Journal of Undergraduate Research in Anthropology

Journal of Undergraduate Research in Anthropology
Volume V, 2021

Contents

From the Editors

Welcome!

As JURA completes its fifth volume, it is noteworthy to highlight a few milestones. Since its inception (2017), JURA has been the chosen forum for 38 undergraduate students representing eleven different universities and colleges.

Submissions have been both multi-disciplinary and geographically broad in scope with contributions that pertain to theory, archaeology, biological, linguistic, and cultural concerns.

The journal continues to grow and expand and we look forward to the next five years. Submitted articles are part of an external peer-review process, with each submission reviewed by an anonymous reviewer. We thank those reviewers for their contributions.

We hope you enjoy contributions in this volume.

Duncan P. McKinnon and Lynita Langley-Ware

Information for Authors

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- a PDF file of the complete submission
- OR a Word file containing the complete paper (i.e., including abstract, tables and figures)
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- Excel file of tables is preferred.

Queen of Mexico: How the Virgin of Guadalupe Encapsulates the Complexities of Mexican Identity

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Abstract

This research examines the complexities of Mexican identity through Virgin of Guadalupe and argues that her iconography and lore represent the varying facets of being Mexican, or *mexicanidad*. To begin, I focus on the history of Mexico in relation to colonialism and religious movements. Essential to Mexico's early history is the story of the apparition of the Virgin of Guadalupe, which proves to be central to her development as a figure. The paper moves towards contextualizing the Virgin of Guadalupe into three key eras: colonial Mexico, an independent Mexico, and a present-day Mexico, which includes Mexican diaspora to the United States. Given the general *mestizo* identity to Mexico's culture and history, the Virgin becomes a fluid figure, adapting to geo-political events, domestic conflicts, and systems of oppression. While throughout my argument I make generalizations, I do not conclude that all Mexicans can relate to the Virgin, nor do I state that in order to be Mexican one must have a connection to the Virgin of Guadalupe. Rather, I assert that the Virgin is an icon that draws in many aspects of Mexican identity.

Introduction

December 12 marks one of the most important religious celebrations in Mexico. This day commemorates the apparition of the Virgin of Guadalupe to Juan Diego and is her feast day in the Roman Catholic Church. The Virgin of Guadalupe goes by many names--*Nuestra Señora de Guadalupe*, *La Morenita*, Queen of Mexico, Patroness of the Americas, Empress of Latin America--and is revered in Mexico and throughout Latin America. The Basilica of Our Lady of Guadalupe is located in Mexico City (Figure 1). The Basilica is one of the most visited religious sites in the world with an estimated 20 million visitors a year (Orcutt 2012). The importance of Virgin of Guadalupe to Mexico's history and culture cannot be overstated. To know the Virgin is to know Mexicans, as she represents the syncretism of Indigenous and Spanish and, like Mexican culture and identity, she is not stagnant and attunes itself within the larger societal changes. While she began as a symbol of hope to the recently overpowered Indigenous people, she has since been used in wars as a unifying icon, to intercede on matters of social justice, and more recently as a means of comfort to disenfranchised populations and immigrants. The figure of the Virgin of Guadalupe embodies the complexities of Mexican identity.

Historical Context

First, it is important to understand the roots of Mexican identity which stem from Spanish and Indigenous cultures. In early Mesoamerica, there were hundreds of powerful and complex civilizations. One of the older civilizations was that of the Teotihuacán. Located about 50 kilometers
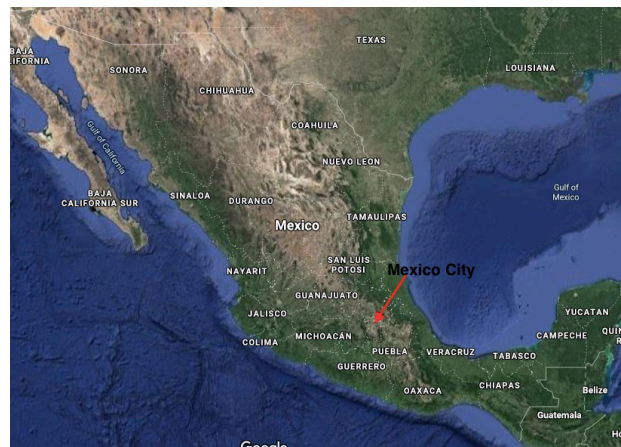
Figure 1. Map of Mexico with reference to the capital, Mexico City. Map Data 2021© Google Earth.

from modern Mexico City, Teotihuacán had a vast empire that influenced all of Mesoamerica (Hamnet 1999:37). This early civilization had a written language, calendars, numerical systems, and massive populations. The capital and largest city was called Teotihuacán and its remains are still present today. Although they were weakened and fell in approximately the eighth century, their religious legacy influenced the Aztecs who adopted some of their gods and cosmology. By the 1400s, the Aztecs had become the most powerful empire in the region and were also known as the Mexica. According to legend, they witnessed an eagle standing on a cactus eating a snake, and built their capital Tenochtitlán in that same location (Hamnet 1999:48). The empire had a complex system of trade involving tribute states, effective water

transit systems, and massive cities with thousands of residents. Despite the splendor and social complexities, in 1521 the Aztec Empire fell to Spanish conquistadors, who were aided by many of the Aztec tribute states. The territory was claimed in the name of the Spanish Crown, and it was soon named *Nueva España* (New Spain) (Hamnet 1999:59).

With the arrival of monks, Spain hoped to evangelize to the Indigenous people of New Spain in the name of the Catholic Church. However, the more nefarious motivation was to ensure control over all aspects of their lives. Monks performed mass conversions and forced the Indigenous to live in missions where their daily routines revolved around Catholic religious services and prayer. In the missions Indigenous people maintained the grounds, helped with crops, and learned Catholic teachings. This massive cultural change took away the identities and agency of the Indigenous people.

Only ten years after the fall of Tenochtitlán, Juan Diego witnessed the apparition of the Virgin Mary on Tepeyac--a hill on the outskirts of Mexico City (The Vatican 2002). Juan Diego was an Indigenous man recently baptized into the Catholic Church. The Virgin asked that he go to the bishop and request they build a shrine on the hill in her name. She promised to, "pour out her grace upon those who invoked her" once the shrine was built (The Vatican 2002). Juan Diego went to the bishop who did not believe him. He returned to Tepeyac and was instructed by the Virgin to gather flowers and bring them to the bishop. He gathered the flowers that were in bloom, despite it being the middle of winter, and brought them to the bishop. According to the legend when he opened his *tilma* (an Aztec outer garment) the flowers fell to the ground and there was an image of the Virgin Mary imprinted on the garment (Figure 2).

What made her apparition and subsequent miracle unique was her image and the language she spoke. In the image, she appears as a dark-skinned woman with dark hair. This depiction of her resembling the Native Indigenous population contrast her normal depiction, which was largely shaped through European artists who painted her as a light-skinned woman. Second, she did not speak Spanish; she spoke Nahuatl, the language of the Indigenous population. By using the Aztec language, she once again aligned herself to the Indigenous man in which she appeared. At the most basic level, the Virgin of Guadalupe, as the apparition became to be known, was both Indigenous and Spanish--she was a Catholic figure yet looked and talked like an Indigenous person. For both the Spanish and Indigenous she symbolized promises. For the Spaniards, her apparition signified a divine sign that their conquest was approved by God thus destined to be filled with glory and riches. In contrast, the Indigenous population saw her apparition as a sign of hope and

Figure 2. *Virgin of Guadalupe*, Antonio de Torres, 1720.

compassion. As colonial life settled in Mexico, she came to represent something more than the Indigenous or Spanish visions. She grew to represent the people of Mexico, the *mestizos*.

Guadalupe and a Developing Mexico

Tonantzin or the Virgin Mary?

The Virgin of Guadalupe's importance to Indigenous people may not be entirely based on the hope she gave to them, however. Tepeyac Hill was a pilgrimage site for several Aztec deities, including Tonantzin (Novoa 2004:267). In addition to being referred to as "Our Blessed Mother," Tonantzin held power over fertility, disease, and natural disasters. It is important to note that the Spanish were aware their mass conversion efforts did not prove as successful as they had hoped. In order to counter "paganism" they took an approach using syncretism by imposing Catholicism values in Aztec sacred spaces and as well as linking Catholic holy figures to Aztec deities. Tepeyac Hill and the center of Tenochtitlán were once sacred spaces of Aztec worship where Catholic churches were constructed by Spaniards (Figure 3).
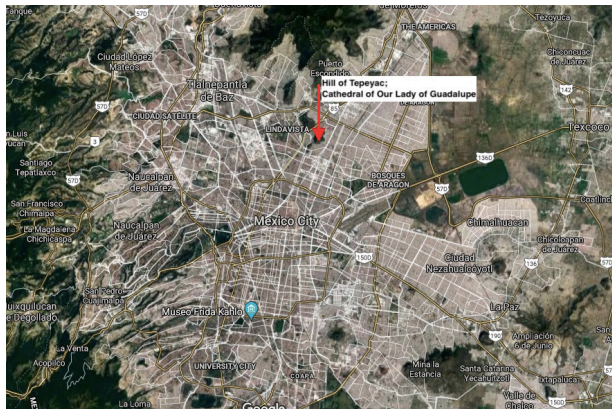
Figure 3. Map of Mexico City with reference to the Hill of Tepeyac and the Cathedral of Our Lady of Guadalupe. Map Data 2021© Google Earth.

Bearing in mind the overlay and integration of Indigenous and Catholic belief systems, it is plausible to assume that Virgin of Guadalupe became a substitute for Tonantzin. Both are calm, benevolent mother figures whose association with fertility are important to their images. Additionally, the colors of Guadalupe's cloak and dress are similar to Tonantzin's colors and iconography. This potential association with Tonantzin no doubt provided comfort to Indigenous people who found their way of life destroyed within a short amount of time. Conversely, it could be perceived as a way for them to take some ownership of this new religion. Able to hold onto their goddess and satisfy the expectation of Catholicism for the Spanish, the Indigenous maintained some sense of control. For the Indigenous who found their identities shattered, the image of the Mother of God appearing to one of their own provided comfort and hope.

Another marginalized group were the *conversos*, or Jews who converted to Catholicism to avoid the consequences of the Spanish Inquisition following the *Reconquista* of Spain from the Moors. Some Jews fled to the Americas in hopes of finding religious tolerance yet still hid Judaism under the cover of darkness and much like the Indigenous they found comfort in the Virgin. Scholars and clergy alike have linked the Virgin of Guadalupe and Mexico for centuries. Marie-Theresa Hernández (2014) wrote on this connection and asserts that to *conversos*, Guadalupe represented a Jewish Nation and potentially is the Messiah. Guadalupe could be the Messiah because the Messiah is, "one who supports, sympathizes, empathizes, and mediates" (Hernández 2014:140). In all her early interpretations, the Virgin embodied those characteristics. She supported the Indigenous who likened her to Tonantzin and she mediated between the Spanish conquistadors and God. Hernández (2014) also refers to a Catholic priest named Manuel Espinosa de

los Monteros who wrote extensively on the connection between the Old Testament, Guadalupe, and the second coming. Throughout the apocalypse, Mary appears with the moon and stars, cloaked in the Sun--features that are included in the Virgin's apparition. Bearing these connections in mind, Guadalupe became a symbol of hope and liberation while acting as a prophet. While this usage of Guadalupe veers from the primary narrative discussed herein, it further demonstrates that Mexicans, regardless of their religious affiliation, see Guadalupe as more than a religious symbol.

The Castas

From the mid-sixteenth and into the nineteenth century, a racial hierarchy was exemplified through an art genre known as *castas*. While this system was complex, it was a complete social construction. *Castas* translates to "caste" and the Spanish used the system to ensure their status of elites. *Castas* paintings personified the racial classifications by showing a family with a father who was from a higher racial and social class than the mother. For an understanding of Mexico today and the role of Guadalupe, it is only important to understand the basics of the system. Those born to Spanish parents in Spain were known as *Peninsulares* and were at the top of society. *Criollos* referred to those born in New Spain to two Spanish parents (Cline 2015). While not as elite in status as the *Peninsulares*, *Criollos* managed the daily functioning of the colonies. *Criollos* are also referred to as *Creoles*, which is not to be confused with the Afro-Caribbean definition. Below the *Criollos* were the *mestizos*, a mix of European and Indigenous. Broadly speaking, *mestizo* can be used to signify a mix of any two races. The Indigenous, or *Indios*, were the lowest class (with the exception of slaves from Africa) (Cline 2015). As immigration of *Peninsulares* decreased, *Criollos* gained more power and influence over the colonies. Additionally, *mestizos* became the majority although they never saw an increase of their power.

There are a variety of *castas* paintings by a number of artists where Luis de Mena's piece featured the Virgin of Guadalupe. Using the Virgin in a *castas* painting was unheard of; although, the paintings often modeled families on the Holy Family featuring a mother, father, and son. Mena's painting situates the dark-skinned Virgin centered at the top overlooking the families. Her place in the image could signify an acknowledgement of her unique role in New Spain or it could be a nod to her image from Mena. Regardless, her inclusion conveys her standing within the colonies. The first panel presents a Spanish woman (*española)* with an Indigenous man, another rarity for the day as most depictions used a Spanish man with an Indigenous woman. Sarah Cline (2015) believes that the choice to use an *española* was deliberate and states that, "the *española*, like Guadalupe,

can be conceived of as the maternal, Christianizing force for the colony" (Cline 2015:228). While not elevating women too much, this image acknowledges the role women played in assimilation efforts especially in regards to childrearing and homemaking. In this sense, Guadalupe's power is just as linked to her femininity as it is to her ability to aid in the Christianizing mission of the Spanish.

A Loyal Nation

Historically, a large portion of the Virgin's power emerges from hegemonic powers, like the *Creoles* or Catholic Church. *Creoles* believed her apparition showed Mexico as a "favored city" and even equated it to a New Jerusalem (Peterson 1992). With this mindset, they could create a national icon that was not imposed by the Spanish or resulting from Indigenous practices. Rather the national icon was unique to New Spain and the people who lived there. In the mid-eighteenth century an epidemic swept through Mexico City and Puebla. To stop the spread and end the suffering, residents prayed to Guadalupe and it is believed that she interceded and saved the people. Soon after, she became the principal protectress of Mexico City and later became the patroness of the entire colony (Peterson 1992). In 1737, Mexicans began calling themselves "serfs of Guadalupe" to signify their appreciation to her aide during the epidemic (Conover 2011). As Guadalupe began to rise as a symbol of protection, the Catholic Church seized this opportunity to further intensify their control. They declared a feast day to celebrate her apparition (December 12) and built churches and chapels dedicated to her. One of the most prominent is The Basilica of Our Lady of Guadalupe.

The Virgin of Guadalupe's importance to modern Mexico truly began with the War of Independence in 1810. Irate with Spanish policies and suppression, *Creoles* started an uprising that eventually included *mestizos*, the Indigenous, and the clergy. Father Miguel Hidalgo, who is credited with starting the war, relied on the image of Guadalupe to draw a more diverse audience. He saw her as wholly Mexican and asserted that she belonged to Mexican people, much like the land they sought to claim as their own as part of the war for independence. Her image appealed to the masses and Hidalgo even went so far as to name her the "General Captain" (Peterson 1992). Even though Hidalgo was a priest, he used her as a symbol to unify a people not under a religious theme, but as a shared, common past. With the birth of an independent Mexico, her the Virgin truly began to represent the Mexican people. One hundred years later the Mexican Revolution began and once again Guadalupe was pulled out to unite factions. Pancho Villa and Emiliano Zapata, both rebelling against the regime of Porfirio Diaz, found her to be important to their causes.

Specifically, Zapata, a devout Catholic who grew up in a region where Catholicism retained some Indigenous rituals, and his Zapatistas followers stitched her image into their hats (Castañeda 2011). Guadalupe symbolized hope for the Zapatistas who were largely marginalized agrarian workers from Indigenous backgrounds. Both Hidalgo and Zapata employed Guadalupe to unite those oppressed by those in power and she soon became the unofficial patroness of the poor and marginalized.

Guadalupe and a Modern Mexico

Before continuing into Guadalupe's presence and influence in modern Mexico and in the United States, it is beneficial to review demographics, beliefs, and trends of Mexico within the last 75 years. As of 2012, there were an estimated 33.7 million people of Mexican origin in the United States, and of that, 11.4 million immigrated directly from Mexico (Gonzalez-Barrera and Lopez 2013). According to the same study, more than half of Mexican-Americans have at least one immigrant parent. Mexican migrants mainly concentrate themselves in Southern California, Houston, Dallas, and Chicago (Gonzalez-Barrera and Lopez 2013). Bearing all the above in mind, Mexican and Mexican-American communities are growing and maintaining their heritage through an increase in migrants from Mexico. These new immigrants bring traditions and customs which perpetuate staples of Mexican culture. In terms of religion, it is estimated that almost ninety percent of Mexicans are Catholic; however, the number of non-religious people has risen by over fifty percent (Instituto Nacional De Estadística 2010). Even with an increase of non-religious people, Catholicism continues to emerge as an influential and important factor in Mexican identity. Catholicism has influenced the political landscape of Mexico for centuries often creating resentment from lower classes and the marginalized communities.

As explored, Guadalupe provides an understanding of notions of race, religion, and hope within Mexico. Her image has evolved to represent Mexicans, and Peterson (1992) writes that many Mexican-Americans cling to her image in order to create "communal solidarity" in an environment they may feel unwelcome. There was a reported apparition of the Virgin in Chicago's Far North Side neighborhood of Roger's Park in 2001 to an immigrant from Mexico (Peña 2008). Although never officially recognized by the Catholic Church as a confirmed apparition, *Guadalupanos* have flocked to this site since the apparition, and it serves as a reminder of the transcendent power of the symbol of the Virgin. Elaine Peña (2008) believes the power of this apparition and subsequent shrine has been enhanced by the community who is often adversely affected by xenophobia, immigration policies, and ignorance. While

Figure 4. Title Unknown, Antonio Pazos, 1992.

Roger's Park is a diverse and generally a welcoming community, outside its confines Mexican immigrants face discrimination. Another challenge to the Mexican-immigrant community are the sometimes-restrictive immigration policies, as they are often unable to travel outside the United States while applying for Permanent Residence Cards (Green Cards). In order to counter the discrimination and longing for their natal land, they cling to the symbols that remind them of home. Although there are official (i.e., sanctioned by the Catholic Church) shrines to Virgin of Guadalupe in Mexico, the Roger's Park shrine provides those unable to travel to Mexico a place to remember, reflect, and pray to the Blessed Mother. Returning to Peterson's (1992) idea of "communal solidarity," the 2001 apparition in Chicago shows, "outsiders that their [Mexican immigrants] expressions were at once singular and diversely connected" (Peña 2008:115). In other words, Mexicans built a unitary community around a single image or object when faced with adversity. Guadalupe, being fully Mexican and rooted in faith, gathered people. Peña (2008) also asserts that Guadalupe supports the ideas of "Mexican nationhood" even if this was not important to this specific apparition until after its authenticity was challenged.

Another realm which exemplifies the idea of communal solidarity is music. Kinto Sol is a hip-hop group based in Milwaukee and often writes about Chicano and Mexican identities. One of their songs, "Somos Mexicanos" (We are Mexicans), explains what Mexicans should be proud of. One verse pertains to heroes and icons born in Mexico and states, "Virgen de Guadalupe la mas bella de las flores," (Virgin of Guadalupe the most beautiful flower) (McFarland 2013:89). Guadalupe is understood to be one of the most important icons in Mexican history. The title of the song indicates what is needed to be Mexican and Virgin of Guadalupe is included in that along with *mariachi*, tequila, and *luchadores*. According to Pancho McFarland (2013), Kinto Sol's music seeks to affirm Mexican identity and to explain why Mexican-Americans should be proud of that identity. McFarland also notes that Kinto Sol firmly argues for Mexican unity and ethnic pride. Further, this solidifies that Guadalupe is an important aspect of *mexicanidad*, of being Mexican.

Guadalupe, the Muse

Virgin of Guadalupe is also featured in art regularly and is often depicted in murals across the United States. One mural in Tucson, Arizona illustrates the "birth" of the Mexican identity through icons important to both Aztec and Spanish (Figure 4). The Aztecs are represented by the snake and eagle (which can be found on the present-day Mexican flag) and Tonantzin, the Aztec goddess of fertility.

Opposite of them are the Spanish, who have their ships, conquistador, and Guadalupe on their side. In this mural, Guadalupe and Tonantzin mirror one another. Tonantzin, is wearing the same colors as the Virgin and appears in a similar meditative state. Through this, Guadalupe assumes the maternal role once assigned to Tonantzin. This mural shows the origins of an early Mexico and Guadalupe is seen in position to be one of the founders of the modern Mexican, which solidifies her place in the narrative of Mexico.

Another mural in Chicago shows the Virgin praying over immigrants (Figure 5). These immigrants are from Mexico and most likely are facing the hardships of traveling to a new country in search of a better life. As mentioned, Guadalupe gave comfort to the marginalized and oppressed. Her presence in this mural, positioned above the migrants in almost a pained way, shows the continuation of her as a comforting icon. An additional point to note about this mural is its location. Although Chicago is a diverse, multicultural city, most murals that depict the Virgin are found in the towns along the Mexico border or within Mexico. Its location in Chicago showcases how widespread Mexican and Mexican-Americans are as well as the perseverance of the Virgin.

Even in more formal art settings, Guadalupe's image and symbols are featured to represent Mexican identity. Yolanda Lopez, a Mexican-American artist, painted a self-portrait in which she is running out of the sun rays in which the Virgin of Guadalupe normally resides (Figure 6). In this portrait Lopez retains essential parts of the original icon of the Virgin--the cloak with stars on it, the sunbeams radiating out, and the blue and pink colors--while including another symbol of Mexico, the snake in her hands. The woman is also young and energetic, potentially demonstrating Guadalupe's consistency in serving as Queen of Mexico.

Lopez also painted two additional images of the Virgin based on this model--one of her as a mother at a sewing machine and the other of her as a grandmother simply sitting. The depiction of the Virgin as a mother sewing represents the unwavering hard work and dedication she has for her people. In contrast to the movement and actions depicted in the her other portraits, the painting of a grandmother shows a woman who looks tired but has a dead snake in her hands. Mostly a nod to the Mexican flag, this grandmother shows strength and *mexicanidad* much like Guadalupe has since her apparition. Shifra Goldman argues that the grandmother portrait of Guadalupe "pays tribute... to the racial and religious affirmations of the Chicano movement" (Goldman 1990:170). Guadalupe is a symbol of Mexico yet can be transferred to Mexican Americans, which came to be vital to the Chicano movement of the 1960s-1970s. The Chicano Movement was a civil rights movement

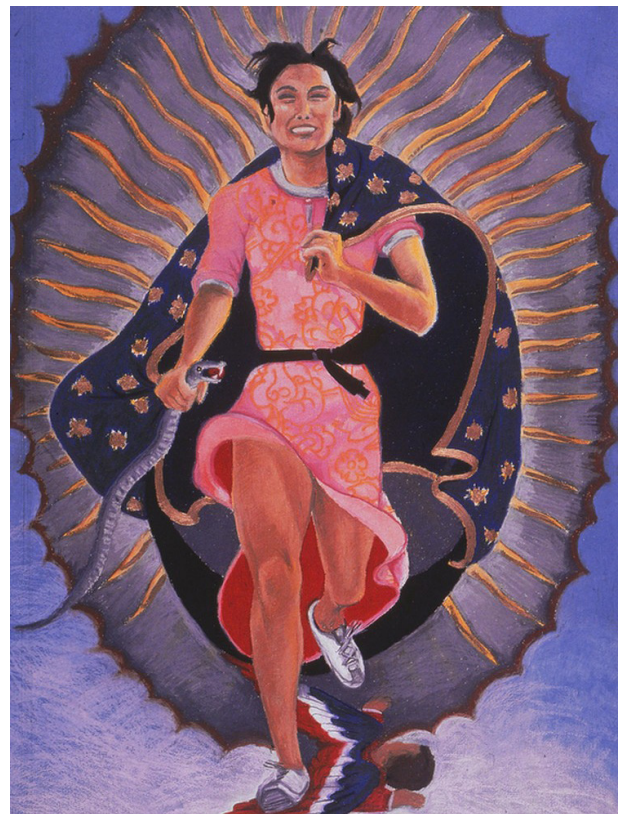Figure 5. "Unbelievable Things You See" Artist Unknown, 1997.

Figure 6. Portrait of the Artist as the Virgin of Guadalupe, Yolanda Lopez, 1978.

that sought to reaffirm rights and citizenship of Mexican-Americans (Chávez 2002:43). Chicanos were Mexican-Americans born during the post-World War II baby-boom, who unlike their white counterparts, experienced insertional racism and restricted opportunities. Within the Chicano Movement, there were demonstrations for farm workers, most notably the Delano Grape Strike, led by Dolores Huerta and Cesar Chávez. Within the context of the Chicano Movement, *mexicanidad* was used to authenticate Chicano identity, which was bolstered by using symbols that were synonymous with Mexico such as the Mexican flag, Guadalupe, and Mayan temples. Chicanos struggled with civil rights and equality which led to a reliance on a strong figure who had the backing of an entire nation to legitimize their struggle while building community around them.

Throughout these images and depictions of Guadalupe, there are variations and constants alike, which demonstrates the complexities she encompasses. Each painting or mural shows movement and interaction of some sort, illustrating the ever-changing makeup of Mexico. Mexico and its citizens are not stagnant and have never been. Whether encountering new peoples or migrating across borders, Mexicans evolve and adapt, much in the same way as Guadalupe's depictions. She can appear energetic and eager to face challenges, such as confronting national economic and social concerns; or she can be pained and frustrated when facing multi-national issues that plague her people. The various art forms also show an awareness for history and current social issues. In the Pazos mural (see Figure 4), the momentous meeting of Spanish and Aztec sets the stage for the future of Mexico. In the "Unbelievable Things You See" mural (see Figure 5), the Virgin's watchful vigil over the migrants calls to attention the enormous geo-political discussion regarding migrants traveling from Mexico, northward.

Counterarguments

Despite evidence which supports the Virgin of Guadalupe as a representation of Mexico and Mexicans, there are many who suggest it is impossible to fully encapsulate an entire nation and people within one image. Eric Wolf (1958) describes the Virgin of Guadalupe as a Mexican "master symbol" yet notes, "it is no longer legitimate to assume 'that any member of the [national] group will exhibit certain regularities of behavior which are common… among the other members of the society.'" (Wolf 1958:34). According to this argument, societies are complex and thus naming only one symbol to describe an entire society neglects the diversity and different lived experiences. Considering the population of Mexico, estimated to be 127.6 million in 2018, and the population of Mexican-Americans, at over 33 million, the

Virgin could never accurately characterize each Mexican and Mexican-American. A 2014 blog post written by a University of Texas undergraduate student (Eric) reflects on what it means to be Mexican-American and his experience growing up as a fifth-generation Mexican-American. In the post, he acknowledges that there is no right way to be Mexican. Rather, it contains variety and depth (Literally Darling 2014). While some of his experiences are trademarks of *mexicanidad*, such as *quinceaneras* and tamales at Christmas, his overall identity is not shaped by a singular definition. Considering this, naming the Virgin of Guadalupe as the symbol that best describes Mexicans socially stretches her among those who may not know her or identify with her. This is an important consideration as the cultural makeup of those who identify as Mexican is always changing.

Although Wolf, Silverman, and the blog post contradict the argument that states the Virgin of Guadalupe encapsulates Mexican identity, those authors fail to recognize the fluidity of the Virgin. Even though some Mexicans may not believe in her apparition or identify with her image, she has played a role in the development of Mexico. Her image was important for the War of Independence and subsequent Revolution, which most Mexicans are aware, and, much like in the United States, take pride in this history. To say the Virgin embodies Mexican identity does not mean that in order to be Mexican one must identify with Guadalupe. Rather it asserts that her origins and manifestations embody aspects of Mexican identity. She combines *mestizo* with Spanish and adapts to the cultural changes of Mexico--elements that nearly all Mexicans understand. It is important to bear in mind her connection with Catholicism. Although she has evolved from the Catholic Church, the dialogue surrounding her legitimacy is Catholic. And while the population of religious people is falling in Mexico, the political and cultural landscape of Mexico is still influenced by Catholicism as a guiding philosophy. Because of these connections to the Catholic Church, it is likely that Guadalupe's following will not fade and will continue to be synonymous with Mexico.

Conclusion

The *Plaza de las Tres Culturas* in Mexico City memorializes three periods of Mexican history--pre-Columbian, Spanish colonial, and an independent Mexico. One statue commemorates the Fall of Tenochtitlan with an inscription which reads, "On August 13th, 1521, Tlatelolco fell to Hernan Cortes, after having been heroically defended by Cuauhtemoc. This was neither a victory nor a defeat, but rather the painful birth of the *mestizo* people that is Mexico today" (Castañeda 2011). This inscription sets up the origin story of modern Mexico, while acknowledging the more painful aspects of this history. The Virgin of

Guadalupe's longevity stems from her origins, which are the same as modern Mexico's origins. Like the *mestizo*, the Virgin came from a "defeat" of the Aztecs and the "conquest" of the Spanish. And while Mexican identity has evolved from the dichotomy of Indigenous and Spanish, so too has the interpretation of the Virgin of Guadalupe. Much like her people she has adapted to changing identities. She symbolizes hope for immigrants much like she gave hope to the recently defeated Aztecs. Song-writers praise her for the pride she brings Mexicans and the same can be said for revolutionaries like Father Hidalgo and Zapata. Her image has always been used in art--from showing the caste system to personifying an everyday woman--that represents Mexicans both past and present. While the Virgin of Guadalupe cannot be imposed on every Mexican, there is no doubt her myth, image, and uses embody *mexicanidad* in a way that no other figure could.

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Does Congressional Representation Matter: The Role Women Play in Reducing Domestic Violence Rates

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Abstract

With the 2018 election of Deb Haaland and Sharice Davids to the U.S. House of Representatives there has been a focus to address a variety of Native American women's issues related to domestic violence and missing and murdered Indigenous women. This paper considers the eradication of domestic violence, disappearance, and murder of Indigenous women through the policies supported by Davids and Haaland which might lead to a change in policy and initiatives focused on domestic violence and murdered Indigenous women. A short comparison of Canadian Parliament with those of the U.S. Congress concludes the paper and is included given the similar histories of colonization.

Introduction

The 2018 congressional election results revealed an historically diverse U.S. House of Representatives, including the election of the first two Native American women (Davids 2018; Haaland 2018). Deb Haaland, who is a Laguna Pueblo, and Sharice Davids of the Ho-Chunk Nation, have made clear their intentions to address matters facing their communities and Native American women's issues. These issues are domestic violence and missing and murdered Indigenous women. This paper considers the possible impact of the first two Indigenous women to be elected to the U.S. House of Representatives toward the eradication of domestic violence, disappearance, and murder of Indigenous women. Both Davids and Haaland have focused on these issues in their platforms which might lead to a change in policy and initiatives focused on domestic violence and murdered Indigenous women.

There are many contributing factors to consider when analyzing why domestic violence rates are so high for Indigenous women. This paper explores the effects of colonization, policies, and stereotypes that have drastically impacted Native Americans since the first European arrival in 1492. Since there is no precedent of Native American women in U.S. Congress, this study also analyzes the impact women in congressional positions have on women's issues in general within the United States, specifically the initiatives preceding and following the passing of the Violence Against Women Act (VAWA). For comparison, Canada's elections of Indigenous women into positions in the Parliament of Canada will be summarized. A comparison of Indigenous women in Canadian Parliament, as well as the social and political impacts women have made in the U.S. Congress thus far, will benefit in predicting the possible positive implications associated with the first two Native American women in U.S. Congress.

Theory

Works found under the categories of Gender Theory and Feminist Theory can attempt to explain the dangers Native women have had to deal with on and off reservations. For example, Slocum (1975:408) discusses the importance of recognizing male bias in the study of women and women's roles. This theoretical perspective could be used as a framework to analyze why domestic violence and missing and murdered Indigenous women persists, why it has not been recognized as a legitimate issue, and why Native women's roles have been trivialized, especially in the case of tribal sovereignty and the redistribution of land. However, in the particular characteristics that create situations of domestic violence for Native American women, Historical Particularism is a more fitting theoretical perspective.

