Authentication of Native American (i.e. Lakota) Artifacts from Circa 1890, 1900

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Abstract

Counterfeit Lakota artifacts pose a significant problem to professional artists, museum curators, collectors, and they misrepresent the Lakota culture and history. Identifying the counterfeit Lakota artifacts is to be determined with a firm understanding of the cultural context, historical referencing and a physical analysis aided by modern analytical tools. The cultural context included interviews with cultural authorities and a developed collection of relevant literature. Historical referencing accounted for period materials of the items and to help parameterize destructive testing. Lastly, the physical analytic tools used were the Visual Spectral Comparator 6000/HS (VSC), an X-Ray Fluorescence (XRF) and a Micro-Computed Tomography (Micro-CT). The Heritage Center at Red Cloud Indian School (HCRCIS) provided a pair of moccasins allegedly retrieved from the Wounded Knee Massacre and a pouch previously attached to an old Lakota bustle. Though this REU, the moccasins were identified to be plausibly retrieved from the Wounded Knee Massacre and the pouch was identified non-ceremonial in nature though still 100+ years old. The analytic tools identified that there are copper rings and organic material inside the pouch and the moccasins have an understandable amount of lead in the beads with arsenic spotting the item. This work provided a database specific to the Lakota people detailing their culture and history as well as demonstrating how modern technology can aid cultural preservation.
Introduction

Counterfeit Native American art and artifacts pose a significant problem to professional artists and museum curators. To tackle this, the research objective is to provide a database pertinent to the Lakota culture and history and develop a versatile process for authenticating Lakota artifacts. The scope of this project becomes quite broad as the phrase “Native Americans” or “American Indians” refers to the entirety of the 566 federally recognized tribes ("Indian entities recognized," 2012). To make this project manageable for the duration of a 10-week summer period, the Lakota people (otherwise known as the Western Sioux Indians) whose reservations are largely within South Dakota are the focus.

The Indian Arts and Crafts Act (IACA) of 1990 identifies authentic Native American art can only be made by enrolled members of a federally recognized tribe or a direct descendent thereof. The IACA does not specify what consists of art specific to individual tribes. This reveals a deeper problem of the 566 different tribes’ identities becoming homogeneous in part due to commercialization. Considering the quantity of the different tribes and the uncertain future of what will be considered tribe-specific art today this project has focuses on the Lakota artifacts, items already established as tribe-specific. The Heritage Center at Red Cloud Indian School (HCRCIS) provided two items to research: a pair of moccasins and a pouch attachment to a bustle.

The moccasins are allegedly retrieved from the Wounded Knee Massacre of 1890 by Wounded Knee creek in the Pine Ridge Reservation. The research objective of this pair of moccasins is to date the approximate creation of the moccasins which will help in verifying whether or not they were retrieved from the Wounded Knee Massacre. In the winter of 1890, +250 Oglala people, one of seven bands of the Lakota, died at the hands of the Seventh Calvary
lead by Col. James W. Forsyth. The Seventh Calvary lost 25 soldiers (Jensen, Paul & Carter, 1991). The entire Seventh Calvary was awarded individual Medals of Honor. 123 years later, this is still a very sensitive issue and any artifact claiming to be from the period is to be handled with great care. Even if this item is not from the actual incident, it can still serve as an existing historical and cultural reference. As noted with the sensitivity of this project, non-destructive testing is essential to maintain long term artifact integrity.

The other item is a pouch with the half below the tie is small enough to fit inside a cubic inch. Pouches were often obtained by a male during a Vision Quest, a ceremonial transition into full adulthood, and attached to their bustle. The goal of a Vision Quest is to be bestowed with a dream of guidance into what kind of life the man should lead. He would collect pertinent items to this dream which could include plants, animal claws/toes/teeth, rocks, herbal medicines and even insect and rodent repellants. The materials vary widely. Another method to obtain a pouch could also be gifted from a family member as a spiritual means of protection; though these are typical they are not rules in a cultural, social, or political sense (Goes In Center, JhonDuane 2013). The research objective for this pouch attachment is to determine as much as possible about the contents while remaining non-destructive and non-obtrusive.

