



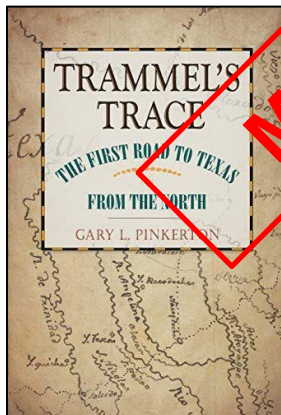
**Thursday, March 19th, 2020, at 6:30 p.m.**  
**“Trammel’s Trace – the First Road from Texas to the North”**  
**Gary Pinkerton**

The March meeting of the Houston Archeological Society will be held on **Thursday, March 19, 6:30pm.** at the **Trini Mendenhall Community Center** located at **1414 Wirt Road** in West Houston. Historian and author Gary Pinkerton will present a program based on his acclaimed book, Trammel’s Trace – The First Road from Texas to the North. Snacks and social including our popular Show and Tell features kick off at 6:30 pm. with the program beginning at 7 pm. The meeting is free of charge and open to the public and there is plenty of free parking.

Since he first learned that a rut across his family land was the route of a historic road to early Texas, Gary’s passion for research and writing about the history of East Texas has resulted in the publication of two books. In this program he will discuss Trammel’s Trace - The First Road to Texas from the North, which is the history of a 200-year old road and its role in early smuggling and migration into Texas beginning in the early 1800s. Both the trail and its namesake, Nicholas Trammell, are the subject of his research. This award-winning work was published in 2016 by Texas A&M University Press. ([www.trammelstrace.com](http://www.trammelstrace.com))



According to the Texas State Historical Association website, Trammels Trace ran from the Red River to Nacogdoches where it met the Camino Real de los Tejas. Trammels Trace was the first road to Texas from the northern boundary with the United States and was used for migration from Arkansas, Missouri and Tennessee before Texas became a Republic.



Praise for Trammel’s Trace has been broad. The President of the Texas Historical Foundation said, “through research, countless presentations to local historical organizations, and one-on-one education of landowners, he has reconnected Trammel’s Trace and brought the historic pathway back into current consciousness.” As a result of his research and his efforts to educate others about the old road, the Stone Fort Chapter of the Daughters of the Republic of Texas erected a five-foot granite marker for Trammel’s Trace in Nacogdoches in 2018.

Pinkerton has a Master of Social Work (MSW) degree from the University of Houston and a bachelor’s degree in social work and psychology from Texas A&M University-Commerce. As an independent researcher and Human Resources consultant he contributes to diverse projects. He is a member of the Editorial Board for the East Texas Historical Association. His work also appears in the online Encyclopedia of Arkansas History and Culture, the online Handbook of Texas, Portal to Texas History, and the Journal of Diving History.

If you have any questions about this program, please contact HAS president, Linda Gorski at [lindagorski@cs.com](mailto:lindagorski@cs.com).

## President's Message – Linda Gorski

HAS members –

You all did it again!!! I am so incredibly proud of the Houston Archeological Society members who volunteered for Archeology Day at the Houston Arboretum and Nature Center on Saturday, February 1! This public outreach program brought members of the public to the Arboretum to screen dirt with our HAS team as part of our Emergency Salvage Archeology Project there. [Louis Aulbach](#), [Robert Sewell](#), Jay Gavitt, [Carlos Rendon](#), Larry Golden, [Sharon Menegaz](#), Valerie Kelly, Mary Overton, David Englebretson, [Charles Aulbach](#), [Patti Wallace Bonnin](#), Mike Quennoz, and Diane Cooper - you were awesome! Thanks especially to our principal investigator on the project, professional archeologist Mike Quennoz with local CRM firm Gray & Pape, who encouraged the kids to "Dress like an Archeologist" Enjoy the photos! And watch for emails from Bob Sewell for future work dates at the site.



Mike Quennoz helps a young visitor "Dress like an Archeologist"



Carlos Rendon and Diane Cooper get their screen ready for visitors



A budding archeologist examines a ceramic sherd at our hands-on displays



Kids and adults enjoy screening dirt at the Arboretum.



HAS members were busy all morning with kids and adults eager to screen dirt!



Larry Golden and David Engelbretson screening dirt.



HAS Education Coordinator Sharon Menegaz with guests doing ceramic reconstruction.



Brothers enjoying the hands-on displays of prehistoric and history artifacts.



Even dads enjoyed the hands-on activities that HAS provided for Archeology Day.



Louis Aulbach and Bob Sewell screen with a dad and his son.



Mary Overton, Valerie Kelly, and Jay Gavitt before crowds arrive



Lots of happy visitors screening dirt



# **Houston Archeological Society**

## **Monthly Meeting**

### **February 13, 2020**

Called to order 7pm.

Welcome New Members and Guests- Linda Gorski. Approximately 60 persons in attendance.

#### **Membership – Bob Sewell – It is time to renew membership!**

136 members so far in 2020.