Historical Particularism was a concept introduced by Franz Boas (1920:138), although the term was coined by Marvin Harris (1966:309). This theoretical paradigm is concerned with framing cultures or cultural phenomenon within particular historical contexts. Considering culture is not static, it is counter-productive to study it without considering the historical events that occurred and define cultures (Boas 1920:138). For the purposes of this paper, it is necessary to consider the historical factors that placed, and still places, Native American women in a particularly vulnerable social positions that increase the likelihood of experiencing violence. Historical Particularism will also aid in a comparison of Indigenous representation in Canadian Parliament with those of the U.S. Congress, since two countries have similar, yet distinct histories of colonization.

The second theoretical paradigm used to frame this study is from a Marxist-Feminist perspective and a focus on the circumstances that created gender inequality in post-colonized North America (Leacock 1983:421-434). There is a popular idea that gender inequality is a

previously existing phenomenon as a result of hunting and gathering subsistence and its associated divisions of labor. However, Leacock (1983:421) dispels this idea by considering Native American attitudes toward domestic violence within those tribes that practiced horticultural and foraging practices in pre-colonial times (1983:420). This perspective employs Marxist positions on the origins of inequality that stem from a distance from production processes and the emergence of dyadic relationships that created individually operating households (Leacock 983:425). This perspective can be used as a framework when considering issues of tribal sovereignty and the incongruence with the U.S. Government court system and a lack of protection and justice for Indigenous women. Secondly, when considering inter-generational trauma carried by Indigenous women, it is important to consider the violence and forced European gender role expectations that accompanied colonization.

Sharice Davids and Deb Haaland

There has been a surge in the last ten years of Native American women holding prominent positions of power and engaging in laws that directly impact Native American peoples (Leeds and Gunsaulis 2012:305). Sharice Davids is the daughter of a single mother Army veteran. She is a member of the Ho-Chunk Nation, a Native American Tribe in Wisconsin and graduated from Leavenworth High School (Davids 2018). She attended Haskell Indian Nations University and the University of Kansas and earned a law degree from Cornell Law School (Davids 2018). Sharice has lived and worked on Native American reservations, working with tribes to create economic development opportunities, programs, and initiatives and she regularly speaks at conferences as a nationally recognized expert on economic and community development in Native communities (Davids 2018).

Deb Haaland served as U.S. Representative for New Mexico's 1st Congressional District (Haaland 2018). In 2021, Haaland was appointed as the 54th United States Secretary of the Interior (U.S. Department of the Interior [USDI] 2021). Deb Haaland was born into a military family with her mother serving in the Navy and her father in the United States Marine Corps (McKosato 2014). She has a daughter, whom she has raised on her own (Haaland 2018).

Pre-colonization Pueblo were matriarchal (passing lineage and property through women) and this largely changed with Spanish settlement and associated European patriarchal ideas (Fouriezos 2018). Women were not allowed to run for the Laguna Pueblo Tribal court until the 1990s when Haaland helped a friend challenge the court. These efforts ultimately led to a change Laguna Pueblo Tribal court policies (Fouriezos 2018). Haaland has served as Tribal administrator for

the San Felipe Pueblo in New Mexico and was the first woman to serve as Chair of the Laguna Development Corporation Board of Directors (McKosato 2014).

Haaland also protested the North Dakota Access Pipeline with the Standing Rock people at Standing Rock Indian Reservation (Haaland 2018). In an interview with Rolling Stone, she recounted her experience in reaching out to rural Native communities for votes on the John Kerry campaign in 2004 and emphasized her efforts in pushing the U.S. Government to realize the trust and treaty responsibilities it has with tribes (Stuart 2018). However, she noted that she is not an overall voice to these tribes, but will attempt to facilitate and empower tribal leaders to be able to voice their concerns for their own tribes (Stuart 2018). Haaland has remarked, "My mother still raised us in a Pueblo household…in spite of the fact that we moved around a lot, we still kept those strong ties to my grandparents and our community of Laguna Pueblo. You can be Native wherever you are" (Nelson 2018:1).

In an interview on Late Night with Seth Meyers (Late Night with Seth Meyers [LNSM] 2021), she was asked about being the first Native American woman appointed Secretary of the Interior:

> You know, for centuries Indians were, I mean, we are victims of genocide, quite frankly, since the Europeans came to this continent and began colonizing Native Americans in this country. We've been through many eras of detrimental federal policies, assimilation, you know, my grandmother, for example was taken from her home when she was eight and sent to a Catholic boarding school. For five years she wasn't able to come home. So those are some of the things that we live with, and it's caused generational trauma to many communities and so I feel like with President Biden in office with his priority of ensuring that we live up to those trust and treaty obligations that it's a new era for Indian country (LNSM 2021).

When asked about how the Department of Interior can assist with President Biden's pro-climate agenda, Haaland responded:

> We want to make sure that we have a 30 by 30 initiative, America the Beautiful Initiative, we're going to Conserve 30 percent of our lands and oceans by 2030, make sure that we are protecting habitats. Right now, we're just on the edge of celebrating the Endangered Species Act, the bald eagle is in the highest numbers that it's been for decades and we absolutely, I mean, we have a lot to celebrate. So, we're gonna keep on that trajectory, we're going to make sure that

climate change is a priority for us here at the DOI [Department of Interior]. We're working in conjunction with many of my colleagues in other departments to make sure that we are doing our utmost to turn that around (LNSM 2021).

History of Native American Women and Violence

For the purpose of brevity, this overview of colonization in what is now the United States generalizes women's roles and positions in pre-colonized Indigenous cultures, although recognizing that each Indigenous culture had its own unique practices and beliefs. The purpose of including a brief summation of the processes of colonization, forced ideological changes, displacement, relocation, biculturalism, intergenerational trauma, and stereotypes is to attempt an understanding of the unique plight of Native American women. These factors all contribute to higher rates of domestic violence and missing and murdered Indigenous women today (Barkdull 2009; Bohn 2003; Hart and Loether 2008; Mihesuah 2003; Weaver 2009; Whitbeck et al. 2004; Whitbeck et al. 2009).

Colonization and Patriarchal Ideology

Europeans first arrived to what is now North America in 1492 and the following two-hundred years of various Spaniard, French, and English conquests brought mass destruction and genocide of Native populations and cultures. The legacy of Manifest Destiny, or the idea that Indigenous people and their cultures were worthless and therefore required usurpation and annihilation by Western civilization, is a legacy that continues with the oppression and violence against Native American women today (Bohn 2003; Walters 2003; Weaver 2009).

Colonization, or the displacing and undermining of social values, cultures, beliefs, institutions and structures, and other ways of life, forces change among a group of people through the ideas and benefits of the colonizer (Weaver 2009:1553). Pre-colonization, Native tribes typically viewed women as "life-creators" and "life-sustainers" (Hart and Loether 2008:191). Each woman's role was unique to her tribe, yet different than the colonizers had recorded (Lajimodiere 2011:58). Women's leadership in tribes were centered around control of horticulture production, land, chief nomination, along with village and tribal decision making (Lajimodiere 2011:58; Weaver 2009). Women's positions and spiritual/healing powers were seen as at least equal to men, if not more (Lajimodiere 2011:58; Weaver 2009). The gift of healing in Native communities has been traditionally seen as the natural responsibility of mothers, wives, and grandmothers (Weaver 2009). Before European contact, domestic violence was rare, and if it occurred it came with social consequences (Bohn 2003). The process of colonization brought with it many misogynistic patterns of thinking, which introduced violence against women into Native communities (Hart and Loether 2008:192). This process, largely through Christian institutions that place power in male leaders and a single male deity, undermined the spiritual and social roles of Native women (Chester et. al. 1994). Mihesuah (2003:41) summarizes the injustices faced by Native women, "Women faced the intruders who invaded their lands and watched the devastation of their ways of life... Indigenous women suffered sexual violence and abuse at the hands of Euro-Americans, and those men created stereotypes and false images of Natives for their own gain." Through physical violence and assault, as well as forced patriarchal ideological changes, Indigenous women had their culture and positions in society stolen from them. The effects of colonization created a type of "trickle down patriarchy" and internalized sexism that is found in contemporary Native communities and tribal politics (Jaimes-Guerrero 2003; Smith 2005; Weaver 2009).

Displacement

Native people were displaced from tribal lands and families were separated. This displacement and relocation brought with it forced patriarchal ideas and stereotypes of Native women (National Coalition Against Domestic Violence [NCADV] 2015:3). For example, The Indian Removal Act of 1830, imposed by President Andrew Jackson, voided previous treaties guaranteeing land rights to Native Americans and forced the relocation of Southeastern Native Americans to lands west of the Mississippi River (Cave 2003:1331). This forced removal and relocation of displaced groups led to numerous struggles in subsistence within these new lands (Akers 1999).

By the late 1800s, boarding schools, like the Carlisle Indian School, aimed to further assimilate Indigenous children into mainstream society, distancing them even more from their matrilineal traditions (Lear 2015). Through forced subsistence patterns, boarding schools, laws, and policies, numerous tribes adopted attitudes about women from the dominant patriarchal society (Fox et al. 2015). Reservations during the allotment period (1880s-1935) were divided into parcels and designated to male heads of households (Braveheart and DeBruyn 1995; Kuhlmann 1992; Weaver 2009). In 1934, the Indian Reorganization Act forced tribes to adopt organizational social and political structures of the United States that differed from the traditional forms of tribal governing and council. This new structure excluded women, became less participatory, and was not as based on consensus decision-making (Robbins 1992:95).

Voluntary Relocation Program

In the 1940s through the 1960s American Indian urbanization was supported through a voluntary relocation program (Miller 2013:51). While volunary relocation required Native Americans living off reservations to navigate social changes tied to setting and culture, it also provided many Native Americans the chance to achieve educational and economic opportunities (Miller 2013:51). However, empirical evidence indicates that associations between relocation and thoughts of historical losses, like loss of land or language, and affective outcomes including guilt, hopelessness, despair, anger, substance abuse, and depressive symptoms existed (Whitbeck et al. 2004; Whitbeck et al. 2009). Although, many Native Americans had more educational opportunities through a voluntary relocation program, the profound long-term effects of colonization remained present.

The aforementioned policies are examples of the broken promises and damaging ways in which the U.S. Government has forced colonizing ideas on Indigenous peoples, including physical relocation, and creating a dependence on capitalist ideologies (Duran et al. 1998; Fox et al. 2015; Whitbeck et al. 2004; Whitbeck et al. 2009). The relocation and assignment of Indian children to boarding schools, through numerous policies and programs throughout the nineteenth and twentieth centuries, almost annihilated traditional Native American cultural ways of life, social organization, and destroyed social support systems for contemporary women who are at-risk for violence (Bubar and Thurman 2004). In addition to cultural annihilation, there is growing documentation of federally sponsored sterilization of Native American women (Lawrence 2000; Torphy 2000; Weaver 2009). These programs disrupted traditional family life and the effects are still seen today in what is referred to as historical or intergenerational trauma (Duran et al. 1998).

Biculturalism and Intergenerational Trauma

It is imperative to recognize the intersections of identity for Native American women as there is sometimes a feeling of biculturalism (living in two different cultures), while being forced to navigate tribal culture and a dominant culture (Barkdull 2009:120; Brown and Smirles 2005). The navigation necessary to identify as a woman, Native American, and other elements is important in consideration of representation (Castle 2003:847). Merkin (2010) offers that through the application of "double consciousness" (Dubois 1903), or always looking at oneself through the eyes of others, Native American women experience a "four-ness" that includes being a woman, a member of a tribe, an American, and as an "other" (Native American) (Merkin 2010). For example, Castle (2003:847) mentions intergenerational trauma as a result of the scattering and genocide of Native peoples. This scattering created a multitude of identities and representations that are relevant for consideration when studying contemporary Native American issues--even within one specific tribal group.

Regarding intergenerational trauma, the colonization of Native peoples introduced systemic learned and patterned violence that differs from other racialized forms of violence (Hart and Loether 2008:192). This learned and patterned violence refers to the conforming of ideas of male superiority and female subordination that rejected traditional ways of women's roles that existed before European contact. Hogan (1981:1) describes Native American women's identity as requiring a navigation of the clashes and conflicts of the Anglo (non-Native) and Indian world, and in turn creates new paths of identity. As Merskin (2010:359) explains "Native girls and women live on the periphery of mainstream and, at times, Native society. They are simultaneously marked as racial and sexual other." These clashes and conflicts require a bicultural navigation that can be taxing for Native American women (Weaver 2009). Identity conflicts that exist within the view of "otherness" and its effects (low self-esteem and depression), in combination with harmful stereotypes, can expose Native American women as victims of physical violence with few to no protections or avenues of justice (Weaver 2009).

Stereotypes

Stereotypes, as hegemonic or dominant tools, reduce individuals to a one-dimensional version that is defined as natural or normal (Coombe 1998:190). As the processes of social and political policy and programs were implemented to assimilate Native Americans, the idea of purifying Native women with the principles of Christianity in order to bring them honor and respect was taking place (Lindley 1996). Colonial ideas of male superiority often portrayed Native women as subservient in their tribal cultures, but that is not the truth (Lajimodiere 2013:105). Some of these images of Native stereotypes were found in sermons, captivity narratives, and in histories in which Native "savages" were redeemed and transformed into civilized noble versions of themselves (Kessler 1998).

Still today, stereotypes fuel violence and other forms of oppression by creating an image of Native women as "princesses" or "slaves" (Weaver 2005). The stereotype of a pure and virgin princess or noble "drudge" willing to give into white man's desires, appear in popular media with characters like the Disney film Pocahontas (Merskin 2010). These stereotypes culminate into objectification, devaluation, and result in viewing Native women as something other than human beings,

which puts them in a vulnerable position for violence and assault (Weaver 2009). Gender-based violence creates damage to Native American women's self-esteem as a result of extreme racialization that it helped create (Hart and Loether 2008:192). This self-hatred stemming from racially created violence replaces tribal values into colonial concepts of being "less than men" or "dirty" and can cause a desire to separate from an identity as Native American or tribal member (Hart and Loether 2008:193). Paired with this possible self-hatred, stereotypes are driving distressing legal and societal treatments of Native women (Bender 2003). Merkin (2010) asserts that the embedding of racist and sexist stereotypes in brands, labels, landforms, and media images and words is an exercise in power. These powerful constraints are the reason that the intersection of race and gender-based violence is crucial for understanding the rejection of identity for some Native American women that define themselves as victims (Hart and Loether 2008:193).

Native American Women: Leaders and Activists

After 500 years of violence and oppression through the processes of colonization, the strength and survival of Native American communities illustrates strength and survival (Weaver 2009:1557). Through their presence in core community roles and activism, Native American women have been crucial to the survival of their communities.

Today, of the more than 550 federally recognized Indian Nations, twenty-one are in Arizona, twenty-four in New Mexico, twenty-six in Nevada, and four in Utah (Prindeville 2004:102). Native American women, in addition to their influence in political arenas, are leaders in other areas, including higher education, the criminal justice system, and urban Indian and tribal organizations (Fox et al. 2015). The separation of Native girls from their families to attend boarding schools in the late 1800s, aside from assimilating them into the dominant culture, also emphasized gendered tasks and roles. This role-separation led to a decrease in women in leadership positions in many Native societies (Fox et al. 2015; Weaver 2009). Since the 1970s, Native American women have increased in the number of elected or appointed positions in tribal governments (Prindeville 2004:101). When interviewing Native American women in grassroot leadership positions, Prindeville (2002:84) found that thirty out of the sixty women interviewed chose to be involved in non-governmental organizations to achieve their goals for their communities.

The South Dakota Coalition Against Domestic Violence and Sexual Assault (SDCEDSV) was an organization created on the Rosebud Reservation in South Dakota in 1977 and was founded by women to work with the community and restore the sacredness of women (Robertson 2012). With its founding, it began to aid the drastic numbers of Native women experiencing violence, but over time conflict between non-Native and Native members became apparent after Native members were dwindling in representation and becoming marginalized (Robertson 2012). While Native American women are resilient activists for women's issues, even their efforts in that realm can be overshadowed by overarching racist ideas (Robertson 2012). This is not to say their efforts are always in danger of being overshadowed. However, such an assertion demonstrates just how persistent these societal pressures can be in order to deter Native women in their efforts to advocate for social change.

Despite these pressures, there have been many successful Native American women activists. For example, in the 1950s, Lucy Covington (1910-1982) was involved in tribal leadership, which was not common at the time. She labored to end the termination of contracts for tribes to keep promised land from the U.S. Government (Ulrich 2013).

The 1960s and 1970s spawned the American Indian Movement (Baylor 1999). The American Indian Movement was established to garner recognition of Native treaty rights--even taking over the headquarters of the Bureau of Indian Affairs and the occupation of Alcatraz--to be granted review of over three-hundred treaties that were allegedly broken (Columbia Electronic Encyclopedia [CEE] 2019). The occupation of Alcatraz for nineteen months, which became a landmark event for the movement, included the participation of many Native American women. It was organized by Belva Cottier (1920-2000) and partly overseen and occupied from beginning to end by LaNada Boyer/Means (1947-present) (Langston 2003).

Wilma Mankiller (1945-2010), the first female Principal Chief of the Cherokee Nation, directed significant efforts to revive education, job training, and healthcare for the Cherokee Nation (Tyler 2018). She is known for her work in fusing Cherokee myth, legend, and history to restore the balance of gender equity that once existed within the Cherokee Nation (Tyler 2018). Wilma Mankiller was praised after her death by President Barack Obama stating, "she transformed the nation-to-nation relationship between the Cherokee Nation and the Federal Government and served as an inspiration to women in Indian Country and across America" (Obama 2010).

Mary Brave Bird, also known as Mary Crow Dog (1954-2013), wrote in her autobiography *Lakota Woman* (1990) about domestic violence against Native American women and its roots in the deliberate attempt by white people to destroy Indian cultures and traditional practices, which led to poverty and poor living conditions on a

reservation (Hendrickson 1996:15). In her writing, she openly scrutinizes the causes of domestic violence and broader violence against Native women, recounting her experiences with boarding schools meant to assimilate and remove Indian children, witnessing violence, facing poverty, alcoholism, racism, and other issues facing Native communities (Crow Dog 1990; Hendrickson 1996:16).

In 2010 Jamie Black, a Métis artist, began the REDress Project, an art installation that uses red dresses to mark the absence of missing and murdered indigenous women in the United States and Canada (Smithsonian Institution [SI] 2019).

Through the lens of Indigenous feminisms, many Dakota, Lakota, and Nakota women used their cultural connections and roles as protectors of water to motivate the protesting of the Dakota Access Pipeline (Privott 2019). The Standing Rock Sioux Tribe had rejected the Dakota Access Pipeline in 2015--a 1,172-mile-long pipeline that was proposed to move crude oil from Bakken oil fields in North Dakota to Illinois and directly through their tribal lands and waterways (Pivott 2019; Mengden 2017). Although rejected, illegal maneuvers and attempts at constructing the pipeline still persevered, and by 2016 the group of protestors grew to include five thousand Indigenous and non-Indigenous people from around the world (Pivott 2019). This movement held women as the central protectors of water, allowing for their key role in organizing and publicizing this event to protect their water and their land (Pivott 2019; Love 2018). In these examples, and many others, Native American women have been vital in the protection and continuation of their communities and cultures and exemplifying strength although they are one of the most oppressed and victimized minorities in the United States.

Native American Women and Violence Today

Tribal Sovereignty

Sovereign Native American tribal nations predate the ratification of the U.S. Constitution, so tribes are not bound by it (Cutler 2016:1755). Living on land within the limits of any Indian reservation under the jurisdiction of the U. S. Government can create a unique situation for women when seeking justice (Hart and Loether 2008:188). The Urban Indian Health Institute (UIHI) reports that 71 percent of Native Americans in the U.S. live in urban areas away from federally defined tribal lands (Lucchesi and Echo-Hawk 2016). The Center for Disease Control and Prevention (CDC) reports a total of 2,907,272 Native Americans and Alaska Natives in the United States in 2009-2013 (Figure 1). Of those, 1,515,870 reported living in metropolitan (urban) areas (Figure 2) and 539,616 reported living on a reservation or off-reservation trust land (CDC 2018c). Sovereignty
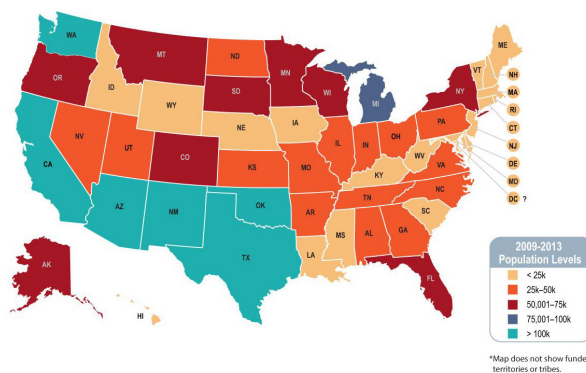
Figure 1. 2009-2013 American Indian and Alaska Native State Populations (Center for Disease Control and Prevention [CDC] 2018a).
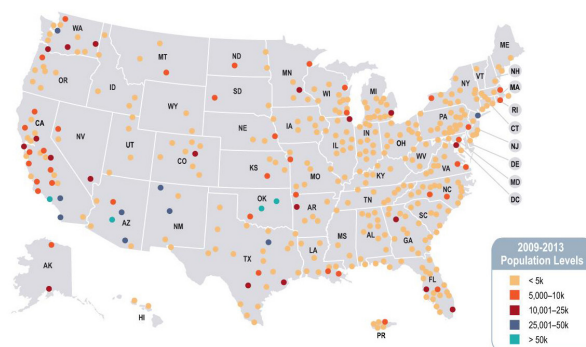
Figure 2. 2009-2013 American Indian and Alaska Native Metro Populations (Center for Disease Control and Prevention [CDC] 2018b).

laws allow tribal governments to function under their own laws and customs, but with specific boundaries that conflict with State and Federal law. For example, 85 percent of perpetuators of rape or sexual assault against Native American women are described as non-Indian, but tribes are not always able to hold non-Indians accountable for their crimes (Hart and Loether 2008:189). Tribal governments have control of day-to-day operations, but law enforcement and criminal justice systems become complicated with federal law and jurisdiction (NCADV 2016:1).

Hart and Loether (2008:216) suggest that in order for tribes to be able to fully protect women, they must be able to have a legal system that operates as culturally relevant to each distinctive tribal group. One legal code or court would not be able to encompass the values and systems of every tribe (Hart and Loether 2008:216; Oppenheimer 2017).

Overall, Native American women report the highest percentage of violent incidents (Table 1 and Table 2; Evans et al. 2006:1416). The National Violence Against Women Survey reveals 34.1 percent of Native American women reporting rape, 61.4 percent reporting physical assault, and 17.0 percent reporting stalking during

Race	population age 12 or older	Number of violent victimizations	Rate of violent victimizations per 1,000 persons age 12 or older	Percentage Population/ Victims of violence
All Races	219,400,860	9,100,950	41	100%
American Indian	1,144,600	116,050	101 .5	1.3
White	184,342,110	7,484,760	41 84.0	82.2
Black	26,625,810	1,336,620	50 12.1	14.7
Asian	7,288,340	163,520	22 3.3	1.8

Table 1. Annual Average Violent Victimization Rates for Persons Age 12 or Older, by Race, 1992-2001 (Perry 2004).

	Percent of violent victimizations				
Type of crime	All races	American Indian	White	Black	Asian
Total	100%	100%	100%	100%	100%
Rape/ sexual assault	4	5	4	4	5
Robbery	11	8	10	19	21
Aggravated assault	21	25	20	25	22
Simple assault	63	61	66	51	52
Annual average number of victimizations	9,100,950	116,050	7,484,760	1,336,620	163,520

Table 2. Violent crime, by type of crime and race of victim, 1992-2001 (Perry 2004).

their lifetime (Evans et al. 2006:1416). Native American women report the highest number of sexual assaults among all other ethnic groups (Evans et al. 2006:1420). As a result of federal relocation and tribal termination, as well as other various reasons, there are more than 60 percent of Native American people that live in urban settings (Evans et al. 2006:1420).

Missing and Murdered Indigenous Women

The Urban Indian Health Institute ([UIHI] 2017:1) conducted a study to assess the number of missing and murdered Indigenous women. What they found were sixteen unclassified cases by law enforcement, meaning they are unaware if the victim is missing or murdered,

	Total Women	Senate only	House service only (Representatives)	House service only (Delegates and Resident Commissioner)	House service only (subtotal)	Women who have served in both chambers
Total	332	40	273	7	280	12
Democrat	215	25	177	4	181	9
Republican	117	15	96	3	99	3

Table 3. Women in Congress, 1917-present (Congressional Research Service [CRS] 2021).

and 506 cases across 71 cities (UIHI 2017:6). Of the 506 confirmed cases, 128 women were missing, 280 were murdered, and 98 cases were at an unknown status (UIHI 2017:7).

Women in the United States Congress

Swers (2002:2) explains the theoretical concept of representation for women in Congress in that members of gender, race, and class will make decisions that positively impact their identity group. In this regard, female legislators have historically expressed a commitment to women's issues across the board, as well as those for children and families (Table 3; Swers 2002:132). Since this paper is focused on policies and effects on rates of domestic violence, the period of focus begins with the surge of women holding positions in the early 1990s (Committee on House Administration of the U.S. House of Representatives [CHA] 2006). The Congressional Women's Caucus was created in 1977 and changed its name to the Congressional Caucus for Women's Issues and began allowing men to join (CHA 2006). By 1993, the membership had doubled and committee assignments after the 1980s focused on women's issues, and eventually fought for bills like the Medical Leave Act (1993) and the Violence Against Women Act (1994) (CHA 2006).

VAWA

The Violence Against Women Act (VAWA) first passed in 1994 during the 103rd Congress (Swers 2002:76). The act took four years of lobbying by more than a thousand coalitions before it was finally passed by Congress (Lu 1996). VAWA was created to provide $1.6 billion over six years to aid in investigating and prosecuting violent acts against women (Modi et al. 2014; Sack 2004). Before its creation, there were no laws that specifically addressed gender-based violence (Lu 1996). The VAWA must be reauthorized every five years. It was reauthorized in 2000 and 2005, but not in 2012 (Modi et al. 2014). The 2012 rejection was a result of Republicans not supporting the revisions to protect same-sex couples and expanding numbers of temporary visas for immigrants who are victims (Modi et al. 2014).

In 2013, the Senate passed a new VAWA, which added provisions for Native Americans living on reservations (Modi et al. 2014). In the Title IX revision

	Rate per 1,000 persons 12 or older				Percent change			
Demographic Characteristic	1994	2000	2005	2010	1994-2010	1994-2000	2000-2005	2005-2010
Total intimate partner violence	9.8	5.1	3.8	3.6	-63.6%†	-47.9%†	-25.2%†	-6.5%†
Sex								
Female	16.1	8.4	5.8	5.9	-63.2%†	-48.2%†	-31.2%†	3.3%†
Male	3	1.6	1.7	1.1	-64.5%†	-46.4%†	9.50%	-39.5%†
Race and ethnicity								
White	15.6	8.8	5.4	6.2	-60.5%†	-43.6%†	-38.9%†	14.60%
Black/African American	20.3	8.5	7.1	7.8	-61.6%†	-58.0%†	-16.40%	9.20%
Hispanic/ Latina	18.8	6.8	5.9	4.1	-78.1%†	-63.7%†	-13.10%	-30.80%
Other(including AI)	6.3	3.9	7.1	3.8	-40.20%	-38.80%	85.00%	-42.2%‡
Total violent crime	79.9	42.3	28.1	20.8	-74.00%	-47.0%†	-33.6%†	-26.10%

Table 4. Intimate partner violence, by sex and race, 1993-2010 (Catalano 2012). Note: Estimates based on two-year rolling averages. Includes rape or sexual assault, robbery, aggravated assault, and simple assault committed by current or former spouses, boyfriends, or girlfriends. † Significant at 95 percent. ‡ Significant at 90 percent.

of the Act, Congress recognized what was phrased as a special domestic violence criminal jurisdiction to participating tribes for a set of individuals who voluntarily and knowingly have ties to the tribe (Douglas 2018). Although Native American women are among the most vulnerable for intimate partner violence, since 1994 to 2010 domestic violence rates have fallen by 64 percent (Table 4; Catalano 2012:1).

VAWA 2019

The 2019 VAWA was reauthorized on April 4, 2019. Sharice Davids presided over the House floor as the 2019 act was passed and co-sponsored multiple amendments to the bill that addresses the crisis against violence against Native women and girls (Davids 2019). The newest version of the bill created a tribal sex offender and protection order registry and reaffirms tribal jurisdiction over non-Indian perpetrators of domestic violence, sexual assault, dating violence, stalking, and trafficking for all federally recognized Indian tribes (House Committee on the Judiciary [HCJ] 2019).

VAWA 2021
On March 8, 2021, the Violence Against Women Reauthorization Act of 2021 was reintroduced by Congresswoman Sheila Jackson Lee (D-TX), Chair of the House Judiciary Subcommittee on Crime, Terrorism and Homeland Security along with House Judiciary Committee Chairman Jerrold Nadler (D-NY) and Representative Brian Fitzpatrick (R-PA) and passed through the House of Representatives (HCJ 2021).

In its report, Congress found that American Indian and Alaska Natives are 2.5 times as likely to experience violent crimes and at least two times more likely to experience rape or sexual assault compared to all other races (ethnicity). The majority of victims--96 percent of women and 89 percent men--report being victimized by a non-Indian. According to the Centers for Disease Control and Prevention, homicide is the third leading cause of death among American Indian and Alaska Native women between 10 and 24 years of age and the fifth leading cause of death for American Indian and Alaska Native women between 25 and 34 years of age. On some reservations, Indian women are murdered at more than ten times the national average. According to a 2010 Government Accountability Office report, United States Attorneys declined to prosecute nearly 52 percent of violent crimes that occur in Indian country (HCJ 2021).

Importantly, the bill called for an increased $3,000,00 for each year (2022-2026) for Tribal Governments to access, enter, and obtain information from Federal criminal information databases (HCJ 2021). This revision also requires that after the enactment, and annually thereafter, the Attorney General and Secretary of the Interior will prepare and submit reports including statistics on missing and murdered Indian women in the United States, including sexual assault and sexual abuse, and provide recommendations to improve data collection on missing and murdered Indian women (HCJ 2021).

Indigenous Women in Canada

By 2016, the Indigenous (First Nations) population of Canada reached 4.9 percent of the total population, or 1,673,785 (Statistics Canada [SC] 2009). Canadian government defined status as an Indian through the 1876 amendment to the Indian Act, forcing patrilineal descent for a person to be defined as Indian (Barker 2008).

MMIW and DV Rates

Four percent of women in Canada are Indigenous, and between 1980 and 2012 they made up 16 percent of female homicides. The Native Women's Association of Canada found that Indigenous women fifteen years or older were 3.5 times more likely to experience violence than non-Indigenous women (Brant 2017). According to the 2009 Canada General Social Survey (GSS; SC 2009), Indigenous women experience spousal and non-spousal violence more than twice the rate of non-Indigenous women (Table 5).

Indigenous Women in Parliament

The Indigenous members of Parliament, along with other members, focus on poverty, struggle to push issues that also effect their tribes, and policies tied to women's issues like domestic violence and missing and murdered Indigenous women. Since the creation of Parliament in 1867, Canada has had 43 Indigenous members (Morden 2018). Despite lobbying by Indigenous members of Parliament, many of the issues concerning treaties, land claims, governance and autonomy, and Aboriginal rights were not emphasized by non-Indigenous members, where the main concern was garnering attention toward poverty (Morden 2018:125). Canada's first Indigenous woman to be elected to Parliament was Ethel Blondin-Andrew, elected in 1988. Since then, seven other Indigenous women have been elected. For example, Leona Aglukkaq, who focuses on improving the quality of life for Indigenous peoples was the Minister of Health and Social Services and the Minister Responsible for the Status of Women (Morden 2018). While this quick summary of Canadian Indigenous women in Parliament highlights the importance of representation, domestic violence rates for Native women in Canada have not fallen in comparison to other ethnic and racial groups that have seen less domestic violence in recent years (Brennan 2011).

Conclusion

The 2018 Congressional elections resulted in the first two Native American women to have seats in the U.S. House of Representatives. Since the VAWA was passed in 1994, domestic violence rates have considerably decreased (Catalano 2012:1). The passing and repassing of the bill were partly a result of the number of women in

Victims	Violent victimization (excluding spousal violence)	Violent victimization (including spousal violence)
Rate per 1,000 female population age 15 or older		
Indigenous female victims	223	279
Non-Indigenous female victims	84	106

Table 5. Violent Victimization of Indigenous Females in Canada (SC 2009).

