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From the Editors

Welcome!
All articles in this volume were part of an external peer-review process, with each submission reviewed by two anonymous reviewers. We thank those reviewers for their contribution.

Beginning with this volume, JURA has established an Editorial Board and those members are thanked for their service.

A mini-thematic section is included in this volume and represents the research conducted by students of the 2018 UCA archaeology field school at Camp Halsey.

We hope you enjoy contributions in this volume.

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Vol. II, 2018 Editors

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Information for Authors

Articles should not exceed 10,000 words in length, including references.

Please submit the following to dmckinnon@uca.edu

- a PDF file of the complete submission (following American Antiquity style)
- OR a Word file containing the complete paper (i.e., including abstract, tables and figures)
- OR a Word file containing the text, references, table and figure captions, plus an individual file of each figure (600 dpi) and/or table.
- Excel file of tables is preferred.

The Mysterious Death of Seqenenre Tao II

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Introduction

One of the more intriguing and thought-provoking mummy mysteries found thus far is that of Seqenenre Tao II. A Theban king from the 17th Dynasty, he is considered to be one of the first rulers from that era to openly dispute Hyksos rule. Coming into power in the 15th Dynasty, the Hyksos were outsiders that took power in Egypt by claiming Egyptian land and resources. Before Tao, the Hyksos defeated the Theban resistance and annexed the remaining land under Egyptian control. It would eventually be Seqenenre Tao II, Kamose, and Amosis I that would "drive the Hyksos rulers out of Egypt" (David 2002:22). There is a story found in Papyrus Sallier I that supposedly describes the beginning of the conflict between Tao and the Hyksos ruler Apophis I (ten Berge and van de Groot 2002:232). The Theban rulers had restarted an ancient ritual of harpooning hippopotami in a pool near Thebes, which was a ritual traditionally used to "destroy the king's enemy through sympathetic magic and to ensure the safety of the Egyptian kingship" (David 2002:130). Undoubtedly, David Apophis took offense because the hippo represented the Hyksos god Seth, master of storms. Seth was also an Egyptian god, but of violence and disorder. Apophis reportedly sent a letter and ordered Tao to stop the ritual. Soon thereafter, war broke out. However, when Tao's mummy was identified hundreds of years later, there were five wounds on his head and face and no definitive evidence of what had happened to him. Recalling the earliest recorded examinations of the body and combining new evidence, the following article proposes a hypothesis to the mysterious death sequence of Seqenenre Tao II.

Initial Observations

The mummy of Seqenenre Tao II was found in 1881 at Deir el-Bahri. It was later identified and unwrapped by French Egyptologist Gaston Maspero on June 9, 1886. The mummy was probably found in its original coffin and was covered in several layers of greasy cloth, from which came a foul odor (Shaw 2009:160-161). Maspero observed that these cloths had been penetrated by worms and that beetle larvae had left behind shells. He noted that the body had started to decompose before the mummification process was completed. His ears had completely disappeared and his mouth was full of healthy looking teeth with the tongue clenched. Maspero recorded three injuries to the ancient king's head. There was a large wound found above the right eyebrow that was surrounded in what appeared to be brain matter. The second injury was found on the left cheek and it had broken his bottom jaw. Maspero also added that he believed this injury was from a mace or battle axe. The third injury recorded was a long slit across the top of his head, which was originally hidden by his matted hair. Maspero added that brain matter must have drained from this hole and was likely made by another axe. It was also observed that Tao had not been mummified the same way as other mummies from this time period. The typical mummification process involved removing the inner organs (except the heart) from the left side of the body. The brain matter was removed typically through the nostril and the body and face were relaxed. Everything was washed, dried, wrapped, or resinated for preservation. Maspero concludes his report by adding that the arms, legs, and vertebrae were disarticulated and his pelvis was broken into several pieces. He was about forty years old when he died and was clean shaven the day he died (Shaw 2009:160-161). Around the same time of Maspero's observations, the body was also examined by a French doctor named Daniel Fouquet. Dr. Fouquet was based in Cairo and had knowledge of Egyptology. In his report, he claimed that Tao was between the ages of 40 and 45 when he died. He also noticed the same injuries that had been reported by Maspero, adding that the state of decomposition was too great to note any other wounds. He added that Tao's nose had been squashed to the right side of his face when normally the nose would have been set and packed during the mummification process (Shaw 2009:161).

In September of 1906, Sir Grafton Elliott Smith completed the unwrapping of Tao and thoroughly examined the body (Smith 1912). Smith was considered a specialist in the history of mummification and was a professor of anatomy at Cairo School of Medicine. Smith reported that in contradiction with the typical mummification process, the king's head was not straight on its trunk, the legs were not fully extended, the face had not been put to rest, and his arms were left in the "agonised attitude" (Smith 1912).

He inferred that Tao died sometime between the ages of 30 and 40 years old based on sutures and ankylosis of the meta- and meso-sterna (Smith 1912:2). This is a process that is no longer used to age skeletons, yet other observations are important. Smith noticed that the cranial cavity had not been emptied through the

nostril, as was common, and there was no linen stuffed in the injury at the back of the head (Smith 1912:4). However, the internal organs had been removed through the left flank and in their place was linen. Smith took this to conclude that the organs had been removed on purpose and had not simply decayed. He observed that the linen in the abdomen "formed a solid mass which is still well-preserved" (Smith 1912:4). The thorax was also packed with linen with a definite opening to show they had been removed, although the organs were not present with the body. Upon finishing his examination, he concluded that there were no other visible injuries to the rest of the king's body. What Smith brought to the metaphorical table was a much more thorough examination than both Maspero and Fauquet. Instead, he chose to focus his observations and calculations on the injuries themselves. He also numbered the injuries with a system that I will use in this paper. Two images have been included with the injuries illustrated. Figure 1 contains injuries 1-4. Figure 2 displays injury 5.

The first wound (Smith #1) was a horizontal wound to the upper frontal bone (Figure 1). It was approximately 0.63 mm and was described as a crack that ran from the left side of the frontal bone to where the left temporal crest and coronal suture meet (Smith 1912:4). Smith observed that the scalp was slightly retracted around the wound, indicating that this wound was inflicted pre-mortem. There was skin that had been stripped away from the frontal bone as well, which Smith interpreted to mean there was a second blow to this area or the weapon used had a projection (Smith 1912:4). He observed a large clump of hair to the right of the wound with what appeared to be dried blood around it (Smith 1912:5). The second wound (Smith #2) was a fusiform shaped fracture of the frontal bone, measuring around 0.31 mm long (see Figure 1). As result, the zygomatic arch was broken (Smith 1912:5). This wound was located above the right eye and was found underneath a clump of hair and blood. There is also a depression around the area of this wound. The third wound (Smith #3) was considered a blunt injury that fractured both nasal bones and probably destroyed the right eye (see Figure 1). This wound caused a perforation in the skin which in turn was "caused indirectly by the projection of fragments of broken bones" (Smith 1912:5). Smith #4 was a cut on his left cheek, just below his left eye (see Figure 1). The only other information offered about this injury was that it was most likely caused by a sharp tool or an axe. The fifth and final wound (Smith #5) was an injury found at the base of the skull and slightly below his left ear (Figure 2). Smith reported that it was probably made with a "pointed instrument such as a pike or spear" (Smith 1912:5-6).

Recent Analysis

With these initial observations, there were also several different theories about what happened to him. Maspero believed that because there was decomposition of the body, Tao had to have died on the battlefield, away from his home in Thebes. Therefore, he was hastily mummified to the best of the ability of his people (Shaw 2009:162). This would explain the lack to positioning that was typical for the time period. Fauquet agreed that he died on the battlefield, but instead theorized that he decomposed on his way back home to be mummified (Shaw 2009:162). Smith, having completely unwrapped and examined the mummy, agreed with Maspero that the body was most likely embalmed somewhere near the battlefield. He also concluded that Tao must have been attacked by at least two men who held between two and three different weapons (Smith 1912:6). Having found

Figure 1. Front of the head highlighting injuries 1 through 4 (Smith 1912:Plate IV).

Figure 2. Back of the skull with injury 5 highlighted (Smith 1912:Plate II).

no other wounds, it was not apparent that Tao tried to defend himself during the attack. Smith also theorized that Tao was lying on his right-side due to the fact that the wounds were mostly found on the left side of his body and that it seemed unlikely he would be hit on top of his head given his estimated stature. Therefore, Smith stated that Tao was probably asleep on the ground or on a bed when attacked. This is supported by the fact that Smith recorded four of the five wounds as having been inflicted horizontally. He also said that Tao may have been struck, fell to the ground, and then received the remaining wounds (Smith 1912:6).

In the late 1960s, the body of Tao was once again examined. X-rays were taken and provided further proof that none of his bones, besides the skull, had been fractured, which verified that only his head had been attacked (Shaw 2009:162). It was also confirmed that Tao died sometime between the ages of 35 and 40. Eugen Strouhal and Manfred Bietak were two scholars who completed an analysis of the body to learn more about the weapons that may have been used against Tao. They argue that the wounds were inflicted by both Hyksos and Egyptian weapons (Shaw 2009:163). They theorized that the wound in the left cheek (Smith #4) and the fracture to the frontal bone (Smith #2) were both caused by a Syro-Palestinian MBII Bronze battle axe. These weapons were likely used by the Hyksos or their Egyptian supporters. They also stated that the horizontal wound to the frontal bone (Smith #1) was probably caused by an Egyptian type axe or broad blade. The nasal bones (Smith #3) were most likely fractured with a blunt object. The last wound (Smith #5) was undetermined. Radiological evidence from 1978 found that Smith #2 was more radiolucent than Smith #1. Both were found on the frontal bone, suggesting that it is possible the king survived this first blow (Bockenheimer et al. 1978; ten Berge and van de Groot 2002:232). Though it was discussed by Bockenheimer et al. (1978) that the radiolucency of the fractures could be caused by artificial bone dissolvement, and that this has been known to happen with embalming fluids present, this new evidence led to additional ideas about the way Tao perished (ten Berge and van de Groot 2002). It has been theorized that the king survived Smith #2 and was possibly paralyzed by the injury on the left side of his body. However, Gonzalo Sanchez, a neuroscientist actively working within the Egyptian field, stated that the blow to the head would have been far too deep to allow Tao to survive for much longer (Shaw 2009:163). He also noted that there was no healed skin over the wound, suggesting that the wound had no time to heal before his death. He further added that if Tao had become paralyzed from the injury his arm and hand would have been found in a different position. He concludes that the king probably fell on his left arm after being struck and upon death his arm remained in the odd position it was found and hardened that way. Sanchez created his own order of events for that fateful day. The first wound (Smith #4) struck Tao on the left side of his face with a Syro-Palestinian axe. A spear was then shoved into the back of his neck (Smith #5), effectively killing him. Around the same time, he was struck a second time in the face (Smith #2) with another, or possibly the same, Syro-Palestinian axe. Then, having fallen to the ground face-up, and most likely already dead, Tao was struck again in the frontal bone (Smith #1). Finally, the blunt injury to his nose (Smith #3) was probably caused by some kind of mace (Shaw 2009:163).

Proposed Theories

Having discussed all of the physical evidence, these scholars began to put more elaborate theories behind the early demise of this Egyptian king. The first theory, supported by Smith, revolves around the idea that the king was assassinated in the palace while he slept. He backs this idea with the lack of apparent defensive wounds to the body. For reasons unknown, only his head was targeted repeatedly. It is unlikely that a conscious man would not try and defend himself from these attacks. Smith elaborates that four of the five blows were horizontal and therefore, must have been made when the king was lying down (Smith 1912:6). Had he been standing, there would likely have been vertical wounds. The blows were also inflicted to the left side of his body. This could mean that Tao was lying down on his right side with his left side defenseless. Because there were so many attacks, Smith decided there had to be more than one attacker (Smith 1912). He also suggested that the wound to the back of the head (Smith #5) was probably the first blow and likely left him unconscious. This theory has been mentioned and restated by multiple scholars. For instance, Dodson and Ikram (1998:116) suggest that the king may have taken the hit to the eye (Smith #2) on the battlefield and was later assassinated because he could no longer lead his army to victory. There are several problems with this theory, such as the observation that Tao had decomposed before being mummified. If he had been killed in his own palace, why did it take so long to take the proper steps with his burial? There was plenty of time and plenty of resources to make sure that the process was completed in a timely manner that was typical for the time period. Some scholars argue that Tao was standing when he was attacked, while others claim he was lying down. There is no firm evidence for either argument at this point. Another odd detail that does not piece together with this theory is that both Egyptian and Hyksos weapons were used. Why would Syro-Palestinian weapons have been used inside the palace? And, why specifically target the head rather than simply attacking wherever one could? Finally, natron was not used during

the mummification process, meaning that there were some bodily fluids remaining when he was examined (Shaw 2009:174). Shaw (2009:175) discussed that if there had been any level of respect shown to the body natron would have been used. Natron is sometimes confused with salt and is a natural substance that contains both salt and baking soda. It is a vital step in the mummification process (Brier and Wade 1997:91).

The second theory, supported by Maspero, Fauquet, Bietak, and Strouhal, returns to the idea of death on the battlefield. Maspero theorized that the king died in battle and, upon his army's victory, was brought back to Thebes to be mummified (Shaw 2009:164). Fouquet states that the king must have been attacked by at least three other people in what seems to have been a frenzied situation (Shaw 2009:164-165). He suggests that Tao had been thrown from his chariot, attacked, then taken back to Thebes, and decomposing slightly on the way. Bietak and Strouhal disagree and do not believe that the king was sleeping when he was killed (Shaw 2009:165). They suggest that because there are several wounds, all seemingly coming from different directions, and multiple types of weapons used, he most likely fought a group of enemies. They also elaborate on the chariot idea, claiming that the first blow was most likely Smith #4 because it was inflicted from a lower angle. This blow brought Tao down from his chariot, where he was killed while in battle with the Hyksos because at least two of the five wounds must have been caused by Syro-Palestinian MB II Bronze Battle-Axes. This specific weapon has only been found in the northeast Delta and has been clearly associated with the Hyksos (Shaw 2009:163). Bietak and Strouhal also mention that the angle of the wound to the back of the neck (Smith #5) came from someone standing below Tao, as if he were standing on a chariot at the time he was struck (Shaw 2009:165). However, this is where the theory falls through. There is no firm evidence of chariot technology in Egypt during the reign of Tao. Even if the technology was brought into Egypt, it would have required expensive, imported wood, along with horses. However, during the Second Intermediate Period Egypt was cut off from Asia and Nubia. This confirms that new technology would have been inaccessible during this time period. The first time that chariots are depicted or associated with the king was during the reign of Ahmose. Historically, they were associated with ranged attacks or chasing down a fleeing enemy (Shaw 2009:176). To reiterate the point Shaw was trying to make, none of this information explains how Tao would find himself on a chariot and surrounded by enemies on a battlefield. James Hoffmeier (1976:43) explains that the technology was actually introduced to the Egyptians by the Hyksos. Literary references occur as early as Kamose, Tao's successor, and pictorial references do not appear until later in the 18th Dynasty (Hoffmeier 1976:43). However, Hoffmeier (1976:44) points out that before Tutankhamun, "chariots are limited to hunting, domestic, and possession scenes." Body armor was not developed until after chariot technology was introduced and the same is said for the use of helmets (Redford and Hoffmeier 2001:410). Regardless, if Tao had been wearing body armor, and assuming he was riding a chariot, X-rays would have revealed if he had been struck. And, the fact that he was only struck in the head is odd.

There is also substantial evidence to support the fact that kings did not participate in battle and watched from a safe distance. Shaw mentions that ante-mortem violence can be detected when a mummy has been suspected to be a "warrior" (Shaw 2009:166). Aside from Tao, Kamose is the only other mummy from the 17th Dynasty and fell apart immediately after being unwrapped. Harris and Weeks (1973) described Kamose as being "delicately built" and reported that it was unlikely that he was involved in any kind of warfare. Thutmose II was described multiple times as a great warrior. However, analysis of his remains confirms no ante-mortem injuries and he was also described as "frail" (Harris and Weeks 1973). The body of Amenhotep III also showed no signs of injuries (Harris and Weeks 1973). The research of Harris and Weeks also confirmed that no 18th Dynasty kings had suffered battle injuries. It was noted that the paste covering many of these royal mummies can hide scars or wounds on the body but X-rays displayed no healed fractures or bone injuries (Harris and Weeks 1973). Finally, there is no explicit evidence that kings ever fought on the battlefield. It is understood that the king was the only one who could take credit for killing enemies, while the army took prisoners or cut off limbs. If there is an account of battle, the king is the only one who killed the enemy. He is also depicted as having supernatural abilities. After all, the ruler had to be divine in order to rule. But this also makes it difficult to understand what actually happened during these battles. The king is always the strongest, the largest, and the most powerful one present in any account of battle. He is also the sole reason a battle is ever won. Shaw writes that "both in textual and pictorial sources, the king is presented as alone charging at his enemies" and this is because the king is the "defender of Maat" (Shaw 2009:170). It is also important to consider that the Hyksos were still strong in the northern nomes of Egypt and this might have an effect on the way the people view the king and his "divinity."

For Tao, there is no insightful textual evidence of military action during his reign. This makes it even more difficult to place Tao on a battlefield and surrounded by enemies. The closest textual evidence is found on the "Kamose Stele" and the Carnarvon Tablet. The "Kamose Stele" was written during the reign of Kamose, who was the son of Tao. It was a flat, stone slab that was used similar

to paper. The military events of a battle are recorded but can be very exaggerated. The Carnarvon Tablet is another slab that is well known for recording the defeat of the Hyksos by Kamose. It was found in a tomb in Deir el-Bahari. Together, these two slabs explain the campaign against the Hyksos, led by Kamose. They describe how he sailed downstream with his "valiant army" in front of him "like a flame of fire" (Shaw 2009:172). This is a clear, and most likely and accurate, example of the king situated behind his army. There is also an example where Kamose sends a troop of medjay, the pharaoh's militant police force, to enclose Teti Son of Pepi within Neferusi. The reason, provided by the king, was that he claims to have been "on watch" (Shaw 2009:172). Shaw adds that the king was acting as a decision maker at that point but only because his army was enclosing Teti rather than killing him.

The final theory is that Seqenenre Tao II was personally executed after a lost battle (Shaw 2009). It was traditional for a king to be depicted as smiting his enemies as far back as the Early Dynastic Period. There are multiple examples of kings from the 18th Dynasty smiting their defeated enemies or even bringing groups of them back home to be executed in front of Amun. Amenhotep II is recorded having brought back seven chiefs to be executed in front of Amun with the king's own axe (Shaw 2009:174). Shaw writes that in this particular situation, the victorious king would not be in danger. When the battle is over, the victory has been won and the king can safely smite his enemy. It could also be considered a clear example of the king coming in to take the credit for the most important death. The theory is that Tao realized or was made to realize that he lost the battle and was taken hostage to be smote. Shaw further adds that smiting the king makes Tao unrecognizable both to his people and his Ka, or this could possibly just be an imitation of traditional smiting practices (Shaw 2009:175). A person's Ka, or life-force, is believed to find a resting place within a Ka statue. To be unrecognizable by your own Ka means that the spirit may not be contained within the Ka and one could wander the spirit world for eternity. This is a fate worse than death.

Shaw recreates the timeline of the wounds as follows: Smith #2 was first because it was concluded that this blow was made by someone of the same height. Smith #4 and Smith #3 followed (Shaw 2009:175). Shaw theorizes that at this point, the sub commander took over, possibly an Egyptian, and dealt Smith #1 with some kind of Egyptian weapon. Finally, Smith #5 was most likely to make sure he was dead and he was left there, lying on his side with his arm and his nose squashed beneath him until the few remaining Thebans returned to take him home (Shaw 2009:176). Lastly, Shaw adds that there is no evidence that Tao remained in that position for long because there is no evidence that he had been pecked by birds.

Conclusion

The evidence reviewed from previous examinations, the combined new evidence, and the explanation provided by Shaw make it clear that Tao was most likely smote by a Hyksos commander. The timeline of the wounds fits this theory like a glove. It is also the first theory that both describes why there was an Egyptian weapon used and why one side of his body had been squashed. Without clear evidence of chariot technology before the reign of Kamose, it is hard to believe that Tao would ride into battle on one. There is also known evidence of Egyptian support for the Hyksos, suggesting that the Hyksos sub commander is Egyptian. Egyptian men were obviously common on the battlefield and so were their weapons. Finally, there is little evidence that kings even fought alongside their army. More than likely, Tao was watching from a distance when a couple of things happened. He may have noticed his dwindling number of men. He may have found himself surrounded and captured, or he may have gone willingly to prevent further bloodshed. However, the only logical way that a full-grown pharaoh would ever take five blows to the head without a single defensive wound is if he had lost the battle, lost a majority of his men, and understood that he was to be smote for it. The death of Seqenenre Tao II would send ripples into history, leading the next couple of rulers to expel the Hyksos rule from Egypt and avenge the death of a once great pharaoh.

References Cited

Berge, R L Ten, and F R W Van De Goot
2002 Seqenenre Taa II, the violent death of a pharaoh. *Journal of Clinical Pathology* 55(3): 232-232.

Bockenheimer, S., U. Eickhoff, E. Metzel, and K. Voigt
1978 Radiologisch-äquidensitographische Untersuchungen der Kalottenverletzungen des Pharao Seqenenre. *RöFo - Fortschritte auf dem Gebiet der Röntgenstrahlen und der bildgebenden Verfahren* 128(06): 691–694.

Brier, Bob, and Ronald S. Wade
1997 The Use of Natron in Human Mummification: A Modern Experiment. *Zeitschrift für Ägyptische Sprache und Altertumskunde* 124(2):89-100.

David, Ann Rosalie, and Antony E. David
2001 *A Biographical Dictionary of Ancient Egypt*. Routledge, London.

Harris, James E., and Kent R. jt. Weeks
1993 *X-raying the Pharaohs.* Scribner, New York.

Hoffmeier, James K.
1976 Observations on the Evolving Chariot Wheel in the 18th Dynasty. *Journal of the American Research Center in Egypt* 13: 43-45.

Ikram, Salima, and Aidan Dodson
1998 *The Mummy in Ancient Egypt: Equipping the Dead for Eternity*. Thames and Hudson, New York.

Redford, Donald B.
2001 *The Oxford Encyclopedia of Ancient Egypt. Vol. 2*. Oxford University Press, Oxford.

Shaw, Garry J
2009 The Death of King Seqenenre Tao. *Journal of the American Research Center in Egypt* 45: 159-176.

Smith, Grafton Elliot
1912 *Catalogue Général des Antiquités Égyptiennes du Musée du Caire,* Nos 61051-61100: The Royal Mummies. Imprimerie de L'institut Français, Le Caire.

An Elemental Analysis of the Mineral Springs at Castalian Springs in North-Central Tennessee

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Introduction

The community of Castalian Springs is located in Sumner County in Middle Tennessee and is sometimes referred to as "The Cradle of Tennessee History" because it contains several state-recognized historic sites (The Tennessean, 17 September, 2017). Two of these are the late prehistoric Castalian Springs Mounds (40SU14) (A.D. 1200-1350) and the historic Castalian Springs inn and resort (40SU75). The latter site was operated in the nineteenth and early twentieth centuries by the Wynne family and today the inn and resort are part of the Wynnewood State Historic Site. A primary attraction for both the people at the mound site and the resort were several nearby mineral springs. Although these springs were used from prehistoric times through the early twentieth century, they have since been buried underneath modern alluvium from a nearby creek. However, an artificial well known as the "sulphur gum" was excavated during the early nineteenth century and is still active today (Smith and Hendrix 2015).

The mineral springs and sulphur gum are situated a few hundred meters south of the Castalian Springs mound site and just to the north of the Wynnewood State Historic Site (Figure 1). Originally, the mound center contained at least half a dozen mounds with five arranged in an outline around a central plaza. Several dozen Accelerator Mass Spectrometry (AMS) radiocarbon samples taken from various contexts at the Castalian Springs site indicate that it was occupied from about A.D. 1200 to 1350. At its height at least several hundred people would have called this fortified settlement home (Beahm 2013: Table 4.2; Eubanks et al. 2018).

As the springs at the site were buried sometime during the mid-twentieth century, there had not been any modern excavations. However, several possible spring remnants represented by roughly circular depressions were identified in the southeastern corner of the 2 hectare (5 acre) "Wynnewood North Field" (Figure 2). This field is located to the south of the mounds and just to the north of Wynnewood. The vegetation in

Figure 1. The locations of the mounds and plaza at Castalian Springs (red), the suspected Mineral Springs (yellow), and the Sulphur Gum Well (blue). Map Data 2016 © Google Earth.

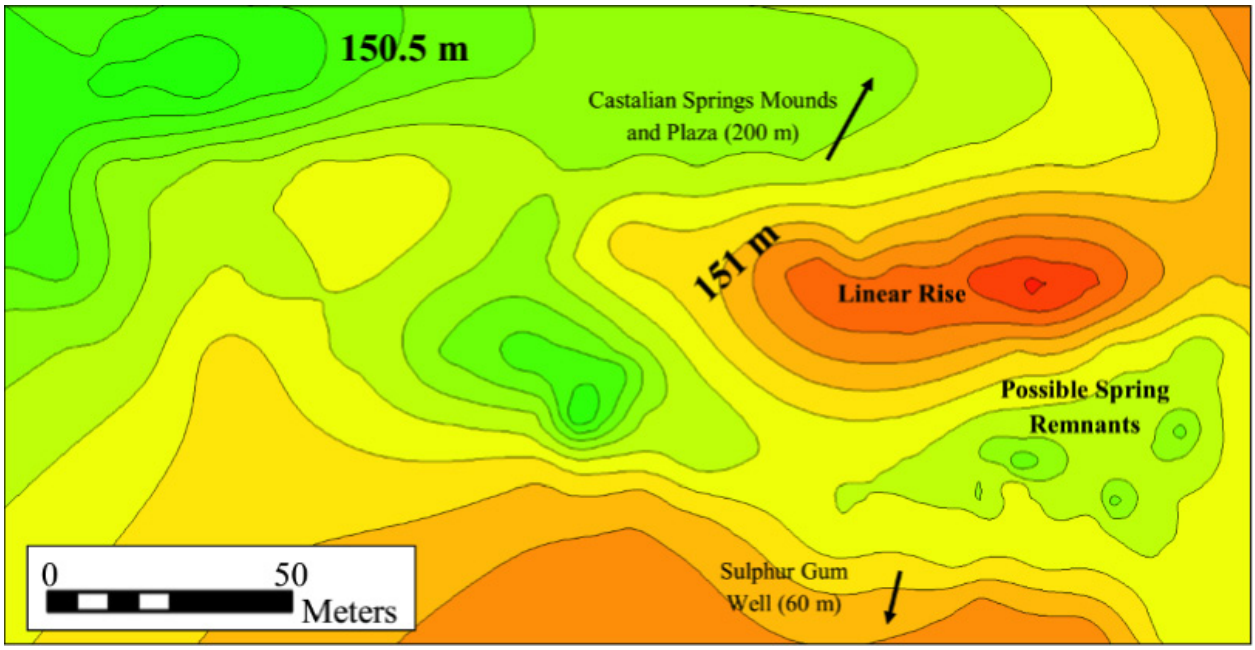

Figure 2 Topographic map of the Wynnewood north field with the suspected location of the mineral springs.

the Wynnewood North Field depressions is distinctly different from its surroundings, perhaps hinting that the underlying groundwater in these locations is rich in salts and minerals. Just to the north of the depressions, running roughly east to west, is a low, linear rise. This rise, which appears to have been built by the Indigenous occupants, is just under a meter in height and is about 80 m (east-west) by 40 m (north-south) (Eubanks et al. 2018).

In the summer of 2017, Middle Tennessee State University (MTSU) hosted an archaeological field school in the Wynnewood North Field near the suspected location of the buried mineral springs. Approximately 50 km (31 mi) to the southwest, at the roughly contemporaneous French Lick (40DV5) in downtown Nashville, there appears to have been an intensive salt making operation as evidenced by an abundance of partial salt production vessels, or "saltpans" (Guidry and McKee 2014). In view of this, the MTSU 2017 field school sought, in part, to examine the possibility that the Indigenous occupants of Castalian Springs were also involved in a large scale or regional salt trade during the late thirteenth and early fourteenth centuries. To test this hypothesis the saline content and elemental composition of the mineral waters from a remnant of one of the possible springs and the sulphur gum well were analyzed using an ionic chromatograph and energy dispersive X-ray spectroscopy.

Geographic Context

The composition of mineral springs, including those that once existed at Castalian Springs, depends on what type of rocks and minerals the waters seep through as they percolate up to the ground surface. Throughout eastern North America after ca A.D. 800, if there was enough salt in a mineral spring it was often extracted by evaporating the brine in a large, basin-shaped ceramic saltpan (Figure 3; Brown 1980; Eubanks and Brown 2015). These pans would then be placed over a hearth and filled with heated stones, or put out in the sun so that their contents could evaporate using solar energy (Brown 1980; Dumas 2007; Eubanks 2013; Eubanks and Brown 2015; Guidry and Mckee 2014; Keslin 1964; Muller 1984). Once the salt had been removed from the brine, it could then be scooped out of the saltpan to be stored, consumed, or traded.

Although an exact number is not known, Tennessee is probably home to tens, if not hundreds of thousands, of springs (Smith and Eubanks 2017). Several of these can be found near the town of Red Boiling Springs in Macon County about 56 km (35 mi) northeast of Castalian Springs. There are five types of mineral waters in Red Boiling Springs, some of which are named for the color they could turn a silver coin. For instance, the town has "red" (i.e., iron and sulfur-rich) and "black" (sulfur and magnesium-rich) mineral waters. The former has a mild sulfur taste, while in the latter, the sulfur taste is much more pronounced. The town is also known for

Figure 3. Partial saltpan vessel recovered from the 2017 excavations at Castalian Springs.

its "white," "freestone," and "double and twist" springs and wells, each of which has its own smells, tastes, and purported medicinal properties (Denning 1983).

White's Creek Springs, another cluster of mineral springs, is about 19 km (12 mi) northwest of Nashville. These springs are known to contain magnesium, sulfur, and iron (Bell 1855:277; Peale 1886:233). Thirty kilometers (20 mi) north of Nashville are Robertson's Springs. These springs are at least somewhat saline, although the exact salt content of their brine is not known (Bell 1855:277). A number of other springs in Middle Tennessee, including the French Lick, Tyree's Springs, Dunn's Spring, and Sam's Creek Springs are known to be rich in sulfur, although most of them also contain salt. As many of the Tennessee springs were known to have been partially saline, prior to statehood in 1796, the North Carolina legislature reserved these springs for the manufacture of salt (Smith and Eubanks 2017). However, in 1789, the legislature sold the land around the springs since they were determined to be "entirely unfit for the purpose of manufacturing salt" (Clark 1906:31-33).

Methods

At the site of the roughly circular depressions in the southeastern corner of the Wynnewood North Field (see Figure 2), a small core was excavated using a bucket auger. The core had a diameter of 23 cm (9 in) and a depth of 1.2 m (3.9 ft). From this excavation, five water samples were collected at 20 minute intervals using an extended handle metal water scoop, being careful not to disturb the sides of the hole. The samples were taken 20 minutes apart to allow for the testing of changes in salt content over time. Immediately upon excavation, the water level rose to a height of 89 cm (35 in) or 31 cm (12.2 in) below the ground surface. The samples were stored in five polyethylene bottles and placed into a cooler before being transported from the site. Polyethylene bottles are commonly used in analytical chemistry due to their low trace element impurity and durability (Bothner and Robertson 1975). Three 50 mL water samples were also taken from the sulphur gum for testing, as this was the only easily accessible source of mineral water at the site. This was done following the reasoning that the elemental composition of the well water should approximate the composition of the buried mineral springs given that they are located less than 100 m from each other.

A 4-point calibration was run on an ionic chromatograph (IC) using known samples created in a lab, which provided linear data, including an r squared value. This value, once graphed, indicates how well the IC is working and how accurate the results will be. The accuracy of these results was at 99 percent. Following the calibration, all five samples of the undiluted water were analyzed by the IC and concentrations were calculated for both sulfate and chloride from the samples. Sulfate content in water begins to degrade considerably after seven days. Therefore, it had to be tested within this period. There were no noticeable changes in the concentrations of ions in the samples taken 20 minutes apart. Following this analysis, means of both chloride and sulfate content were ascertained from all five samples to ensure that any calculations made were representative. The water samples collected from the sulphur gum were also tested by the IC using the same methods.

In addition to the ionic analysis, an elemental examination was also conducted on these samples using energy dispersive X-ray spectroscopy (EDS). As EDS usually cannot be performed on liquid materials, the water samples were evaporated in an oven using polyethylene tubes at a temperature of approximately 93 C (200 F). The solid film left behind was then sent to the Interdisciplinary Microanalysis and Imaging Center Lab at MTSU for analysis. The elemental data associated with these samples was then converted from weight percent to parts per million, which is equal to mg/L, so that they could be compared to the data from the IC, which are presented in mg/L. Equivalent sodium chloride content was calculated assuming that all the chloride present was sodium chloride, a common assumption for estimating salt content in chemistry.

Results

Testing of the water samples showed that the equivalent amount of sodium chloride (salt) within the sulphur gum was approximately 143.6 mg/L at the time the samples were taken (Figure 4). The samples from one of the circular depressions showed an even smaller amount of equivalent sodium chloride by comparison. Given that these samples came from a depth of only 1.2 m (3.9 ft), they were likely composed primarily of non-mineralized ground and rainwater. However, the sulphur gum well has

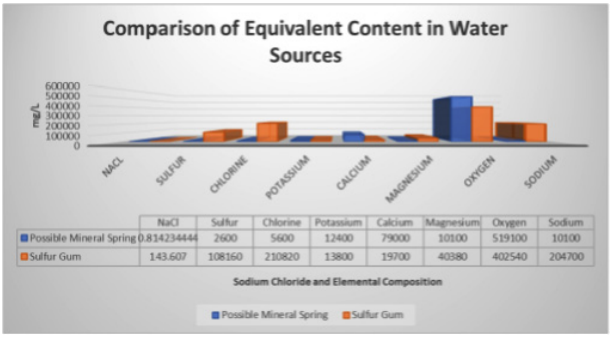

Figure 4. Comparison of equivalent content in water sources in mg/L.

a depth of approximately 4.9 m (16 ft.). Thus, its mineral contents are more concentrated relative to the samples from the potential spring. If the mineral springs that once flowed at the late prehistoric Castalian Springs Mound site and village are similar in composition to the mineral spring feeding the sulphur gum well, the equivalent amount of sodium chloride within the springs would have been approximately 143.6 mg/L. This means that in order for a prehistoric salt maker to produce one teaspoon of salt, she or he would have to boil or evaporate 9.52 gallons of mineral water.

A Compositional Analysis from the 1880s

The qualitative analysis of the sulphur gum shown in Figure 5 is from the 1880s and was found in a pamphlet at the Castalian Springs inn and resort. This analysis was conducted by John Irodelle Dillard Hinds, a professor of chemistry at the University of Nashville. Hinds presents his data in grains to gallon, but since one grain to gallon is equal to 17.118061 mg/L, these figures can be converted to mg/L. After converting the Hinds data from the sulphur gum from grains to gallon to mg/L, it would appear that the amount of chlorine has more than doubled and that the sulfur content has increased by a factor of 25 over the last 130 years (Figure 6). The well's chlorine content

Figure 5. A photograph of the Hinds 1880 qualitative analysis.

