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Table of Contents

"Word, Sound, and Power: Transformation of Rastafarian Consciousness through Dread-talk"
By Alexandra Vangsnes
Harvard University Extension School
Page 85

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Photographs contributed by: **Rebecca L. Cuntala**

Superstition No More: A Provisional Aztec Explanatory Model of Disease

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Abstract: This paper examines the 1521 epidemic that took place in the Aztec city of *Tenochtitlan* from the point of view of medical anthropology. Based on period sources and advances in modern medical anthropology theory, this paper attempts to construct what in modern biomedical terms can be called an Aztec "explanatory model of disease" for the 1521 epidemic in the Basin of Mexico.

Introduction

In this paper, I will employ the method suggested by Arthur Kleinman and others, known as the "Explanatory Model of disease" to examine the Aztec understanding of the epidemics introduced by the Spanish conquistadors. In particular, I will address the epidemic that devastated the Aztec city of Tenochtitlan in 1521. The theoretical perspective employed here allows for a restructuring of the basic questions which modern scholars use in their approach to the topic of early contact period epidemiology. Instead of analyzing the number of those who were affected with various diseases or the biomedical cause for their demise, a qualitative analysis of the sickness would allow a more profound understanding of *how* the people themselves saw and explained their sickness. A qualitative study of the curative methods of the Aztec medical tradition would allow for a deepened understanding of how and why the Aztecs applied certain remedies and not others when afflicted by disease.

I will begin with a brief historiographic survey of the study of early-contact period epidemiology and highlight the existing interpretations of this phenomenon. Having done this, I will examine the theoretical background of present-day medical anthropology, which examines the ways in which various cultures experience and explain illness. Lastly, I will attempt to construct an explanatory model of disease drawing from a qualitative analysis of Nahuatl medical practices as presented in surviving period documents. Employing a qualitative mode of analysis like the explanatory model approach will hopefully open the door for a reinterpretation of the gathered knowledge from extant primary sources and shift the mode of inquiry from, what I see as, an obsession with the number of those who died after contact with the Spaniards from various causes and the meticulous biomedical identification of those causes to attempting to ascertain what it was that the indigenous population thought happened that caused them to die. The explanatory model approach will hopefully break through the simple explanation that the natives' beliefs are "superstition" and "devilry' as they were written off by the Spanish observers during the early colonial period. Instead, the model I attempt to construct below will hopefully

make it clear that there is no aura of superstition surrounding the indigenous curative methods, that instead, both the explanations for sickness and the cures employed to remedy them are rational and intimately connected to one another.

Problems of Historiography

After the formal seizure of power by the Spanish crown, the health of the indigenous population remained perilous. The 1521 epidemic proved to be neither the last nor the most serious of the calamities that befell the Basin of Mexico in the 16th century. In a seminal essay, Prem (1991) identifies a total of ten epidemics of what appear to have been Western diseases introduced into the New World after the arrival of the Conquistadors. Among the causes of these epidemics are smallpox, measles, typhus, and mumps (Prem 1991). All these outbreaks occurred within a period of roughly 20-30 years, effectively ensuring that there was not a single year in the period between 1520 and 1600 that there was not some sort of major sickness ravaging indigenous communities in the Mexico basin. Since its publication, Prem's work has influenced a number of anthropologists and historians of medicine to undertake inquiries into the character of new world epidemics. A major contribution to the field has been the introduction of the concept of Virgin Soil epidemics which suggests that the reason for the extent of the depopulation of the Mexico basin was the absence of inborn immunity to introduced European diseases among the native people of the Americas (Borah 1991).

Scholars' wide acceptance of the Virgin Soil theory has conditioned the state of the present scholarship in the field. Most recent anthropological and historical work has focused on the question of population decline and current scholarship is quantitative in nature, attempting to establish the number of victims who succumbed to the epidemic, as well as the number of people living in the Basin of Mexico on the eve of European contact. Lovell attempts to construct a model of native depopulation and estimates roughly 50 million casualties in the period of 1518-1580. The reason for the heavy prevalence of numerical data regarding mortality is in part a consequence of the condition of the primary sources from which population information can be drawn. The earliest period of European-American contact was not one where a census-type venture was undertaken. Instead, a system of *encomiendas* was prevalent. *Encomiendas* were land tracts entrusted to Spanish officers in the new world who, in return for "instruction in the true faith and wages" would be entitled to the labor of all constituent natives (Sanderlin, 1992). In many parts of modern Mexico, the new Spanish overlords elected to have their newly acquired native serf-like servants to work in the mines to extract gold from New World reserves for European markets. Much of the record that survives to this day talks about the number of laborers who died in any particular period in the mining operations and the number brought in to replace them. Such a picture is by no means exhaustively complete, and at best circumstantial. Nonetheless, it allows analysts to construct prognoses and approximations of the probable overall number of people living in New Spain within one or two generations of the conquest. While an invaluable source of information on some aspects of Aztec daily life, indigenous and indigenous-informed sources like Sahagun's *General History of the Things of New Spain* are not

particularly helpful in this regard either. Although statements like, "the epidemic lasted more than 60 days in Tenochtitlan" and "more than half the people died there [*Tepeilhuitl*]" can give researchers an indirect testament to the seriousness of a given epidemic, they are practically useless in determining precisely how much "half the people" would be (Sahagun 1982:81).

In general terms, the preoccupation of both the colonial bureaucrats and modern scholars with mere figures is unnerving. A quantitative analysis at its core is a report of *what happened*. The qualitative explanatory model approach that I will attempt to construct counteracts this trend of outsider indifference. Instead, it is appropriate to pose the question: what did the people *think was happening*? The best way to answer this question is to focus on the methods indigenous medical professionals used at the time. Such an approach is justified because every medical system at its core must be rational and logical. That is to say that the curative method is intimately tied with the understanding of how the disease itself works within the patient's body and what exactly is happening as a result of said disease. However, while all medical treatment systems are logical, it might be difficult to rationalize them from the point of view of what can be colloquially termed "Western medicine." Naturally, those 16th century medical professionals who assembled the early colonial compendia of treatments had difficulties of rationalization. The fact that these late-medieval/early modern conceptions of disease differ rather drastically from our modern disease-related epistemology adds to the difficulty of understanding the extant primary sources, as they are effectively doubly removed from the observed fact. In the first step, the (usually European-educated) chronicler would attempt to rationalize the native medical practices in terms of canonical Western medicine of the late Middle Ages; in the second iteration the modern professional attempts to translate the late-medieval interpretation into the modern biomedical one, while remaining true to the indigenous original. This circumstance necessarily makes almost all available information to some degree dubious.

Problems of Biomedicine

Given the difficulties described above, I have attempted to circumvent the question of numbers altogether. Instead, the aim of the present project is to attempt a qualitative analysis. A qualitative analysis has not yet been attempted. This is due in no small part to the problems posed by the extant historical material outlined above. However, a new perspective on what is available would allow, at least in part, for a termination of projection of modern ideologies on to the past. Such an approach poses its own set of difficulties, not the least of which, paradoxically, is that I attempt to superimpose the standards and categories of modern medical anthropology onto a set of events that are culturally and temporally bounded in a completely different medical and philosophical tradition. In this section, I will attempt to flesh out these nuances. In effect, this work in itself is an attempt to explain the problems of the past in modern terms. Unlike all the research done to date, I hope to at least illuminate the possibility for a superimposition that takes into account cultural, ideological, and social factors that have, to this point, been largely ignored in disciplines outside anthropology.