**Broader Impact**

When a process and database to identify historical Lakota artifacts is established it can then be used to authenticate multiple pieces. However, slight modification may be necessary with respect to different tribes and materials. The Visual Spectral Comparator (VSC)-6000/HS, X-Ray Fluorescence (XRF) Spectrometer, and the Micro-Computed Tomography (CT) are advanced analytical tools that can be utilized to help protect museums, and collectors from counterfeit artifacts. This is also in the spirit of the Indian Arts and Crafts Act of 1990 in helping
to also protect the artists. Misrepresentation of the specific tribe(s) is an equally important issue to be addressed throughout.

**Procedure**

**Materials**

Pair of Moccasins:

- [Mule deer] brain-tanned hide and rawhide sole
- Glass seed beads, non-consistent in shape
- Sewing
- Red trade cloth
- Designs: via quillwork and beadwork and manufacture characteristics of moccasins

Pouch Attachment:

- Cloth Covering with a Calico Print
- Brain-tanned Hide Lacing
- Copper Rings
- Vegetation (Unknown, possibly a thistle)

**Equipment**

Vinyl Latex Examination Gloves Powder Free

Hard Plastic Casing, Paper Wrapping

Visual Spectral Comparator-6000/HS

X-Ray Fluorescence

Micro-Computed Tomography
General Procedure Overview

1) An initial cultural analysis of the artifact(s) is crucial, as it establishes the context of the sensitivity of the historical object(s), which helps to parameterize the significance of non-destructive testing.

2) As this project is dealing with a historical item, it becomes necessary to next identify if the materials used were even relevant to the time.

3) Once the artifact is determined to be within the boundaries described by both the cultural and historical framework, the next step is to proceed with use of appropriate tools to analyze the item’s materials.

Cultural Analysis

Figure 1 Pair of Moccasins (Mary Bordeaux’s Work)
The intricate designs made with the beads and manufacturing style may tell more about its history and how to address the item with the physical analysis. To acquire the information necessary to describe it accurately trusted literature and interviews with cultural authorities such as professional artisans, pertinent museum curators, instructors of the culture, and local cultural elders.

Building a literature collection was a continuing process. The sources varied from the Rapid City Public Library to Prairie Edge to the Journey Museum. The book Quill and Beadwork of the Western Sioux was obtained from the Rapid City Public Library for approximately four weeks. Specifically, this book has been known to be used by Lakota Arts instructors of Sinte Gleska University (SGU) located within the Rosebud Reservation of South Dakota. Prairie Edge is a local establishment focuses on “…blending the lessons of elders and the essence of the old ways with modern materials and individual expression…” (“Prairie edge home,” 2010). From Prairie Edge, a number of books were purchased providing essential information relevant to both the pouch attachment, bustle from what it was attached to, and the pair of moccasins. The Journey Museum also had important literature and the Sioux Indian Museum aspect is actually one of three museums administered by the Indian Arts and Crafts Board of Washington, D.C.
Mary Bordeaux, the curator and interim director of the HCRCIS, has allowed the author and colleague Sean Long Fox to visit the HCRCIS to observe and photo document the bustle in greater extent to obtain a clearer understanding of the bustle, or at least to report more details to our cultural advisors. Mary Maxon, the collections manager, removed the pouch attachment from the bustle tedious as it was due to the deterioration of the hide lacing.

The first cultural advisor interviewed was JhonDuane Goes In Center. He currently serves as an advisor to the Oglala Lakota Tribal Historic Preservation Advisory Council. Mr. Goes In Center is also a professional Lakota metallurgical artist. Steve Tamayo provided guidance as a lecturer/consultant of Native American art of both the Metropolitan Community College of Omaha, NE and the Smithsonian’s National Museum of the American Indian. In general, it is safe to assume that every aspect of the item has significance, interview questions should reflect that.

**Historical Referencing**

Historical referencing is the step to determine if the artifact could reasonably from the time period suggested/claimed. For instance, the purported time of the moccasins is after the time that the Pine Ridge Reservation was established, and with it came scarcity of new materials typically gathered in the self-sufficient society. At this time cultural practices were banned entirely. Later in the early 1900’s, the United States government permitted cultural practices, but only if they were patriotic in nature (i.e. the national colors and flag were central designs on moccasins, dresses, bags, and etcetera). Once that the historically criterion referencing is established the materials, organic and inorganic, can be observed microscopically to be matched with other artifacts verified with documentation or other confirmed materials of the time.
This process was, inherently, very similar to the Cultural Analysis with the collection of literature and interviews with experts in Lakota culture and history. Indeed, some of the same sources that provided an accurate cultural prospective simultaneously provided a historical account.