#### **Treasurers Report - Bob Sewell**

Current Status – Bob reported on financial status. Significant donations for publishing, and also for the TAS Annual Meeting have been received

**Bob still has HAS hats for donations- \$10, only green and blue left.**

**Audit Committee will meet on March 10 - Linda**

#### **New Business**

**Reports and Journals for members to pick up** – Dub Crook and Louis Aulbach - April is projected publication date of a hastily added special report which will be a synopsis on current research regarding the peopling of the Americas by Dub Crook. Prior scheduled publication with a theme of Western Archeology: West Texas to the Pacific will be slated for July.

**Monthly Show and Tell** – Larry Golden- Meyer's Family Stoneware and a small selection of Staffordshire transferware in honor of tonight's guest speaker and all the transferware recovered at San Felipe.

#### **Projects and events:**

#### **Emergency Salvage Archeology Project at The Arboretum – Bob**

Watch for emails from Bob regarding workdays - next date is this Saturday 02/15.

Public Archeology Day on 02/01 was a big success and well attended despite road closures in the area. HAS was well represented, and thanks to all members who participated!

**San Felipe de Austin State Historic Site– Bob Sewell, Sarah Chesney - to be discussed during the main presentation!**

**Thursday, February 27<sup>th</sup> – Rosehill Christian School Go Texan Day. 9am-noon** – Please email Linda or Sharon to volunteer – HAS really needs more volunteers for this event!

**February 28<sup>th</sup> & 29<sup>th</sup> - public outreach events at Spring Creek Heritage Festival** - this involves manning a table for the HAS. Please Volunteer!

**April 4 – Public Outreach at San Jacinto Symposium** – requires registration - \$50 per attendee – HAS will have 3 tables

**March Program – Gary Pinkerton – Trammels Trace** - March 19 at Trini- please join us, especially if you have an interest in early Texas history!

**Gault Tour** – Thursday Feb 27, organized by Ric Frasse. Sign-up sheet at the meeting or email/call him to get on the list. Plan is to meet at the Gault site around 10am for the tour, and then proceed to the lab at UT to view artifacts. Travel is not provided and the responsibility of the participant.

**February Program Dr. Sarah Chesney** - Update on archeology at San Felipe de Austin- Excellent review of the history of the site and the history of the archeological investigations at the site over the years. Dr. Chesney also unveiled phase 1 of her master plan for excavation at San Felipe which will commence this spring, culminating with the Texas Archeological Society's "Archeology 101" Academy in May. There will be plenty of opportunities to volunteer, she needs lots of manpower!

*Beth Kennedy, Secretary*

# **STOP PRESSES!!! NEW DATE ANNOUNCED FOR 2020 TAS ANNUAL MEETING OCTOBER 29 – NOVEMBER 1, 2020**

Due to an unexpected development at the Omni Houston Hotel Westside, site of the upcoming 2020 Texas Archeological Society Annual Meeting, the dates have had to be changed to October 29 – November 1. In addition to concessions offered by the Omni to meeting attendees, the date change also presents us with the opportunity to have fun with a Halloween theme for the Saturday night banquet. Costumes anyone 😊! We are thrilled that our Public Forum Speaker, Doug Boyd, and the Banquet Speaker, Dr. Carolyn Boyd have arranged their schedules to present on the new dates. Watch for announcements in this newsletter and on the HAS Website at [www.txhas.org](http://www.txhas.org). If you have any questions please contact Linda Gorski [lindagorski@cs.com](mailto:lindagorski@cs.com) or Bob Sewell [robert-sewell@att.net](mailto:robert-sewell@att.net), event Co-Chairs.

## **HAS Memberships for 2020 Are Now Due**

**We hope you will renew your membership in the Houston Archeological Society and maybe even give a membership as a gift to someone you know will enjoy digging up Texas history with us – one trowel full at a time. You can download a membership form here <http://www.txhas.org/PDF/HAS%20Membership%20Form.pdf>**

**Our membership is the best deal in town:**

- \$25 Individual membership**
- \$30 Family Membership**
- \$35+ Contributing membership**
- \$15 Student membership**

**Remember that benefits of your membership include the unique opportunity to dig with us at archeological sites in the area, work with us at our labs where we process artifacts from those sites, and your FREE copies of our current academic publications including HAS Reports and Journals. Please join us!!!!**

## **91<sup>st</sup> Annual Texas Archeological Society Meeting, October 29 – November 1, 2020, Houston, Texas**

As most of you already know, the Houston Archeological Society is hosting the 91<sup>st</sup> Texas Archeological Society Annual Meeting on **October 29 – November 1. PLEASE NOTE THE DATE CHANGE FOR THIS MEETING!** Known as “The Gathering of the Clan”, we expect 400+ avocational and professional archeologists from across Texas and from surrounding states to attend. The Fort Bend Archeological Society and the Brazosport Archeological Society will join us in sponsoring what we hope will be the most successful TAS meeting ever. You will be receiving much more information about this important meeting in the coming months!!!!