One of the most important things that modern medical anthropology attempts to do is conceptualize the ailments of different patients within their own socio-cultural contexts. Toward this end, specialists have proposed a method known as the "Explanatory Model of disease." Arthur Kleinman, who is responsible for the introduction of this concept, explains its necessity thus, "[outside the discipline of anthropology] culture is made synonymous with ethnicity, nationality, and language… patients of a certain ethnicity – such as the 'Mexican Patient' are assumed to have a core set of beliefs about illness owing to fixed ethnic traits" (Kleinman 2006). It is obvious that Kleinman is arguing against what might be called a processualist approach, one that boils down culture to a set of universal and necessarily progressive stages along with unchanging inherent cultural attributes. Kleinman's model counteracts this tendency for cultural stasis by introducing a set of guidelines to apply when dealing with members of different cultures who experience disease. These are to determine whether the patient himself sees their ethnic identity as something influencing their disease. It is also important to construct an "illness narrative" in which the patient explains personally what they think the causes and long-term effects of the illness are. In tandem with the illness narrative, the patient is asked to construct a "stress narrative" which aims to generate an account of the intra-personal relationships of the patient and the patient's self-identified place within those relationships, with the goal of understanding how the illness might affect the patient in the world as they understand it (Kleinman 2006).

In a seminal piece titled "Why does Juan Garcia have a drinking problem?" Singer suggests that there is a trend with modern medical professionals to look for unifying "culturally bound" factors that would push an immigrant to succumb to chronic illnesses like alcoholism when put into stressful situations (Singer 1992). Searching for such (often nonexistent) links between a person's cultural identity and their behavior leads medicine down an erroneous path of looking for a uniform "cultural patient." While an example drawn from a work on 20th century Puerto Rican immigrants to the United States might seem anachronistic when dealing with a medical conception of the ancient *Mexica*, it is nonetheless relevant. On one hand, it shows that there is a direct need to counteract the conception of the culturally-static "molded patient" that exists at present in the medical field, and in many other non-anthropological disciplines. This is exactly what an explanatory model analysis aims to do. On the other hand, searching for clues in the historical record dealing with Aztec curative practices allows for an extension of work done in the modern period through contextualization of seemingly random medical practices in rational tradition. The problems of historiography mentioned earlier, not least among which is the filtering of native informants' accounts through culturally alien and biased Spanish recorders, are even helpful in this case. This is because such accounts would make it difficult for modern researchers to construct a full and static universal "Aztec explanatory model." On the other, a preliminary explanatory model approach would allow for a shift away from questions concerning the number of casualties as a result of the Spanish invasion of the Basin of Mexico. Rather, it would allow for a construction of a narrative of disease. In turn, this could potentially lead to a better understanding of the Aztec perception of self as disease-subject. Such an approach would

therefore serve to remove the accumulated aura of detached indifference towards particulars that has permeated historical study of Aztec epidemiology following the collapse of the Aztec empire. Given this limitation, any attempt I make to construct such a model in the subsequent section will be partial and incomplete.

A Provisional Aztec Explanatory Model

To begin to answer the question of how an explanatory model approach might be applied within the medical tradition of the 16th century *Mexica,* it is best to take a somewhat circuitous route. This is because most of the extant sources that deal most directly with individuals and prescriptive rules governing individuals' lives are semi-religious, rather than medical texts. Toward this end, it might be useful to begin with an examination of the Aztec divinatory calendar. Such a move is valid because the calendar was a universally used tool for determining the individual's lot in life. Berdan (2006) notes that the rites and ceremonies of the Aztecs were intimately and exclusively tied to this divinatory calendar. The ceremonies were tied primarily to the patron sign of any given day. The calendar was tied to the movement of the celestial bodies, primarily the sun and the planet Venus. The lives of individuals were also in no small part influenced by the movements of the planets according to Aztec belief. However, it was not the priests who assisted the common folk in divining their fate. This was the area of expertise of a *curandero* (shaman), who would employ various methods of divination to discover the future of the beseecher (Berdan 2006). For example, the Aztecs held a belief that a person who would be born under the day sign of 2 Rabbit would necessarily succumb to drunkenness later in life and it would simply be said that "he has become like his Rabbit" (Berdan 2006:71). Similarly, "any person man or woman, noble or commoner, was particularly inclined toward a career in sorcery if he or she was born on the days of 1 Rain or 1 Wind" (Berdan 2006:77). These people would probably become respected and somewhat feared as *curanderos* in the community. According to the Aztec belief system, disease was often sent down as divine punishment for the impious. Certain gods and goddesses were associated with causing or curing certain kinds of disease. For example, the god of rain, *Tlaloc*, was seen as the causing deity of colds, chills and other "wet" illnesses, due to his association with water[1]. Curing an ailment brought about by Tlaloc or his avatars would entail both mundane and supernatural cures in the form of supplication and penance to the god.

Although it becomes tempting to read the Aztecs' reliance on omens and magic as a complete and total reliance on fate in the governance of daily personal affairs, such an interpretation would be limiting and erroneous. Many colonial-period writers who came into contact with the Aztec *tecitl* (medicine men) or *curanderos* suggested that their practices were heathen appeals to these Pagan deities and saw this as a sign that the indigenous healing practices were illegitimate. However, reliance on calendrical and celestial omens, in my opinion, serves as direct proof of an understanding of personal agency and accountability in mundane matters and matters of individual destiny among the Aztecs. Evidence for this interpretation comes primarily

[1] Richard Andrews and Ross Hassig in Treatise of Ruiz de Alarcon

from Hernando Ruiz de Alarcon's 17th century *Treatise on the Heathen Superstitions of the Indians of New Spain*, but also from Sahagun's account of the reasons that might lead a patient to consult a doctor. Sahagun states that:

> The doctor is a seller of cures and ointments [and] a diagnostician, a knower of herbs stones, trees and roots. He is moderate in his acts. He provides health restores people, provides them with splints sets bones for them, purges them, gives them [poultices], gives them potions, he lances, makes incisions in them, stiches them, revives them, envelops them in ashes. [Sahagun 1982:30]

On the basis of this description alone it is possible to draw a number of conclusions. Firstly, it is obvious that the medical professional in the Aztec system was well versed not only in ritual cures of diseases, but also quite mundane afflictions, like broken bones or burns. It is therefore preemptive and unfounded to assume that the Aztec system of curative measures was solely tied to fatalistic appeals to the divine and total acceptance of one's fate. Of course, curative and religious aspects were linked, but not in a way that subsumed one under the other. However, by the same token, an alternative reading of the practices in and of themselves can yield such an interpretation. It is important to note at this juncture that the information that survives of the curative methods of the Aztecs is found not in unmediated native Nahuatl accounts, but is rather transmitted through treatises of missionaries who arrived in New Spain for the purpose of reforming the souls of the indigenous population. In some areas of New Spain, as in the case with the Maya of the Yucatan, "reforming the souls" took the form of physical destruction of material culture, in the form of Codices and buildings. For example, a missionary to the Maya, called Friar Diego de Landa, boasts of personally having collected and destroyed 40 Maya scrolls and presided over the destruction of "heathen" temples.