**Physical Analysis:**

Visual Spectral Comparator-6000/HS

- The VSC is specified to view flat objects with a high-powered microscope. The VSC can also observe items under a wide wavelength from infrared to ultraviolet. It can be reasonably hoped that the material observed will have a fluorescent signature.

X-Ray Fluorescence

- The X-Ray Fluorescence (XRF) Spectrometer identifies relative proportions of elements with higher atomic masses than Silicon, element 14. The XRF does not provide reliable numbers though it is capable of providing what specific elements are present and to what approximate proportion to each other, locally. The following results help to identify how iron of the brain-tanned hide of the pair of moccasins is closely related to the mule deer hides. The SDSM&T faculty member Mr. Russ Lingenfelter is especially thanked for the help crucial in using this machine.

Micro-Computed Tomography

- The Micro-Computed Tomography (Micro-CT) is a machine that uses a multitude of X-rays to render a three-dimensional image of the item. This would allow researchers to observe the inner contents of a closed item without opening it, ideal for this situation.
Results

Cultural Analysis:

The pair of moccasins, shown in Figure 3, loaned by the HCRCIS are very much ‘Lakota’ in terms of their philosophical designs and manufacture. Specific to the interwoven philosophy, the idea that the natural world is symmetrical is a cornerstone philosophy to the Lakota people. Further, the number seven is often identified according to symmetry best described in our recognized directions: the four cardinal directions, above, below, and the center. In understanding the moccasins it is appropriate to observe them as a pair. Certain numbers are addressed symbolically, such as four for describing our physical reality, three for our spiritual reality, and seven addressing the unity in a simultaneous fashion. These philosophies are evident for observing the two red and yellow triangles on the face of each foot on the moccasins. Together, these triangles are seen as four, most likely representing the Black Hills, our creation story describes it as our birthplace as humans. The red diamonds with the green square inside and blue bars at the end is actually to be understood as the reflected design of a tipi, a nomadic
dwelling, acknowledging the importance of the home in a child’s development. Though it may be hard to tell from the picture there is six of each element for each moccasin. This is intentional as it is understood that the wearer represents the seventh item, a concrete example of the “seventh direction” being the center, the self. The numbers represented and concrete designs are set to a white background symbolizing purity. Considering the amazing condition and intricate designs shown in Figure 3, it is highly likely that this pair of moccasins were worn for ceremonial events only.

With regard to manufacturing, represented authentic materials would be: (deer) rawhide sole, brain-tanned deer hide, glass seed beads, thread, and a red cloth sewn around the ankle. All of these items are typically used by the Lakota people with the hide obtained locally for proper preparation. Other tribes make their moccasins recognizably different as different geographical regions intuitively required different footwear to accommodate for the land (White, 1992). For instance, the Plains Indian footwear requires a hard sole to help accommodate for the rocks and small cacti. Visual inspection showed that the sole was hand-stitched using an expected whip-stitch (fully described in [Stohlman, Patten & Wilson, 2008]) as was the red cloth around the ankle. The tongue of each moccasin identifies the gender of the wearer to be female as it is one piece and not split as a male’s tongue is (Goes In Center, JhonDuane; Tamayo, Steve 2013).

The approximate age of the wearer is speculative. Typically, horizontal bar lines across the arch would indicate a female’s transition into adulthood physiologically. A female would adorn the markings of a young woman of these bar lines only through ceremony and prayer (Wissler, 1904). Since these bar lines are not present, it does not contribute much other than identifying what it is not. She could have been younger, older, or this pair of moccasins was one of a set for this wearer.
Pouch Attachment:

Figure 4 Pouch Attachment from bustle (Sean Long Fox’s Work)

Pouches were worn and obtained exclusively by men. Such pouches are typically acquired through a four day and four night ceremony of spiritual awakening known as a Vision Quest. In short, a young man transitioning into adulthood would seek spiritual guidance by living alone and fasting during this time. In doing so he would be endowed with a dream instructing him how to live the rest of his life, including that individual to collect various items pertinent to their Vision Quest dream. It is to be noted that the Vision Quest is not the only method for a Lakota male to obtain a pouch. For instance, it could be a gift of good fortune for spiritual, physical, and/or mental protection. However, if the pouch was a consequence of the Vision Quest it would be considered a taboo of the culture for a woman to handle the item as any woman would contaminate the article (Hassrick, 1988). This type of information is needed for museum curators and restorers alike to tread lightly when dealing with items of preserving/protecting the tribe-specific cultural integrity.
The focus of Figure 3 is to show the arch of the wearer. Before the establishment of the boarding schools, moccasin soles note flat feet because there was no support for the arch. This changed when children were required to wear shoes in attending the boarding schools. Forced attendance of the boarding schools was part of the assimilation process to “Kill the Indian, and Save the Man” (Pratt, 1892); in part they were forced to wear clothes in the style of their American counterparts.

