# Concho Valley Archeological Society Newsletter

*April 2015*

## My Experiences At Eagle Shelter

C.A. Maedgen

As we all know Texas State University Archeology department is working in Eagle Shelter on Jack and Wilma Skiles property at Langtry. I have been very impressed with the presentations by Texas State at the TAS annual meetings. A fine group of folks to be really proud of. Charles Koenig, on site team leader, invited me to come work with the crew. Every day we hiked in and out of the canyon and while we were there we were each assigned a task for the day, working a grid. This is where the story gets interesting.

The excitement started when Larsen uncovered a coprolite which he so carefully removed for future study and analysis. Before removal the artifact was accurately pin pointed on their Total Data system and this recording put the artifact into context with other artifacts and within the project over all.

The next thing to be discovered was an artifact that came out of my grid. This item too caused quite a stir. A fore shaft with notch intact and with its binding material to hold a dart point. There was a substance adhering to the binding that appears to be a form of tree sap. One end of the fore shaft had evidence of being shaped. This fore shaft was the first one discovered in Eagle.

After this we were all impressed with Victoria and her delicate touch while excavating what remained of a grass mat. Very thin and delicate. I learned from watching Victoria work. Another really unique item uncovered was one that Larsen carefully removed. A small piece of what we assume to be rabbit fur wrapped around some cordage, twisted plant fiber. Between Larsen and I there seemed to be a preponderance of coprolites occurring in our grids. We are not sure which of us was the "coprolite king" for the day. We bagged 'em and we tagged 'em. A few days later Victoria uncovered the remains of a sandal made of plant fibers. Awesome work.

On my last day there Charles asked Larsen to lead me to Bonfire Shelter. Very tricky access to Bonfire and lots of climbing over boulders. They asked me if I had ever climbed over boulders. I said no. The instructions from there was go to the boulder field and when you get there you will find out real fast if you can. The trip to Bonfire was a dream come true for me and I am most appreciative of Larsen leading the way.

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## April Speaker

### On the Trail of the People of the Cows:

**Eric Schroeder will be our speaker for the April meeting. Early Spanish expedition journals document vast areas of the Trans Pecos as being almost devoid of people during the late summer and early fall bison hunting season. Archeological evidence suggests that mobile populations traversed ancient transportation corridors to ceremonial rendezvous located along the western edge of the Edwards Plateau. There disparate groups congregated at sites like Ram's Head and Squawteat Peak, where they engaged in ceremonial feasting and in the production of mainly hide processing tools as they prepared to move as communal groups into areas like the upper Concho River Valley in west-central Texas to hunt bison. It is hypothesized that such behavior may have been driven by a hide economy, in which bison and possibly deer hides were seen as major commodities in Late Prehistoric exchange.**

*Eric Schroeder is a CVAS member and a professional archeologist. He is the founder and owner of Applied Archeological Sciences, Inc. Applied Archeological Sciences, Inc. is a cultural resources consulting firm committed to providing practical, problem-solving solutions for the management of archeological and historic resources. He has been involved in compliance-related cultural resources consulting for over 20 years.*


To bring this story to a close I would like to compliment the team members on their culinary skills. Each day they rotated the responsibility of cooking the evening meal for the crew. I can say that we ate well and there was never any left overs. I really want to go back but will have to wait for an opening. The next time I go we will see if they have any extra slots open for some of you folks to go. In closing, I suggest whole heartedly that any of you that can make the TAS annual meeting do so because if you don't you won't get to hear presentations from Texas State. When Tee and I attend the annual meeting we go to the Texas State room and we sit there all day listening to the presentations. My congratulations to Dr. Steve Black for a job well done at Texas State and to Charles Koenig. Very impressive indeed.