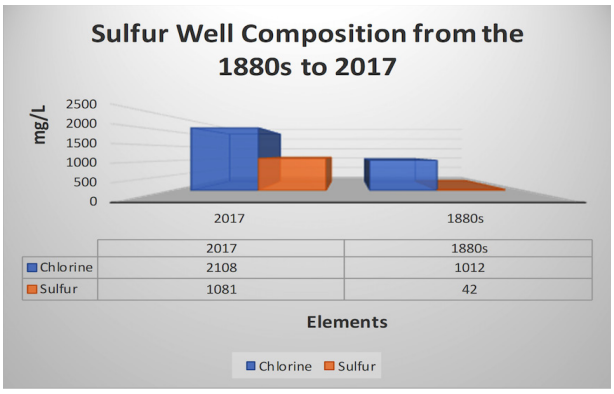

Figure 6. Change in sulfur and chlorine in the Sulphur Gum from the 1880s to 2017.

has also risen from 0.1215 weight percent composition to 21.082 weight percent, and its sulfur content has increased from 0.005153 percent to 10.816 percent. While this would seem to imply that these minerals are becoming more concentrated through time, it should be noted that the changing height of the water table and the frequency and intensity of recent rains have an impact on how much "fresh" water is found in a spring or well.

Archaeological Data

In addition to the elemental analysis described above, the archaeological data from the 2017 field school also provides insight into the scope and scale of a potential salt making operation at Castalian Springs. On the linear rise adjacent to the suspected location of the buried mineral springs, a dense concentration of archaeological materials, or "midden," was identified. In this midden was a range of artifacts including numerous fire-altered stones, plant and animal remains, hearth debris, and cooking jar fragments, all of which are indicative of communal feasting activities. Several hundred large, fabric-impressed saltpan sherds were also recovered from the midden. Similar sherds have been found near salt and mineral springs elsewhere in Middle Tennessee in much larger quantities. For example, at the French Lick in Nashville, saltpans comprise 80 percent of the total ceramic assemblage (Guidry and McKee 2014). Along with an abundance of saltpan sherds, the French lick also contained other archaeological correlates consistent with large scale salt production. There were large, heavily fired pits, possible saltpan mold pits, and numerous pieces of fire-altered rock and burned limestone. However, at Castalian Springs, saltpan sherds make up less than 10 percent of the total ceramic assemblage and there have yet to be any signs of fired pits, or molding pits, used to mass-produce saltpans (Eubanks et al. 2018; Smith and Beahm 2008). When coupled with the apparent low salinity of the spring, the archaeological materials recovered during the 2017 field

season suggest that if salt was made by the Indigenous peoples of Castalian Springs it was likely intended only for local consumption and use.

Conclusion and Future Directions

The low salt content of the mineral springs, along with a lack of archaeological data indicative of salt production, suggest that Castalian Springs was likely not at the center of a regional salt trade during the late prehistoric period. However, this does not mean that these sources of water did not hold any ceremonial or spiritual significance to the Indigenous peoples who lived at or near this site. For instance, during historic times, many American Indian groups were known to have consumed a tea known as the "black drink." The purpose of this beverage was to induce vomiting as this act was said to purify the body. Given the concentrations of laxatives like sulfur and magnesium in the sulphur gum, it could be that the mineral spring waters were consumed in an effort to produce a similar "purifying" effect (Eubanks et al. 2018). There is also a large quantity of feasting debris on the linear rise by the springs along with exotic or ritual items, such as mica, copper-stained wood, possible tattooing or scratching implements, and other materials suggestive of ceremonial activities.

Though we now know more about the current salt content of the sulphur gum, additional research is required to determine the precise location of the prehistoric mineral springs at Castalian Springs. Given the results of the elemental analysis, it seems likely that the samples from the circular depression were not mineral spring water. Thus, it may prove worthwhile for future researchers to core the circular depressions to a greater depth to ensure that the samples are not simply "fresh" rain and groundwater. If these cores were extracted from the buried springs, then it may be expected that their mineral contents would be similar to those from the sulphur gum. If this effort proved successful, then we would know the precise location of a place on the landscape that was of great importance to both the Indigenous occupants of the mound site and the patrons of the Castalian Springs inn and resort.

References Cited

Beahm, Emily L.
2013 Mississippian polities in the Middle Cumberland region of Tennessee. PhD dissertation, Department of Anthropology, The University of Georgia, Athens.

Bell, John
1855 The Mineral and Thermal Springs Sharetn.gov http://sharetngov.tnsosfiles.com/tsla/exhibits/tnresorts/images/BellBook.pdf, accessed April 16, 2018.

Bothner, Micheal H., and D. E. Robertson
1975 Mercury Contamination of Sea Water Samples Stored in Polyethylene Containers. *Analytical Chemistry* 47(3): 592–595.

Brown, Ian W.
1980 Salt and the Eastern North American Indian: An Archaeological Study. Lower Mississippi Valley Survey Bulletin No. 6. Peabody Museum, Harvard University, Cambridge.

Clark, Walter (editor)
1906 The State Records of North Carolina. Volume XXV, Laws 1789-1790. Nash Brothers, Goldsboro, North Carolina.

Denning, Jeanette Keith
1983 Good Times: Vacationing at Red Boiling Springs. *Tennessee Historical Quarterly* 42(3): 228-229.

Dumas, Ashley A.
2007 The Role of Salt in the Late Woodland to Early Mississippian Transition in Southwest Alabama. Ph.D. Dissertation, Department of Anthropology, The University of Alabama, Tuscaloosa.

Eubanks, Paul N.
2013 Mississippian Salt Production at the Stimpson Site (1CK29) in Southern Alabama. *Journal of Alabama Archaeology* 59(1&2):1-21.

Eubanks, Paul N., and Ian W. Brown
2015 Certain Trends in Eastern Woodlands Salt Production Technology. *Midcontinental Journal of Archaeology* 40(3):231-256.

Eubanks, Paul N., Kevin E. Smith, and Shonda L. Clanton
2018 Preliminary Interpretations from MTSU's 2017 Excavations at Castalian Springs in Sumner County, Tennessee. Paper presented at the thirtieth Current Research in Tennessee Archaeology Annual Meeting, Montgomery Bell State Park, Burns, Tennessee.

Guidry, Hannah, and Larry McKee
2014 Archaeological Investigations of the Ballpark at Sulphur Dell, Nashville, Davidson County, Tennessee. Report submitted to Capital Project Solutions by TRC Environmental Corporation. TRC Project No. 212578, Nashville, Tennessee.

Keslin, Richard O.
1964 Archaeological Implications on the Role of Salt as an Element of Cultural Diffusion. *The Missouri Archaeologist* 26. Columbia.

Muller, Jon
1984 Mississippian Specialization and Salt. *American Antiquity* 49(3):489–507.

Peale, Albert C.
1886 Lists and Analyses of the Mineral Springs of the United States: A Preliminary Study. Bulletin of the United States Geological Survey, No. 32. Washington Government Printing Office.

Smith, Kevin E., and Rick Hendrix
2015 Solving the Mystery of the "Sulphur Gum" at Wynnewood State Historic Site. *The Courier* 63: 5-7.

Smith, Kevin E., and Emily L. Beahm
2008 Preliminary Report of the 2005 Archaeological Field Season at The Castalian Springs Mounds (40SU14). Report of Archaeological Investigations No. 3. Manuscript on file, Department of Sociology and Anthropology, Middle Tennessee State University, Murfreesboro.

Smith, Kevin E., and Paul N. Eubanks
2017 More than Just Salt: Architectural and Archaeological Surveys of Mineral Spring Sites of Tennessee. Paper presented at the 2nd International Salt Congress, Los Cabos, Mexico.

The Tennessean [Nashville, Tennessee]
2017 [Article "Hawthorn Hill Historic Site to Host Grand Opening Event"] 17 September. Nashville, Tennessee.

Determination of the Origin of Caddo Artifacts Using SEM-EDS

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Introduction

This report presents the results of an analysis of artifacts from the Bowman site (3LR46) that are currently on loan from the Arkansas Archeological Survey (ARAS). The analysis was to determine if the objects are natural or human-made. The Bowman site is located along the Red River Valley in Southwest Arkansas and represents a multi-mound Caddo site (Hoffman 1971). The analysis of the objects was done using a Scanning Electron Microscope with an Energy Dispersive X-Ray Spectrometer (SEM-EDS). The SEM was used for a visual analysis of the artifacts and the EDS was used for elemental analysis of the components.

SEM-EDS uses an electron beam to analyze and scan the surface of specimens. The instrument consists of an electron gun, two condenser lenses, an objective lens, an electron detection system, and a set of deflectors (Khursheed 2011). A simplified diagram of an SEM-EDS instrument is shown below (Figure 1).

The surface topography of objects is analyzed through the detection of secondary electrons emitted from the surface of a sample after it is hit with the electron beam (JOEL ltd 2009). Energy Dispersive Spectroscopy allows for elemental identification and quantification by the analysis of X-rays that are emitted from the sample.

After visual analysis, it was hypothesized that the Bowman objects are a type of iron concretion. A second working hypothesis was that the artifacts are fulgurite, a material formed from lightning strikes. Iron concretions are theorized to have formed in riverbeds due to the flow of water through different openings in the ground (Loope et al. 2011). Using this theory, it was hypothesized that the flat pieces of the Bowman objects represent the horizontal flow of water depositing iron in a flat surface, while the round pieces of the Bowman objects represent the vertical flow of water depositing iron in a ring. The Bowman objects were labeled as R1, R2, and F (Figure 2).

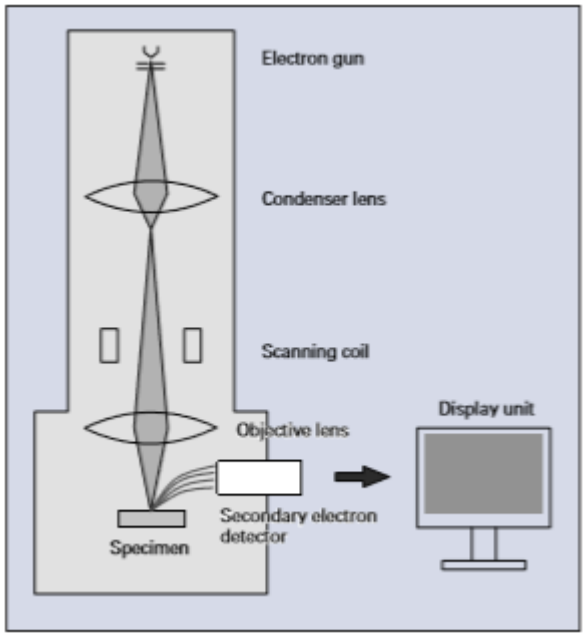


Figure 1. A simplified diagram of a SEM-EDS instrument (JOEL ltd 2009).

Experimental

Analysis of the Bowman objects was done using an SEM-EDS instrument. Small pieces of each artifact were removed and mounted on metal pegs using a small circle of carbon-based adhesive. The height of the largest sample of artifact was recorded in millimeters (mm) and used to set the z-axis of the electron beam. After the instrument was vented to atmospheric pressure, the sample stand was inserted and the sample area was evacuated. Visual

Figure 2. The three main pieces of artifact (labeled R1, R2 and F) analyzed along with assorted fragments. A quarter is also pictured for scale.

analyses of the samples were recorded and the images were saved. The exterior of each sample was analyzed using EDS and data were recorded using mass percent and atom percent. Two small areas were selected on the interior of each sample and elemental analysis was done using EDS. Elemental analysis data were also recorded using mass percent and atom percent. Safety goggles were worn during the operation of the vacuum chamber. Gloves were not worn while handling the artifacts due to their non-toxic nature.

Results and Discussion

The outside of each sample contains a mixture of predominately carbon, oxygen and silicon (Table 1). The exteriors of R2 and F are mostly similar in carbon content, while R1 contains almost double the amount.

The interior of each sample contains a heterogenous mixture of a predominately iron matrix with pieces of sand scattered throughout (Figure 3). Elemental analysis was run on two different areas of the heterogenous mixture within a fragment from artifact R1– one area containing a sand particle and one area containing the iron matrix. The data were compiled using pie charts (Figure 4).

An iron standard sample was run to gauge accuracy of the quantification of the iron in the samples. The iron sample was almost pure except for a small amount of carbon. It is most likely that the carbon contamination came from the carbon-based adhesive used to hold the samples. The percentages for the sand suggest that the material is mostly SiO_2 (see Figure 4). Similarly, the atom percentages for the iron suggest a mixture of iron oxides (see Figure 4).

This heterogenous mixture of SiO_2 and iron oxides is consistent with the hypothesis that these artifacts were formed due to the horizontal and vertical flow of water carrying iron. These iron concretions would be washed out of the riverbeds during floods and could have been found along the river as the water levels returned to normal.

Element	R1	R2	F
C	34.7	16.2	15.6
O	47.5	50.3	49.5
Si	9.35	14	16.5
Na	ND	ND	ND
Fe	6.54	15.1	14.5
Al	1.56	2.9	2.08
P	ND	0.44	0.36
S	ND	ND	0.5
K	0.29	0.61	0.51
Ca	ND	ND	0.41
Mg	ND	0.42	ND

Table 1. Table listing the mass percentages of the exterior of the three large pieces of artifact, found using SEM-EDS. (ND - not detectable).

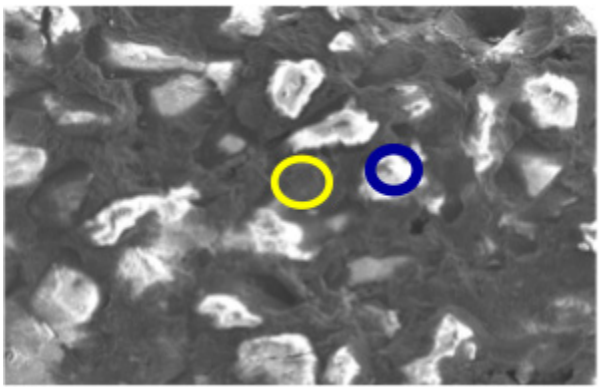
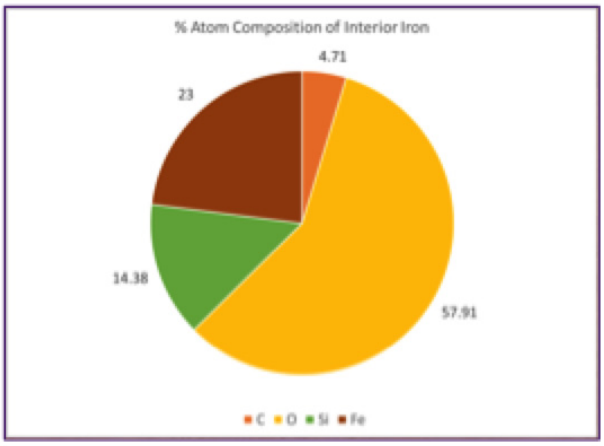


Figure 3. A SEM image of artifact sample R1. EDS analysis was run on the areas within the blue and yellow circles. Data were collected and compiled in pie charts.



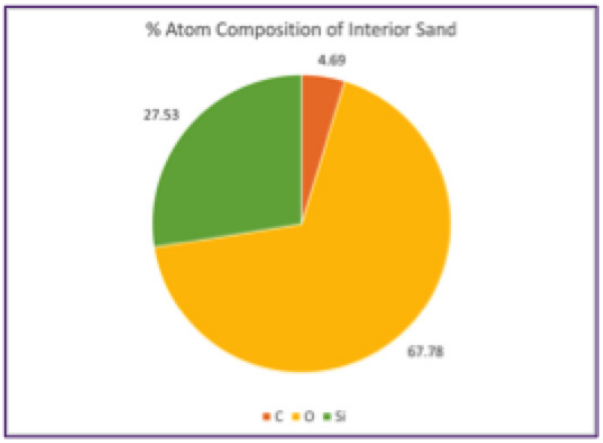


Figure 4. Pie charts of the percent atom composition of two selected areas of artifact R1. The chart on the top is from the yellow circle, and the chart on the bottom is from the blue circle as shown in Figure 3.

Conclusion

The elemental composition of the artifacts suggests that they are naturally occurring iron concretions. Elemental composition analysis also suggests that the artifact pieces R2 and F are from a similar source, while R1 is from a different source.

Further analysis of the iron-containing artifacts will involve using the SEM to analyze the interior of each of the artifact samples. These methods will allow for the creation of experimental models, which can then be applied to the analysis of similar objects from the Bowman site.

References Cited

Anjam, Khursheed
2011 *Scanning Electron Microscope Optics and Spectrometers*. World Scientific Publishing Company.

Hoffman, Michael
1970 Archaeological and Historical Assessment of the Red River Basin in Arkansas. In *Archeological and Historical Resources of the Red River Basin*, edited by Hester A. Davis, pp. 137-194. Research Series No. 1. Arkansas Archeological Survey, Fayetteville.

JOEL Ltd.
2009 SEM; Scanning Electron Microscope A to Z: SEM; Scanning Electron Microscope A to Z, JOEL Desktop Modules. JOEL Desktop Modules.

Loope, David B., Richard M. Kettler, and Karrie A. Weber
2011 Morphologic Clues to the Origins of Iron Oxide-Cemented Spheroids, Boxworks, and Pipelike Concretions, Navajo Sandstone of South-Central Utah, U.S.A. *Journal of Geology* 119(5), 505-520.

Willcox, O.W.
1906 The Iron Concretions of the Redbank Sands. *The Journal of Geology* (3):243-252.

Perceived Image of Poultry Products on Consumer Loyalty

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Introduction

Americans have a distant relationship with food. In 1990 more food was purchased in restaurants than grocery stores (Linder 1995:37). Most food production in the United States is done by major corporations (Kenner 2009). Americans in turn have only a vague understanding of where food comes from or what power they have to make a change in the industrialized food system. In this paper I examine how the perceived image of Tyson Foods affects consumer loyalty to the brand. I analyze the relationship between perceived food safety of Tyson chicken products by consumers and their loyalty to the brand. In other words, I investigate how the overall perceived image of Tyson Foods by consumers shapes their purchasing behavior.

Through an examination of the literature relevant to food and worker safety, I discovered several problems plaguing the poultry processing industry. In order to gain a more specific under-standing of key issues, I focused on those that examined consumer purchasing behaviors and the daily routine inside poultry plants. For comparison, studies of brand loyalty to other types of food are also reviewed (Dillaway et al. 2010:373-380; Espejel et al. 2008:865-880; Sanders 1990:1690). I utilized these analyses to gain a better understanding of what drives consumer loyalty. In addition, I reviewed studies on the poultry production industry to understand the history and current status of chicken production (McGraw 1994:442-445).

Consumerism Theory

Consumerism theory is the idea that "increasing consumption is desirable" (Narayan-Sarkar and Kundu 2017:45-66). Anthropology, economics, history, psychology, and sociology all have their own definitions of consumerism theory. The Dictionary of Marketing defines consumerism to be any activity concerning the protection of the rights and interests of the consumer (Doyle 2011:10). Other marketing definitions also look at putting the consumer first, sometimes at the expense of the shareholders. The Oxford Dictionary of Economics defines consumerism by stating that when the interests of the producers and consumers clash, the law should side with the consumers because the producers are motivated by profit (Black 2004). The cultural studies approach suggests that consumerism is a part of postmodernist culture and that it holds no deep value. That is, consumerism is the exchange of symbols and is therefore meaningless (Narayan-Sarkar and Kundu 2017:48). The consumer activist viewpoint argues that the consumption of goods and services leads to personal happiness. Clearly, there are many definitions of consumerism, but I will focus on the definition applied by anthropologist Daniel Miller (2017:18-19).

Miller approaches consumerism from a background of material culture which are the physical parts of one culture that define the culture. Objects can include anything that people surround themselves with and can be consumed, created, or used. Material goods in a culture often play a part in determining many aspects of a culture that includes norms, traditions, and regional identity. Material culture often looks to see how physical object usage changes a culture over time (Harris 1992). Material culturalists use the etic approach, meaning they take the outsiders viewpoint in an to attempt to remain objective.

Miller labeled this theory the "theory of shopping" and it is applicable to the chicken industry because its foundation is built on buying what is best for your "loved ones". One of his case studies found that consumerism of everyday items such as chicken or baby formula is linked directly to the people you love. In Miller's theory "love" means feeling an obligation and responsibility to select people with whom you share a long term relationship that can be, but is not necessarily, romantic. Miller defines love as including elements of care, concern, obligation, responsibility, and habit, along with occasional frustration or resentment. He looks at these characteristics as ingredients. The core idea of Miller's theory is that when shopping in a grocery store one demonstrates their love to long term relationships by choosing items that best fulfill their needs and desires (Miller 2017:18-19).

For his study, Miller conducted an ethnography in a grocery store in North London where he observed and later interviewed a single mother buying baby formula. He observed that she spent a long time deciding between the cheaper brand and the name brand. The idea of the name brand offered a sense of safety to the shopper, while the generic brand allowed her to save money for other things her baby needed. Her decision was both economical and emotional. In other words, Miller's study highlights that consumer loyalty to a brand is multivariate. It is a decision that must be made using more factors than just cost (Miller 2017).

Building Brand Loyalty

The building of brand loyalty by corporations is largely based on advertising and price. For example, a recent study investigated word use in potato chip advertising (Freedman and Jurafsky 2011). Twelve brands of potato chips were analyzed using the Flesch-Kincaid readability test, which is a measure of how difficult a sentence in English is to understand by native speakers based on word and sentence length (Freedman and Jurafsky 2011). The study concluded that sentence length and word choice provided clear indicators of which socioeconomic class was targeted by advertising on the potato chip bag. In addition, there was a significant price difference between brands that mirrored the language usage. Brands such as Boulder and Kettle Brand (Snyder's-Lance Inc. 2016) that used more words cost 68 cents per ounce compared to the 40 cents per ounce cheaper brands that were more terse in advertising. In other words, both price and marketing matched the socioeconomic target group. Typically, consumers of lower socioeconomic status are more conscious about price, making it an important decision making factor (Freedman and Jurafsky 2011:48- 52).

Price sensitivity affects all purchases, including chicken. Chicken was originally not a popular meat option until it was branded and marketed to be the ideal dinner meat (Striffler 2005:37). Chicken companies like Tyson Foods and Holly Farms began marketing chicken in 1960 as an easy preparation or ready-to-cook meal in order to fetch a higher profit (Striffler 2005:129). Tyson began selling de-boned and pre-cut chicken for a higher price than a whole chicken, which allowed the company to profit despite the high grain prices during the 1960s (McGraw 1994:442-445). By 1979 Tyson was selling 24 poultry based specialty items in the freezer section, including the chicken patty, chicken hotdog, and chicken bologna (Striffler 2005:21-22). Tyson set the stage for frozen meals with their Chick 'n Quick line of easy-to-make chicken meals in 1980. This was quickly followed by the partnership with McDonald's and the creation of the McNuggets that allowed Tyson to enter the restaurant chicken market. Today, Tyson Foods provides chicken to 90 out of the top 100 most profitable restaurants, including McDonalds and KFC (McGraw 1994:442-445). Familiarity with the Tyson Foods brand has created a circular system of rebuying.

Repeat buying of the same product establishes consumer loyalty. It also provides a greater market share and a higher relative price for the product. A 2008 study of brand loyalty to the product, Olive Oil from Bajo Aragon, found that the company was able to build loyalty based on customer perceptions (Espejel et al. 2008). For example, it was important to consumers that the product name mentioned the place of origin, Bajo Aragon, because of the association with traditional food practices in Spain. The company also emphasized the quality as recognized by the Spanish government to help gain trust from buyers. These two factors created a feeling of safety and a link to tradition when buying this olive oil. In turn, customers were more likely to maintain brand loyalty (Espejel et al. 2008:865-880).

Food Safety

Food safety has been called into question at various times in the last few years, forcing private companies and the federal government to rethink how they build long-term food trust and brand loyalty (Yeung and Morris 2001:171). Outbreaks of salmonella and E. coli can make customers question the safety of chicken products (Rampl et al. 2012:254). For example, a recent study examined the criteria customers consider when developing trust for a food product. Brand-using surveys from a representative population were conducted in Denmark, Italy, Germany, Great Britain, Norway, and Portugal to see how customers developed trust in food (Kjærnes 2007). The study concluded that trust was based on food safety perception but also ethical issues, food quality, and overall nutritional value (Kjærnes 2007:930-932). Results demonstrate that trust is based not only on shared consumer expectations of the food industry and regulative institutions, but also expected performance from those food industries, transparency, and predictability of quality, and nutritional value.

Food trust and brand loyalty are often challenged when there is a recall of poultry products due to contamination. Today, most chicken is produced by large corporate farms and processed in large factories. This type of industrial food production increases the opportunity for food borne pathogens and toxins to contaminate the product and poison consumers. Furthermore the globalization of major brands, like Tyson, presents an opportunity for contaminated food to reach people in other areas of the world (Sanders 1990:1690).

To evaluate this issue, a recent study examined if consumer response to media coverage of food contamination had a lasting impact on brand loyalty (Dillaway et al. 2010:373-380). The study examined short- and long-term effects by tracking purchasing behavior of chicken and chicken products. The Experimental Economics Laboratory for Policy and Decision Research at the University of Delaware recruited 110 subjects from an unnamed northeastern university and divided them into a control group and an experimental group. The experimental group was given information on poultry safety from a Consumer Reports magazine (Consumer Reports 2007:20-24) that stated certain chicken brands, such as Foster Farms, Perdue, Pilgrim's Pride, and Tyson, often contained harmful bacteria. The experiment

presented a lesser known but more expensive brand, Ranger chicken, as having a history of being relatively safe and free from food contamination. Both groups were asked to evaluate their willingness to pay for Ranger chicken or another major brand based on the Consumer Reports data. The subjects in the experimental group showed an increase in willingness to pay for the safer brand. This experiment was repeated three times over the course of seven weeks with different experimental groups and found that consumers who received positive information about Ranger were more willing to pay a premium for "safe" foods (Dillaway et al. 2010:373-380).

Studies in behavioral economics suggest that people will continue to buy the popular brand unless a media source highlights the brand in a negative way (Shepherd and Saghaian 2017:126-127). The unknown variable is how long the news of contaminated meat will keep people away from their usual brand.

Tyson Foods: Case Study

Tyson Foods has grown from a small one man operation in Springfield, Arkansas into a massive corporation that provides chicken and other foods to hundreds of restaurants and grocery stores. In the 1920s, chicken was a food for which farmers did not exert much time or money. In the Midwest, chickens roamed the farm yard and ate dinner scraps and were fairly self-sufficient (Striffler 2005:33). In 1923, Wilmer Steel of Delaware began selling her chickens "New York dressed," (Striffler 2005:34) meaning they were dead, de-feathered, but with entrails and feet intact.

John Tyson and his chicken truck came onto the scene in 1931 when he moved his family to Springfield Arkansas from Missouri to be a chicken transporter, or middle man, in the chicken business. Tyson entered the industry when chicken was still viewed as a lowly farm animal and people were not willing to pay much for it (Striffler 2005:37). Tyson was quick to think about how he could expand his one-man truck of chickens into a more profitable business. He invented a way to feed and water the chickens during transport, built a corn mill to make his own feed, and bought a hatchery to produce more chicks. Others were doing similar things, and by 1950 there were many chicken operations in production across the country, creating tough competition (Striffler 2005:37-42).

By 1940, many elements of the modern industry were developing. Thousands of small family-owned farms were raising chickens to sell to the larger budding chicken companies. World War II made chicken the popular household staple it is now. Chicken was not rationed like other meats and the federal government set the selling price far above the price of production. One pound of chicken was 30 cents during World War II and black market chickens sold for 50 cents a pound (Striffler 2005:43). Tyson merged with several smaller chicken producers from 1940 to 1970, making Tyson one of the top three chicken producers in the United States (Striffler 2005:52).

Inside the Chicken Plant

Tyson Foods supplies chicken to almost every major big-box grocer (Tyson Foods 2017). There has been a significant amount of research conducted on labor safety and workers rights within chicken processing plants (Galassi 2015:1-4), but less is known about how consumer shopping behavior impacts manufacturing processes at chicken plants. On a basic economic level, using the theory of supply and demand, it is understood that more demand will cause chicken companies to work to supply that demand. Over the last 70 years, Tyson Foods, Inc. has built a "chicken empire" in the global market but not without some safety scares and concerns regarding workers' rights (Galassi 2015).

The large scale production of chicken in America is fraught with worker safety concerns (Galassi 2015:1-4). Recent research at chicken plants has demonstrated that Tyson has extensive safety protocols designed to protect the workers and food safety, yet they are regularly ignored and broken (Striffler 2005:127). Striffler's 2005 research concluded there was an unacknowledged burden that came with the daily work routine that resulted in negative effects on workers. The daily monotony was the first thing workers complained about. Monotony ranked higher in complaints than working conditions, pay, and poor supervisors in chicken plants. Monotony of daily tasks can cause psychological harm but it also causes physical damage due to repetitive motions. If a worker is on the same line for over a year doing the same job, the damage to their body can be extensive. Back, neck, arm, and joint pain from monotonous work can make tasks outside of the factory difficult to do as well (Striffler 2005:128-134). One worker stated, "As soon as I start hanging chickens I feel…like that's all my muscles know how to do" (Striffler 2005:129). Between 1980 and 1993 the number of repetitive trauma disorders reported in chicken processing rose from 18 percent to 60 percent, the second highest percentage among all American industries during that period (Linder 1995:35). However, these numbers are slightly dated. The Occupational Safety and Health Administration (OSHA) documented in 2013 that workers were 4.5 times more likely to develop a serious injury due to repetitive motion in the poultry industry than any other industry. While the number of repetitive injuries has gone down from 1990, OSHA states that the poultry processing industry still presents significant danger to workers (Linder 1995:37). The industry, on the

other hand, claims these repeated motion injuries only occur when workers fail to follow established processing protocol (Striffler 2005:129).

Nearly every worker that Striffler interviewed during his time observing chicken processing had work related injuries. Other safety concerns recorded by Striffler included how the production lines moved too quickly for safe handling of tools and animals. In fact, the speed of the line requires workers to make as many as 40,000 repetitive motions in one day (Linder 1995:36). He noted that workers were in close quarters, which increased the possibility of accidental injury by co-workers. Workers were not always properly trained to use the equipment and often lacked the required safety gear. Workers are also expected to work long hours, something Striffler concludes is a violation of international human rights but which is treated as a normal part of the industry work ethic (Striffler 2005:129).

A separate study of Perdue Farms conducted by the National Institute for Occupational Safety and Health (NIOSH) found that people who worked in eviscerating and de-boning plants were four times more likely to have work related disorders and injuries than those in low exposure jobs like maintenance and clerical work (Linder 1995:36). Workers have tried to convince the states to regulate the speed of the conveyor belt but these efforts were undermined by owners of the large industrial farms and major companies (Linder 1995:38).

Synthesis of Data on Brand Loyalty and Food Safety

In an attempt to evaluate and synthesize data concerning the relationship between brand loyalty and perspectives on food safety, qualitative data from select studies were used to address the following:

How does the purchasing behavior of preferred brands change given the possibility of contamination, such as salmonella or other bacterial contamination?

Three studies from the literature research asked similar questions regarding purchasing behavior of chicken products. I modified researched questions from each study in order to synthesize and compare with data collected as part of this research (Dillaway et al. 2010:373-380; Lassoued et al. 2011:630; Shepherd and Saghaian 2017:125). The original questions were as follows:

Did brand-related food safety information increase your willingness to pay more for a relatively safer product (Dillaway et al. 2010:373-380)?

How important is food safety in food-purchasing decisions (Shepherd and Saghaian 2017:125)?

How likely are you to avoid purchasing the [contaminated] product or brand completely for some time after the story has left the news (Lassoued et al. 2011:630)?

Since these questions were related, they have been combined in the following manner: *How likely are you to continue purchasing a brand of chicken after news of a safety risk?*

To provide a direct comparison to the synthesized data, I collected data via random and anonymous surveys from 15 students at the University of Central Arkansas (UCA). Names and personal information were not collected. Criteria for selecting students consisted of their willingness to talk to me and their presence in the student center. The sample size was smaller than desired due to a combination of rain on campus and a general lack of interest in participation from students in the student center. Of the students participating, 66.7 percent were between the ages of 18 and 21 years old, 13.3 percent were between 22 and 25 years old, and 20 percent were over the age of 40. The ethnicity of participants was strongly Caucasian, with a small percentage of Asian, Latin, and African American. The gender of participants was predominantly female at 66.7 percent, leaving male participation in the survey at 33.3 percent. The survey I engineered is a combination of questions based on the two of the surveys used in the synthesis. Questions include (see Appendix A):

When buying fresh chicken at the grocery store is food safety extremely important to you?

Would you continue to buy the fresh chicken if there was news of a health risk associated with it, for example, salmonella contamination?

Would you avoid purchasing the brand associated with the contaminated chicken for a period of time after you found out about the risks?

How long would you avoid the contaminated chicken brand after news of the health risk?

Results

Each study that looked at the safety information affecting consumer purchasing behavior found that when the volunteer participants were given information they found trustworthy the more likely they were to not buy their usual product. The participants thought of TV news, newspapers, and internet media to be the most trustworthy sources. The Graffeo et al. study found that commitment or loyalty to a product did not make consumers trust the product more than other products. When given safety risk information about the product, they were three times more likely to abandon the product they had intended to purchase (Graffeo et al. 2009).

The Lassoued et al. study used surveys from 461 participants to gather perceptions and attitudes about trust toward chicken producers. The study found that when trust in the food industry as a whole increases, then brand trust also increases. Researchers also found that the brand name of a product is an important quality indicator for consumers because it sets expectations about the chicken (Lassoued et al. 2015:635).

An additional study surveyed 224 people and found that a variety of factors go into how people choose which chicken to buy, including value for money, food safety, and ethical food production. Food safety ranked as the most important factor when buying food (Shepherd and Saghaian 2017:125).

Results from the UCA survey indicate that most people think that food safety is extremely important when buying fresh chicken. Out of the 15 participants, 12 (80 percent) said that food safety is extremely important when buying fresh chicken. In order to determine if this data is significant, I did a Chi Square Test. The null hypothesis is "There is no preference for food safety when buying fresh chicken" and the research hypothesis is "There is a preference for food safety when buying fresh chicken". The Chi Square Test at a 0.05 critical value indicated that there is a significant preference for food safety when buying fresh chicken (Table 1).

Only 3 out of 15 people (20 percent), said they would continue to buy their brand of chicken given news of a food safety risk. I used second Chi Square Test to look at the possible significance of the data collected (Table 2). The null hypothesis states that there is no significance between people continuing to buy the chicken or not. The research hypothesis says that there is a significance between those buying the chicken and those who do not after news of a health risk.

When asked if the participants would stop buying the brand associated with the food safety risk for a period of time after they learned about the risks, 14 out of 15 participants said they would stop buying the chicken brand for a while (Table 3). There was one outlier who would continue to buy the possibly contaminated chicken. The null hypothesis states that there is no significance between people avoiding the chicken or not. The research hypothesis says that there is a significance between those who continue to by the chicken and those who do not buy the chicken.

	fo	fe	fo-fe	(fo-fe)^2	((fo-fe)^2)/2
Yes	12	7.5	4.5	20.25	2.7
No	3	7.5	-4.5	20.25	2.7
Total	15	15	--------	--------	5.4

Table 1. Results of Chi Square Test: When buying fresh chicken at the grocery store is food safety extremely important to you?

X^2=5.4
Degrees of Freedom= K-1
DF=2-1
DF=1 at 0.05 critical value is 3.841
5.4>3.841 meaning the research hypothesis is retained.

	fo	fe	fo-fe	(fo-fe)^2	((fo-fe)^2)/7.5
Yes	3	7.5	-4.5	20.25	2.7
No	12	7.5	4.5	20.25	2.7
Total	15	15	--------	--------	5.4

Table 2. Results of Chi Square Test: Would you continue to buy the fresh chicken if there is news of a health risk associated with it, for example, salmonella contamination?