While destruction and appropriation of religious spaces in the Basin of Mexico did occur, such destruction did not reach the periphery of colonial Mexico to such an extent. Instead, friars who were sent to minister to the newly-converted indigenous Christians relied on public denunciation of the practices of the natives that they regarded as un-Christian "idolatry" (Ruiz de Alarcon 1982). Indigenous healing rituals, for they did in fact have a ritualistic aspect and religious overtones to them as noted before, necessarily also became "idolatrous." The result is rather in-depth reportage of the physical appearance of the ritual in the written account, but at the same time an almost total ignorance of and flaunted indifference to the significance of the rituals in question. Ruiz de Alarcon writes:

> The thing that surprises me most is that while contingency… is the precise essence of fortune, the ignorance of the Indians is so great they have such dull intellects and such darkened natural light that they consider things that in themselves depend on free will to be by chance… the limit to which blindness can reach. [To] this blindness they add that they consider it to be evident that the fortune told without an invocation will not have the desired effect nor proper effect; so they attribute the greatest part of the prediction to the incantation. They

> are persuaded that the instruments take on their proper disposition because of these words. [Ruiz de Alarcon 1982]

A rational system of indigenous medical knowledge takes on the appearance of mindless dribble. Elsewhere, Ruiz de Alarcon states outright that the practitioner of such a form of "sorcery" no doubt "has a pact with the Devil." Thus, any sort of analysis that modern scholars can make based on the information that the source as a whole provides is based on an observation stripped of its cultural context. What Ruiz de Alarcon's, albeit biased, account does allow us to see is that the Aztecs' own oral tradition can open doors in understanding what the *tecitl* perceived themselves as doing in these rituals. Although it is presented here as a kind of nonsensical babble.

The point is best illustrated by example: if a patient came to the *tecitl* complaining of stomach pain, the specialist would quickly diagnose the illness as "green," and then the specialist would apply a "green" cure, such as tobacco, to expel the illness with a like color remedy. In doing so, the curer might invoke an incantation which addresses the cause of the discomfort (the stomach pains) directly, telling them that they are causing pain to the patient and warning that if they do not leave of their own accord, the curer will use a needle to drive the pains out forcibly[2]. One must remember that to the observer outside the cultural context, as Ruiz de Alarcon would have been, the ritual might, indeed, look barbaric. A patient being stabbed in the abdomen with a needle to drive away pain would have been considered the epitome of ignorance by any even slightly "knowledgeable" European physician. Yet at the same time, this verbal exchange between the illness and the curer allows for a glimpse into the ontological world-view and understanding of the Aztec medicine men by way of textual and tonal analysis. In the aforementioned passage, the medicine man assumes that he is the equivalent of the infirmity in power. This is clear from the fact that he addresses the sickness directly and does not appeal to the heavens for strengthening. Instead, the *curandero* simply explains to the stomach pain what exactly will happen should the illness refuse to abate. The curer then offers the illness a chance to leave of its own accord without flaunting his own power. Instead, he only alludes to his potential for using the cures at his disposal. What is also important here is that the curative methods are anthropomorphized, but not personified. For example, the *curandero*'s needle is referred to as having "guts" (i.e. its thread), but never called upon as an agent or witness in its own right. This suggests that the medical professional has a profound agency to exert over the sickness and can, of his own accord and by his own devices, make it recede if necessary. Such a reading would corroborate the point made earlier, that even though deities and supernatural omens played an important role in the medical practice of the Aztecs, they not only recognized, but also exalted their own agency as people in control of their own, and even others' (in this case the sick patient's) body and destiny. The practice of applying cures that are complimentary in terms of "color" to a given illness seems to have been common in the Aztec medical tradition.

[2] This is a paraphrasing of the curative incantation found in Ruiz de Alarcon's Treatise 6, Ch. 21

Further analysis of Ruiz de Alarcon's treatise suggests that the Aztec *tecitl* conceptualized the body in terms of competing forces that affected the health of the patient. It is safe to draw a parallel here to the humoral conception of Galenic medicine[3]. The Aztec conception of a tripartite soul has similar overtones. According to Aztec metaphysics the soul has three parts: the *tonalli*, a *tona*, and *teyola.* An individual's *tonalli* was the part of the soul that a person receives upon first contact with the sun. It is associated with the force of heat and gives the person character, courage and determination. This *tonalli* could also leave the body in dreams and have out-of-body experiences. The *teyola* was the part of the soul that resided in the heart and controlled the person's constitution. It is inseparable from the person and if separation does occur, the patient dies. This part of the soul can be likened to character, because besides giving a person physical health it is responsible for a person's memory, inclination, and affections. The final part of the soul, or *tona*, was the faculty responsible for base desires and passions. While the soul was considered to be tripartite, one part of the soul was not privileged over any other, rather the balance between all three competing soul-forces was sought. Here lies the commonality between the Galenic humoral approach described above and the Aztec *tecitl's* approach which is mentioned in Ruiz de Alarcon's treatise. While the *tecitl* is treating an affliction of one part of the soul, most likely the *teyola*, the objective is not to remove the symptoms which plague the individual but to restore balance to the person so they might continue to exist in the world, to prevent the *teyola* leaving the body. Ruiz de Alarcon writes:

> If [the Indians] do not know the sickness or its cause – a thing that occurs quite commonly even with the learned doctors because the subjects [patients] neither know how nor are able to say what they feel and necessarily this knowledge is more lacking in the Indians because of their scanty reasoning and total ignorance of medicine. [They] attribute the sickness to some superstitious cause and… immediately consult a tecitl who almost always answers that the child lacks… a tonalli or it has left him. [Ruiz de Alarcon 1982]

Much like the cure for stomachache that I described in detail above, the cure Ruiz de Alarcon calls "Reconciling," depends on a prolonged declaration or incantation spoken by the *tecitl* to the soul of the patient which would cause the soul to return to the patient. Generally speaking, Reconciling can be seen as a cure for the "loss of the soul" and therefore also an attempt to restore balance within the patient. The incantation itself requires further analysis. The words run:

> "I have come to put here the white conjured one and the yellow conjured one [water and a medicinal plant called piciete]. I come to set up the Yellow priest and the White Priest [again the piciete and water]… Adverse fate, dark star, I will deposit you in the sea… Green sickness, leave here for anywhere and consume yourself in any way you like. And you, [water] you are to purify him, and you

[3] Galen was an ancient Greek physician whose teachings lay at the base of all Western medical knowledge at the time of contact. Galen's approach centered on controlling "hot" red blood "cold" white phlegm "wet" yellow bile and "dry" black bile in his patients.