# Thermodynamics of Fires, Hearths, and Earth Ovens

Stephen L. Black and Alston V. Thoms

***Editor's Note: This paper is one of the best studies I've ever read on burned rock middens. It has helped me understand quite a bit of what we found in Alan's Shelter and the other BRMs around Independence Creek. I've received permission from Steve Black to print extracts of the paper in monthly installments for our newsletter. I hope you find it as interesting and informative as I have. Tom***

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Functionally, all cooking-related fires can be said to have at least two have at least two main parts, a surface upon which a fire is created and the fire itself. The surface can be minimally prepared or elaborately so, flat or concave, and lined or unlined and may or may not be confined within a pit;4 such characteristics reflect function, context, and degree of reuse. Many archaeologically recognizable aboriginal cooking features have a third component, a layer of rocks that functions as a heating element and is typically placed atop or within the fire. The bed of hot rocks is usually covered by other layers, including moist green plant material and food baked by heat released from the rocks, and capped by an earthen lid to hold in the heat: Heat has three singular and interesting properties that affect how it can be generated and used. The first and most important is intensity or temperature, which measures its ability to affect materials. The second is that heat flows constantly from a higher to lower temperature.

The third is that it cannot be confined, since there is no known material that does not conduct heat to some extent. From the instant it is generated, heat leaks everywhere and constantly [Rehder 2000:9].

A small wood fire typically combusts relatively quickly and reaches temperatures of well over 500°C. The temperature and duration of a fire are dependent on type, quality, and amount of fuel; the availability of oxygen; and how the fire is contained (or not). As fire burns, it heats the air, which expands, rises, and becomes "lost" to the atmosphere (diffused) unless the heat is confined or transferred to something in the immediate vicinity. Escaping hot air causes the fire to draw in more cool air, which repeats the cycle in the heating process known as convection. Fires also radiate heat as thermal radiation (Siegel and Howell 2001). Infrared waves move through the air and only release heat when they strike a surface that can absorb them. This is what warms your hands when you hold them near a fire. In an enclosed space, such as inside a domestic structure, thermal radiation heats all of the exposed surfaces around a fire. An outside fire also provides warmth through radiation, but most of its heat is lost to the atmosphere. Fires built on flat surfaces or in shallow basins lose most of their heat quickly through radiation and convection.

By containing or confining a fire, more of its heat can be directed toward whatever is being heated and used before it is lost. The simplest way to contain a fire is to build it in a pit. Dry sediment conducts heat very poorly because it is porous and made up of many tiny particles having a high surface to mass ratio. Sediment particles immediately adjacent to the fire heat quickly, but the heat flows slowly from particle to particle through conduction, making dry sediment a good insulator and container. Wet or damp sediment, on the other hand, readily loses heat through convection.

As the moist sediment near the fire heats up, the moisture is converted to vapor, which dissipates heat and, through capillary action, draws more moisture toward the fire. It is often desirable to store quickly the generated heat of a fire and release it more slowly in a controlled way. The most efficient and effective way to store a substantial amount of heat is to transfer it to a material with high thermal mass—the ability to absorb, store, and release heat over time (Ataer 2006). Relative to water or unconsolidated sediment, rock has high thermal mass. A large rock is a superior thermal storage device compared with several smaller rocks of equal mass because it has less surface area relative to mass. Holding mass equal, rocks with smaller ratios of surface area to mass (like rounded cobbles) cool more slowly than those with larger ratios (such as thin slabs), and relatively dense, solid stones are superior to porous or fractured stones. Dense, solid rocks of any geologic origin absorb and hold heat reasonably

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# Thermodynamics of Fires, Hearths, and Earth Ovens

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well, releasing it slowly over periods of hours, or days, if properly insulated. But thermal storage comes at a cost.

Thermal cycling— heating and subsequent cooling—causes thermal stress and fatigue within any lithic material, eventually (or quickly) causing fracture and resulting in fire-cracked rocks (cf. Schalk and Meatte 1993). This disintegration, sometimes known as thermal stress weathering, is a familiar geological process in desert settings with pronounced diurnal thermal cycles. The factors that govern whether a rock of a given type, variety, or shape survives intense thermal stress weathering better than another are complex. While certain igneous rocks appear to survive thermal cycling better than most metamorphic and sedimentary rocks (Jackson 1998), overall, the archaeological record suggests that aboriginal cooks tended to use rock types at hand. Stark (2002) found that people who bake plants in earth ovens today look for relatively large rocks, small enough to easily manipulate by hand and of types not prone to explode or fracture quickly with repeated use.