X^2=5.4
Degrees of Freedom= K-1
DF=2-1
DF=1 at 0.05 critical value is 3.841
5.4>3.841 meaning the research hypothesis is retained.

	fo	fe	fo-fe	(fo-fe)^2	((fo-fe)^2)/7.5
Yes	14	7.5	6.5	42.25	5.633
No	1	7.5	-6.5	42.25	5.633
Total	15	15	--------	--------	11.266

Table 3. Results of Chi Square Test: Would you to avoid purchasing the brand associated with the contaminated chicken for a while after you found out about the risks?

X^2=11.266
Degrees of Freedom= K-1
DF=2-1
DF=1 at 0.05 critical value is 3.841
11.266>3.841 meaning the research hypothesis is retained.

Discussion and Conclusion

When evaluating chicken purchasing within a marketing perspective, it would seem that the price of chicken would be the prevailing decisive factor when considering brand loyalty (Freedman and Jurafsky 2011:48-52). However, when food safety becomes a concern it is evident that the safety risk becomes the clear motivating factor that shapes purchasing behavior. One study found that participants who were provided the safety information were willing to pay 36 to 94 cents more per pound of chicken breast for the safer brand (Dillaway et al. 2010). This would indicate that the safety of the chicken is extremely important to consumers. In the survey I conducted, I found that 80 percent of respondents valued food safety as extremely important when purchasing fresh chicken. This is the same conclusion Shepherd and Saghaian found in their 2017 survey of 224 people.

The shopping theory as defined by Miller (2017) suggests that people who are purchasing fresh chicken are thinking about the potential risk they are putting their "loved one" in if the chicken is contaminated. Primarily, those shopping in grocery stores are shopping for themselves and loved ones. Brand loyalty was not seen to affect consumer purchasing behaviors when trust-worthy information about food safety risk was provided. When information about the safety risk was not from a source the consumer trusted than the purchasing behaviors were largely unchanged (Shepherd and Saghaian 2017:125).

The data I collected supports the research conducted in previous studies (Graffeo et al. 2009; Shepherd and Saghaian 2017). I find that when consumers have the knowledge about a possible food safety risk to their fresh chicken, they will stop buying the chicken for a while after they learn about the contamination. The amount of time they stop buying varies, but all participants reported that they would eventually return to their preferred brand after the food safety risk had passed. In fact, 6 out of 15 participants marked that they would begin buying the chicken again after their news source stopped covering it (Table 4), which is the same conclusion Shepherd and Saghaian reached in their research. The three participants who reported they would continue to buy the contained chicken during an outbreak of salmonella were between 18-21 years old. This is likely due to financial reasons rather than loyalty to the tainted brand.

Brand loyalty studies indicate that when consumers are given information about a safer chicken brand they are more willing to pay more for the safe chicken. However, consumers are likely to return once the media stop coverage of the contamination of the food.

Table 4. Results of how long participants would avoid a contaminated brand of chicken after news of a health risk.

References Cited

Black, John
2004 *Oxford Dictionary of Economics*. Oxford University Press, Oxford.

Consumer Reports
2007 Dirty Birds: Even "Premium" Chicken Harbor Dangerous Bacteria. *Consumer Reports*:20-24.

Dillaway, Robin, Kent D. Messer, John C. Bernard, and Harry M. Kaiser
2011 Do Consumer Responses to Media Food Safety Information Last?. *Applied Economic Perspectives and Policy* 33(3):363-383.

Doyle, Charles
2011 *A Dictionary of Marketing*. 3rd ed..Vol. 4. Oxford University Press, Oxford.

Espejel, Joel, Carmina Fandos, and Carlos Flavián
2008 Consumer satisfaction: A key factor of consumer loyalty and buying intention of a PDO food product. *British Food Journal* 110(9):865-881.

Freedman, Joshua, and Dan Jurafsky
2011 Authenticity in America: Class Distinctions in Potato Chip Advertising. *Gastronomica: The Journal of Food and Culture* 11(4):46-54.

Galassi, Thomas
2015 United States Department of Labor. Occupational Safety and Health Administration. October 15.

Graffeo, Michele, Lucia Savadori, Katya Tentori, Nicolao Bonini, and Rino Rumiati
2009 Consumer decision in the context of a food hazard: the effect of commitment. *Mind & Society* 8(1):59-76.

Harris, Marvin
1992 The Cultural Ecology of India's Sacred Cattle. *Current Anthropology* 33(S1): 261-276.

Kenner, Robert, Richard Pearce, Eric Schlosser, Melissa Robledo, William Pohlad, Jeff Skoll, Robin Schorr, Diane Weyermann, Elise Pearlstein, Kim Roberts, Michael Pollan, Gary Hirshberg, Joel Salatin, and Mark Adler
2009 *Food, Inc*. Magnolia Pictures.

Kjærnes, Unni
2006 Trust and Distrust: Cognitive Decisions or Social Relations?. *Journal of Risk Research* 9(8):911-932.

Lassoued, Rim, Jill E. Hobbs, Eric T. Micheels, and David Di Zhang
2015 Consumer Trust in Chicken Brands: A Structural Equation Model. Canadian *Journal of Agricultural Economics* 63(4):621-647.

Linder, Marc
1995 I gave my employer a chicken that had no bone: joint firm-state responsibility for line-speed-related occupational injuries. *Case Western Reserve Law Review* 46:33-143.

McGraw, Dan
1994 Birdman of Arkansas. *U.S. News & World Report* 117:442-445.

Miller, Daniel
2013 *A Theory of Shopping*. Wiley, Oxford.

Narayan Sarkar, Dev, and Kaushik Kundu
2017 Developing A "Theoretical Toolbox" For The Concept of Consumerism. *WEshkar* 23(2): 45-66.

Ollinger, Michael, and Danna L. Moore
2008 The Economic Forces Driving Food Safety Quality in Meat and Poultry. *Review of Agricultural Economics* 30(2):289-310.

Rampl, Linn V., Tim Eberhardt, Reinhard Schütte, and Peter Kenning
2012 Consumer trust in food retailers: conceptual framework and empirical evidence. *International Journal of Retail & Distribution Management* 40(4):254-272.

Sander, Tom
1990 Food Production and Food Safety. *British Medical Journal* 318:1689-1693.

Shepherd, Jonathan, and Sayed Saghaian
2008 Consumer Response to and Trust of Information about Food Safety Events in the Chicken and Beef Markets in Kentucky. *Journal of Food Distribution Research* 39(1):124-129.

Snyder's-Lance, Inc.
2017 Annual Report. Retrieved at http://files.shareholder.com/downloads/LNCE/6341356748x0x973985/EBED2555-EF08-4874-A804-67F108B34199/LNCE-12.30.2017-10K_FINAL.pdf.

Striffler, Steve
2005 *Chicken: the dangerous transformation of Americas favorite food*. Yale University Press, New Haven, CT.

Tyson Foods
2017 Annual Report. http://s1.q4cdn.com/900108309/files/doc_financials/2017/Q4/Tyson-2017-10K.pdf.

Yeung, Ruth M.W., and Joe Morris
2001 Food safety risk. *British Food Journal* 103(3):170-187.

Appendix A

Survey Questionnaire:

Age: _____

When buying fresh chicken at the grocery store is food safety extremely important to you?

Yes No

Would you continue to buy the fresh chicken if there is news of a health risk associated with it, for example, salmonella contamination?

Yes No

Would you to avoid purchasing the brand associated with the contaminated chicken for a while after you found out about the risks?

Yes No

How long would you avoid the contaminated chicken brand after news of the health risk?

___I would not avoid the brand
___Less than 1 month
___About 6 months
___About 1 year
___More than 1 year
___I would never buy this brand again
___Until my news sources stopped talking about it

Mohenjo-Daro and Harappa: What Happened?

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Introduction

Over the last one hundred and twenty-five years, the ancient cities of Mohenjo-Daro and Harappa, located within the Indus River Valley of Pakistan, have been extensively studied in terms of geography, culture and infrastructure. Still, many writings, from these cities, remain untranslated and the purpose of artifacts that have been excavated is still speculative. Harappa and Mohenjo-Daro are known for being the most influential, largest, and most advanced cities of the Indus River Valley (Lawler 2013). The purpose of this research is to explore various factors contributing to their success, similarities between the two cities, their demise, and lack of revival. Both cities possessed advanced infrastructure and were highly functional by design. It was their advancements in culture, construction, labor division, and technology that allowed Harappa and Mohenjo-Daro to be as successful as other urban cities of the ancient world. The aim of this paper is to consider whether these advanced developments also contributed to their abandonment and attempt to explain why they did not have a revival period. This is important to consider since subsequent cities succeeded by appropriating the advances at Mohenjo-Daro and Harappa and by culturally assimilating the occupants of these two cities after their abandonment.

Theory

Three theories guided this research. The first is conflict theory as presented by Karl Marx regarding capitalism. He states that the "natural" construction of capitalism is every work force playing a role to the success of the society. So, the high class exploits the laborers to feed them and themselves and it is the mental exhaustion of constantly fighting for resources that keeps the laborers continuing without question (Marx 1981). This is the theory that social structure is best understood by the constant conflict or tension that is the competition for limited opportunities and resources throughout a society or community (Schaefer 2015:15). This means that if Harappa and Mohenjo-Daro functioned in this manner their class systems would clearly be exhibited. Distinctions in the city would represent a high, middle, and low class (Schaefer 2015:15). As I will illustrate in this paper, neither Mohenjo-Daro nor Harappa show any evidence of structured inequality or the deliberate concentration of wealth and resources with those who hold social and political power over a society. Since, neither Harappa nor Mohenjo-Daro show evidence of singular rulers or elite class, there is no reason to believe that highly stratified classes existed or there may not have been a clear distinction between the rich and poor.

The second theory examined in the context of this research has been defined by many people, such as Emile Durkheim and Bronislaw Malinowski, and is still applied today in psychological, sociological and anthropological studies. Functionalism is the structure of a society that favors a system of interconnected groups of people, or communities, working together simultaneously to maintain harmony and balance within the society (Schaefer 2015:15). Durkheim explains that every person, animal, plant, building, and more serves a function or place in society without question (Durkheim 2009). Functionalism is important to consider in this research because it appears that community-based survival methods were important to the people of Mohenjo-Daro and Harappa. With only evidence of apparent groups, or clans, contributing to a common goal, a functionalist society becomes very evident rather than conflict-driven, highly stratified society.

The third theory to consider in this research is related to the demise of these two cities. The idea that environmental degradation occurring heavily in the area could have been a contributing factor to the want and need for assimilation--the idea that a minority, similar enough to a dominant group that with little amounts of adaptations, can blend into the society of the dominant group (Schaefer 2015:24-25). This could have contributed to the decline of population in the two cities considering goods were traded with many distant places and relationships between people developed as time progressed.

Background and Location of Mohenjo-Daro and Harappa

Mohenjo-Daro and Harappa are two of the 1500 other sites within the Indus River Valley that spans across 625,000 square miles or about 1.6 million square kilometers (Figure 1). All of these sites together supported around 1 million people living within the Indus River Valley at their peak (Kenoyer 2003). The cities lie within modern day Pakistan along the Indus River. The two cities are centrally located within the Indus River Valley and are roughly 375 miles (600 kilometers) apart (Kenoyer 2003).

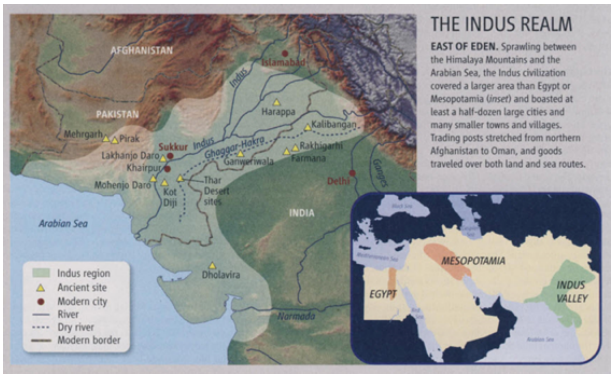

Figure 1. A map showing where Harappa and Mohenjo-Daro are located in comparison with modern cities and developments (Lawler 2008: 1278).

Mohenjo-Daro was constructed around 2600 BCE (Jansen 1993). There is no known information about the existence rulers of the city, its true size, or even its ancient name. Mohenjo-Daro is translated as "mound of the dead;" named by locals because prior to excavation in the 1920s it was presumed to be a mound that was filled with bones of an ancient society (Lawler 2013). During the 1930s, 40s and 50s various excavations were conducted and early theories were developed such as the theory presented by Sir Mortimer Wheeler in his discovery of the "citadels" (Wheeler 1950). After several years of research, the Aachen University Research Project Mohenjo-Daro (ARPM) released all their documentation of Mohenjo-Daro in 1979, which offered a new interpretation of the city and its role in the Indus River Valley (Jansen 1993:36). At Aachen University, two different groups of scholars participated in excavations where one group focused on architecture and planning and the other on craft production and distribution (Jansen 1985:161). It was in this overall study that the sewer systems of Mohenjo-Daro were discovered. The study also determined that Sir Wheeler's discovery of a "citadel" was incorrect and that the structure likely served another purpose, which has yet to be determined (Jansen 1985:166).

The construction of Harappa dates to around 2600 BCE (Atre 1989) and its downfall to around 1900 BCE (Agrawal 1964:950). Harappa was discovered in 1921 in the same year in which the Mohenjo-Daro excavations began (Artre 1989). Sir Mortimer Wheeler also excavated Harappa in the 1940s and concluded that the site was a major addition to the archaeological study of Harappan cultures in that it was a founding city for the Indus River Valley.

Neither city exhibits any exemplary evidence of a singular leader but rather a system of small groups or clans that worked in conjunction for one common goal related to the good of the community. This is supported by the architectural design of the city (Kenoyer 2003). This would have been a contributing factor to assimilation since there was no one leader with whom to negotiate. Instead, groups of independent people with their own leaders would have made the decisions. Five factors of assimilation generally affect the rates in which the people move into other societies or cities: time of entrance, manner of entrance, demographics, cultural similarities physical similarities (Schaefer 2015). As discussed below, each of these factors may have played a role and to a varying degree.

The University of California at Berkley began a program in 1986 to further study Harappan Culture. In 1992, this program was renamed the Harappa Archaeological Research Project (HARP) (Kenoyer 1997). Many aspects of this research were created to compare theories and facts of the two cities. The theories of what Harappa and Mohenjo-Daro represented changed drastically after the 1980s from the original thoughts by the excavators in the 1920s through the 1950s due to new technological advances and studies completed. Originally the cities were thought to be much more religious with citadels, and stupas, but with more modern excavations of the cities it has become apparent that this assumption is incorrect.

Construction and Socialization of Mohenjo-Daro and Harappa

What is understood today is that Mohenjo-Daro and Harappa differed in size and population. The current size of Mohenjo-Daro is about 600 acres (243 hectares). The population of the city may have been the highest of its time within the Indus River Valley. Evidence supports a population size of around 40,000 with the possibility of reaching up to 100,000 people (Lawler 2007). Harappa is smaller. The population would have been around 25,000 residents and the city covered around 370 acres (150 hectares) (Wheeler 1950). These are relatively high population estimates for their time, which presumably have necessitated social stratification in the two cities. Every person would have had a job or purpose within the cities, which may or may not have included socializing only with traders and people of that position. This is indicative of some degree of capitalism being present in Harappa.

Discoveries about the construction of Mohenjo-Daro and Harappa and the possibility of a large population led post-1980s researchers to formulate a "high populations" theory. Material usage and conservation led to the people of these cities developing various structures and construction techniques. Archaeologists discovered that fired mud bricks were used for foundations and non-fired for walls. (Colart 2001) Mud bricks are also the primary medium for construction within the city of

Harappa. Homes within both cities ranged from one to two levels. Streets and alley ways reached sizes of 14 ft (4.27 m) across (Bin Naveed 2015). With the material and size of homes in both cities known, a more accurate estimate of the cities' populations was created, in support of the high populations theory.

The two cities differed with respect to spiritual culture. The ruins of Mohenjo-Daro show significant evidence of spiritual practices. A platform that overlooks the entire city was found at its northern end. In the 1920s a step pyramid was excavated. When discovered, it was recorded as a Buddhist stupa, or dome-shaped shrine. In 2007 Giovanni Verardi disputed this, stating that the structure was not in congruence with other Buddhist temples. It was not aligned with the major points of direction of other Buddhist structures and the base was rectangular rather than square. Moreover, Verardi found a terracotta seal that depicted a supposed goddess on top of a tree with a man sacrificing an animal below (Lawler 2003). This terracotta seal may have been sacred and held high importance to the religious practices of Mohenjo-Daro.

Harappa, on the other hand, exhibits no sign of religious temples, ceremonial plaza, or political structures. An example of this is evident in the granaries of the two cities. Mohenjo-Daro granaries are centrally located and have ceremonial platforms around them. The platforms are likely to have been used for sacrificial purposes or to demonstrate a hierarchy of priests of social status. The granaries in Harappa, in contrast, were not built for ceremonies but had living spaces and pods where the people who ran the granaries may have lived (Atre 1989).

Both Harappa and Mohenjo-Daro excavations revealed baths, toilets, and general water maintenance. The cities had drainage systems that ran water into and out of the public area and wells that were scattered throughout as an extra source of water. Flood water collection and control was also present. In Mohenjo-Daro, The Great Bath is present (Figure 2). The Great Bath is a mud brick structure that was 26 ft. x 39 ft. (7.9 m x 11.89 m) in size. (Fitzsimons 1970:13) The Great Bath is given its name for its uniqueness and is housed atop a citadel-like structure within the city. It is the largest bath among the civilizations of the Indus River Valley meaning it could have been used ritualistically for spiritual or ceremonial purposes (Jansen 1993). Mohenjo-Daro homes also contain evidence of personal wells and baths within residencies. Harappa, however, does not have a single major bath like Mohenjo-Daro. Instead, Harappa has public wells scattered throughout the city as well as smaller baths (Colart 2001). This finding supports the idea of Harappa being more secular and even suggests that possibly Mohenjo-Daro was a public center for the people of the Indus River Valley.

Figure 2. The Great Bath (Lawler 2013).

Trade, and Arts

In the later years after 2000 BC, both cities commenced trade with other civilizations across Asia and possibly into Europe and Africa. This trade may have contributed to the development of their cultural differentiations. Evidence for trade is seen in that Indus civilizations have been recorded in multiple writings across Asia. For example, two written accounts describe Indus people being present in Mesopotamia, which demonstrates evidence of migration and movement of goods and traditions. One account is from a court case. The other account is also in court, but the Indus individual acts as an interpreter. The Sumerian word for a person from the Indus was a "Meluhhan" (Lawler 2013:35). Trade is also supported by archaeological evidence, such as beads being found from oceanic regions, which appears to have aided development of social class within the Indus River Valley.

The people of Mohenjo-Daro and Harappa took part in irrigation farming as well as raising animals (cattle, horses, elephants, goats, sheep, and pigs,) and creating art such as beads, statues, and other textile creations (Neiburger 2013). Abundance of resources would have elevated the carrying capacity of the environments of the cities, causing an increase in population and trade. This means there could have been an access of goods, and since the cities could have had capitalistic traits to the infrastructure, this would promote exploration and trade.

If the population was large enough and shortages occurred, the need for non-commodity trade goods may have surfaced. Copper is one item that could be one of the resources traded within the Indus civilizations. Presence of the element at the cities likely caused the people migrating through the Indus River Valley to settle and build cities such as Mohenjo-Daro and Harappa. The metallurgy of the Indus peoples also reveals that artifacts created from copper do not change style throughout the rise and fall of Harappa or

Mohenjo-Daro. Moreover, evidence supports the idea that metal was not a regulated commodity. That is, the elite people of the society were not the only ones with access to copper and other alloyed metals (Neiburger 2013). Testing of copper artifacts, such as tools, statues, and figurines, revealed the practice of recycling metal. This suggests that the discovering the value of copper in trade could have meant it was protected from local exploitation. Neither Mohenjo-Daro nor Harappa exhibit any evidence of large production or mining of copper. It is likely that ingots, or conveniently shaped metal masses, were traded and used frugally (Hoffman and Miller 2009). In other words, they retained copper and other metals rather than mass producing it.

Other resources were likely traded in unique ways. Grains were weighed and kept in a warehouse-like fashion, as would be done to support trade. Other materials, such as textiles and fabrics, were likely traded (Kenoyer 2003). The cultural influences of external civilizations have yet to be fully determined. However, the archaeological study of Harappa suggests a trade-focused system because of its secular attributes and apparent focus on production. With a population twice the size of Harappa, Mohenjo-Daro may have had to focus efforts on feeding its residents. The possibility of Mohenjo-Daro and Harappa being trade centers meant a constant flow of people entering and leaving the cities regularly. These people placed additional demands on the food supply.

There is no consensus on the trade and demise of Mohenjo-Daro and Harappa and the rest of the Indus River Valley. However, there are many sites within the valley left unexcavated. For example, Ganweriwala, a largely populated Indus River Valley was discovered in 1978 and to this day no formal excavations have occurred there (Shinde et al 2018). A terracotta tablet was found at the site depicting a cross legged yogic person below a tree. The city could hold the key to fully understanding the downfall of Harappan Cultures and the trade that occurred with these supposed population centers.

Beads and Figurines

A significant number of beads have been found within Mohenjo-Daro and Harappa as well as in other settlements within the Indus River Valley (Lawler 2013). The beads themselves are constructed of various materials such as bone, shell, stone, or clay. Some of the beads that have been discovered are glazed or fired. These intricate beads vary in size, and shape and have even been found in Mesopotamia and other markets (Vidale 1989). Trade of beads with Mesopotamian groups is evident (Vidale 1989). The design of the beads changed slightly over time and supposedly became more detailed toward the end of the two cities (Kenoyer 1991) (Figure 3).

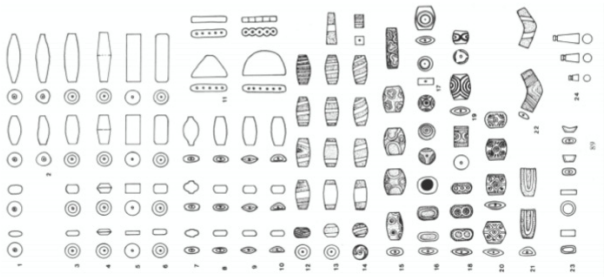

Figure 3. The various sizes, shapes, and designs of beads that have been excavated at Harappa (Kenoyer 1991:89).

Arguably, the most interesting discoveries at Mohenjo-Daro and Harappa are the terracotta emblem seals and figurines. However, figurines are found in both cities and seals are typically only found in Mohenjo-Daro. Mesopotamian seal remnants have also been found in Mohenjo-Daro (Fitzsimons 1970). The use of materials varies between Mohenjo-Daro and Harappa, but they are similar in size and apparent intentions of use.

Harappa's figurines were first discovered along with the discovery of the site in 1921 (Atre 1989). The figurines are constructed out of various materials such as clay or metal. However, rather than having theistic features, the figurines are more characteristic of humans with no apparent spiritual or religious purpose (Clark 2009). These figurines may have possessed a more secular purpose as if the figurines were the materialization of the people who created them. It is these figurines that formed the basis of the ideas of Harappa's culture and helped coin the term "Harappan Culture", which is now the accepted term in describing any part of culture stemming from the surrounding region within the Indus River Valley (Clark 2009:234-236).

Mohenjo-Daro has a wide array of figurines created from clay and metal that support evidence of the figurines being used as toys or spiritual symbols. Excavations uncovered various animals such as bulls, sheep, birds, and fish. These figurines are considered toys (Dales 1965). Several clay figurines have very feminine features and are assumed by anthropologists to be mother-goddesses. The most famous figurine of the Indus River Valley was found in Mohenjo-Daro and is known as "The Dancing Girl" (Figure 4) (Fitzsimons 1970). The Dancing Girl dates to around 2300 BC and stands at about 5 in (12 cm) tall. She is positioned to be dancing, possesses accurate proportions, and has jewelry on her arms, neck, and head. Her face, however, is the most interesting feature. It contains expression and appears very natural (Fitzsimons 1970). The figurines of Mohenjo-Daro are still being studied today and new developments arise as more of the city is excavated.

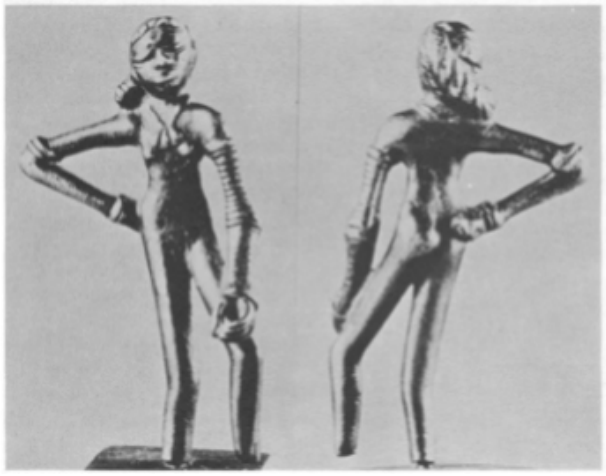

Figure 4. An image showing both the front and the back of the Dancing Girl figurine (Fitzsimons 1970).

The Demise of Harappa and Mohenjo-Daro

Anthropologists are currently attempting to create a more detailed theory on what happened to the Indus River Valley Civilization (Kenoyer 2005). However, there is no consensus yet. The demise of the Indus civilization is not quite understood but the true cause may be hidden in writings that have yet to be translated or discovered.

Evidence found demonstrates that neither of the cities exhibit any sustained damage from warfare (Wheeler 1950). However, one contrary theory does promote the idea of the cities being attacked, taken over by the Aryans, and populations forced to leave (Possehl 1997). This appears unlikely given the evidence that warfare is not present. The archaeological evidence found in Mohenjo-Daro and Harappa do not demonstrate any sort of defensive building construction, suggesting that they were never physically attacked (Possehl 1997). Instead, the declines of Harappa and Mohenjo-Daro were gradual and spanned across hundreds of years (Dales 1965). The people seemed to have slowly left rather than being forced through conquest.

Climate change is the basis for another theory (Possehl 1997). Massive floods could have resulted in a lake of water that blocked the flow of the river and prevented the cities from draining properly (Dales 1965). The cities had very complex sewage and irrigation systems that were created to control flood waters. However, the flow and control of flood water would have been negatively affected if the water levels were to high, causing water to collect and heavy erosion of crops. At Mohenjo-Daro, 35 skeletons were buried in flood deposits that measure 31 feet (9.5 m) high in comparison to current levels. Such evidence supports climate change over warfare due to the probability that these deaths were likely caused by a natural disaster (Dales 1965). On the other hand, recent scientific examination of the climate during the decline of Mohenjo-Daro and Harappa suggests a severe decrease in monsoon water from the mountains and in silt deposited from the Indus River during this time. The fossil record of structures built from the early periods of the cities to the late depict a decrease in quality of construction and materials (Possehl 1997). Droughts and climate shifts are noted across Egypt and Mesopotamia causing devastation and economic strife for these regions. (Cullen et al. 2000; Rice 2003)

A final theory is that ideological similarities to cultures outside of Harappan cultures ultimately caused people to assimilate. The gradual decline of industry, resources, and growth was ultimately caused by population migration out of the Indus River Valley (Lawler 2008). Evidence suggests that Mohenjo-Daro, in its late phase, was not an urbanized area, but a place of squatters (Dales 1965).

A mixed combination of factors could be responsible. Maybe flooding or drought led to a lower carrying capacity of the environment, which forced inhabitants to assimilate into other societies. Though there is no evidence supporting the cities being attacked by Aryans or another group of people, this could have left remaining residents vulnerable if warfare occurred. However, more recent studies lean toward the idea of climate change and assimilation. Since the depopulation of the Indus River Valley left the cities abandoned and they were not able to recover, much of this is left completely to speculation.

Abandonment and Revival

Several cities, like Mohenjo-Daro and Harappa, throughout history experienced declines in urbanization after reaching the environmental carrying capacity for a large civilization. Some were left abandoned and some were rebuilt. What sets the abandoned apart from the revived? What did the places that revived do to avoid permanent abandonment?

The timeline of Egypt is divided into Kingdoms and Dynasties. The Old Kingdom (2600 BCE to 2100 BCE), was a highly prosperous time for Egypt. Great advancements were made in their society from cultural to architecture and arts (Rice 2003:189-225). Egypt experienced high amounts of development until climate began to change. After many years of drought lowering water levels and impacting crops or animals, the economic impact became too great. The government began to fall apart, religion diminished, tribes began invading from the deserts and usurping their culture. The king in power tried desperately to save the state, and in some accounts even regulated resources, (Rice 2003:189-225). As a result, Egypt split into Upper and Lower Egypt. The Asiatic and other "barbarian" tribes began to invade and

the Egyptian economy suffered. People began to leave Egypt as foreigners arrived there. From the 6th Dynasty to the 10th Dynasty, Egyptian power passed from ruler to ruler. However, in the 11th Dynasty, when trade began to flourish again, climate adaptations were made, new political systems were created, and Upper and Lower Egypt were reunited (Yeakel et al. 2014). Egypt never obtained the level of success it had after the downfall, but it was revived from certain abandonment due to the efforts of leaders who implemented regulatory systems to combat drought.

Another example is with the Akkadian Empire in Mesopotamia. The Empire fell very quickly around the year 2200 BCE. The cause is not entirely known but is suspected to be climate change. Global temperature increased between 5000 - 3000 BCE to 1 - 2° C (33.8 - 35.6° F) and decreased between 3000 - 2000 BCE causing a drop in sea levels (Cullen et al. 2000). Just as Egypt struggled environmentally, so did the Akkadian Empire. There was a sudden switch to a climate that was barren and dry with little to no rain. A dramatic climate shift had an effect on economic values and caused the state to crumble at an alarming rate. In the early formation of Mesopotamia, there was a system of secondary states that were formed. It was not until there was a consolidation of power between 2400 - 2300 BCE that issues arose. It was during this time that fine arts and craft came to an end and mass production of clay pots began (Weiss 1993), which would have made the beads and figurines of Mohenjo-Daro and Harappa more valuable. Between 2300 - 2200 BCE the Akkadian Empire took over and began changing various practices. The population was liquidated into one area under their imperial rule and people were possibly paid in seed rations - standardized worker rations of barley and oil. A city wall was constructed (Weiss 1993). All of this was an attempt by the emperor to save the water that was steadily declining. However, in ca. 1900 BCE the entire city was abandoned and left at about half of its original size (Weiss 1993). However, they too were able to re-establish themselves after their fall. There was a dark period but by 2100 BCE, trade had begun again in search of raw hard materials. The Akkadian Empire never reached its previous stature but revived when others were not so lucky (Sax et al. 1993).

There are other examples of civilizations that were not able to revive. The city of Cahokia, located near modern day St. Louis, was bigger than London, England at its height. It was the first city in North America and grew exponentially around the year AD 1100 (Iseminger 2010). This was a spiritual place in which thousands of people lived. The people of the city built over 150 mounds within 2200 acres (890 hectares) of land (Iseminger 2010). The largest mound is what is called today Monks Mound because of the French Monks who occupied it after Native groups had vacated. Monks Mound was the center of the city and around it was a stockade that took 15,000 - 20,000 logs for each of the 3 - 4 times it was rebuilt (Iseminger 2010). The people of the central portion of Cahokia were only a small piece of the matrix of small tribes and clans that surrounded the city. Cahokia was the trade and power house to the surrounding areas. Evidence has been found to support the demise of political power over time. For example, wall sections around the stockades were reconstructed multiple times with the construction style of the wall changing. Smaller tribes on the outskirts became less dependent on Cahokia and may have even broken away from it because of these differences and trade (Iseminger 2010). This would have had a profound effect on the economy. The ability to trade decreased as resource depletion and climate change became more evident. The amount of wood used for the stockade as well as the 100 or so trees it would take to build a home (plus firewood and use of wood throughout everyday life) impacted their landscape (Iseminger 2010). With depletion of resources came the inability to feed the entire population because their crops were not yielding enough produce. Rival communities surfaced and evidence of conflict arose around AD 1200. These changes occurred not just within the boundaries of Cahokia but the tribes and clans surrounding it who also rebuilt stockade walls at Mississippian centers at the same time (Iseminger 2010). The general size and density of the population also caused the transfer of diseases and infections even before conflict and economic and environmental problems became prominent. Even after they surfaced, the remains demonstrated that there were bone effecting diseases effecting the population due to malnutrition from a corn-based diet (Iseminger 2010). By AD 1300, Cahokia was no longer occupied. The descendants of people who did survive became the Osage, Omaha, Quapaw, Ponca and Kansa tribes (Iseminger 2010).

Another civilization that suffered the same fate as Cahokia were the Mayan groups of Mesoamerica. For example, the city of Tikal collapsed after about 1100 years (Pringle 2009). Between AD 711 - 790, Tikal culture was at its peak (Willey et al. 1971). This is when advances in architecture, rituals, and social stratification occurred. Roughly 62,000 people lived in a central plaza at Tikal and around 30,000 worked around the perimeter in farming (Pringle 2009). After Tikal reached its peak, ceramic arts declined. By AD 830 architectural and sculptural advances ceased and by AD 950 the city was abandoned (Willey et al. 1971). The steady declines in culturally important attributes suggests the Mayan demise was likely caused by a population increase that could not be fully supported by agriculture. The people of Tikal who practiced arts, such as ceramics, could no longer be supported with the

crops of the farmer. Thus, every person had to provide for themselves and their subsistence in some way other than trading arts and design. They exploited the trees, which ultimately destroyed forests and contributed to soil degradation (Williams 2007). The years between AD 750 and AD 850 were the driest years that were recorded in the 700 years prior (Willey et al. 1971). The population was high, which also influenced diseases and an increased transmission rate. Competition between ceremonial centers rose and classes became further divided. Resources were further depleted. There was more than likely a revolt of the lower status people against the leaders. Their environment was degrading quickly and attempts to save it, only worked on a short-term basis. This only prolonged the end of Tikal when ultimately trade decreased and their economy (Willey et al. 1971). The Mayan people more than likely assimilated into the Central Mexican cities and clans that surrounded them where they live today.

Conclusion

Mohenjo-Daro and Harappa were successful because of their advancements. They had steady access to the resources needed for survival and a complex system of infrastructure around them. The cities used mud and water from the Indus River to help build shelters, create water systems, grow plants, and raise animals. Through gaining control of the Indus River, they were able to have a surplus of food that led to social stratification where residents could take on more "luxurious" roles within their communities. For example, the use of bronze in the statue of the Dancing Girl demonstrates that people had the freedom as artisans. The person who constructed the Dancing Girl not only committed time, but was also able learn the metallurgy skill. Her construction was probably not a random occurrence, but a product of meticulous hours of training and time. The creation of statues such as these are clear evidence that there were craftsmen in the community. This research assumes that people had the opportunity to improve life by creating things of aesthetic value as opposed to focusing all their efforts purely on sustaining life.

Harappa and Mohenjo-Daro were possibly even exposed to ideas from other societies with which they traded. There was some level of communication between groups of people that had to occur to complete trades and trusting relationships would need to be built for it to continue. The terracotta figurines and beads suggest communication of ideas, especially at Mohenjo-Daro where there is evidence of some sort of spiritual practice. Trade is a way that not only goods are exchanged, but thoughts as well. So, this could have led to differences in worldview between Mohenjo-Daro (more spiritual) and Harappa (more secular.) Harappa maintained a focus on industrialization. Arts were present but Mohenjo-Daro likely had a different social structure that focused on rituals, ceremonies, gods and goddesses, and incorporating those into their daily lives.