> [the lost soul] who has walked like an outcast through the mountain ranges and the plains, I miss you! I want you! […] Come, tonalli, it was on a whole mountain, on the whole plain where you used to live, [a healthy body] I am asking you here, O Tonalli And you, tobacco beware of bringing shame on yourself, do your duty properly. [Ruiz de Alarcon 1982]

Having recited this incantation, the specialist utters another in which she summons the fire to warm the sick child, so that the child might become well again. A closer inspection of the lines suggests a number of similarities between this incantation and the one examined earlier, which was supposed to cure the stomachache. Once again, the curer asserts a position of authority over the "conjured ones," which are her medicines. Then, she once again identifies the sickness by color. Like the stomachache, this sickness happens to be green. Because it is a green sickness, the curer once again applies tobacco (a green cure) to it, as well as the yellow cure of *peciete* and the clear cure of water. The speaker also refers to the body of the sick patient as "the whole mountain and the whole plain," which corroborates the claim that the Aztec medical system saw the body as a system in which health meant balance. Furthermore, the fact that the medicine woman subsequently summons fire to warm the sick patient falls in line with the connection made earlier to the Galenic tradition. The *tonalli* is a part of the soul which comes from the Sun and also the only part of the Aztec soul that may leave the body. Having the fire warm the sick child after the soul has "returned" to them after the completion of the ritual suggests that the curer considered it imperative to restore the heat to the body that would have been lost while the "hot" *tonalli* was absent from the body.

Having analyzed a number of pieces of evidence independently, it is now possible to draw them together to synthesize an explanatory model of disease that could account for the cultural tradition of the Aztec. Above all, for the Aztecs, a disease was an imbalance of some sort. Any curative measure was primarily an attempt to right the balance within a patient's body. The person of the *tecitl*, or medical professional, served as an intermediary between the forces of imbalance and the sick patient. This professional was seen to possess the power to command and influence the process of the patient's recovery with the help of implements and herbal cures that were often personified. The remedies and the sicknesses had attributes which would help the professional tell them apart, the most important of which was color. The color of the remedy was often tied to the perceived color of the illness. Certain illnesses carried symptoms that brought with them an imbalance of the forces of hot and cold, wet and dry. These inequalities were usually righted with the help of the "hot" or "cold" element found in nature. This explains the use of the fire and water in healing rituals described in Ruiz de Alarcon's treatise. The illness was seen as a personified agent and so was the person in charge of the curing ritual. This explains the "idiotic reliance on incantation" Ruiz de Alarcon was quick to condemn. The incantation seems to have been less a "spell," as it was perceived by the Spanish observer, but rather an address and dialogue with the illness and the medicines that were at work in the patient's body.

While this model is necessarily incomplete given its reliance on limited and inherently biased period source material, it is nonetheless extremely useful for a number of reasons. Firstly, it counteracts the tendency noted in the modern field of medical anthropology to apply a one-size-fits-all model to ethnic responses to disease. Secondly, it is a model that is based not on quantitative data, but on qualitative, empirical accounts. Such an approach has not yet been attempted given the present preoccupation with establishing the number of dead souls and how and why they died in modern analyses of the source material. The application of an explanatory model like the one I have attempted to construct poses the question in a new way, namely "why did the indigenous population think they died?" In an attempt to see past the accusations of idolatry, superstition, or prophesy, all of which were cited in the Spanish accounts of the conquest of Tenochtitlan and the subsequent epidemics[4], an explanatory model approach allows for a scientific explanation of the death of so many and explains why the measures that were taken to cure the ill, which the chroniclers denounce as Pagan and unscientific, were taken. Granted, this explanatory model is largely theoretical and based within a non-western medical epistemological system, but it is at the same time compatible with the period accounts which survive and allows for a new vantage point from which to survey history.

Conclusion

I began the present work with the intention of presenting a novel method to counteract the trends in modern scholarship surrounding the study of indigenous Aztec medical practice. I have attempted to make clear the trend in modern historiography, which has had a tendency to preoccupy itself with discovering the exact number of indigenous peoples who died in the Basin of Mexico as a result of the introduction of European diseases. This paper has been an attempt to break with that tradition. Throughout this work I have argued for constructing an explanatory model with which to approach the study of Aztec curing practices. Such a qualitative analysis has yielded fruitful results. Firstly, it has made obvious the fact that contrary to the belief of many of their Spanish contemporaries, the Aztec curative forms were not "superstitions" and were in no way irrational for their time. Through my analysis of documents like Ruiz de Alarcon's *Treatise on the Heathen Superstitions* and the Aztec curative formulas it preserved, I have been able to effectively draw out some basic principles and rational basis for cures that the author of the treatise condemned as devilry.

This brings me to consider the question of the historical sources themselves. Many of the accounts of deaths that occurred during the early contact period come to us in the form of approximations, not figures. Thus sources like Sahagun's *General History of the Things of New Spain* while indispensable when considering other aspects of the Aztecs' daily life like religious or calendric rituals, it is not very helpful to scholars attempting to discover how many died

[4] For a closer discussion of the "omens" connected with the downfall of the Aztec empire and of Tenochtitlan specifically it is helpful to refer to Miguel de Leon-Portilla's "Broken Spears" which presents a cohesive account of the siege and surrender of Tenochtitlan drawing from period sources.

during the contact period. Through the findings I have gathered in this paper, I have attempted to rephrase the basic question. The sources cannot tell us how many died, perhaps the exact figure will never be known, but the exact figure whether it is 500 thousand or 50 million will not change the fact that what happened in the New World in the years following arrival of the Spanish conquistadors was a tragedy. On the basis of the research I have presented, it is possible to begin to understand and answer the question of how the Aztec population conceptualized disease in the first place. The provisional explanatory model that I have constructed allows for at least a modicum of insight into this issue.

My research has also shown that while it is possible to extract and construct a model of disease conceptualization from historical sources, such a venture would necessarily be incomplete. Unlike modern medical anthropologists, I have not been interested in the biomedical soundness of the model that I constructed; rather I am interested in the model as an epistemological tool of the culture that created it. The result is a work that is almost purely theoretical. However, the model I constructed throughout this paper has opened a number of possibilities that can be undertaken in future research. Modern *curanderos*, who inherited part of the medical knowledge of the Aztec *tecitl*, still have a large presence in Mesoamerica. Therefore, what the historical period sources have been unable to tell us about curing certain specific ailments using indigenous methods could be gathered by studying the practices of these modern specialists and then applying the Aztec model as a sort of ethnographic analogy. Another possibility would be to apply the present model to the study of subsequent colonial period outbreaks of European diseases in New Spain. Taking such an approach would not only shed light on the perception of the epidemics of the past, but also help to expand the model itself.

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Lifting the Veil: Identity, Religiosity and Change in Contemporary Christian Weddings in Lahore

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Abstract: The expression of religiosity in the Christian community of Pakistan is reflected through distinct cultural practices that are influenced by a narrative of persecution and marginalization. This paper based on original ethnographic research uses the framework of intersectionality to develop an understanding of the process of conflict and reconciliation rooted in different forms through which people of this community experience religiosity through wedding rituals. The questions that this paper aims to address include: how are rituals experienced and how do local perceptions and beliefs link to experiences of persecution? What, if anything, is a 'Christian' identity and how is it collectively negotiated with respect to experiences of persecution? How do wedding spaces become grounds of conflict and reconciliation of identity?