Ethnographically documented cooks often placed rocks directly on the fire or ignited the fire with the rocks amid the fuel. As anyone who tries to cook with heated rock soon learns, once the fire dies the uncovered rocks quickly begin to lose heat to the surrounding environment. This explains why most heating elements were insulated from conductive heat loss by being placed in a pit and insulated from convective heat loss by a cap of earth.

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[**Next month: Earth Oven Technology in Systemic Context]**

# What is Bioturbation?

aswtproject.wordpress.com, By Matt Larsen , 19 Mar 2015

Bioturbation is the term archaeologists use for any disturbance of the ground by living things. These include plants and tree roots, rodents, reptiles, insects, worms and any other organism that delves into the ground. Bioturbation is an issue all archaeologists face in some form or another. So, how does bioturbation affect archeological digs?

Bill Murray isn't the only one concerned with burrowing animals. Archaeologists are concerned with bioturbation because it alters the archaeological context (see Where Context is Crucial). As organisms move through the earth they can affect the archaeological record in several ways. First, and most obviously, bioturbation changes the stratigraphy. Roots and especially burrows move dirt around in the earth. Dirt that was down deep is brought up, dirt that was near the surface is carried down and earth can be moved all over as animals backfill their own burrows. In a Canadian study of pocket gophers it was estimated that, if one gopher at a time lived in a 10x20m area and digging activity remained constant over 200 years, approximately 25 metric tons of earth would be moved!

Burrowing animals often move artifacts up in the ground. The gophers, for example, make burrows about 6-7cm wide. Anything they come across that is less than 6-7cm, such as tools or projectile points, will be carried by the gopher out to the surface or into a side chamber of the burrow.

Bioturbation can also cause artifacts to move down farther into the ground. Burrowing by animals can undermine artifacts, even artifacts much larger than the animal (like a grinding slab for example), which allows them to sink down

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# What is Bioturbation?

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in the earth.

Burrowing animals also have a tendency to bring things in to their burrow, such as food or nesting materials. This means that some objects may seem to be deposited by people, but in actuality were brought into the ground by animals.
The movement of earth and artifacts through bioturbation requires archaeologists to understand that just because an artifact is found in a certain stratum does not mean it was originally deposited at the same time as that stratum. It also means care should be taken in establishing an age for a stratum or an artifact.

The destruction of a stratum or the movement of artifacts are negative aspects of bioturbation, from an archaeological standpoint. Bioturbation can also, however, be a positive thing. Bioturbation can be a tool an archaeologist uses to study the past.

**Bioturbation at Eagle Cave**

So what does bioturbation mean for us on site in Eagle Cave? How do we recognize it? How does it hinder us and how does it help us?

At the surface in Eagle Cave, the main agents of bioturbation were sheep, goats, and people. Eagle Cave was used in the early 20th century as a convenient place to pen sheep awaiting shearing in the pens atop the cliff. This means that the surface was mixed up by their milling about and is heavily disturbed. Further, people visiting the site for nearly a century have picked, plucked, and scratched at the surface (and deeper) of Eagle. We surmise the strata from the Historic through the Late Prehistoric eras – the layers at the "top" of the shelter profile – are nearly completely destroyed. When we excavate at Eagle Cave, we first clear away the disturbed surface layer to get to the intact deposits underneath. As we dig into these intact strata, the main agents of bioturbation are burrowing animals such as rodents, lizards, and insects. The burrows we find range from very small insect burrows to extremely large mammal burrows. Most burrows are from rodents and are, on average, about 7cm (~2-3 inches) in diameter. We are able to distinguish burrows from intact material in several ways.

PS010 is a nice example of different burrow sizes and shapes. Note the excellent color contrast in the central burrows. First, we use visual clues to identify burrows. We often have clear layers (e.g., alternating white, black, and gray bands of ash, charred fibers and the like), and whenever there is an interruption in the strat from a burrow, the contrasting colors stand out, like in the above photo. We also often see nesting material in the burrow matrix, grass or straw, and sometimes there are pockets of cached seeds. In modern burrows, we often find sheep and goat dung mixed in as well.