Here are some things you need to know **NOW** about this very important meeting:

### **Special Rate Hotel Reservations at the Omni for October 29 – 31, 2020 now available!**

Many plans are already in the works for this meeting which will be held at the Omni Hotel Westside, at I-10 and Eldridge Parkway. We sponsored the 2015 TAS meeting at this location and it was a huge success. We hope to repeat that in 2020. The cost of the hotel rooms this year will be \$119 which includes free parking in over 600 spaces at the hotel. The Omni has set up a direct link for reservations to the TAS meeting. You can access the link here to make early reservations at <https://www.omnihotels.com/hotels/houston-westside/meetings/tas-91st-annual-conference-10232020>

### **First Call for Papers**

Professional Archeologists Dr. Jason Barrett and Dr. Gus Costa have already started collecting abstracts of papers and poster presentations for this meeting and have published their First Call for Papers. Abstracts must be submitted through the online web form available at the 2020 TAS Meeting URL: <https://forms.gle/spW25x6eKKDBRtJz7>

**Please note the date for the meeting has changed to October 29 – November 1, 2020**

### **Four \$500 Scholarships available for Students**

The Houston Archeological Society had planned to offer two \$500 scholarships to college students attending the meeting who will also present a paper or a poster presentation. However, thanks to a generous donor who wishes to remain anonymous we are now able to offer **FOUR** \$500 scholarships! These scholarships should pay for meeting registration including lunch on Saturday and the Saturday night banquet, two night's accommodation at the Omni, and an annual membership to TAS. If you'd like to apply for this scholarship please contact HAS Education and Scholarship Coordinator Sharon Menegaz at [smenegaz@rcseaglesonline.org](mailto:smenegaz@rcseaglesonline.org)

### **Public Forum and Banquet Speakers Announced**

We are very excited to announce our two major speakers for the event. Friday night's Public Forum (October 30) will feature professional archeologist Doug Boyd with Prewitt and Associates who will give a presentation on the exciting excavations at the Frost Town site in downtown Houston where over 250,000 artifacts were recovered. The Saturday night (October 31) Banquet speaker will be noted rock art expert and founder of the SHUMLA School for Rock Art Research, Dr. Carolyn Boyd. We are planning a fun Halloween theme for this banquet, so watch this space for more information!

If you have any questions about this meeting, please contact co-chairs Linda Gorski at [lindagorski@cs.com](mailto:lindagorski@cs.com) or Bob Sewell at [robert-sewell@att.net](mailto:robert-sewell@att.net).



## **TEXAS ARCHEOLOGICAL SOCIETY 2020 ANNUAL MEETING PUBLIC FORUM BRICKS, BOTTLES, AND BONES AT FROST TOWN:**

### **Historic Archeology of a 140-year-old Working-Class Houston Neighborhood**

**Douglas K. Boyd, Cox|McLain Environmental Consulting**

Douglas K. Boyd, senior archeologist with Cox|McLain Environmental Consultants will present the Public Forum program at the 2020 TAS Annual Meeting to be held in Houston, October 29 – November 1, 2020. The public forum will be held on Friday night of the conference, October 30. Boyd's presentation will feature a preliminary report on recent

excavations in Frost Town, a 140-year-old working class Houston Neighborhood.

Beginning in the 1830s, German immigrants settled in a prominent bend of Buffalo Bayou located just downstream from the famous Allen's Landing. Named after its founders, Jonathan and Samuel Frost, the community called Frost Town covered eight city blocks. It began as a few scattered tents and evolved into a thriving neighborhood that survived for more than 130 years. It is one of Houston's oldest neighborhoods, and it grew up shadow of Houston's downtown business district

Throughout its lifespan, Frost Town was a working-class community. Like many similar urban neighborhoods across the United States, the ethnic makeup of Frost Town changed over time. The dominant groups that lived there were German immigrants/German Americans from the 1830s–1890s; African Americans from the 1890s–1920s; and Mexican immigrants/Mexican Americans from the 1920s–1970s. By the 1930s, the Hispanic residents called it Barrio del Alacran (the scorpion neighborhood) and by the early 1950s, the City considered it to be a slum area. The fate of the community was sealed when a large swath of the houses was removed in the mid-1950s for the construction of the Elysian Viaduct bridge. The last houses were torn down in 1990s for another freeway construction project.

A Texas Department of Transportation (TxDOT) road improvement project triggered the first investigation of Frost Town in 2004. Archeologists were called in to examine the site because TxDOT would be removing the old Elysian bridge and replacing it with a larger and safer roadway. There were no surface indications that this had once been a residential community, but archeologists quickly discovered intact archeological remains of the former community in every trench they dug. This eventually led to series of more extensive archeological testing and archival research from 2008–2015, followed by large scale “data recovery” excavations in 2016 and 2018. For this project, Prewitt and Associates' archeologists collaborated with TxDOT's Archeological Studies Program and many volunteers from the Houston Archeological Society. This work discovered over 1400 residential and nonresidential features and recovered more than 250,000 artifacts associated with households from all time periods.