Congress at the time, as well as their willingness to take the floor, debate, and an allegiance to their constituent's requests. This same commitment can be seen in the case of Deb Haaland and Sharice Davids, who have publicly addressed their concern and duty to decrease violence against Native American women. The case for domestic violence of Native American women is unique, as it is dynamic and has multiple historical, social, and political dimensions associated with colonization, stereotypes, poverty, policies, sovereignty laws, and many other components (Barkdull 2009; Bohn 2003; Hart and Loether 2008; Mihesuah 2003; Whitbeck et al. 2004; Whitbeck et al. 2009; Weaver 2009).

As noted with Canada, Indigenous women fight for Indigenous women's issues while holding these important high-ranking leadership positions (Morden 2018). With the 2021 nomination of Deb Haaland as Secretary of Interior, she continues to highlight the injustices that Native American people have experienced, as well as articulate her commitment to environmental change and the responsibility to honor trusts and treaties that the U.S. Government made to Native American people (LNSM 2021). Overall, women's participation in Congress and Parliament is important, as well as the diversity among these elected women to approach issues that may not have been addressed, considered, or had a voice previously. This change in representation will likely have positive long-term effects regarding underrepresented minority women.

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Projectile Point Occurrences in Faulkner County, Arkansas: Patterns and Variations within the Wilson Collection

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Abstract

The Wilson Collection housed at the Faulkner County Museum in Conway, Arkansas is a valuable assemblage of Native American lithics from the Central Arkansas region. This study analyzes 606 lithic projectiles from the collection in terms of their raw materials and their morphological features, such as stem types and notching preferences. Based upon basal characteristics, thirty distinct morphological categories were present in the collection, including several lanceolate and drill forms that had been previously unidentified. Additionally, eleven distinct types of raw materials were identified through macroscopic analysis. Geographically, there is a strong overlap in materials sourced from the southwest region of the Ozarks and the potential range of exchange extends from the Ouachita Mountains in Arkansas to the Ozarks in Missouri, the southeastern corner of Oklahoma, and the northeastern eastern corner of Texas. Since this region is distant from Faulkner County, the presence of secondary stone resources may indicate trade relations. Alternatively, these raw materials could have been sourced from quarries through direct travel or found within the gravel beds of local rivers.

Introduction

Of the myriad ways in which archaeologists attempt to learn about humankind's distant past, perhaps one of the oldest methods for studying prehistoric societies is through the analysis of stone tools. Also known as lithics, these artifacts include any culturally modified stone involved in prehistoric tool use. Some types of stone tools archaeologists find at prehistoric sites include projectiles, hand axes, and hammer stones (Andrefsky 2005). Debitage, a term describing the waste material which forms as a result of producing stone tools, is also commonly found in situ with lithic artifacts. Lithic tools are unique because they are one of the few artifacts able to withstand the processes of taphonomy (how artifacts and fossils decay or how they preserve) over time. Unlike the perishable organic materials, which humans use to create clothing and shelter, lithic tools preserve in the archaeological record for a much longer time span. For this reason, stone tools are some of the most abundant sources of information about prehistoric peoples (Andrefsky 2005). In some cases, lithics are the only evidence that remains of human settlement (Odell 2004).

Archaeologists who analyze stone tools found at a site or compared within a region can make inferences about the lifeways of people that once inhabited and exploited a particular ecology. This scientific process, known as lithic analysis, is a fundamental methodological approach to describe and interpret stone artifacts. Archaeologists measure lithic characteristics in terms of morphology, size, material, microwear, luminescence, and function (Whittaker 1994; Odell 2004; Andrefsky 2005; Madle 2020). In analyzing and classifying stone tools in this way, researchers can compare characteristics across broad regions to gain insights into cultural adaptations employed by prehistoric peoples, such as subsistence and hunting strategies and the types of tools they produced for extraction or processing purposes.

The Fred Wilson Collection

Lithic analysis has been applied to the material from the Fred Wilson Collection at the Faulkner County Museum in Conway, Arkansas (Madle 2020:19). Fred Wilson, an employee of the United States Postal Service, was an avid surface collector and over the course of two decades he amassed an extensive body of lithic material. As a mailman, his delivery routes spanned northern Faulkner County, a region situated between the Ozarks and the Ouachita Mountains. Along his 60-mile mail route, Wilson formed relationships with residents who granted him permission to search for "arrowheads" on their private property. As a result, his collection is a valuable assemblage of lithics from this region. Upon his death, Wilson's family donated his collection to the Faulkner County Museum where much of the lithic material remained to be sorted, categorized, and analyzed

In 2020, the process of analyzing this collection began with over 800 projectile points (Madle 2020:24). Madle was interested in three lithic characterizations from the Wilson Collection: raw materials used, chronological distribution, and style and typology. Of the lithics analyzed, he identified 23 morphological groups within the collection based on the hafting characteristics of the projectile.

The present research draws upon Madle's preliminary findings in order to classify the remaining projectile points in the Fred Wilson Collection. Using macroscopic lithic analysis, experimental archaeology, and Madle's polythetic system of typological classification, this research is based on the following themes:

1. Style and Typology: Which morphological groups are present within the Wilson collection? What is the ratio of archaeological types present? The categorization of lithic projectiles is based on morphological features such as stem types (including contracting, expanding, and straight stems) and notching preferences (such as corner, side, and basal notches).

2. Raw Materials: What raw materials were used to create the lithic projectiles? What region were these raw materials quarried from? Are there any non-local materials present, and if so, can trade connections can be inferred from the presence of these anomalies? Jack Ray's (2007) guide to the macroscopic identification of Ozark chipped stone resources is used to identify the raw materials as well as geographic source.

With these areas of focus, this paper classifies the projectiles in the Wilson Collection by utilizing Madle's typology, which previously identified 23 morphological groups based upon basal characteristics. Madle's (2020:23) existing typology, which focused on the stem, shoulder, and base types is polythetic (Figure 1). A polythetic typology is one that considers multiple morphological features of an artifact at once, such as stem type, base type, and the type of corner notching if applicable (see Figure 1). This contrasts with a monothetic approach to typology which would only classify one feature at a time (such as identifying a stem as straight, expanding, or contracting, but without identifying other features like the base shape or the raw material present). A polythetic approach to lithic analysis can allow archaeologists to better make inferences about the manufacture of projectiles and the sourcing of both local and exotic raw materials.

Background: Lithic Analysis and Typology

One of the most important functions of lithic analysis is to classify, summarize, and describe lithic data. Lithic artifacts vary widely in terms of morphology. Thus, archaeologists group lithics into classes based on their distinct features. By classifying a wide variety of lithics found at a particular site into manageable and quantifiable categories, it is easier to compare archaeological analyses across a broader region (Andrefsky 2005). An archaeologist can make inferences about the function and the chronology of human settlement based on the types of stone tools present at a site, and the evolution of these lithics in terms of morphological classification.

Archaeologists have created many typologies within the past two centuries to systematically analyze lithic artifacts (Holmes 1891; Bell 1958,1960; Debénath and Dibble 1994). These texts are grounded in the historical methodological approach of lithic typologies. The foundational work of Holmes (1891) was influential because he argued that differing styles of stone tools can be used to establish chronology at an archaeological site. Tied to this focus on lithics as diagnostic chronological markers, his goal was to better understand how both the morphology and function of stone tools changed throughout time. Decades later, identification resources facilitated regional analyses and covered local variations in lithic morphologies. For example, Bell (1958, 1960)
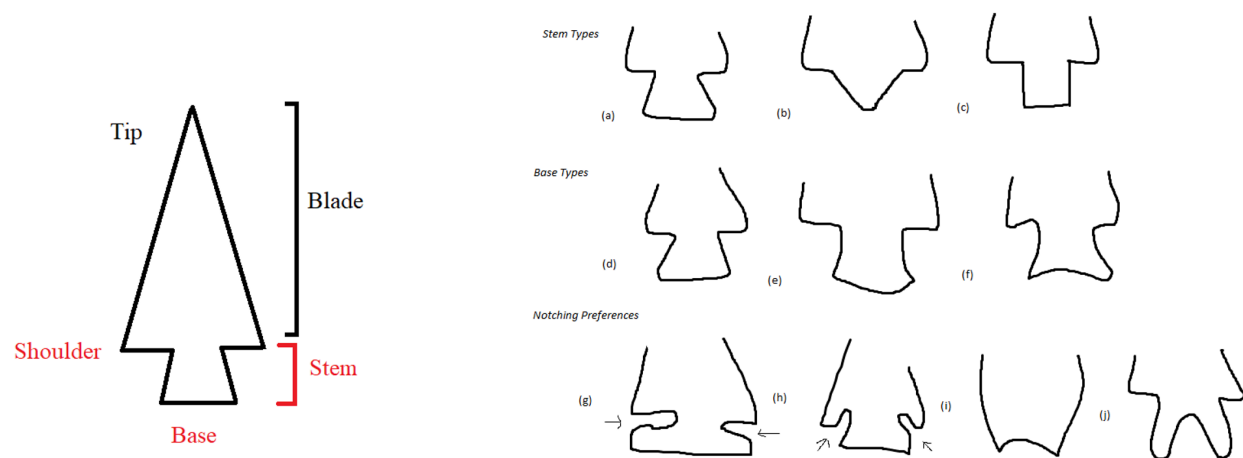

Figure 1. Left, the anatomy of a lithic projectile. Right, morphological characteristics of lithic projectiles. Stem types: (a) Expanding stem; (b) contracting stem; (c) straight stem; Base types: (d) Straight base; (e) convex base; (f) concave base; Notching preferences: (g) Side notched; (h) corner notched; (i) lanceolate; (j) bifurcated stem.

discusses the chronological distribution and cultural associations of the stone tool in the Texas and Oklahoma region. His work provides an illustration of each type of projectile point, and gives the reader information about where the point likely came from, who created it, and what time and place of its creator. This formulaic approach is representative of classic lithic typologies of the 1950s and 1960s, many of which follow a similar structure and cover various other regions throughout the United States.

Researchers today (cf. Andrefsky 2005; Shott 2003) emphasize a *chaîne opératoire* approach to lithic typology. This term translates to "operational chain" and refers to the contingent sequence of events that goes into creating a stone tool. When a projectile is produced, for example, raw materials must first be located, procured, processed, and delivered to the manufacturer. The manufacturer in turn is also influenced by factors such as technology, cultural traditions, material scarcities, and even aesthetic preferences (Andrefsky 2005:5; Ray 2007:336). Each link in this chain of events influences the outcome of the final product, and archaeologists study the interrelatedness of these factors to learn about prehistoric peoples. Such is the methodological focus of *chaîne opératoire*, a French school of thought that sees technology as a subsystem that operates as a part of a greater cultural system. This approach encapsulates the entire series of processes and activities related to the production of stone tools and include cultural systems that influence the acquisition of raw materials, the preparation of cores, the removal of flakes, and the retouching of tools (Ray 2007:335). Due to the interconnected nature of these cultural systems, a disruption in one aspect of tool production can have consequences for the manufacturing process as a whole. Sometimes, changes in the operational sequence can result in morphological changes of stone tools. In contrast to earlier lithic typologies and methodologies, the *chaîne opératoire* approach is diachronic, meaning that scientists who employ these methods are interested in the evolution and development of stone tool morphologies throughout time.

Selecting Lithic Raw Materials

Archaeologists can use stone tools to explore the "behavior, lifestyle, social and economic structures, and organizational principles" (Odell 2004:9) of prehistoric cultures. Stone tools can reveal more about the past than just subsistence strategies, because when examined in a broader context lithics can teach about prehistoric quarry techniques, processes of tool manufacture, and the characteristics of certain raw materials selected to be modified into tools.

Pressure flaking is a method used to create projectiles and other lithic tools. Using an antler, bone, or other material, toolmakers apply pressure to a core rock until flakes break off in a predictable manner. Eventually, this process results in shaping the desired lithic tool. The method of pressure-flaking flint, chert, or any other suitable raw material, to produce tools is also known as lithic reduction. Stone tool makers favored certain raw materials, including granite and microcrystalline silicates like chert, for their value in the production of lithic tools. Native Americans prized these materials for their desirable fracture dynamics, as stone tool production requires stones that can be broken in a predictable way. Selected stones are "brittle, homogeneous, and isotropic." These features make rocks particularly suitable for the production of stone tools because they "do not have direction-dependent properties such as bedding planes, fissures, cracks, or inclusions" (Andrefsky 2005:23). These direction-dependent properties can cause a stone to fracture uncontrollably when put under pressure. When the proper raw material is selected they break with a conchoidal fracture when pressure is applied and are thus able to be reliably and predictably "knapped" into a tool (Ray 2007:6). Therefore, heterogenous stones were not suited for pressure-flaking due to the presence of inclusions and other imperfections, which made the material unreliable when forming stone tools.

One highly prized raw material is chert. Most artifacts from the Ozarks are made using chert, because it is elastic, resilient, can produce conchoidal fractures, and has an "isotropic structure" (Ray 2007:7). This isotropic structure means that the chert is homogenous, having "uniform physical properties in all directions, thereby permitting fraction in any direction" (Ray 2007:7). These qualities make chert, and similar isotropic materials, suitable for the production of lithic tools.

Lithics are knapped from a wide variety of raw materials, and by determining the material that composes a stone tool a researcher can potentially determine where the raw material was sourced (Ray 2007). Since the location of quarries corresponds to geologic features of the landscape, archaeologists can use the presence of raw materials in a lithic assemblage to ascertain the region in which stones were originally sourced. The process of locating the geologic source of lithic resources began in the 1970s with comparative type collections. These guides go beyond identifying lithic resources based on color alone, as earlier studies into chert and other lithic raw materials tended to do (Ray 2007:2). For researchers typing lithic collections polythetically (in terms of both morphology and raw material present), comparative type collections are a vital resource in identifying types of raw materials present, and in making inferences about the procurement and use of said materials.

Degrees of Utilization

Why were certain raw materials chosen for use in stone tool production over others? This was "highly variable and dependent on various factors, including knappability (quality, texture, presence/absence of inclusions, etc.), the use of heat treatment, the availability of alternative resources, and possibly even aesthetic qualities" (Ray 2007:36). Degrees of utilization, or the frequency by which a raw material was utilized, can be divided into three terms: primary resource, secondary resource, tertiary resource. A primary resource is the most commonly used raw material in an area. A secondary resource can be local or non-local, and is used to supplement the region's primary resource. It usually composes 10 to 30 percent of a site assemblage (Ray 2007:36). A tertiary resource occurs even less frequently, comprising no more than 10 percent of the raw materials in a sample. In contrast to primary resources, secondary and tertiary resources are likely more limited in availability or are less suitable for flintknapping (Ray 2007:36). On the southern side of the Boston Mountains Escarpment in Central Arkansas, Pitkin chert and Undifferentiated Osagean chert were typically used as primary resources, and "Reed Springs chert and Atoka argillite were used as secondary resources, and Akota chert" were tertiary resources (Ray 2007:40).

Analyzing materials in terms of local resources and exotic artifacts derived from a non-local source can be beneficial in discussions about regional trade connections. When archaeologists can determine the source areas for exotic raw materials present at a site, they can then make inferences about cultural connections that existed between the regions, as the exotic non-local material was potentially exchanged through trade. An example of the archaeological application of raw material identification can be found in Trubitt's (2005) discussion of Novaculite Quarries in Hot Springs, Arkansas. Arkansas Novaculite is a form of chert, and its microcrystalline structure allows it to break with a conchoidal fracture. Trubitt (2005) discusses how Arkansas Novaculite was so prized in stone tool making that it was traded by Native groups over the course of 11,000 years. As such, novaculite can be used to demonstrate the existence of regional tool exchange systems (Trubitt 2005). For example, if Novaculite quarried in Hot Springs, Arkansas, is found in a lithic assemblage at a prehistoric site in northern Missouri, researchers can infer potential a cultural connections between people living in both regions.

Arkansas Novaculite is particularly useful when discussing trade connections because its only geologic source is in the Ouachita Mountains. This material is not locally available to stone toolmakers in Faulkner County, so the presence of novaculite suggests trade may have occurred between these regions. Alternatively, people from Faulkner County may have travelled to the Ouachita Mountains to procure this prized raw material.

Methods to Identify Raw Materials

There are numerous ways to identify raw materials using existing classifications. Archaeologists can analyze raw materials through their visual physical attributes (such as their color, luster, texture, fossil content, and internal structure) using macroscopic and microscopic analysis (Ray 2007:42). Archaeologist Jack Ray lists many advantages of the visual method, because "(1) it is a relatively easy method to learn and use, (2) raw material typing can be accomplished in a timely manner and on a large scale, (3) the process does not alter or destroy artifacts, and (4) it is cost-effective" (Ray 2007:41). Despite these advantages, the visual identification method can lead to misinterpretation of the raw material present in a lithic assemblage due to the subjectivity of qualitative descriptions. However, experienced archaeologists can make confident identifications of lithic raw materials. The identification of raw materials using a visual method is used in the present study and is based upon Jack Ray's (2007) identification guide to chipped-stone resources

Raw Materials: Results and Discussion

Curated tools cannot be used deterministically in generating conclusions on local resource use. This is due to the fact that "curated tools are usually the most mobile artifacts, especially among nomadic and semi-nomadic hunter-gatherers, and they can skew data on local resource use because they can represent procurement and use of resources from distant locations" (Ray 2007:336). However, since this study focuses on the bases of projectile points, raw material identification of curated tools are used herein, as curated tools may indicate broader regional trade connections. Macroscopic visual analysis was accomplished following the standards outlined in Ray's (2007) guide. However, it is important to note that the present study did not use a physical raw material collection for visual comparison. Further analysis utilizing a physical raw material comparative collection is recommended.

Using Jack Ray's comparative type collection (2007), the present study has visually identified eleven distinct types of chert raw materials: Jefferson City, Pitkin, Penters, Reed Springs, Burlington, undifferentiated Osagean, Akota, Lafayette, Fortune, Pierson, and Arkansas novaculite. (Figure 3). Geographically, there is a strong overlap in materials sourced from the southwest region of the Ozarks. The range of these sources extends from the Ouachita Mountains in Arkansas to the Ozarks in Missouri, the southeastern corner of Oklahoma, and the northeastern corner of Texas. Since these sources are several miles away from Faulkner County, the presence
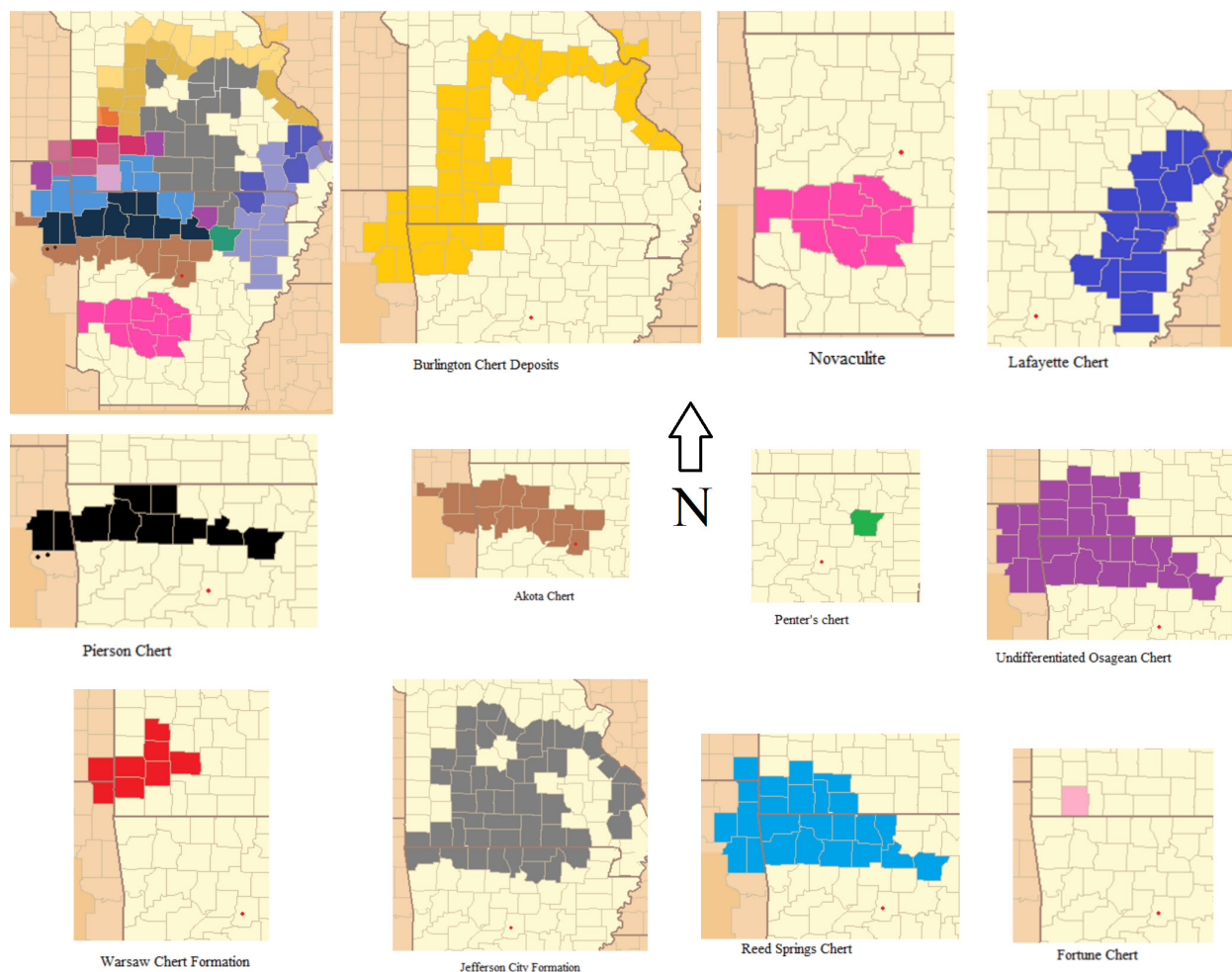
Figure 2. The 11 materials present in the Wilson Collection, and the location of their sources (Ray 2007).

of non-local stone resources in the Wilson Collection may indicate trade relations with indigenous groups in the southwest portion of the Ozarks. Alternatively, the inhabitants of Faulkner County could have used long-distance travel to directly source these materials from distant quarries. They could have also found these raw materials within the gravel beds of local rivers. Either way, the diversity of secondary and tertiary chipped stone resources present within the Wilson collection demonstrates the high degree of resourcefulness and skill that toolmakers in this region possessed (Ray 2007:36).

Lithic Data: Results and Discussion

The present research has identified 30 different types or groups of chipped stone tool resources (Table 1; Figure 3) with 23 of these groups were initially identified by Madle (2020:24). New classifications were added to include lanceolate and drill forms. This study classified 606 projectiles. Each group was then weighed and measured by minimum and maximum length, as well as minimum

and maximum width. The most prevalent morphological group in the Wilson collection was convex base with contracting stem, which accounted for 9.41 percent of the total sample (see Table 1). The lest common type was identified in Madle's study (2020:25) as convex base, contracting stem, and corner notched (Group 31), but was not present in this analysis.

Some of these morphological categories can be linked to other common Arkansas point types known in the literature, such as Dalton, Big Sandy, and Gary point types (Figure 4). Each of these morphological groups are associated with a certain chronological period in prehistory. Dalton points are associated with the Late Paleoindian or Dalton period (10,500-9,500 BP) and are characterized by a concave base and resharpened edges (McGahey 2000:27,31). Big Sandy points (9,500-9,000 BP) are associated with the Archaic period (10,000-8,000 BP) and are side-notched with a parallel configuration (McGahey 2000:41,50). Gary points (4,500-3,000 BP) are associated with the Late Archaic to early Woodland period (3000-1000 BP) and are characterized by barbed,

Group	Morphological Classification	Total weight (G)	Minimum length (mm)	Maximum length (mm)	Minimum width (mm)	Maximum width (mm)	Total # of bases	% Sample
1	Straight base; Straight stem (17)	298.9 g	20 mm	77 mm	16 mm	33 mm	39	6.44
2	Straight base; Straight stem; Corner Notch (18)	105.1 g	50mm	41 mm	33mm	38mm	9	1.49
3	Straight Base; Lanceolate**	168.8 g	42 mm	76mm	23 mm	44mm	19	3.14
4	Straight base; Expanding stem (22)	328.7 g	14 mm	69mm	10mm	43mm	47	7.76
5	Straight base; Expanding stem; Side notched (10)	49.8 g	17mm	37mm	20mm	31mm	9	1.49
6	Straight base; Expanding stem; Corner notch -1	173.2	18mm	54mm	25mm	45mm	20	3.3
7	Straight base; Expanding Lanceolate**	78.8 g	19mm	83mm	26mm	43mm	6	0.99
8	Straight base; Contracting Stem (21)	427.9 g	28mm	62mm	15mm	51 mm	51	8.42
9	Straight base; Contracting stem; Corner notch -8	48.6 g	27 mm	44mm	22mm	44mm	4	0.66
10	Straight base; Contracting Lanceolate**	145.5 g	30mm	61mm	11mm	35mm	20	3.3
11	Convex base; Straight stem (20)	336.1 g	15mm	58mm	16mm	48mm	43	7.1
12	Convex base; Straight stem; Corner notched (3)	69.9	21 mm	53mm	21mm	48mm	6	0.99
13	Convex base; Expanding stem (15)	211.6 g	19mm	45mm	12mm	37mm	33	5.45
14	Convex base; Expanding stem; Side notched (9)	95.1 g	22mm	76mm	20mm	31mm	11	1.82
15	Convex base; Expanding stem; Corner notched (12)	134.0 g	23mm	60mm	13mm	45mm	17	2.81
16	Convex base; Contracting stem (16)	533.1 g	18mm	78mm	16mm	49mm	57	9.41
17	Convex base; Contracting stem; Basal notched**	94.8 g	19mm	57mm	27mm	53mm	9	1.32
18	Convex base; Lanceolate**	253.0 g	18mm	76mm	18mm	40mm	18	2.97
19	Convex base Drill**	109.0 g	19mm	67mm	9mm	32mm	20	3.3
20	Concave base; Straight stem (13)	120.8 g	19mm	57mm	17mm	34mm	20	3.3
21	Concave base; Straight stem; Corner notch (14)	28.5 g	23mm	38mm	28mm	33mm	4	0.66
22	Concave base; Straight stem; Side notch**	2.1g	18mm	19mm	-	-	1	0.17
23	Concave base; Drill**	68.9g	19mm	51mm	12mm	35mm	13	2.15
24	Concave base; Lanceolate**	288.0g	19mm	93mm	18mm	59mm	22	3.36
25	Concave base; Contracting stem (no notching) (7)	153.5g	19mm	59mm	17mm	35mm	22	3.36
26	Concave base; Expanding stem (23)	256.5g	14mm	63mm	19mm	45mm	37	6.11
27	Concave base; Expanding stem; Corner notched (19)	62.3 g	24mm	45mm	27mm	38mm	11	1.82
28	Concave base; Expanding stem; Side notched (11)	121.6g	20mm	59mm	19mm	34mm	23	3.8
29	Basal notched; Auriculate (4)	45.4 g	17mm	40mm	18mm	32 mm	11	1.82
30	Bifurcated base; stemmed (6)	20.5 g	18mm	41mm	22mm	29mm	5	0.83
31	Convex base; Contracting stem; Corner notched (2)	0	0	0	0	0	0	0

Table 1. Morphometric measurements of the Wilson Collection.

tapered shoulders and a long and narrow blade (McGahey 2000:144). Chronologically, these morphological types identified within the Wilson Collection span a time ranging from the Late Paleoindian period to the Woodland period (McGahey 2000:27,31,50,144). This demonstrates that humans have inhabited the Faulkner County region for millennia.

Further Research

Though not the focus of this study, the Wilson Collection also has substantial amounts of lithic raw material in the form of debitage, scrapers, knives, cortexes, preforms, broken projectile tips, axes, grinding stones, flakes exhibiting cortical surfaces, and other chipped stone tools. Further research into these raw materials is needed and can provide insight into both the manufacture of these artifacts and the procurement patterns used by humans to acquire these raw materials.

Although debitage was not included in this analysis of the raw materials, further studies will be valuable as it is "most representative of local resource exploitation" relative to other forms of chipped-stone resources (Ray 2007:336). If one wanted to research the procurement of resources from local sources in Faulkner County, a raw material study focused on identifying the present types of debitage and cores would provide a necessary comparison to this present research, since the "best determination of local chert utilization at a site or project area is to analyze early-stage reduction debitage (e.g., primary decoration flakes, secondary decoration flakes, and cores) and early- to- middle-stage preform failures and rejects" (Ray 2007: 37). In contrast to refined tools like scrapers and arrowheads, debitage is not often transported long distances through trade or down-the-line exchange. Finished tools on the other hand, like the projectiles analyzed by this study, "were often transported within toolkits" and over long distances, meaning that these artifacts are more likely to be manufactured non-locally. Therefore, "percentages of non-local and exotic resources are greater in tools (vs. debitage) due to curation and exchange" (Ray 2007:37).

Figure 3: Samples of the most prevalent morphological groups in the Wilson collection. a) Group 1; b) Group 4; c) Group 6; d) Group 8; e) Group 10; f) Group 11; g) Group 13; h) Group 16; i) Group 19; j) Group 20; k) Group 24; l) Group 25; m) Group 26; n) Group 28.

Figure 4. Chronological associations of Dalton, Big Sandy, and Gary points.

Therefore, debitage is a more diagnostic way to study local processes of procurement and use.

Meanwhile, because refined tools are more likely to be composed of exotic materials procured through trade, further research into scrapers, knives, and other artifacts can also provide further insight into long-distance lithic procurement methods that the prehistoric residents of Faulkner County utilized. Both this paper and Madle's initial study into the Wilson Collection solely considered the bases of projectile points for analysis in terms of lithic typology and raw material identification. Though all projectile bases in the Wilson Collection have now been classified and archived, many tools remain unsorted, both unfinished and refined, including scrapers, tips of projectile points, hammerstones, axes, preforms, and cortexes. These have been roughly sorted into groups based on function, although further work is needed to fully categorize and analyze this lithic material. Further studies into the quantification of all present raw materials, lithic morphologies, and chronologies of these miscellaneous tools will provide a more complete understanding of this Faulkner County assemblage.

Conclusion

The Wilson Collection is a great example of lithic analysis as applied to a specific region. Fred Wilson, a mailman from Greenbrier, Arkansas who collected artifacts along his mail route for over two decades during the early twentieth century, amassed a collection of chipped stone-tool resources that is worthy of archaeological consideration. Since his surface collecting spanned a single region in northern Faulkner County, the lithic he collected are a representative sample for the Central Arkansas region as a whole. Using a polythetic approach to lithic typology, the present study used the macroscopic analysis of projectile point bases and raw materials in the Wilson Collection to make inferences about the availability of local lithic resources in Faulkner County, long-distance trade and travel between prehistoric cultural groups, and the chronological evolution of lithic technology throughout time. Of the 606 projectiles analyzed, 30 unique morphological groups were found, and at least 11 types of raw materials were found to be present in the collection.

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Statistics Ain't All That:
The Overlooked Human Factor in Statistical Analysis

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Abstract

"Statistically significant" is a phrase that carries an overtone of "infallibly true." Haraway's "god trick" that we endow to the technology of statistics from the science of mathematics requires us to look more critically at this human assumption. Humans, with all their foibles, are the heart and soul of statistical analysis. Starting with choosing what to study, how data will be collected, what comprises a data set, which data are classified as outliers, the narrative created by the researcher to fit the observed pattern, how the statistical analysis will be used, and to what purposes the results are used are all parts of the process influenced by human bias. Although computers have been a huge aid in the process, an algorithm coded by the programmer into the computer model and the binary aspect of the data process are part of the statistical creation process. The cultural context of people involved in the production of statistics subtly influences results. We do a pretty good job of recognizing our bias with such constructs as peer review. However, if a human is the subject of a study, they can deliberately influence the research. We must be very careful in weighing the objective truth of statistical information, especially when applied to public policy. The context of the knowledge creation needs examined. Careful review of the universe surrounding the statistic creation process will aid critical thinking and avoid the trap that statistics are infallible.

Introduction

It was a dark and stormy night when I arrived at the local ice cream shop's drive thru ten minutes before closing. My order was very simple, a vanilla ice cream cone. After I paid at the window, the employee directed me to wait by pulling forward and wait by the back door, just a few car lengths ahead. I decided to stay put since there were no other customers inside or in the drive thru. I would keep watch and would pull forward when another customer appeared. I figured that this would keep the employee from dashing out in the rain; but the employee was most distraught I hadn't followed their directions. This experience exemplifies how human agency can skew data collection and the subsequent statistical analysis that might lead to policy.