In plan view (looking down on a unit from above) we can often see the burrow as a linear track extending across the unit. In profile view (looking at a vertical surface from the side) we often see burrows as either a circle of material, a hole, or as a linear disturbance extending across a profile face.
Archaeological excavation is not just dependent on visual cues, like color changes, but is also an extremely tactile endeavor. When we hit a burrow, it usually feels very different under the trowel from the rest of the stratum. Most of the time the burrow material is exceptionally loose; the trowel just sinks right in several centimeters without any pressure applied by the excavator at all.

The deposits at Eagle Cave often have burrows in them, and it can be extremely frustrating for an archaeologist to work with strata that are more burrow than intact. When we began excavation this season, we were excavating near the back of the shelter and we had to move a lot of earth before we found intact deposits. As we were cutting back the trench face we finally had to stop because we came upon a burrow nearly a meter across, the aforementioned "Badger Burrow". We are no longer excavating from this area (the far right unit in the photo to the right) to the back of the shelter because it is all the backfilled trenches of the excavations in the 1930s; which just goes to show that archaeologists can be proficient bioturbators as well!
While at times frustrating, the disturbed and burrow material does not go to waste. We screen samples of these disturbed sediments on-site and use the artifacts we find for educational purposes here and at Texas State University. We often find interesting artifacts within the burrow material, including two large bison teeth this season.

# Fort Chadbourne Days Living History Event

May 1st & 2nd

CVAS has been invited to maintain a table of information and artifacts during the event. We need volunteers to be available to maintain the table and answer questions from the visitors. Please contact either Callan Clark or C.A. Maedgen or Tom Ashmore to put your name and time in for volunteering.

Callan Clark clarkc74@gmail.com
325-763-7361
C.A. Maedgen camaedgen@gmail.com
325-942-9854
Tom Ashmore tomashmore@wcc.net

## Fort Concho Frontier Day
## Saturday, April 25th

CVAS was asked if we could man a table at the Frontier Day event. We need volunteers to man a CVAS table. You can bring any artifacts you would like to display and Bob will try to get some specific to the fort.

Please let us know if you can volunteer for the event. It will be from 7 a.m. to 12 p.m.

**CVAS**

**FORT McKAVETT**

West Texas Heritage Days 2015

**THANK YOU!**

FRED BRAZIEL
BILL YEATES
HENRY DUSEK
ROBERT VILLAREAL
DUB WILLIAMS

for volunteering and coming out to help


## SWFAS 2015

The Southwest Federation of Archeological Societies 2015 symposium is scheduled to be held in **Hobbs, NM the weekend of April 25th**. Tom Ashmore will be giving two presentations—Independence Creek's Alan's Shelter and Drones in Archeology. C.A. Maedgen will be representing CVAS at the board meeting. If anyone else is interested we can pass along the details. The agenda has been sent out via via email.

# 2015 Dues

**Please don't forget that annual dues if you have not paid. The new application form is on the back of this newsletter or you can pay at the meeting to our treasurer, Steven Schooler. The new address is on the application in this issue.**

WE'RE ON THE WEB AT
CVASSANANGELO.ORG

## Meeting Location

Please remember that our meetings are now in the classroom at the Fort Concho Living History Stables, **236 Henry O. Flipper St. We enter through the side door.**

# 2015 Membership Application

Name_____

Address_____

City_____

Zip_____ Phone_____

Cell_____

Family members_____

_____ 132 Kilt Road San Angelo, TX 76901

Email_____

| | | |
|---|---|---|
| **Individual** | **$15** | ☐ |
| **Family** | **$20** | ☐ |
| **Student or military N/C** | | ☐ |

(active military only)

I pledge I will not intentionally violate the terms or conditions of any current or future state or local statute concerning cultural resources or engage in the practice of buying or selling artifacts for commercial purposes, or engage in the willful destruction of archeological data, or disregard proper archeological field techniques

Signature_____ Date_____

Mail to: CVAS, 132 Kilt Road, San Angelo, TX 76901