The glass seed beads are Czechoslovakian made, as noted by Steve Tamayo, from the latter half of the 19th century. Pony beads were introduced to the Great Plains area in the earlier half of the 19th century and the smaller, more applicable “seed” beads easily became a high demand amongst the Lakota women (Lyford, 1992) during the 1870’s when the market for applicable beads was realized to be highly marketable in trading with the local tribes’ people.
The beads are sewn to the hides of the moccasins using a style commonly known as Lazy Stitching, “lazy” compared to spot stitching as spot stitching requires beads to be secured in groups of two or three the lazy stitch can incorporate eight beads before tacking down again. Lakota women much preferred to use the lazy stitch as their designs adherently geometrical even though it is not as secure; a compromise by design. This enables the women to bead adornments of impressive sizes.

Pouch Attachment:

The pouch was attached to a bustle (not of the European fashion context), a fixture of feathers arranged together on a lightweight, yet sturdy, backboard support then fastened around the waist. The idea of collecting feathers for accomplishments of bravery and/or kills in warfare is recognized by multiple tribes suggesting that it is a really old practice. Although it was the Omaha people who were the first to arrange the bustle in its circular fashion and secure it around the waist (Steve Tamayo, August 2013). Omaha Dance (Heylushka, now known as the Grass Dance) was brought to the Lakota people in 1864-65, including the head-roach and bustle (Big Missouri Winter Count). Prior to this the Omaha people and the Lakota people were enemies and this was a big event in the process of the “everlasting peace” (Cheney, 1998) of 1873.

More about the bustle: the Omaha people used the bustle to describe the “Second Battle.” This battle entails the fight of carnivorous birds over the carrion of men and horses from the “First Battle.” Over the centuries, the battle has taken several identifiable different forms though what the Omaha people first put together is referred to as the “Messy Bustle.” Typical of any tribe, the Lakota people absorbed the new article of clothing into their own style.
The Lakota people incorporated their feather-keeping counting coup system. To “count coup” in this context is to showcase bravery by touching an enemy and escaping both unscathed. In some cases, multiple men will count coup on the same enemy. The first man to do so shows his exploit by notching the tip of a feather, typically an eagle or hawk feather, and tying horse hair to the exposed stem. The second man to count coup will notch the right side of the feather by cutting into it horizontally. The natural grain of the feather’s fibers will create an upward curve. The third man will notch the left side of his feather. The fourth man will make multiple cuts on both sides of the feather’s stem. The fifth man to count coup will cut the fibers to about half and then strip the bottom half of the feather. Lastly, if a man is wounded he will identify it by stripping the feather in multiple places along the stem. Here is an example of cutting into a feather; this principle holds true for (most/all) feathers, note Figure 6:

Figure 6 Owl feathers had been stripped along the sides (Author’s Work)
Following in Figure 7, notes these two white bands with blue stains. This actually notes a British dying process used only in the early 1900’s. A sheet of wool was clamped on by flat metallic grips to dip the sheet of wool in that particular dye. Later on, the clamps changed to be more serrated-like. Typical American and European fashion of the time considered it an ugly necessity to be cut off when in use to make adornments. However, Lakota women found this fashionable and kept it for the men to use on such regalia.

![Figure 7 Flat-clamped wool, early 1900's](Author's Work)

**Physical Analysis: VSC 6000/HS**

The moccasins were observed under the VSC in hope of finding a fluorescent material (Long Fox, 2013). The significance of a fluorescing material could have been used to be another characteristic trait. However, this was not the case as the only fluorescence detected was very
light on the surface with nothing deterministic. Following are the images using the VSC under ultra-violet lighting:

*Figure 8 Left moccasin under UV light (Sean Long Fox’s Work)*

*Figure 9 Pouch attachment under UV light (Sean Long Fox’s Work)*
Physical Analysis: XRF

The X-Ray Fluorescence (XRF) Spectrometer identifies relative proportions of elements with higher atomic masses than Silicon, element 14. The XRF does not provide reliable numbers though it is capable of providing what specific elements are present and to what approximate proportion they are to the area inspected. The following results help to identify how iron is closely related to the mule deer hides.