There are also noticeable environmental correlations and adaptations between Egyptians, Mesopotamians, Cahokia peoples, the Maya, and many more. Each of these populations reached a point at which something in the environment changed. Whether it was because of exploitation or natural event, it caused social conflict in some way. Egypt, Mesopotamia, Mohenjo-Daro and Harappa all fell around the same time and seemingly for almost the same reasons. Egypt and Mesopotamia were able to revive themselves although Harappa and Mohenjo-Daro were completely abandoned. One major difference separated them. Mohenjo-Daro and Harappa have no evidence of one individual ruler whereas Egypt and Mesopotamia had a king or emperor that made the decision to do whatever it took to preserve their kingdoms until people got tired of the policies and ordered change. All of these sites demonstrate assimilation into other societies or groups. However, Mohenjo-Daro and Harappa were not able to revive themselves because there was no one leader to which to turn, the people were a part of a community that had its own systems/leaders. There was no need to come back.

Surprisingly, conflict may also have played a role. There was social tension that may have caused issues for which overthrowing the government or dominant group was the only tangible answer for these people. Mohenjo-Daro and Harappa could have had negative internal affairs, such as disagreements between the clans within the community when ecological or environmental obstacles surfaced causing people to want to leave the city.

The climate changes in the Indus River Valley that occurred 4000 years ago still affect the sites today. The climate is dry and barren and there is a small town around Mohenjo-Daro of about 20,000 people under Pakistani control. Countries of the present day have had 4000 years to adapt to life in these conditions and have built major trade systems to ensure survival. So, if resources are unable to support the population due to size and the environmental carrying capacity, it appears that the fall of the society will follow and people will move and assimilate into other areas that are able to support their needs. Contact through trade and spiritual practices seem to have a positive correlation in the ability to assimilate. The people of Mohenjo-Daro and Harappa either redistributed into the smaller tribes or clans that surrounded the cities, like the people of Cahokia, or they slowly migrated away from the area and into other societies like the Maya of Tikal.

References Cited

Agrawal, Dharma Pal
1964 Harappa Culture: New Evidence for a Shorter Chronology. *Science* 143(3609):950-952.

Atre, Shubhangana
1989 Toward an Economico-Religious Model for Harappan Urbanism. *South Asian Studies* 5(1):49-58.

Clark, Sharri R.
2009 Material Matters: Representation and Materiality of the Harappan Body. *Journal of Archaeological Method and Theory* 16(3):231-261.

2003 Representing the Indus Body: Sex, Gender, Sexuality, and the Anthropomorphic Terracotta Figurines from Harappa. *Asian Perspectives* 42(2):304-328.

Colart, Claire
2001 The Indus - The Masters of the River. The Mystery of India. Gedeon Programmes, NHK, La Cinquieme, RTBF-Claire Colart, TFO-TV Ontario, Canada. Published in English 2006.

Cullen, H. M., P. B. Demenocal, S. Hemming, G. Hemming, F. H. Brown, T. Guilderson, and F. Sirocko
2000 Climate change and the collapse of the Akkadian empire: Evidence from the deep sea. *Geology* 28(4):379.

Dales, George F.
1965 New Investigations at Mohenjo-Daro. *Archaeology* 18(2):145-150.

Durkheim, Emile
2009 The Politics of the Future. *Durkheimmian Studies* 15:3-6.

Fitzsimons, Matthew A.
1970 The Indus Valley Civilization. *The History Teacher* 4(1):9-22.

Hoffman, Brett C., and Heather M.-L. Miller
2009 Production and Consumption of Copper-Base Metals in the Indus Civilization. *Journal of World Prehistory* 22(3):237-264.

Iseminger, William
2010 *Cahokia Mounds: America's First City*. The History Press, Charlotte, SC.

Jansen, Michael R. N.
Mohenjo-Daro: Type Site of the Earliest Urbanization Process in South Asia. *Studies in the History of Art* 31(4):35-51.

Kenoyer, Jonathan Mark
2005 Uncovering the keys to the Lost Indus Cities. *Scientific American* 5(1):24-33.

1997 Trade and technology of the Indus Valley: New insights from Harappa, Pakistan. *World Archaeology* 29(2):262-280.

1991 Ornament Styles of the Indus Valley Tradition: Evidence from Recent Excavations at Harappa, Pakistan. *Paléorient* 17(2):79-98.

Lawler, Andrew
2013 Mohenjo-Daro's New Story. *Archaeology* 66(1):32-37.

2008 Unmasking the Indus: Boring No More, a Trade-Savvy Indus Emerges. *Science* 320(5881):1276-1281.

2008 Unmasking the Indus: Indus Collapse: The End or the Beginning of an Asian Culture?. *Science* 320(5881):1281-1283.

Marx, Karl
1981 CITA. *Mientras Tanto*(6):119–120.

Naveed, Muhammad Bin
2014 Harappa: An Overview of Harappan Architecture and Town Planning. *Ancient History Encyclopedia*. December 13.

Neiburger, E.J.
2013 A comparison of the American Old Copper Culture with the Indus Valley Civilization. *Central States Archaeological Journal* 60(1):18-21.

Possehl, Gregory L.
1997 Climate and the Eclipse of the Ancient Cities of the Indus. In *Third Millennium BC Climate Change and Old-World Collapse*. NATO ASI Book Series.

1997 The Transformation of the Indus Civilization. *Journal of World Prehistory* 11(4):425-472.

Pringle, Heather
2009 A New Look at the Mayas End. *Science* 324(5926):454-456.

Rice, Michael
2003 Chapter 9 and 10. In *Egypt's Making: The Origins of Ancient Egypt*, pp. 189-225. 2nd ed.. Routledge.

Sax, M., D. Collon, and M. N. Leese
1993 The Availability of Raw Materials for near Eastern Cylinder Seals during the Akkadian, Post Akkadian and Ur III Periods. *Iraq* 55:77-90.

Schaefer, Richard T.
2015 *Racial and ethnic groups*. 14th ed.. Pearson Education Inc., Upper Saddle, NJ

Shinde, Vasant S., Yong Jun Kim, Eun Jin Woo, Nilesh Jadhav, Pranjali Waghmare, Yogesh Yadav, Avradeep Munshi, Malavika Chatterjee, Amrithavalli Panyam, Jong Ha Hong, Chang Seok Oh, and Dong Hoon Shin

2018 Archaeological and anthropological studies on the Harappan cemetery of Rakhigarhi, India. *Plos One* 13(2): e0192299. https://doi.org/10.1371/journal.pone.0192299.

Vidale, Massimo
1989 Early Harappan Steatite, Faience and Paste Beads in a Necklace from Mehrgarh-Nausharo (Pakistan). *East and West* 39(1/4):291-300.

Weiss, H., M. -A. Courty, W. Wetterstrom, F. Guichard, L. Senior, R. Meadow, and A. Curnow
1993 The Genesis and Collapse of Third Millennium North Mesopotamian Civilization. *Science* 261(5124): 995-1004.

Wheeler, R.E. Mortimer
1950 Archaeology in India and Pakistan Since 1944. *Journal of the Royal Society of Arts* 99(4837):113-132.

Willey, Gordon R., and Demitri B. Shimkin
1971 The Collapse of Classic Maya Civilization in the Southern Lowlands: A Symposium Summary Statement. *Southwestern Journal of Anthropology* 27(1):1-18.

Williams, Sarah
2007 Not so clear-cut: Soil Erosion May Not Have Led to Mayan Downfall. *Science News* 172(17):262.

Yeakel, Justin D, Mathias M Pires, Lars Rudolf, Nathaniel J Dominy, Paul L Koch, Paulo R Guimarães, and Thilo Gross
2014 Proceedings of the National Academy of Sciences of the United States of America. *Proceedings of the National Academy of Sciences of the United States of America* 111(40):14472-14477.

Constructions of Modern South Korean Masculinity: An Examination of Military Culture & Cosmetic Usage of South Korean College Students

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Introduction

In 2015, beauty products for South Korean men composed more than $1.5 billion of domestic sales (Fifield 2015). Additionally, sales of men's skin care products have grown 86 percent from 2010 to 2015 to average $39 yearly for each South Korean man (Hatch 2017). Cosmetic usage for South Korean men has become popular in recent years, but South Korea's mandatory military service requirement has remained constant since 1957. Since 1957, all able-bodied South Korean young men have been required to serve in the military (Moon 2001). At first glance these two concepts seem to be at odds with each other. Cosmetic usage is usually closely associated with femininity, as military service is with masculinity.

My paper aims to better understand the tensions and overlaps between Korean military culture and Korean cosmetic usage regarding the construction of an ideal South Korean masculinity. Military service is mandatory for all Korean men and has long been an important factor in the construction of Korean masculinity. However, the ideal model of masculinity has changed with the emergence of the "flower boy" phenomenon. An important aspect of the "flower boy" phenomenon is a more effeminate look which is achieved through the use of skin care products. I examine cosmetic usage as an aspect of this larger phenomenon. Historically, South Korean women have been the main consumer of cosmetics and cosmetic usage is closely associated with conceptions of femininity. However, for the growing number of men who use cosmetic products, they do not see their own behavior as feminine. I want to further explore how atypical male behaviors such as cosmetic usage are reinterpreted when they are introduced to mainstream culture. Through my interviews with South Korean college students, I investigate contemporary views on military service and cosmetic usage and their relation to the changing construction of Korean masculinity.

As a researcher, I am interested in how constructions of gender shape people's lives. My studies in gender sparked my interest in examining masculinity. I believe that to solve issues of gender equality, studies of men and masculinity are vital. Certain masculine ideals can be harmful and limiting for both men and women. Research on gender needs to focus not only on women but also on men and the relations between men and women. I became interested in the topic of Korean masculinity through my own casual observations about Korean culture. Since I cannot read Korean fluently, the scope of my study was limited to articles written in English, and many seemingly relevant articles written in Korean had to be excluded. From what I found, while there have been separate studies written in English on military culture and cosmetic culture, there have not been any that have analyzed them side by side.

Literature Review

Studies of masculinity can be found in numerous disciplines. Researchers of masculinity have drawn from disciplines such as anthropology, sociology, and gender studies (Connell 1995; Gutmann 1997; Moon 2001). According to Tikhonov (2007), masculinity can be understood as the following:

> *Masculinity - that is, social ideals of manhood - refers here to the social constructions surrounding biological maleness, constructions that are underpinned by power relationships and articulated through prevailing cultural and ideological forms.*

Multiple constructions of masculinity can exist within a society, and Connell (1995) argues that there is a hierarchy of masculinities. Hegemonic masculinity refers to the attitudes and practices among men that perpetuate gender inequality, involving both men's domination over women and the enforcement of the hierarchy of masculinities among men (Connell 1995). For both men and women, hegemonic masculinity is seen as a cultural ideal of manhood (Jewkes et al. 2015). Although constructions of masculinity refer to the expression of one's male gender identity and not to one's sexuality, a core element of hegemonic masculinity is heterosexuality (Jewkes et al. 2015). Therefore, hegemonic masculinity creates a link between gender identity and sexuality.

In South Korea, military service is a key element of hegemonic masculinity. It is part of a man's national duty (Moon 2005). The link between military service and masculinity has been explored by several authors through historical documents and surveys (Choi 2012; Moon 2005; Tikhonov 2007). In the context of South Korean society, hegemonic masculinity not only justifies or naturalizes men's domination of women, but it also

encourages conformity and complicity from individual men through various forms of rewards and punishments (Moon 2001). These rewards and punishments exist both institutionally and socially.

In examining newer constructions of South Korean masculinity, researchers have started to rely on media sources such as newspapers, television, and the internet for depictions of South Korean men (Holliday and Elfving-Hwang 2012; Lim 2011; Miyose and Engstrom 2015). Newspapers are a medium that wield public authority, and they offer a glimpse into the dominant discourses of the time. For researchers of South Korean masculinity, it can show how the portrayal of South Korean men has changed over the years (Lim 2011). Newspapers, magazine articles, and websites have also been used by researchers to examine the role of cosmetic surgery in South Korean society (Holliday and Elfving-Hwang 2012). Studies that examine Korea's cosmetic culture tend to focus on cosmetic surgery for women and have a tendency to ignore the large number of men who use cosmetics or undergo cosmetic surgery (Park 2007; Woo 2004). Holliday and Elfving-Hwang (2012) address this critique by emphasizing the importance of appearance for both genders, which they trace back to physiognomy and its role as a traditional form of divination.

This paper mainly draws from interviews done with South Korean college students to examine South Korean masculinity. While there has been separate research on the effect of military service and cosmetic usage on South Korean masculinity (Lim 2011; Moon 2005), this paper will fill a gap in the literature by exploring the effect of both elements on ideal constructions of masculinity among South Korean college students. Additionally, rather than focusing on cosmetic surgery practices, as is common in research about appearance enhancement, I will focus on the use of cosmetic products as a less extreme approach to appearance alteration.

Korean Masculinities of the Past

Modern understandings of South Korean masculinity must be approached with an historical perspective in mind. During the Choson dynasty (1392-1910), the idealized masculinity model among commoners included physical prowess and toughness, but it had to be balanced with a demonstration of loyalty to central Confucian values (Tikhonov 2007). Confucian values made men structurally relevant members of society and relegated women to social dependence (Kim 1993). The idealized masculinity model for the yangban class, especially those hailing from scholarly lineages, differed greatly. Masculinity in that class entailed conforming to the ideal of being an impassioned leader and of having a great sense of duty and righteousness without being violent (Tikhonov 2007:1042). The refined, aesthetic restraint of a scholarly neo-Confucian gentleman contrasted greatly with the unrestrained, physically tough and powerful commoner (Tikhonov 2007:1045).

Several factors in the early 1900s led to the militarization of Korea. Korea's experience of Japanese colonization heightened the status of warriors tremendously (Choi 2012). There began to be a focus on physical strength and patriotic sentiment. As written in an article by Kim Huison during this time period, it was stated that "the vigor of the nation was dependent on the state of the nation's physical fitness" (Tikhonov 2007:1056). It was believed that physical weakness of the nation would lead to a weakened "spiritual or mental strength" (Tikhonov 2007:1056). During these years of Japanese colonization, the model of the patriotic and strong man emerged as a masculine ideal. This model combined the previous versions of masculinity of the scholarly gentleman and the physically tough commoner (Choi 2012: 77).

In addition, a new vision of masculinity began to permeate into Korean society through Japanese translations or adaptations of European ideologues and moralists (Tikhonov 2007:1047). This mainstream vision of nationalized, constrained and well-controlled masculinity became intertwined with Korean formations of masculinity. These new ideas caused Koreans to blame colonization on effeminate Koreans and to praise and glorify the military tradition of honor and patriotism (Choi 2012: 77). This phenomenon was not confined to Korea. During the Meiji period (1868-1912) in Japan, there were disputes regarding effeminate Japanese men called high-collar gentlemen. These Japanese men copied the manner and dress of European men, and were considered by critics to be too feminine (Karlin 2002). Critics saw the lifestyle of the high-collar gentlemen as a "worship of Western culture" (Karlin 2002). In contrast, the other type of Japanese masculinity present at the time, the soshi, were encouraged to be strong fighters and were depicted as patriotic with a strong national spirit in comparison to the high-collar gentlemen (Karlin 2002)[1].

As a result of the Korean War, there was an increased emphasis on militarized national security, and there was the sentiment of a need "for a strong military for decades to come" (Choi 2012:78). The military service functions as a way to define manhood as the state has considered the system of universal male conscription the desirable method to recruit soldiers to protect the nation from the impending threat of North Korea (Moon 2001). Since its establishment in 1957, mandatory military system requires all able-bodied young men of the age of 19 and above to serve in the military for twenty-six

to thirty months (Moon 2001). The compulsory military service of men in Korea has played a large role in instilling military ideals of masculinity.

In the late 1990s, the South Korean government relaxed a ban on Japanese cultural goods, thereby exposing South Koreans to popular manga featuring pretty, effeminate men (Hsu 2012). It is possible that the term "flower boys" originated from these pretty boy characters from Japanese shōjo manga which are comics written for girls describing the lives of teenage girls at school and their romantic relationships (Jung 2010). However, the exact origins of the "flower boy" trend is unclear. One theory suggests that the relationship between Japan and South Korea made it easier for these cultural images to spread in South Korea. During Japanese occupation of Korea between 1910 and 1945, the Korean cultural sector resisted Japan in relation to freedom of expression and its own sovereignty, but it also learned from and mimicked Japanese culture and its products (Jung 2010). Another theory postulates that the 1997 Asian financial crisis and the frustrations of women at the time played a role in the development of this trend (Turnbull 2009).

These "flower boys" are called kkonminam in Korean (꽃미남). The Korean phrase is a combination of 꽃 (flower) and 미남 (handsome man). Generally, "flower boys" refer to men who are pretty looking and who have smooth fair skin, silky hair, and a feminine manner (Jung 2010). The new male image is characterized by an interest in grooming and adorning one's external appearance (Lim 2011). As discussed by Kim Yong-Hui, "the kkonminam syndrome is developed from a consequence of the deconstruction and the hybridization of female/male sexual identities rather than males merely becoming feminized" (Jung 2010:58). Newspapers reported on the emergence of this new form of masculinity. The emergence of men who deviated from traditional Korean concepts of masculinity became interesting fodder material for the daily newspapers, which were constantly looking for new stories to report (Lim 2011). One news article said that if the traditional male image exaggerated strong, masculine appeal, the "flower boy" is a new male image that stimulates the maternal instinct, appearing soft, innocent, and attentive (Lim 2011). This new masculine ideal has been popularized in Korean dramas and music which have received a great amount of global attention in the past decade (Fifield 2015). As a result, this new image of the Korean man has been dispersed throughout Korea and the world and has created a new pressure and ideal beauty standard for Korean men. It is important to emphasize that the "flower boy" phenomenon represents an ideal and not an identity.

According to a survey by the National Institute of Food and Drug Safety Evaluation, South Korean men use 13.3 grooming products on average per month (Asia Personal Care & Cosmetics Market Guide 2016:104). The articles discussing the "flower boy" phenomenon reported on the skin whitening products, cleansers, and eye creams that were being used by these "flower boys" (Lim 2011). Skin care product advertisements declared things such as "Skincare is no longer for women only," and "Now, men need makeup, too!" (Lim 2011).

The overlap between the militaristic model and the "flower boy" model of Korean masculinity can be clearly seen in the cosmetic product released by Innisfree, a popular Korean cosmetic company. The company released a line of brown, green, and black face paint for army conscripts called Extreme power camo cream that is gentler on the skin than the standard-issued products (Fifield 2015). This product represents the way in which two seemingly contradictory approaches to masculinity can come together.

Research Methods

During the spring of 2016 in Seoul, South Korea, I conducted seven interviews. For my interviews, I was interested in how Korean students, particularly males, view and express their masculinity. Through interviews, I wanted to see how factors such as mandatory military service and a focus on appearance through cosmetics affected the construction of their masculinity. My interviewees were college-aged South Koreans studying at Korea University and Sogang University, and they all had an adequate command of the English language. I interviewed six males and one female for approximately one hour each.

I met most of my interviewees firsthand in classes or in a cultural exchange program during my time studying abroad at Korea University. After completing a Collaborative Institutional Training initiative social and behavioral research course and receiving HSRB approval, I contacted my interviewees through a Korean messaging app. Most of my interviews took place in cafes. The rest took place in parks or study areas. I used a pre-made set of interview questions to structure the interviews, but I allowed room for follow-up questions or divergence from the list. Before starting each interview, I explained my project, and I had all of my participants sign an informed consent form. During the interviews, I took notes and recorded our conversation. I assigned all of my participants a fake Korean name to safeguard their identity. These pseudonyms will be used in the paper.

The sample I interviewed represented a very specific and unique subset of Korean males and females. My sample size was very small, and the students I interviewed all mostly came from similar circumstances.

They were all college aged students aged 21-25. One of the interviewees was from Sogang University, but the rest were from Korea University. Korea University is one of the top three universities in Korea and has a highly selective acceptance rate. Therefore, the students I interviewed were not necessarily representative of the view of an average Korean college student and may only reflect common ideas of masculinity within elite institutions.

All of these interviews were conducted in English and not in the native language of the participants. To get the best and most natural sounding information, it would have been better to interview the participants in Korean; however, I lacked the necessary language ability. I tried to get participants who felt comfortable speaking in English, but there were several times during the interview process where one of my participants had to stop and look up a word in English. I could tell they had trouble expressing certain ideas; as a result, the quality of my data may have suffered. This study was also limited as I was only able to interview seven South Koreans. This study would have been benefited from the addition of more interviews and a survey about how South Korean males frame their own masculinity. In addition, the scope of my examination of Korean masculinity was limited. I only looked at masculinity in regards to cosmetic and military culture, and there are many other dimensions of Korean masculinity that I do not cover in this paper. However, I felt that military and cosmetic culture best represented the ideas of masculinity I wanted to explore in present-day Korea.

With these interviews, I want to use them in my discussion to demonstrate how individuals make and transform the world they live in. They provide insight and perspective into how young adult men in Korea view and conceptualize their own masculinity in their daily lives and conform to or resist masculine ideals.

Analysis of Interview Data

Regarding my interview data, all but one of the males I interviewed had completed their mandatory military service. Since military service is mandatory for men, many of my interviewees found it to be an obvious part of manhood. One of my interviewees, Minjun, said that in military he was told "You guys are here to protect our country, protect your families, and your mothers and sisters and brothers from North Korea." Serving in the military is seen as a natural and necessary part of being a man.

As discussed by Moon (2001), mandatory military service is a major element of hegemonic masculinity. It acts as a mechanism that essentializes and naturalizes gender differences which reinforces the dichotomy of the masculine provider and the feminine housewife. One of my interviewees who had served in the military, Jinwoo, told me there was a Korean saying that said, "Men have to go to army but women have to bear a child."[2] He said that the pain men endure in military is like the pain women have during childbirth. Although my informants told me that the phrase is not commonly used anymore, the phrase highlights the sentiment toward the duties of males and females.

As military service is seen as an important aspect of Korean masculinity, there are negative social consequences for men who are unable to or are unfit to serve in the military. As explained by my informant, Jinwoo, "Since many Korean men have been to military service, those who haven't been become outcasts. Mandatory military service is one of the big burdens of living in Korean society and one that everyone has to share." Jiyu, a Korean female I interviewed, said that male college students could be divided into those who went to military service and those who have not. She mentioned differences in maturity level and physical appearance. She said, "If someone acts immature, we say you should go to military. Then you'll be a man." Her comments point to the construction of mandatory military service as a rite of passage for men. Ideal constructions of Korean masculinity require one to have undergone the hardships of military service. Through military service, young men become disciplined and mature. Therefore, participation in military service is required for one to be taken seriously as a man. Since participation in military service is seen as such a critical and transformative process for men, those who do not or cannot serve in the military fail at achieving hegemonic masculinity and are socially punished.

Since most of the people I interviewed had already finished their required military service, it was possible to ask them about the changes they perceived in themselves after having served. Many of my interviewees talked about how military service made them more conscious about their bodies and about being in shape. Minjun said, "I didn't really think that physical strength was important in modern society, but the military taught me about the importance of my strength in protecting others." Even Taemin, who worked in the public works service in a non-combat role, felt the pressure to be physically strong. He said, "No one directly said that you have to get more muscular. It is not like that. There just exists silent pressure." In addition, he felt that "if mandatory military service didn't exist, we wouldn't care about physical strength."

Through military service, men gain certain economic advantages such as the widespread perception that military service is a valuable exercise in discipline and responsibility that prepares men for employment outside the home (Moon 2001). However, some of the

men I interviewed resisted the notion of mandatory military service. Jinwoo said, "I don't think [military service] should be mandatory for anyone. I think it's a waste of time for everyone to serve in the army." A 1997 national poll conducted by Media Research showed a trend toward the separation of military service and masculinity among the younger generation of men (Moon 2001). Furthermore, the poll also showed that the younger and more educated the respondent, the more critical his attitude toward military service and the less accepting of its necessity (Moon 2001). Serving in the military can be quite disrupting to one's studies as many of my interviewees served in the military after their second year of university. As Jinwoo and the others I interviewed were studying at elite universities in Korea, this may highlight a class and educational attainment distinction that still exists today. More research would be needed to see if the attitudes of lower class men or less educated men toward mandatory military service is different.

One of the greatest insults to a man in the military service is, "Are you a girl?" (Choi 2012:79). This statement creates an interesting contrast to the rise of male cosmetic sales in Korea as cosmetics and a focus on appearance have traditionally been a concern of Korean women. For women, there is a heavy emphasis on appearance because it is one of the few spaces that they have had control over (Cho 2001). Mothers encouraged their daughters to undergo cosmetic surgery, believing that an improved appearance would change their daughters' life chance in marriage and employment (Cho 2001). Interestingly, most of my male participants told me it was their mothers and sisters who encouraged them to use cosmetic products and take care of their skin. To a certain extent, the importance of caring for one's appearance has been de-feminized as the demands and pressures on men's appearances has increased.

When discussing cosmetic culture as a part of the "flower boy" phenomenon, I would like to make the distinction between makeup and skin care products. My interviewees were adamant that they did not use makeup; however, most said they used skin care products. Their rejection and separate conceptualization of makeup was a surprise to me. To my interviewees, makeup was seen as a marker of femininity in a way that skin care products were not. Additionally, when I discuss cosmetic culture, I am referring broadly to any enhancement or altering of appearance through products or surgery. However, in my paper, the discussion of cosmetic culture will mainly refer to the use of skin care products unless otherwise stated.

Men who fail to adhere to hegemonic standards of masculinity are at risk of being labeled as gay. Oppression positions homosexual masculinities at the bottom of the gender hierarchy among men, and gayness represents all that has been symbolically expelled from hegemonic masculinity (Connell 1995). The perception of gays and gay culture is particularly negative in Korea as discriminatory and prejudicial attitudes toward homosexuality remain strong among the general public in Korea (Lim 2011). A study conducted by Park and Chung in 2006 showed that regardless of the respondents' academic background, sense of values, or family income, homosexuals were generally regarded as the most marginalized group (Lim 2011).

When talking with my informants, they often found the use of makeup by men to be odd except in the case of celebrities. Korean pop stars usually wear a great deal of makeup, especially eye makeup. According to my informants, male celebrities have to wear makeup as part of their job but that is not seen as something for regular people to emulate. Regarding the use of makeup by non-celebrity males, Gunho, one of my informants, said "Some people may think they're gay. If someone wears makeup, people might think he cares too much about his appearance." By caring too much about one's appearance and deviating too far from the hegemonic standard, men risk losing their credibility and status as masculine Korean men. From the point of view of hegemonic masculinity, gayness is easily assimilated to femininity (Connell 1995). The characteristics associated with the "flower boy" had to be de-feminized in the news stories to guard against transgressions of societal norms (Lim 2011: 116). Although men do care about their appearance, in order to maintain the hegemonic standard, the amount of time and products used must be less than the amount that females spend. In their discussion about the "flower boy" phenomenon, newspaper articles have tried to temper the fear of the social stigma attached to men's grooming through headlines such as "Made-up men are beautiful." (Lim 2011). The articles report that the new male image is being pursued by the majority of men, who are presumed to be straight; therefore, men can safely jump in on the trend without fear of being suspected as gay (Lim 2011).

In order for the use of skin care products to be agreeable with constructions of masculinity, the usage of such products needed to be de-feminized. In my interviews with the men, there seemed to be two mindsets toward the use of skin care products. For some, it was the solution to an acne or skin problem they had. For others, it was another aspect of taking care of oneself. One of my informants, Junho, said that "skin care is just for human beings." He didn't think of it as gendered. In tandem with his statement, newspaper articles have redefined the use of skin care products as behavior consistent with human instinct rather than a deviant attributed to homosexuality (Lim 2011). In fact, some of my interviewees did not even think of the products they used as skin care products. One of

my interviewees, Minjun, told me that he used toner and moisturizer and asked if they counted as skin care products. To most of them, the use of skin care products was a normal and natural product to use. In fact, many of my interviewees downplayed their desire to improve their appearance for vain reasons. They described their usage in practical terms. My interviewees did not think their usage of skin care products was anything of note as everyone they knew used them. Minjun said, "I don't want my skin to be like the actors. I just want it to be normal." The men sought to differentiate themselves from women who used cosmetic products for more superficial purposes. Therefore, it is not really the case that males are becoming more accepting of female usage of cosmetics as they are defining their usage in a different way. Furthermore, this suggests that in regards to the "flower boy" phenomenon and its connection to cosmetic usage, there is no intention to disturb the androcentric and heterosexist social order that has long been seen as "natural" or to abandon the structural privilege that men and heterosexuals have collectively enjoyed (Lim 2011).

In South Korea, appearance is highly valued. When applying for a job, many companies require applicants to attach a photo of themselves. As a result, appearance is becoming increasingly important as the job market becomes more competitive (Holliday and Elfving-Hwang 2012). Men are encouraged to recognize their appearance as a new form of capital to get ahead (Lim 2011). This is shown in article headlines such as "Groom and you shall succeed!" and "Men must compete over looks, too" (Lim 2011). Therefore, the importance of men paying attention to their appearance is being portrayed as an economic necessity.

This focus on appearance has historical roots in the practice of physiognomy. Physiognomy is the art of judging character from facial characteristics. Around half of all Koreans believe that one can "read" a person's character by looking at their face (Holliday and Elfving-Hwang 2012). Through the use of cosmetics, one can enhance certain facial characteristics. Physiognomy is often used to evaluate candidates where qualifications and experience are equal (Holliday and Elfving-Hwang 2012). While not everyone believes in physiognomy, having a "lucky face" reduces the risk of leaving an unfavorable impression (Holliday and Elfving-Hwang 2012).

However, it is also important to note that while common among the people I interviewed and the circles I frequented, not all young Korean men use skin care products. In fact, one of the men I interviewed, Gunho, did not use any kind of skin care product. He said, "I don't even put on sunblock. I only use shampoo and body wash. That's it. No more." Gunho was the only man I interviewed who did not use any kind of skin care products. He did not view such products as necessary. He said, "I don't want to use my money to get cosmetic stuff. It's not an important factor for me. I feel pressure, but normally I don't care." Thus, for some men, the cost and hassle of using skin care products may outweigh the benefits. In addition, Gunho said his parents and sister do not spend money on such products. Many of my other participants had said they started using skin care products because their mother or sister had encouraged them to.

Even within the militaristic model of masculinity, there was a focus on appearance. In that model, men needed to look physically tough and well-disciplined. Within the effeminate or "flower boy" model of masculinity, the focus on appearance is greater, but it still relies on the concept of self-discipline. Instead of muscular bodies, men need flawless skin which requires having a disciplined diet and a rigorous skin care routine.

Discussion

For most of my interviewees, the construction of masculinity in military culture and cosmetic culture were not at odds with one another. Instead, the two types of masculinity combined and made the ideal Korean masculine type more complex. Jinwoo described the ideal Korean man as having the "flower boy" style in regard to the appearance of his face but at the same time having a strong body. As the use of skin care products has been de-feminized, there is less of a conflict with using skin care products and also being masculine. In fact, the use of skin care products is needed to maintain one's position as a masculine provider. Korean society places a high value on appearances and men need to also look good in order to be competitive for the job market. However, not all men agree with this trend. One of my interviewees, Jinwoo, told me that he did not feel comfortable with the "flower boy" trend. He said that he felt tension every time he went to the barber shop. He said, "I want to cut it [my hair] very short, but almost every barber doesn't recommend it. I think I look more masculine when I have short hair, but with the trends, the hairstyle he recommends makes me look a little girlish. It's not as masculine as I want it to be."

For many of my informants, the ideal Korean was strong yet compassionate. Unlike previous constructions of militarized masculinity, it seems that it is no longer enough just to be an economic provider. Constructions of Korean hegemonic masculinity have become more complex. Korean men have to be both physically strong and visually attractive. One article argued that the strong masculine image will resurface if an economic recession occurs, suggesting that the "flower boy" phenomenon will not replace the traditional image and will be relegated to a mere fad (Lim 2011). I disagree with this statement

because I do not think that the different masculine images are at odds with each other. Considering the importance of appearance to employers and society, I believe the "flower boy" image is here to stay.

Conclusion

As the use of cosmetic products becomes de-feminized, men must appeal to both expectations of physical toughness and a flawless appearance. Care of one's appearance is an important aspect of masculinity as it bolsters social perception, economic potential, and stability. Military culture instills ideas about the role of Korean men in society and emphasizes the importance of physical strength in protecting loved ones and the nation itself. This depiction, however, portrays women as weaker than men and in need of protection. Additionally, the inclusion of cosmetic usage into mainstream constructions of masculinity comes at the expense of homosexual masculinities. Although modern Korean masculinity may emphasize aspects that seem less toxic, it still relies on concepts of power over women and aspects of homophobia.

I believe my paper has applications to discussions of gender equality. Through understanding how or where men might form sexist ideas, gender equality programs can better address the problem. According to my interviewees, their participation in the military had a deep impact on their construction of masculinity. Thus, the military serves as a possible site to address broader issues of gender equality. By examining how South Korean college students relate to and interact with the hegemonic standard, one can gain insight into the effect of mandatory military service and the "flower boy" phenomenon on constructions of masculinity.

Notes

1. Hereafter this point, any mention of Korea or Koreans will refer to South Korea and South Koreans only.
2. The phrase in Korean is 남자는 군대에 가야 하지만 여자는 아기를 낳아야 한다.

References Cited

Cho, Haejoang
2001 Living with Conflicting Subjectivities: Mother, Motherly Wife, and Sexy Woman in the Transition from Colonial-Modern to Postmodern Korea. In *Under Construction: The Gendering of Modernity, Class, and Consumption in the Republic of Korea*, pp. 165-195. University of Hawaii Press, Honolulu.

Choi, Hoon
2012 Brothers in Arms and Brothers in Christ? The Military and the Catholic Church as Sources for Modern Korean Masculinity. *Society of Christian Ethics* 32(2):75-92.

Connell, R.W.
1995 *Masculinities*. University of California Press, Berkeley, Calif.

Fifield, Anna
2015 In South Korea, Beauty Is Skin Deep (Just Make Sure To Pierce The Stubble). *Washington Post*.

Gutmann, Matthew
1997 Trafficking in Men: The Anthropology of Masculinity. *Annual Review of Anthropology* 26(1):385-409.

Hatch, Patrick
2017 South Korean men are wearing make-up and it's serious business. *The Sydney Morning Herald*.

Holliday, Ruth, and Joanna Elfving-Hwang
2012 Gender, Globalization and Aesthetic Surgery in South Korea. *Body & Society* 18(2):58-81.

Jewkes, Rachel, Robert Morrell, Jeff Hearn, Emma Lundqvist, David Blackbeard, Graham Lindegger, Michael Quayle, Yandisa Sikweyiya, and Lucas Gottzén
2015 Hegemonic masculinity: combining theory and practice in gender interventions. *Culture, Health & Sexuality* 17(2):96-111.

Jung, Sun
2010 *Korean Masculinities and Transcultural Consumption: Yonsama, Rain, Oldboy, K-Pop Idols*. 1st edition. Hong Kong University Press, Hong Kong.

Karlin, Jason G.
2002 The Gender of Nationalism: Competing Masculinities in Meiji Japan. *The Society for Japanese Studies* 28(1):41-77.

Kim, Myung-hye
1993 Transformation of Family Ideology in Upper-Middle-Class Families in Urban South Korea. *Ethnology* 32(1):69-85.

Lim, In-Sook
2011 The Trend of Creating Atypical Male Images in Heterosexist Korean Society. *Korea Journal* 48(4):115-146.

Miyose, Colby, and Erika Engstrom
2015 Boys Over Flowers: Korean Soap Opera and the Blossoming of a New Masculinity. *Popular Culture Review* 26(2):2-13.