Introduction

Marriage is a key aspect of the study of human kinship and examining the interplay of local or transnational politics and socioeconomic background in constructing a religious identity for a minority group and its manifestation through wedding rites is an aspect of the Christian community of Lahore, Pakistan that I chose to study in the spring of 2014 when I conducted research among five Christian families of Forman College *Kachi Abadi* with colleagues Hadiqa Khan and Saniya M. Ali[5]. In this ethnographic piece, I relay my findings from the time I spent in the field and analyze these in the light of an intersectionalist framework in order to develop an understanding of the process of conflict and reconciliation rooted in different forms through which people of this community experience wedding rituals, otherwise having multiple meanings and histories, as an expression of religiosity in a sociopolitical context of marginalization (even persecution), while they are in the process of renegotiating their religious identity as more than a marker of them constituting a 'minority group'. For this, I present the experiences of the people I interviewed and their perceptions regarding the changes and developments occurring in wedding rituals. I argue that this narrative of change is very much reflective of the relationship between religion and the local understanding (i.e. multiple meanings) of the rituals and how it is shaped by factors like social background, education, class and exposure to print and electronic media.

[5] The research project was a collaborative effort under the supervision of Dr. Sadaf Ahmad, Associate Professor at Humanities and Social Sciences department of Lahore University of Management Sciences (LUMS), Pakistan. This ethnography shares the valuable insights of the co-researchers and the supervisor because of their significant contributions to the research process,

An intersectionalist theoretical framework helps us grasp how religious spaces in weddings are representative of the multiplicity and possible reconciliation of conflicting identities and multiple aspects of the same identity. The aim of this paper is not to study syncretism in wedding rituals but to move beyond that to study rituals interpretatively.

Pakistani Christian community has been in the spotlight in recent years; however, a review of the literature tells that this focus mostly comprises of journalists and political commentators writing excessively on the persecution of Christian community. Pervez Hoodbhoy is one such commentator who writes about how Christians face an even "tougher time" in light of the Taliban insurgency (Hoodbhoy 2014). Voices from the Christian community are visible in the form of protest demonstrations that often dominate the media scene and through members of the community writing about the "plight of Christians in Pakistan", as Bishop Dr. Ijaz Masih puts it (Bishop Masih 2014). The literature about Pakistani Christian community is ripe with narratives of Christians being oppressed by the state as well as the Sunni-Muslim majority in Pakistan. An essentialist understanding of a 'Christian' overshadows the other aspects of what it means to be Christian in Pakistan, resulting in a lack of literature about the lives and experiences of a highly diverse community that has members who have vastly different lifestyles and circumstances that need to be understood in their respective socioeconomic and cultural contexts. While the literature on Christian weddings regarding spiritual significance of wedding rituals written by local pastors is relevant, the lack of sociological literature poses problems for anthropologists who wish to understand lived realities of Christians in Pakistan and the dynamics of their religious spaces. This paper aims to fill this gap by presenting the experiences of Christian families of Lahore interviewed about wedding rituals in their community in order to understand how they perceive the changes that are occurring in the rituals in light of local politics and conflict.

After a brief account of research process, a background of Pakistani Christian community and political developments occurring in past decades is presented to locate the research in a historical context, followed by the significance of choosing to study Christian weddings in Lahore. In the second section of the paper, rituals conducted in religious spaces during weddings are analyzed with respect to how these are often representative of social conflict and reconciliation that surrounds people's lives.

A note on Research Methodology:

This ethnographic piece is based on research spanning over three-four months (January-April 2014) conducted among five Christian families, four of which were from Forman College *Kachi Abadi* and one from Shahjamal Bandaly, Lahore. FC *Kachi Abadi* is a residential colony occupied by the worker class whose most residents are Christian. The bleak condition of the colony can be observed through its narrow, littered streets with open gutters, and multiple storied houses in cramped streets blocking sunlight. The houses were significantly small in size and rooms were cramped with furniture of all sorts. Shahjamal Bandaly is similar to FC *Kachi Abadi*, but the area is on the outskirts of an elite Muslim residential housing scheme. At the time of

study, a wired fence divided the Shahjamal Bandalay colony from other affluent houses. Our gatekeeper, Khala Samina[6], a Christian woman in her 40s who works as a maid for a Muslim family, lived in FC *Kachi Abadi*. The research process consisted of in-depth, semi-structured interviews of around 16-20 people and participant observation at three weddings. Owing to the limitations imposed by the brief tenure of the research (during Lent period), less frequent participant observation in weddings was supplemented through wedding videos of the respondents and of their relatives. Non-probability and judgment sampling techniques were used for selection of sample population.

Choosing to study weddings as texts was an important choice for this research because these "texts" are representative of how a religious identity is renegotiated in a space that is not 'exclusively religious' in relation to the many factors in the equation at the same time that define what it means to be Christian in such spaces.

Construction of a Christian Identity

Christians constitute only 1.6 percent of the Pakistani population (Country Profile: Pakistan, 2006); hence they have been given the official status of a religious minority by the Pakistani government. There is an extensive history of Christian presence in the South Asia, which some Christians trace as far back as to the time of Apostles and Saint Thomas who settled in India for propagation of Christ's message. This is an understanding commonly shared by the Christian clergy in FC *Kachi Abadi*. However, there is considerable diversity of Christian denominations and associated churches even within that community. Walbridge gives a more nuanced historical account of how "the early nineteenth century saw a new wave of religious fervor take hold both in Britain and United States. Missionaries were eager for the opportunity to 'save the heathens'" (Walbridge 2003, 8). Denomination holds importance for the people. Akbar Masih, 70, almost scandalized his son when he talked about alcohol consumption during weddings in his youth, to which his son immediately responded that they are Catholics and other denominations do "this kind of stuff".

The Christian presence in Pakistan has not been entirely smooth. On May 6, 1998 Bishop John Joseph, the first Punjabi Roman Catholic priest and bishop shot himself to death in front of Sahiwal Session Court as a protest to blasphemy laws – a major source of conflict for the community (Owen-Bennet, 1998). In a post 9/11 context, writes Sabir Shah in *The News*, and with the rise of Taliban insurgency the Christian communities in various parts of the country were attacked on repeated occasions[7], the worst of which include the Peshawar Church attack in September 2013 in which 78 people were killed and over a 100 injured (Shah 2013) and the arson of at least 100 houses in Joseph Colony in Badami Bagh by an angry mob on accusations of blasphemy in March 2013. It is the same infamous blasphemy laws that resulted in conviction of Asia Bibi in 2011, and assassination of Shahbaz Bhatti, Minister of Minorities Affairs and Salman Taseer, Governor Punjab in 2011. *The News* reported in August 2009 that some Christian

[6] All names have been changed in this ethnography to preserve anonymity.