Statistical analysis, based on rigorous scientific methodology, has become the lamppost guiding many facets of modern society. If we are told something is statistically significant, we take it as a given that it is true. Worshiping this truth adds another leg to prop up the "god trick" of Science (Haraway 1988:581). While being "statistically significant" isn't equivalent to true, it does add a cachet of veracity to any claim. Statistics applied to experimental testing data underpins the justification of scientific laws and theories and, most critically, public policy. Wernick draws attention to our belief that "mathematical models remove bias" (Wernick 2014:29). But we are substituting a different bias of only considering those factors "that can be captured or counted (i.e, digitized or "datafied") so that they can be modeled mathematically" (Wernick 2014:30). We are losing our "situated knowledge" (Haraway 1988:575) in the increasing pursuit of the computer binary mathematical model. Not to mention the situated knowledge of the culture surrounding the exercise of statistical production.

With the advent of advanced computing technology, the newest sliced-bread in the area of statistics is data modeling and data visualization. If the data set underlying these colorful expressions isn't accurate, we have multi-colored unicorn excrement. While it is obvious the analysis is only as good as the data that are collected, an often overlooked aspect is the human factor that can pollute data. When a process is being monitored to supply data for further analysis, humans can knowingly and unknowingly throw in an uncontrolled variable, either as the study designer, data collector, analyst, or as an actor in the monitored process. Humans as researchers, research subjects, and statisticians invalidate the generalizations the statistical data tries to justify, which means the resulting analysis is then flawed. Additionally, public policy and other decisions are based on this flawed analysis instead of the bedrock of objective truth they suppose impact society. The intersection of science, technology and society is where the technology of statistical analysis is used to justify scientific findings and the societal policy decisions that are based on these potentially flawed constructions. Understanding human agency is important to the criticism of any statistical analysis because of the profound impacts to the justification of the data to the foundation of the modern society and policy.

Setting the Stage

The production of knowledge through science went through a revolution in the past five hundred years, but mathematics has its foundation in the earliest roots of civilization when someone first needed to count something. The technology of statistical analysis was probably developed around A.D. 900. Recently discovered manuscripts demonstrate "al-Kindi (801-873) used relative frequency analysis some 1100 years ago to decode messages" (Broemeling 2011:255). With the advent of computers, using the science of math and the technology of statistics is faster and certainly more ubiquitous.

The pervasiveness of statistics in our lives is now problematic, since Donna Haraway's (1988) concept of the "god trick" of science reminds us that science isn't all-knowing, but situated in a very human framework. She notes that science is "a series of efforts to persuade relevant social actors that one's manufactured knowledge is a route to a desired form of very objective power. Such persuasions must take account of the structure of facts and artifacts, as well as of language-mediated actors in the knowledge game" (Haraway 1988:577). Statistics are a guidepost but are not infallible. The people involved in the knowledge game of statistics have their own cultural experiences and their own human agency driven towards their goals. The artifact of statistical analysis output is based on the structure of facts contained in the data set. The selection of the make-up of the data set is a very human endeavor. Thus, there is a need to examine the situation in which the statistic has been created to successfully apply the knowledge. But is this science and technology good for us? When it is used to make public policy decisions for our societies, we must be careful that data sets used for statistical analysis do not contain bias.

Social Construction of Statistics

Statistics are human created artifacts that are susceptible to the influence of social construction. Unfortunately the goal of the statistical creation is to influence public opinion and public policy. Human agency cannot be strained out of the process of statistical analysis but we can recognize the bias introduced with a careful review of the circumstances surrounding knowledge production.

In the media, the desire for an attention-grabbing headline that sells ad revenue often results in outrageous statements and Best (2004) notes that: "people do knowingly present distorted or even false figures" (Best 2004:XIV). In 2016, headlines asserted one Christian was killed every six minutes for their faith. Subsequent exploration of the study and the headlines found this statistic problematic even though it was very eye catching and good at drawing readers to the article. The data set was extrapolated from ten years of data;

some of those Christians killed were fighting other Christians and a Christian who died prematurely while acting out their faith was considered a martyr--say, saving a child drowning (de Vries 2019:27-31). Unfortunately, this false figure has given rise to the incorrect public "knowledge" that those of the Christian faith are under continuous threat of martyrdom. The background for the headline has not been made clear and the problems with the assumptions of the study are not included in the public discourse. Once data has been released into the common vernacular with the false cloak of statistical rigor, removing the incorrect narrative in the public mind is nearly impossible. Public opinion has been manipulated to believe that poverty is directly caused by the poor person's choices and disregards the societal conditions that create poverty. The misused statistic is that public assistance recipients are single black mothers and not the actual overwhelming poor white majority.

Similarly, the misuse of statistics can be seen when there is a vested interest by those creating the statistics, particularly for monetary gain. The controversy of the link between cigarette smoking and cancer, brought to the public's attention the use of statistical analysis. Statistics played an important part of "overcoming skepticism and resistance towards the connection between cigarettes and lung cancer involved, in large part, convincing the medical community that statistics could provide a legitimate form of scientific evidence" (Harker 2015:5). Cigarette manufacturers used their massive marketing machine to urge smokers "to trust their own judgments over the science" (Harker 2015:7), which is an appeal to favor anecdotal evidence over statistical rational evaluation. Another insidious threat to truth is funder bias, which is also present in this example. When the tobacco industry's attack on science was not going so well, they hired their own scientists to mange "projects which received industry funding [that] were far more concerned with genetic and environmental explanations for lung cancer" (Harker 2015:8). Their paid scientists discovered exactly what they were paid to find--that there were other causes of lung cancer, but they didn't take the next step to compare these other causes to risk from smoking since that was not the message the tobacco industry wanted to market. The blatant funder bias can be uncovered by searching for the funding sources and of course in the academic realm is cross-checked with peer review and independent replication of results.

Misunderstanding Statistics

When a coin is flipped, there is a 50 percent chance it will land on heads. No matter what the coin showed on the previous flip, the next flip still only has a 50 percent chance it will land on heads. This is an inarguable statistical fact that can not be influenced by a fairly weighted coin

being tossed by a fair, impartial person. However, if we have a run of tails, it is hard not to believe that surely the next flip will be heads. We want to believe that the statistical probability changes based on past performance. We need our statistical facts to keep us away from this non-scientific wishful thinking.

Humans are not very good at rationally evaluating risk, particularly when it relates to fatality. While cold hard facts, in theory, should help us overcome our subjective reactions, in reality, our perceived risk may be more related to experience than actual risk level. For example, travel fatality data illustrates that air travel is statistically safer than car travel. In 2016, 720 million people took a domestic flight and zero people died. In 2017 there were 741.7 million domestic flyers with, again,, zero deaths. In 2018, there was one fatality out of 777.9 million passengers (Bureau of Transportation Statistics [BTS] 2020). Going back to the start of air travel, the five-year rolling average of fatalities has consistently decreased since 1948 (Millam 2021), even though the number of passengers is increasing. On the other hand, fatalities in automobiles is alarming. In 2018, there were an estimated 36,750 fatalities in the United States, 37,133 in 2017, and 37,806 in 2016 (Bomey 2019). While cars are getting safer, we deny this rational statistical information that driving is inherently riskier than flying; we are more anxious about flying in a plane on a vacation than a car trip to the local grocery store. Statistics gives us a factual description of our risk.

We also tend to favor anecdotal evidence over statistical rationale evaluation. The base rate fallacy occurs when personal judgment eclipses known base rate information. Tversky and Kahneman (1973) used the lawyer and engineer problem to illustrate. In a sample population of 100, there are 30 lawyers and 70 engineers or a probability that someone is a lawyer is 30 percent and the probability an engineer is 70 percent. However, people will ignore the base rate probability and instead rely on only a descriptive explanation to determine a given person's profession. The base rate fallacy is relying on details about a specific uninformative exemplar instead of statistical probability. Statistics gives us a rational framework that is not based on our subjective feelings. During an experiment, I asked classmates to determine if a person was a lawyer or an engineer given the population was split 30/70. A brief description was given and the audience classified the subjects based on their biases. The descriptions were deliberately misleading and played into the preconception of lawyers have briefcases and engineers have glasses even though following these biases left the answers not following the 30/70 split which they were told had been maintained in the sample.

Raw numbers can also be misinterpreted. According to the Center for Disease Control (CDC) the total number of cases of COVID-19 from January 21, 2020 until July 18, 2021 for the State of California, our most populous state, was 3,748,365 and for the State of Wyoming, our least populous state, 68,523 (Center for Disease Control [CDC] 2021). At first glance, we might assume it was safer to be living in Wyoming in the pandemic because of the significantly lower number of cases. California had almost 55 times the number of cases. But when these numbers are reported against total cases per 100K population, the picture changes radically. California is 9,487 and Wyoming is 10,976 total cases per 100K population. Obviously there are more factors than population size that impact the rate of disease transmission. We need to make sure that the conditions surrounding the statistical statement are examined. The statistics of 55 times greater number of cases considered in isolation without normalizing for the population size is misleading. Population density, health mitigation strategy compliance, health care system ability, and so many other factors cannot be disregarded.

The involvement of humans in the scientific knowledge creation process, introduces fallibility. Harker (2015) asserts that humans introducing "fallibility is expected" (Harker 2015:46). Empirical evidence can be misperceived as with the examples given. But, when scientific endeavor repeats the experiment and statistical analysis is applied to a data set, the resulting scientific descriptions of our world can be shown to have a higher probability of being true. Statistics provides a means to check our conclusion. If repeated and well-designed observations offer the same statistical frequency of observation, we have a guide post that our conclusions are factual.

As with any human endeavor, statistics contains bias. The umbrella of mathematical science does not exclude statistical analysis from this problem and Best (2004) notes that "we cannot dismiss bias as nonexistent" (Best 2004:XIV). Statistics are socially constructed and not just the science of applying mathematical formulas. The researcher chooses the topic and explores collection of data they feel will be insightful. The input into the hopper of statistics "are products of people's choices and compromises, which inevitably shape, limit, and distort the outcome" (Best 2004:XIII). Critical thinking is necessary to examine the socially constructed numbers. Best reminds us that "we must recognize that all numbers are social products and that we cannot understand a statistic unless we know something about the process by which it came into being" (Best 2004:XV).

We have been instructed that our statistical analysis has to have an acceptable p-value. The rate has been set at p-value < 0.05 by convention. It is rare the

discussion of the p-value makes it to the popular press but the acceptance by researchers that this convention is canonical law without considering the entire environs of the study can be problematic. Before waving around the acceptable value, "researchers should not be allowed anywhere near a p-value or similar measure of statistical probability until they have demonstrated that they understand what it means" (Bishop 2020:9).

For example, an experiment is designed where the amount of water a mouse drinks every day is changed to examine the mouse weight change--nothing else, like the amount or type of food, is changed, just the amount of water. The null hypothesis (Ho) is that the change made no impact. The alternative hypothesis (Ha) is that change in water did change the mouse weight. The p-value is the probability that a sample will give a result as or more extreme than the sample result by random chance. Concisely, "a p-value measures the 'surprise value' of a particular observed result conditional on the null hypothesis being true"(Hubert and Wainer 1944:260). A tradition has developed: "many scholars seem to believe that p < 0.05 is both necessary and sufficient to make a finding 'meaningful'" (Goldfarb and King 2016:175). "Under most circumstances, the choice of a level of statistical significance is not made through the explicit consideration of arguments for different statistical choices, but by the tradition of an area of research or the choice of a computer statistical package" (Douglas, 2000:566). So if the weight change in a sample of the mice in the experiment is greater than 0.05, we would reject the null hypothesis, but this does not mean we immediately accept the alternative hypothesis. To add to the confusion, when research is lauded in the press, lay readers believe that something being 100 percent makes it more accurate. If a sample has a 100 percent p-value, this means it has no validity at all! Luckily, the lay-reader is not often presented with this situation, but the researcher can be caught unaware that rejecting the null hypothesis does mean accepting the alternate. Lower p-values indicate more reliable results; that the sample was probably more like the entire target population. So 100 percent doesn't mean what you think it means (truth); it means it is impossible (inconceivable!) [A reference to the character Vizzini's iconic line "Inconceivable" and Inigo Montoya's response "You keep using that word. I do not think it means what you think it means."--*The Princess Bride*].

In his 1958 publication on the beginning stages of schizophrenia, psychiatrist Klaus Conrad created the term apophenia to label the human tendency to perceive meaningful connections between unrelated things. Scientific apophenia is "the tendency to find evidence of order where none exists" (Goldfarb and King, 2016:167) since humans tend to look for patterns.

Unfortunately, Bishop notes that this tendency can be problematic since "conventional training in statistics is insufficient, or even counterproductive, because it might give the user misplaced confidence" (Bishop 2020:9). For example, Bishop's students found patterns in null data sets (random numbers), when none should have been found. This illustrates the human foibles interfering with statistical knowledge production. We expect statistics to find patterns. This subtle bias of expecting the world to make sense can be one of the hardest to counter during statistical analysis. While difference can be discovered that are statistically significant, they may not be socially meaningful, either.

Big Data versus Small Data

Our age is touting "big data" as the way to gain insight and make sound decisions. Big data, with its "associated 4Vs: Volume, Variety, Value, and Velocity," (Cheng et al. 2018:1), does offer a window into the major currents of our society. However, because of these characteristics, the focus has shifted to correlation instead of the elusive causality and a further perpetuation of misunderstanding statistical analysis. Big data is touting the ability to up-selling to shoppers by providing targeted ads based on similar shopping patterns observed in large population sizes. Even if we connect a person's shopping data, their Ring doorbell data, and their 23andMe DNA data, do we really have anything that approaches causality? The collections of these disparate data sets into combined larger constructions are called data ponds. Big data allows for the possibility to find correlations between unrelated events. Without a clearer integration point than just the single consumer perspective (which might be incorrectly mapped), these are murky data swamps.

"Wal-Mart found that its beer sales were significantly positively correlated with the baby's diaper sales" (Cheng et al. 2018:4). But, correlation does not imply causation. The store then embraced the scenario that the father was sent to buy baby diapers and also got some beer. The jump from the correlation, does not guarantee the truth of the scenario. The perceived value of the big data became a roadblock to further analysis to determine who the shoppers were and why they were purchasing what they were. A big data standard process is "mainly relying on the subjective judgment of the researchers" (Cheng et al. 2018:3). The researchers determined the scenario of the helpful beer-buying new father out of their own bias.

Personal handling of the data is required to comb and refine the data swamp--it is certainly not a pond at this point but with big data is the possibility to find correlations between unrelated events, which also adds an undesirable human factor. We are trusting in the truth of the statistical analysis because big data is

big and sampling errors are not as problematic when we are looking at a larger population sample. However, the human fallibility factor is still present in how the researcher interprets correlations.

Another new approach is to look at "small data" when all the data points are known. Small data is more available and does not require big player access. Small data is either traditional sampling with its associated mature science and analysis techniques or it also could be all the data there is on a topic. The entire data set is everything there is to know, so the problem of sampling error is nonexistent. Personal handling, the refining required in big data, is generally not required or advised with small data. Trying to look at subsets of small data from a big data set quickly leads to data privacy problems. Big data analysis without a small data perspective leads to incorrect conclusions. The flaw of collecting data on humans who know of the data collection effort can also cloud the small data. This will be discussed shortly.

The flaw of collecting data on humans who know of the data collection effort can also cloud small data. The quality of the data isn't just based on data set size or how complete it is. A clear example of this problem of data integrity is based on a scenario when the great sailing ships were the heart of intercontinental commerce. Sailors were afraid of the monsters of the sea, often imagined in the margins of their maps in great detail. They were especially worried about drowning. Dolphins were seen as heroes for rescuing drowning seaman. What is missing from the data set is that sailors drowned by the dolphins obviously did not report their experiences. The current trend is to take an excursion to swim with wild dolphins in the oceans. Dolphins do kill and do not consume their kills. (Patterson et al. 1998:1167-1170). The sport of swimming in the wild with dolphins is becoming more popular. "Through 1994, Dr. Kohn said, statistics showed that the injury rate was less than 1 in 10,000 people" (Broad 1999:F1). Before we give the dolphins any fish rewards, remember, none of the sailors drowned by the dolphins reported their experiences. Regardless of the data size, it needs to be truly representative.

Computational Statistics

We have added statistical modeling based on the binary state of computers to our statistics production. Our health care system is so focused on matching disease codes with treatment codes that we might be missing providing health care to the individual, unique patient. What if the patient has multiple conditions that are interacting? We are tantalized with promise that soon scans of our DNA, cross-referenced with the doctor's clinical disease code, will provide the exact personal treatment down to the personally tailored drug therapy.

Our easy models do not take into account the complexity of reality. The use of this knowledge production machine may actually be hiding the goals that are in plain sight. Life is not binary. Our attempts of fitting health experience into a computer model is "stripping life of its serendipity to fit a model [that] may not only be an assault on the soul; it may simply substitute one type of bias for another" (Wernick 2014:31).

Research presented in 2010 by Snijders, van de Bunt, Steglich, and Christian (2010) explored the interpersonal relationships as self-described by a Dutch school class of 26 students over their first year at secondary school. Actualization of an actor based model is provided by software called SIENA (Simulation Investigation for Empirical Network Analysis). The purpose of the SIENA model is to test hypotheses concerning network dynamics, which were exercised using the research findings for school study. The exercise of the SIENA model is very clear as is the data collection. The software source code is publicly available for peer review. At the time the researchers noted, "these models are relatively new, and more complicated than many other statistical models to which social scientists are used" (Snijders et al. 2010:58). The researchers seemed self-congratulatory with their complicated peer review-able model. However, teasing out the bias of what was humanly selected by researchers to model, simply by reading the computer programming code is difficult and impossible to see what was not selected for modeling. The program code obscures the selection/rejection criteria of the researcher in the model which makes the environment in which the statistics were constructed hard to examine.

O'Neil (2014) discusses several areas of big data jeopardizing democratic principles. Adding computerized models of target areas to search for crime codifies existing systematic racism. Police have targeted "bad" areas in the past looking for crime. When this historical map of "found" crime is turned into a modern algorithm for directing police efforts, crime is "found" (O'Neil 2014:84-104). If you do not look in "good" areas for crime, there is no way to find it! Saying we know from historical data that most crime occurs in "bad" areas ignores that "good" areas were never explored. Just like the example the sailors who drowned by dolphins not being included, "good" area crimes are not included. Adding a computational model codifies and cements the incorrect conclusion that "good" areas do not have crime.

Setting Policy

Jumping back to my rainy, late-night ice cream cone, statistical analysis plays a part in setting policy. After some reflection, by staying at the drive-thru window, my car

was still in the store's camera view and the time to fulfill the order was still increasing. The employee wanted no management "help" about such a simple order taking too long. There are several problems with what happened. Obviously the data collected had been compromised because of the employee's actions. If other customers waited at the back door, the wait-time to fulfill the order is only abstract and not useful to make any inferences. The only way to realize the collected data is compromised is to see the employee modifying the order process in action. An unlikely chance as corporate time is in motion, data scientists rarely go back out into the field to test data collection strategies. Decisions will then be made on this polluted data set. Perhaps employee time targets will be set unrealistically for the entire employee team.

While this ice cream incident is mostly amusing, inappropriate police conduct is notably not. The Black Lives Matter movement started in July 2013 as a critical public response to the problem of police shooting without cause. The New York Times article by Butterfield (2001:4-5) details the problematic nature of not having clean data regarding violent police encounters. The problem is self-reporting: the data are provided exactly by the entities themselves. We have many heartbreaking examples of fatal civilian shootings without just cause and certainly weighted towards minority segments of our population. "Local police departments [are required] to report their figures on police shootings to the Federal Bureau of Investigation" (Butterfield 2001:4-5). While it is easy to see that disparate collection methods among local police departments would pollute data, the human factor of actively missclassifying the incidents is overlooked. The essence of the problem is "the lack of distinction between justifiable police shootings and murders" (Butterfield 2021:4-5). This aggregate classification disregards the social problem. In the report provided from the data, no distinction is made! In other words, the fox reports on how many chickens it ate out of the hen-house. Worse, the fox defines the chickens as all deserving death. The jury verdict yesterday (April 20, 2021) on George Floyd's murder by police directly contradicts the police department's initial report of the incident. The video taken by the bystander with an independent viewpoint was crucial to this verdict because it provided additional data not presented initially by the police. Public policy can not be effectively directed when there is no difference between felons shot in the line of duty and innocent bystanders murdered by police. Since data collected to date is marred by the problem of self-reporting, measuring the effectiveness of policy change without a solid baseline is impossible. Therefore, determining the efficacy of policy change is also impossible.

Once the data collection is clean, the next problem is policy makers' emotional response. A common technique is to look at all licensed drivers as being representative of the collective law makers are representing. This technique immediately falls apart in that this sample is not representative of the population. At the very least this data set is missing the elderly whose license may have lapsed or the disabled or the undocumented immigrant who can not get licenses. Arguing that the unlicensed have no rights is disingenuous because they are still a member of the society irrespective of rhetoric structure. When making decisions on public policy, the entire population needs to be considered.

Science has long regarded epistemological values as the only ones that matter, which is what makes statistics so beguiling. Values that can be analyzed for patterns, which trend to apophenia, might cause bias. Once we move the analysis into the realm of politics, epistemological values are not enough. Douglas (2000) explains that non-epistemological values like social, ethical, and political do play a part in science. Attempting to make science value-free results in incomplete flawed reasoning. She encourages science to broaden the discussion, but to not lose sight of good sound arguments by stating that: "when non-epistemic consequences of error can be foreseen, non-epistemic values are a necessary part of scientific reasoning" (Douglas 2000:578). Scientists must act with the same morality as the rest of the society and to claim science is value-free is ridiculous, especially when it is used to codify societal value into policy. Haraway's (1988) standpoint theory is that we all view the world (and thus science) from a particular standpoint that is grounded in experience and aspects of identity (age, sex, gender, race, socioeconomic status, education, culture, etc.). Thus, the feminist critique of science is that it cannot be objective because the humans doing the science are incapable of being objective because of their standpoint. As a result, we bring our values with us when we make interpretations and analyze data using statistics.

The problem Tant (1995) brings to the front is those that request (and fund) the statistical information to be produced want specific results that will shed light in the direction which the funder wants public policies to be changed. This can result in funder bias as discussed above. Because long-term consistent data collection is difficult and the publication frequency of the data changes, drawing accurate conclusions is hampered. Data collection can be terminated when the public problem is seen to be on the decline, and which will not hinder the impression in the future that the problem was "solved" and government credibility is unjustly sustained. Tant (1995) demands more government transparency and critical thinking on the part of the governed. Fitting the requirements of data collection into a presupposed favorable outcome is undesirable for accurate policy decisions. Tant (1995) demands we acknowledge "the

manner by which official statistics are produced [which] demonstrates clearly that the Facts' do not 'speak for themselves', and equally clearly, that political incentives do exist for [the] government" (Tant 1995:262). Policy makers do not spend the time to understand the background surrounding the 30-second media sound bite statistic they cherry-pick to support their policy decisions.

Conclusion

The mature mathematical science has given us the technology of statistical analysis to guide rational decision making for our society. Our usage of terms in common parlance does not always match up with the technical use in statistics. For example a 100 percent p-value means something has no validity instead of the 100 percent accuracy that might be commonly assumed. Human perceptions are influenced by calls to emotional response, apophenia, base rate fallacy and others. The social nature of statistical construction can be driven by capitalistic values (ad revenue and sales) and funder goals. Other biases are present with statistics via the definition by the researcher of the problem, the selection of the data set by the analysts, the algorithm coded by the programmer into the computer model, and the narrative created by the researcher to fit the observed pattern. Human actors also participating as subjects during data collection impact the quality of data either with life being more complex (health data), policy makers declaring a problem is "solved" when the data simply trends in the right direction, or having an agenda as the subject different from the researcher to influence data gathering. Influencing the data gathering was discussed with retail worker data collection, police shootings, and policy decisions. Data integrity, if it can not be made sacrosanct, must at least be understood. We need to "understand something about the place of statistics in contemporary policy rhetoric, [and] about the processes by which numbers get produced and circulated" (Best 2005:213). Blind acceptance of the truth of statistics, accepting the "god trick," without understanding the human situation that produced the knowledge, has too narrow of a vision. We must be careful when using our statistical technology for public policy decisions that codify our society's morals and our scientific claims. Statistical analysis must be held to peer review for all stages of the knowledge production.

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Fingerprinting Analysis with an Emphasis on Human Identification and the Ethical Implications of Wrongful Convictions

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Abstract

Forensic science is in a constant state of improvement. This improvement is highlighted through the movement from a small, city-wide database with hundreds of physical fingerprint cards, to a nationwide system that can help investigators in a matter of minutes. Fingerprints are a complex section of crime scene analysis that can help researchers understand the implications of convictions, how they are transferred, their details, and their uniqueness. Fingerprints are useful in physically placing suspects at the scene of the crime. With new advancements in technology, they can also be used to identify individuals at the crime scene and can lead to a more empirical method of conviction. This is created through the physical evidence which can satisfy the requirement of conviction to a judge or jury. In this paper, fingerprinting is examined in context to its history, implications, and its improvements. A brief history, alongside methods, and different aspects of fingerprinting is introduced. Fingerprints identify individuals across the nation, they are unique to the individual, and essential in understanding and advancing fingerprinting techniques for the future. This paper examines the implications of fingerprinting from a functionalist approach, alongside its connection to both Black's Theory of Law and Social Control Theory. Practical considerations of new technologies and ethical considerations using fingerprint evidence are also discussed. Understanding fingerprinting in the context of anthropological and criminological theory provides an essential understanding of technology and its ethical concerns.

Introduction

Human fingerprints are unique biological identifiers that help distinguish one individual from otherwise similar people (National Forensic Science Technology Center [NFSTC] 2013a). These differences can be found in the minute changes between patterns and other types of attributes. Fingerprinting allows criminal investigators to gather individual-specific information regarding crime scenes (Innes 2008:11). Forensic science began in 1909, with fingerprinting following shortly after in the 1920s. It was not until the 1980s that fingerprinting started to revolutionize technology in terms of large-scale databases (Komarinski 2005). During this time, police and agencies across the United States began to document human fingerprints as a unique identifier used as evidence in criminal investigations. Largely, technological innovations marked these revolutionary changes. When police departments began collecting fingerprints and keeping them on record, these records were not available to a wide range of local police and government entities. In 1999, the Integrated Automated Fingerprint Identification System (AFIS) was created by the Federal Bureau of Investigation (FBI) as a national digital online fingerprinting database.

This research first summarizes past fingerprinting methods and its advancements, such as AFIS. This is followed by select examples of wrongful convictions based on fingerprinting evidence. The goal is an analysis of wrongful convictions based on selected cases provided by the Innocence Project, and the associated societal and ethical implications, to better understand crime on the individual and on society. In addition, research analyzes the effectiveness of past methods as compared to new technology and qualifications of witnesses. Fingerprints are one of the oldest forms of biometric analysis, but contemporary law enforcement utilizes many other resources including retinal ID, DNA, dental profiles, palm prints, voice profiles, and other methods. However, this paper focuses solely on fingerprinting and how fingerprint evidence is now an essential tool for past and present criminal convictions. In short, has better fingerprinting technology led to a better understanding and more valid identification for conviction?

Background

Beginning in 1878, Dr. Henry Faulds learned of the long-term use of fingerprints on ancient pottery (Faulds 1912). He noticed that prehistoric Japanese pottery had fingerprints and that each of the fingerprints were distinct and unique (Onin 2020; Faulds 1912). From this, he surmised that patterning of fingerprints could apply to criminal identification of humans. Faulds began experimenting with fingerprints by collecting them and devising a classification method known as the Henry Classification System (Beavan 2001:65; Faulds 1912). The Henry system was a unique classification that applied a numerical sequence to each end of the finger and defined

its unique patterned characteristics. His system could identify around 100,000 different combinations (National Missing and Unidentified Persons System [NAMUS] 2021). Faulds pushed for police departments to adopt fingerprinting analysis and wrote letters to police departments in the U.S. and Europe, which ended with few replies (Faulds 1912). With only minimal research on the methods fingerprint data collection, it was not widely adopted.

Despite the early methods derived by Faulds, William Herschel is often credited with creating the technique of fingerprinting (Herschel 1916; Innes 2008:12). Herschel's research was distinctive from Faulds because he was the first to collect fingerprints on documents that could be compared to a fingerprinting database and used for personal identification (Herschel 1916; see also Onin 2020). He did not understand the scientific implications of fingerprinting. Instead, Herschel used fingerprinting as a binding technique. He played on the superstitious idea that fingerprints created a binding effect on documents, and used this to his advantage (Onin 2020). Herschel realized the importance of fingerprinting and collected them for 57 years. From these efforts, he used fingerprint comparisons to identify prisoners, collect deeds, and issue jail warrants in Jungipoor, India in 1858 (Herschel 1916; see also Dreyer 2013).

Fingerprint Characteristics

Fingerprints are raised, minute ridges located on the skin's surface of a finger. These ridges are called friction ridges (Daluz 2019:3). Within the boundaries of friction ridges are type-lines. Type-lines are ridges that may start in a parallel direction and then diverge or terminate (Federal Bureau of Investigation [FBI] 1979:4). Type-lines can be continuous, but the majority of them may appear incomplete (Figure 1). The type-lines define a pattern area. This is the area of the finger that houses the characteristics, which allows for the interpretation and classification of a set of distinct fingerprints (FBI 1979:3).

Fingerprints comprise three general patterns of type-line friction ridges. These include arches, loops, and whorls (FBI 1979:4). Arches are a small "hill-like" feature

(Figure 2). There are two types of arches. A plain arch is a small, very slight arch, whereas a tented arch is a tall arch (Daluz 2019:9). A loop contains two subsections. A radial loop turns towards the thumb, whereas an ulnar loop turns away from the thumb. The whorl consists of
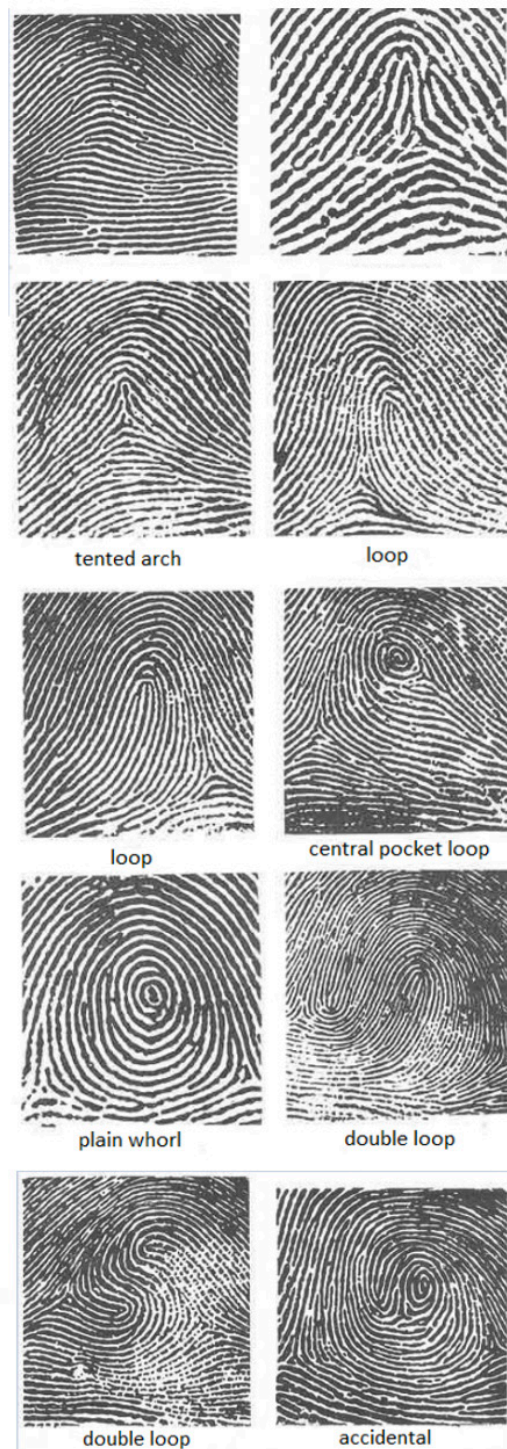

Figure 2. A chart of arches, loops, and whorls.

