Project Background

Justification for research

For many years, the dominant theory for the peopling of the Americas had been the “Clovis First” Model. In this model archaeologists claim that Paleo-Indian people using Clovis technology were the first people in America. They were said to be big game hunters that came to America from Asia over an ice free land bridge known as Beringia around 12,000 to 11,000 RCYA (13,600-12,550 calendar years ago) (Collins). They were said have followed herds of large game across the land bridge and down the west coast of North America while leaving the first small populations of people that became the ancestors of the Native Americans encountered by the Spanish.

The Gault site contains one of the largest Clovis components ever found. Due to the relatively small number of known Clovis sites, and the historical implications surrounding Paleo-Indian culture, the Gault site and its finds have been under intense scrutiny. The Gault site appears to have a cultural component that pre-dates what was thought to be the first Paleo-Indian culture, unofficially called “Older Than Clovis” (OTC). This is because of the presence of cultural material found well below levels containing Clovis material. This is where the controversy comes into play because: “Archaeological sites within physically “active” soils, such as Vertisols, are considered suspect by archaeologists because of concern for possible disturbance of stratigraphic context” (Steven G. Driese). Some archaeologists have expressed concern that the stratigraphy at the Gault site may be subject to disturbances, and that cultural material thought to be OTC may in fact be Clovis material that has been vertically displaced by pedagogic processes.

This paper will address the idea that cultural material found at Gault may have been subject to vertical displacement, by comparing previous work about the integrity of the stratigraphy at Gault and surrounding areas with the work performed by the University of Michigan (UM) in Area 8. This paper will also serve to expand upon the findings of other excavations at the Gault site in Area 8 to help gain a more complete understanding of the significance of the Gault site to the Paleo-Indian, and to the peopling of America.

Summary

A doctoral student from the University of Michigan (UM), Ashley Lemke, conducted an archaeological excavation in Area 8 of site 41BL323 in Bell county (The Gault Site) from May, 15, 2013 – June, 8, 2013. Previous excavations at the Gault site in Area 8 include but are not limited to an amateur non-scientific excavation that became significant with the find of a mammoth mandible and associated Clovis tools. After the land owners found the mammoth mandible they wisely called in an archaeologist (Dr. Mike Collins) who was given a very short time to exhume the mandible. This exhumation of the mandible left more questions than answers and spurred more excavations in the area. This excavation was carried out in order to further investigate the area, and to expand upon the context of the mammoth mandible find, as well as, to gain lithic samples to be sent away for use-wear, starch grain, and blood residue analysis. I arrived at the excavation after archaic levels had been excavated, thus this report focuses on the two Clovis components as identified by Dr. Michael Collins.
Previous scientific excavations at Area 8, informally known as the Lindsey Pit, of the Gault site include a large excavation by Texas A&M University (TAMU) in 2000, and 2001 by Michael Waters, Harry Shafer, and David The University of Texas (UT) under the direction of Dr. Tom Hester and Dr. Michel Collins, also conducted scientific excavations in Area 8 of the Gault site as shown in figure 1. Since the summer of 2006, TAMU has been excavating at the Debra L. Freidkin site. This site is located along Buttermilk Creek, just 200 m downstream of the Gault site, and approximately 300 meters from Area 8. During this excavation The TAMU team recorded lithic finds from each stratum, along with OSL dates from each stratum. The close proximity of these excavations to the UM excavation allows me to compare both archaeological and geologic data from all four excavations in order to gain a larger understanding of the significance of this site to Paleo-Indians as well as to gain further insight into the integrity of the stratigraphy at Area 8. All excavations in Area 8 of the Gault site are shown in figure 1.
**Comparative results**

The Gault site is partly known for the spectacular amount of artifacts it produces, as well as its large Clovis component. The excavation that I took part in delivered both of these things as well as other amazing finds. The amount of artifacts recovered from the 4 1m x 1m excavation units was staggering. Within Clovis levels the team individually mapped (piece plotted) over 600 artifacts, and recovered thousands more. The excavation produced a Fluted Clovis point, two incised stones, two Clovis age bi-faces, a large chopper, several overshot flakes, several end thinning flakes, several channel / fluting flakes, bi-face thinning flakes, and ample faunal samples for DNA, seasonality, and isotopic analysis. The team recorded a bison ankle bone, a whole bison tooth, possible bison leg bone, a whole horse tooth, possible animal rib bone, many yet unidentified bone fragments, and a small amount of turtle shell. All of these samples are associated with large clusters of flakes, as well as each other (figures 2-5). Most of the Clovis artifacts and associated faunal remains were found in situ and individually plotted by total station.

