TIME CAPSULE

THE NEWSLETTER OF THE

FORT BEND ARCHEOLOGICAL SOCIETY

An affiliate of the Fort Bend History Association
500 Houston Street / Richmond, TX 77469
281-342-6478 / FAX 281-342-2439
March 2020

March 17, 2020. 7PM

Speakers: Sergio Ayala

Topic: The oldest tools in Texas:
Experimentally Supported Analysis of the Bifaces used at the Gault site over 16,000 Years Ago

The debate regarding the early migrations into the Americas is a hot topic, and the Gault site has shed considerable light on this debate. Often the debate consists of discussions and analysis of lithic materials dated from contexts that are older than the Clovis horizon, and the Gault site uncovers continuous occupation for over 16,000 years. In this presentation, Sergio J Ayala will discuss his interpretations of the bifacial technologies that were excavated from the Gault site, that span between 16,000 - 20,000 years ago.

Sergio Ayala is from south central Texas and joined the Gault School of Archaeological Research in 2012. Ayala received his Bachelors of Science degree in archaeology at Texas State University and is currently completing his PhD at the University of Exeter, UK, where he started under Bruce Bradley and Linda Hurcombe. Ayala has focused on the cognitive and behavioral aspects of lithic technology and this is supplemented by his own experimental lithics research

Location: **Gus George Law Enforcement Academy** - 1521 Eugene Heimann Circle, Richmond, Texas.
Everyone is welcome - the program is free and open to the public.

Upcoming Meetings:

April 21: Jason Barrett will present on the lithics collected near Smither's Lake in Fort Bend County, as well as Diamond Knoll.
May 19: TBD
June – NO JUNE MEETING DUE TO FIELD SCHOOL --
All meetings are held at the Gus George Law Enforcement Academy
FBAS members are also invited (and encouraged) to attend HAS meetings. Here is the link:
https://www.txhas.org/PDF/newsletters/2020/2020%20March%20Profile.pdf

Meeting Minutes from the February Meeting

FORT BEND ARCHEOLOGICAL SOCIETY
Minutes from February 18, 2020

The Fort Bend Archeological Society met at the Gus George Law Enforcement Academy, Richmond TX.
In attendance were 14 members and 13 guests.
The meeting was called to order by Jay Roussel, President, at 7:05pm.

Minutes from January 21, 2020
No objections, minutes stand as approved.

Treasurer's Report: Balance as of February 13, 2020 is $3,741.96
No objections, Treasurer's Report stands accepted. Roussel explained the number was up due to a corporate contribution for his and Bob Crosser's volunteer work.

Old Business:

- None

New Business:

- President Jay Roussel welcome everyone to the meeting.
- Bruce Grethen gave an update for the archeological work currently taking place at the Lamar Site in Richmond. Volunteers are investigating anomalies with excavations. The anomalies were detected by the society using various electronic devices. To date about 30-31 pits have been dug. Artifacts are being discovered at the 16"-20" level, but no evidence of Lamar's house yet.

Announcements:

- The next meeting will be held on March 17. The speaker will speak about the pre-Clovis occupation in central Texas through the findings at the Gault Site.

Presentation:
Vice president David Rose introduced guest speaker, Dr. Michelle Marlar. Her presentation was titled *"The Osiris Temple at Abydos: An Offering Which the King Gives."* Dr. Marlar is an Egyptologist who teaches at the Center of Excellence for Visual and Performing Arts at Houston Community College. She travels to Egypt each spring for a couple of months to perform excavations. Her work done at the Osiris Temple at Abydos sheds new light on early Egyptian culture.

Meeting adjourned: 8:02 pm
Minutes submitted by: Paul Spana

Treasurer's Report

Balance as of February 13, 2020					**$3,741.96**
Deposit	2/18/2020	Thomas Catlett	membership dues	+20.00	
Balance as of March 6, 2020					**$3,761.96**

Submitted by
Claire Rogers, Treasurer

ARCHEO CORNER

(Printed with permission from the Houston Archeological Society)
Analytical Archeology: How X-Rays Can Be Used in Archeology
Part I: X-Ray Diffraction (XRD)
Wilson W. "Dub" Crook, III

All inorganic substances are composed of minerals, which in turn are composed of crystals. Each crystal is made up of atoms which are arranged in a specific regular order called a lattice. Like a fingerprint, the arrangement of the atoms in a crystal lattice is unique for each mineral.