Figure 1. Pattern area consisting of two type-lines and a delta. Type-lines are in bold above and below the delta.

four subsections. A plain whorl resembles concentric circles. A central pocket loop is a loop with a whorl at the end. The double loop is two loops that create an S-like pattern. Lastly, the accidental whorl is a whorl that is irregularly shaped or cannot fit into another category.

Other unique type-line attributes are apparent (FBI 1979:12). The first is a bifurcation. A bifurcation is a "forking or a dividing of one line into two or more branches" (Figure 3a; FBI 1979:9). A second attribute is a divergence, which is the spreading apart of two lines that had previously run parallel (Figure 3b; FBI 1979:8). Other examples of unique attributes are an acute ending "ridge, a dot, a short ridge, a meeting of two ridges, or a point on the first recurving ridge" (Daluz 2019:10) located proximate to the core and in front of the separation of the type-lines (Figure 4). Fingerprints are also composed of focal points. These are areas within loops and whorls known as delta and cores (FBI 1979:5). The delta is a point on a ridge near the center of the divergence of type-lines. It is typically found at the start of type-lines or in front of them (FBI 1979:8). Simplified, it is an opening around the beginning of the divergence of type lines, similar in shape to a geographic river delta (Figure 3a). A core is the innermost part of the fingerprint and is composed of a loop signifying the central most part of a fingerprint.

When examining and comparing fingerprint patterns, there are three possible conclusions. These include, identification, exclusion, or inconclusive (Daluz 2019:13). First, fingerprint examiners look at all components of fingerprint characteristics, where they can conclusively state a confident identification is apparent. A positive match is known as identification (Daluz 2019:13). If the match is negative the suspect is excluded. An exclusion means that the identity of the person who provided the fingerprints is excluded from the suspect comparison pool. If the fingerprint patterning is not substantial or complete enough to provide confident conclusions, then results are considered inconclusive.

Fingerprinting Methods

Methods for the collection of fingerprints are categorized as two distinct types of prints. When investigators check surfaces that are likely to contain fingerprint evidence, they conduct a series of observations that allow them to choose the appropriate recording method. Observations can include the visibility of a print, or if inadequately visible, they revert to checking places frequently touched. Patent prints are the most visible and common types of prints. They can be recorded on smooth surfaces, in blood, on door frames, or glass (Claridge 2018; Innes 2008:33). Patent prints use low-angle or alternative light sources with dye chemicals, where a photo is taken and uploaded into a computer. The visible impressions of a fingerprint left at a crime scene or on an object are

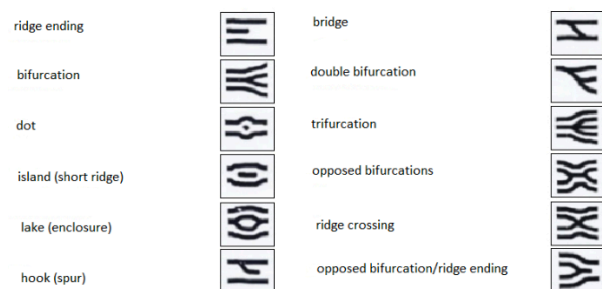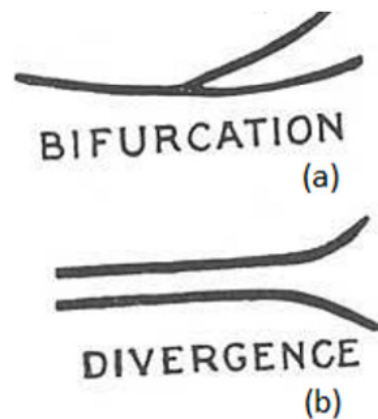Figure 3. Examples of bifurcation and divergence patterns.

Figure 4. Fingerprint characteristics.

also known as impression prints (Bureau of Criminal Apprehension [BCA] 2021).

Latent prints are much more difficult to visualize as they represent the minute traces of sweat that are left on the surface of an object either through direct contact or by traces deposited indirectly (Innes 2008:33). As such, technicians must use additional collecting methods to document latent prints (NFSTC 2013b). The first method is using an alternative light source or ALS. With latent prints, this method does not always work; sometimes, fingerprints may become smudged or unclear. An effective method that provides a clearer impression for documenting latent prints is the use of a reflected ultraviolet imaging system (RUVIS) (Gulick 2008). Like patent prints, latent prints also use powders or dye stains to make the image more visible. Cyanoacrylate, or superglue, is sometimes applied to a surface before applying powders or dye stains. This allows the print to be more easily viewed with ambient light or a white light source (NFSTC 2013b). However, an issue with the use of superglue is fumigation. If fingerprints become fumed by superglue for too long, the prints become chalk-like and unusable. Additionally, this method does not permit fingerprinting on porous items (Gulick 2008). If prints are collected on porous surfaces, a chemical called ninhydrin is used with a physical developer (NFSTC

2013a). A physical developer is a chemical technique that is an "aqueous, silver-based reagent" to help lift prints from both porous and non-porous items (BVDA 2021). Ninhydrin and the physical developer allow for a purple or glowing depiction when using a blue-green light (Byrd 2002). The Ninhydrin mixture then "lifts" the print and allows it to become visible from the porous surface. A similar method is the use of magnetic powder. However, magnetic powder is very sensitive to metals and only works on hard surfaces (Gulick 2008).

Requirements and Implementations

To use forensic evidence in a courtroom, the fingerprint analyst must qualify as an expert witness (Moessens and Meagher 2011:13). A witness can be qualified as an expert in the Federal Rules of Evidence [FRE] 702 (Cornell Law School 2021). If all of the below terms are sufficient, a judge will allow them to present evidence to the courts as an expert witness (Monessens and Meagher 2011:13-14).

Expert witnesses provide interpretations of AFIS/IAFIS. A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

a. the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue:

b. the testimony is based on sufficient facts or data;

c. the testimony is the product of reliable principles and methods; and

d. the expert has reliably applied the principles and methods to the facts of the case. (Cornell Law School 2021)

Only after the expert witness has gone through a screening process can they provide any forensic evidence to a court of law. To do this, the witness must take the stand, get sworn in, provide answers to all questions from both counsels (Monessens and Meagher 2011:13-14). They are responsible for keeping a relevant curriculum vita, which allows them to show they are up to date in applicable procedures and practices. If all of the above is sufficient, then a judge will allow them to present their evidence to the courts as an expert witness (Monessens and Meagher 2011:13-14).

The use of fingerprint evidence brought about changes to the criminal justice system, such as ethical guidelines, accurate data collection, and implications for those previously wrongfully accused (Innocence Project [IP] 2021a). DNA evidence, including fingerprinting evidence, has cleared over 137 out of 274 (50 percent) cases of wrongful convictions over the last couple of decades using fingerprint analysis (IP 2021a).

Ethical Implications

Exonerees are often stigmatized and berated for false confessions or guilty verdicts (Scherr et al. 2020). Frequently, exonerees suffer from mental health issues, are considered less intelligent, or are blamed for their convictions (Scherr et al. 2020). Ethically and socially, this can wreak havoc on an individual. After years of imprisonment, leaving a prison puts exonerees in a state of culture shock (Hamison 2013).

Readjustments for those who have left prison after time served compared to those who leave after being exonerated have little difference, where readjustment to everyday life must be considered on a case-by-case basis. Reentry strategies have been a struggle to gain compensation for victims of wrongful convictions (Hamison 2013). To those who have been exonerated, the reach of these wrongful convictions extends much farther than just to the wrongly accused. This process is a ripple effect and also impacts families and communities (Bishop and Osler 2015:1033). After learning of the wrongful conviction, the victim may feel guilt, fear, devastation, depression, and helplessness, to name a few (Irazola et al. 2014:1). They may feel responsible for the exoneree's conviction or are responsible in the eyes of the public (Irazola et al. 2014:3).

Many convictions under review are by individuals on death row (IP 2021b). Ethically, those who feel that they have been wrongfully convicted and who have not had their fingerprints and DNA analyzed before their execution date poses an essential moral question. Is withholding the ability to test fingerprints and DNA detrimental to an individual and their case?

Theory and Methods

Theory

Biological identifiers, specifically fingerprinting, exemplify the growth and evolution of new technology meant to make the future of fingerprinting more precise, and provide a more definite justice. Functionalism is an anthropological theory that evaluates the connectedness of the different parts of culture by comparing them to a living organism (Porth et al. 2021). Functionalism posits that culture is an interconnected being and can live and function throughout its organized system (Levin 2018). Functionalism asserts that everything in culture has a purpose, and without it, cultures would cease its existence (Radcliffe-Brown 1940:195-210). An important purpose of functionalism is to explain how different social mechanisms interact, and much like biological processes, various aspects of culture are interrelated and rely upon each other. Emile Durkheim, a French sociologist, coined the term "social facts" as a set of cultural rules in which people are born. It is a functional

set of culturally preexisting conditions, duties, rights, norms, ways of speaking, and believing (Durkheim 1895). Individuals do not create their cultures but are born and enculturated into an existing set of preexisting sets of culturally determined conditions, such as morals, laws, and expectations of the justice system. A core thought behind Durkheim's functionalism is the idea that people are largely unaware of these social facts until they violate them and that the adherence to these rules is through the process of social coercion (Durkheim 1895; see also McGee and Warms 2017:86). Functionalism is most notably connected to religious or social settings (Porth et al. 2021). Like the criminal justice system, religion seeks to find answers to unanswered questions. When interrelated cultural parts and individuals work cohesively, it becomes a body of information that can be conducive or detrimental to society. The use of biometric identifiers impart an important function to the criminal justice system in providing a deeper understanding of the crime and its possible perpetrators.

When considering social theory in this context, it is essential to also recognize criminological theory. Social control theory and Donald Black's Theory of Law are two criminological theories that outline the aspects of fingerprinting regarding society and ethics. They do so by acknowledging the impact governmental rules have on a society, and their influence on social control as a form of behavior (Black 1976:1). Social control theory posits that social groups regulate themselves, this theory provides insight into conforming behavior which helps to define a set of societal rules to follow (Kempf-Leonard 2012). A major factor of this is free will, which places social responsibility in the hands of individuals. Social control theory outlines a set of behaviors which identifies the set of rules meant for society to follow; these, as known as social facts (Durkheim 1895). The absence of a close social relationship, with morally "good" individuals, increases motivation to engage in deviant behaviors (Kempf-Leonard 2012). Social control theory establishes a binding effect. Individuals who have committed crimes are held accountable, and are regulated by social facts outlined by society. Fingerprints provide a connection between the suspect and the crime scene, making convictions a regulation of social facts. Wherein, Black's Theory of Law establishes a connection to handling the conflict between humans (Campbell 2011).

Donald Black uses the theoretical strategy, pure sociology, in order to define his framework. Pure sociology posits that human actions are a direct result of social life, and when actions are in opposition to each other social control theory comes into action (Campbell 2011). Another aspect of Black's theory is the Social Geometry of Law, particularly focusing on the vertical dimensions of unequal distributions of society that affect the application of law. An example is the social stratification seen from state to state related to number to individuals who can interpret these data and accompanying access to biometric identifying technology (Campbell 2011; Black 1976). Society will regulate itself when individuals have good influences, and in the absence of this social connection, humans engage in moral disputes. Crime is an example of a moral dispute.

Methods

Fingerprinting provides not only a small excerpt of how forensic science can prove or disprove the idea of an individual committing a crime, but can also provide evidence of DNA exonerations. This research offers a textual analysis of fingerprinting examinations. A textual analysis consists of gathering, synthesizing, comparing, examining, and critically evaluating the published work of scholars, such as in this case the FBI fingerprint guidebook, Integrated Automated Fingerprint Identification System online content, the Innocence Project, and publications on the background and history of fingerprinting methods. The use of a textual analysis for this research has contributed to a clearer understanding of fingerprinting, and its functionality in terms of exonerating wrongful convictions. The Integrated Automated Fingerprint Identification System is a technological example of Black's Theory of Law where expert witnesses provide information pertaining to fingerprinting gathered from these databases and are able to provide an overview of the information collected.

Database Systems

In recent years, fingerprinting databases have allowed crime specialists to more easily compare fingerprints. For example, the Integrated Automated Fingerprint Identification System (IAFIS) is currently managed and maintained by the FBI and is an automated system that offers a searchable database of fingerprint images collected on fingerprint cards or digital capture equipment (Komarinski 2005). IAFIS allows for the identification of an individual and the use of background checks in a rapid and efficient method with over 250 million fingerprint records, and more than 100 million criminal files (Komarinski 2005; Innes 2008:42).

Similar to IAFIS, Next Generation Identification (NGI) is another system of identification. This system is a platform for different forms of biometrics, or unique characteristics, that can be used to identify an individual. NGI is an evolving platform, which means with new technology, NGI itself will be refined (FBI 2021a). This began in 2011, and replaced IAFIS, yet is still housed under the umbrella term IAFIS. NGI provides an improved matching accuracy rate of 99.6 percent, which is compared to the previous 92 percent (FBI 2021a). A

few additional features of NGI are faster response time, fewer rejected fingerprints/biometrics, and the increased likelihood of identification and file maintenance (FBI 2021a).

Police acquire fingerprints following an arrest, but data collection is also done under several additional situations (FBI 2021b). For example, the FBI records fingerprint submissions related to federal employment, naturalization, or the military (FBI 2021b). These resources are only available to authorized criminal justice personnel, for the purpose of criminal justice, and must be in accordance with both state and federal laws (FBI 2021a).

Wrongful Convictions

The Innocence Project was founded in 1992 as an organization dedicated to investigating cases that might be wrongly convicted using fingerprinting data, among various other methods. (West and Meterko 2015). Its purpose is on national litigation, public policy organization, and reforming the criminal justice system to prevent future injustice tied to limited access to biometric and DNA testing (West and Meterko 2015; IP 2021b). The project began at Cardozo School of Law at Yeshiva University in New York and later became an independent 501(c)(3) non-profit organization in January of 2003 (IP 2021b). A non-profit organization is for the social and public benefit, operated by a collective, with the sole purpose to support the public through its purpose and mission. Although it is independent, law students from Cardozo work alongside the Innocence Project to evaluate proposed wrongfully convicted and work toward exoneration, if applicable (IP 2021b). The Innocence Project has provided evidence of DNA and fingerprint exonerations. The Innocence Project has also provided proof through the in-depth discussion of the growth of technology needed to give exonerees their way out (IP 2021a).

Herein, I highlight three case studies undertaken by the Innocence Project due to its reputable nature, and dedication to reforming the criminal justice system to prevent future injustice due to limited access to DNA/fingerprint testing (IP 2021b). The selection of cases is a rigorous task for those involved. To start this process, the Innocence Project uses mail as the primary source of contact. Next, extensive information pertaining to each case is gathered, and are reviewed to look for sufficient calls for innocence. A sole question posed by those conducting this analysis is the access to evidence. The search might seem debilitating, but due to a heavy influx of approximately 2,400 cases submitted each year with only six full time attorneys, research is necessary to understand the upcoming battle. The Innocence Project's sole purpose is to help individuals who have been wrongfully convicted (IP 2021b). Detailed below are some instances in which a reexamination or examination of fingerprint data proved useful in assessing blame and provided evidence to help a potential exoneree prove their innocence.

Archie Williams

Archie Williams was charged with life without parole in 1983 for rape and stabbing (IP 2019). In 1982, a man broke into the house of a woman in Baton Rouge, Louisiana and forced her into her bedroom, touching the doorknob and leaving semen at the scene of the crime. Despite having an alibi of his whereabouts, Williams was convicted from eyewitness testimony and was picked out of a lineup. Archie maintained his plea of innocence. In 1996, fingerprint testing became available as a biological testing tool used to make crime identifications in not only Archie's case, but also for governmental agencies. Archie began corresponding with the Innocence Project in 1995, and throughout two decades, they fought for the right to test evidence using DNA evidence, such as fingerprinting (IP 2019). The IAFIS database was initially used to look for a match against Archie, unfortunately due to the limited permitted nature of its use, this proved difficult in a court of law. The law has not caught up to fingerprinting technology, so it is on a case-by-case basis to which databases are allowed as succinct evidence within a court of law. Using Next Generation Identification (NGI), which is a more advanced fingerprinting system also maintained by the FBI, that incorporates palm prints, iris, and facial identification, his conviction was overturned. Fingerprinting examination as evidence in the past was not used, but with its reexamination, fingerprints left on the scene provided investigators with enough evidence to convict the correct man. Archie was exonerated at age 58, spending over 36 years in prison for a crime he did not commit. Although pleased with his release, he states that he is not free until those who served alongside him are also free (IP 2019). Archie filed a claim to be restituted for his time served in March of 2020; he has yet to hear back.

Ledell Lee

In 2017, Ledell Lee was executed in the state of Arkansas. Lee was convicted in 1993 for the murder of Debra Reese (IP 2020). Throughout his conviction, he maintained his status of innocence. Two weeks before his execution, the Innocence Project and the American Civil Liberties Union (ACLU) were brought in. Unable to grant a stay of execution due to the court's refusal to hear testimony on the grounds that it was too late, and on the matter of overturning his conviction, both the ACLU and the Innocence Project are continuing the fight to establish his innocence (IP 2020). They requested and were eventually

granted the DNA and fingerprints found at the crime scene, which were not a match to Lee. This DNA and fingerprint analysis was previously not tested because of lack of technology. This case is a prime example of the stratification of individuals within the justice system. The fingerprints found at the scene of the crime were not Ledell Lee's, but because he had limited access he was unable to prove innocence until after death. With the increase in better technology, his conviction could have provided information that led to information regarding a wrongful conviction. Arkansas chose to continue to execute Ledell Lee because vials of fluid containing lethal injections were expiring (IP 2020). Ethically, this poses a question of morality--how someone may have been wrongfully executed when DNA or fingerprint evidence was accessible and could have been used to prove innocence. This case is important in understanding the ethical implications of those who have fingerprint data available to be tested but are executed before these data are obtained.

Richard Jackson

In September of 1997, Alvin Davis was murdered in his apartment in Upper Darby, Pennsylvania. The only remaining evidence found at the scene of his murder were two bloody fingerprints left on a fan near the body of Davis (Possley 2012). Richard Jackson, a part time lover of Alvin Davis, was questioned in connection to his murder. Police, did not run fingerprints through IAFIS and used expert testimony alone to convict Jackson. This expert testimony was based on the examination of the fingerprints collected from Jackson, with the fingerprints found on the scene of the crime. Without uploading into a national database, human error led to misidentification, and demonstrating that technology is an essential part of fingerprint efficacy. During the trial, several expert witnesses testified, in which all had conflicting statements as to the identification of his fingerprints (Possley 2012). In September of 1998, Jackson was convicted to serve a life sentence without parole. Due to the testimony of conflicting identification of Jackson's fingerprints, the International Association of Identification (IAI) looked into this case and concluded the work of the original examiner to be wrong. After these findings, the original examiner admitted his mistake, and his license was revoked as a fingerprint examiner associated with this accreditation. The IAI is the largest forensic organization in the world and uses a database to share information regarding sharing, educating, critiquing, and publishing new methods of forensic science (International Association for Identification [IAI] 2021). New techniques and research are typically shared as well, to help forensic science evolve as a whole (IAI 2021). This case study highlights the failure and evolution within the history of fingerprinting. This case is important in understanding failure and the achievement of success after the refinement of fingerprint analysis criteria.

Data Analysis

This research paper reviewed three case studies from the Innocence Project to provide an analysis of wrongful convictions and their associated societal and ethical implications. In turn, this will provide an evolution of fingerprinting, and the technology associated with these convictions. This research seeks to understand the difference between past and present forensic science techniques relating to fingerprinting, and decide if it is an essential tool for past and present criminal convictions. These individuals suffered injustice--including but not limited to--life in prison and the death penalty, for a crime they did not commit or may not have committed.

Through the hard work of the National Registry of Exonerations, and the Innocence Project, these individuals were able to be set free, or in the case of Ledell Lee, justice is still being fought for. The data for this research project was collected primarily from the Innocence Project, which is a well-known, and sought out project designed to help wrongfully accused people gain access to information and testing methods which may have previously been ignored or overlooked. Out of the three cases observed, two were exonerated, and one was executed. Of the two exonerated, Jackson spent two years in jail during the late 1990s and early 2000s, whereas Williams spent 36 years beginning in the early 1980s. This array of information highlights the importance of fingerprinting technology and how information and laws have changed drastically to increase the likelihood of the right conviction taking place. In the case of Archie Williams, NGI was used to exonerate his conviction. The technology of NGI provided Williams with a new examination, and evidence to provide testimony of his innocence. This is a direct result of the changes in law, and how his past conviction was overturned due to better technology. In the case of Ledell Lee, his motion to stay his execution date was not granted. His stay of execution was refused on the grounds of belated testimony, since his request was submitted two weeks before his execution. This is despite that the provided testimony could have established his innocence. Arkansas has since released his fingerprints and the fingerprints at the scene of the crime to be tested. To this day, the local Arkansas police department has provided little information of the case which is still under investigation. As for Richard Jackson, he only served two years in jail--in part due to the year of his conviction. He was convicted in 1998 and IAFIS was established in 1999. The technology associated with IAFIS highlighted the technological limitations and human error, prior to modern fingerprinting. This

allowed Jackson to be retried, and eventually establish his innocence. Fingerprinting technological advancements have proven useful. The reliance is no longer in the hands of an individual and no longer based on the testimony of a few. Instead, fingerprint evidence is loaded into a national database that allows for a more precise method of analysis. With this database, the improved accuracy is now 99.6 percent using NGI. Using Next Generation Identification (NGI), is exclusively used by the FBI, and is the most advanced fingerprinting system in the United States. While IAFIS provides a 92 percent accuracy rate of analysis of fingerprints in a matter of minutes, NGI incorporates palm prints, iris, and facial identification, and fingerprinting examination. While this technology is available, most state courts still require the analysis of fingerprints by human expert witnesses.

Has better technology led to a better understanding, and more valid identification for conviction? Based on the case studies presented, the answer is unambiguously yes. In the past, fingerprint identification has been limited and erroneous. Through new technology, fingerprints left on the scene of the crime can now provide indisputable evidence to convict the proper individual.

Synthesis of Information

Functionalism is the idea that different parts of society can be compared to a living organism. Law is very similar to this comparison. The ebb and flow of laws, and the creation of law, are important in understanding the nature of fingerprinting, and their legal challenges. Social control theory posits that everything is regulated within the mechanism of social organisms. Social control theory is seen throughout the application of fingerprint analysis as a mechanism to promote the control of illegal activities. This is done by establishing a personal connection to individuals through science and can help provide more evidence to convict an individual with a limited risk of misidentification.

Black's Theory of Law is the idea that both humans and law produce a regulatory guideline, and that helps humans regulate themselves and engage in moral disputes. The idea of moral disputes, such as lawsuits, or criminal cases, are seen throughout social control theory. The evolution of fingerprints from Fauld's classification methods, to the creation of IAFIS is an influential purpose as to how the Innocence Project and other similar organizations are able to test evidence. Stiffer requirements within the law ensure that qualified professionals are able to testify, or provide testimony pertaining to these questions. Although, as the law progressed the requirements became much clearer, and precise. This progression is shown throughout the case of Richard Jackson and the battle for fingerprint

misidentification within the court of law. After many conflicting statements of the misidentification of his fingerprints, he was exonerated due to the availability of new technology and information. This is an instance in which the International Association of Identification stepped in to make sure all cases are treated equally, and professionally. Not only is this justice for the individual, but also for the public. As citizens of the United States, taxes are collected on everyday purchases and allocated to different government entities. Under wrongful convictions, the money spent to imprison could have been allocated to the correct person, or not at all, saving millions of dollars in restitution fees and damages (IP 2021a).

Modern fingerprinting provides another layer of security, allowing for those who cannot be the suspect to be ruled out. Whereas past methods were not as accurate, or the science was unavailable, and led to many wrongful convictions. With the creation of IAFIS and the understanding of fingerprinting analysis, the Innocence Project, among others, has been able to use these data to retry cases in which individuals may have been wrongfully convicted. IAFIS provides nationwide data, creating a quicker analysis of fingerprints. This is in contrast to searching through thousands of prints manually--many of which may only be local data. To be more specific with unclear fingerprints and information, the use of NGI is implemented. Sometimes, as seen in the Archie Williams case, the science precedes the law which makes it difficult to be tried. So, police implement multiple methods of data analysis. Ethically, and in connection to functionalism in which the law is similar to a living organism, misidentification is a cancer which radiates out and can affect all individuals residing in the United States. How can a state use taxpayer money to justify the execution of a potentially innocent person, such as the case of Ledell Lee? His possible misidentification may have resulted in his murder by the state of Arkansas. Like so many others, his pleas of innocence were ignored. DNA evidence should be tested and fingerprints run through IAFIS, which will likely provide a clearer understanding regarding pleas of innocence.

Conclusion

Henry Faulds, and William Hershel created methods of fingerprinting, and through years of identification and refining of the science, fingerprint testing methods have become incredibly accurate. Biometric evidence is a relatively new component to the justice process, including new fingerprinting methods. Contemporary methods require individuals with specific knowledge to interpret the findings of these database systems. The evolution of fingerprinting databases highlights the accurate nature, and the increased need for quicker, and more affordable

database systems. These case studies provide evidence of the evolution (in a system established to help exonerate innocents or condemn perpetrators) in terms of the years a crime is committed. This is a direct correlation of time spent in prison alongside access to evidence. Fingerprint evidence has created a unique identifier that allows lawyers and investigators access to databases that could prove their innocence. This is commonly seen among the Innocence Project, but also has many other programs within the United States, such as the National Registry of Exonerations. The Innocence Project was created to help those wrongfully convicted, with the sheer existence of this project providing evidence of a flawed justice system.

The constant evolution of technology paired with individuals who strive for justice speak highly of a constantly transformative culture. Although this is the case for some, it is not the case for all. With just the concept of breaking rules, or social facts, those sent to prison under false pretense often are stigmatized regardless of the outcome. With access to fingerprinting databases investigators can now push to provide additional evidence of a person of interest. DNA evidence has, for investigators and lawyers, opened up availability to retry falsified cases or other cases with little evidence. Fingerprinting may overturn wrongful convictions and allow for the path for a better future and a conviction beyond a reasonable doubt. Wrongful convictions impact the individual and society as a whole. It connects to functionalism in the idea that society cannot function correctly if all interconnected parts are not flowing and striving for a better system.

Evolution is important, it creates an ever-changing nature and allows for progress. It is time for this recognition and the United States justice system to acknowledge wrongful convictions and strive to achieve justice. It is important for evidence to be readily available to the individual, especially if it can save someone from life in confinement, or even death. With programs such as the Innocence Project and the National Registry of Exonerations, information can be provided to better understand the impacts of wrongful convictions on society and victim impact statements can be better evaluated.

Future Research and Limitations

Future research is essential to understand the direct correlation between fingerprinting and exonerations. It would be interesting to see the amount of data of those thought to be wrongfully convicted. It could establish merit to these prisoners and establish a working system or a separate entity that could process these requests, perhaps funded by the government. Another avenue of research is learning the cross-racial misidentifications, alongside fingerprint evidence to consider races that have been disproportionately underrepresented. In partnership with the Innocence Project, information about wrongfully convicted individuals could open a plethora of unanswered questions. It would allow for demographic and socioeconomic information pertaining to those who have limited access to evidence in the cases against them.

Limitations of this evidence include the technology. As mentioned, technology sometimes precedes law and it is just a matter of time for it to catch up. Another limitation of this research is the case of Ledell Lee, in which the fingerprint and other DNA evidence is still being tested and information is still being gathered by the Innocence Project. Another limitation raised with the application of fingerprinting is with biometric databases and the access to specialized resources and knowledge that can allow for alternative interpretations and explanations of fingerprints and other forms of biometric data. An example of this is shown through the collection of fingerprints at a crime scene. Crime scenes are often messy, and not every fingerprint gathered is of someone who committed a wrongdoing. This raises ethical questions pertaining to the physical evidence, and can leave suspects vulnerable. These suspects often do not have the power or resources to counter state evidence in an investigation. This problem highlights not only the ethical concerns of fingerprinting, but also the power and socioeconomic differential seen throughout the United States. With no funding and limited resources, the case studies provided are a precursor to the more rigorous and systematic studies that could be done to evaluate the use of biometric databases as a whole. The purpose of this paper is to highlight fingerprinting in conjunction to ethics.

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Clan Culture in the Eighteenth Century: A Study of Select Scottish Highland Castles

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Abstract

The Scottish Highlands are a social and cultural phenomenon in northwestern Scotland. Scottish Highlanders have a deep connection to the harsh Scottish landscape and the physical constructions erected throughout history. Throughout this paper, the discussion of Scottish Highland culture is observed in the detailed account of Mingary Castle, Castle Tioram, and Castle Leod. Using this combination offers an intricate way to observe these landscapes over time, alongside the physical changes apparent through spatial data. In the Scottish Highlands, the struggle with clan identity and its intrinsic connection to land ownership is ever present where land ownership is connected to clan lineage and identity. Understanding and contextualizing the historical landscape in the Scottish Highlands allows for a connection between space and place. In a culture defined by its submission to English rule, it is essential to acknowledge and study the core social components of Scottish heritage that remain as foundational components of a vibrant and evolved culture.

Introduction

Lasting nearly a century, the Jacobite revolts were an extensive series of uprisings in what is now the United Kingdom. The first occurrence of the Jacobite ideology occurred in 1688 when the House of Stuart was deposed during the Glorious Revolution (McLynn 1985:64). Broadly described, the Jacobites were Scotsmen (Scots) who "attached themselves" to any member of the House of Stuart, for any number of reasons (McLynn 1985:80). Many Scotsmen were not necessarily politically motivated, but joined the Jacobite uprisings based upon religious, ideological, or self-serving financial reasons (McLynn 1985:6).

The most notorious Jacobite uprisings in Scottish history are known as "The Fifteen" and "The Forty-Five" named after the years in which they occurred (1715 and 1745 respectively) (Bold 1975:19). Catholicism, the predominant religion in Scotland, is one of the many ideological reasons for the Jacobite revolutions during the eighteenth century, which conflicted with the Protestant faith followed and mandated by the reigning Hanoverian king in England (Houston 2008:51). The last Jacobite uprising began in 1745, when many Scots began, once again, to aggressively fight for their religious and cultural independence from the English. The ultimate goal was to restore Catholic "Bonnie Prince Charlie" to the throne (Paoletti 2017:188). These uprisings culminated with the Battle of Culloden on April 16, 1746 at Drummossie Moor near Inverness in Scotland (Bold 1975:21). It was a battle between Jacobite clans led by Charles Edward Stuart The Young Pretender who fought against the Hanoverian army led by the Duke of Cumberland (Bold 1975:21). The quick and deadly battle resulted in the butchering of Jacobite revolutionaries by the British military. Following the Battle of Culloden and the last failed Jacobite uprising, clan life, which formerly governed the Scottish social structure, abruptly ended under British control (Fraser 1996:193). Scholars accept the Battle of Culloden as the distinctive end to integral parts of the long tradition of clan life (Paoletti 2017:198).

Clan is an overarching term referring to a chief and his direct and fictive kin or tenants. Prior to British rule, clan life signified the social, economic, and spatial organization throughout the Scottish Highlands tied to architecture, clothing (tartans), clan colors, music (bagpipes), and language. Scottish Highland culture was centered around a "Laird" or chief and his land (Paoletti 2017:198). An example of this type of kinship organization is a chief "in charge of clans built on the bonds created by kinship, feuding, feasting, and gifting" (Houston 2008:91). A chief was considered the "monarch, landlord, judge, and lawmaker" within his clan land (McLynn 1985:47). The new British rule of the Scottish territories prohibited clan social, political, and kinship organization, the use of clan colors or tartan plaid as a form of Scottish identity, and speaking in Gaelic (Fraser 1996:193). Gaelic was the primary language spoken by Scottish groups until the mid-eighteenth century. King George II outlawed Gaelic to discourage further revolutions and uprisings by the Jacobites (Houston 2008:126). Although English was taught as the primary language in schools, the use of Gaelic continued in private and "underground" among practicing Scots (Fraser 1996:193). The new British rule also prohibited the playing of bagpipes, which "were banned as seditious," and not allowed until the end of the eighteenth century (Fraser 1996:193; Houston 2008:143). Certainly, the defeat at Culloden Moor in 1746 changed the course of broader Scottish history and culture, but

specifically for the Scottish Highlands, "here history was decided" (Paoletti 2017:198).