This program will look at the history and historic archeology of Frost Town as it evolved over 140 years. The analysis of the archeological evidence is still underway, but the features and artifacts are already revealing some exciting insights into the people who lived in Frost Town at different times. In many cases, groups of artifacts can be linked with specific time periods and households. These materials can reflect differences in social and economic status between households and changing status over time. Some artifacts—such as German-made dolls and hand-painted Mexican pottery—also reflect the ethnicity of the residents. Some features do too. Lines of buried, upside-down bottles turned out to be garden and walkway borders that are strongly linked with German-immigrant households. Oral history interviews with former residents also provide rich narratives illuminating the final days of the Alacran community.



The program will also look at the mystery of the Chinese opium pipe bowl (see photo right) and Chinese porcelain recovered from a yard pit at an early twentieth-century bordello.

Douglas K. Boyd is a senior archeologist with Cox|McLain Environmental Consulting (Austin) with more years of experience than he would like to admit. He began his archeological career in the 1970s while in junior high and high school, working on several archeological projects for West Texas State University and the Llano Estacado Museum. He received a BA degree in General Studies-Archeology from West Texas State University in 1983 and an MA degree in Anthropology from Texas A&M University in 1986. Boyd spent 33 years at Prewitt and Associates, Inc. serving as a project archeologist, project manager, or principal investigator on numerous cultural resources management (CRM) projects throughout the state.

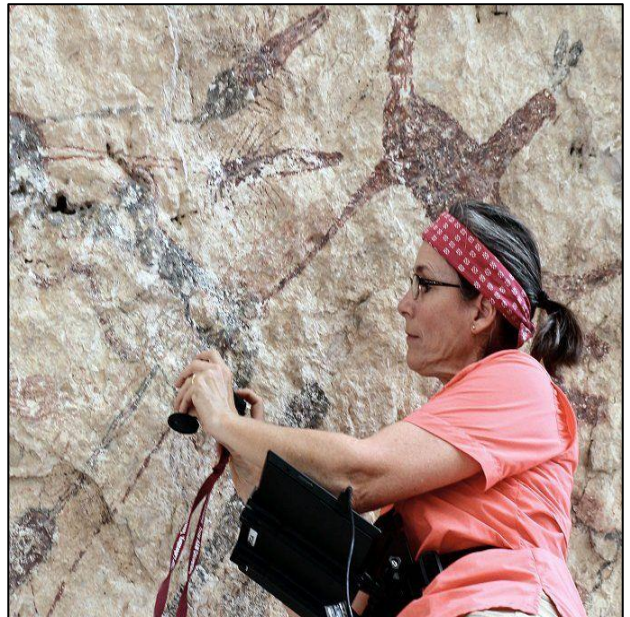
Boyd has worked on many prehistoric and historic archeological site investigations, primarily in Texas, New Mexico, and Oklahoma. He has published more than 150 CRM reports and articles for books, professional journals, and popular magazines. He has presented hundreds of archeology programs and site tours and collaborated on a wide variety of public outreach products, from popular brochures to internet web sites to documentary films. Boyd also serves on the Texas Preservation Trust Fund Advisory Board and the Antiquities Advisory Board to the Texas Historical Commission. One of his more rewarding outside activities is his role as a Youth Group dig for the Texas Archeological Society's annual field school. The 2020 field school in Kerrville will be Boyd's 20th year as one of the Youth Group Directors.

## DR. CAROLYN BOYD TO BE BANQUET SPEAKER AT 2020 TAS ANNUAL MEETING IN HOUSTON OCTOBER 29 – NOVEMBER 1, 2020

### Update on Rock Art Research in the Lower Pecos Canyonlands

The 2020 Texas Archeological Society Annual Meeting is literally right around the corner, coming up October 29 – November 1, 2020 at the Omni Westside in Houston, Texas! This year we are privileged to announce Dr. Carolyn Boyd as our Saturday night (October 31) Banquet Speaker.

As most of you know, Dr. Boyd is the Shumla Endowed Research Professor in the Department of Anthropology at Texas State University. She is the founder of a nonprofit organization, Shumla Archaeological Research and Education Center ([www.shumla.org](http://www.shumla.org)), which was established in 1998 to preserve the oldest known “books” in North America – the rock art of the Lower Pecos Canyonlands in southwest Texas and Coahuila, Mexico.



These ancient images engraved or painted on the landscape provide a visual record of global human history. They represent a fragile and irreplaceable heritage of worldwide significance. The Lower Pecos canyonlands of southwest Texas and northern Mexico contain some of the most spectacular and complex rock art in the world, ranging in age from 4,000 years ago to the time of European contact. Information gleaned from these ancient pictorial manuscripts is not only shedding new light on Texas prehistory, but on the prehistory of North America. Join Dr. Carolyn Boyd as she presents an overview of the methods used by Shumla Archaeological Research & Education Center to preserve this important record of human history through documentation, education, stewardship, and research.