[7] A brief list of major attacks on the Christian community in Pakistan can be viewed at (Jalil 2015).

families in Islamabad out of fear of persecution moved to a forest and started living in camps and set up a church within that forest (AP_News Report 2012). A report compiled by Movement for Solidarity and Peace said around 1000 women are forcibly converted for marriage every year in Pakistan, and up to 700 of these women are Christian (Iqbal 2014).

Commonly referred to as *chuhra*, Christians are considered second-class citizens in Pakistan, who are reduced to menial low-paying jobs. Muslims are forbidden to eat from the same utensils as those of a Christian. This ritual purity is related to the South Asian caste system. The Punjabi *chuhra* caste is the extension of the *Bhangi* (sweeper/scavenger) that occupy the lowest rung in the society (Sharma 1995, 51) and are therefore untouchables (Pruthi 2004, 164; Shyamlal 1992, 11). Moreover, the early Pentecostal converts in South Asia were associated with the *dalit* caste (Phan 2011, 24) and many of these converts were *chuhra* and were described as "smelly, small and dark" (Walbridge 2003, 16, 18). Hence, janitorial work has been traditionally associated with the Christian community of Punjab for a long time (Walbridge 2003, 19). The people living in FC *Kachi Abadi* are mostly unemployed or working on low-paying jobs like janitors, gardeners, drivers etc. and most of them are not educated. It is in this context of 'persecution' and discrimination that Christian families discussed in this paper need to be located. It would be incorrect to deduce that all Christians in Pakistan face such circumstances and that the families of FC *Kachi Abadi* and Shahjamal Bandalay categorically see themselves as victims of persecution by the state and Muslims. It is nonetheless important to understand that this history of persecution is very much connected to people's religious identities and experiences and this paper documents instances of when it is reflected in wedding rituals.

The journalists and commentators pick up on only one aspect of the religious identity of Christians for political purposes, which leads to construction of an essentialist notion of what it means to be Christian in Pakistan. This pervasive narrative of persecution is playing an active role in shaping a specific discourse about Christian community that is influencing the local politics and state policies[8]. This paper serves to deconstruct this particular identity and highlight the complexities of it – thus discouraging an essentialist understanding of Christian persecution. A Christian religious identity is not isolated and monolithic, nor is Christian persecution. It is grounded in the surrounding social, economic, political hierarchies and cannot be divorced from class, caste, gender, education, and other factors like exposure to media. One ought to understand identity as a spectrum in order to conceptualize that it is fluid and it continuously interacts with other identities (or aspects of other identities) to give new meaning to itself, the other identities associated with it and the activities stemming from them, which in this case, are wedding rituals.

[8] The blasphemy laws passed in Zia-regime in 1980s, for instance, have been a topic of intense debate in political and legal spheres and the 'persecution narrative' has played an active role in constructing an essentialist image of Christians as the 'persecuted victims' in Pakistan. See (AFP_News Report 2014)

Theoretical Framework

The theoretical model of intersectionality applied in this paper is very similar to the way feminists have traditionally used the concept. However, Martin Sokefeld's ethnography about Shia-Sunni conflict in Gilgit-Baltistan in terms of local politics (Sokefeld 2010) is quite similar to the understanding of intersectionality of identities that I present in this article.[9] Furthermore, *Bricolage*, proposed by Levi-Strauss, is "generally understood as the bringing together of previously used signs into new (and unexpected) combinations" (Levi-Strauss qtd. In Leeds-Hurwitz 2002, 180). This paper combines Wendy Leeds-Hurwitz's treatment of weddings as texts with an intersectionalist framework to capture the complexity of wedding rituals.

Christian Weddings

What exactly are Christian weddings like? They mean different things for different people and they experience them differently. However, a general sentiment shared by all respondents was that of associating weddings with happiness. Jameela calls the rituals '*choti choti khushiyan*' (little events of shared happiness) but many other meanings are associated with the rituals.

The timeline of wedding rituals: Before the wedding commences, there are rituals that have specific cultural significance. The *May'on* ceremony, a segregation ritual, is held for 8 days ideally and the bride and groom are forbidden to see each other while the bride is secluded and restricted to specific a room in house. The women of the house apply *ubtan*[10] on her skin, and feed her *misri*[11]. The ritual is followed by *tael* ceremony in which women apply oil on hair of the bride (similar ritual happens with the groom) and also give *salami*[12]. The *ubtan* is followed by *dua* held mostly in Church, which is a religious activity meant to bless the wedding and the couple. The pastor presides over this ceremony and specific verses of Bible are recited.

The wedding itself lasts for three days. The first day is *Mehndi* in which the family of the groom goes to the bride's house (and vice versa) to apply the *henna*[13] as a symbolic gesture to highlight communal bonds. The bride wears yellow or green and sits while people apply *henna* (*mehndi)* on her palms and give *salami* and feed her sweets. The second day is *Baraat* and *Nikah*[14] which is the primary event. At the groom's house *Sahra-banai* (dressing of the groom in the traditional headdress) takes place followed by '*Khaeriyan khaelna*'[15] after which the *baraat* (wedding procession) leaves for the bride's home. At the bride's home, she is prepared for the wedding and dressed in a white 'wreath veil', which is a recent tradition in this particular

[9] Also see (Killoran 1998) and (Peteet 1997).

[10] *Ubtan* is a mixture of turmeric powder and sandalwood.

[11] Local form of sweet.

[12] Money sacrificed and given to the poor as a symbolic ritual to please God and bless the couple

[13] Extract from *henna* plant

[14] The term *Nikah* is also used by Muslims. Hindus use *vivaah*.

[15] In this ritual several clay pots are stacked over each other and the groom is supposed to jump over them and break them at the same time. Women I interviewed associate this with expression of masculinity as opposed to wedding rituals like *ubtan* that emphasize the femininity of the bride.

community that started in the late 1980s[16]. When the *baraat* arrives, the ritual of *milni* occurs in which the male members of the family exchange gifts. This gift exchange forms a crucial aspect of the Punjabi gift economy (Alvi 2010, 19-32). The mother of the bride is supposed to take off the *sahra* of the groom and see his face. At this time, she blesses the groom and it is also meant to represent her approval of the marriage, as Parveen explains. All subsequent rituals take place at the Church. The bride and groom sit next to each other and all the relatives settle on the ground. The pastor gives a sermon which combines specific Biblical verses with religious narratives meant to highlight the importance of marriage. They then proceed to sing certain wedding carols (also a recent tradition). The bride is accompanied by her brides-maid and flower girls while the groom is accompanied by a group of bachelor men. *Nikah* ceremony takes place next in which the pastor gives a small speech to both the bride and groom and then asks them if they accept each other as life partners. The bond is sealed with rings and the pastor's blessings. This is the climax of the wedding and holds spiritual importance for people, many of whom see it as a religious act – Yousaf said, this is like sanctifying the marriage between two souls in the presence of God. Father Iftikhar related it to the union of Adam and Eve and said that marriages are approved by God in heaven but celebrated on Earth. The religious space (church) plays a crucial part in assigning a sacred character to the ritual (and vice versa). After the *Nikah* ceremony, wedding carols and celebrations continue – in the form of traditional *bhangra* and fireworks at the house of the bride. Little customs like *jota churai* and *dodh-pilai*[17] are also particularly enjoyed. The bride dresses in red for *rukhsati* and throws rice back at her relatives while moving out of the house. The senior-most male member of the house holds a Bible over her head for protection and blessing. When the bride reaches the home of the groom, the sister in-law 'lifts' her to the door of the house. Here *daleej-pharai* takes place in which the groom gives certain amount of money to his sisters-in-law, which also symbolizes a gift exchange system reflected in wedding rituals. The mother of the groom welcomes the bride into the new house and sanctifies the union by ritual of *dodh-warna*. Khala Samina explains that this is meant to ward off evil spirits ("*buri nazar*") and Shameem adds that it is also meant to give blessing to the couple. Little customs like *'gana-kholna', 'ring dhoondna', 'mun dikhai'* and *'chawal khaelna'* follow.[18]

[16] Initially the bride and groom were made to wear red, that was believed to be sacred and representing fertility.