Historically, clan life was intrinsically connected to landscape, land ownership, and the architecturally constructed castles tied to clan lineage and identity. Understanding and contextualizing the historical landscape associated with Scottish Highland castle architecture offers an examination of the interconnected relationships between space and place among the occupants of Scotland (Anschuetz et al. 2001:159). With the suppression of the Scottish culture, understanding surviving aspects of clan tradition through systematic research reveal a vibrant and advanced culture.

This research analyzes the constructed, visible, and tangible remains of three Highland Scottish castles: Mingary Castle, Castle Tioram, and Castle Leod (Figure 1). Each location has a unique architectural chronology with historical and modern renovations as well as land ownership changes between private and public. The connection between constructed landscapes and social memory (the intangible) can also be used to analyze both objective and subjective aspects of archaeological findings along with historical references in the literature (Tilley 1994:27). Objectively or quantitatively, this study describes Mingary, Tioram, and Leod from the perspective of the archaeological and historical record and compares those details with modern satellite imagery using Google Earth and Pastmap. Subjectively or qualitatively, clan life and Scottish Highland identity of the past is compared to changes that occurred after the Battle of Culloden. Despite the structural, social, and architectural changes in the Highlands and their castles, the clan collective identity is still ever present in modern Highland culture and architecture.

Landscape Archaeology

A landscape study, or anthropology of place, seeks to explain relationships between natural elements and the remains of human constructions that represent or solidify the social meaning or identity attached to a region (Anschuetz et al. 2001). A landscape study is utilized to provide an explanation of the past through its analysis of the "dynamic interdependent relationships that people maintain with the physical, social, and cultural dimensions of their environments across space and over time" (Anschuetz et al. 2001:3). Using this approach, this research documents cardinal directions, physical locations, building techniques and architectural styles, geographic features, and a brief occupational history associated with the social and physical boundaries created at each of the three castles. Such an approach provides additional evidence for a deep connection between space and place among eighteenth century Highlanders in the Scottish territory.
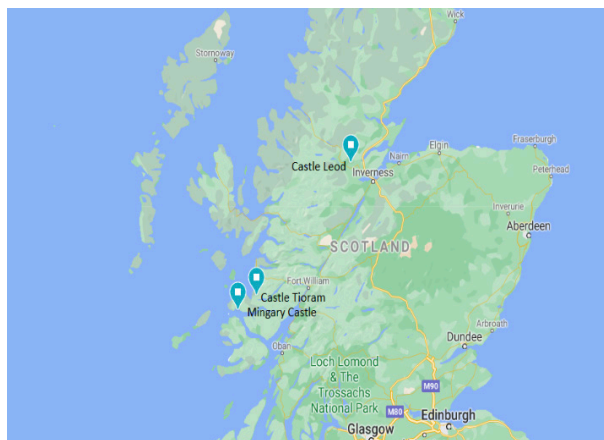

Figure 1. The castles and their spatial relationship within the Scottish Highlands.

Integrating both natural and cultural components allows for the implementation of ideologies, settlement patterns, and social memory in order to understand a specific region or culture (Anschuetz et al. 2001). For example, the landscape throughout the Scottish Highlands is considered a "hard, unyielding geography" (McLynn 1985:48). However, past and modern secular Scottish literature generally contain a "strong sense of place," which embodies both identity and space as a connection to the landscape despite the realities of a rough and unyielding natural geography (Houston 2008:140). Notably, nineteenth-century Scottish Oracadian (being from the Orkney Islands) poet Edwin Muir "derive[d] inspiration from the landscape" for poems and novels, such as the novel Scottish Journey (Houston 2008:140; Muir 1935).

As such, a landscape approach is the in-depth analysis of the physical landscape (natural bodies of water, landforms, etc.) and human-made geography, such as castles, buildings, and trash middens (Murray 1998:73). To evaluate these relationships, researchers use analytical material remains (objects, architecture, etc.) and interpretive historical written references to provide a more complete interpretation of the past. Using historical analytical and interpretive approaches in the context of a site chronology and use can "construct fuller" metaphysical understandings of past structures and landscapes (Anschuetz et al. 2001:175).

Spatial Data

Technological advancements in satellite imagery can help archaeologists "see the world without borders" and collect data without damaging a site or structure (Parcak 2019:219,230). Spatial data programs provide modern and historical satellite and aerial imagery where the evolution of constructed landscapes can be studied and evaluated remotely.

Google Earth provides recent, historic, and contemporary images of the buildings, surrounding areas, and the surrounding geography. Particularly, Google Earth has recently been used to remotely survey Icelandic structures, buildings, and field boundaries from "Viking-to-modern range" and provide natural landscape background to inform on what "to look for" when evaluating the presence or absence of sites (Parcak 2019:53). Another Google Earth application in the Preajba Valley of Southwestern Romania was undertaken in order to "identify the human pressures on the lakes' ecosystem" (Mititelu-Ionus et al. 2020). This study of lake ecosystems aimed to demonstrate the direct response from anthropogenic pressure on the landscape. Using satellite images available on Google Earth, the team observed spatial and temporal variability over the course of ten years. Results highlighted that human intervention greatly affected surrounding vegetation and lake size (Mititelu-Ionus et al. 2020). Another interesting study found that Google Earth is an exceptional tool to detect, monitor, and map lava flows for volcanic thermal activity around the world. From a global perspective, the team used a Normalized Hot Spot Indices (NHI) algorithm to monitor over 14,000 active volcanoes (Genzano et al. 2020). This allowed them to compile large amounts of data and found that the NHI algorithm using Google Earth is "currently the only platform" that allowed a study of this magnitude through informational satellite data observation (Genzano et al. 2020).

Pastmap, an online Spatial Data Infrastructure (SDI), comprises and organizes different types of related data sets in layered segments throughout time, and by emphasizing excavation sites, and other archaeological features. Additionally, Pastmap shows previous geospatial data and environmental data associated with archaeological sites. For instance, a team from Adapt Northern Heritage of Scotland surveyed the historic and submerged Threave Castle using satellite imagery available on Pastmap (Bain 2019). The team was able to measure and gather data on the rising water levels throughout the years and assess impacts to the castle, evaluate climate change tied to flooding, and develop conservation techniques to protect the castle and the potential loss of archaeological data (Bain 2019). Another example of the value of Pastmap is an ongoing study of Aray Bridge in Invergarry. The Aray Bridge was first built in 1758 and rebuilt in 1772 and is considered a National Heritage site. However, climate change and water erosion over time have impacted the bridge. The study focused on using Pastmap environmental data to better understand erosion and climate change factors that can provide insight on appropriate conservation measures (Bain 2019).

Pastmap also contains current spatial data, primary maps, and grids. Beginning in the 1940s, several archaeological excavations have taken place at Inveresk Roman Fort in Musselburgh, East Lothian. Using Pastmap, researchers were able to combine data from various excavations at the site (McKeague 2019). In this case, project reports are housed in a centralized database, which allows for easy access and an efficient method to gather cumulative information.

Historical Particularism

Historical particularism is an approach that utilizes fieldwork and history to analyze a culture (Boas 1920). Through historical particularism, research is conducted with a focus on understanding a culture in culturally relative terms. This ideology is the work of Franz Boas, known as the "Father of American Anthropology." In the early twenty-century, Franz Boas established a theoretical framework that focused on fieldwork and cultural relativism to cross compare cultures or aspects of cultures (Boas 1920). Historical particularism is crucial to this research; in order to understand the cultural significance of castles and landscape within the Highland region, one must understand the corresponding culture's history. For instance, knowledge of the Battle of Culloden allows researchers to conceptualize the distinct shift in Highland social structure from clan based organization to an English based social structure. An English based social structure is not centered around social hierarchy in the form of clans, but rather focuses on royalty, alongside a heavy reliance on socioeconomic differences in the form of classes. Clan life resembles that of other social organizations throughout history, however, this research highlights the differences based on elements such as land ties and social hierarchy. Through the literature provided, fieldwork on the castles, and surrounding landscape, this research is able to explain the relationships between natural elements and the remains of human constructions that represent or solidify the social meaning or identity attached to the Highland region.

Description of Castles

Mingary Castle

Mingary Castle is located on the Ardnamurchan peninsula near the western Scotland village of Kilchoan (see Figure 1; Murray 1998:86). The castle first appears in the historical record in the late fifteenth century, and for nearly three centuries the Campbells and MacDonalds fought for control of the land (Simpson 1954:86; Murray 1998:86). The 14 m (45 ft) tall and 7.5 m (24 ft) thick walls of the castle face the northwest (Figure 2). While massive, the defensive height and width of the castle walls are similar to other fifteenth century castles. The structure's shape is hexagonal, although the sides differ in wall size and length
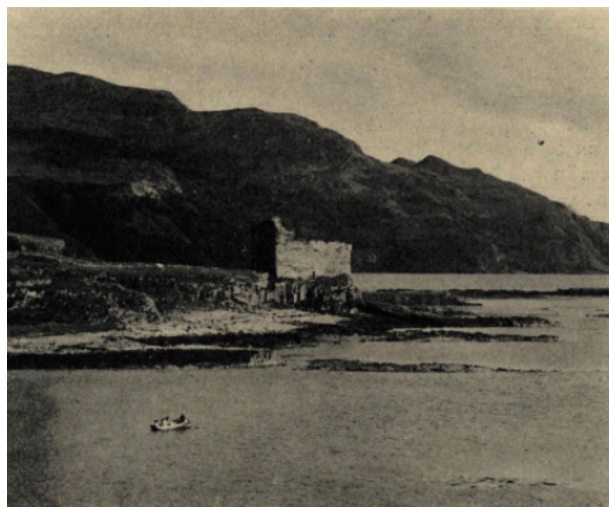
Land Access
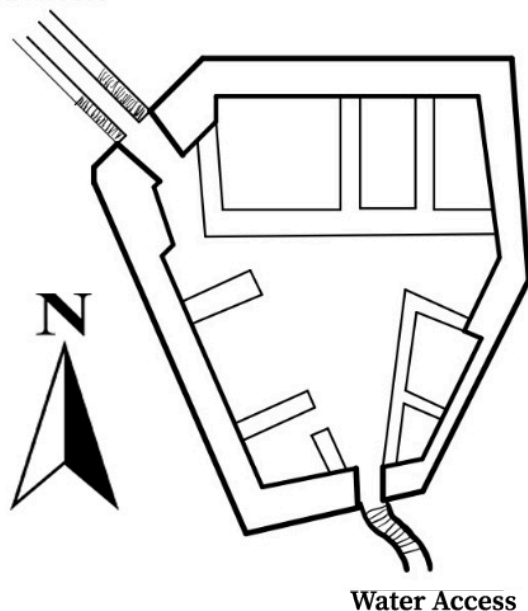
Water Access

Figure 2. Top, Mingary Castle, 1954; Bottom, Mingary Castle floor plan.

(see Figure 2). Mingary Castle is in "general scheme and shape," meaning that despite the smaller size (390.04 m²), the castle was built in an architecturally similar design to castles within the region with an analogous design of non-rectangular shapes (Simpson 1954:81). Mingary Castle is built in a strategic position along the Sound of Mull that divides the Northern and Southern isles (see Figure 1; Simpson 1954:85). The castle's location was likely chosen as a defensive position—a site selection frequently chosen during Scottish Highland inter-clan warfare during the centuries before the Battle of Culloden.

There are two entrances to the castle (see Figure 2). One entrance is positioned to allow access from the land, whereas the second allows for water access from the Sound of Mull (Murray 1998:83). The water entrance appears to have been of more importance based on the design of "shale, with a rounded arris [natural inclusions]" and defensive measures that are distinctive from the land access (Murray 1998:83; Simpson 1954:83). The early builders split the fine-grained shale rock to show the arris or natural lines within the rock center (Simpson 1954:83). Access to water during the time of initial construction was significant because of the accessibility for travel. The secure water entrance leads up to a stone stairway that leads to a wooden entrance, which meets another inward wooden door equipped with a drawbar (Simpson 1954:83). Not only are the walls of the castle tall and thick for protection on all sides, but the entire structure is surrounded by a ditch or moat, presumably for additional protection from land-based visitors. The first construction of Mingary Castle is dated to the thirteenth century, but it is not mentioned in historical records until the fifteenth century. Simpson theorized the first construction based on its angled shape and building features, such as a simple land entrance, the defensive water entrance, among other features (Simpson 1954:85).

Mingary Castle was abandoned in 1838 following the last Jacobite revolution. At the time of construction, the country was at war with itself, so there were little to no buildings surrounding the perimeter of the castle. Clans would have built needed additional buildings within the castle walls. The surrounding geography has also changed throughout time in that where trees once stood the landscape is now rocky and bare (Murray 1998:73). Much of the former woodland was cut down by the castle's residents and used for building or "fuel or agricultural purposes" (Turnock 1982:44). Not only did people in the Scottish Highlands use trees for fuel for their fires, but they also removed trees to make room for livestock, most notably sheep (Turnock 1982:45).

Castle Tioram

Castle Tioram is a neighboring castle to Mingary located "high above the sea" on Eilean Tioram Island near Fort William and Acharacle in the Western Highlands (see Figure 1; Murray 1998:73; Driscoll and Rutherford 1999:5). The castle, now abandoned, was once the seat of Clanranald (Clan MacDonald) (Driscoll and Rutherford 1999:5). The date for the building of Castle Tioram is disputed, with some sources saying the twelfth century and others referencing the fourteenth century (Murray 1998:5; Driscoll and Rutherford 1999:5). Land deeds provide proof of habitation on the land during the twelfth century (Murray 1998:5). However, deed documents do not specifically make reference to Castle Tioram until a land charter in the fourteenth century gave the castle to the new Lord of the Isles (Murray 1998:5). Castle Tioram

Castle Tioram is pentagonal shaped, with 9.1 m (30 ft) high and 2.3 m (7.5 ft) thick walls (510.77 m²)(see Figure 3; Murray 1998:75). There is a 24 m (70 ft) east to west courtyard in the center of the castle (Simpson 1954:75). The north to east coordinates are not described in original literature, but for the purposes of this paper, it is estimated at 24 m x 24 m with area of 576 meters. The remaining original inlay of masonry on the outside of the castle walls is "very uniform" and intact, even though the castle has long been abandoned and not maintained (Simpson 1954::75; Driscoll and Rutherford 1999:5). The strategically horizontally placed stones that define the walls "exhibit a striated texture" with varying sized blocks on the edges (Simpson 1954:75). The geography surrounding Castle Tioram was once covered in trees, but now remains rocky and bare (Murray 1998:73). Similar to Mingary Castle, the surrounding woodland was cut and used for building, fuel for fires, and to make room for livestock like sheep (Turnock 1982:44, 45).

Castle Leod

Castle Leod is located in the east of Ross-shire in northwest Scotland (see Figure 1). It is the ancestral home of Clan Mackenzie. Clan Mackenzie's residence at the castle spans a time of occupation of roughly 500 years (Peteranna 2014:7). The castle is an L-shaped, five story, tower structure facing southwest and situated on a grassy mound or "man-made motte" dated to the thirteenth or fourteenth century, with 1.8 to 2.4 m thick (6 to 8 ft) walls (Figure 4; Peteranna 2014:5). The height of Castle Leod is absent from the literature, so for the purposes of this paper a simple calculation is provided. If the height of each story is approximately 2.4 (8 ft) to 3 (10 ft) meters high, and the castle is five stories, then the height is around 12.2 (40 ft) to 15.2 (50 ft) meters high.

The castle is currently occupied by descendants of Clan Mackenzie and is available for public tours throughout the year and as its use as a wedding venue (Peteranna 2014:7). Significant restorations and renovations on the castle during the seventeenth century include an "ornately carved stone" placed over the main door entrance and an extra wing extension (Cockcroft et al. 2013:5). Archaeological test pits conducted in 2014 revealed multiple renovations from different materials dating from the sixteenth century to the eighteenth century (Peteranna 2014:1,15). For example, building fragments found during testing reveal a possible wall with evidence of continual rebuilding and remodeling of the castle and other buildings on the grounds. Glass fragments and more building stone at the base of the castle were also documented (Peteranna 2014:14).

Clan Mackenzie has always been an economically and socially prominent clan in the Scottish Highlands (Moncreiffe 1967:150). One exception is during the late
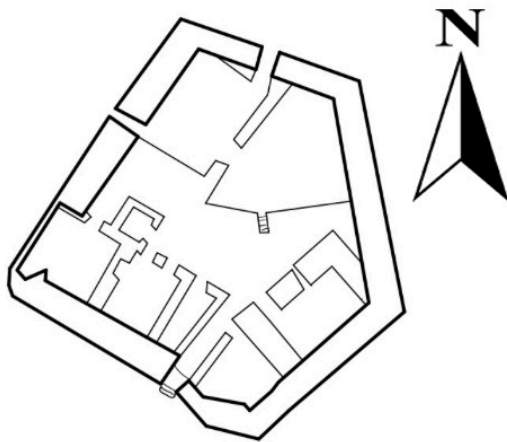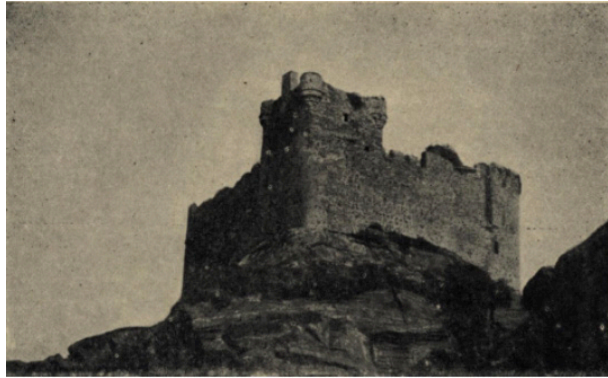

Figure 3. Top, Castle Tioram; Bottom, Castle Tioram floor plan.

was abandoned in 1748 immediately following the last Jacobite revolution. The builders constructed the castle on a rocky hill at the edge of the inlet with the front facing southwest (Figure 3; Simpson 1954:73; Driscoll and Rutherford 1999:13). Similar to other castles constructed during this time, additional buildings were built within the castle walls for protection. Surrounding the castle are multiple natural formations and human-made trash middens from "different occupations and formed under different circumstances" (Driscoll and Rutherford 1999:13). A full palynology, or pollen analysis, of the middens could provide details about the natural vegetation, cultivation practices, and diet for the castle's residents over time (Driscoll and Rutherford 1999:13). However, such an analysis has yet to be conducted. At the water's edge on the eastern side of the castle is a large earthen slope, which is thought to be one of the human-made trash midden deposits from the castle's residence (Simpson 1954:70). Some underwater excavation is needed to fully access and document the entire midden (Driscoll and Rutherford 1999:14).

Table 1. Comparison of the three castles evaluated in this research.

	Mingary	Tioram	Leod
Location	Ardnamurchan peninsula near the western village Kilchoan	Eilean Tioram near Fort William and Acharacle	East of Ross-shire near Inverness
Geography	Rocky, previously woodland, and surrounded by water	Rocky, previously woodland, and surrounded by water	Large mountain range to the east; man-made grass terraces
Size	14 m (45 ft) tall and 7.5 m (24 ft) thick walls	2.3 m (7.5 ft) thick and 9.1 m (30 ft) high walls	1.8 to 2.4 m thick (6 to 8 ft) walls (height unknown)
Purpose (Past/Present)	Clan home to tourist attraction (Hotel and Restaurant)	Clan home to tourist attraction (Ruins)	Clan home and some months of the year tourist attraction

Figure 4. Top, Castle Leod; Bottom, Castle Leod floor plan.

Castle Comparisons

Mingary Castle, Castle Tioram, and Castle Leod provide for an interesting comparison (Table 1). The Scottish Highland castles are characterized by imposing, elaborate, and strategically placed towerhouses. Towerhouses are multi-storied residences with a tower or vantage point, and were common homes for clan chiefs (Moncreiffe 1967:41). Some Highland castles are now abandoned, such as Castle Tioram; however, some castles are currently occupied, maintained, and continuously refurbished (Moncreiffe 1967:73). Castle Leod, for instance, has been updated throughout the centuries from its origins in the twelfth century to nineteenth century Victorian architecture (Moncreiffe 1967:153). Although building styles change throughout the centuries, Scottish Highland castles are generally built of local stone materials with wooden components, such as stairs and wood framing. The layout, building techniques, and contents of a castle depended on the era, whereas the materials, specific placement, and purpose of each castle depended on the location or landscape. For example, Mingary and Tioram are on the coast near the Sound of Mull in a strategic location during a time of conflict and warfare (Figure 1). Mingary and Tioram were built to be highly defensive and strategically placed.

Geography

Mingary and Tioram have a similar landscape comprised of rocky and previously wooded areas, and surrounded by water. This similarity is related to their locations on a rocky outreach on the coast of the mainland. Much of Scotland is mountainous and rugged. Leod is distinct from Mingary and Tioram in that it is near the eastern coast of Scotland, adjacent to a large mountain range to the east. Leod has man-made grass terraces and other added buildings throughout the years, as opposed to Mingary and Tioram, which have no other buildings on the immediate land (Simpson 1954:86; Murray 1998:86).

eighteenth century when the Jacobite revolution led to the imprisonment of the estate's head, Lord MacLeod, for joining the Jacobite cause (Cockcroft et al. 2013:7; Moncreiffe 1967:151). The surrounding region remained for centuries farmland and empty fields with only a few seventeenth century ancillary buildings and structures, such as a walled garden and orchard (Cockcroft et al. 2013:8,11). Unique to Castle Leod are the mason marks or apotropaic marks. These marks elucidate the builder responsible for work conducted (Cockcroft et al. 2013:19). The marks are important because they are carved in numerous places around the castle and represent years of renovations (Cockcroft et al. 2013:19). The most common mason mark at Castle Leod is a heart shape attached to a triangle with either the heart on top or bottom (Cockcroft et al. 2013:19). These mason marks appear to be without discernible reasoning. Theoretically, the design could be the mark of the specific mason, who has not been identified.

Castle Size

Clan Mackenzie was substantially more economically prosperous than in previous centuries. Mingary is 14 m (45 ft) tall and 7.5 m (24 ft) thick walls, whereas Castle Tioram is 2.3 m (7.5 ft) thick and 9.1 m (30 ft) high walls (Murray 1998:75). Leod has 1.8 to 2.4 m thick (6 to 8 ft) walls with an undisclosed height (Peteranna 2014:5). Mingary and Tioram are smaller castles, largely because of their location. Building on the sound and being strategically built during a time of inter-clan warfare, Mingary and Tioram are easy to defend. Both Mingary and Tioram are smaller in size, and built architecturally similarly to castles within the same region. Mingary is hexagonal shaped and Tioram is pentagonal shaped, representative of the analogous design of non-rectangular shapes from the thirteenth and fourteenth centuries. They are also much smaller than Leod because they were abandoned, whereas Leod is continuously being renovated. Leod is an L-shaped tower structure facing southwest and has several significant renovations and additions.

Purpose (Past/Present)

In the past, all three castles were primary homes for their clan's prospective chief. Tioram, once a residential home, is now a ruin for tourist attractions. Mingary stood abandoned for over 150 years, but has since been restored and is used as a hotel and restaurant. There are expansive modern views of the sound and mountains in the distance of each castle. In contrast, Leod is still the great house of Clan Mackenzie, and is currently occupied and available some months of the year for tours and weddings.

Google Earth

Mingary Castle

Mingary Castle, once abandoned for over 150 years, is now a hotel and restaurant (mingarycastle.co.uk). The restoration and rebuild began in 2013 and lasted three years. The rebuild kept the original outer stone walls of the castle, but the roof and inner walls were rebuilt (Figure 5). Tourists can stay in one of the rooms named after four Scottish clans: MacDonald Suite, Maclain Suite, MacDougall Suite, and McCain Suite. The 1843-1882 drawing of Mingary Castle shows its slightly higher north than modern data relays; perhaps due to rising water levels or human error. Surrounding Mingary are plowed fields to the north and the Sound of Mull to the south. There are some potential residential homes to the northwest of the castle along the shoreline. The castle appears to be resting at a similar water level with more recent images from the last 50 to 70 years than the initial drawings showed. The rocky edges of the shoreline extend throughout the entire coast in front of
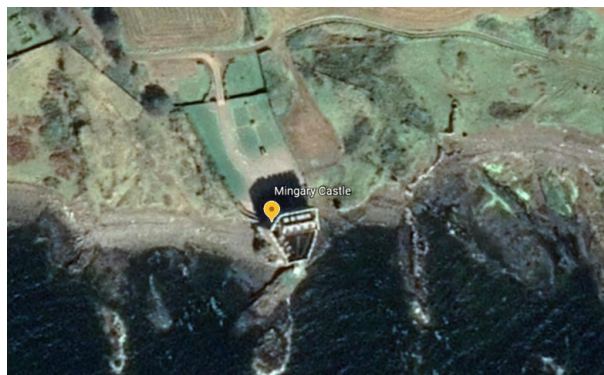

Figure 5. Mingary Castle from Google Earth.

and beyond the castle. Treelines are visible to the west of the residential area and to the east of the castle. The surrounding area is rugged and rocky.

Castle Tioram

Tioram is in ruins, but remains a scheduled (protected) monument in Scotland because of its long history. The imagery shows overgrowth in and around the castle, as well as boarded and fenced areas deemed unsafe for public use. There are trails throughout the ruins for safe walking in and around the castle. Remarkably, the surrounding walls, including some doors and large arched and squared windows, are still intact (Figure 6). The outer walls of the castle are still intact despite some cracks and large chipped corners, such as the side facing the northwest edge by the coast. The outer walls of the castle are a dark textured shale color. Castle Tioram is on a peninsula connected to the mainland by a small landbridge. The sound surrounds all of Castle Tioram. Tioram is also surrounded on three sides by the mainland and some smaller islands. From the coast of the peninsula in front and behind the castle are mountains on the other islands in the distance.
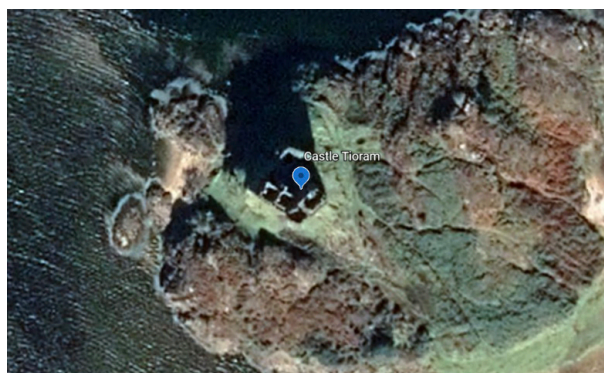

Figure 6. Castle Tioram from Google Earth.

Castle Leod

Compared to previous maps, the overall structure of the castle has not changed much since the mid-eighteenth century (Figure 7). A new entrance to the castle from the driveway and the removal of some smaller buildings on the grounds are the major changes. Visibile in the aerial images is a human-made motte that the castle was built upon, despite new concrete additions around the castle, such as the driveway. Older maps and images do not show the roof or outside texture; however, images from the early twentieth century through modern day shows the light red stone of the outside of the castle. Castle Leod is surrounded on all sides by thick woodland, scattered planted trees, and mountains in the distance. In modern aerial imagery, the immediate grounds around the castle still have several trees, but no distinct defined buildings. There are what appear to be manicured or plowed fields on the eastern and southern sides of the castle grounds. On the south side of the castle is a large rectangular outline in the grass, perhaps from an older building (from a previous construction) or just from continuous mowing and maintenance of the land.

Results and Discussion

Scottish castles and their subsequent clan associations are a microcosm of the social, political, and historical landscape of the Highlands. This social kinship organization motivated the everyday lives of those throughout Scotland, but mostly throughout the Highlands. Although the clans were said to be built on the bonds of blood relations, this was not always the case. Before the seventeenth century, clansmen did not bear the surname of their clan (McLynn 1985:50). This "perception of kinship" allowed for not only a common goal of a clan but also provided each member with a duty and a "network of rights" (Bold 1975:19; McLynn 1985:50). Kinship in the Highland clans is a social agreement, not necessarily definitive of blood relations. In the Scottish Highlands, as elsewhere throughout the world, sometimes "human behaviour, myth and collective image are far more important than fact" (McLynn 1985:50).

The power the chief had over his clan, or tenants, is summarized by the way the harsh Scottish landscape was divided, used, and farmed. Every plot of arable land "was cultivated to the limit of available skills and technology" (McLynn 1985:48). This delineation led to the three main types of advantageous land: Mensal, deeded or gifted land, and most importantly the 'tacks' land. Mesal land was used only by the chief for his farming reserves or livestock. Deeded or gifted land refers to land given, generally by the chief, to people close to him. The most important and most abundant land is the 'tacks' held by tenants under the chief (McLynn 1985:51). This land was leased out to tacksmen or divided again
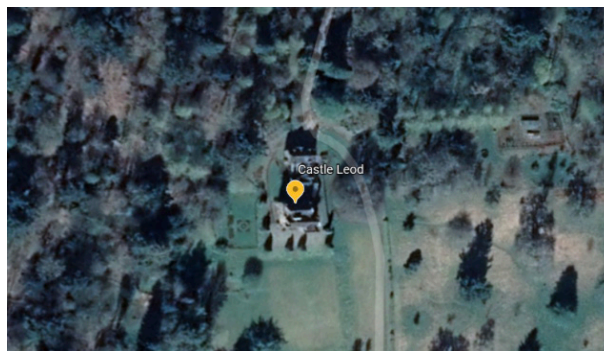

Figure 7. Top, Castle Leod from Google Earth.

by their tenants and a portion of the goods or monies gained went to the chief (Turnock 1982:63). The results of this division of land are still prevalent in the fields near Mingary Castle, Castle Tioram, and Castle Leod (see Figures 5, 6, and 7). This is especially the case at Castle Leod where farmland surrounds all the available land around the castle grounds. After the defeats of 1746, clan chiefs lost control of their lands to the British and clan independence based on the land diminished (Bold 1975:3. Related was a transition from the previous social structure in the Highlands to a more British social organization. The power of the land connected to each castle is highlighted by the size, placement, and purpose of each castle. Leod is the largest of the three and is located in a more agriculturally advantageous area (Turnock 1982:67). The rocky coastline immediately around Mingary and Tioram are far more agriculturally challenging. As a result, Mingary and Tioram were less involved agriculturally because of the rocky coastline where the castles were built. This is because Mingary and Tioram, based on the building dates, were constructed on strategic locations where a close water source was crucial as it was the easiest travel route. The clans that held Mingary and Tioram were likely also financially prosperous, as these castles were allowed access to inland trade and transportation. Their locality provided ample opportunity for economically prosperous clans because they were in a high volume area for travel and exchange through the connected sounds. For example, Mingary castle was highly sought after land, and this is evident throughout the three century long conflict between the Campbells and MacDonalds. Castles in this region were built with defensive measures in mind, which is evident in the shale resources used to construct Mingary and Tioram. Leod, a castle held by a financially powerful clan, has some defensive measures; however, much of which has been renovated in past centuries.

Land ties and clan castles are an integral aspect to Scottish, and specifically Highland, culture and identity. Throughout the centuries, castles originated as the home to a clan chief, and with time have become landmarks in Highland history. The identity throughout the Scottish Highlands is entwined in a strong sense of place and history. Through their culture they embody their identity and space as a connection to the land. This sense of place is prominent regardless of the unyielding and rugged terrain that is their natural geography. While the purpose of each castle has changed over time, the importance and significance of each castle and land still exists. The historical importance of each castle is highlighted in how all three are now tourist attractions in one way or another. Despite structural, social, and architectural changes in the landscape and castles, the clan collective identity is omnipresent in modern Highland culture and architecture. Since land provided social, political, and economic power to the chiefs, land and castles were paramount to social structure. As the new British rule of the Scottish territories changed the social organization in the Highlands, the intrinsic connection to landscape, land ownership, and constructed castles tied to clan lineage and identity changed as well. They were stripped of their tartan colors, clan identity, and dissemination of clan land (Bold 1975:3,19). In short, the removal of the constructed, visible, and tangible components of clan life also impacted an integral part of Scottish culture (Fraser 1996:193).

Future Research

Accruing data for this research, to a large extent, consisted of database searches for established literature, spatial data, and archaeological excavation data. Warfare and erosion throughout the centuries have destroyed many Scottish Highland castles, although some modern clan societies have tried to preserve old castles (Bold 1975:23). A proper study of the internal and external grounds of each castle could provide further evidence for other forms of construction and occupancy within the site. In addition, an in-depth excavation, such as the one conducted at Leod, could highlight changes in building techniques over time for each castle structure. The castles that remain are predominantly privately owned and used as residences or have been converted into other entities, such as public venues or museums (Moncreiffe 1967:41).