Dr. Boyd is the ex officio head of research for Shumla and serves as Vice President on the organization’s board of directors. She also is an active member of the Rock Art Network (<http://www.bradshawfoundation.com/rockartnetwork/>), a working group established by the Getty Conservation Institute and the Bradshaw Foundation to promote, protect, and preserve rock art globally.

Dr. Boyd received her doctorate in archaeology from Texas A&M University based on her analysis of the 4,000-year-old rock art of the Lower Pecos. She is author of *Rock Art of the Lower Pecos*, published in 2003 by Texas A&M University Press and *The White Shaman Mural: An Enduring Creation Narrative*, published in 2016 by the University of Texas Press, which received the 2017 Scholarly Book Award from the Society for American Archaeology. Dr. Boyd teaches Field Methods in Rock Art, a four-week field school offered through Texas State University and gives numerous lectures around the country and abroad.

Currently, Dr. Boyd serves as the Principal Investigator for Shumla’s Alexandria Project, a baseline documentation project of over 300 rock art sites in the Lower Pecos region. The goal is to establish a georeferenced graphic database of over 300 rock art sites. Dr. Boyd and her colleagues are using this reference library to conduct an iconographic investigation that will identify, describe, and interpret the content of these ancient murals. The information encoded in the images is sufficiently rich to inform archaeological research into territoriality, information exchange, labor organization of foragers, and the origins and tenacity of myth.



# **Notes on Munitions**

## **Rimfire and Center-fire Cartridge Basics, Part 3**

### **The History of the Center-Fire Cartridge**

#### **By Tom Nuckols**

#### **INTRODUCTION**

A center-fire cartridge has its primer located in the center of the base of the case. The primer is a cup containing a sensitive explosive compound which, when struck by a gun's firing pin will ignite it. Unlike the rimfire cartridge that cannot be reloaded, the center-fire cartridge is reloadable<sup>1</sup>.

The center-fire cartridge evolved in the 1860's with the invention of the Berdan and Boxer primed cartridges. Ironically, the Berdan primed cartridge, invented by an American, was adapted by Europe and the rest of the world, while the Boxer primed cartridge invented by a Briton, was adapted by the United States. Berdan or Boxer primer-equipped cartridges are interchangeable; they can be fired in the same gun if the caliber is the same.

From an archaeological standpoint, the two primer types are almost impossible to distinguish just by looking at a center-fire cartridge case recovered on a site. However, it can be assumed that a cartridge case with a Boxer primer will have a headstamp that identifies it as having been manufactured in America and a case with a Berdan primer will have a foreign headstamp.

#### **HISTORY**

General Hiram Berdan, (1824 – 1893) was the commanding colonel of the United States Volunteer Sharpshooter Regiments during the American Civil War. On March 20, 1866, Berdan patented his invention in the U.S., and it would become known as the Berdan primed center-fire cartridge.

Berdan's invention consisted of a cartridge case in which the anvil was a part of the formation of the primer pocket at the head of the case and the primer itself was similar to a percussion cap. The primer pocket in a Berdan cartridge case head had two flash-holes (see Figure 1). In operation, A gun's firing pin crushes the primer against the anvil and ignites the priming mixture (see Figure 2).

Berdan primed cartridge cases were never intended to be reloaded. However, they can be reloaded by removing the fired primers with a tool such as an ice pick or forced out with hydraulic pressure.

Meanwhile, Colonel Edward Mounier Boxer (1822-1898) of the Royal Laboratory, a part of Woolwich Arsenal, England, was working on a primer design for cartridges. In Boxer's primer, the anvil was a separate stirrup piece that sits inverted in the primer. The primer pocket in a cartridge case head has a single flash hole (see Figure 1). In operation, the primer's cup anvil provides sufficient resistance to the impact of a gun's firing pin to ignite the priming mixture (see Figure 2).

What would become known as the Boxer primed center-fire cartridge was patented in England on October 13, 1866, and in the U.S. on June 29, 1869. According to Barnes (2006: 161), the .50-70 Musket (.50 caliber, 70 grains of black gun powder) was the first center-fire Boxer primed cartridge<sup>2</sup> in general use by the U.S. military from 1866 to 1873. It was used in various models and modifications (from muzzle-loading) of the single shot Springfield rifle until it was replaced by the .45-70 center-fire cartridge.

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1

Reloading or hand loading refers to the process of replacing the contents of a fired center-fire cartridge case. The process begins with the removal of an expended primer from the case, installing a new primer and adding gun powder and a bullet. Commercial ammunitions costs are one of the many motivations for reloading.

2

Research by this author has failed to determine the first Berdan primed center-fire cartridge.

The different positioning of the flash holes in the Berdan and Boxer primed cartridge cases does not make any difference in the cartridge's performance, However, the single flash hole in the Boxer cartridge makes fired primers easier to remove for reloading. A single, centered rod (part of the reloading tool) pushed through the flash hole from the open end of the case will eject the primer.

