possible, Dr. Gordus explains, because obsidians from different regions vary in concentration of trace elements.

The neutron activation method is also being used for pottery analysis. For example, Jacqueline Olin, of the Smithsonian Institution, and Dr. Edward Sayre, of Brookhaven National Laboratory, have jointly studied potsherds to determine if pottery made in a particular area has a uniform composition and if this composition can be used to distinguish potsherds found in one location from those found in another.

Not only does chemical analysis serve the historian, it also assists policemen and insurers in detecting forgeries of archaeological artifacts. For instance, the absence of certain trace elements and impurities in silver coins or objects can mean that they are of modern—not ancient—origin. Today's refining techniques result in more pure products.

In one forgery case, thermoluminescence was the key by which the University of Pennsylvania's ASCA solved the mystery of a fake terra cotta figurine. The figurine allegedly had originated near the town of Orvieto in central Etruria between 510 and 490 B.C. Measurement of the inherent radioactivity of a sample from the figure during the course of a thermoluminescence determination revealed that its age was one tenth what it was claimed to be.

In another highly publicized forgery case, chemistry came to the rescue of New York's Metropolitan Museum in revealing that figurines of three Etruscan warriors were fakes. Solution of the case centered around the black glaze, characteristic of true Etruscan pottery. Because of the Etruscans' method of firing objects, manganese content of both the glaze and body of the pottery is the same. In the case of the warriors at the museum, spectrographic analysis showed a disproportionate amount of manganese in the glaze. This indicated, the museum notes, that manganese had been added as a coloring agent. Subsequent testing confirmed the hoax—authentic Etruscan glaze does not survive firing at temperatures above 1025° C., while the glaze on the fraudulent figurines endured.

Coloring agents are the key to unmasking forged paintings in a method being developed by the National Gallery in Washington, D.C. The method is based on measuring distinguishable radioactive emissions of radioactive lead and radium in white lead pigment. Radioactive lead and radium are produced in lead ores by the slow decay of associated uranium, which is usually present in the ores. In undisturbed lead ores the rates of radioactive emission from all three elements are exactly equal. But when the ore is smelted to obtain metallic lead, a fraction of the radium in the ore and a much larger fraction of the radioactive lead are carried into the molten metal. The result is that their radioactive emission becomes unequal, both in the metal and in the white lead pigment made from it.

Although the trace of radium present yields additional quantities of radioactive lead, its concentration is virtually constant, as the half-life of radium is more than 1000 years. Thus, in white lead that has been produced recently, there should be a higher level of radioactive lead than radium. In samples processed a century or more ago, the radioactive disintegration rates should be equal.

Despite the many instruments and analytical methods available to the archaeologist, his principal task is still what it always has been—digging. And this means time-consuming hard work with picks and shovels. Dr. Rainey notes that as labor costs continue to increase all over the world, and as modern civilization encroaches upon ancient sites, "there is a desperate need to accelerate and facilitate the finding of structures at known sites and the locating of lost or unsuspected cities and sites."

A variety of instruments has been developed to help the archaeologist detect buried features and to help take the guesswork out of determining where to dig. For example, a resistance apparatus, which measures the electrical conductivity of surface soils, can locate many relatively shallow features, as long as there is sufficient difference in moisture or some other quality to cause a difference in soil conductivity.

Some other instruments that can detect buried features are varieties of magnetometers, which depend in one way or another on the difference in magnetic fields of large buried stone objects, for example, and the surrounding ground. Examples of such instruments are the proton magnetometer and the flux-gate magnetometer.

Archaeologists used a Varian-developed cesium magnetometer last spring to locate several stone objects associated with the Olmec civilization of some 3000 years ago at the site of San Lorenzo in Veracruz, Mexico. The site is under investigation by Dr. Michael Coe of Yale University in cooperation with the Museum of Anthropology and History in Mexico City.

When the West Bloomed

Summers in the Great Basin of the western United States are so pitilessly hot and dry that it is difficult to imagine any life but prairie dogs and rattlesnakes surviving in the vast expanse of desert and arid hills extending from California's Mojave Desert through Nevada and into Utah, Idaho and Oregon. But in a hillside cave 75 miles northwest of Salt Lake City, anthropologists have discovered the remains of prehistoric Indians who lived 8,000 years ago when the land was wetter and greener.