Furthering this research would consist of adding additional comparative castles in order to examine commonalities in architecture, landscape, and organization. Castles such as Duart, Cawdor, Eilean Donan, and Dunollie would be prime candidates. Duart Castle is the ancestral home of the Maclean clan and is located in the Sound of Mull (Moncrieffe 1967:73).

Cawdor Castle, built during the fifteenth century by the Clan Campbell, would also aid in furthering this research by expanding clan representation (Moncrieffe 1967:109). Similar to Castle Tioram, Eilean Donan is located on a small island aconnected by a small landbridge and formerly the ancestral home of Clan Mackenzie. Finally, still in the possession of Clan MacDougall are the ruins of the Dunollie Castle at Oban Bay in Lorn (Moncrieffe 1967:119).

Furthermore, surveying and excavating at each castle and on the surrounding geography would aid in the future of this research. Test pits and an underwater excavation on the water access of Mingary Castle, palynology on the findings from the various middens surrounding Castle Tioram, and further test pits at the surrounding ditch at Castle Leod would provide a basis for further work. The ability to visit the site could garner unbiased data specific to this research which focuses on connecting landscapes and culture.

Conclusion

A modern revival of Highland culture is emerging in Scotland and among Scottish descendants worldwide (Houston 2008:140). Landscape archaeology for the Scottish Highland cultural group provides a glimpse into both identity and the landscape. Most importantly, history shows the drastic efforts throughout the past to erase individual aspects of cultures or cultures in total, such as the Gaelic language. Referencing primary sources like maps, personal accounts from contemporary clan members, and excavation data enrich any Scottish study focused on the anthropology of place. Due to the deep ties between clan life, clan land, and the geography of the Highland region, Scottish understanding of the connection to the spatial organization across space and throughout time is essential to understanding past and modern Scotland (Bold 1975:23).

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State Production, Chicha, Gender:
A Stylistic Analysis of Eight Unprovenienced Chimú-Inka Ceramic Vessels at a Small Museum

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Abstract

This project uses an original stylistic analysis of eight ceramic vessels from the Duerst Collection, housed at the Linfield Anthropology Museum to discuss the Chimú and Chimú-Inka period in the Andean region of South America. The vessels are positioned within an existing seriation developed by Scheele and Patterson (1966), which establishes age and identifies the ceramics as chicha vessels. Through analysis and research, the vessels are also confirmed to be burial goods. Once age is established and the vessels are identified, the intersections of gender, state production, and chicha (corn beer) consumption and production in this time period and region are explored. This exploration uses the lens of style, and the value of archaeological evidence to provide insight into human behavior in the past is considered. Also examined is the value of researching collections without provenience.

Introduction

Ceramic vessels are reflective of style, or what the people who made the artifacts interpreted the meaning of the objects to be. Style is the communicative, variable, functional "way of doing" that interprets and is interpretive of meaningful information about the people who made and used material culture in the past. For this research, I conduct a stylistic analysis of eight ceramic vessels. These ceramic vessels lack provenience, making it necessary to conduct a stylistic analysis because the lack of context renders other analysis methods less effective. This work utilizes a post-processual framework through a stylistic analysis. I use my own definition of style described above, that I established for this research, as there is not a commonly agreed upon definition for style in archaeology to work from. By referencing previous research and seriations, as well as provenienced collections, it is confirmed that these vessels are Terminal Chimú chicha (corn beer) bottles that were likely burial goods. This research examines the connection between gender, state production, ceramics, and beer in the Terminal Chimú and Inka Empire period, while demonstrating that small museum collections without provenience do have research potential and should be studied.

Linfield Anthropology Museum

The Linfield Anthropology Museum (LAM) is located on the McMinnville, Oregon campus of Linfield University. The museum was founded in 1987 from a set of items that were found on the McMinnville campus. The LAM is a small museum where undergraduate students engage with the collection to learn about museum studies as well as the cultures represented by objects in the museum. The objects are used to put on small exhibits, usually curated at least in part by students. The collection is made up of the initial artifacts that were discovered in the campus buildings, as well as artifacts that have been donated by members of the Linfield University community. The LAM is a teaching museum and uses the majority of the collection to teach students about artifacts, artifact preservation and curation, exhibiting artifacts, and museum studies.

Collection Information

The eight vessels featured in this analysis are a part of the collection that was donated to the Linfield Anthropology Museum in 1991 by Elvin A. Duerst. Duerst worked professionally in agricultural transportation and infrastructure projects, economic development planning, and foreign aid coordination. He worked with numerous federal aid agencies during his career as an agricultural economist fulfilling a variety of professional roles. Duerst collected artifacts, artwork, and other items, mostly from South America, and brought them back to the United States to make up his personal collection (Oregon State University [OSU] 2020). Eventually, he donated this collection to the LAM and other institutions. Receipts, descriptive documents, and insurance appraisals reveal that the collection was transported to the United States from South America in the 1960s. Some of the pieces are now no longer accounted for. Other pieces in the Duerst Collection at LAM include 65 total items, such as ceramic vessels from South and Central America (including Guatemala, Costa Rica, Peru, and Colombia), amulets, figurines, weaponry, jewelry, and unidentified items that

more research must be conducted upon. There is no excavation information about the objects, meaning that the collection lacks provenience.

Research Statement

This research seeks to define the vessels in terms of their cultural and geographical origin and date, and then place them within the existing body of archaeological knowledge. Previous research has demonstrated that Andean ceramic vessels often reflect the role that gender plays in state production (Bray 2003; Halliday 2018). This research identifies stylistic indications in these eight ceramic vessels of gender at play in Andean state production, thereby illustrating the research value of small museum collections. During the Terminal Chimú and Inka eras, the Chimú people were creating vessels to be used by the state to hold chicha (corn beer) during ceremonies. The chicha was created by women and demonstrates their essential role in state production. This research demonstrates that small and unprovenienced collections are useful and museums should take the time to research and work with them in order to contribute to the greater knowledge when possible and appropriate.

Cultural Context

Chimú and Chimú-Inka Culture

The Chimú culture was located on the North Coast of what is now Peru from A.D. 900-1470 (Wauters 2016:238). The Chimú predated the Inka Empire and were one of the groups that were integrated in the Empire in the fifteenth century. At the time that the Inka conquered the Chimú and other neighboring groups, the Chimú capital city of Chan Chan was inhabited by thirty to forty thousand people and an estimated 12,000 full-time artisans worked in the city (Halliday 2018:49). Chan Chan had a complex architectural design that provided "imperial administration and social order" as social inequality, which was highly reflected in the city (Halliday 2018:49). Halliday (2018:58) posits, "Craft production underpinned several principles of Chimú statecraft" as imperial expansion was related in the acquisition of valued resources to produce crafts that were valued by the royal Chan Chan residents. Chimú statecraft also involved joint rule and both indirect and direct rule within the same area. In these areas, local traditions persisted alongside Chimú traditions, much like later times in which Chimú traditions persisted alongside Inka traditions (Halliday 2018:59). At this time, the Chimú were regulating and managing labor, which in turn, meant that craft production was regulated and managed. They managed everything from large scale public projects to the manufacturing of everyday objects (Halliday 2018:60). The later Inka state was also highly regulated and managed, and it is likely that certain principles of the

Inka model were similar to or derived from the Chimú model (Halliday 2018:60-61).

During the Chimú, Terminal Chimú, and Inka periods (A.D. 900-1528), maize was the most important crop in the Andean diet. It was used to prepare chicha, but could also be boiled or toasted to be eaten in a variety of ways. Various accounts reveal that the elite in Chimú and Terminal Chimú-Inka society appeared to eat food of higher quality and status than the common people. The elite ate more maize than the common people, and their maize was of higher quality. The common people ate primarily potatoes, and maize was seen as special and desirable. The elite also drank chicha that had been fermented longer, making it smoother and more luxurious (Bray 2003:8). "Reports of royal gifts involving food offer further insight into the symbolic weighing of Andean dietary elements... It is apparent that maize and meat were considered the food of the gods, and by extension, of the Inka" (Bray 2003:8). It is interesting to note that despite the consumption of maize stretching across the social spectrum, it was not for everyday consumption by the common person.

Chimú Ceramics

The North coast of Peru sourced some of the most distinctive "remarkable, and well-known Precolumbian ceramic styles" (Donnan 1997:30) reiterating just how important this area was for the development of some of the most important and influential ceramic styles in the Andean region. Halliday (2018:56) agrees with many scholars that "Chimú pottery is highly visually and technically distinctive" remarking of the noteworthiness of these vessels. Furthermore, "its ubiquitous nature and apparent homogeneity, standardisation and substitutability" (Halliday 2018:56-57) further distinguish Chimú pottery from other ceramics, including those in the Andean region. The Chimú produced a diverse range of ceramic shapes (Wauters 2016:238). One of the most well known shapes is the stirrup spout bottle (Figure 1), which was an inherited style from the Moche and continued into the Inka period (Wauters 2016:238). During the Chimú period, the status of potters declined. This was in contrast to the status of artisans working with metal and textiles, where researchers suggest that of the many craft specialists who worked at Chan Chan, none were potters (Wauters 2016:240). This, among other research, suggests that the manufacture and distribution of ceramics was organized at the local level and workshops were located outside of the city. Ceramics were being mass produced, and their distribution of ceramics was no longer aimed at the elite, but rather at a larger and wider group (Wauters 2016:241). Wauters also maintains that "despite the relatively low social status of Chimú potters and the carelessness in production that can be

Figure 1. Vessel 2007.001.0022 Effigy vessel in the shape of a reed boat

observed in some vessels, there is a homogeneity in manufacturing techniques and iconography that suggests that transmission of an ideological message" (Figure 2; Wauters 2016:241). Furthermore, some ceramics that have been discovered are of higher quality--especially finer blackware vessels--and these vessels were likely intended for elite or prestigious consumers (Wauters 2016:241).

In the first centuries A.D., the cultures in the North Coast Andean region began to use molds for producing ceramics (Donnan 1997:30). This use of molds became one of the most essential hallmark features of Chimú ceramic making. In the following centuries, the mold making technology that developed in this area surpassed the technology that was seen in other regions of the Western Hemisphere prior to European contact (Figure 3; Donnan 1997:30).

Mowat also discusses funerary pottery, which is relevant here as the Duerst collection is most likely grave goods. At the time of the burial, vessels were used to hold offerings of chicha and other liquids. These accompanied the deceased on their journey into the other world (Mowat 1988:14). Therefore, it is reasonable to conclude that the pottery in the Duerst Collection at one time, held chicha for funerary purposes, meaning that they are chicha vessels.

State Production, Gender, Beer, and Ceramic Vessels

Mowat (1988) suggests that ethnographically, many potters are women and ceramic production is well suited to the domestic context. Molding does not require superior strength and can be done within the household as well. Family groups can work together using this technique. Textile patterns also frequently occur on Chimú pottery, and this may indicate a female bias amongst their creators, because the same patterns in both weaving and pottery would indicate that their makers are carrying styles from one project to another. The fact that Chimú pottery was created on a smaller scale allows for women potters to have been making it alongside men (Mowat 1988:15-16). The Chimú were not the only culture in the region to have a complex system of state production, however. The Inka also relied on their state system in similar ways.

State sponsored food preparation was done on an astonishing scale in the Inka Empire. The ideological and political importance of feasting and food exchanges have been documented (Bray 2003). The eight vessels discussed in this work relate to the subject of feasting because they are chicha vessels, and chicha was one of the state sponsored and produced foods which was served during these feasts. The Chimú-Inka intersection of culture at this time meant that the understandings and

Figure 2. Vessel 2007.001.0024, Chimú blackware bottle with iconography of birds consuming maize.

Figure 3. A vessel with an obvious mold seam from being made in a two part mold. Vessel 2007.001.0055.

practices of ceramics, feasting, state production, and more were colliding and connecting. Inka ceramic assemblages have been studied to understand state-related food practices and sponsored preparations. This importance has particularly been noted when it comes to feasting and food exchanges related to chicha during this time. The Inka ceramic assemblages are dominated by vessels used for serving or storing liquids, which is a marker of the Inka imperial food culture. Chicha drinking and serving was therefore incredibly important for imperial expansion during this time (Cuellar 2013:139). As Cuellar (2013:145) states "In the Andes, attention to questions of state expansion, gender, and labor has revolved mostly around chicha." Large scale feasting had an impact on the status of women, because as feasting and production became centralized, women lost control and influence that they formerly had through domestic production and distribution gained through a household's social network. The state feasting, valued by the Inka Empire, required massive amounts of women's labor. The critical resource for Andean leaders' capacity to organize the large-scale feasts was the labor of women--not land or maize (Cuellar 2013:145). This is where the "most extreme case," that of the "acllakuna, Inca [sic] state specialists recruited for textile and chicha production" comes to light (Cuellar 2013:145). These women, chosen at a very young age to create these cherished goods, were sequestered, and were responsible for consistent state production, rather than state production done in addition to their own personal obligations (Cuellar 2013:145). Despite women being so integrally connected to the feasting process, they did not enjoy high social status or access to the feasts (Cuellar 2013:145). Maize intake was higher for men under the Inka, according to scholars who have examined food consumption during this time. This suggests that men had greater participation in public events involving chicha (Cuellar 2013:145). The women were needed by the Inka Empire, but were not rewarded for their service through status.

Chicha was a necessary part of social and political exchanges throughout the Andes and was also consumed daily. Chicha was used in offerings and was considered to have agency, or power, to enact action. Being able to serve and brew extensive amounts of beer demonstrated the power, wealth, and generosity of the Inka Empire (Hayashida 2019:51). The chicha was served from ceramic jars with pointed bases and flared rims and were distinct from other vessels that were made by the local conquered groups (Figure 4).

The jars were distributed throughout the Empire and were also used to store grain in the state warehouses. Groups of pottery making households were permanently relocated to state administered production sites to make pottery vessels for the Inka as part of the labor tribute obligation. Archaeological excavations uncovered that potters at these workshops made vessels in their local styles as well as making the flared rim vessels. In addition, the excavations uncovered molds that were "surprisingly homogenous," which demonstrates that potters were retrained by the state to make the Inka chicha jars but retained some of their own manufacturing techniques (Hayashida 2019:52-53). This is visible in the eight vessels that are present in the LAM collection, because they display both local styles and Inka styles. For example, Vessel 2007.001.0009 has the Inka style of an effigy vessel, but the vessel is made in the Chimú burnished blackware form (Figure 5).

Women's social position in the Inka Empire, despite having such a significant role in making chicha, was below men in many regards, especially for common people (Bray 2003:10). However, women were integral to the division of social classes and the building of the Inka Empire and state. The Andean people understood the "principles of sexual complementarity and gender parallelism that structured traditional social organization" (Bray 2003:21) and the Inka manipulated these traditional and ancestral understandings into a new system. The system that the Inka continued to build was a social hierarchy based on gender, and the key difference is that it was hierarchical rather than complimentary (Bray 2003:21). The Inka continued to divide the world into gendered spheres, which upheld the ancestral traditions, while slowly incorporating their new power dynamic of social classes.

Furthermore, women also played another important role in the Empire, and that was in the role of *acllakuna*, or chosen women. Girls from across the Empire were collected as tribute and housed in special buildings to perform labor for the state in a position where they were both venerated and imprisoned. After performing labor for some time, they may either be chosen for sacrifice or be given by the king to an imperial subject as a wife. Their work included spinning, weaving, and preparing chicha and other special foods. "It was the products of these women's labor, specifically cloth and corn beer, that underwrote the imperial project" (Bray 2003:22). The work of these women allowed the Inka to continue to build and strengthen their social hierarchy that allowed them to maintain their state control over their subjects and vast empire. Furthermore, within the actual boundaries of the state, the Inka articulated their control through female activities of cooking and brewing by way of the labor tribute and the reciprocal obligations of the state's hospitality (Bray 2003:22). The state's strategies relied heavily on gendered roles and presentation in order to uphold state control and social hierarchy (Bray 2003:22). Gendered labor division and state controlled production were important components of Andean culture during this time period.

Figure 4. Vessel 2007.001.0024, note the pointed base and flared rim, distinct Inka styles on a Chimú burnished blackware form.

Figure 5. Vessel 2007.001.0009, Inka style effigy vessel in Chimú burnished blackware form.

Method And Theory

Methods of Establishing Age of Andean Ceramics

Many authors and scholars have undertaken the task of studying Andean ceramics, and in particular, Chimú and Inka pottery because of their ubiquitous nature and aesthetic popularity. The body of knowledge that exists on these ceramics is extensive, yet, it remains clear that small museum collections, such as the one studied in this paper, can still contribute to the scholarship on the subject. Harry Scheele and Thomas C. Patterson's (1966) seriation of Chimú pottery remains one of the most influential pieces for archaeological understanding of Andean ceramics. By placing artifacts within a seriation, their relative ages can be determined based on their characteristics in comparison to other artifacts of known age and provenience within the assemblage. Scheele and Patterson (1966:15) created a preliminary seriation after anthropologists and archaeologists excavated and worked with ceramics from the Andean region, including Alfred L. Kroeber (1926), Wendell C. Bennett (1939), Donald Collier (1955), and Gordon Willey (1947). This seriation, even after the introduction of radiocarbon dating and other absolute dating, remains influential and important when studying Andean ceramics and working to situate them within a time period. One of the researchers who recently utilized Scheele and Patterson's (1966) seriation is Halliday (2018), who conducted dissertation research on style and media in Chimú ceramics and textiles. When working with unprovenienced collections, such as the Duerst collection, a seriation is one of the best ways to obtain a relative date for artifacts from the collection.

Approaches: Documentation of Attributes

To begin this project, vessels from the Duerst collection that were identified in the records as Andean were removed from the collections storage and visually examined for their attributes. The attributes examined were color, shape, size, presence of effigy or imagery, and decoration on the vessels. All vessels that were black were grouped separately. All of these vessels were bottles and several had effigies. Vessels were also grouped by their specific cultural designation indicated within the existing records, and two distinct groups emerged: Nazca and Chimú. The vessels lack provenience, therefore, the information from the Duerst LAM records and visual attributes were the only ways to begin sorting the vessels. A visual sort was conducted, which lined up with the limited cultural designations within the records. The Chimú vessels did not fall outside of the visual sort that were conducted, and therefore, I was confident about continuing with the stylistic analysis of these vessels. The vessels associated with each culture differed greatly in appearance, and any ambiguous vessels were not included.

Scheele and Patterson's Seriation of the Chimú Pottery Style (1966)

Phase	Time Period (defined by Scheele and Patterson) (1966)	Approximate Date Range	Eight Duerst Vessels Place in Seriation
Taitacantin	Last epoch of the Middle Horizon and the early part of the Late Intermediate Period (1966:16)	The Middle Horizon was from 750A.D-1000 A.D. The Late Intermediate Period began in 1000 A.D. (Conlee 2003:47)	
Trujillo T-1	Epochs 2 and 3 of the Late Intermediate Period (1966:18)	The Late Moche culture to transitional period was from about 550 A.D. to about 850 A.D. and that appears to fit into this time period (Chapdelaine 2011:196)	
Trujillo T-2	Epochs 3 and 4 of the Late Intermediate Period (1966:20)	The Late Moche culture to transitional period was from about 550 A.D. to about 850 A.D. and that appears to fit into this time period (Chapdelaine 2011:196)	
Lambayeque	Epochs 5 and 6 of the Late Intermediate Period (1966:21-22)	The Lambayeque culture existed from 750 A.D.-1375 A.D. (Wauters 2016:240)	
Chimú T-1	Epochs 7 and 8 of the Late Intermediate Period (1966:23)	The Chimú culture arose in 900 A.D. (Wauters 2016:238)	
Chimú T-2	End of the Late Intermediate Period; Late Horizon (1966:24)	The Late Intermediate Period ended in 1476 A.D. (Conlee 2003:47)	
Chimú T-3	Early part of the Colonial Period (1966:26)	15th century; 1470 A.D.-1528 A.D.	Eight vessels this research focuses on fit into this time period

Table 1: Scheele and Patterson's Seriation of the Chimú Pottery Style (1966).

The choice was made to continue data collection with the eight Chimú vessels, as they most likely were involved in Chicha production or consumption, especially under Inka state control as the Chimú culture integrated into the Inka Empire. All eight vessels were documented using a standard ceramic analysis form used by the LAM.

Metrics were documented using typical archaeological techniques, described below. The vessels were examined using the eye and a 16x hand loupe, as well as a magnifying lens. The color of each vessel was documented, as well as its shape, surface treatment, paste, temper, and decoration. Because of the lack of color variation within the assemblage, colors were recorded as either matte or shiny black, as each vessel had been reduction fired. The shape, surface treatment, paste, temper, and decoration were recorded using qualifications from the ceramic analysis form with standards and information from Prudence Rice (2015) and Anna Shepard (1954). Measurements of height, diameter, and thickness were taken at specific points on each vessel. Each vessel's mold seams, form, and size were recorded, as all of these vessels were molded in the Chimú technique. Information about the whole vessel, the rim, neck, lip, body, base, and handles, if applicable were recorded. Some vessels lacked certain parts, such as

handles or a lip, and in those cases, information was not obtained for these parts. Effigy vessels were studied and examined to determine if the effigy was representative of a known symbol.

Establishing Age and Context for the Eight Vessels from the Duerst Collection

All vessels were then placed into the existing seriation (Scheele and Patterson 1966). This is a statistically insignificant sample alone, and the vessels are missing provenience and contextual information, so a new seriation cannot be created from these vessels. The Scheele and Patterson (1966) seriation draws on Kroeber's (1926) work in Peru on technical differences in Andean pottery tradition. This seriation forms the basis for how these ceramics are being situated in time and space. Within the literature, Scheele and Patterson's seriation is used in a classificatory manner, similar to how a typology might be used today. I used the Scheele and Patterson (1966) seriation to provide a relative date for these eight ceramic vessels, not as a classificatory tool, like most researchers use it, since a typological classificatory tool was not necessary for the research questions that I was hoping to address.

According to Scheele and Patterson's (1966) seriation, the collection of ceramics in the LAM are likely part of the Chimú T-3 phase, dating to the fifteenth century (Table 1). This period falls in the early part of the Colonial Period (Scheele and Patterson 1966:2). The Chimú were overtaken by the Inka in A.D. 1470 and the Spanish arrived at the borders of the Inka Empire in A.D. 1528. These vessels were produced during this time period; however, they are much closer to dating to around 1470, due to the notable Chimú techniques present that indicate Chimú practices that had not been significantly changed by Inka conquest. Upon arriving in South and Central America, the Spanish were notorious for destroying Indigenous cultural practices and literally building Spanish style buildings upon the foundations of destroyed Indigenous cities and buildings. It is likely that if these vessels did date closer to 1528, that there would be Spanish influence and much less Chimú and Inka tradition present, as the local potters were incorporated in the mission economy system. There is no apparent Spanish influence upon the vessels.

The vessels in this collection get their signature black and dark color from reduction firing. A notable change that occurred in this period was reduction fired pottery which was "beginning to become increasingly more popular" (Scheele and Petterson 1966:27). Through the use of this seriation to situate the ceramics within a certain time frame, it is possible to fit the vessels into a time range that these vessels were likely created within. These vessels likely date to the late fifteenth century, around the time period that the Inka Empire was unifying groups in the Andean region. This can be determined by the evidence displayed in the seriation, as well as the fact that these vessels display characteristics of both Chimú and Inka forms. The vessels are made with distinctly Chimú techniques and stylistic techniques, including molded imagery and reduction firing. The vessel construction techniques are also distinctively Chimú, as they were skilled potters, and these vessels are very uniform in size and composition (Halliday 2018:56).

The effigy vessels take a form that is both Inka and Chimú, which further narrows the time period. They are made in the blackware style of Chimú pottery but made into effigies, which are an Inka decorative form. One of the vessels that displays an effigy features a face (see Figure 5). This face decorates one side of the vessel. According to Halliday's (2018:113) research, on most Inka vessels the main decoration is featured on one side only. Inka ceramics often used colorful paint, but they were captivated by creating effigies and creating vessels in the shapes of other items from their world. The Duerst vessels are also made into other shapes, such as a reed boat (see Figure 1) and a fish (Figure 6).

The shapes of these vessels depict common themes in Inka effigies, while reflecting the Chimú pottery techniques (Kauffman-Doig 1998). The vessels represent a period when the Inka Empire was unifying different groups under one rule in the Andean region and this helps to date the vessels, even without provenience or absolute dating. It is important to stress that the Inka Empire was not creating one homogenous culture, rather, they were bringing different groups under one rule. These groups were still practicing their different traditions, much like the Chimú with their pottery.

I utilized a stylistic analysis to study these vessels, as they are lacking provenience and absolute dates. A stylistic analysis in archaeology is an analysis of artifacts that focuses on the decorative aspects, form, and function of the objects utilized by the makers and users of those objects. A stylistic analysis is interested in the intention and shared ideas that people in the past had and how the style of the artifacts may be able to communicate these ideas. It is impossible for archaeologists to be able to truly understand every aspect of the past, so a stylistic analysis is somewhat subjective, but a true stylistic interpretation is interested in what people were thinking in the past. A stylistic analysis is the most effective way to analyze these vessels based on the information that is available about them.

Basic Findings

All eight vessels are North Coast Andean Terminal Chimú-Inka burial goods, based on their whole form. All vessels are complete, with only minor damage or repair. Four

Figure 5. Vessel 2007.001.0021 Effigy vessel in the shape of a fish.

of the vessels were matte black and four of the vessels were shiny black. The vessels were burnished after firing, a process where the surface is polished using a hard, smooth object. All of the vessels are of certain authenticity in terms of their origin, but do lack provenience for the location of their excavation. The paste on all eight vessels is compact, hard, and smooth, based on characteristics defined by Rice (2015). All vessels are bottles and were made in two-part molds. The necks of the vessels (made out of a single piece of clay) were applied after the vessels were removed from the molds. The vessels vary in size, with the smallest vessel 16.3 cm high and the largest vessel 22.85 cm high. The actual size variation between the vessels is small, compared to other assemblages. Of the three vessels that were measured for rim height, one rim height measured 0.637 cm, another measured 0.309 cm, and the other measured 0.525 cm, which is a very small amount of variation, and indicates how exact Chimú pottery techniques were. Only two vessel rims were able to be measured for their thickness, and one measured 0.566 cm and the other measured 0.788 cm. Again, this is a very small amount of variation between the vessels. Three vessels were measured for lip thickness, and the measurements are: 0.588 cm, 0.349 cm, and 0.240 cm. These measurements are again similar, which indicates

the level of mastery and consistency of Chimú potters. Four neck thickness measurements were taken, and these measurements are also very close: 0.680 cm, 0.497 cm, 0.500 cm, and 0.570 cm. The thickness measurements are very indicative of standardized techniques, because it indicates that the clay sheets being placed in the molds were being made consistently. Six of the vessels had circular bases, one did not have a base, and one had an undistinguished base (which seems to be another feature of the Chimú vessels). Six of the bases were measured for diameter, and they range from 8.183 cm to 9.186 cm, with one outlier of 1.533 cm, which could be indicative of many different situations. That the base bottom diameters are so similar in size is another very interesting measurement. The fact that the vessels had so many measurements that were very similar establishes a pattern that proves that the Chimú potters were both consistent and masters of their craft.

One of the most important foods in the Andes was maize. Maize is a cereal grain, domesticated in Central America about 8,700 years ago and spread into the Andes and South America (Piperno et al. 2009:39). As stated above, one of the most important uses of maize in the Andean region was to produce chicha, which was both an everyday beverage and also used for social and

ceremonial events (Bray 2003). Andean women would make the chicha and it would be collected by the Inka state and then redistributed for ceremonial usage, making women an essential part of both the state and ceremonial system (Bray 2003). Ian Hodder (1990:45) argues that events and the interpretation of these events are an important element of style. The intersection of gender, state production, and ceramics in the occurrence of an event is apparent in the production of chicha and feasting. The event can be analyzed through the lens of style because it is a way of doing and understanding (Hodder 1990:44-45). The event communicates information about gender, state production, and ceramics through production and feasting. The eight vessels from the Duerst collection are most likely chicha bottles based on their form and style. By establishing context for these vessels through a stylistic analysis and the use of Scheele and Patterson's seriation (1966), it is clear that the vessels likely contributed to the state production and distribution of chicha. A stylistic analysis can offer more information on the human behavior present at this intersection. This is an example of the role of material culture in the process of state production and the importance of archaeological evidence to understand human behavior in the past. Even small collections can provide compelling data about complex societies and their influence.

Theoretical Orientation

Approaches in the Archaeology of Style

My research seeks to understand style using post-processual archaeology. My definition of style is: style is the communicative, variable, functional, way of doing; that interprets and is interpretive of meaningful information about the people who made and used material culture in the past. Style is communicative in that it communicates a variety of meanings about the form, function, the intentions, and the shared ideas encased in objects. Style is communicated by people by being acquired and exchanged and is socially and culturally determined through groups and individual connections. Style, as a communicator, can legitimize and reaffirm power (Bourdieu 1980; Halliday 2018; Hodder 1990). This is an essential component of the definition of style for this project, because of the focus on state production. Because it is acquired, exchanged and socially and culturally determined, it is by nature, ever changing. It is essential that the variable nature of style is acknowledged in this respect. Not only does style vary over time, it varies across space, across cultures, and even within a culture (Bourdieu 1980, Halliday 2018, Hodder 1990). At this point, I must acknowledge human agency and the variation that it causes. It is impossible for me to truly account for and understand the human agency in the past because I am interpreting from the

present. Humans have agency, and there are not always clear answers and reasons for human behavior and choices, especially when looking at the past (Bourdieu 1980; Halliday 2018; Hodder 1990).

Style is also functional. In many cases, the form of an object serves a particular purpose. An object may be made in a particular way because it meets a need for the people making it or because it makes sense to make it in that way (Bourdieu 1980; Halliday 2018; Hodder 1990). For example, it may have been easier to maintain a firing environment with reduced oxygen that led to the blackware that the Chimú are so famous. A vessel may have been constructed with a narrow neck to keep the contents inside while being carried, to prevent evaporation, and to minimize contamination of the contents, and a stylistic analysis may not reveal such details. Style is also a way of doing, and many agree with this definition, including Hodder (1990:44-45). Style is a way of making, using, and doing that can be gleaned from a stylistic analysis. Style is how things are done and how human behavior shaped material culture. Style works as a communicator to legitimize power in state production. Style is an interpretive force, especially important when lacking contextual information. The definition of style is not agreed upon, but this understanding is widely accepted.

Connecting to style as a way of making, using, and doing, is Pierre Bourdieu's (1980) idea of habitus. Habitus is another concept that is notoriously difficult to define. Bourdieu postulates that habitus is a subconscious way of being that is attributed to of all humanity (Bourdieu 1980). Bourdieu thinks of habitus as the way in which people understand, react to, and perceive the world. It is the mutual understandings, norms, values, and practices that individuals from similar groups share. Habitus affects how individuals move through the world, how they interact with others, and how they teach their cultural practices and values (Bourdieu 1980). Additionally, there is no separation between the mental and physical world. In fact, they are completely connected, and there is no distinction between objects and ideas, which gives objects agency, or power to act (Bourdieu 1980). This is an incredibly important concept, especially that of perception, sharing, understanding, and reactions. Style, both when being created and when analyzed, is subject to human perception, and the shared understandings are important.

Stylistic Analysis of the Duerst Chimú Vessels

I chose to utilize a stylistic analysis for this research project because these vessels have little to no contextual information, but still have research potential when considering them from an attribute based approach. These vessels have basic contextual information: basic

geographic and cultural origin information that came with the collection and the information that I was able to ascertain about the collection through my research. At the beginning of my research, vessels were labeled as being Chimú, which situated them as Andean, and I confirmed that they were in fact, most likely Chimú and dated to the fifteenth century during the Terminal Chimú-Inka period (Scheele and Patterson 1966). This is very basic contextual information and does not offer much archaeological information. Because they are whole pots, made in a fairly elaborate style, and such vessels in this region are commonly included in burials, it is widely accepted that they are grave goods. However, it is unclear from where they were excavated, when, what else was found with them, or what kind of person they were buried with (Halliday 2018). Until a scientific value and research potential of these vessels can be established, destructive absolute dating cannot be justified. Furthermore, without provenience and context, there is no point in absolute dating these vessels because they will not offer much information about a site or other artifacts. When faced with circumstances like these, stylistic analyses are a much more appropriate angle of archaeological investigation and are both valuable and useful. In this way, small museums like the LAM are able to engage as much as possible with collections like the Duerst collection, that may be lacking context, but still can hold valuable information, especially for teaching.