[17] Stealing the shoes of the groom in return for money and making the bride and groom drink milk from the same pot

[18] *Gana-kholna*: the traditional yellow thread tied on the bride's arm for protection and blessing during *ubtan* is taken off. This symbolizes her patrilocal relocation that is the start of a new life.
Ring dhoondna: a custom in which the bride and groom try to find a ring from a bowl of milked water. It is believed that whoever finds the ring first will hold sway in the marriage.
Mun dikhai: a mirror is placed on the lap of bride and groom and they see each other's faces for the first time. This is considered a very blessed moment.
Chawal Khaelna: is a sort of fertility ritual in which the bride sits and each married female member of the family pours rice in the bride's lap and they exchange it seven times among themselves. Shameem says it is meant to welcome the bride to the house and pray for a healthy progeny.

The last post-wedding ritual is '*maklawa*' in which the bride is taken back to her home for 3-4 days after which she permanently settles in her husband's home.

Multiplicity of meanings and conflict: While interviewing the people, the issue of the meaning attached to rituals came up. Most of the people considered majority of customs Hindu rituals, but they said they follow these because their ancestors did so. The association with ancestors transforms them into obligatory traditions. The understanding that these are Hindu rituals is very recent and is mostly promoted by pastors who encourage a 'purity', which can be interpreted as an effort to ground rituals in a 'purely Christian' identity. Yousaf while talking about a priest draws a parallel with Muslim *wahabism* here. Akbar Masih who is in his 70s tells that in his time when Hindu, Muslim and Christians used to live together in his village, there was no divide between which ritual is Christian, Muslim or Hindu – weddings were just weddings. This conflict was often very obvious in our research process, for instance, Jameela, who is an orthodox Christian talks about how nobody follows *Kalaam* (Bible) anymore and the signs of apocalypse are showing. When asked why she and her family follow certain wedding customs when they don't have a basis in Bible, she voiced her frustration by scolding us and asking us to "stop bringing Bible in everything". Later she said, she thinks these customs are traditional '*choti choti khushiyan'* that people have to follow. When interviewing Yousaf Masih, I asked him about how Christians reconcile their concept of marriage with the fact that 'Hazrat Issa' never married. Yousaf gave a very measured response and explained how it is not Issa for them but *khuda-wand-yasu-masih* (Lord and Savior) and that it does not make sense to ask why God did not marry. For other people, the reconciliation comes in the form of reinterpreting Bible to ground meaning of rituals in the text, for instance, Yousaf's understanding of *salami* (which has no direct reference in Bible) is by relating it to the charity of Christ. This is a very simple illustration of a conflict between being educated, being a follower of Bible, and being a follower of traditions. For many people the conflict is further complicated through factors like class, power, gender, occupation and exposure to media.

Rituals in Religious Spaces in Weddings and Conflict:

The experience of being a Christian means so many different things to different people and is often defined by intersection of different factors like class, caste, media, gender and politics. For Christians, conflict in their religious identity is represented in the form of resistance between the part of identity that is based in the 'narrative of persecution', and the effort to renegotiate their religious identity as more than a marker of them being the persecuted victim of the minority group. What follows is an account of three specific wedding rituals to trace how Christian persecution in Pakistan adopts new meaning in terms of internal conflict of people when they are in such a space where Christianity is defined in multiple and sometimes contradictory ways (read: intersection of identities).

The White Dress:

Akbar Masih told us that in his village the bride used to wear a red dress for the wedding. The red dress was replaced by the white wreath veil in 1980s for this group of families. John tells that the wreath veil was borrowed from the British and the foreign missionaries and this existed in many elite families and the lower economic classes did not adopt it until the late 1980s. A very similar understanding is shared by all the members of the families I interviewed for whom the wreath veil is a tradition that should be followed. The wreath veil is rented by the families and not bought because it is still not affordable by most families. Why do they bother with it then? One oft-told reason had to do with it being considered 'fashionable' which is how economic class comes into play in the wedding rituals. There is a shared understanding that wreath veil is worn by 'rich people' and by that virtue it becomes fashionable. This is further supplemented by exposure to media. Nearly all of the respondents thought that the rituals are changing and especially the white dress, bride-maids and flower-girls have been adopted because of increased exposure to foreign movies. So, the dynamics in multiplicity of meanings here are that: (a) wreath veil is associated with foreign Christian traditions (stories/movies), (b) the wreath veil is considered fashionable, and (c) being fashionable is associated with the upper classes as well as the foreign people and there is a pressure to move up the social ladder and 'become rich' (or as John puts it "who doesn't want to be financially stable in such troubled times?"). So, wreath veil becomes a marker of them being fashionable which is meant to represent their financial stability in addition to marking them as different from local Muslims and Hindus through association with foreign Christian traditions. John's wife, Samia, who was recently married, said she wore the veil because "everyone wears it". So the new generation associates a meaning of traditional importance with rituals to certify cultural codes of obedience.

This becomes further complicated when wearing of the wreath veil is given a religious connotation in the wedding spaces. Father Shahbaz, Shameem and Parveen defined the wreath veil in terms of being 'Christian'. They explained that wearing a white dress differentiates them from Muslims and Hindus and marks it as something that is purely 'Christian' in nature. Here the meaning associated with the ritual was in terms of difference from Muslims and a functionalist approach would be that the religious identity manifested through this ritual relates to the dominant 'persecution narrative' i.e. in a context of persecution, wearing the veil marks one as exclusively Christian because it differentiates them from the Muslims and also marks them as the member of the community that is being persecuted by Muslims. What Amritya Sen said is relevant in this context, that "the sense of one's identity creates a sense of exclusion from mainstream and in many cases carries with it the perception of distance and divergence from other groups" (Sen 2006, 2).

However, this functionalist understanding fails to capture the complexity of what it means to be Christian through the veil. While it could be argued that wearing the veil highlights the part of religious identity that is being persecuted, yet in that particular religious space the woman wearing the wreath veil associates a multiplicity of religious meanings with the veil i.e. the experience of wearing a veil translates into being a Christian but being part of a persecuted

minority is not the only way the religiosity of veil is experienced. This multiplicity in the religiosity of veil makes the experience of this activity in a religious space into something more than being a member of a persecuted community.