X-rays are a form of high energy electromagnetic radiation which occurs in waves. When X-rays encounter crystalline substances, the atoms in the crystal lattice scatters the X-ray waves. Just as an ocean wave striking a rock produces secondary waves emanating back from the rock, so an X-ray striking an atom produces secondary waves emanating from the atom. This phenomenon, known as X-ray scattering or elastic scattering, can be measured with both the angle of the diffraction (or reflection) and its intensity being characteristic of each atom in a crystal lattice. A regular array of atoms produces a regular array of scattered waves which are unique for each individual mineral.

Machines which produce and measure X-ray reflections are known as X-ray diffractometers. X-ray diffractometers consist of three main components: (1) an X-ray tube, (2) a sample holder, and (3) an X-ray detector. X-rays are generated in a cathode ray tube by heating a filament to produce electrons. The electrons are accelerated toward the target substance by applying very high voltage and bombarding the sample with electrons. These electrons in turn knock electrons out of the atoms in the target sample whose intensity and angle of reflection can be measured using an X-ray detector. The detector is rotated during the analysis in order to pick up all reflections from a substance. To maximize the amount of reflections, the sample being analyzed is ground to a fine powder and placed in a sample holder, typically made of aluminum or glass. The detector records and processes the diffracted X-ray signal and converts the signal to a count rate which is then output to either a printer or a computer monitor. A typical X-ray analysis of a substance takes anywhere from 30 minutes to an hour to complete.

Applications to Archeology

X-ray diffraction or XRD can be used to identify a small amount of material (typically the size of a pencil eraser or more when ground to a powder). This can be especially helpful in identifying ochres or paints left on stone artifacts, ceramics, or even rock walls. Even if the sample to be measured is a mixture of two or more substances, X-ray diffraction can often decipher the combination of materials used. Knowing the mineral content of such stains or powders can potentially lead the archeologist to its source, which in turn, can help identify patterns of prehistoric movement of people.

For example, at the Sister Grove site in Collin County, I found several small grinding stones (manos) which were covered on one surface with a dark black substance. I carefully scraped some of this material off the sample and further ground it to a very fine powder using an agate mortar and pestle. When submitted to X-ray diffraction analysis, the results indicated that the black material was a combination of the manganese minerals hausmannite, psilomelane, and pyrolusite. The closest place these manganese minerals occurred was near Viola, Oklahoma, 150 km north of the Sister Grove site. Thus, the Late Prehistoric people along the East Fork of the Trinity River were purposefully traveling long distances to obtain (or trading for) black manganese minerals to grind into a black ochre.

Similarly, at the Brushy Creek (41HU81) Clovis site in Hunt County, Mark Hughston and I recovered a Clovis point whose distal end was coated with a red substance. We carefully scraped off some of this material, ground

into a fine powder, and X-rayed it. The result showed the material to be the mineral hematite, iron oxide, otherwise known as red ochre – a substance found on many Clovis artifacts across North America.
While a strong analytical tool, the negative side to using X-ray diffraction is that the target material is destroyed in the sense that it must be ground to a fine powder prior to analysis. However, once ground, the substance can be preserved and re-analyzed a number of times. Also, X-ray diffraction typically cannot always identify where a material originated. For example, if part of a chert artifact were detached and ground to a powder, X-ray diffraction could tell you that the material was chert but it could not tell you if the chert was from the Edwards Plateau or some other source location. For that information, archeologists must use other tools like X-ray Fluorescence (XRF) which will be the subject of another article in this series.

Small one-hand mano from the Sister Grove site in Collin County showing prominent black staining on the surface which proved to be manganese oxide minerals from southern Oklahoma.

Fort Bend Archeological Society
c/o Fort Bend Museum
600 Houston Street
Richmond, TX 77469