![XRF Spectrogram](image)

Figure 10 Left moccasin, ankle brain-tanned hide (Author’s Work)
Figure 11 Right moccasin, ankle brain-tanned hide (Author’s Work)

Figure 12 Right moccasin, heel sole (Author’s Work)
Figure 13 Left moccasin, dark green beads (Author’s Work)

Figure 14 Right moccasin, light green beads (Author’s Work)
Figure 15 Left moccasin, white beads (Author’s Work)

Pouch:

Figure 16 Pouch attachment spectra 1, note high amount of copper (Author’s Work)
Figure 17 Pouch attachment spectra 2, different section (Author’s Work)

Figure 18 Commercially tanned deer hide inside (Author’s Work)
Figure 19 Commercially tanned deer hide outside (Author’s Work)

**Physical Analysis: Micro CT**

Pouch: The purple and orange/yellow is an infrared discoloration arbitrarily chosen. These are still images of videos, approximately 12 seconds in length.
Figure 20 Copper rings, notice the nearly even segments it is fragmented along (Author’s Work)

Figure 21 Features suggest these rings are earrings (Author’s Work)
Figure 22 Internal fiber strands, unidentified (Author’s Work)

Figure 23 Unidentified plant, possible thistle (Author’s Work)
Figure 24 Unknown plant (possible thistle) towards center (Author’s Work)

Figure 25 Another image of plant, possible thistle (Author’s Work)
Discussion

This project helped us to work with local institutions to help isolate particular materials for identification. This included more information about the tanning processes, a book bought at the journey museum for brain-tanning. Tandy Leather had a book to describe the tanning processes of vegetable and chromium tanning. It is highly suggested to document a tanning factory’s process thoroughly in future related work, also considering environmental concerns as a result.

As one overarching goal was to protect cultural integrity, visits to local establishments that sell counterfeit Native American items becomes necessary. Following are some photo examples of such counterfeit items, or items commercialized and mass produced:

Figure 26 Example of border-line counterfeit Native American art (Author’s Work)
Figure 27 Example of counterfeit dreamcatchers (Author’s Work)

Figure 28 Example of authenticity tag (Author’s Work)
Conclusion

In conclusion, the overarching goal of solidifying a large database pertinent to the Lakota culture was achieved. This database exists as a collection of books, notes, photos, and videos. Specifically for the moccasins, it is inherently difficult to determine the age of such an item for the lack of documentation. Possible evidence to support such a claim could be a photo of the moccasins either being worn or showcased in a museum at the time. Though this particular example would not fully determine authenticity, it does make for a stronger case. Since this or another type of evidence of a similar magnitude was not found, pin-pointing the decade to 1890-1900 is as close as determinable with the given data. The pouch, since the pouch itself and the bustle from which it was retrieved, had copious amounts of European materials; it is likely that this item was not ceremonial in nature.

This project also resulted in building positive relationships with local establishments and institutions such as the Heritage Center of the Red Cloud Indian School, Prairie Edge, Tandy Leather, and the Journey Museum/Sioux Indian Museum, helping to promote cultural integrity and preservation.

Summary

The pair of moccasins is plausible to have been retrieved from the Wounded Knee Massacre, though it is difficult to determine its actual date, let alone specific location for a lack of documentation. The pouch attachment does not appear to be spiritual in nature as the materials are heavily influenced by European materials.

The pair of moccasins and the pouch attachment are great pieces of historical and cultural value to the Lakota people as living documents to the time they were created and philosophy
they are imbedded with. This project reflected the usefulness of how modern technology can be useful in learning more about a people’s history. Ultimately, this is working towards cultural preservation for years to come.

**Future Work**

In the progress of this project, there were areas of study that would be of high interest in understanding aspects that are largely related to what was observed. The chemistry of brain-tanning is largely unknown along with deterioration causes, potential rates, in comparisons to vegetable and chromium tanned hides of different animals. Chromium tanning is of special interest as chromium tanned hides can be used for clothing. An important question to address is if the human body is capable of accumulating chromium from wearing items treated in that manner. Other materials of interest for chemical, cultural and historical databases are glass seed beads, feathers (of all local birds), porcupine guard hair and barbed quills, dyes, hair, sinew, and artificial sinew.
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