If you would like to see how many caliber of center-fire rifle and handgun cartridges there are, see Wikipedia, at [https://en.wikipedia.org/wiki/List\\_of\\_rifle\\_cartridges](https://en.wikipedia.org/wiki/List_of_rifle_cartridges) and [https://en.wikipedia.org/wiki/List\\_of\\_handgun\\_cartridges](https://en.wikipedia.org/wiki/List_of_handgun_cartridges).

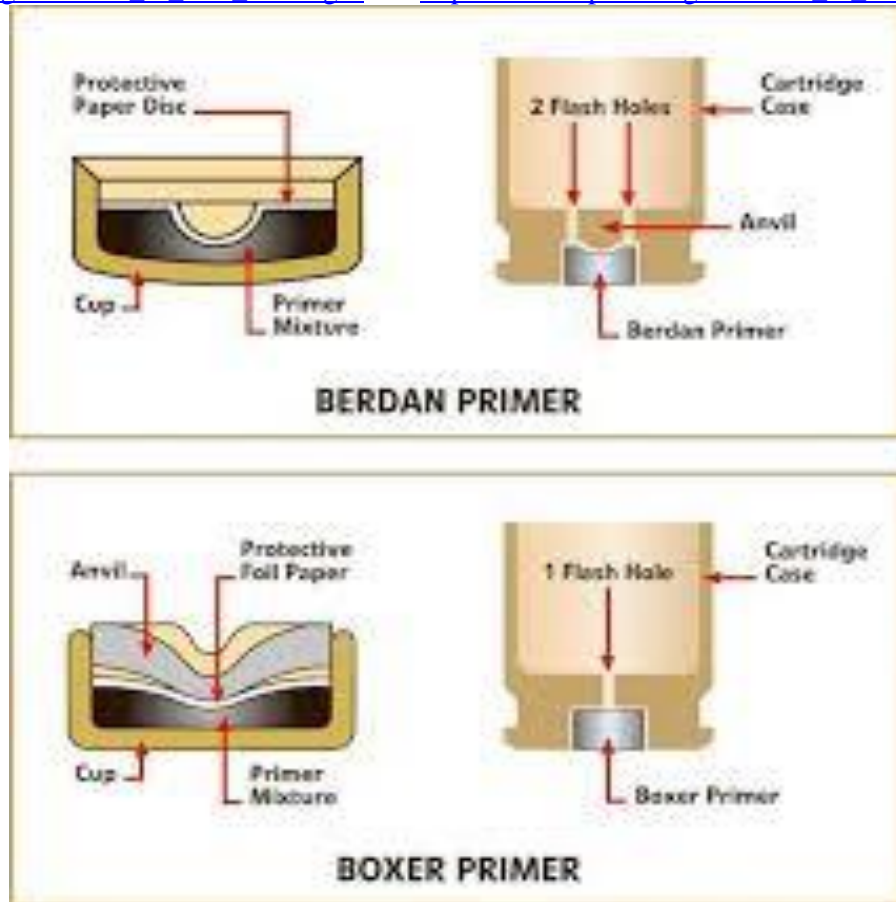


Figure 1. Pak guns.com.

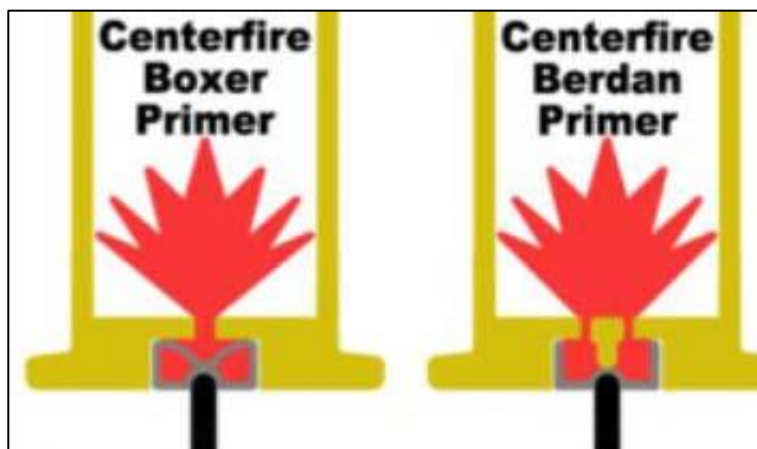


Figure 2. The black line represents the firing pin of a gun striking the primer. GUNADVICE.



Figure 3. A firing pin imprint on the primer of a .38 Special caliber revolver cartridge case. Firearms, Toolmarks, And Impressions.