The artifacts removed from the cave help anthropologists complete their portrait of the American Indian that has emerged over the past decade. The evidence also seems to refute the theory that the Great Basin suffered a devastating drought 4,500 to 7,000 years ago.

University of Utah anthropologist Jesse D. Jennings's search for Great Basin Man took him, Prof. C. Melvin Aikens and a team of graduate students into the cave for the past two summers. In the loose, dusty soil accumulated in the 20-foot-wide, 100-foot-long cave, the team soon uncovered objects easily identified with nineteenth-century Digger Indians—relatives of the Shoshone tribe. Going deeper, and wearing respirators against the choking dust inside the cave, the team carefully scraped down to another layer of arrowheads, pottery shards, knives and other utensils from the Fremont culture—the name given a tribe of Indian "big game" hunters whose artifacts were first encountered alongside the Fremont River in southern Utah in the 1930s. Successive generations of their tribe apparently occupied the cave intermittently from A.D. 400 to the middle of the fifteenth century.

Bedding: On the floor of the limestone cave, the Utah diggers found the residue of the cave's probable first inhabitants—Archaic Indians. Among the many objects unearthed was a segment of a woven mat, apparently used as bedding and remarkably intact after centuries in the dry dirt. Carbon-dating of the different specimens showed the objects dated from 6400 B.C. to A.D. 400.

The Archaic Indians, Jennings judges from the unearthed material, "were completely Homo sapiens, slight and graceful, not heavily muscled. They were much like the Digger Indians seen by Spaniards hundreds of years ago. They were predators; they didn't produce foodstuffs." The fossil remains of various small animals and plants convince the Utah scientist that game and vegetation were more abundant during this period.

But the land gradually dried, Jennings thinks, and the Indian was eventually forced out. "Even at its best," he says, "it was a hard life here. I'm sure we'll never find the bones of an Indian over 40. Death came early here."

Skeletons Of Indians Discovered

Port au Choix, Nfld. (AP)—More than 50 graves unearthed in this community have yielded the first skeletal remains of a branch of the Red-Paint religious culture dated roughly at 4180 to 4400 years ago.

Excavation last fall for a pool hall exposed a wealth of information for anthropologists. Traces of the culture have been found on the Eastern Seaboard as far south as Maine, but only a meager supply of tools and other artifacts was available until now.

The discovery here was a bonanza for James Tuck, 28, assistant professor of anthropology at Memorial University in St. John's, Nfld.

Dark red stains from ochre dust spread over the graves immediately indicated its significance. With four graduate students, Dr. Tuck gleaned several thousand artifacts and 100 skeletons from 52 graves.

Radio-carbon tests are to be rechecked to pinpoint the dating.

Dr. Tuck and other researchers will try to eliminate, culturally and biologically, some of the myriad theories already offered about the origin, history and fate of the culture.

Fragmentary indications are given of short, heavy-set Indians, plagued by arthritis but generally healthy and not hostile.

A vast array of tools indicates a relatively sophisticated culture.

"We have almost a complete inventory of their tools — axes, knives, needles, even combs," Dr. Tuck says.

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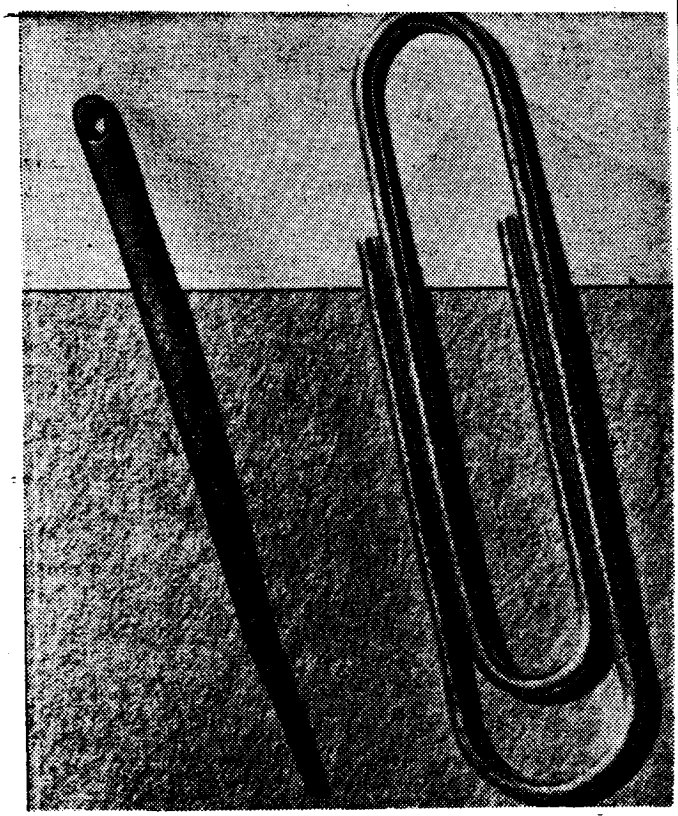