Moon, Seungsook
2001 The Production and Subversion of Masculinity. In *Under Construction: The Gendering of Modernity, Class, and Consumption in the Republic of Korea*, pp. 79–113. University of Hawaii Press, Honolulu.

2005 *Militarized Modernity and Gendered Citizenship in South Korea*. Duke University Press Books.

Park, Sang Un
2007 "Beauty Will Save You": The Myth and Ritual of Dieting in Korean Society. *Korea Journal* 47(2):41-70.

Tikhonov, Vladimir
2007 Masculinizing the Nation: Gender Ideologies in Traditional Korea and in the 1890s-1900s Korean Enlightenment Discourse. T*he Journal of Asian Studies* 66(4):1029-1065.

Turnbull, James
2009 Korea's "Flower Men": Where's the Beef? *The Grand Narrative*.

Woo, Keong Ja
2004 The Beauty Complex and the Cosmetic Surgery Industry. *Korea Journal* 44(2):52-82.

An Analysis of Anthropophagy Among Ancestral Pueblo People of the Four Corners Region

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Introduction

Cannibalism, or anthropophagy, has a unique history in many cultures around the world (Raffaele 2006). Despite having been practiced regularly in the Western world for medicinal purposes before the Renaissance (Gordon-Grube 1993; Sugg 2006), most contemporary Western cultures view the practice as grotesque, taboo, and sometimes illegal (Marriner 1997). Perhaps because of this taboo and the general macabre nature of the subject, I had no shortage of sources to examine comparatively across multiple cultures and multiple time periods.

While conducing a literature search, I stumbled across an interesting series of arguments that appeared to be contradictory. They were based on the culture of the Ancestral Pueblo Peoples of the Four Corners North America, also known as the "Anasazi" (Bullock 1991, 1992; Diehl and Donnelly 2006). In these articles I found authors from various disciplines, such as historians, archaeologists, and forensic anthropologists, all voiced their interpretations using the methods and approaches that define their disciplines. However, these educated professionals could not come to a consensus over whether or not cannibalism actually occurred, and it is apparently a widely debated issue (Witze 2001). A feature I failed to identify among the sources in my literature review was an interdisciplinary approach to this argument. While some were astute at finding opposing arguments to rebut within their own disciplines, few had taken the initiative to look at other forms of evidence to support their own apparent findings and beliefs. This research developed as a result of this paradox.

Herein, I use an interdisciplinary anthropological approach by attempting to provide an objective analysis to relevant historical evidence and modern forensic findings. I argue that Ancestral Pueblo Native American people practiced survival endocannibalism (endoanthropophagy) as a response to the harsh conditions they endured as climate of the Four Corners region underwent rapid and drastic changes and tribes split up into smaller functional units.

Anthropology and the Relativistic Perspective

Anthropology is an interdisciplinary field of research that comes with a unique set of approaches to the study of human evolution and adaptation (Xiaotong 2000). One such approach is the application of the principle of cultural relativism, often credited to Franz Boas, an American anthropologist of the early twentieth century (Boas 1920). The three main pillars of Boasian cultural relativism suggest that every culture is a social world that reproduces itself through the process of enculturation, where enculturation (otherwise known as ethnocentrism) is the passing down of behaviors, attitudes, and values from generation to generation (Brown 2008:365). Second, it argues that every culture should be evaluated objectively and seen as having its own degree of high integrity no matter how grotesque or obscene rituals may seem. Finally, it suggests that a more critical analysis is obtainable when reviewing non-Western practices and institutions in an attempt to impose "its own varieties of ethnocentrism on others" (Herskovits and Herskovits 1973 [1958]:103).

Boasian cultural relativism divides itself into multiple subcategories. The three most relevant and applicable to modern anthropology are methodological relativism, cognitive or epistemological relativism, and ethical or moral relativism (Brown 2008:367). Methodological relativism is withholding judgment of a practice until it may be understood in the entirety of its context. Cognitive relativism relates to the translation of rituals and behaviors from one culture to another. It acknowledges that there are some universals in human cognition that may be applied to alien concepts in order to better understand them. It also concedes that the culture being studied is surrounded by a very different source of knowledge from the observer. Due to these contradictions there is much debate about the validity of cognitive relativism (Xiaorong 2007). Lastly, ethical or moral relativism claims that moral propositions do not stem from a universal source or understanding, but are instead rooted in cultural, social, and personal truths and values. The concept of moral relativism is seemingly contradictory because it denies the existence of the "universals" that are often applied to other anthropological concepts (Brown 2008:369-371).

A modern definition of cultural relativism attempts to remedy these concerns (Brown 2008). This definition argues that ethnocentrism can be overcome because most modern-day cultures are not closed systems. The interpretation claims that institutions must be understood in the context of the entirety of their culture (not just the parts that are relevant to the institution) and makes use of the ethnographic record. All societies contain varying degrees of internal diversity with cultural tensions existing as a result. Further, intercultural

interactions may have far-reaching effects on the internal social dynamics between the cultures involved. Thus, the modern definition argues that universals should not be used as a sole basis for comparative analysis and for cross cultural examination but that keeping universals in mind is a valid tenet of cultural relativism (Brown 2008:372).

When studying anthropophagy, one must be extra wary of the application of cultural relativism. There lies a danger in reviewing cultural practices vaguely and applying an "anything goes" approach to analysis that does not allow for cultural overlaps. I suggest that it is appropriate to apply universals when attempting to understand vague concepts of completely foreign rituals or customs that are not in any way analogous to the researcher's own. But here lies peril in ethnocentrically applying incorrect universals. For example, confusing religion with morality and applying a strict religious construct in a culture where it does not exist will only serve to muddle the actual reality and intent behind the custom or activity (Handler 1986:13). Ethnocentrism is a danger to cultural interpretation and is where much of the "horror" is applied toward cannibalistic customs. It is also how exoticism and sensationalizing occur in that anthropologists could report what they expect things to mean instead of what their research actually meant to those being studied (Gardener 1993:35; King 2000).

Definitions and Perceptions of Cannibalism

Cannibalism is a broad biological term used to describe one member of a species consuming another member of the same species (Lester et al. 2015). It is something seen across multiple species on microscopic and macroscopic levels for multiple reasons (reproduction, survival, etc.). The term may also be applied to humans, but in this context it usually has a negative association with the behavior it describes. That is, "cannibal" denotes someone who has consumed the flesh of another human as a deviant or criminal act.

Sarcophagy is defined simply as the practice of feeding on flesh, such as that practiced by carnivore species. Anthropophagy is a more specific term used to describe the act of one human consuming the flesh of another human. This action may be practiced for any purpose, such as biological or social, deviant or adaptive. It is used in the lexicon of social sciences because it does not carry with it the weight of an explicitly negative connotation that the word "cannibalism" carries. There are several forms of anthropophagy that include autosarcophagy, endoanthropophagy (endosarcophagy), exoanthropophagy (exosarcophagy), and to an extent, sexual cannibalism.

Autosarcophagy is the consumption of one's self. Related, autocannibalism in the world of nature is often a matter of survival, as with instances of animals chewing off limbs to escape some form of immediate or impending peril (Kantner 1999). However, with autosarcophagy, the motives are not necessarily as drastic. There is some debate about the exact definition, which are centered on what parts of one's body one must be consumed for the act to be considered autosarcophogy. This is important to consider, because we naturally consume the cells from the inside of our cheeks and the surface of our tongue every day. However, some sources argue that the acts of chewing hair, biting nails or cuticles, and other acts related to the disease pica might all fall under the umbrella of autosarcophagy (Denton 1984; Monasterio and Prince 2011). The strictest definitions say that only acts in which someone is knowingly and intentionally devouring their own flesh or blood can the consumption be considered autosarcophagy. Even if one were to make a conscious effort to not participate in these acts, autosarcophagy also occurs inexorably within the human body every day as an act of cell maintenance and survival, particularly with regards to regulating the growth of tumors. This process contains a sequence of steps known collectively as autophagy. This is the system by which the body isolates, transports, and degrades old or improperly functioning cells before making use of the components that are still operable. At least on a microscopic scale autosarcophagy, or autophagy, is a part of our natural functioning and existence. These are all natural, sometimes instinctual acts that may be performed impulsively or unconsciously, which is important to keep in mind when we are framing our conceptions of anthropophagy and how it relates to ourselves.

Endoanthropophagy is the act of consuming someone within one's intimate social group or cohort. There are some instances of endoanthropophagy being used as a last resort for survival, as seen in the Donner-Reed Party in 1846 at the Alder Creek Camp in the Sierra Nevada Mountains (Dixon et al. 2010; McGlashan 1947). While mapping a new route, the group of pioneers became stuck high in the mountains after meeting unexpected difficult terrain and a particularly harsh and early snowfall. It was not until February that the group was found by rescue parties, leaving the pioneers stuck in the cold and inhospitable environment for four months. After several attempts at pressing forward, which only served to split the group into smaller units and decrease morale and supplies, the families resorted to consuming the flesh of those that perished as a means of survival. Accounts from the surviving Donner-Reed families indicate that the people were so desperate to survive that after the parts of the oxen that had perished on the trail were eaten the children had picked apart the ox-hide rugs and the dry leather straps holding their crude snowshoes together and attempted to eat those. These same accounts also detail systematic ways of endoanthropophagy, such as

stripping the carcasses of all edible biomass, drying it out to preserve it, and carefully storing and keeping track of it to help ensure that no one ate their family members. In the instances where flesh was served to the party as a whole, certain women butchered and cooked the rations (as opposed to eating the flesh raw). This is an important claim because recent archaeological findings are inconclusive to prove the existence of cannibalism (Grayson 1990). None of the bones in the hearth tested positive to be human. However, it is very possible that the butchering techniques used excluded the bone, as it is unlikely that they would have needed to cook human bones and only cooked bones would have been preserved. There is also a possibility that the bones were cooked and consumed entirely (as with the ox and horse bones).

In other populations, such as the Yanomami people of the Amazon and the Madagascar villages under the reign of Ranavalona I during the nineteenth century, endoanthropophagy was used to help the souls of the dead pass on to their ancestral plane (Campbell 2013:1033; Steverlynchk 2008). The Fore tribes in Northern New Guinea believe that violent or accidental deaths are caused by evil spirits who possess the bodies of loved ones and cause them to perish in unexpected ways in their youth (Rhodes 1998). It is believed that the evil spirit manipulates the person it possesses by eating it from the inside out. So, to avenge the deceased they believe have been taken over by a spirit, they eat the corpse (presumably still containing the spirit) to seek revenge on it (Dolan 2012). Finally, a recent case study demonstrated that endoanthropophagy might be used in various cultures to create or quell political uprising (Pottier 2007:826).

Exoanthropophagy is the act of consuming someone not within ones intimate social group or cohort. It is sometimes used during times of war as a means of intimidation or torture as it was between the Native American groups in the American Colonies and the Colonists (Abler 1992:5). It was also used as a symbol of power and triumph over warring clans of Mountain Ok people of central New Guinea (Gardener 1993:35). After emerging victorious in battle, the winning Mountain Ok warriors would return home with the bodies of their slain enemies and put their enemies' heads on display as a method of intimidation to dissuade further battle by neighboring clans in the future. They would then feast on the spoils of their conquest. In some South American cultures endoanthropophagy was used as a platform for upward social mobility (Winkelman 2014). By contrast, Central America Aztec culture stated that all men were trained to be warriors, but only those who successfully brought in sacrifices could be initiated and achieve true warrior status. Human sacrifice was considered a sacred and ceremonious practice. After the heart had been removed and offered to the gods (usually by burning it), the limbs would be offered to the warrior who brought the sacrifice, the head would be displayed, and the torso would be entombed inside of the pyramid-like temple atop which the sacrifice had been offered after the ceremonies had concluded (Burhenn 2004).

Lastly, sexual cannibalism is observed almost exclusively as a function of reproduction among arachnids, insects, amphipods, gastropods, and copepods. These instances often involve the female eating the male before, during, or after the act of copulation. Examples include the Chinese Mantis who eats the head of her mate during intercourse, and the easily identifiable species of *Latrodectus* spiders that have commonly come to be known as Black Widows due to their behavior of eating their mates after the act. In some instances with other arachnid species, such as *Micaria sociabilis* and *Allocosa brasiliensis*, there is reverse sexual cannibalism where the male eats the female.

A Brief History of the Pre-Pueblo and Ancestral Pueblo

Anasazi is the name applied to the pre-Pueblo and ancestral Pueblo people in the Southwest region of the United States, primarily in the area known as the Four Corners (where the states of Colorado, New Mexico, Arizona, and Utah meet). The term came from the Navajo word "Anaasazi," meaning "ancestors of the enemies." It was established as an archaeological term in 1927 and is often used as a blanket-term to describe the people of the Basket Maker II and III periods (Plog 1979:108). Speculations of anthropophagy are centralized around the Western Anasazi, which is the focus of this paper. Due to the biased and potentially offensive origin of the term Anasazi, I will use the words pre-Pueblo and Ancestral Pueblo instead, although it should be noted that reputable sources still use "Anasazi" as a descriptor.

There is some debate as to whether or not the pre-Pueblo and the Ancestral Pueblo people were in fact related due to breaks in continuity and a large gap in the time between the existences of the two cultural expressions (Willey 1966:206). This is illustrated through discrepancies in the styles of their homes. For example, the pre-Pueblo people lived in circular subterranean clay structures made of wood-and-mortar that was stacked to about head height on top of horizontal logs (Willey 1966:208). The later Ancestral Pueblo people adopted rectangular shaped "apartment style" dwellings and used stone and plaster to line the walls of their homes (Willey 1966:210). There is little evidence of subtle transition from one style of home to the other, aside from the kiva. A kiva is a specialized ceremonial subterranean

building used for communal religious gatherings, which closely resembles the subterranean domestic dwellings used by the people of the Basket Maker III period.

The Basket Maker II (ca. 100 B.C.- A.D. 400) period ushered in the first wave of Southwestern agriculture with the introduction of domesticated varieties of Mesoamerican maize. The Western Pre-Puebloans were unique in that they used hunting, gathering, and agriculture as means of procuring food. Game included elk, deer, antelope, rabbit, turkey, and mountain sheep. Walnuts, juniper berries, acorns, and pinon nuts were harvested from the trees. Sage, chamiso, and saltbush also provided subsistence. Agave, cholla, and prickly pear were also valuable gathered resources. When a member of a family passed, they would be buried in one of the cists in their home or somewhere near their home, or they were placed into one of the village's several refuse mounds (Willey 1966:205). They were often buried in a flexed body position in full dress of loincloth and string apron, sandals, and jewelry of beads, bones, or shells.

By the time of the Basket Maker III period (ca.A.D. 400 - A.D. 700), agriculture had been firmly established with beans, squash, amaranth, sunflower seeds, and tansy mustard seeds being added to their list of farmed crops. Corn remained the primary cultivated plant. Trade and influence from the southern Mesoamerican cultures introduced ceramic technology, which proved more useful than baskets for transporting water and hot-rock cooking. Basket Maker III and later Pueblo I (ca. A.D. 700 - A.D. 900) periods also brought about milestones of the polished grooved axe, the bow and arrow, the cotton cloth, and the domesticated turkey. There was a sort of cultural stagnation as cultures evolved into the Pueblo I and II periods, with the only substantial differences being changes in architecture and the addition of the ringed neck to water vessels. It has been suggested that communities grew during the Pueblo I and II periods as houses changed shape, taking on a more rectangular form (Plog 1979:119; Willey 1966:207). These individual dwellings were clustered together in groups of three or four, with roughly four clusters making up a village by the time of Pueblo III (ca. A.D. 1000 - A.D. 1300). Corn surpluses led to the development of exterior storage units, which was an advancement over the smaller internal cists with beehive shaped lids of the Basket Maker II period. These new developments also brought with it the advent of irrigation techniques including the use of stream diversion dams, canals, and terraces and check dams to retain rain and flood waters and redirect the water for agricultural use. Burial practices also gradually changed during this time. While still buried in a flexed position, burials no longer contained jewelry and other valuables buried with them. There have been far fewer burials found in Pueblo III village sites than in the earlier Basket Maker sites, and there were some apparent isolated instances of cremation, though there is no evidence that cremation fully replaced the traditional flexed burial (Willey 1966:210).

Shortly after A.D. 1300 almost all of the land in the Utah and Arizona settlements was mysteriously abandoned. Hopi oral history claims that this was the time of a great migration, but do not cite the reason for such a move (Bernardini 2008). It is also odd that this migration, instead of moving everyone in the same direction, split the villages into smaller units that then spread (primarily) north and south from their respective locations. There are several theories as to what could have caused this massive diaspora including environmental pressures (both from the physical or social climate), increase in population size, and potential conflict with neighboring tribes (Kidder 1960:289; Plog 1979:129; Willey 1966:218).

The pre-Pueblo and Ancestral Pueblo people became less dependent on hunting and gathering and more dependent on agriculture subsistence once corn was successfully grown, harvested, and stored. This led to a less nomadic and more sedentary lifestyle. This more reliable food source also allowed for a gradual increase in population size facilitating a change in house style and an increase the in crop size to sustain population growth. Archaeologically, this can be seen through evidence of soil erosion control during Pueblo III and the development of irrigation techniques (Kidder 1960; Plog 1979; Willey 1966). The physical environment in the Four Corners has an arid atmosphere with extreme temperatures and very dense clay or loose sand among rocky mountainous regions and canyons. While some areas had rich and fertile soil, this was not the case for all of the settlements in the region. Thus, farmable landscapes would be a valuable resource worth protecting and utilizing, but there is little evidence of crop rotation or fallow fields, which could have caused major damage where over-irrigating to compensate might make conditions worse. But this temporary boon meant an excess of crops, which they were storing outside in granaries. Spatially, other Native groups occupied regions around the Ancestral Pueblo with large village organizations and differential access to certain technologies (like the bow and arrow). It is possible, then, that these neighboring people would be passing through to hunt or migrate to a new location as they escaped the drought. Thus, they could very easily loot the unprotected outdoor stock of grains and corn with little resistance. As one author suggested, this would not even have to be a massive invasion or overtaking, but small "parasitic" plundering from time to time that might have been enough to deplete surplus in a time when the soil was beginning to fail and pressures were immediately felt to migrate or adapt (Kidder 1960:289).

Cave homes inside of canyon walls in Utah show evidence of poor nutrition and analysis of bone shows an increase in dental cavities and a prevalence of anemia (Plog 1976:128). Due to this perfect storm of external forces, the larger settlements of the Ancestral Pueblo fragmented into smaller villages throughout the landscape. It is possible, however, that certain groups were not able to move as far since a number of older or younger family members, those potentially ill or malnourished, would be unable to move far quickly, or not at all. In this case, it has been suggested that they potentially resorted to anthropophagy as an extreme means of survival within this depleted and exhausted environment (Plog 1976:128).

Evidence of Anthropophagy with Ancestral Pueblo

Coprolites

Taphonomy is a sub-discipline within biological anthropology that involves documenting the changes that organic remains undergo after death, which can lead to archaeological specimens or fossilization. The study includes the processes of decay and preservation that disturb and damage bones before, during, and after burial and is relevant to understanding the application of anthropophagy.

Fossils are the mineralized remains or impressions of a prehistoric organism preserved in petrified form or as a mold or cast in rock and may be used to determine aspects of animal morphology as indicators of biological change and adaptation. Coprolites and paleofeces are fossilized dung that may be used to determine behavioral or cultural aspects, such as diet and seasonal subsistence strategies. With coprolites, mineral deposits have replaced the organic components. With paleofeces, the majority of the original composition remains and may be used to reconstruct and determine initial chemical properties. Coprolite is the term used for human feces. Both are valuable research tools to paleontologists attempting to acquire data about cultural behavior such as diets.

Coprolite samples found at pithouse sites in southwestern Colorado were biochemically analyzed using an enzyme-linked immunosorbent assay (ELISA) (Marlar et al. 2000:76). ELISA is a unique test that is used to detect the presence of specific antibodies in the blood and may be used in medical diagnosis, pathology, and industrial quality control. Antigens from the sample are attached to a surface. Then, a further specific antibody is applied over the surface so it can bind to the antigen. This antibody is linked to an enzyme, and, in the final step, a substance containing the enzyme's substrate is added. The subsequent reaction produces a detectable signal, most commonly a color change in the substrate. After properly performing the ELISA test on the samples from Colorado, it was determined that myoglobin was present in the feces (Marlar et al. 2000:76). The presence of myoglobin is significant because it functions as a protein molecule that transports oxygen from the inner surface of the membrane of skeletal and cardiac muscle cells to the energy generating components within the cells. In other words, this protein might be found in a skeletal muscle sample (such as a limb), but not in a smooth muscle sample (such as in the gut, or in any gut cells that would normally be found in a fecal sample). Thus, the only way myoglobin could be present in a coprolite sample would be if it had been ingested and digested. So, there is a high degree of confidence that myoglobin found in the coprolite samples from the southwestern Colorado site were the result of anthropophagy.

Another interesting find indicated that there was a total lack of plant matter in the feces (Holden 2000). Artifacts on site suggest that the house was at least occupied during the Pueblo II to Pueblo III periods, when agriculture was firmly established and maize would have been a staple in the Pueblo diet at this time. The fact that there was a lack of plant matter with the existence of the human myoglobin would suggest that human flesh was an available, and potentially acceptable, form of subsistence and the application of survival endoanthropophagy.

The same site also contains evidence of charred bones and teeth in the cooking hearth that were not disposed of in any documented Ancestral Pueblo burial practice, but instead discarded around the hut in a manner similar to the disposal of consumed non-human animals. That is to say, the bodies (if buried at all) were not in proper burial posture and the bones were not gathered or collected in uniform fashion. Disarticulated bones of different individuals were intermingled. Upon analysis of the disarticulated bones, it is estimated that there were at least seven different people, with four adults and the remaining being adolescents. Cooking and food preparation knives and sherds of cooking vessels were also found on the floor of the pithouse. They also tested positive for human myoglobin (Holden 2000; Marlar et al. 2000:76).

There are five standard criteria for proposing anthropophagy at a site: "cutting, breaking, burning, missing vertebrae and hammerstone abrasion" (Turner and Turner 1992a). This evidence for excarnation and disarticulation does not prove anthropophagy when independently evaluated but when paired with the biochemical analysis of coprolites within the Colorado pithouses it offers strong support in favor of anthropophagy in Ancestral Pueblo peoples (Marlar et al. 2000:77).

Cut Marks

Cut marks are "V" or "W" shaped notches across the external surface of a bone. Multiple irregularities within the notches, due to the imperfect cutting edge of flint tools, are indications of human action as opposed to grooves or scoring produced by small carnivores. Unmodified flakes or blades made of obsidian or other very fine-grained materials produce fine, even cut marks, whereas broader and more irregular cut marks result from refined tools, especially those made of coarser-grained materials, such as limestone or quartzite (Turner and Turner 1999). To demonstrate that cut marks on a skeleton were human produced with the intent of butchering and consuming flesh rather than being related to body mutilation, torture, or warfare, bones can be compared to other preserved samples where human consumption is confirmed. However, ritualistic sacrifice performed by a practiced hand would yield different cut patterns than those of someone who was cutting for mutilation or butchering for survival. The experience of the person carving the flesh would also affect the patterns of scraping and cutting left on the bone. For example, evidence of confirmed anthropophagy in the caves of Great Britain suggest the act was a ritual, perhaps to dispose of dead bodies and sanctify those who had passed, as the cut marks on the bones found were wider, deeper, and closer together than those from stripping flesh from the bone (Yin 2017). Yet, this is all speculation Without a detailed ethnographic record and accurate account of history with the Great Britain study it is difficult to place certain markers with their specific form of autosarcophagy.

Alferd Packer, also known as the "Colorado cannibal", reportedly killed and cannibalized five traveling companions during the nineteenth-century gold rush in order to survive (Curry 2002; Starrs 1990). The bones of the victims were excavated and analyzed to create a model of the kinds of damage that resulted from a documented case of survival anthropophagy. Within the Packer bone assemblage, it was found that cut marks appeared on 95 percent of long bones at the distal (towards the torso) and proximal (away from the torso) ends of the shaft. These are the areas that contain the bulk of muscle and tendon attachments. This indicates the cuts were being made to efficiently remove flesh from bone without disarticulating the limbs. Cuts made for disarticulation tend to be exclusively located on the epiphyses (the end of the long bone). Along with the cut marks found on long bones, most of the other cut marks on the axial skeleton occurred at the location of the largest muscle attachments, which would be consistent with the expectations for most efficient nutrient consumption.

A related study of the same bones also showed that there were no cut markings on the "small bones of the hands or feet, or on the head" (Rautman and Fenton 2005). In a case of survival this would be expected, as there is not much edible flesh to be derived from these areas. Evidence such as that collected at Cave Site 7 in Utah, where cut marks were located primarily on the face and skull, is often attributed to warfare and mutilation as opposed to anthropophagy (Turner and Turner 1999). In addition, data show that the bones were cut in small parallel lines from indiscriminate angles and at different times due to "as needed" carving that demonstrates that a tremendous amount of body processing can be related to survival anthropophagy.

There are some interesting points of comparison between the commonly cited evidence of anthropophagy in Ancestral Pueblo sites and the Packer general assembly, such as a lack of evidence of butchering for transport, and that it appears that post-mortem body processing happened on site (LeBlanc 1999:176). In both cases the site of disposal is presumed to be the kill site as well as the site of consumption. This evidence "contrasts strongly with other archaeological evidence of mass slaughter for non-human animals (such as bison), where the kill site might be far removed from the home site or sites of consumption" (Rautman and Fenton 2005:334). Another interesting point of similarity between the assemblages is that there is no "evidence of processing for drying, storage, or any form of delayed consumption or redistribution" (Rautman and Fenton 2005:335). The bodies were consumed and disposed of very quickly after slaughter, as to be expected from an "as needed" survival approach (LeBlanc 1999:176).

Fracturing

Fracturing of bone represents a multitude of causation at an archaeological site and is possibly the most difficult defensible marker of human consumption. Still, the location and nature of the fractures can be indicative of anthropophagy. An important variable collected from the Packer data was that all of the cut mark damage seemed to be done to "green" bone (Flinn et al. 1976). "Green" means that the cuts were made soon after death. These data are significant because while the bone is still fresh it is still malleable and easy to manipulate. It is during this time that bone might be twisted off or torn apart in an effort to remove edible marrow from within. This was observed at site 29LA4528 on Burnt Mesa in northwestern New Mexico (Flinn et al. 1976). When green bone is split it forms jagged fragments known as "greenstick splinters" that expose the marrow cavities so that the protein-rich marrow within may be more easily extracted. Anvil and hammer abrasions on bone indicate precisely what the name implies; a hammer or a similar tool was used to

split the bone open or to shatter it so that the marrow and grease within could be extracted for consumption or fuel. As such, this only indicates anthropophagy when the abrasions are on marrow-rich bone. For instance, if fracturing or shattering of the scapula were observed, then it would not necessarily imply marrow extraction or anthropophagy, as the scapula is not a rich marrow source. There are many other natural causes of bone fracturing and splintering that do not involve human interaction, such as "butterfly breaks, spiral fractures, and longitudinal splintering" (Flinn et al. 1976:309). When these types of breaks are evident they can be difficult to discern from anvil abrasions, and "taphonomic models of animal modification and careful scene reconstructions" become necessary (Flinn et al. 1976:312).

Another prominent form of fracturing is skull breakage. The human brain is quite nutritious for fat and proteins and smashing the skull open is a way to get to the brain and the marrow within (Yin 2017). Such damage is observed not only at Ancestral Pueblo sites but was also a part of the Packer assemblage and is a major contribution to the evidence that Neanderthals in southern Spain also consumed human flesh (Flinn et al. 1976; Ratuman and Fenton 2005; Yin 2017). In such cases the skull is not bludgeoned but instead is crushed and cracked. Sites in which human remains contain several bludgeoning marks with only minimal damage are more likely the result of assault without the intent to consume. It is evidence of this nature that provides a platform for anthropophagy doubters to argue that corpse mutilation and pre-mortem aggression are all reasonable explanations for fractured skeletons found at Ancestral Pueblo sites (Flinn et al. 1976). If there were only bludgeoned heads and broken arms, ribs, and legs this might very well be the case, but I suggest that the "greenstick" fractures combined with the evidence of cooking vessels and utensils near the breaks, plus the multitude of even fractures along the long bones and the crushing of skulls, points to cases of survival anthropophagy.

Bone Burning

Burning is a distinctive marker of anthropophagy that is often overlooked or discredited by those who argue against human consumption with the Ancestral Pueblo (Turner and Turner 1992b). The arguments suggest that bones found burnt were being burned for fuel or for oil extraction, or that the bodies were accidentally placed too close to a burning fire and charred. The most common argument against burnt bone being indicative of anthropophagy is formal cremation. I suggest formal cremation is not a valid argument in this case for several reasons. First, the average wood burning fire will burn at roughly 600° C until the wood burns down to charcoal and ash, which will continue to burn at roughly 1,000° C as long as there is burnable material and sufficient oxygen. Flesh will start to burn at roughly 300° C, but bone doesn't burn until 700° C (Absolonová et al. 2012; Shipman et al. 1984). Even then, only the organic components of the bone will begin to burn and the other elements, such as crystallized minerals and salts, will remain. Calcium phosphate, the most abundant inorganic material in human bone, will remain unburned, but when heated will bind and result in calcination (Shipman et al. 1984). In order to achieve the vaporization afforded by modern cremation techniques, bodies are often burned for several hours at intense constant heat ranging from 760° C to roughly 980° C (Absolonová et al. 2012). Even after this burning process the inorganic components are still left behind and must be pulverized into a fine powder. Ancient techniques would not be nearly as advanced and more than likely would consist of placing the body on a wooden pyre (or in the case of the Ancestral Pueblo possibly into a fire or cooking pit or hearth) and burning the body until the flame went out (Absolonová et al. 2012). Likely, there would still be remains left behind. Determining whether or not burned bone fragments found at an excavation site are the remnants of a formal cremation involve examining the amount of skeleton that remains, bone density and shrinkage, the posture of the skeleton and its burial, and the color and chemical composition of the skeleton overall (Absolonová et al. 2012).

When bone is burned it will not only calcinate, but also changes color (Hunter 1948; Shipman et al. 1984). The Commission Internationale de l'Eclairage Lab (CIELAB) color scale is used to determine the degree of burned bone at crime scenes and archaeological sites (Hunter 1948). CIELAB is an advanced color coordinate system reaching into the X, Y, and Z planes that is used to quantify color on a numerical axis. Through a comparative analysis of axis values, minute spectrum changes that would not be perceivable to the naked eye are measurable. There is a macroscopic observable continuum of color variation among burned specimens that ranges from unburnt (normal colored) bones, to non-incinerated or smoked bone that shows blackening on the edges, to incompletely incinerated bone (blackened or dark brown in color), to completely incinerated or calcined bone that is usually described as bluish-white or grey in color (Shipman et al. 1984). Cremated remains from exhumed sites are classified as "incompletely incinerated" and very rarely "incinerated" due to the duration of exposure to flame (Shipman et al. 1984). Bones at excavated at Four Corners sites show a lack of calcination and only moderate burn damage. Some of the burn damage is limited to the ends of the bones where fracturing occurred, as at site 29LA4528,

where charring occurred at the marrow exposed end of the "greenstick" fragments indicating marrow extraction (Flinn et al. 1976:310). I propose this result is indicative of anthropophagy rather than formal cremation.

One would also expect that the entire body would be present as expected in a burial. Animal scavenging could cause the loss of some bone material from a site and must be taken into consideration. For example, at 29LA4528, "the sacrum, innominates, and phalange" were almost entirely absent, which might suggest scavenging (Flinn et al. 1976:310). However, the bones show a lack of incisor marks from small carnivores and the gnawing scraping patterns that would be consistent with rodent scavenging. Thus, it would seem that non-human foraging would not be an issue during analysis. Multiple bodies were found at all of the sites reviewed but none of them were complete skeletal remains and were piled together or found within midden piles. More over, the material items (jewelry, clothing, shells) that typically accompany a traditional burial were nowhere to be found. However, as previously mentioned, at the Utah site there were tools typically used for meat processing littering the ground. These tools, when tested, were positive for residue of human blood on the blades of the knives and inside the bowl of the pot (Dixon et al. 2010).

Missing vertebrae, not only at these sites but also at formalized burial sites, also suggests the activity of cooking the bones to extract marrow or grease. Those who discredit this evidence say that while it is possible that the vertebrae were removed and being boiled for their grease, this could very well have been the work of scavenging travelers instead of members of the same cohort (Flinn et al. 1976:310). Thus, it is argued that it does not necessarily imply consumption but instead utilization of an available resource.

Lastly, pot polish, while not indicative of anthropophagy exclusively, can be strong support for its performance when combined with other evidence, such as multiple long bone fracturing, anvil abrasions, and cut markings (White 1992). Pot polish occurs when bone is rubbed repeatedly against a smooth hard surface, as it would be if it were in a pot being stirred as it cooked. Long bones would be fractured into smaller pieces, smashed up, and placed in pots to boil in order to extract marrow and grease. The outcome is that the bones have smoother surfaces than normal and when observed under a magnification the fractured ends appear to be shiny and opalescent. It is important to note that pot polish may be caused by a number of post-excavation factors including bone cleaning, transport, and processing.

Ethnographic Data

Ethnography is the systematic study of people and cultures. It is designed to explore cultural phenomena where the researcher observes society from the point of view of the subject of the study using participant observation. The use of historic and ethnographic records is also important in the field of anthropophagy (Conklin 1995). The specific history of the Four Corners region in this case constitutes both the history of the Ancestral Pueblo and also of the Spanish conquistadors who later came to the region in the sixteenth century. It is difficult to find ethnographic sources for the Ancestral Pueblo, as their history was largely based on oral tradition, although some symbolic writing forms exist. For example, there were petroglyphs and pictographs found in homes and carved on the side of intact vessels. The ethnographic record for the Four Corners region contains evidence of anthropophagy where "Yavapai [war parties] slew prisoner, burned bodies; on rare occasions ate some of [the] flesh; boasted of this at next and with the enemy. Yavapai informant said Walapai did likewise" (Gifford 1936:304). Additionally, ethnography documents that the Yavapai kidnapped the wife of a Walapai leader and "assembled the people, killed the woman, and cooked and ate her. Each man, woman, and child was given a piece of the flesh. Many ate it; some pretended and then threw it away" (Gifford 1936:326).

Contemporary written works are recollections of present day Pueblo peoples based on either direct or indirect accounts or as the source of an interview. Historians have often sensationalized the "disappearance" of the Ancestral Pueblo in the fourteenth century (Bernardini 2008). Modern day Pueblo assert that they did not vanish, but simply migrated "to areas in the southwest with more favorable rainfall and dependable streams" (Bernardini 2008). Migration is plausible, and the drought event is archaeologically defensible. The Ancestral Pueblo built a massive road system budding out of the Chaco region whose uses are hypothesized to have been agricultural cycling, solstice marking, and possibly astrological observation (Bernardini 2008; Lekson 2015). While anthropophagy is not recorded as being nutritionally or ritualistically important in the quotidian history of the Ancestral Pueblo, it is important to note that consuming the human flesh was an important rite of passage for witches (Darling 1998). For example, to maintain their life on the material plane they had to steal the life essence or breath from living humans. The rite of initiation for a witch in Ancestral Pueblo culture involved the ritualistic sacrifice, the use of contagious magic, and the consumption of a symbolic "deer" (someone close to the initiate). When witches perished they would be placed in deep graves and their bodies pulverized with large stones to prevent their return to the living world as an animal (Darling 1998). Thus, anthropophagy and other related behaviors such as necrophilia were avoided and punished.