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## **REMINDER THAT MEMBERSHIPS ARE DUE BY END OF MARCH 2020.**

**It's that time of the year again when HAS memberships are due. So, don't forget to complete and forward your renewal application form and dues to our membership coordinator – Bob Sewell. You can find him at the next monthly meeting. Alternatively, you can mail it to:**

**Houston Archeological Society  
PO Box 130631  
Houston  
Texas 77007-0631**

**If we do not receive your application and dues by end of March then you will no longer be able to participate in HAS activities, except the monthly meeting, or be eligible to receive complimentary copies of the Society's publications. You will also not receive the link to the HAS newsletter.**

**If you joined HAS after September 1<sup>st</sup>, 2019 then your membership is good for 2020.**

**If you are not sure if your membership is current for 2020 then contact Bob Sewell at [robert-sewell@att.net](mailto:robert-sewell@att.net)**

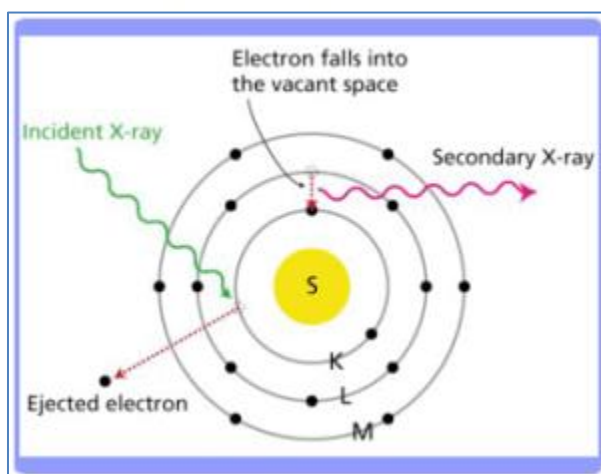


## Analytical Archeology: How X-Rays Can Be Used in Archeology

### Part II: X-Ray Fluorescence (XRF)

Wilson W. “Dub” Crook, III

Another feature of bombarding materials with X-rays is the production of ions – atoms which their net electrical charge has been changed by the addition and/or subtraction of an electron. Atoms are composed of a central nucleus which contains various numbers of protons (positive charge) and neutrons (no charge). Circling around the nucleus are electrons (negative charge). The electrons are arranged in different ordered orbits or “shells”. When a high velocity X-ray is shot into a substance, some of the in-coming X-rays hit electrons in the innermost shell (k-shell) and eject it from the atom. The vacancy left by the electron kicked out of the inner k-shell creates instability in the atom. Electrons from outer shells (l, m) will move into a lower orbit to fill that vacancy. As they do so, the movement from an outer shell to an inner shell emits energy in the form of a photon (secondary X-ray) which can be detected (see figure below). Thus, the material bombarded by X-rays emits radiations which is characteristic of the atoms present in the substance. The re-emission of radiation is termed X-ray “fluorescence”, as the material absorbs incoming radiation and then emits radiation in the form of photons. Since each element emits a slightly different energy, both the elements contained in the material being analyzed and their relative percentage can be measured.



X-ray fluorescence units thus contain three components: (1) a stage on which the sample being analyzed is placed, (2) a source of X-rays, and (3) a detector for measuring the secondary X-rays emitted from the sample. XRF spectrometers can either be large table mounted devices or smaller hand-held gun-like units which can be used either mounted or as portable spectrometers. One of these smaller, portable units costs about 40-50k dollars making it reasonably affordable for most educational institutions. Typically, a detailed analysis, including multiple measurements per sample to increase accuracy, can be obtained in less than 15 minutes.

#### Applications to Archeology

Both X-ray diffraction and X-ray fluorescence technologies are only as good as the database that the raw data collected is compared to. In the case of X-ray diffraction, the American Society of Testing and Materials (ASTM) maintains a database of well over 100,000 inorganic compounds which can be used to almost instantly identify any measured unknown. In X-ray fluorescence however, databases are not as well established.

XRF technology was first used by archeologists in the early 1960s to try and identify the source of obsidian artifacts. The trace element geochemistry of obsidian is very characteristic of the volcanic eruption which produced it. Moreover, a simple 7-9 suite of elements (and sometimes only 3 or 4) can accurately pinpoint an obsidian's source. As a result, XRF databases for worldwide obsidian sources have been developed.

However, analyzing the source of more complex archeological materials, such as chert or turquoise, is much more difficult. Not only do cherts and turquoise contain many more elements than obsidian, they are typically in lower concentrations making subtle differences between sources harder to determine. In addition, there are no existing databases to compare the raw results to. In 2013, Tom Williams of the Gault School of Archeological Research and I attempted to create a geologic database for cherts from the Edwards Plateau of central Texas. This included detailed sampling of nearly 40 outcrops and taking over 500 geologic samples. Each sample location was mapped, and chert was taken from the interior of the outcrop to avoid any effects from surface weathering. Every sample was analyzed multiple times using XRF technology. Data was collected for not just 7-9 elements but a suite of 30 elements. We then analyzed a large number (n=225) chert artifacts of Clovis age from sites all across Texas using the same procedure. When compared to the geologic database, we found we could fairly easily determine if the chert was from the Edwards Plateau or a non-Edwards Plateau source. Determining the source further to a specific location within the Edwards Plateau was much more problematical. Cherts from the eastern margin of the Plateau, in the area in and around the Gault site and the Fort Hood Military Reservation, have a very characteristic geochemical signature; other cherts sources from the southern and northern parts of the Plateau did not. So, the use of XRF for sourcing cherts remains experimental.