**Lithic**

The findings of the UM excavation in area 8, are very consistent with findings from previous excavations in Area 8. In his chapter of book *Foragers of The Terminal Pleistocene in North America* by Walker and Driskell (2004), Dr. Collins describes the Paleo-Indian component in Area 8 of the Gault site: “Clovis materials vary in their concentrations from fewer than 10 to more than 300 pieces per 0.05- cubic- meter units. This variance is expressed horizontally as areas of high artifact density separated by relatively artifact free areas and, in one area of the site (Area 8), vertically as multiple Clovis components of great density separated by nearly sterile zones. Features include numerous tight clusters and small piles of debitage, a large concentration of initial reduction cores and flakes, one small pit of unknown function, (Collins) p.62.” The UM excavation of Area 8 helped to expand upon these findings, and artifact disbursement, type, and quantities remained extremely consistent with Dr. Collins lithic findings in area 8.

Lithic finds from TAMU excavations from Area 8 of the Gault are: “over 74,000 pieces of debitage and over 1300 artifacts, mostly from the Clovis horizons”([www.cffa.edu](http://www.cffa.edu)). These findings by the TAMU team are consistent with the UM excavation as well as the UT excavation. All three excavations recovered large piles of flakes blades and broken tools in similar concentrations.

Figure 2: These side by side pictures are intended to show the consistency in lithic finds between the TAMU (right) and the UM excavations (left), as well as to show the amazing density of Clovis cultural material at this site.
Fauna

In a book chapter entitled Discerning Clovis Subsistence from Stone Artifacts and Site Distributions on the Southern Plains Periphery Collins explains that “where ever faunal evidence is recovered in Clovis campsites, mammoth remains are only part of a diverse array of small, medium-sized, and large animals (Cannon and Meltzer 2004)(Collins 2004 p79).” The chapter lists the faunal remains found with in Clovis components at the Gault site in table 4.4; Turtle, snake, bird, mammoth, horse, bison, deer, cotton tail rabbit, gopher, and canine. The faunal remains recovered from the UM excavation are very consistent with the faunal remains recovered by the UT Team, and with the explanation of the typical Clovis component by (Cannon and Meltzer 2004). In the field the UM team identified bison and horse; shown in figure 3, as well as, turtle, remains. Many other yet unidentified bone fragments were also recovered. Furthermore, the UM excavation area included the area where the mammoth mandible was found by the Lindsey family and excavated by the UT team.

According to the book Clovis Lithic Technology Investigation of a Stratified Workshop at the Gault Site, Texas (2001) by Waters, Pevny, and Carlson the Texas A&M team recovered Approximately 5700 faunal specimens from the Lindsey pit encompassing a large array of different species including all of the species found by the UM and UT excavations with the exception of mammoth remains recovered by UT. These results are consistent with previous excavations in Area 8 in both types of animals represented as well as in density of faunal remains.

Comparing the faunal and lithic data from the three excavations in Area 8 at Clovis levels allows us do draw the conclusion that not only was this site used for butchering and eating many types of animals, but also as evidenced by the numerous flakes diagnostic of Clovis tool making such as several overshot flakes, channel flakes, bi-face thinning flakes, and a blade cores a place where chipped stone tool were being made. The combination of these two activates at a single location suggests to me that this was an all-around living area, and would have been home to Paleo-Indian peoples.

These pictures are intended to show the quality of faunal finds during the UM Excavation.
Figure 4: This picture is a close up picture of N1022 E993 within the second Clovis component. It also shows fragments of a longer more narrow bone, possibly a rib bone (dark blue dots). After I mapped and removed the flakes shown here, another layer of flakes directly underneath these was exposed. Within a depth of 10 cm in a 1m X 1m we mapped over 80 artifacts associate with the flake cluster and recovered many more. Artifacts shown here are not brushed or cleaned off in order to protect the integrity of future blood residue analysis.

Figure 5. Shows what turned out to be a 4 ½ in blade unexcavated situ in the profile. A black arrow shows the location of the flake cluster in figure 2. Also shown is the bison tooth in situ. An orange arrow points to a Clovis bi-face in situ. This picture is intended to show manner in which these finds presented themselves.