Records of Spanish conquistadors indicate anthropophagy was being observed when they first arrived to Pueblo villages in the 1500s (Willey 1996:217). It is important to acknowledge that the Spanish conquistadors were bringing their own views onto a foreign land. They were exploring for the "Three Gs" (God, Gold, and Glory) and hoping to expand their nation's foothold in the New World. Given the desire to convert Native inhabitants, it is entirely possible that they exaggerated or sensationalized their observations in their reports related to witchcraft and its practice. Perhaps they were coming from previously explored Mesoamerica and were conflating their observations of those cultures with those of the Ancestral Pueblo. It is also possible that they fabricated their stories in an attempt to receive more glory or support from the Spanish Crown.

However, these suggestions are limiting. A similar instance happened during the debate of anthropophagy being ritual practice for Ancient Xiximes, the Aztecs, and the Mayans in Mesoamerica (Carrasco 1995). Present day Mexican archaeologists and anthropologists were disputing the evidence of ritual anthropophagy until biochemical findings similar to those unearthed in Utah were presented. These data supported the arguments for those in support of ritual anthropophagy among Ancestral Mesoamericans (Kidder 1960; Plog 1979; Willey 1966).

Interpretation and Conclusions

I theorize that a perfect storm of inhospitable environmental conditions brought on by a prolonged drought and invading people forced a mass migration of the Ancestral Pueblo from their established villages and settlements. Those who could not move or who did not move far enough to escape the environmental and social pressures were faced with starvation. Those who wished to survive pursued endoanthropophagy as a means of survival. I believe anthropophagy was only practiced among members of the same community because the bodies found at multiple sites included those of men, women, and children (Flinn 1976:310; Marlar 2000:76). The raiding parties would have consisted of only males. If the Ancestral Pueblo had been consuming the bodies of slain invaders this would have been reflected in the bones found in the refuse piles at the excavation sites.

The combined biochemical, archaeological, and ethnographic data all show evidence of anthropophagy by the Ancestral Pueblo. Taphonomic data such as fracturing before cooking, multiple small parallel cut marks along long bones, skull damage, "greensplint" fracturing, and intensive body processing at the kill site appears to be the same as the processing and consumption documented elsewhere (Curry 2002; Starrs 1990) and suggests survival based butchering, processing, and consumption. That there is no means of preservation or transport on site, the biochemical evidence of human blood residue on cooking and butchering utensils, and myoglobin in the coprolite are all indicative of survival being the reason for anthropophagy.

Furthermore, a recent paper about anthropophagy in Mesoamerica proposes an alternate catalyst and cause for human consumption that is potentially applicable to the Ancestral Pueblo (Ernandes et al. 2002). It has been shown that maize consumption can lead to serotonin deficiencies that in turn could lead to "neurobehavioral after-effects" such as aggression and "religious/ideological fanaticism" (Ernandes et al. 2002:7). This, combined with the stipulation that during times of severe stress, such as those that cause the migration and anthropophagy among the Ancestral Pueblo, led to increased instances of accused witchcraft (Darling 1998). This could be an example of an increase in religious fanaticism. It is also possible that the mythology behind witchcraft, when combined with the low serotonin levels and the stress of the failing environment, proved to be a catalyst for anthropophagy instead of a deterrent.

The forensic, archaeological, and historic evidence for anthropophagy on the whole supports that anthropophagy was practiced at sites in Colorado and New Mexico (Flinn et al. 1976; Marlar et al. 2000). The most undeniable evidence, to me, was the biochemical analysis of fecal matter found in a refuse pile at one of the villages (Marlar et al. 2000:75). The fact that myoglobin was found in coprolite in amounts that were detectable through forensic analysis indicates without a doubt that anthropophagy was occurring. While historic ethnographic evidence is questionable, the records from Spanish conquistadors document isolated cases of anthropophagy among the people in the areas in which they were expanding. It is still important to question the validity of these resources, as the Spanish were traveling north from Mesoamerica where such practices were indulged and frequent. Despite the differences in social structure, architecture, dress, agriculture, and religious practice, it is possible that the Spaniards somehow managed to meld the two cultures together. It is also possible that it was all fabricated in an attempt to incite interest or outrage in Spain so that further exploration was warranted and financially supported. Even if the accounts are truly accurate and they were in fact witnessing some sort of anthropophagy among Ancestral Pueblo, it is important to remember the views of Franz Boas and understand that these newcomers were more than likely not approaching this new culture with an attitude of understanding and curiosity, but rather one of superiority, righteousness, ethnocentrism, and a lack of cultural relativism. Thus, their observations more than likely exhibit a heavy bias.

It is crucial to remember the issues set forth by Boas about an ethnocentric approach to anthropology. There is a particular need for meticulousness and sensitivity in this case because while the Basket Maker and Pre-Pueblo cultural expressions are no longer practiced, their modern day descendants, the Pueblo peoples who still live in the Four Corners region, are very much a thriving and rich Native culture. Modern Western culture as it stands tends to see human consumption only as cannibalism, an act of violence, and gore that usually has a deviant cause or intent. It would be wholly incorrect to apply this kind of thinking to the anthropophagy performed by the Ancestral Pueblo. If not only because one must be cautious when applying methodological, cognitive, and ethical or moral relativism to outside cultures in an attempt to better understand the behaviors and traditions performed therein, but also because time has come to taint essence of what is being studied perhaps more than the action was when it was being practiced presumably for survival by the Ancestral Pueblo.

In closing, the events leading up to the practice of anthropophagy discussed herein suggest that agriculture was booming for the Ancestral Pueblo, so much so that they had developed complex watering systems to support their crops. I speculate that the irrigation methods were put in place not to maintain a fully functioning system, but to help revive one that was already beginning to suffer the damaging effects of soil erosion and environmental change. A boom in agricultural production suggests that they would have had enough to start storing surplus in their outdoor storage that became popular as the architectural style shifted. It is then possible that as nomadic tribes passed through the lands of the Ancestral Pueblo that they would take advantage of this unguarded stock and take what they could while migrating between hunting grounds. If this parasitic drain happened at precisely the right time then it could have forced the now resource-poor Ancestral Pueblo to leave in a great migration, as documented in their oral traditions, and that those who could not leave or who could not get far enough away from the draining influence to escape its effects, might have been forced into endoanthropophagy as a survival practice.

References Cited

Abler, Thomas S.
1992 Scalping, Torture, Cannibalism and Rape: An Ethnohistorical Analysis of Conflicting Cultural Values in War. *Anthropologica* 34(1):3-20.

Absolonová, Karolína, Miluše Dobisíková, Michal Beran, Jarmila Zocová, and Petr Velemínský
2012 The temperature of cremation and its effect on the microstructure of the human rib compact bone. *Anthropologischer Anzeiger* 69(4):439-460.

Bernardini, Wesley
2008 Identity as History: Hopi Clans and the Curation of Oral Tradition. *Journal of Anthropological Research* 64(4):483-509.

Boas, Franz
1920 Methods of Ethnology. *American Anthropologist* 22(4):311-321.

Brown, Michael F.
2008 Cultural Relativism 2.0. *Current Anthropology* 49(3):363-383.

Bullock, Peter Y.
1991 A Reappraisal of Anasazi Cannibalism *Kiva* 57(1):5-16.

1992 A Return to The Subject of Cannibalism. *Kiva* 58(2):203-205.

Burhenn, Herbert
2004 Understanding Aztec Cannibalism. *Archive for the Psychology of Religion* 26:1-14.

Campbell, Gwyn
2013 Eating the dead in Madagascar. *South African Medical Journal Suid-Afrikaanse Tydskrif Vir Geneeskunde* 103(12):1032-1034.

Carrasco, David
1995 Cosmic Jaws: We Eat the Gods and the Gods Eat Us. *Journal of the American Academy of Religion* 63(3):429-463.

Conklin, Beth A.
1995 Thus are our bodies, thus was our custom. *American Ethnologist* 22(1):75-102.

Curry, Andrew
2002 Case of the Colorado Cannibal. *Archaeology* May-June: 50-53.

Darling, Andrew J.
1998 Mass Inhumation and the Execution of Witches in the American Southwest. American *Anthropologist* 100(3):732-752.

Diehl, Daniel and Mark P. Donnelly
2006 *Eat Thy Neighbour: A History of Cannibalism*. Sutton Publishing

Denton, Derek
1984 *The hunger for salt: an anthropological, physiological and medical analysis*. Springer, Berlin.

Dixon, Kelly, Shannon Novak, Gwen Robbins, Julie Schablitsky, G. Richard Scott, and Guy Tasa
2010 "Men, Women, and Children Starving": Archaeology of the Donner Family Camp. *American Antiquity* 75(3): 627-656.

Dolan, Maria.
2012 "The Gruesome History of Eating Corpses as Medicine." Smithsonian. https://www.smithsonianmag.com/history/the-gruesome-history-of-eating-corpses-as-medicine-82360284/

Ernandes Michele, Rita Cedrini, and Marco Giammanco
2002 Aztec cannibalism and maize consumption: The serotonin deficiency link. *The mankind quarterly* 43(1):3-40.

Flinn, Lynn, Christy G. Turner II, and Alan Brew
1976 Additional Evidence for Cannibalism in the Southwest: The Case of LA 4528. *American Antiquity* 41(3):308-318.

Gardner, Don
1993 Anthropophagy, Myth, and the Subtle Ways of Ethnocentrism. In *The Anthropology of Cannibalism*, edited by Laurence R. Goldman, pp. 27-50. Praeger Press.

Gifford, Edward W.
1936 Northeastern and Western Yavapai. University of California *Publications in American Archaeology and Ethnology* 34(4):247-354.

Gordon-Grube, K.
1993 Evidence of medicinal cannibalism in puritan New England: 'Mummy' and related remedies in Edward. *Early American Literature* 28(3):185.

Grayson, Donald K.
1990 Donner Party Deaths: A Demographic Assessment. *Journal of Anthropological Research* 46(3): 223-242.

Handler, Richard
1986 Of Cannibals and Custom: Montaigne's Cultural Relativism. *Anthropology Today* 2(5):12-14.

Herskovits, Melville J., and Frances Herskovits
1973 *Cultural relativism: perspectives in cultural pluralism*. Vintage Books, New York.

Holden Constance
2000 Cannibalism. Molecule Shows Anasazi Ate their Enemies. *Science* 289(5485):1663.

Hunter, Richard S.
1948 Photoelectric Color Difference Meter. *Journal of the Optical Society of America* 38(7):985.

Kantner John
1999 Survival Cannibalism or sociopolitical intimidation? *Human Nature* 10(1):1-50.

Kidder, Alfred Vincent
1960 Southwestern Archaeology: Conclusions. In *The Golden Age of American Anthropology.* edited by Margaret Mead and Ruth Leah Bunzel, pp. 279-296. G. Braziller, New York.

King, Richard C.
2000 The (Mis)Uses of Cannibalism in Contemporary Cultural Critique. *Diacritics* 30(1):106-123.

LeBlanc, Stephen A.
1999 *Prehistoric Warfare in the American Southwest*. University of Utah Press.

Lekson, Stephen H.
2015 *The Chaco Meridian: One Thousand Years of Political and Religious Power in the Ancient Southwest*. Second Edition. Rowman & Littlefield.

Lester, David, John White, and Brandi Giordano
2015 Cannibalism. *Omega* 70(40):428-435.

Marlar, Richard, Leonard Banks, Brian Billman, Patricia Lambert, and Jennifer E. Marlar
2000 Biochemical evidence of cannibalism at a prehistoric Puebloan site in southwestern Colorado. *Nature* 407(6800):74-78.

Marriner, Brian
1997 *Cannibalism: the last taboo!*. Diane Pub Co, London.

McGlashan, Charles Fayette
1947 *History of the Donner Party: A Tragedy of the Sierra*. Stanford University Press.

Monasterio, Eric, and Craig Prince
2011 Self-cannibalism in the absence of psychosis and substance use. *Australian Psychiatry* 19(2):170-72.

Plog, Fred
1979 Prehistory: Western Anasazi. *Handbook of North American Indians*. Smithsonian Institution, Washington, D.C.

Pottier, Johan
2007 Rights, relations, rumor, and rhetoric: making sense of cannibalism in Mambasa, Ituri (Democratic Republic of Congo). *Journal of The Royal Anthropological Institute* 13(4):825-843.

Rautman, Alison E., and Todd W. Fenton.
2005 A Case of Historic Cannibalism in the American West: Implications for Southwestern Archaeology. *American Antiquity* 70(2):321-341.

Rhodes, Richard
1998 *Deadly feasts: tracking the secrets of a terrifying new plague*. Touchstone, London.

Shipman, Pat, Giraud Foster, and Margaret Schoeninger
1984 Burnt bones and teeth: an experimental study of color, morphology, crystal structure and shrinkage. Journal of Archaeological *Science* 11(4): 307-325.

Starrs, James
1990 Why Alferd Packer? The Causes for the Dig Fever. American *Academy of Forensic Sciences Publication* 90:99.

Steverlynck, Astrid
2008 Cannibals, Amazons, and Social Reproduction in Amazonia. Tipití: *Journal of the Society for the Anthropology of Lowland South America* 6(1):51-78.

Sugg, Richard
2006 'Good Physic but Bad Food'. Early Modern Attitudes to Medicinal Cannibalism and its Suppliers. *Social History Of Medicine* 19(2):225-240.

Turner, Christy, and Jacqueline A. Turner
1992a The First claim for cannibalism in the Southwest: Walter Hough's 1901 discovery at Canyon Butte Ruin 3, northeastern Arizona. *American Antiquity* 57:661-682.

1992b On Peter Y. Bullock's A Reappraisal of Anasazi Cannibalism *Kiva* 58(2):189-2.

1999 *Man Corn: Cannibalism and Violence in the Prehistoric American Southwest*. Salt Lake City: U. of Utah Press.

White, Tim D
1992 *Prehistoric Cannibalism at Mancos 5MTUMR-2346*. Princeton University Press, Princeton.

Willey, Gordon R.
1966 *An Introduction to American Archaeology.* Prentice-Hall, Englewood Cliffs, New Jersey.

Winkelman, Michael
2014 Political and Demographic-Ecological Determinants of Institutionalized Human Sacrifice. *Anthropological Forum* 24(1):47-70.

Witze, Alexandra
2001 Researchers Divided Over Whether Anasazi Were Cannibals. National Geographic News. https://news.nationalgeographic.com/news/2001/06/0601_wireanasazi.html

Xiaotong, Fei
2000 Anthropology as an Interdisciplinary Field. Chinese *Sociology & Anthropology* 33(1):20–24.

Xiaorong, Li
2007 A Cultural Critique of Cultural Relativism. American *Journal of Economics and Sociology* 66(1): 151-171.

Yin, Steph
2017 Bones Marks Suggest a Cannibal Ritual in Ancient Britain. *New York Times*, August 10.

The Use of Remote Sensing at Camp Halsey

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Introduction

On May 14, 2018, undergraduate students of the first archaeological field school offered at the University of Central Arkansas (UCA) began their work at Camp Halsey. Located approximately one mile east of Woolly Hollow State Park in Faulkner County, Camp Halsey is known as archaeological site number 3FA313 (Figure 1). The camp was created as a Soil Conservation Corps (SCS) camp in 1934, which was a branch of the Civilian Conservation Corps (CCC) (McKinnon et al. 2018). In this paper, through comparative analysis, we note some of the benefits of using remote sensing at Camp Halsey, the role this technology played in surveying portions of the site, our field methods, and preliminary interpretations of data gathered.

The various types of remote sensing open a window into the past, providing us with a new perspective and information. The use of remote sensing at archaeological sites offers a perspective of data that would have remained otherwise undocumented (Johnson 2006; McKinnon and Haley 2017). For example, located only three kilometers away from Stonehenge is Durrington Walls. Durrington Walls contains 90 buried stones with some reaching four and a half meters in height. The site had previously only been recorded as a walled enclosure and remained undocumented for many years before remote sensing surveys were conducted (Neubauer et al. 2017). Data collected from Durrington revealed that mapping of the buried stones would not have been possible without the technological advances that the use of remote sensing has brought to the science of archaeological research.

Figure 1. Current aerial photograph of Camp Halsey from Google Maps.

Another example is at Chetro Ketl in Chaco Canyon where archaeologists used a combination of ground-penetrating radar (GPR), a time series of historical aerial photography, and a real-time kinematic global navigation satellite system (RTK GNSS) to map and survey the site. By using GPR, archaeologists at Chaco Canyon were able to identify numerous shallow buried, long, and linear features (Sturm 2018). An RTK GNSS was used to correlate data collected from the GPR survey with the historical aerial photographs in order to analyze and interpret landscape change over time. Using a depth analysis, three distinct categories of linear features were identified and interpreted from the GPR maps. Likewise, it was discovered that there were basin-like circular features that appeared primarily at depths ranging from 10-50 cm. Although the analysis of the research was somewhat inconclusive, the discovery of these features was paramount in expanding the knowledge that archaeologists have about Chetro Ketl. Furthermore, these subsurface features could not have been discovered without the use of remote sensing.

Camp Halsey

Camp Halsey was first established in 1934 as a response to widespread erosion due to the overuse and poor management of agricultural lands during and after the Great Depression. To remedy this environmental catastrophe and the deterioration of natural resources, the US Government established the CCC. One focus of the CCC was the creation of the SCS, where one or more SCS camps were established to provide participating local farmers with additional labor. The enrollees of the camps were trained in a variety of natural resource management skills related to landscape

terracing, constructing wind fences, laying sod in pastures, controlling wash-outs and gullies, and seeding fields to promote growth (McCarty 1977; McKinnon 2018). Between 1934 and 1939, Camp Halsey was occupied two separate times. The first occupation was as an SCS camp between the years of 1934-1935. In 1937, the camp was occupied again and converted into a forestry camp, which closed in 1939. Not long after the final occupation, the lease on the land expired and the buildings were then dismantled and removed (McKinnon 2018). Though the occupation of Camp Halsey was short lived, the work that the camp enrollees completed in the local areas and works accomplished throughout Arkansas by neighboring camps proved crucial in re-establishing economic and environmental stability to the Natural State.

All that remains at Camp Halsey today are some foundations, a large chimney from the recreation hall, and a message board. Records document that the camp included a multitude of structures, such as a latrine and bathhouse, nine barracks, mess hall and kitchen addition, hospital, headquarters and supply building, officer's quarters, foreman quarters, a recreation hall, and an army garage (Office of the Chief of Engineers, Civilian Conservation Corps [OCE, CCC] 1939). Also evident on the landscape are numerous terraces that were created by the enrollees of Camp Halsey for soil management in order to conserve water run-off and manage erosion. This area served as our main focus when using remote sensing equipment (see Figure 1).

Instrumentation

We used two instruments to collect data at Camp Halsey. These included a Topcon total station and a Bartington magnetic gradiometer. A total station is a modern surveying instrument that collects vector data as a representation of the world using lines and points and helps to establish a site grid. It is a survey instrument with a telescope called a theodolite to measure horizontal and vertical planes simultaneously and is mounted on a tripod stand (Jurovich Surveying 2018). A total station uses a prism in order to calculate distance where the theodolite emits a low intensity laser beam towards the prism. The time in which it takes for the beam to reach the prism and travel back to the theodolite is then calculated as the distance. When the user is satisfied with the calculation, collected data can then be stored as a vector point with three values (x, y, z). Once the precise locations of the desired data points are collected and saved they are downloaded and converted to create a shapefile that can be imported into ArcGIS to create a map. Once the map is created, additional data can be overlain with other datasets. These layers can be examined to evaluate spatial relationships between major features (Neubauer 2004).

A magnetic gradiometer measures the changes in magnetic frequencies that occur within the soil (Bartington and Chapman 2004). These frequencies are measured in what is known as nanoteslas (nT), which occur naturally at approximately 50,000 nT. This means that any deviation in the magnetic frequency could be a possible archaeological feature or concentration of artifacts (Kvamme 2006). Magnetometry is a method that uses a variety of natural (magnetic susceptibility) and cultural (thermoremnant) processes in order to combine numerous magnetic variations that point to subsurface features making it one of the most productive prospecting methods in archaeology (Johnson 2006; Kvamme 2006).

Methodology

Field work began at Camp Halsey on Thursday, May 10, 2018 to prepare the site for remote sensing data collection and establish a site grid for magnetic gradiometry data collection on the following Monday. The very first step in creating a site grid requires the use of a total station and the establishment of a site datum. The main visible feature at Camp Halsey is the message board (architectural Feature 2), which is believed to be near the old road called Front Street. The message board was used as a reference to establish a datum and begin to measure the location of other visible and potential features. In order to set up the total station, the tripod was first placed where Datum A was established, which was 1.5 m east of the southeast corner of the message board. The total station was then mounted atop the tripod stand and secured lightly. Balance wheels were used to balance the bullseye bubble level and then to balance the bubble level above the keypad at 360 degrees. Once the datum and grid north were established a site grid was created. A site grid provides spatial provenience for any structure or artifact found at the site. Datum A was established arbitrarily as Northing (N) 5000 m, Easting (E) 5000 m, and Elevation (Z) 500 m. From the established datum, 20 x 20 m geophysical grids were setup and additional topographic data were collected.

To setup the magnetic gradiometer, two poles containing sensors were attached to both ends of the data logger. After doing a process of individual scanning to ensure that operators were metal free, the chosen operator attached the harness and calibrated the instrument to zero. When the instrument was calibrated, non-metallic tapes were situated along established north-south baselines with a mobile meter tape situated perpendicular to the north-south baselines. These served as transect guidelines. The operator then walked the length of each transect on the left-hand side of the tape where the left sensor recorded transect data at 0.25 meters and the right sensor recorded transect data at

1.25 meters. At the end of the transect this process was repeated heading south. This is known as a zig-zag pattern (Figure 2). The process was continued with transects spaced at 50 cm and 12.5 cm spacing along each transect. The area surveyed totaled 3,200 square meters (0.79 square acres) (Figure 3).

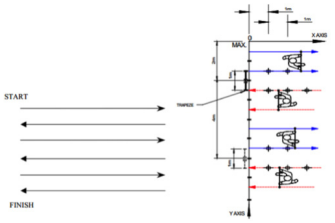

Figure 2. Illustrations of the zigzag pattern utilized in collection of magnetic gradiometer data (Bartington Instruments Ltd, 2018).

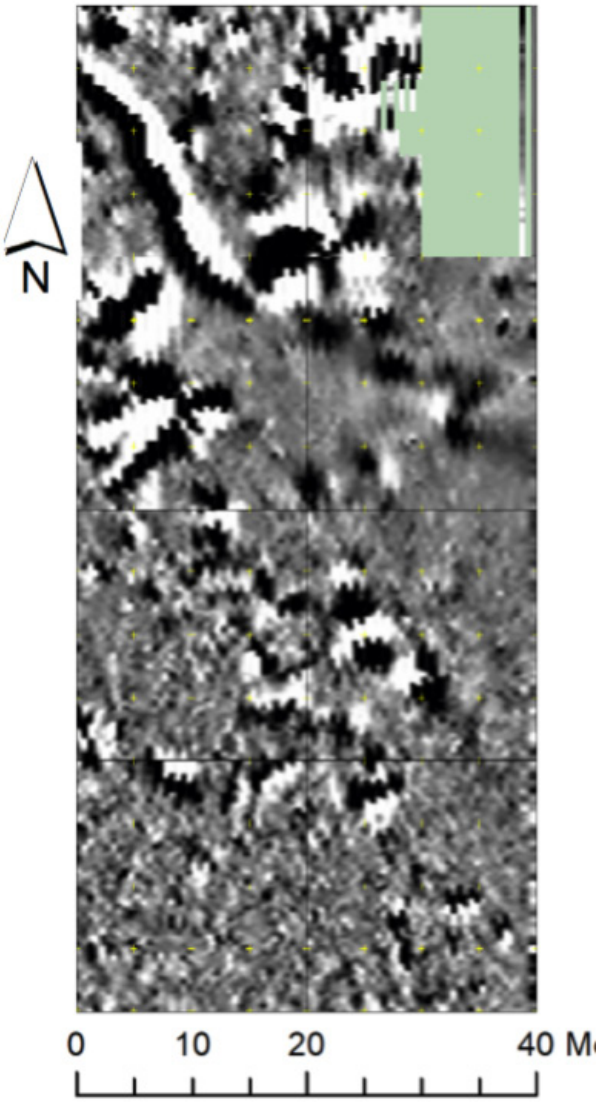

Figure 3. Magnetic gradiometer data map.

Data sets from both the total station and the magnetic gradiometer were downloaded in the archaeology lab at UCA to combine the data and map the landscape subsurface features (magnetic data) and the surface features (total station data) (Figure 4). This information was used to determine locations for additional testing through the use of shovel tests in order to "ground truth" anomalies in the magnedtic gradiometry data (Hargrave 2006). After analyzing the numerous magnetic anomalies displayed within the map, shovel tests (ST) were dug across a very large subsurface anomaly that bisects the former proposed location of Front Street (Figure 5). Six holes were dug, each at a depth of 50 cm and a diameter of approximately 15-20 cm.

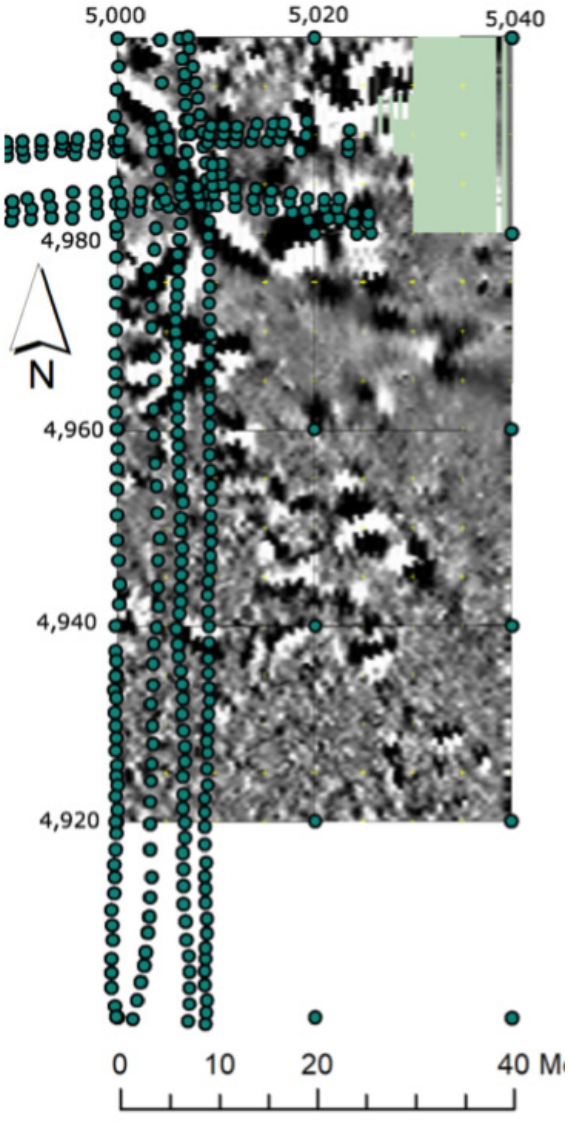

Figure 4. Total station data overlay on magnetic gradiometer data.

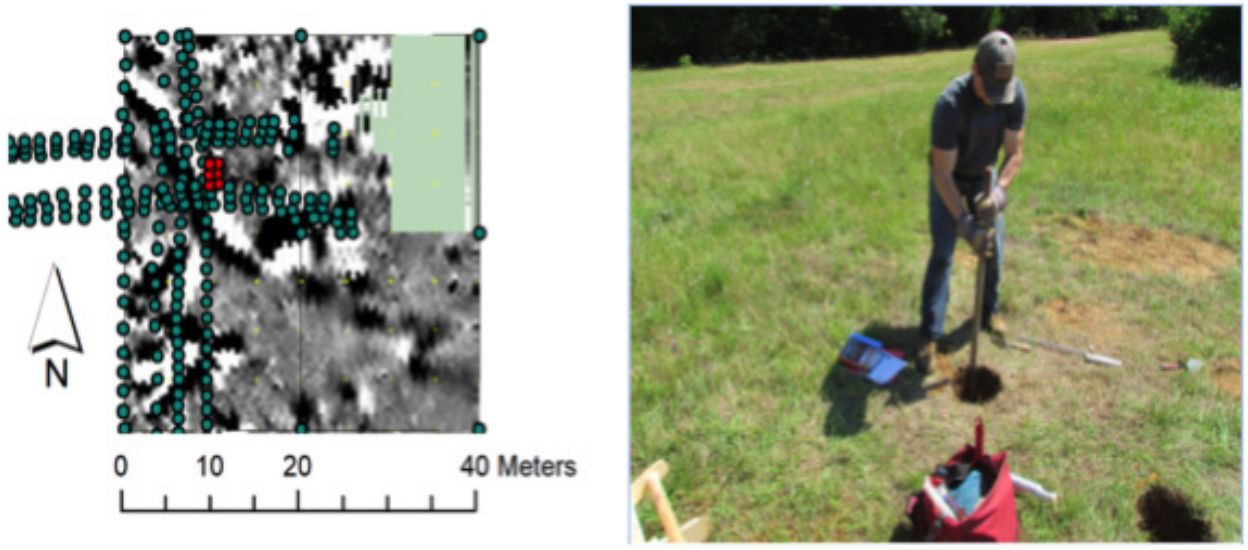

Figure 5. Shovel test locations noted in red on cropped data map(left), conducting shovel test (right).

Arbitrary 10 cm horizons were used and soil color was recorded using a Munsell book (Table 1). The Munsell soil color system is used to describe soil coloration by recording hue (color), value (lightness and darkness) and chroma (color intensity) (United States Department of Agriculture [USDA] 2000). The first 10 cm of every shovel test contained a layer of shale (see Table 1). Shale was a common constituent of roads and walkways within the CCC camps and the shale from the shovel tests likely represents material from Front Street. In addition to shale, bits of charcoal were recorded in deeper horizons of the shovel test holes. For example, in ST1 and ST2, charcoal was located 50 cm deep. In ST3, ST5, and ST6, the charcoal was located from 20 cm to 50 cm. However, in ST4 there was no charcoal identified (see Table 1). The presence of charcoal is undetermined at this time and requires further analysis of the surrounding area.

Shovel Test	ST1	ST2	ST3	ST4	ST5	ST6
10 cm	Dirt -Brown (10YR 3/5) Shale	Dirt- Brown (10YR 5/4) Shale	Dirt- Brown (10YR 4/4) Shale	Wet dirt - Brown (10YR 3/4) Heavy Shale	Wet dirt - Brown (10YR 4/4) Heavy Shale	Dirt - Brown (10YR 4/6) Heavy Shale
20 cm	Dirt- Brown (10YR 4/4) Sandstone present	Dirt - Light brown (10YR 4/6) Shale	Sandy - Brown (10YR 4/6) Charcoal	Sandy - Tan (10YR 4/6) Shale, Red sandstone	Crumbly - Brown (10YR 4/6) Charcoal	Dirt -Dark Yellow Brown (10YR 4/6) Charcoal
30 cm	Sandy- Light brown (10YR 5/4) Charcoal	Dirt - Light brown (10YR 4/4) Shale	Dirt - Brown (10YR 4/4) Charcoal	Dense clay - Tan (10YR 4/6) Shale	Sandy - Tan (10YR 3/6) Charcoal	Dirt - Yellow Brown (10YR 5/6) Charcoal
40 cm	Sandy - Light brown (10YR 4/6) Charcoal	Clay - Light brown (10YR 3/6) Charcoal in profile	Dirt - Brown (10YR 4/6) Charcoal	Clay - Tan (10YR 5/8) Shale	Clay - Brown (10YR 3/6) Charcoal	Dirt - Yellow Brown (10YR 5/8) Shale and Sandstone
50 cm	Sandy/Muddy - brown (10YR 5/6)	Clay- Light brown (10YR 4/6) Charcoal	Clay - Brown (10YR 4/6)	Clay - Brown (10YR 5/6) Shale	Clay - Brown (10YR 4/6)	Clay - Dark Yellow (10YR 4/6)

Table 1. Shovel test data.

Data Interpretation

Data recovered from both the total station and the magnetic gradiometer can be used to create a visual representation of the potential location of artifacts and features. The total station gave an exact grid location of a feature and allowed for an analysis of the spatial relationships between features. At Camp Halsey, magnetic gradiometer data reveal several magnetic anomalies within the site grid survey area. However, it is currently unknown as to what these anomalies represent. Although shale and charcoal were documented in the shovel tests, shovel test data were not mapped to the precise locations of the anomalies. This is most likely due to the fact that total station grid data was not used prior to conducting the shovel testing. The total station grid combined with the magnetic map would have provided a more accurate set of coordinates for the location of the magnetic anomalies. The final total station overlay on the magnetic map demonstrates that the placement of shovel tests was approximately 15 cm outside of the magnetic anomaly that was being tested (see Figure 5).

With the shovel tests there is supporting evidence of the location of Front Street with the presence of shale in the first 10 cm of every shovel test. The map created by the magnetic gradiometer reveals many anomalies of interest. For example, a long, linear magnetic anomaly the northwest corner is speculated to be a possible drainage pipe running beneath the road (Figure 6). However, this claim remains undetermined due to a lack of spatial control of the shovel tests. Given

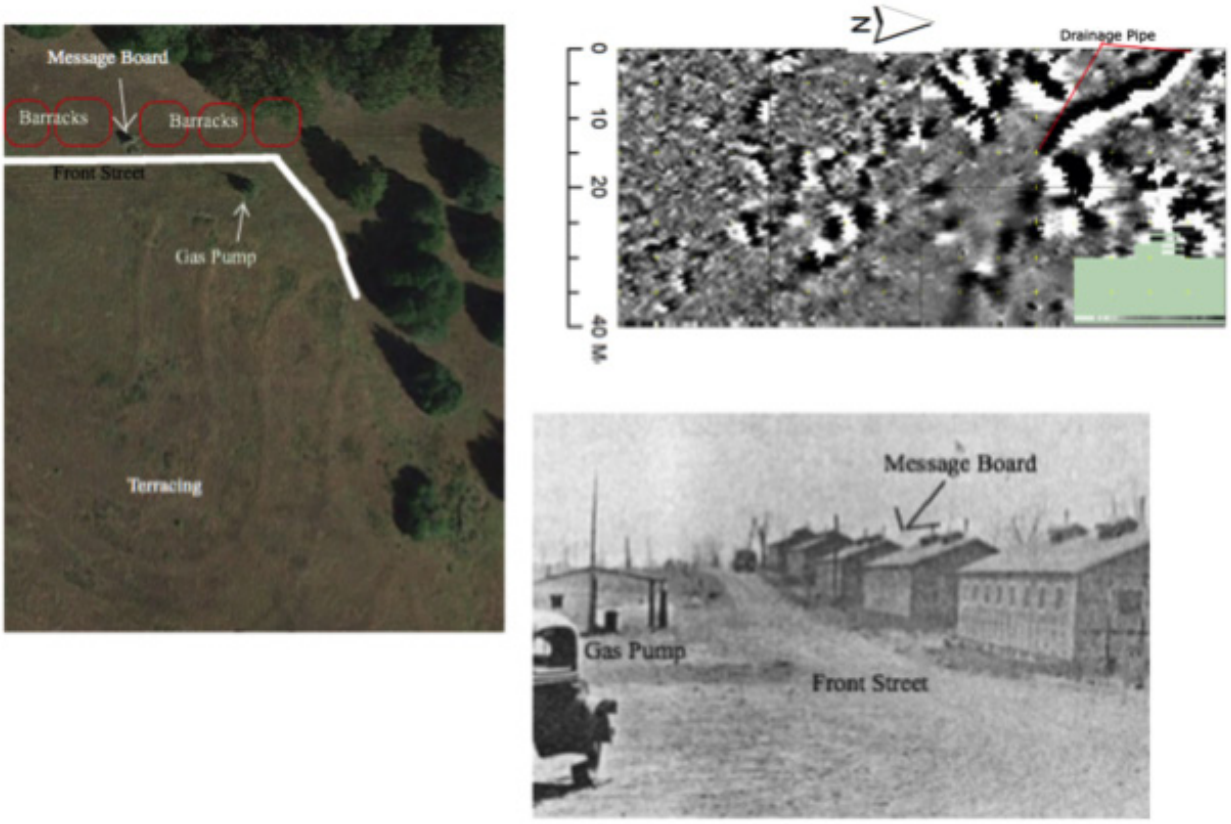

Figure 6. Interpretation of locations of Front Street, and gas pump (left), historical image of Camp Halsey (lower right), drainage pipe as seen on magnetic map (upper right).

its size and proximity to the road, it could also represent a form of drainage, such as a culvert, that is filled with metal debris.