The eight vessels from the Duerst collection have specific attributes that link them to other recorded vessels in provenienced collections and research done on Chimú vessels. This situates these vessels within the existing body of knowledge. The bottle shape of these vessels is one attribute that is easily compared to other provenienced vessels. When examining collections at larger museums, some of the bottles are similar in shape. A common shape that is seen at larger museums is the double-chambered bottle and the stirrup spout bottle. The stirrup spout bottle is a form that was revived during the Chimú Phase T-3 period that Scheele and Patterson discuss in their seriation (1966:27). By identifying the stirrup spout vessel from the collection as a form that was revived during this period, the likelihood that these vessels are Chimú increases. The Duerst vessels included one stirrup spout bottle (see Figure 1), but the LAM does not possess any Chimú double-chambered bottles. When comparing the stirrup spout bottle at the LAM to stirrup spout bottles at other museums, they look very similar. The stirrup spout bottle at the LAM is an effigy bottle, shaped to look like a reed boat, which is the shape of a vessel that was sold through an online auction house selling Chimú and Inka ceramic artifacts (Ancient Artifax Galleries 2021). The stirrup spout bottle at the LAM also features an adorno on the handle, in this

case, in the form of a monkey (Figure 7; see also Figure 1). An adorno is a small figure decorating the handle or spout of a bottle, often on or at a junction. This was often seen on stirrup spout bottles created by the Chimú. The Metropolitan Museum of Art website displays several examples of provenienced bottles with this adorno on the stirrup spout. By comparing this adorno on the LAM bottle to the bottle at the Metropolitan Museum of Art, the comparison can be made between these two bottles to determine that the bottle at the LAM is likely Chimú in origin. Furthermore, beyond just the comparison to other collections, Scheele and Patterson's seriation references the adorno inclusion on Chimú pottery. "The small modeled figure which rests on top of the spout is usually a small bird and occasionally a small monkey... this feature becomes much more common during the early part of the Colonial Period"(1966:26) and these vessels date to this early part of the Colonial Period. The adorno on this vessel clearly marks these vessels as Chimú and further confirms the date of the vessels as dating to the Chimú Phase T-3 as referenced in the Scheele and Patterson seriation (1966:26). The style of including an adorno on the junction of the stirrup spout, especially in the form of a small monkey is distinctly Chimú.

All eight of the Chimú vessels in the Duerst collection at LAM are blackware. Burnishing after firing creates a shiny black exterior texture (for an example of a shiny exterior texture see Figure 1), which four of the vessels had, whereas four of the vessels had a matte black texture (for an example of a matte exterior texture see Figure 6). The Chimú favored the reduction fired blackware over the previously favored oxidized and painted redware. Later, the Inka would bring back the commonality of the oxidized and painted redware, but at the time of the Terminal Chimú and transitional Inka, which these vessels fit into, blackware vessels were quite common and the Duerst collection reflects this (Halliday 2018:132).

Furthermore, all eight vessels analyzed were made in two part molds. The practice of making vessels within two part molds can either be used to form the upper and lower halves of the vessel or the two sides of the vessel (Rice 2015:138). In the case of these vessels, the two part mold was used to form the two sides of the vessel, and they were joined vertically, by smoothing the clay together. This can be identified by mold seams on the vessel (see Figure 3). Very skilled potters can smooth them, but they can be felt at junction points, often on the inside of the vessel. When molding vessels, "a section of clay, often preformed into a disk, is pressed firmly into or over a prepared mold" (Rice 2015:138). Two part molds, especially the molds that allow two sides of the vessel to be joined vertically allow rapid production of vessels by people with little skill (Rice 2015:138); however, evidence

Figure 7. Adorno in the shape of a monkey on vessel 2007.001.0022.

shows that the Chimú were skilled potters (Halliday 2018). "Molds may be formed of plaster or fired clay, although ad hoc forms are often created from broken vessel fragments, baskets, or depressions in the ground" (Rice 2015:138). Parting agents, such as powdered clay, ash, manure, pumice, or fine sand, are used to prevent the vessel from sticking to the mold (Rice 2015:138). One of the techniques that the Chimú utilized often was incising and carving their molds, so that "when the clay is firmly pressed into them the molded surface acquired the decoration in relief" (Rice 2015:138). The Chimú pottery tradition utilized these two part molds, an inherited practice from the Moche culture, which preceded the Chimú in the Andean region (Halliday 2018:132). The Chimú added on to these traditions by constructing entire vessels within the mold, employing the technique of incising and carving their molds, rather than applying paintings after a vessel was molded. This differed from the Moche and with groups practicing pottery traditions prior to and after, and in different regions from the Chimú, as these groups utilized painting to decorate their pottery (Halliday 2018:132). The eight Duerst vessels were made from a mold that had been incised, fitting with the Chimú style.

Summary And Conclusions

Ian Hodder's Definition of Style Applied to the Duerst Ceramics

Ian Hodder is a pioneer of the post-processual movement, which is sometimes also referred to as interpretive archaeology. Post-processual archaeology is interested in the subjectivity of archaeological interpretations, a recognition that did not occur in earlier types of archaeology. As a post-processualist, Hodder argues for the usage of stylistic analysis. Stylistic analysis leaves room for the subjectivity of the archaeologist and their interpretations. Hodder thinks about style as a set of rules for the archaeologist to use style as an interpretive theoretical method. Processual approaches to style are less arbitrary or subjective in nature than post-processual styles that Hodder and other archaeologists popularized. First and foremost, Hodder asserts that style is "a way of doing," and this way of "doing" involves "the activities of thinking, feeling, being" (1990:45). Style covers everything--particular ways of doing that are related to cultural ways of understanding, as well as non-cultural, or more universal ways of doing (Hodder 1990:45). Hodder states, "everything has a function, and equally everything is done in some manner" (1990:45)

so each thing in the world has some sort of style, everything from the ways in which trees grow, the ways in which humans walk, and the ways in which animals fight. Some style is functionally determined, as in order to cut down a tree, one needs something with a sharp edge (Hodder 1990:45). However, style cannot be simply reduced to just biological or functional, especially not simply social function. Style is not simply a summation of cultural attributes, nor is it a set of rules for action by the archaeologist. Style is also not a summation of objective content like motifs and rules, nor is it a choice made between functional equivalents (Hodder 1990:44-45). Style transmits information about group identity, about self-evaluation by a group, and about self-evaluation within a group. The ideas about group identity and self-evaluation are constantly changing within and outside of a group. Style is also partly about events and the interpretation of these events (Hodder 1990:45).

In the case of these eight vessels, Ian Hodder's ideas about style are incredibly useful. The way of doing is reflected in these vessels in their very makeup. The utilization of a two-part mold to make the vessels is a way of doing. The incising of the molds is a way of doing, as is the reduction firing and burnishing. The specific forms the vessels take, whether that be of an effigy, a stirrup spout bottle, or another shape, is a way of doing. Hodder notes that everything has a function, and therefore, everything is done in some manner, and this way of doing is done in some way (1990:45). The forms are done as some function, as everything has function (Hodder 1990:45). The way of doing is ever-present, and that is because human behavior and choice is ever-present. The way that the vessels are made could be because of cultural or non-cultural ways of understanding or doing (Hodder 1990:45). It is possible that it is a combination of both biological and functional ways of doing that led to the style of these vessels. Without being present in the past, it is impossible to truly know, but a stylistic analysis allows an educated guess to be made. Style is present in the vessels, and Hodder's ideas are particularly useful when conducting a stylistic analysis.

Potential in Small Collections

Small, unprovenienced collections do have research potential, and this work demonstrates just that. Even without context, these artifacts can still reveal valuable and useful information about the people who made them and the values and ideals of the culture. Even without context or absolute dates, researchers can use stylistic analysis to make interpretations about these artifacts and reach conclusions about their origin, age, and function, as well as the behaviors, thoughts, and actions of the people who created and used them. Items like the Chimú chicha vessels reveal important ideas about the culture

and what celebrations and ceremonies they were having and hosting. In times of unification of different groups, like the Inka Empire, ceramics can indicate a mixing of styles, which is indicated in these vessels with Chimú ceramic techniques mixed with Inka imagery in effigy vessels. They can reveal information about the kinds of decorative styles and ceramic making practices that were occurring during the time, even without provenience. This can also serve as a reminder to support legal and ethical excavations which are properly done. Especially in a teaching museum, collections like the Duerst collection have exceptional value for helping students learn to work with museum collections, interact with objects, research objects and collections, and interact with new ideas and concepts.

Conclusion

This project conducted a stylistic analysis of eight ceramic vessels, which lacked provenience. This meant that a stylistic analysis was the most effective method of analysis, as the lack of context rendered other methods less effective. Using a post-processual stylistic analysis, the eight pots were documented, analyzed, and compared to existing data. This work sought to examine the link between chicha, gender, state control, and ceramics in the Terminal Chimú-Inka Empire period in the Andes.

Through a stylistic analysis, it was confirmed that these eight vessels were Terminal Chimú-Inka chicha (corn beer) bottles. The vessel shape, size, form, and style indicated that they were chicha bottles based on existing data sets and information. By placing the vessels within the Patterson and Scheele (1966) seriation, they were dated to the late fifteenth century. The whole form of the bottles also indicated that they were burial goods. Further research showed that pottery was created to be buried with individuals, and would be filled with chicha and other liquids to be taken with them to the afterlife. Therefore, these chicha bottles, as burial goods, would have been filled with chicha at some point. During the Terminal Chimú-Inka period, the state closely regulated the production of goods, including ceramics. Pottery workshops were established for the production of vessels to be made in specific styles for chicha distribution and storage based on governmental specifications and regulations. Furthermore, it is likely that potters traveled around the Empire to rural areas and sold vessels to the people there to be used in burials. The production of chicha was also regulated by the state. The task of producing chicha was completed by women, meaning that their gendered role was connected to the pottery, the chicha, and state production. Women did not participate in the ceremonial consumption of the chicha, as the men were the only ones who were allowed to participate. Chicha was placed in bottles and buried with

deceased people, and therefore, women had a role in that process, as well as state production, despite not being allowed to consume chicha in a ceremonial context. This research examined the connection between gender, state production, ceramics, and beer in the Terminal Chimú-Inka Empire period. It also demonstrated that small museum collections, even without provenience, do have research potential and should be studied.

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Moving Beyond Dichotomy: Native Horticultural Experimentation and Social Complexity in the American Southeast

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Abstract

This research underscores some of the challenges in Mississippian archaeology that occur when trying to model highly nuanced relationships between ever-changing social relations and plant-related subsistence practices. I provide a context around how archaeologists trace the history of plant cultivation and social complexity in the American Southeast--from the early gardening experiments of Woodland populations moving in and out of the American Bottom to the full-scale agricultural society of Greater Cahokia. Of particular interest is how interpretations of the archaeological past continue to change over time. This question is a tangled knot of anthropological theory from which I attempt to pull a single thread. As an approach to this question, I identify multiple theoretical frameworks that rely on dichotomous reasoning like push versus pull, simple versus complex, and decentralized versus centralized, that have been either refined or supplanted by pluralistic or dialectical alternatives (e.g., cross-contextual risk-mitigation and fission-fusion models). I conclude that the archaeological past of the American Southeast evades the explanatory power of these dichotomies, and that recent scholarship moves beyond them with careful attention to the inter-related continuum of human experience and ecology.

Introduction

The Native peoples of the American Southeast experimented with plant domestication and cultivation as early as 3050 B.C. (Smith 2011:S480; Smith 2006). Over thousands of years, they composed "different combinations of domesticates and wild foods" into a "coherent whole" known as the "Eastern Agricultural Complex" (Price 2009:6427)--one of the few independently domesticated crop complexes in the world. Around the turn of the first millennium, intensification of agriculture around this crop complex occurred in tandem with a spectacular restructuring and reordering of Southeastern society and culture. Thousands of people with disparate origins migrated to the interior of the American Bottom and integrated themselves into Southeastern foodways, creating unprecedented challenges for Mississippian peoples (Blitz 2010:11; see also Fritz 2019:86; Slater et al. 2014:125). Various phrases like "Big Bang," (Pauketat 1997:31) "Mississippian Transformation," (Bowne 2013:24), and the more regionally specific "Cahokian phenomenon" (Friberg 2018:39) have been used to describe this explosion of population and culture marked by the emergence of social hierarchies and chiefdoms, horticultural food production economies, maize agriculture, populous and organized settlements, and mound construction (Fritz 2019:9, 86; Fortier and McElrath 2002:202; see also Cobb 2003:66, 71; Peres 2017:430). The story of how the earliest horticulture experiments began, how they changed over time, and how they were deployed and systematized alongside

this phenomenon is a matter of ongoing interdisciplinary research that ranges from archaeology to theoretical anthropology. This story culminated with the explosive growth and subsequent dissolution of Mississippian chiefdoms, and it begins in the Archaic Period, when humans interacted with plants in the alluvial floodplains throughout the American Southeast.

The interactions and relationships between humans and plant populations are coevolutionary; humans impose selective pressures on plants by cultivating them, and genetic changes in plants occur hand in hand with "cultural shifts and innovations on the part of people" (Fuller et al. 2014:6151). There are two main archaeobotanical characteristics used to identify evidence of plant domestication: morphological difference and spatial difference. Plant species, isolated from their wild counterparts and repeatedly manipulated, exhibit morphological differences in their features over time (i.e., changes in the size or shape of seeds, flesh, and fruit) compared to their wild counterparts (Fritz 1990:396; Ford 1981:10; Fuller et al. 2014:6148). Plant species that were removed from their wild populations and tossed into midden dump heaps or informal gardens were crossed with other isolated members of their own species, which enabled the selection of desirable traits over time and induced gradual change (Simon and Parker 2006:218; Smith 2006:12226). When a plant exhibits change over time to the extent that it is no longer able to survive on its own without human intervention, it is considered a domesticate. But a lack of morphological

evidence does not preclude cultivation. Evidence of cultivation also includes the archaeological presence of a plant species outside its natural range or its presence in the vicinity of other known domesticates (Fritz 2019:35). The earliest domesticated plants were species that thrived in regions of the American Bottom floodplain that were "periodically abandoned and subsequently reoccupied" (Simon and Parker 2006:215).

Early Experiments

Some of the earliest domesticates in Eastern North America include the bottle gourd (*Lagenaria siceraria*), squash (*Cucurbita pepo* ssp. *ovifera*), sunflower (*Helianthus annuus* var. *macrocarpus*), marshelder (*Iva annua* var. *macrocarpa*), and later, chenopod (*Chenopodium berlandieri* ssp. *jonesianum*). Three of these species--squash, marshelder, and chenopod--were "early successional floodplain colonizers" (Smith 2011:S473). All three were recovered in Late Archaic settlements "scattered across the interior riverine midlatitudes" (Smith 2011:S473; see also Simon and Parker 2006:246). These species thrived in "anthropogenically disturbed habitats" (Zeanah 2017:6), such as intentionally cleared fields or land otherwise disturbed by human activity. Floodplain inhabitants would have no doubt observed this phenomenon. In this view, "domestication resulted from intentionally replanting seed stock on recently exposed floodplains" (Zeanah 2017:6). Sowing the seeds of floodplain colonizers into isolated, loosely managed floodplain plots would have induced gradual changes like those outlined above, adding an additional source of food to the Southeastern repertoire.

Though there was certainly a degree of intentionality behind the emergence of plant domestication, the earliest experiments included some combination of deliberate and non-deliberate actions (Fuller et al. 2014:6152; Langlie et al. 2014:1611; see also Price 2009; Smith 2011:S472). For example, giant ragweed "thrived in disturbed, soil-enriched patches" (Fritz 2019:26), and ragweed was recovered from plant assemblages in Late Archaic rockshelters at the Napoleon Hollow, Marble Bluff, and Cloudsplitter sites (Smith 1989:1568; Zeanah 2017:5). In the same rockshelters, quantities of domesticates like sunflower, marshelder, squash, and chenopod were also recovered. The recovered ragweed is not distinct from its wild counterparts, meaning that this cultivar was not planted and manipulated to the extent that the other recovered species were. People may have harvested it from the edges of clearings and gardens of other cultivars. The representation of ragweed in the Late Archaic across several geographical boundaries and the subsequent lack of representation in later periods suggests that early horticultural experimenters took on other cultivation projects in more promising crop candidates that became features in food economies. While the high fat content of sunflower seeds and the nutritional benefits of roasted squash or gourd seeds secured their place among the budding crop complex, the attempted domestication of ragweed is described as an "unsuccessful bid to become part of the developing agricultural system" (Fritz 2019:26), lending to the experimental nature of early Southeastern horticulture.

Loose garden management, like harvesting garden-edge species and planting leftover seeds from food stores in recently wetted floodplains, would eventually turn into the formalized management of farms. These precursory forms included "initial management of forest gaps and edges, where gap colonizing species were exploited for food" (Fuller et al. 2014:6151). Ragweed is one example of a gap colonizing species that was identified as a potential crop candidate and deliberately diffused beyond the range of its wild counterparts. This style of landscape management contributed to selection pressures and the isolation of wild plants, and it was increasingly formalized and systematized over time (Fuller et al. 2014:6151; Zeanah 2017:5). Even though plant cultivation practices across the Midwest-Riverine area extend well into the Archaic, it was not until later Woodland periods that the "first indications of a gardening complex appeared [in the American Bottom]" (Simon and Parker 2006:221).

There is a lack of data from floodplain sites in the Early Woodland period, but Simon and Parker (2006:220) interpret this as evidence for the "sporadic and transitory nature" of Early Woodland floodplain occupation. Despite the limited evidence, it is known that plant use in the Early Woodland Period was largely similar to that of preceding periods. By the Middle Woodland, the crop complex had expanded to include starchy-seeded crops like domesticated chenopod, erect knotweed, maygrass, and little barley (Fritz 2019:29-39, 1990:397; Ford 1981:10; Fortier and McElrath 2000:107, 115; Holt et al. 2010:75; Simon and Parker 2006:219). One of the best representations of this expansion is the Smiling Dan site of the Lower Illinois River Valley from which 13,000 chenopod, maygrass, erect knotweed, and little barley seeds were recovered (Fritz 2019:62). And, by the Late Woodland, permanent residents occupied the region rather than merely "strategically utilizing" it (Simon and Parker 2006:219). With this permanent residence in the American Bottom, the fuse of agricultural intensification was ignited, but its full extent was not realized until the later Mississippian periods.

Expanding the Eastern Agricultural Complex

The horticultural practices, technology, and plant-knowledge that made the cultivation and domestication

of this variety of crops possible were continually adapted as populations moved into and out of the region and created permanent residences in the American Bottom. The addition of starchy-seeded crops into the existing Terminal Late Archaic and Early Woodland crop complex is just one example. Further adaptation was facilitated by communities participating in exchange networks in which knowledge and seeds were passed around (Cobb and Garrow 1996:33; Fritz 2019:43). These exchange networks facilitated the initial arrival of corn (*Zea mays*), but the introduction of corn was temporally and spatially non-uniform and irregular, and the precise dynamics of the spread are still being studied (Fritz 2019:52). It is known that corn journeyed along exchange networks for thousands of years, all the way from Mesoamerica into the American Southwest and finally to the Southeast, where it was incorporated into well-established cultivation practices. Multiple studies indicate some form of exchange and trade between Southwest and Southeast communities that was ultimately responsible for the further migration of maize (Cobb and Garrow 1996:30; Smith 2011:S480; VanDerwarker et al. 2017:33). Mueller's (2013) study identifies a seed exchange responsible for the spread of an agricultural complex across the Hopewellian Interaction Sphere, and Fritz (2019:66), describes the Mississippi River as a "highway for traders" which could have facilitated the spread of maize.

Fritz (2019) identifies a risk reduction strategy that may have pressed Southeastern peoples to incorporate maize into a pre-existing crop complex and a food production economy (VanDerwarker et al. 2017:34). Like earlier experiments with other plants, corn was manipulated and genetically modified over hundreds of years. It was a challenge to cultivate corn, as it is particularly vulnerable to different soil conditions, rainfall patterns, and climate conditions. This vulnerability is consistent with a repeated introduction and re-introduction of corn into Southeastern exchange networks and crop systems (VanDerwarker et al. 2017:34), as it would have taken repeated experimentation to develop corn landraces that could grow in a region for which the species was not well suited (Simon 2017:147). By the turn of the first millennium, "a new spatial strategy" was implemented for "optimizing the positioning of even more crop species" (e.g., maize) across an extended range of "prime agricultural land" (Fritz 2019:70). Eventually, maize would come to be an indispensable crop for "escalating cycles of feasting and community ritual" (Fritz 2019:86) and a base crop for southeastern food production economies that underpinned complex Mississippian chiefdoms.

The Intensification of Maize Agriculture and Emergent Social Complexity

By around A.D. 900-1050, corn had secured its place among the crop complexes of the Mississippian Period. A recent study by Emerson et al. (2020) compiled and analyzed old and new data on the timing of maize incorporation to determine that it became a principal crop in the American Bottom by A.D. 900. In this study, isotopic analysis of human and dog bone confirmed that subsistence-level consumption of maize in Cahokia occurred around A.D. 900. There is a correlation between population growth and this diversification of earlier agricultural systems to include maize, but as outlined, corn was supplementary to a pre-existing complex, and the intensification of agricultural practices around this complex occurred at roughly the same time as the full incorporation of corn in the Southeast. This intensification is causally linked to the particularly dense population and the emergence of complexity in terms of political structure, distribution of power, and social hierarchy during the Mississippian Period (ca. A.D. 1050-1500). The scale and population of this period is not the only distinguishing factor, however. An even more striking difference between early and later forms of agriculture can be observed in the movements of food surplus between multiple layers of sociopolitical settlement and organization.

Building on previous scholarship, VanDerwarker et al. (2017:31) propose that changes in plant domestication practices did not necessarily cause social complexity, but instead were likely "embedded into changing social relations" that resulted in "the emergence of social hierarchies" like those of complex chiefdoms. Recent scholarship on the concept of Mississippian complexity identifies problems with rigor and precision in the use of the terms Mississippian and complexity. The meaning of the term Mississippian has changed considerably over time, and the dynamics of complexity in Southeastern chiefdoms continue to be the subject of intense debate (Blitz 2010:3; Cobb 2003).

The main indicator of complexity is the existence of social hierarchy and chiefly authority. People with elite status exercised control over food stores and surpluses, and the societies appear to be partly organized around coercive and non-coercive forms of tribute to chiefs (Cobb 2003). While scholars may disagree to some extent over the level of coercion and appropriation of surplus on the part of elites, there is a consensus that agricultural surplus moved "from farm to major mound center or back again" (Fritz 2019:145). Recent scholarship proposes that this movement of agricultural surplus at Cahokia was non-coercive. For example, Fritz (2019:145)

holds that Cahokian farmers were women of high-ranking households who played a non-negligible role in decision making and willingly contributed surplus for a variety of purposes. These farming households not only grew enough food in smaller, individual garden plots to feed their immediate social group, but they were also responsible for producing surpluses of food from larger, outfield crops. This difference in interpretation can be framed in terms of whether complex Mississippian chiefdoms were centralized or decentralized. The decentralized view is gaining favor because as more evidence is gathered, the more difficult it is to place Mississippian polities across a wide range of sociopolitical histories and contexts into either category. Decentralized models typically focus on ideology as a source of power, rather than economic resources. In fact, according to some models, "economy is seen as embedded in a ritual mode of production" (Blitz 2010:5). This reframes the discussion away from elites whose avenues of power and authority are not uniform across Mississippian cultures and toward "horizontal organization of corporate groups…and how these social groups might be recognized in community plans and artifact distributions" (Blitz 2010:5). For example, according to Fritz (2019:5), Cahokian Farmers "occupied all levels of the social hierarchy" and possessed "expert knowledge of soils, distinct crop varieties, weather, and supernatural beings who could be called on to promote fertility." This knowledge would have no doubt been instrumental for community planning, agricultural intensification, and large-scale agricultural projects, all of which appear to have started around the same time as the "establishment of local and regional political hierarchies" (VanDerwarker et al. 2017:31).

The simultaneity of these events highlights the difficulty in establishing a causal relationship between the incorporation of maize agriculture in the Terminal Late Woodland and the dramatic restructuring of society in places like Cahokia (Fortier and McElrath 2002). Instead, corn was appended to the existing crop complex that was intensified in tandem with "shifts in community patterning…that mark the onset of the Mississippian period" (Fritz 2019:87). On a macro level, this problem can be observed in the difficulty of establishing a connection from the "transition from simple to paramount chiefdoms" to some "continuum from benign redistribution to kin demands on surplus, to some control over the means of production" (Cobb 2003:78).

Nevertheless, at several points throughout the Mississippian Period, elite members of chiefdoms held power and authority over large areas of land, considerable populations of people, and agricultural surplus (Cobb 2003). Archaeologists have identified "differential access to resources between the elite and nonelite [*sic*]

segments of the population" (Peres 2017:440). In these studies, differences in the quality of food and range of species recovered between households of elites and non-elites are examined. Additionally, asymmetrical flows of resources including food surplus have been identified, meaning that, to some degree, resources moved from exterior food-producing villages in the outlying floodplains toward the center of major population centers, where the surplus was mobilized for various purposes including ceremonial and ritual feasting, redistribution, and even symbolic warfare in which entities of chiefly authority would throw elaborate feasts to indebt their rivals (Cobb 2003:77; see also Blitz 2010:18).

The Cahokian phenomenon and the cultural explosion after A.D. 1050 represent a sociopolitical project with some degree of integration and interaction across social groups. Waves of immigrants were pulled into the interior of the American Bottom, creating a pluralistic, "multiethnic, multilingual polity" (Fritz 2019:86). Some settled near mound-centers, while others resided near the exterior of the city in "smaller, dispersed hamlets and farmsteads" (Fritz 2019:86). Multiple social groups competed for power simultaneously. However, "hereditary lineage heads" had a greater likelihood of acquiring authority based on "differential access to, and control of, critical resources" (Fritz 2019:71, 86)--and the most critical resource of all would have been agricultural fields. The leaders of these competing social groups were able to "command the loyalty of followers" if they could "accumulate enough influence, wealth, and charisma" (Bowne 2013:4). One process by which disparate communities become "integrated into a hierarchically organized, regional polity" (Beck 2003:643) is that of regional consolidation, and it operates on two principles: the intensification of production technologies and the attraction of new followers to expand labor pools for surplus production. This process can occur in coercive and non-coercive forms. For Cahokia, it could be the case that outlying food producers were willing to cede a degree of power and decision making to elites because they "were viewed as essential to the stability of the natural order by virtue of their esoteric knowledge and authority" (Cobb 2003:78), lending to the hypotheses that some monopoly on ideological or ritual power was one source of chiefly authority. Another source of authority "can be traced in part to the chief's ability to reduce risk" (Bowne 2013:4), which also fits into the contexts of later Mississippian polities that were especially reliant on corn agriculture.

Difficulties and Challenges of Theory

The dynamics of complexity in Southeastern chiefdoms is still a matter of debate. Some work has been done to provide a framework for "ongoing discussions on

the origin of complexity" (Cobb 2003:64). Historians, anthropologists, and scholars of Western traditions at large tend to impose univariate theoretical models based in linearity and cause-effect relationships that may not be sufficient to explain the history of early Southeast agriculture and its relation to Mississippian complexity. The very concept of a chiefdom is a product of research based around typological methods. When used as a heuristic, some argue that it obscures variation and "lacks the specificity needed to model all Mississippian political organizations" (Blitz 2010:3). Every distinct Mississippian polity occupied a unique position in "the vast temporal and spatial web of Mississippian interconnections… [that] transcended regional boundaries" (Blitz 2010:13). Horticultural practices, back to the first cultivated plants, are non-uniformly represented among the various Southeastern subsistence traditions because each community responded to ecological pressures that were unique to their respective environments (Simon and Parker 2006:233).

In the American Southeast, the origins of agriculture are as mysterious as the evident reordering of Southeastern society. Why would people in resource-abundant oak and hickory forests who enjoyed access to deer, small mammals, fish, shellfish, hickory nuts, walnuts, acorns, and forest fruits choose to experiment with plant cultivation and domestication? Experimental cultivation--the practice of manipulating plants by "clearing fields, sowing seeds, transplanting, and weeding or otherwise tending to the resultant plants" (Simon and Parker 2006:214)--requires mental and physical labor as well as a substantial time commitment. To take on the task of experimenting with plant manipulation would necessarily mean less time tending to proven and time-tested subsistence practices. Like the problem of understanding the roots of social complexity, this is a problem for anthropologists seeking to understand the roots of horticultural practices that were repeatedly refined, expanded, diversified, and intensified over time, eventually graduating into full scale agricultural economies that would underpin complex polities. Various models have been proposed for the initial motivations toward horticulture.

One can draw similarities between the problems intrinsic to the theory behind models of the origins of agriculture and social complexity. One model for understanding the initial motivations toward horticulture experimentation is framed in dichotomous terms of whether Southeastern hunter-gatherers were pushed or pulled into plant domestication practices (Langlie et al. 2014:1612). An abundance of food resources may have allowed Southeast peoples to experiment with the early floodplain colonizers that they surely observed. If they had relative food security, they could divert attention and

time to developing new subsistence practices, essentially pulling them toward plant domestication. During the Middle Woodland Period, either population growth or a decrease in available resources may have pressured further intensification of horticulture, and these pressures "forced people to intensify food production or expand diet breadth" (Langlie et al. 2014:1612), hence pushing them into agricultural intensification. Other models stray away from the push and pull dichotomy, focusing instead on risk-mitigation strategies that integrate into both contexts of scarcity and abundance. In these models, seasonal or yearly predictability was the primary motivator of early plant cultivation (Langlie et al. 2014:1612; see also Zeanah 2017:15). Whether Southeastern hunter-gatherers were largely pushed or pulled into agriculture is still a subject of debate, but evidence that some communities were pushed while others were pulled fits well within the recent pluralistic trends in Mississippian archaeology.

Conclusions

The theoretical frameworks used to study the coevolution of Southeastern agriculture and social complexity have become increasingly nuanced. Past archaeological studies over-exaggerated the importance of corn in the emergence of Mississippian culture, and according to Blitz (2010:5), there is a "long established and still influential" proclivity in Mississippian archaeology to model Southeastern chiefdoms as primarily centralized. There is likely a kernel of truth to both interpretations. Corn was an increasingly important crop in many regions of the American Southeast, and at times there were centralized chiefdoms, but the story is not always so simple. New perspectives invite us to challenge and to move beyond dichotomous models of agricultural origins and chiefdom complexity, and we see this trend throughout the relevant scholarship: push versus pull, centralized versus decentralized, simple versus complex, foraging versus farming, and others. Each of these dichotomies has been either supplanted or synthesized. Push versus pull models were supplanted by hybrid versions and cross-contextual risk-mitigation models (Fuller et al. 2010). Centralized versus decentralized models have been criticized for being "conceived in an overly dichotomous manner" (Blitz 2010:6,8), and the simple versus complex concept is said to be of "less aid in exploring the range of variation among Mississippian chiefdoms" (Beck 2003:657).

Efforts have been made to refine these dichotomous models. Blitz (1999:577) favors a fission-fusion model in which "oscillations between dispersed and concentrated regional power centers…create polities of different size and complexity" over time. While this replaces a dichotomy with a dialectic, the fusion-fission

process accounts for non-linear political transitions between the poles of simple and complex and has the added benefit of "encompass[ing] a greater diversity of Mississippian political forms" (Blitz 1999: 577).

Fortunately, these nuanced perspectives, alongside innovative technologies like accelerator mass spectrometry (AMS) dating, flotation recovery, and stable carbon isotope analysis allow us to interpret more evidence and re-interpret old evidence (Blitz 2010; Hart 2014:170; Langlie et al. 2014:1607). There is a shift in Mississippian archaeology away from approaching the peoples and cultures of the archaeological past like specimens in glass cages, as if they can be understood when partitioned into discrete categories and removed from their unique ecological contexts, histories, and cosmologies (Baires and Baltus 2017). Especially in the case of foodways, which are intimately wrapped up in socio-politics, these more nuanced perspectives and models encourage an appreciation of the story of the American Southeast not as a linear progression of events, but instead as a nexus of changing ecological relationships and social interactions that spans the continuum of human experience--from the coevolution of plants and humans, to settlement patterns, chiefdom complexity, symbolic belief-systems, culture-making, identity formation, and everything in between and beyond.

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