XRF has a strong advantage as an analytical tool for several reasons. First, it is virtually non-destructive to the sample unlike almost every other type of chemical analysis tool. Second, it is fairly inexpensive, and results can be obtained almost immediately. Lastly, the new portable units can be taken into the field to analyze pigments in rock paintings without the risk of any destruction. As a result, they have been used by many museums to detect forgeries in paintings. However, as shown above, there are limitations to its ability to discern differences between complex geologic samples. XRF technology yields results on a parts-per-million (PPM) basis. Other more complex analytical tools, such as Neutron Activation Analysis, can measure chemical compositions on a parts-per-billion (ppb) basis. Thus to determine more subtle geochemical differences in materials like clays in pottery, archeologists must use other tools like Neutron Activation (INAA) which will be the subject of another article in this series.



A portable X-ray fluorescence unit set up in the artifact vault at the Texas Archeological Research Laboratory in Austin to analyze Texas chert Clovis artifacts. The artifact stage is the black part sitting on top of the XRF source/detector unit.



A Clovis blade from the Timber Fawn site in northeast Harris County which was sourced to the Edwards Plateau using XRF analysis.



**HAS to Participate in San Jacinto Symposium**  
**Saturday, April 4, 2020**  
**University of Houston-Downtown**



Please join members of the Houston Archeological Society as we participate in the 2020 San Jacinto Symposium. This annual, one-day, Battle of San Jacinto Symposium is the preeminent conference on the Texas Revolutionary era. It is a forum for promoting public awareness and scholarship about the Mexican colonial era in Texas (1821-1835), the Texas Revolution (1835-1836), the Battle of San Jacinto (1836), and the Republic of Texas (1836-1845). These pivotal years mark the transition from Spanish and Mexican sovereignty to independent Texas and annexation to the United States. The theme of the 2020 Symposium is “Myths, Mysteries and Misunderstandings of San Jacinto”. Several members of HAS will attend and display our large exhibit of artifacts recovered by a local family from the mudflats of the San Jacinto townsite adjacent to the San Jacinto Battleground. We have exhibited this display in the past and it has always been extremely well received. Co-sponsored by the San Jacinto Battleground Conservancy (SJBC), the Symposium was started in 2001 by the SJBC and has now passed into the hands of the Texas State Historical Association, a 501(c)(3) non-profit dedicated to the preservation of Texas history. You must register early for this very popular Symposium! For more information and registration form see the website at this link: <https://sanjacintosymposium.com/?q=sanjacintosymposium>



# **Announcing Texas Archeological Society's Archeology 101 Academy, San Felipe, Texas**

**In partnership with the Houston Archeological Society and the Texas Historical Commission**

**May 1-3, 2020**

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**This 3-day course introduces the field of archeology and provides each participant with the tools to identify, assess, and record an archeological site. The Academy will be held at San Felipe de Austin State Historic Site.**



**To Register, visit: <https://www.txarch.org/academy03>**

**Scholarship Opportunities: <https://www.txarch.org/scholarships>**

**Registration Fee: \$100 plus TAS membership. CPE credits available.**

Background photo source: Texas Beyond History

## **Houston Archeological Society**

### **Monthly Meeting Programs for 2020**

**6:30pm Third Thursday of every month (except June)**

**Trini Mendenhall Community Center, 1414 Wirt Road**

**April 16, 2020 – Jeff Girard – The Caddos and Their Ancestors**

**May 14, 2020 – Amy Borgens, Texas State Marine Archeologist –Boca Chica shipwreck**

**June** –Normally no meeting TAS Field School activities.

All **Houston Archeological Society** meetings are free of charge and open to the public. For more information about HAS then visit our website at [www.txhas.org](http://www.txhas.org) or email [lindagorski@cs.com](mailto:lindagorski@cs.com). You can also join our Facebook page at <https://www.facebook.com/groups/123659814324626/>

Please submit articles for publication to *The Profile* Editor Bob Sewell at [newsletter@txhas.org](mailto:newsletter@txhas.org). Please submit articles for the March 2020 issue no later than 21st February 2020.

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### **Fort Bend Archeological Society - Upcoming Meetings:**

**March 17:** Dr. Tom Williams will present on the Gault Site in Texas.

**April 21:** Jason Barrett will present on the lithics collected near Smither's Lake in Fort Bend County, as well as Diamond Knoll.

**All meetings are held at the Gus George Law Enforcement Academy, Richmond, Texas.**

**FOR MORE INFORMATION ON ARCHEOLOGY IN THIS AREA, CONTACT THE FOLLOWING:**

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