A second anomaly is located close to a brush covered area near the message board. When paired with an early historical photo of the camp, what appears to be a gas pump can be seen south of the barracks and Front Street (see Figure 6). Today, within that approximate location there is overgrowth of brush and a tree. This might indicate that a structure of some kind was there which prevented clearing of that area. Many of the visible features within the camp are located in overgrown areas today.

Another interpretation of an anomaly seen in the magnetic gradiometry data is located south of the possible drainage pipe. There appears to be a horseshoe pattern of ferrous material, which seem to match up with part of the terracing. This could point to the use of metallic objects within the terrace to provide structure and support when first constructed. There are a number of other anomalies as well. These subsurface disturbances may be accounted for by either natural or cultural processes. For instance, the topsoil may have become magnetically enriched as a result of natural biogenic processes (Kvamme 2006). The anomalies could also be evidence of fired material such as fired clay, pottery, or even ferrous materials.

Discussion and Conclusion

There are both positive and negative aspects when using remote sensing to survey a site. With any archaeological site, excavation is a necessity when trying to uncover the past but remote sensing can save archaeologists a lot of time as well as the cultural resources of that area (Johnson 2006). The use of excavation requires diligent effort to record when and where artifacts are found, which consumes a lot of time. With the use of remote sensing, the need for unnecessary excavation is reduced because technologies such as a magnetic gradiometer provide data on potential artifacts and features, without disturbing a site. In the case of Camp Halsey, multiple possible features were identified. One anomaly is interpreted as a possible drainage pipe below Front Street and a second as the location of the gas pump. There are some disadvantages that come with using this technology. Since magnetic gradiometers are sensitive to the presence of metallic objects, one of our grids was not completed due to the operator wearing a watch.

Another disadvantage, is that a magnetic gradiometer only measures magnetic changes in the soil up to two meters deep, so anything below that depth will likely not be recorded.

To remedy this issue and speed up the recovery of data to provide a clearer, more concise representation, different types of remote sensing equipment could be used in the future. For instance, we could pair a magnetic gradiometer with GPR and historical aerial photography. Nonetheless, given the limited amount of time and coverage area by the magnetic gradiometer, the anticipated location of Front Street was confirmed and additional anomalies recorded the possible subsurface features for future analysis. We now have an idea of where the gas pump and drainage pipe are possibly located. Also, the magnetic data map provides us with an idea of the materials possibly used to construct the terraces. Our data confirmed previous assumptions before entering the field and provided information on land formation processes. It has given a better understanding of what may be incorporated within the site.

In closing, remote sensing is a systematic process that must be done in a particular order. Without this process much of what is presented at Camp Halsey would seem ambiguous. The use of remote sensing technologies has proved to extremely beneficial toward the archaeological process of site survey and the research at Camp Halsey.

References Cited

Bartington, Geoff and Cyril E. Chapman
2004 A High-stability Fluxgate Magnetic Gradiometer for Shallow Geophysical Survey Applications. *Archaeological Prospection* 11:19-34.

Civilian Conservation Corps
1939 Historical Record of CCC Camp Buildings. September 1934 and November 18, 1938. RG 77 Records of the Office of the Chief of Engineers, 1989-1999, NM 19 Entry 395, Historical Record of Civilian Conservation Corps Buildings. Box 13, Folder 7th Corp Area, Folder 2 of 7 (Arkansas P-75), National Archives.

Hargrave, Michael. L.
2006 Ground Truthing the Results of Geophysical Surveys. In *Remote Sensing in Archaeology, An Explicitly North American Perspective*, edited by Jay K. Johnson, pp. 269-304. University of Alabama Press, Tuscaloosa, Alabama.

Johnson, Jay K. (editor)
2006 *Remote Sensing in Archaeology: An Explicitly North American Perspective*. The University of Alabama Press, Tuscaloosa.

Jurovich Surveying
2018 What is a Total Station? Electronic document., https://www.jurovichsurveying.com.au/faq/what-is-a-total-station, accessed May 22, 2018.

Kvamme, Kenneth L.
2006 Magnetometry: Nature's Gift to Archaeology. In *Remote Sensing in Archaeology, An Explicitly North American Perspective,* edited by Jay K. Johnson, pp. 205-233. University of Alabama Press, Tuscaloosa Alabama.

McCarty, Joey
1975 Civilian Conservation Corps in Arkansas. Master's Thesis. Department of Anthropology. University of Arkansas.

McKinnon, Duncan P.
2018 Camp Halsey, http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=13348, accessed May 1, 2018.

McKinnon, Duncan P., and Bryan S. Haley (editors)
2017 *Archaeological Remote Sensing in North America: Innovative Techniques for Anthropological Applications,* edited by Duncan P. McKinnon and Bryan S. Haley. University of Alabama Press.

McKinnon, Duncan P., Lynita Langley-Ware, Wendy Plotkin, and Katelyn Trammell.
2017 The Faulkner County Survey Project: Beginning a Program of Research at Camp Halsey http://www.camphalsey.com/bibliography/mckinnon_etal_2017.pdf. Paper presented at the 2017 meeting of the Arkansas Archeological Society in Hot Springs, Arkansas.

Neubauer, Wolfgang
2004 GIS in Archaeology - the Interface between Prospection and Excavation. *Archaeological Prospection* 11:159-166.

Neubauer, Wolfgang, Vincent Gaffney, Klaus Löcker, Mario Wallner, Eamonn Baldwin, Henry Chapman, Tanja Trausmuth, Jakob Kainz, Petra Schneidhofer, Matthias Kucera, Georg Zotti, Lisa Aldrian, and Hannes Schiel
2017 Sussing out the super-henge: a multi method survey at Durrington Walls. In *AP2017. 12th International Conference of Archaeological Prospection* edited by Benjamin Jennings, Christopher Gaffney, Thomas Sparrow, and Sue Gaffney, pp. 166–168. Archaeopress Publishing Ltd., Oxford

Sturm, Jennie O.
2018 A Remote Sensing Approach to Studying Land Use Change in Chaco Canyon, New Mexico. In *Archaeological Remote Sensing in North America: Innovative Techniques for Anthropological Applications,* edited by Duncan P. McKinnon and Bryan S. Haley, pp 83-94. The University of Alabama Press, Tuscaloosa.

United States Department of Agriculture.
2000 The Color of Soil, Electronic Document, https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054286, accessed May 30, 2018.

Camp Halsey SCS-1, Re-fleshing the Bones Through the Use of Historical Fiction

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During the bleak days of the Great Depression and the American Dust Bowl in the 1930s the United States Government created what may have been the most ambitious social engineering and social welfare project ever attempted, known as the Civilian Conservation Corps (Civilian Conservation Corps Legacy [CCC Legacy] 2018). The Civilian Conservation Corps was known variously as Civilian Conservation Corps, the CCC, and Triple C. The CCC served as an umbrella for many public works projects including the Soil Conservation Service (SCS) and Forestry Service. The Forestry Service helped to map existing trees by species type, mitigate fire dangers, and planted more than three billion trees (CCC Legacy 2018). The SCS trained young men to protect valuable topsoil from erosion by terracing and prevent bank erosion, taught gully control, installed fencing to reduce overgrazing, and sodded pastures to anchor the topsoil in place (Helms 1985; Hope 2002; Log Cabin Democrat [LCD] 23 July 1935). The CCC ran these manifold operations out of localized residential camps that were organized by task. They were dubbed, with much originality, CCC camps.

CCC camps were by no means simply hard-labor work camps. The work was voluntary and the men and boys who served in the camps received a monthly stipend (the majority of which was sent to their families), education, medical checkups and treatment, including monthly venereal disease checks (Civilian Conservation Corps [CCC] 1934a). They also enjoyed access to local recreational activities including church functions and dances (Jones 2004). This paper looks specifically at the Arkansas CCC camp called variously; Camp Halsey, SCS-1, and P-75.

As with many CCC camps, Camp Halsey went through multiple iterations (Murphy 2002). This was primarily due to the completion of works projects and shifting need in the surrounding area. As a project of one type was completed the camp would be shut down until needed again. Then the camp would be repaired or refurbished as required and reopened with a new camp commander and the requisite personnel to perform its new function. Initially Camp Halsey was designated SCS-1, or Soil Conservation Service 1, and active from October 1, 1934 to November 1, 1935 for a total of 13 months (Figure 1; LCD 1 October 1934; Murphy 2002). Although Camp Halsey was not the first CCC camp in the state, SCS-1 was the first Soil Conservation Service

Figure 1: 1934-1935 "The Wooley Hollow Bunch".

camp in Arkansas (LCD August 17, 1934). Company 1706 transferred from the Pope County Ozark forestry unit at Camp Victor to form the core of SCS-1 personnel (LCD August 17, 1934; McKinnon 2018). Camp Halsey's second iteration was as a Forestry Service camp designated P-75 (Company 4748), which opened on September 15, 1937 (Figure 2; Arkansas District 1937; Murphy 2002).

The most visible achievement of SCS-1 is what is today Woolly Hollow State Park and Recreation area, which was first designated on September 2, 1935 (McKinnon et al. 2017; Murphy 2002). Woolly Hollow includes Lake Bennett and Lake Bennett dam, which was constructed by SCS-1 (Clark 1971; McKinnon et al. 2017; Murphy 2002). The Camp Halsey area of responsibility included approximately 125,000 acres of land spanning across Cleburne, Faulkner, and White counties (CCC 1934a; McKinnon 2018). A local businessman donated the land for the dam on August 8, 1934. An additional 280 acres were purchased from Missouri Pacific Railroad through community donations (Clark 1971; Hope 2002; McKinnon et al. 2017).

Although the Lake Bennett dam at Woolly Hollow is the most visible of public works projects completed by SCS-1, they accomplished a great many other projects, such as mitigating farmland topsoil erosion thorough terracing, bank erosion abatement or gully control, fencing, and sodding pastures. Techniques and skills related to these projects were taught to both

Figure 2: Company 4748.

the local community and to new recruits (Helms 1985; Hope 2002; LCD 23 July 1935). The Camp trained young men (women were excluded) on the job throughout its various projects. Since the youth were, in large part, locals, the skills they learned generally stayed local. This had additional positive impact on the communities and on local farming practices by reducing the labor burden on the SCS while still reducing topsoil loss. To begin to measure the impacts of the CCC camps, one only needs to look at the local newspapers of the day, although it may be required to extrapolate events from the reporting to find the facts. An example of extrapolation is a Log Cabin Democrat report announcing a second quarantine in six weeks at Camp Halsey (LCD 8 August 1934). The report announces not one, but two quarantines at Camp Halsey and multiple illnesses.

Historical Fiction Method

While newspapers tell the story of their local camps in a broad perspective (sometimes with little detail), to appreciate daily life in the camp one must shed the modern perspective and acclimate to the times in which the camps were active. One method researchers can use to orient themselves to the period of interest is through a perspective of narrative immersion (personal accounts, such as letters and diaries). In the case of Camp Halsey there are few first-hand narratives. Thus, data to achieve literary immersion must be drawn from other sources, such as newspaper reports, camp newsletters, camp communiques, camp reports, participant letters home (when available), poetry, weather analytics, and investigative reports. Investigators can even drill down the daily diet through the published mess-hall menus in some instances.

By combining all these data, an historical 'fiction' narrative can be created. Such a narrative is factual about events yet is fictional about personages and minutia. One can compare the process of creating an historical fiction to a forensic anthropologist building a facial reconstruction bust. By adding layer upon layer, the result is to ultimately enable the unfamiliar reader to experience an active vision of the past. In the historical fiction the historian becomes concerned with relating to the modern audience how things felt based on the body of research (Lyons 2016). It must be noted that great care must be taken during the construction of an historical fiction to not introduce anachronisms or narratives that run counter to the facts. Holsinger (2014) takes great pains in describing how being able to teach something is far from being able to write effectively about it since it is the rich detail of every day existence that brings such a work to life.

The historical fiction then becomes a tool for the layperson at a museum or for an investigator new to the project to peruse and become familiar with the circumstances of daily life at the site under investigation. This would include the technologies available, living conditions, education levels, and broad level concerns of the individuals in the period and site. With an historical fiction, a picture is presented of what life in the camp was really like. This makes it easier for the reader to step outside of their experience and get a better understanding for the life in a CCC camp of the period.

A contemporary example for the history of Camp Halsey would be the presence of an article alongside the newspaper article announcing the location of Camp Halsey. The article is announcing a speech given by Adolf Hitler at the United Nations where he tells the audience that he "Seeks Only to 'Go Own Way In Peace'" (LCD 8 August 1934). This coincidental article helps to contextualize Camp Halsey as active during the escalation of global tensions before WWII, and that local residents of rural Arkansas were made aware of what was happening in Germany. Understanding the contemporary context of the subject can aid in understanding what camp life was like and possibly how, and why, the camps

operated the way they did. Through this understanding, the investigator can make informed judgements and extrapolations during research and the creation of an historical fiction.

Although historical fictions can greatly enhance a museum experience for a layperson and aide the investigator in understanding the sociological and temporal context, investigators must take great pains to not read into the evidence used to create historical fictions. These fictions are only as accurate as the evidence and original author allows. Thus, some liberties must be taken to fill in gaps. Just because an historical fiction presents that an event happened a certain way does not mean that it was exactly thus. The fiction must be rewritten if new evidence comes to light that contradicts its narrative. Furthermore, by adjusting the narrative of the historical fiction the researcher can work to keep it aligned with the evidence and thus continue to enhance the experience for all readers.

A Proposed Historical Fiction for Camp Halsey SCS-1

An historical fiction for Camp Halsey SCS-1 could take the form of a camp occupant journal and might look something like this:

Excerpts from the Journal of James Waldron

October 7th, 1934. It's our first week in the new camp and were still doin grounds clearin. The mess hall and hospital are gettin panted by a different barracks and we got to put down the walks (LCD 5 October 1934). They gonna be soapstone and shale walks to keep down the mud in the barracks and workshops when it rains (LCD 5 October 1934). Leaswize we got the doors an windows stained the other day (LCD 5 October 1934). That nocount Johnny's hand got stained too cause he was nappin on the job. They feed us pretty good. Breakfast today was bacon-egg-omlet peaches an cream, hot biscuts, and coffee (CCC 1934a). I didn't like the coffee so much in the beginning but it grows on ya.

October 10th, 1394. We got our G.I. issue. We got two sets of O.D.'s and two sets of denim work clothes and get this. We got two pairs of shoes! Can you imagine, two pairs of shoes! We even got a slicker an hat for the rain. I aint ever had so many clothes. I was wearing everything I owned when I reported in and it wernt much (Jones 2004). The camp education advisor Southard, what kin of name is Southard, says I got to write in this durn journal each day and bring it in for him to look at durin class time (CCC 1934b). He says he's gonna to make a scholar of me if it kills me. I still reckon third grade was plenty fine. No body else in the family made it further.

October 14th, 1934. This teacher may kill me wit education yet. I doan see the point in more schoolin. I doan need it to dig ditches an to till fields, but he insists, he says I gotta do it ifin I want to stay workin in the camp. Some of the new boys in barracks no. 3 were feelin uppity and didn't like the commander's no drinkin order. They decided to test him on it. Soz they got some empty whiskey bottles from the locals and filld em with tea, then they arranged for the commander to see em drinkin it (Sunde 2016). Then they tried to make off. When they was caught they tried to pretend like it never happened. The commander didnt take to that at all. They was almost out the door when it fell out that it was tea an not whiskey. Commander got madder n a wet hen that they would try to push him like that. They still almost went home. If not for their leader vouching for them theyd be gone as I write this. Instead they are on probation for a month and have extra KP duty.

November 22nd, 1934. Thanksgiving supper wern't bad. There was plenty to go around too, not like at home. It was a nice change from the no meat suppers we've been having lately. I reckon the foods fine but some that spent time in other camps are complaining. There was even an investigation last week cause some nit wrote their congressman (CCC 1935-1943). Nothin cum of it though cause that foods just fine. Durn shur had me in a turn though, when that investigator called me in and sat me down all official like and started with the questions. I thought I was gettin the third degree from a G-man. After all his questions he talked to the commander and then addressed all of us. He told us the results, and what actions were being took, none. I'm glad that nonsense is over. Mabe now the wingers will quiet up.

March 5th, 1935. The paper says that General Heintzelman likes our camp a lot. He even called us 'superior' to the other camps (LCD 4 March 1935). Maybe that's why the commanders in such a fine fettle.

June 18th, 1935. Second durn quaranteen in two months. We can't go to town this weekend, not even to get saved. The boys in barracks no. 2 got it bad tho, they got to bleach clean, and air out their whole barracks. I'd be sleepin under the stars for a night or two ifin it was me. With as hot an sticky as it is, it might be better sleepin under the stars anyhow, leastwise til the skeeters find ya. Doc Proctor says that it's scarlet fever this time, not spinal meningitis again (CCC 1934a; LCD 18 June 1935). He says another kid has diphtheria too (LCD 18 June 1935). They have the sic guys in isolation at the infirmary (CCC 1934a). I hope they make it, they are good guys.

September 2nd, 1935. Wouldncha know it, they went and named our lake we made after that director Bennett fella. At least the recreation area is named 'Woolly Hollow'

after the fella that homesteaded it (Clark 1971). That has a good ring to it I reckon. I wonder what's gonna to happen to us now that the work on the dams done and our lakes filled. It may not matter for me, I don't reckon they'll let me do another tour, I done four already (Jones 2004).

August 30th, 1935. A bunch of girls from Conway came to camp to dance and carry on (LCD 4 September 1935). Later in the evening when our Camp Halsey Boys were on a break a couple of the girls needed to relieve themselves. Being gentlemen, we boys volunteered to 'clear out' the latreen and stand guard for them. Apparently as one girl hiked up her dress and pulled down her panties ta do her business, a beam of moonlight showed through a screened vent, and shined on the biggest louse bug she'd ever seen: a Ripley's Believe It or Not louse. Being a townie, she screamed, a lot, an then, as we entered to see what the ruckus was about she fainted dead away. James pushed in as the other girls ran out like spooked hens, just barely in time to catch her. As he did, he saw the enormous louse, an he immediately understood what had happened an he could barely hold the girl up—panties draggling in the floor around her ankles—because he was laughing so durn hard, the rest of us who had answered the screams of distress were rollin on the floor. Since I'll be headin home soon I'm frightful glad I didn't miss that story!

September 2nd, 1938. This was my first time back to Woolly Hollow since my discharge. Finding works been hard, but without what I learned at Halsey it would have wouldn't have happened at all. Employers really like us fellas that were in the CCC. They say we're reliable and don't shy away from a lil hard work. I hadn't realized how much I'd changed until I went to the job placement folks and saw how sloppy and lazy some of the men were. It wasn't until later that I realized that I had been that way too, before my time with the CCC (Jones 2004; Sunde 2016). Woolly Hollow hosted Arkansas's first ever forestry festival for the new unit at Halsey, Protection Unit 18. Lake Bennett's a great place to have a picnic. The papers say 1,500 people attended. There was loads of entertainment with two-person team log sawing, for men and for women teams, the log was 46-inchs in diameter, horseshoe matches, and hog calling. There were food contests too, pie eating, cracker eating, and bean guessing (Murphy 2002). Apparently, Geneva Glover had a red-letter day, winning in several categories, including the sawing event, women's nail driving, women's shoe kicking, rolling pin throwing, and husband calling. Vernon Blythe who reported on the events for the Centerville newspaper set a state record in tobacco-spitting, 22 feet 2 inches (Murphy 2002). We had a picnic supper and there was music and singing by the Camp Halsey Boys. Walter Tyler's quartet played too. I didn't stay for the main program (Murphy 2002).

Conclusion

By constructing historical fictions using the evidence from a site and colloquial language and grammar contemporaneous with the period involved, such a fiction fills out the experience of the investigation. By constructing in the mind of the reader the images, feeling, and scents of the past, the author re-fleshes the proverbial bones of the daily life at Camp Halsey and brings it back to life in the minds of the readers. As noted, the narrative must be updated as new evidence comes to light and with every revision the experience should become more factual and enriching as a continuing evolution of an understanding of the site activities and contributions. Otherwise, an historical fiction becomes merely fiction and is no longer historical. In the museum setting, the proposed historical fiction journal entries created for Camp Halsey SCS-1 can be displayed with and between artifacts and the newspaper clippings to which they are pertinent. Such a display would provide patrons with a 'feel' for how life was like at Camp Halsey. This will add interest to photographs, artifacts, and other objects, which are not dynamic and might be an otherwise a dull and lifeless exhibit. By breathing life into the events and people of the past, events become active and real and move beyond being words on a page. By keeping the memory of places like Camp Halsey alive by using historical fiction and educating people on the events of the times, we animate a piece of history.

References Cited

Arkansas District
1937 Official Annual Yearbook, Camp Halsey. Arkansas District. Civilian Conservation Corps. Seventh Corps Area. Center for Arkansas History & Culture, SD 144.A8 C5 1937 Ark.

Civilian Conservation Corp
1934a Inspection Report. Emergency Conservation Work. Office of the Director. RG 35 Records of the Civilian Conservation Corps, 1933-1953, Pl 11 Entry 113, Camp Inspection Reports, 1933-1942. Box 16, Folder: Arkansas SES-1.

1934b Monthly Education Report, Camp Halsey. Emergency Conservation Work. Educational Program. RG 35 Records of the Civilian Conservation Corps, 1933-1953, Pl 11 Entry 113, Camp Inspection Reports, 1933-1942. Box 16, Folder: Arkansas SES-1.

1935-1943 NARA CP CCC RG35 Box 16, Part 2. Obtained from National Archives, College Park.

Civilian Conservation Corps Legacy (CCCLegacy.org)
2018 Civilian Conservation Corps Legacy: CCC Brief History. http://www.ccclegacy.org/CCC_Brief_History.html, accessed May 31, 2018

Clark, Sam
1971 Origin of Lake Bennett. Faulkner *Facts and Fiddlings XIII* (3):66-68.

Helms, Douglas
1985 The Civilian Conservation Corps: Demonstrating the Value of Soil Conservation. *Journal of Soil and Water Conservation* 40:184-188.

Holsinger, Bruce
2014 Stretching the Truth. *Humanities* 35(6):34.

Hope, Holly
2002 Arkansas Architectural Resources Form: Camp Halsey Site, FA1241. Arkansas Historic Preservation Program.

Jones, Paul E.
2004 *The Forgotten Boys of the Civilian Conservation Corps, Who Enlisted as Boys and were Discharged as Men*. Rocky Publishing, Eldorado, IL

Log Cabin Democrat (LCD) [Conway, Arkansas]
1934 *Triple C Camp Site is Located at Centerville: 250 Men to be Transferred to Soil Erosion Service*. August 17, 1934.

1934 *Camp Halsey Is Beautified: Enrollees do Much Work on Grounds*. October 5, 1934.

1935 *Camp Halsey is Commended: "Superior," Says General Heintzelman*. March 4, 1935.

1935 *Camp Halsey Again Under Quarantine*. June 18, 1935.

1935 *Will Complete Dam This Week: Woolly Hollow Project Near Completion.* July 23, 1935

1935 *Camp Halsey Boys to Broadcast Tonight*. September 4, 1935.

Lyons, Mathew.
2016 Between fact and fiction. *History Today* 66(1):46.

McKinnon, Duncan P.
2018 Camp Halsey. The Encyclopedia of Arkansas History and Culture. http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?search=1&entryID=13348, accessed May 31, 2018

McKinnon, Duncan P., Lynita Langley-Ware, Wendy Plotkin, and Katelyn Trammell
2017 The Faulkner County Survey Project: Beginning a Program of Research at Camp Halsey. Paper presented at the 2017 meeting of the Arkansas Archeological Society in Hot Springs, Arkansas.

Murphy, Michael
2002 The Rise and Fall of Fire Lookout Towers in Faulkner County: Construction by Company 4748 of the Civilian Conservation Corps, 1937-1939. *Facts and Fiddlings* XLV (2,3,4):29-68.

Sunde, Karen A.
2016 Family Oral History: Catherine (Kay) Autry. Compiled December 2016. Attached as Appendix A.

Appendix A

Family stories from Mena Arkansas in the 1930s as transcribed by Karen A. Sunde PhD., December 2016. Here are the stories through high school:

School Days

True Grit

When MOM was 6 and starting school, the family lived a couple of miles from the school, and, of course, there were no buses in 1931 Mena, AR.

Mamaw dressed MOM in her Sunday dress and made her wear shoes and socks. She told Jim to see Catherine to school, but what 8-year-old boy wants to show up the first day of school with his baby sister—and a bossy, non-stop talking tattletale at that—in toe? So as soon as their house was out of sight, Jim ran off with his buddies, leaving MOM alone in the middle of the road. MOM was really, really scared, so she turned around and went back home. As she climbed the porch steps, Mamaw came out. She didn't say anything, just kissed MOM's forehead, put a hand on each of her shoulders, turned her around, then pushed her in the back and said, "Off you go."

When I first heard this story, I was appalled. I couldn't reconcile it with the sweet, empathetic woman I knew as my grandmother. I knew Mamaw couldn't walk with MOM because of the baby, but how could she be so cruel?

MOM defended her mother, saying that she held education with the utmost importance and had no choice if MOM were to do so, too. More importantly, MOM argued that what Mamaw did took tremendous courage and was a model for building that courage in children—true grit (I heard the term well before the novel came out).

I still have my doubts, especially as Mamaw apparently didn't apply the same discipline to either Jim or Ethel.

On the positive side, just over the first hill, MOM joined up with the black kids from across the road, and they helped her find her way to "the white kids' school.*

* In MOM's day, black kids and white kids had to go to separate schools. She always said that when she was a kid, she really, really wanted badly to go to the black school because it sounded as if they had a lot more fun: they certainly got more recess time.

First Daze

MOM finally arrived at her school—a huge building. Someone told her where to line up, and she did as she knew several of the kids in that line. Soon a teacher came out and marched them into the school, into their classroom—there were 35 or so students in her class—and they all took a seat at the desks lined up in rows. The teacher introduced herself, told them her name. Then she went to the first desk in the front row and asked the student his or her name.

When the teacher came to MOM and asked her name, MOM answered, "Catherine." Fine, what is your second name? MOM had no middle name—a fact she resented all her life—so she just said nothing. The teacher asked, Don't you have a second name? Catherine answered with total seriousness, "Catherine Shut-up," because that was the most common way she was addressed.

Frustrated, the teacher asked, "What is your father's name?" Catherine answered, "Daddy." Totally flummoxed, the teacher then asked the class at large if anyone knew Catherine's father's name.

A boy MOM went to church with spoke up from the back row: "Gosh, Miss, we don't know. We all just call him Mr. Autry."

From then on, kids called her Catherine Shut-up when they got annoyed with her.

Sexual Animals

MOM always insisted that human beings were sexual animals, that sex was a perfectly ordinary and natural part of what it was to be a human being and to not talk about it or acknowledge it was not only perverse, but destructive to growing children because they didn't learn how to accept and understand their own emotions. She also argued that children were sexual beings from the time they were born.

She would tell the story about her first-grade class in Mena. She had a fairly young teacher for first grade. She says that the woman wore very tight knit skirts that hugged her thighs and hips so that her pubic mound was outlined. She said that when the woman would walk up and down the aisles between the desks, the little boys in the class would giggle and whisper among themselves as she passed by—about guess what? Her point was that even at age 6, boys—and girls in the class, too—were sexually aware.

Race

At the farm in Prescott, where the family retreated when Grandpa George couldn't get work at the sawmill in Mena, there was a family of blacks living across the road. MOM's family and this family were pretty close and friendly as they both were trying to survive during the Great Depression.

For example, one time, Mamaw needed to butcher a hog to feed the children she was having to support while Grandpa George and the adult men were off at a logging camp making money for the winter. She hired the man from across the road, with the help of both his and her older boys, to build a smoking shed, telling him how to construct it. Then, he followed her directions on how to slaughter, butcher, hang, and smoke the meat. She wasn't strong enough to do the work herself but knew how. He was strong enough but lacked the knowledge. Together, they fed both families until the men came home from camp with money enough to move back to Mena.
Nevertheless, MOM says that there were barriers. For example, when Mamaw wasn't around, sometimes the school aged white kids would jeer, "Nigger, nigger" at the black kids. The black kids would jeer back, "Rather be a nigger than po' white trash."

Class

When MOM was in 3rd grade, the Depression had settled even over the timber industry in Mena. With no money to buy any but the basic fabric for constructing clothes, Mamaw would recycle as much material as she could to reconstruct dresses, shirts, and pants from the older children for the younger and save the flour sacks to make underclothes and night clothes for the family.

One day at school, MOM was in a bathroom stall and her panties, of course, were down around her ankles so they could be seen under the stall dividers. A couple of older girls came in gossiping and giggling. They ridiculed and mocked "white trash" people who were so poor they had to wear flower sack underwear.

This incident scarred MOM for life. She was always sensitive about clothes and defensive about any perceived attempt people might make to deride or patronize her, becoming pugnacious, even belligerent, when she thought people were disrespecting her or treating her with distain.

Fowl

When MOM was a little girl, she had a little black dog who went everywhere with her and slept under the porch, waiting for her to come back to school.

One Saturday, Mamaw got Uncle James—who was visiting in order to court Stella—to help her catch a chicken for her to make into chicken 'n' dumplings for Sunday dinner. So, James and Mamaw went into the chicken coop, but left the door ajar just a little.

MOM and her little black dog were sitting on the fence just outside the coop watching. Now, this little black dog loved to put the game up. MOM used to take him to the pond to tease the ducks and the geese (who would peck MOM so that she was afraid of them) by chasing them into flying away or into the middle of the pond.

MOM watched Mamaw and James chase the chickens all over the coop, never quite able to catch one, for several long minutes. Then, MOM looked down at the little black dog panting at her feet, tongue hanging out, so eager to get those chickens. Just as Mamaw and James had a fat hen cornered and were reaching out to grab her, MOM told her little dog, "Get 'em!"

The dog was off like a barking bullet homing straight in for the hen. The hen heard him coming and flew up into Mamaw and James's face squawking loudly and distressingly, beating them both in the face as she tried to escape the little black dog.

James and Mamaw looked around to see what had happened. James started laughing so hard he bent over holding his stomach. Mamaw, like Queen Victoria, was not amused.

Stockings

Once when Stella, who was a lot older than MOM, was talking with a boyfriend on the porch and playing her guitar and singing for him, MOM got bored with all the talking. She wandered around to the back of the house where she saw that Stella had hung out several pairs of her silk stockings to dry.

Suddenly inspired, MOM ran into the house, found Mamaw's scissors, and cut the feet out of each of Stella's stockings.

When I asked her why, MOM replied, "Because they were there." George Mallory would have been proud.

Stealing Peaches

Her freshman year, MOM's brother Jim had a girl friend named Viola. MOM says he was simply crazy about her, and she about him, too, though she was a year older and Mamaw disapproved of her. MOM says that Mamaw disapproved of every woman Jim was ever in love with, so don't set too much store by that.

One night, Viola was spending the night, sleeping in with MOM and Ethel. It was a hot summer night and none of them could sleep. About midnight, Viola suddenly got hungry for a peach. Now, the family was living on Spring Street then, and down the street just a couple of blocks a family had a peach tree in their yard. On a walk earlier in the day, the girls had seen that the tree was full of juicy, ripe peaches. Viola got up and threw on her silk dressing gown with the dragon embroidered on the back (MOM says she loved that robe), and the three of them headed out for the tree.

Viola was the first one up the tree, lusting for peaches. However, they giggled so much that the owner heard them and the man leaned out the window yelling at them. MOM and Ethel stood on the ground catching the peaches that Viola was tossing down to them, so they could run, but Viola in her hurry to get out of the tree, hampered by her long tight gown, had more trouble and ended up falling. Fortunately, she was not hurt, so the three ran for home clutching their forbidden fruit, which they enjoyed greatly.

Rushing Rivers

There wasn't much to do in Mena, AR in the way of parties as so many of the population, including Mamaw, were Pentecostal and so didn't approve of them. However, the high school kids still had fun. One of the things they would do was to go swimming in their favorite swimming holes, the area having plenty of rushing streams and a couple of good sized rivers. MOM couldn't swim—she said she floated about 2 feet off the bottom of any body of water she was in—but the swimming holes usually had a shallow enough bottom not too far away from where people would jump in for her to participate.

One spring, MOM and her buddies went out swimming just after a couple of heavy thunder storms. The swimming hole they chose was one that had a huge tree limb hanging out over the water. Someone had tied a rope to the limb so that the kids could swing out to the middle and jump in or swing back to the bank.

On this occasion, the water foamed and flowed so strongly that they absolutely couldn't go into the water, but dared one another to swing out over the dangerous, raging waters and back to the safety of the bank.

When it came her turn, MOM swung out, but didn't have enough weight or momentum for the rope to return her to the bank. There she was, a non-swimmer, hanging out over a raging river.

One of the boys took off his shirt, jumped in, and swam out so that he was under her. Then, he told her to let go. Now MOM really, really, liked this boy, so she gathered her courage, let go, and fell into the water right beside him. He towed her to the shore.

At age 90, MOM still considered this boy her hero. She says he was killed in World War II.

Maxine

MOM says that Mamaw really, really, loved Maxine, perhaps sensing that Maxine would be her last child. When Maxine died, MOM was about 8 years old. The church held their typical open-casket funeral. The whole family was forced to attend. MOM says that Mamaw broke down, crying hysterically, rushing up to the coffin, taking Maxine into her arms and trying to run out of the church with her. This is why MOM requested that she be cremated and that there be no funeral ceremony.

Also, after Maxine's funeral, MOM came home from school one day to see a couple of men carrying out of the house Mamaw's curved glass front oak china cabinet that she kept her tea china in. Mamaw told her that they didn't have the money to pay the doctor for treating Maxine, so that was the price of his help with Maxine's illness.

Ice Bath

Around the time Maxine died, MOM got ill, too. I can't remember if it was diphtheria or typhoid, but MOM's fever was extremely high for days. To keep MOM from dying, Mamaw got a long, narrow galvanized stock trough and filled it with ice. She then laid MOM down in it, making sure that her feet and head came in contact with the ice, to draw the fever away from MOM's brain. It sounds awful and primitive, but it worked.

Aunt Cathy

When MOM was 9 or 10, Aunt Cathy Mamaw's sister, was ill with a wasting disease, and had been sick for a couple of years. MOM said that her husband had taken her to every doctor he could drive to, but no one seemed to know what to do for her. They came to stay with Mamaw, who put MOM in charge of getting her to eat. MOM said that she'd put a spoonful of porridge or soup up to Aunt Cathy's mouth, and Aunt Cathy wouldn't eat at all. She'd just say, crying, "I don't know why, Catherine; I just can't eat."