Figure 6. This picture shows hundreds of flakes that are a result of tool making, also called debitage. Certain flakes can be diagnostic of certain activities, cultures, and tools. Flakes themselves make very good expedient tools; many flakes show use-wear and modification.
Figure 7. This picture shows a possible bison leg bone surrounded by several flakes and blades (light blue dots) two of which lying directly on top of the bone. It is likely that use-wear analysis, and blood residue analysis will show that some of these flakes and blades were in fact used to butcher and prepare meat. This picture also well demonstrates the special relationship of the faunal and lithic remains in a single cluster, which is the dominant feature of the Clovis components in Area 8 and, in all four excavations discussed with the exception of the Friedkin site. You can imagine that that’s just how they left it 11,000 years ago.
Methods

The excavation was carried out in order to collect diagnostic cultural material, as well as samples for blood residue, use-wear, and starch grain analysis, as well as faunal remains to be analysed for dietary practices, with a focus on the Paleo-Indian culture. The testing strategy involved hand excavating four 1 X 1m units to bedrock, while avoiding back fill from previous excavations. The excavation was carried out in 10cm levels through Archaic levels, and in 5cm levels in Clovis age levels. Units were placed northeast of the original location of the mammoth mandible and of the TAMU excavation, in order to gain more information about the context of the original find. All diagnostic artifacts in Archaic levels were piece plotted using a Total Station. Any flake quarter- sized or larger in clovis age levels were piece plotted. All excavated material that was not piece-plotted was screened through ¼ in wire screen. Clovis age levels were dug with small plastic trowels as to not damage uncovered artifacts (figure8,10). Surgical gloves were worn by all excavators to not contaminate samples to be sent away for blood residue and starch grain analysis. Notes and pictures were taken to document the soil stratigraphy, depth, artifacts and faunal remains within and after each day of work. Most lab work including washing and cataloging artifacts was done the evening prior to excavation(figure8).

A field jacket was used to recover without damaging a possible bison leg bone and associated flakes and blades which were found directly on top of and leaning against the bone (figure8). A sample from every group of diagnostic flakes, and tools will be sent away for blood residue, starch grain and use-wear analysis.

Figure 8,This picture is of the same bone shown in figure 7. This picture is intended to show the method of creating a plaster cast (field jacket) around the fragile remains as a way of preserving the remains for future study. Green arrow points to a small plastic trowel used for excavation with-in Clovis levels.
Figure 9. Shows three parallel 1m X 1m excavation units where the floor meets the profile. The excavation is divided into four 1x1 meter sections positioned at N1023 E993 – N1021 E993, N1023 E992. This picture shows the floor of the excavation between what the team decided was the first and second Clovis components. A blue arrow shows the location of the possible bison bone (figure 7). The green arrow shows the location of the flake cluster (figure 4). A red arrow shows the location of the possible spring throat (figure 13).

Figure 10. This picture shows the method of using the Munsell chart to classify the color of the soil. This soil sample is greyer than the brighter yellow soil surrounding it. This may be the result of human habitation, or the dissolution of a limestone rock in the soil. I determined that the soil is color 7.5yr 5/3.
Figure 11. This picture shows the excavation area at the Clovis level. The higher area being stood on is back fill from the previous TAMU excavation. This picture is intended to give a visual depiction of the nature of this excavation. The picture is also intended to show the relatively small size of the excavation, which makes the number of Clovis artifacts recovered very impressive. The red arrow points out an Archaic feature though to be a hearth. Also prominent at this site is evidence of continuous habitation through Paleo-indian and Archaic times.

Figure 12. Each day all artifacts were washed and set out to dry. Then that evening the artifacts are re-bagged and cataloged. Tags from the field (orange and green tape) are kept with the artifacts through the curation process in order to protect against loss of provenience.
Geology Stratigraphy and Site formation

Site Formation

The Gault site is located in a karst environment between two large outcrops of Edwards lime stone which helped guide the formation of the site. Buttermilk Creek is low-velocity spring feed creek. The lowest zone above bedrock is the product of multiple ancient high-energy events that would have deposited and oriented the rocks into a bed, possibly a buried point bar. Periodic overbank flooding with varying amounts of energy, and colluvial slope processes over a period of about 30,000 years (OSL TAMU) help to create the rest of the well-stratified profile in the UM excavation at Area 8. Rocks of all sizes within the strata represent the force it took to put them there. I believe that most of the rocks in the profile (some circled in blue in figure 14) are alluvial flood deposits and represent periodic overbank flooding events of varying energy. Pedagogic processes such as carbonate formation and illuviation have also helped form the profile we see today.