AP Wirephoto

13,000-YEAR-OLD NEEDLE

Scientists digging at the Marmes Rockshelter in the state of Washington have uncovered this delicate, 13,000-year-old bone needle which they say represents a feat of engineering comparable to the wheel. The needle was discovered 20 feet from where the remains of the Marmes Man were found.

Recent articles from the News media. Our thanks again to Mr. L. D. Stewart, Jr. for contributing "When the West Bloomed".

Indian Maidens Sacrificed

CAHOKIA, Ill — (UPI) — Archeologists have discovered a burial pit that contains the bones of 53 Indian maidens killed as sacrifices probably about 300 years ago, it was announced Saturday.

Melvin Fowler, professor of anthropology at the University of Wisconsin at Milwaukee, announced the finding at the opening session of a midwestern archeological conference at Washington University in Saint Louis.

Fowler said the burial pit is in a mound at Cahokia Mounds State Park. He said the evidence indicates that the sacrificed maidens were 18 to 25 years old. He said the Indians had disappeared from the area before the white man navigated the Mississippi River.

Fowler said the mass burial pit was adjacent to the grave of a high chief found last summer. Fowler said he could not determine whether the chief was the man for whom the "young ladies were sacrificed."

TEXAS ARCHEOLOGICAL SOCIETY ANNUAL MEETING

The annual meeting will be held in the Alico Center Inn, 411 Austin Ave., Waco, Texas on November 1 - 3, 1968. Registration will begin Friday evening at 6:00 P.M. with a general business meeting at 8:00 P.M. Presentation of papers will start at 9:00 A.M. Saturday through 5:00 P.M. The banquet will start at 7:30 P.M. and Dr. Fred Wendorf of Southern Methodist University will be the speaker. A field trip is scheduled for Sunday at 8:30 A.M. Location of site to be visited will depend on weather conditions.

If you are not a member of the TAS and desire information on the annual meeting, contact any HAS officer..

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SITE SURVEYS

An appeal to archeological societies as well as individuals to increase their activities in the field of site surveying has been made in the latest Texas Archeological Society Newsletter. We were pleased to see the recognition given the Houston Archeological Society for the survey work we have done. We quote "The Houston Archeological Society is one of the groups that have been particularly active in this field". Lets continue to work to deserve this accolade.

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ADDITIONS TO HAS LIBRARY

Hole, F., and Shaw, M. - Computer Analysis of Chronolocical Seriation. Rice University Studies, Vol 53, No. 3. Summer 1967 Donated by Dr. Hole

Bulletin - Oklahoma Anthropological Society. Vol IVI, March 1968.

Kirkland, F. - An Archeological Survey of the Cranfills Gap Area. Reprinted from Central Texas Archeologist, No. 4, December 1938.

Gilmore, K. Presidio - San Luis and Mission Santa Cruz de San Saba, Menard County, Texas. State Building Commission Archeological Program, Report No. 9. Dec. 1967.

Lorrain, D. - Archeological Excavations in Northwestern Crockett County, Texas 1966-1967. State Building Commission Archeological Program Report No. 12, April 1968.

Watt, F. H. - The Waco Sinker. Reprinted from: Central Texas Archeologist, No. 4, December 1938.

Texas Archeological Society Bulletin - Volume 38, 1967.

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