Church & Beer

Mamaw "got religion" midway through MOM's childhood, so she can remember pre-Pentecostal as well as post-Pentecostal family dynamics. For instance, Mamaw before religion made the best beer in Polk County. After religion, there was no alcohol or dancing of any kind in the house, and even the music moved to MOM's half-sister Sylvia's porch.

MOM says that her father absolutely refused to have anything to do with the church, though he would attend services once in a while with the family to see the children recite or perform. On the day that Mamaw was formally inducted into the Pentecostal church at a revival meeting, Grandpa, his brother Charles, and a couple of Grandpa's older boys by his first marriage grumpily watched her leave, towing the youngest children along with her, the men knowing that she was to bring the preacher back with her to take an ax to the beer barrel in the basement.

When Mamaw and the preacher returned to the house, all four of the menfolk were in the basement uproariously drunk, trying to drink all the beer left in the barrel before the minister could take his ax to it.

Church & Whiskey

When MOM was 10 or 11, she had to attend Sunday School at Mamaw's Pentecostal church. She and her friends, though, usually didn't have to sit through the entire church service, so they'd run around outside the church.

There was a trash heap around the back of the church where trash that people threw on the street was piled. One Sunday, MOM and her friends found a couple of empty, clear, one-pint whiskey bottles, probably left there by the drunk that the church hired to take care of the church yard. One thing led to another, and one of her buddies "triple-dog-dared" her to drink the bottle in front of the church. MOM sneaked the bottle home and filled it with ice tea.

So, the next Sunday, after the children were excused from the service MOM and her friends sneaked in the back-side door. MOM walked up onto the stage the behind the minister, raised the whiskey bottle and chugged it. The congregation exploded in agitation. The minister was totally confused until one of Mamaw's male friends ran up onto the stage to drag MOM—and her whiskey bottle—off. MOM says it was one of the best moments of her life.

Homework

Grandpa was the one who helped the kids with homework because Mamaw had had to quit school in the 3rd grade to take care of her brothers and sisters because of her

mom's illness. All three kids would do their homework at the dining room table. Grandpa would sit close by and read, mostly ignoring them because he was so involved in his book.

Periodically, Mamaw would stalk out of the kitchen and demand in a loud voice that George quell the riot that was occurring among his offspring at the table. He'd say, "Get back to work." Silence would reign for about 10 minutes, then the noise would build again.

Why There's No Music for MOM

Another problem MOM had with the Pentecostal church was the music. She thought all church music sounded like a dirge, which she felt was morbid. This attitude was complicated by the fact that early on in her life, she decided she couldn't sing. Her whole family were singers and musicians. They all played instruments and sang the popular and folk songs almost every night on the porch to entertain themselves. But not MOM.

MOM's sister Ethel, MOM says, had a lovely voice. Mamaw, eager to show her off to the congregation, started bullying her to sing for the service on a Sunday. However, Ethel was shy. She resisted all Mamaw's importuning. Mamaw enlisted the minister to persuade her. He hit on the idea of making MOM get up to sing with her. Ethel agreed that if MOM would sing with her, Ethel would sing, too. MOM steadfastly refused, but no one paid any attention to her.

On the Sunday of the performance, the minister introduced the sisters, and Mamaw swelled with pride as they walked up to the dais. The organist played, Ethel started singing, got about three words in, noticed that MOM hadn't opened her mouth, and quit. Nothing anyone could do, including threats of physical punishment, would make MOM sing.

On the way home, Mamaw was bewailing the stubbornness of her daughters who wanted to embarrass her. Grandpa merely said, "Waal, this just shows that you can take a horse to water, but you can't make him drink".

Watermelons

The gang of kids MOM hung around with in high school were kind of wild—and so was she.

In the summer after work, to cool off, they'd go swimming. To get to their favorite swimming hole, they'd cut across a farmer's field, and often on the way would "liberate" a watermelon or two for a snack. Finally fed up with their depredations on his crop, the farmer one evening brought out his shotgun and opened fire on them as they were absconding with their succulent booty.

Alas, the farmer was a decent shot, as Mom's friend the sheriff's son found out. The farmer shot off half of his ear that night while the boy was cresting the hill with the watermelon under his arm, running like Hector being chased around the walls of Troy by Achilles. He probably ran faster that night than he ever did carrying the football for the school team. He was killed in World War II.

"He, Him, and Men" Are Women, Too

When MOM was about 13, she became interested in where the ideas in our Declaration of Independence and Constitution came from. Grandpa handed her John Locke's Two Treatises on Government, helped her read them, and discussed the idea in them. She started asking Grandpa about why women weren't included in Locke or any of her civics class documents.

Grandpa explained that in English grammar there was no pronoun or noun that could refer easily to both men and women. Latin, and all the Romance languages, solved that problem by using the masculine nouns and pronouns when referring to both men and women, a convention of language that English followed. QED, he told her that she should include herself when a philosopher or writer of any sort referred to "men/he/him" in the abstract.

MOM says it took her a long time to discover that most men, especially bosses, had never heard this explanation and definitely did not include women when they talked of workers' or citizens' rights.

Mile High Is Not Only in Denver

When MOM brought Paul and Mike to Arkansas the second time, she took them up to a lookout point on a cliff on Rich Mountain, a favorite place of hers. The lookout is marked 5280 feet. She told them that they could get up to the edge of the cliff and pee a mile because it falls a mile to hit bottom.

So, both my brothers have what is probably the world's farthest distance peeing record.

Red Cross

When MOM was about 15, the War had started and she wanted to do something for the cause. She tried to volunteer for the Red Cross like some of the girls in her class were doing. When she went to the office to do so, though, she was told by the woman that she "was not the type of young lady they wanted working for the organization." When she thought about it, she realized that all of the girls she knew who were volunteering for the Red Cross were from wealthy or well-off families in Mena. Mom's bitterness at American's class prejudices was reinforced and her bitterness about them well ingrained.

Life Chances—Medicine

At about 15 years old, MOM decided that the medical field might be one that would provide a life-supporting job for her. Few well-paying occupations were open to women in those days outside of teaching and nursing. MOM did get a job at the local hospital as a Nurses' Aid. She had been on the job for about a week when a disaster occurred. A worker on the passenger train line running through Mena infected almost the entire train with a dysentery virus. The Mena hospital was suddenly overwhelmed with more than a hundred people vomiting and defecating uncontrollably. MOM, as a nurse's aid, was the vomit basin and chamber pot carrier as well as being rapidly assigned to the mop-their-bottoms team when it became obvious that the nurses and LPNs couldn't handle the load. MOM says that one of the men, after a gut-wrenching spell of its coming out at both ends, looked up at her holding his basin and asked, "What's a young thing like you doing here? They shouldn't let you anywhere near this." This experience put her off any jobs in the medical field for life.

Leaving Home, Temporarily

MOM's sophomore year, 1941, Grandpa couldn't find work in Mena, so the family moved once again to Grandpa's farm in Prescott. Grandpa George was a ladies' man and he was now at loose ends. Intensifying his situation, he was unable to provide for his family: he was no farmer and had no clue, nor any interest in learning, how to successfully run a farm.

Mamaw, as might be expected, wasn't happy as she was doing all the organizing, managing, not to mention all the work he should have been doing in addition to the work he should have been doing. Consequentially, life in the Prescott farmhouse was rather stressed. Feeling incompetent because he could no longer find work in his field of expertise, he took to driving off in the family's Model A for prolonged periods of time, ostensibly looking for work.

MOM, at 15 years old, loved clothes and fashion—a love that stayed with her, her entire life. One day when Grandpa took the kids to school, MOM found a fashion magazine on the floor of the back seat of the car. She took it inside and once home poured over the photographs of models in the latest fashions and drawings of beautiful clothes. Mamaw discovered her trying to copy some of the illustrations in the book and demanded to know where she had found it. Needless to say, a confrontational earthquake rocked the house that night. Not only did Mamaw lay into Grandpa George for philandering, but for leaving the corrupting evidence of scarlet women and harlots around for his innocent children to find. MOM mostly regretting the burning of her magazine but understood Mamaw's hurt and anger at being betrayed and was wholly on her side. Despite the fact that MOM was actually more like Grandpa in temperament and interest, MOM was fiercely loyal to her mother.

Less than a month later, Grandpa picked MOM up at school again, and this time MOM found in the back seat a pair of frilly panties. Faced with this evidence of used feminine underwear in his car, Grandpa admitted his guilt when MOM confronted him. The next morning, MOM left the Prescott farm and transported herself to Mena.

MOM lived for a while with Sylvia's family (her half-sister). She enrolled in Mena High School and found work with the family living in the house that she later bought when she returned to Mena in the 1990s. She did cleaning, laundry, and helped take care of the family's children.

This was a hard time for MOM. Not only was she having to support herself at age 16 and was isolated from her normal family support, the Prescott school that she had attended her sophomore year was far behind and far inferior to the school in Mena. She had to play catch-up in all her subjects, but the most problem was math. First, she could no longer rely on her father to help her out with her homework. Second, she observed that math is a progressive discipline. If you miss out on one step, then you are crippled when trying to work subsequent problems. She had lost more than half a year at the Prescott school and struggled hard trying to understand the math required at Mena high.

H er life got a bit easier when, about 6 months later, Mamaw showed up with Ethel in toe. Between the two of them, MOM and Mamaw, they earned enough to afford their own place. Mamaw got a job as chief cook for the C & B Cafe and soon MOM was waiting tables there.

World War II

World War II changed the lives of all the people in Mena, but especially the lives of the young adults and high school students. Many of the young men from poor and working-class families in Mena joined the Reserves as soon as they could because of the extra money each month and the camaraderie of the social group they formed. Thus, the effects of World War II encompassed almost all of the boys MOM knew as well as those in her family.

Of course, these young men were the first to be called up when the Army activated. In 1941, most of MOM's family paid no attention to national news. Only Joyce's family had enough money to possess a radio. One of Joyce's older boys was a reader of and listener to national news. He had been telling everyone for months that the US

would soon be going to war. Everyone would scoff at him. The scoffing stopped on the afternoon of Sunday, 7 December 1941.

The family had gathered at Sylvia's house after church when one of the boys came racing in breathlessly yelling that Japan had bombed the US. A couple of the boys moseyed over to Joyce's house to see, but most stayed at Sylvia's until one came back telling them it was true. That night, the entire extended Autry family packed themselves into Joyce's living room for the evening radio news. Everyone was really quiet, MOM says, as first they listened to the news announcement and then her half-cousin explained in more detail what had led up to the bombing, where Pearl Harbor was, why it was important, and what it meant for them.

Two days later, the family again gathered to listen to Roosevelt's speech to Congress requesting that the US declare war on Japan and her allies Germany and Italy.

All of the Reservists were immediately activated after Congress declared war and were shipped out within months. All but one or two of MOM's classmates were in uniform and off to training within weeks of graduating—several leaving even before the ceremony. She says their mortality rate was about 70%.

This loss of her generation left MOM with several convictions shaped her lifelong attitudes:

1. War is run for the benefit of the rich but fought and paid for by the families of the poor. She became a lifelong pacifist.
2. The American boys she knew gave their lives for the lazy, no-good French who couldn't fight for themselves, and because of the opportunistic, cowardly Italians, and the autocratic, overbearing, cruel Germans. She had very anti-European attitudes.
3. The prevailing zeitgeist should be looked on with skepticism. MOM was all in favor of supporting drafted and serving enlisted. However, she observed firsthand the enthusiasm of the general population to support their country being used and manipulated for the political power of the rich and the enrichment of the already rich. Such emotion should not be trusted.

Life Chances—California Here I Come

MOM's brother Jim signed up for the Navy as soon as he could when the was started: he had graduated the June before Pearl Harbor. By spring, he was in uniform and off to basic training. The family was beginning to spiral outward, away from their enclosed Arkansas world. In fact, all of Mena was.

Prevented by her family from joining the military herself, MOM stayed in Mena for a couple of years after high school, working at the C&B Cafe. Then she hustled up a job with a woman whose husband was being transferred to Lo Angeles to help her take care of her twin infants on the train to California.

MOM says that the three-day trip was awful. By the third day, she couldn't stand herself: she was so sweaty and grimy from the trip with no bathing facilities—not to mention smelling like spit-up baby milk, urine, and poop. She locked herself in the one bathroom on her car and gave herself a basin bath with the tiny metal sink, soap, and paper towels in the bath. She says that by the time she was half through, women were pounding on the door to get in and complaining loudly. When she came out they gave her REALLY dirty looks.

Viola and the Louse

In the middle of the summer of his senior year, Jim invited the girlfriend he was crazy about to spend the weekend with MOM's family. Grandpa George gave his permission, so Viola came for a sleepover, sharing MOM and Ethel's room. MOM really enjoyed Viola and said that she thought Jim's life would have been much better had he married her, which at the time he wanted to do before he enlisted. This ambition became impossible for him during Viola's summer sleepover.

At this time, Mamaw was fighting for the family reputation: she was determined that her children would not be put into the "hillbilly," "hick," "poor white trash" category. Viola was crazy about Jim, but her family didn't approve of the relationship. She was a year or two older than he was, for one thing. The poverty of his family was the strongest factor, though. Viola's family was solidly middle class and determined to stay that way. Jim would be a step backward for her, they judged. The effect of this class prejudice on Mamaw was to make her hostile to Viola: she was that uppity wench from that snooty family who disapproved of Mamaw's golden-haired boy.

One night towards the end of Viola's sleepover, she had to go to the bathroom late at night. Everyone had gone to bed when she put on her Chinese silk dressing gown and quietly trotted off to the outhouse around the side of the house by the tomato patch. As she hiked up her night gown and dressing gown and pulled down her panties, a beam of moonlight shown through the screened vent in the ceiling, illuminating what MOM later described as the biggest louse she had ever seen: a Ripley's Believe It or Not louse.

Viola screamed multiple times, then, as Uncle James (who was sleeping over with one of Great Uncle Charlie's sons) entered, fainted. MOM says that James saw the louse, immediately understood exactly what had happened and that he could barely hold her up—panties draggling in the floor around her ankles—because he was laughing so hard, as were the other men who answered Viola's screams of distress.

Viola and Jim got over the incident, but neither Viola's parents nor Mamaw did. Viola was sent away from Mena and Jim informed that it would be a cold day in hell before he could marry her. For her part, Mamaw was completely humiliated: 1. The family did not have indoor plumbing, which put them possibly in the "po' but proud" category. 2. The louse, however, put them squarely in the "poor white trash" category. 3. Mamaw's menfolk's' reaction, which totally embarrassed and humiliated poor Viola, was unforgivable in middle class Mena, AR

Life Chances College

As she was finishing high school, MOM really, really wanted to go to college. To do so was the height of her ambitions at that time and she was encouraged in that goal by two of her teachers. However, her family had absolutely no money to send her. Arkansas was coming out of the depression, but Grandpa George, now in his 70s, was frail and ill. He was long past the ability to work full time, even if there was a timber company willing to hire a 72-year-old lumber estimator and crew manager. Mamaw, now in her mid-50s, was working long hours as chief cook while managing the crew at the C&B Cafe where the Courthouse gang hung out. This was a good job for a woman in these times but would barely support the three of them even with the other two girls holding down part time jobs. It certainly would not support MOM and pay college tuition at the same time.

MOM's Grandpa Anderson's second wife was still living around Mena, out towards the Oklahoma border. She would come into town to visit her daughter, who was living with her son and his wife while attending high school. Step-grandma Anderson was Native American. This meant that her daughter would receive a BIA scholarship to attend college. MOM was furious, jealous, and deeply scarred by the fact that this girl, who was not as good a student as MOM, would get to go to college, which she didn't particularly want to do, while MOM couldn't get money to go to school simply because she was white—a so-called "privileged" white girl. MOM to her dying day was resentful of any minority-targeted Federal aid, especially college grants for minority students. She saw them as being unfair and unfairly handicapping the worthy poor, whites.

Metal Detecting Use at Camp Halsey

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Introduction

This report is a brief study of the use of metal detectors in archaeological field studies. The site used for testing is the Camp Halsey Civilian Conservation Corps (or CCC) Camp. The camp is located about one-mile (1.6 km) east of Woolly Hollow State Park in Greenbrier, Arkansas. The Arkansas Archaeological Survey (ARAS) site identification number is 3FA313. Between May 14 and 18, 2018 field work efforts were focused on excavating and testing Feature 10.

The intent of the fieldwork was to determine the former purpose of Feature 10, which today is a concrete foundation where a building once stood. The excavated building foundation was initially thought to be the camp infirmary. However, during field work a different purpose appeared where an automobile repair or storage garage seems likely to be the use of the space. To uncover artifacts, map features and look at landscape modifications many methods were used, such as magnetic gradiometry, shovel tests, digging and sifting dirt in formal units and in large areas, as well as metal detecting.

This report examines data and artifacts collected using metal detectors in the unexcavated areas of Feature 10. The intent of the report is to determine uses for metal detectors in archaeology using these findings as a case study.

Background on Camp Halsey

Camp Halsey was a residential Soil Conservation Corp Camp constructed in the summer of 1934 and occupied in the fall of the same year (McKinnon et al. 2017). The purpose of the camp was to train men about soil conservation as quickly and efficiently as possible. These efforts were largely a part of the rise in soil conservation efforts between 1933-1934 in the United States. The area the men worked on spanned three counties and included roughly 125,000 acres (50586 hectares) of land (Civilian Conservation Corp 1934).

During the first occupation of the camp, the enrollees took on many projects such as terracing land, installing buildings and site maintenance. About 200 enrollees and officers occupied the land. One of the major projects was the creation of Lake Bennett, named for Dr. Hugh Bennett, who was the Soil Conservation Corp Founder (Clark 1971). To construct the lake, they used dirt, cement, and sandstone to create a dam that allowed the area to fill with water. Lake Bennett subsequently became a popular recreational spot for locals and is now part of Woolly Hollow State Park (Clark 1971).

At the end of 1935, the camp was abandoned and remained unoccupied until fall, 1937. On October 1, 1937, Camp Halsey was reopened (McKinnon et al. 2017). This occupation, however, had the focus not on soil conservation but on private forestry management. Company 4748 occupied the camp at that time. Originally from Camp Harrison (Boone County, Arkansas) the group was transferred to Camp Halsey when it was reopened (Log Cabin Democrat 1934). The camp was abandoned again in 1939. The buildings that remained were supposed to be used by 4-H, Boy Scout and Girl Scout Troops at Woolly Hollow. However, the buildings were taken apart and removed from the area instead (Murphy 2002).

Camp Halsey is no longer a functioning camp. The roads have been over taken by grass and the buildings have been long since removed, leaving only partial foundations that suggest former locations. The land served as a cow pasture for some time and is now a roaming area for the horses and dogs of Larry Halsey, the property occupant. However, evidence of the former camp is visible on the landscape. The two largest and most visible structures that remain are chimney that was attached to the recreational hall and the message board. The recreational hall was where the men spent time off, relaxing, playing games, and getting to know each other. The message board was where menus, messages and other information were posted for the enrollees who attended the camp. There is evidence of other structures such as the latrine, kitchen, and officers' quarters hidden away in the woods. With exception of the message board, vegetation and trees have overtaken all of the visible remaining architecture.

Instruments

Neither the recreational nor archaeological use of metal detectors today is the original intended use. In 1881, Alexander Graham Bell constructed a medical tool that could be used to find bullets within patients and in 1925, a portable metal detector was invented. By 1931, metal detectors were available commercially and to the public (Bellis 2017).

Today metal detectors are used to find metal buried beneath the surface of the earth. The instruments operate by discriminating the type of metal (iron, copper,

silver gold, tin, etc.) and, in some cases, the actual item (buckles, coins, nails, etc.). Technology has developed which improves the reliability of discrimination, though this feature is not often used in archaeological applications. Metal detectors can be used to discriminate between modern trash (aluminum cans, wiring, pull tabs, etc.) from artifacts of interest that have historical significance (coins, buttons, bullets, etc.). Often the operator will still have to dig to confirm the metal detector identification. In metal detecting, two types of metal detectors are typically utilized.

The first type contains a round or oval head of the detector and is located at the end of a long pole. When held properly, a user can operate while standing upright. To use this type of metal detector, the user simply "sweeps" the head of the detector at close proximity and parallel to the ground. Ideally, a slow, zig-zag motion of the detector head across the desired area of study is the method of surveying. While properly surveying, the head of the detector emits a radio signal into the ground that, when received back, detects signal disturbances made by subsurface metal (Dancy 2017). Any low-cost, upright metal detector will work for recreational use but often lack some features and sensitivity of more advanced instruments. The preference is for those detector brands that have fast processing rates to reduce false positives (Dancy 2017:53). The ability of the machine to reset the magnetic field after it locates an artifact in preparation for the next emitting signal, is dependent on the processing rate speed.

A second type of metal detector is a small hand-held device used to aid in finding artifacts after the upright metal detector has signaled the presence of an object. These smaller detectors are called "pin-pointers." They are roughly one foot (30.5 cm) in length and usually have a light on the end to aid the user when digging in greater depths. When the pointer picks up a magnetic field, it makes a soft tone when distant and a louder sound when the user is closer to the desired metal. This device also uses the same radio technology as the upright detector, but usually lacks the ability to discriminate (Darcy 2017).

The Use of Metal Detecting

Metal detecting instruments can and have been used in various settings, including recreational and archaeological. Historically, metal detectors are used in recreational settings, although archaeologists (especially historical archaeologists) are beginning to employ this method.

Recreational Metal Detecting

Recreational metal detecting is common in many areas such as battlefields, beaches, and other landforms. In May of 2009, the USDA Forest Service released a statement that not only are metal detectors a valuable method for prospecting metal artifacts, minerals, and stones but they are also legal to use in National Parks and Forests, with specific provisions that protect sites of known or potential archaeological significance (Doran 2009). To ensure these laws are not violated it is suggested the metal detector user to use resources such as state libraries, archives, chancery court records, and other documentation to determine site locations and restrictions (Dancy 2017). However, the U.S. Government also installed a program called Passport In Time (PIT) that allows recreational users of metal detectors to contribute to archaeological sites and excavations as volunteers. PIT is a national program that connects recreational metal detector users to archaeological and historic preservation sites. (Doran 2009).

A concern with archaeologists and the use of metal detectors recreationally is the act of removing the artifacts found from their context, thus destroying their contextual information. Fortunately, this is changing. Many online and offline metal detecting clubs share the goal of not disturbing the historical integrity and context of the site and are actively engaged in educating their members. The Arkansas Treasure Hunters Club, for example, is one of the organizations that strives to preserve artifacts and their context. The club code of ethics outlines rules for obtaining permission, detecting a site, and sanctions for doing so improperly.

Use in Archaeology

An argument for the use of metal detectors in archaeology is that, when combined with more traditional excavation techniques and used systematically, they become a very valuable asset. One of the earliest recorded uses of metal detectors in archaeology is in 1958 by Don Rickey. Rickey used detectors to locate the Little Big Horn and Big Hole battlefields in Montana (Conner and Scott 1998). By using metal detectors, Rickey was able to determine where bullets had been fired (Scott and McFeaters 2003:106). In the United States during the 1980s and 1990s metal detecting at historic battlefields increased across the nation. Hundreds of artifacts ranging widely in size, composition, and color were found, collected, and cataloged because of metal detectors. Another example of the use of metal detectors is the 1990 excavation of the 1846 Donner Party winter camp, where metal detectors were used to locate the site (Conner and Scott 1998). During the excavation of the camp, the use of metal detectors produced many artifacts such as ox shoes, cut nails, and horseshoes that had been used by the Donner Family. The detectors were also used to determine the original location shelters used by of George and Jacob Donner, though no architectural evidence of the structures remained (Hardesty and Brodhead 1997).

Metal Detector User and Archaeologist Collaboration

There are many ways in which metal detecting enthusiasts and archaeologists can work together to create a knowledge base and understanding of the items uncovered. An example of this is the excavation of Camp Lawton, a civil war camp, in Georgia. In the early 1980s, metal detectors were used by archaeologists to further understand the layout of the camp. However, the 1983 excavation was the first time in which archaeologists and recreational metal detector users banded together (Fagan 1996). This enabled the archaeologist to form a consensus on the battlefield footprint. The excavation of Camp Lawton marks the beginning of recreational and archaeological metal detector operators forming a collaborative effort (Fagan 1996).

Another example of this kind of coalition is a 2001 excavation near Canterbury in Kent, England A retired electrician who metal detected for entertainment came across a golden cup that dated back to 1600 BCE (Brodie 2002). With the help of an archaeologist in the area, he discovered that the spot where the cup was found was actually the remains of an ancient mound that, through a thousand years of plowing, had been flattened completely and displaced from the archaeological record (Brodie 2002). The cup went on to become a part of the British Museum collection of artifacts and an ancient mound was recorded that would have been lost to time if it had not been for the metal detector.

Lastly, they can work together through social media. Online groups, such as Colonial and Early U.S. Coins and Artifacts provide a way to "crowd source" identification of artifacts. Members simply post a photo of the item. A specialist in the group will typically the look at the item and tell the user the item's context, how to conserve it, etc.

Because metal detectors are easy to come by and are largely marketed for recreational use, archaeologists are often hesitant about utilizing this tool. However, it has become a remote sensing tool for many archaeologists (Conner and Scott 1998). Metal detectors can aid in testing of an area as well as excavation and inventory of the types of metal artifacts. They can also help determine site artifact densities and the approximate depth of artifacts. The use of metal detectors is easily integrated into the system for excavation that the archaeologist creates.

Despite the seemingly beneficial uses of metal detectors some archaeologists still do not use them. This partly because of the difference between looting and archaeology, with many archaeologists having to face the problem of "detector scat"- the remnants of holes created by the metal detecting hunts that make excavation more difficult (Conner and Scott 1998). Largely, the negative connotation of the use of metal detectors as archaeological method is focused on the history of use in looting. However, it depends how the metal detector is used rather than the act of metal detecting itself. The usefulness of metal detector surveys in archaeology depends on the individual and their ability to use metal detectors in accordance with archaeological methods and ethics. That includes not removing an artifact found using metal detecting without recording its context in order to better understand its purpose and spatial relationship to other artifacts.

Case Study of Feature 10

While clearing and sifting of the north floor of Feature 10 (Figure 1), it was found that beneath a thick layer (6 inches) of organic material (sod, roots and vines) was a hand-poured concrete slab. Throughout the first three days artifact identification was meager. On the fourth day two metal detectors and two pointers were used on portions of Feature 10. These metal detecting instruments were used to locate precisely where metal artifacts were located in the buried soil. Allowing access to small spaces, the pin pointers were used between roots of the plant life and thin openings between slabs of concrete that formed the steps.

A portion of concrete slab was left unexcavated, which included copious amounts of ticks and poison ivy. These areas were swept through the use of metal detectors and began with parts of the foundation that had not been cleared. Immediately, the metal detectors picked up various items across the foundation floor (see Figure 1). Most of what was uncovered by metal detectors was nails, bolts, a transmission rod, and other metal objects used during the period of time that the camp was occupied (Figures 2 and 3). The nails varied in size and could have served many purposes such as being a part of the roof system, holding something on the wall of the building, or from the bed of a truck. The bolts and transmission rod might have been used for a specific vehicle, but an analysis of the artifacts did not attribute the rod to one specific manufacturer type. Additionally, two metal rods that were embedded into the foundation slab might have been easily overlooked had it not been for the metal detector (see Figure 1). It took time to excavate each metal detector "hit" individually, but the metal detectors also saved time in that large areas of dense roots and poison ivy did not have to be cleared, collected and sifted. The artifacts were excavated directly out of the ground, and were recorded to ensure that none of their contexts or historical relevance was disturbed.

Although many artifacts from the slab floor were found using metal detecting, there were some issues. For example, multiple objects in one area was sometimes confusing. An area on the north side of Feature 10 (see

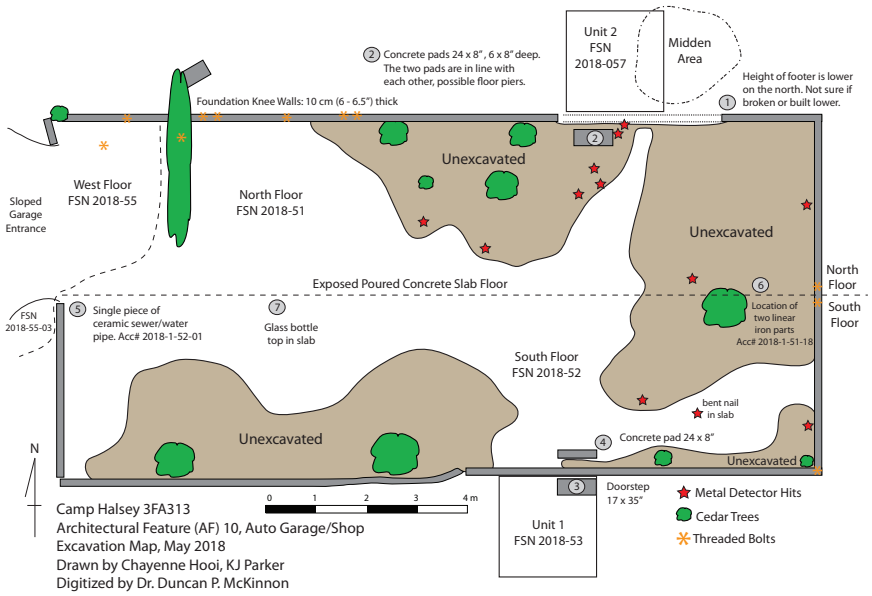

Figure 1. Map of Feature 10, Digitized by Duncan McKinnon, Collected by Kayla Parker and Chayenne Hooi.

Figure 2. Nails, bolt, washers and transmission rod found metal detecting at Feature 10 (Photographed by Shelby Nipper).

Figure 1) produced multiple nails in close proximity. This could have been a "nail rain" from the building being removed but while the metal detector found all of them it made excavating them difficult.

There were also a lot of false positive detections. This means that the metal detector identifies a magnetic field but upon digging there is no metal present. This could be the result of oxidation in the soil where metal objects once resided but have since corroded into dust. In the case of Feature 10 there was also an issue that metal seemed to have been used while mixing the concrete and was now embedded into the foundation. This is technically not a false positive since the object is present, just buried and irretrievable. These hits were important to consider, because it provided insight on the process of the enrollees mixing the concrete to form the slab.

Finally, in areas of the slab where the dirt and brush had not been cleared, the dense roots were a problem. Every time the metal detector identified a possible artifact, it was an obstacle to dig through the dense root system that was close to the surface. It took time to dig the hole and find the item, which made finding fragments of nails and other items very tedious and difficult. Also, because the dirt around the metal artifacts was not sifted, non-metal objects were not found, even though they may have been present.

Conclusions

Metal detecting has a both negative and positive effects on archaeology. It could be used as a tool or found to be a burden. The most important part of metal detecting for archaeology is not destroying the context of the artifact being unearthed. There is a growing popularity in connecting metal detectors with archaeology. With that, it must be understood that a metal detector at an archaeological site should not be the only tool used to survey a specific, or significant area. During excavation of Feature 10, the presence of metal objects that were within the foundation highly disrupted the excavations and the use of metal detectors would have probably been more beneficial in other areas across the site.

Going forward, it is possible that the use of metal detectors could help identify other features more clearly. Using them could help determine the perimeter, location, and artifact clusters where non-foundation buildings once stood, such as the enrollee barracks. Unlike most of the buildings, the barracks did not sit on top of a slab foundation but were raised up on stilts (Civilian

Figure 3. Metal bars found in Feature 10 (Photographed by Shelby Nipper).

Conservation Corp 1934). Using a metal detector in this area could help pin point the location of each building by identifying and mapping the "nail rain" created when buildings were removed. This could also help to determine a path of exit for structures at the camp, since it is known that the buildings were not destroyed but dismantled and removed (Civilian Conservation Corp 1938). A simple system of sweeping, flagging, and mapping hits using a Total Station could ultimately create an accurate image of the placement of these barracks. Doing a sweep in front of and around the message board could allow archaeologists to find personal items, such as coins, buttons, and push pins that might have fallen while the enrollees read the messages for the day. This would also protect the message board from suffering possible structural damage of a formal excavation since metal detecting is not as abrasive to the land around the artifacts.

The use of metal detecting at Camp Halsey supports the idea of using metal detecting as an archaeological resource such as locations where high metal content of minerals, rocks and stones would be counterproductive. With proper collaboration and permissions, a metal detector user, group, or club could potentially make archaeological discoveries that otherwise may have gone completely overlooked. As long as users conduct systematic research in accordance with archaeological methods, metal detectors themselves can serve as a beneficial tool to archaeologists and their research endeavors.

References Cited

Bellis, Mary
2017 The Evolution of the Metal Detector. ThoughtCo. ThoughtCo, September 5. https://www.thoughtco.com/history-of-the-metal-detector-1992303. accessed May 25, 2018

Civilian Conservation Corps
1934 & 1938 Historical Record of CCC Camp Buildings. September 1934 and November 18, 1938. RG 77 Records of the Office of the Chief of Engineers, 1989-1999, NM 19 Entry 395, Historical Record of Civilian Conservation Corps Buildings. Box 13, Folder 7th Corp Area, Folder 2 of 7 (Arkansas P-75).

1
934 Inspection Report. Emergency Conservation Work. Office of the Director. RG 35 Records of the Civilian Conservation Corps, 1933-1953, Pl 11 Entry 113, Camp Inspection Reports, 1933-1942. Box 16, Folder: Arkansas SES-1.

Clark, Sam
1971 Origin of Lake Bennett. Faulkner *Facts and Fiddlings* XIII(3):66-68.

Connor, Melissa, and Douglas D. Scott
1998 Metal detector use in archaeology: An introduction. *Historical Archaeology* 32(4):76-85.

Dancy, Bill
2017 *Discovering Virginia's Colonial Artifacts*. 1st ed. Greybird Publishers, Acworth, GA

Doran, Mike
2009 Mineral and Rock Collecting and Metal Detecting on the National Forests. US Forest Service.

Fagan, Brian
1996 Metal Detection. PBS. Public Broadcasting Service. http://www.pbs.org/time-team/explore-the-sites/lost-civil-war-prison/metal-detection/. Accessed June 28, 2018.

Hardesty, Donald L., and Michael J. Brodhead
1997 *The Archaeology of the Donner Party*. University of Nevada Press, Reno

McKinnon, Duncan P.
2018 Camp Halsey. http://www.encyclopediaofarkansas.net/encyclopedia/entry-detailaspx?search=1&entryID=13348, accessed May 25, 2018.

McKinnon, Duncan P., Lynita Langley-Ware, Wendy Plotkin, and Katelyn Trammell
2017 The Faulkner County Survey Project: Beginning a Program of Research at Camp Halsey. Paper presented at the 2017 meeting of the Arkansas Archeological Society in Hot Springs, Arkansas.

Membership Application. Arkansas Treasure Hunters Club.
http://www.arkansastreasurehuntersclub.com/membership-application. Accessed June 28, 2018.

Murphy, Michael
2002 The Rise and Fall of Fire Lookout Towers in Faulkner County: Construction by Company 4748 of the Civilian Conservation Corps, 1937-1939. *Facts and Fiddlings* XLV(2,3,4):29-68.

Log Cabin Democrat
1934 *Triple C Camp Site is Located at Centerville: 250 Men to be Transferred to Soil Erosion Service*. August 17, 1934.

Scott, Douglas D.
2003 Oral Tradition and Archaeology: Conflict and Concordance Examples from Two Indian War Sites. *Historical Archaeology* 37(3): 55-65.

Scott, Douglas D., and Andrew P. Mcfeaters
2010 The Archaeology of Historic Battlefields: A History and Theoretical Development in Conflict Archaeology. *Journal of Archaeological Research* 19(1): 103-132.