Stratigraphic Integrity

I will compare the stratigraphy and time diagnostic artifacts of the UM excavation with the stratigraphy and Optically Stimulated Luminescence (OSL) dates of the Friedkin site in order to address the idea that artifacts found during the excavations in Area 8 may not lay in original context. The idea that artifacts may have moved or shifted from their original location by means of churning soil, or other pedagogic process. I will cite an orientation and re-fit study by Dawn Alexander to show a possible margin of error as it pertains to the vertical context of artifacts found in Area 8.

Scientific studies of the geology and stratigraphy of surrounding areas of Buttermilk Creek have been conducted by TAMU and are presented in a scientific paper titled: “The Buttermilk Creek Complex and the Origins of Clovis at the Debra L. Friedkin Site, Texas”. The report explains that using time-diagnostic artifacts compared with dates derived from (OSL) dating the TAMU team determined that integrity of the stratigraphy is good and that: “Time-diagnostic artifacts recovered from these horizons are in correct stratigraphic order and correlate with corresponding OSL ages” (Michael R. Waters). These results combined with measurements of mass-normalized magnetic susceptibility were enough for the TAMU team to conclude that “the artifacts from block A (Sample area dating from approximately 32,000bp to approximately 1000bp) lie in undisturbed contexts and have not worked downward or displaced upward by soil-forming processes (Michael R. Waters).

This analysis was done at N1305 E1359, 283 meters North and 366 meters East from Area 8. The formation of the floodplain of Buttermilk Creek is too complex to assume that the OSL dates and the stratigraphy at the UM excavation area and the excavation area of the Friedkin site coincide exactly. But, due to the close proximity of the two excavations, I believe that the greater geologic processes and the materials involved in these processes are similar enough to determine that the integrity of the stratigraphy at the UM excavation in Area 8 is sound for the same reason. Diagnostic artifacts found in situ with in the appropriate stratigraphic layers of the UM excavation in Area 8, suggests that the strata of the UM excavation lie in chronological order.
However, a re-fit and artifact orientation study done from within the Lindsey Pit by Dawn Alexander in order to evaluate any post-depositional displacement of artifacts that suggests that there is some movement by artifacts within the soil. The artifact orientation portion of the study was done by evaluating the dip of recovered artifacts (artifact inclination). The theory assumes that artifacts fall flat on the ground and that artifacts found not flat have been subject to some sort of displacement. The study concluded that: “Orientation data reflects a relatively high degree of contextual integrity, with a slight preference for the general paleotopography recorded in the stratigraphy” (Alexander 2008). The re-fit portion of the study was done by painstakingly trying to re-fit, or piece together lithic artifacts that were presumably broken at the time of deposition. This study was done in order to measure, if any, the vertical difference between the re-fitted pieces, and draw inferences about the integrity of the stratigraphy of excavations within Area 8. Alexander concluded that: “The maximum vertical distance between refits measured 20 cm, although 67 percent of the thirty-three groups measured a maximum vertical separation of 6 cm or less.(Alexander 2008)” The results of this study do not disprove either Waters or my own conclusions about the integrity of the strata of Buttermilk Creek, but they do demonstrate a margin of error as it pertains to the vertical position of piece-plotted artifacts.

Furthermore, the UM excavation discovered the presents of spring throats, geologic features where ground water creates pathways through which water travels upward penetrating the overlaying stratigraphic layers (Figure13). These features compromise the integrity of the stratigraphy where present. At least one presumed spring throat was located in lot N1023 E993. With-in the pathway of a spring throat at Clovis levels the team discovered a stone drill diagnostic of the Archaic period as well as two flakes. Neither the drill or the flakes found with-in the presumed spring throat had been stained a yellow color by contact with the ground water, as was the case with all other cultural material found within Clovis (Figure13). This find indicates the existence of, and the possible complications associated with spring throat in archaeological sites, i.e, vertical displacement of artifacts.

It is worth noting that the article about the Friedkin site does not mention the presence of features such as hearths or clusters of artifacts that dominate the finds at excavations in Area 8. This lack of features combined with the fact that the Friedkin site is about 300m downstream from areas dominated by these features suggests that while the artifacts do lie in correct chronological order they may not lie in original context, as artifacts may have been washed down-stream from their original location close to the time of deposition.
Figure 13. Shown here is a discoloration in the soil at bedrock indicating the presence of a spring throat (area where ground water flows vertically). The presence of a stone drill diagnostic of the archaic period within the discoloration is strong evidence for disturbance of the stratigraphy by geologic features in this area. Note that this artifact is not stained the yellow color from being under the water table while all other artifacts found at Clovis level have been stained yellow. The color of this artifact indicates that it was not in contact with ground water long enough to become stained, and must have been moved into Clovis levels during archaic times.
Stratigraphic Description

The University of Michigan excavation was done in excavation Area 8 of the Gault site. The excavation is of units N1021 E993, N1022 E993, N1023 E993 from surface to bedrock, and N1023 E992 through archaic levels. Located between foot slope and toe slope of the hill slope, there is about 1700 cm of alluvial deposits that have built up over Approximately 30,000 years. Horizon boundaries can be described as “clear” as that the boundaries between the zones are well defined and make a clear change with in 2cm to 5cm of each other. The color of the soil gets redder and yellower with depth, this is due to the clay and iron oxides washing down from zone 1. I have identified and described each zone below:

- Zone 1 is the upper most strata it is a dark almost black clay, rich in organic matter, called “humus” and has a cracked dry blocky texture.
- Zone 2 is comprised of the same blocky clay as Zone 1 with the addition of the heavy accumulation of CaCO3. The CaCO3 accumulation is the dominate feature in Zone 2. It gives the strata a lighter color and a corer texture than Zone 1. Zone 2 also contains medium sized rocks indicative of a flooding event with a strong enough current and high enough water levels to deposit the rocks in their locations (rock circled in blue).
- Zone 3 is comprised dominantly of characteristics associated with the A Horizon, including cracked blocky clay with a significant loss of CaCO3 from the previous Bk Horizon. However, the color of the AB Horizon is redder than the previous 2 Zones which is consistent with the pattern of increasingly reddening and yellowing of the soil with depth.
- Zone 4 is comprised of an accumulation of hard yellow clay, slightly silty, with some gravel and medium sized rocks.
- Zone 5 is thought to be buried point bar deposits consisting of fine to very corse bed of rocks. The rocks lie with in a yellow/red gritty matrix. An ancient stream would have built up this pile of rocks on its banks.
- Zone 6 and is the lime stone bedrock floor of the excavation pit is approximately 1700 cm from the surface. The bedrock is white in color with a soft outer layer due to erosion from ground water which periodically rises and falls. Flowing ground water carves channels in the bedrock creation a wavy surface.
Figure 14. All dates from this diagram are from, Turners and Hesters book *A field Guide to Stone Artifacts Of Texas Indians*. This photograph is of the East profile of lot N1033 E993. Red lines separate the distinct strata. Blue dotted lines separate the soil horizons. Time diagnostic artifacts found during this excavation are adjacent to the level in
which they were found. The rocks circled in blue are evidence of a high energy flooding event. Green arrow shows a large flake associated with the large flake cluster.

**Conclusion**

As we pealed the dirt away from the Clovis levels little by little we exposed a window into the past. The piles of artifacts and bone look so perfectly random, as if they were carelessly dropped flung and discarded yesterday. The scene exposed in the excavation is one of leisure and relaxation. You can almost picture a Paleo-Indian person full of bison or horse taking a nap meters from the where the excavation is now. I believe our excavation paints a beautiful picture of a day in the life of the Paleo-Indian people.

Ample samples of cultural material and faunal remains were successfully recovered from all stratigraphic levels. Levels associated with the Clovis technology produced significant data that will be used draw more inferences and conclusions about the dietary practices of the Paleo-Indian people and the significance of this site to the Paleo-Indian. Early analysis of the data from the UM excavation helps to strengthen the conclusions drawn by previous scientific excavations.

Due to the controversy surrounding the context of archaeological finds at the Gault site, I have sited an artifact re-fit study, artifact orientation study, and OSL dating results from the other excavations at and near the Gault site in order to compare that data with data collected from the UM excavation. I concluded that artifacts do lie in presumed chronological order with a possible slight vertical margin of error.
Works Cited

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