The white color of wreath veil is seen to represent purity and is associated with a specific verse of Bible that is interpreted as prescribing the veil because of its purity. The veil is also associated with the Virgin as expressive of her purity. This is a very different form of experiencing the religiosity of veil and it intersects with other factors as well. Khala Samina attributes this partly to the rise of education, that, because Christians have become more literate and are able to read Bible, they can see that "wreath veil is in Bible". For Samia and Lubna, who avidly follow fashion trends, the religiosity of the purity of veil intersects with how it represents "Christian fashion" like "the *abaya* is Muslim fashion". These are different ways in which they reconcile conflicting meanings/identities resulting from their social context and individual experiences. So, Father Shahbaz's opinion that they follow "Asian culture in weddings" and that religious differences are secondary, can be translated into how he sees things differentiating them from Muslims (e.g. veil) primarily as reflective of an identity that associates religiosity of a ritual with Bible rather than an identity that marks them as a member of a persecuted minority group.

The religiosity of veil needs to be seen through an intersectionalist lens to understand that a Christian woman wearing the wreath veil experiences it in multiple ways (e.g. fashion, tradition, class, religion) and in this framework when the experience of persecution is highlighted through religiosity, it is simultaneously acted upon by other identities and aspects of other identities – which leads to association of new understandings with the same ritual through which that ritual can be experienced in a different form and can lead to reconciliation of conflict between identities. In this way, what it means to be Christian is defined in a religious space that highlights the persecution narrative as well as the effort of Christians to renegotiate their religious identity as more than a marker of them being from a 'minority group' – which comes as a critique of functionalist reductionism.

The Pastor:

Another very similar example is that of the role of Pastor in weddings. Many people agreed that the role of pastor has increased in Christian weddings especially since the late '90s. This coincides with the Church gaining central importance in wedding rituals. The authority of the Pastor is reflected through his engagement with people not only as a spiritual guide, but also as an officiator of marriage on behalf of God and the state. The pastor sings certain wedding hymns and people repeat after him. The increased role of pastors was observed generally in life.

The four major functions of the pastor which construct a ritual in a religious space in the wedding are: (a) the act of giving blessing, (b) engagement with Bible, (c) the officiating of marriage on behalf the Church and the state, and (d) the *dua* ceremony. One can argue that in these ritual performances, the religiosity experienced can have a direct link with the persecution narrative, especially in terms of how people engage with the pastor. For example, the *dua*

ceremony that takes place before marriage includes even direct references to how the community is facing difficult times and the pastor's *dua* is a source of luck for the couple.

A functionalist understanding would attribute the increased role of the pastor in Christian lives to the recent political climate and environment of persecution. Bijukumar develops a similar understanding in a context of ethnic violence, asserting that "exclusion [marginalization, persecution] is linked to the recognition of social identities, resource allocations and power relations. In most cases, both subjective consciousness and actual inequalities lead to assertions of one's identity [sic] and extremist activities" (Bijukumar 2014, 19). If one is to apply a similar framework to understand the increased role of pastor in the weddings, then religiosity associated with pastor's presence highlights one's identity as a member of persecuted group. A Durkheimian functionalism would suggest that the pastor is a source of social solidarity for the community that is highly marginalized. Matthew Engelke talks about how authority figures in their specific way of engagement with the text help construct an identity for the people (Engelke, 2004, 76-81). If people locate the presence of pastor in context of persecution then ritual acts as a way of reaffirming that identity.

However, there are multiple ways in which the pastor engages with the community and there is a multiplicity of meanings associated with the pastor and people's engagement with him. For instance, in relation to the link between the community dealing with persecution and religious activities under the pastor, Parveen and Shameem said that whenever any such incident takes place in which the community is attacked, they do feel persecuted but when they do a *dua* ceremony under such circumstances (in a wedding or otherwise), they not only pray for their Christian brothers and sisters but also for Muslim victims. The *dua* is for the betterment of Pakistani citizens, the ritual thus consists of an anti-Taliban narrative combined with a nationalistic sentiment overcoming a religious narrative. Father Shahbaz's saying that "humanism is the primary religion of everyone" is reflective of how a humanistic and nationalistic discourse is usually adopted completely or is incorporated into the *dua* in relation to any incident of persecution. So while religiosity in this case represents a part of identity that comes from a persecution narrative, it is also accompanied by other equally strong sentiments/discourses that offer new ways to experience the religiosity of *dua*.

The Bible:

Engagement with the text works in an intriguing way among the Christians of Lahore. I have discussed above in the case of the White Dress, how the text works as a way to reconcile conflicting ends of an identity. But in many cases the meaning associated with the Bible has to do with establishing a difference with Muslims. Father Shahbaz's authority as a pastor (who is educated) enables him to engage with the Bible in a specific way. In order to describe what makes a wedding 'Christian' he drew statements of difference by pointing out what is 'Muslim' about the South Asian wedding, for instance, polygamy, *pardah* and *haq-mahar*. He laughed at the idea that the bride and groom say "*qabool hay*" (I do) to the *maulvi* and not to each other. Borrowing an understanding from the Bible, he makes the point that in a "Christian wedding",

bride and groom must not be segregated because the whole idea is for them to accept each other as life partners. So, according to Father Shahbaz and others, the pastors allow the bride and groom to see each other in the eye to take an informed consent, thus establishing a spiritual connection. The pastor's speech during the *nikah* and Biblical references to 'Christian' nature of weddings in it are also meant to establish difference from Muslims, which feeds into the functionalist explanation of a 'persecuted religious identity' defining ritual and meaning.

The complex multiplicity of meanings behind the particular ritual of the bride and groom facing each other and that of pastor's 'Biblical speech' do not need an explanation. What is important here is how an intersection of meanings and identities shapes how Christians experience religiosity associated with the Bible in a way that is not entirely based in a persecuted religious identity. One excellent example of such a ritual is how the spiritual notion of *barkat* extends in space and allows people to experience the religiosity of the Bible in an alternative way. When the bride is about to leave the house, the senior most male member of the house holds a Bible over her head for protection. This particular activity uses the Bible to construct a sacred space where the function of the Bible is far away from its use as textual authority. This activity is something that is followed in the exact same manner by the Muslims in their marriages through the use of Quran. So, the gap that is created by the scriptural difference in carving out different religious identities for Christians and Muslims is overcome and filled by the concept of *barkat* which as an institutionalized ritual regulates the use of scriptures as a sacred item to gain blessing. This can be seen as a way of engaging with the text that does not highlight a religiosity that is based in 'the persecution narrative' and experiencing the Bible in this way defines anew what it means to be Christian in terms of mediating the latter's relationship with Muslims.
The intersection of one's educational identity complicates this further. The fact that people are uneducated and they can't engage with the Bible textually, so they find a way to engage with the Bible spiritually and ritually through *barkat*, is reflective of how they find a new way of associating a religious experience with the Bible that goes beyond the idea of persecution.

Conclusion

I have presented a detailed interpretative account of Christian families in FC *Kachi Abadi* and Shahjamal Bandalay to explain how the religious spaces in weddings are often synonymous to conflict zones, where different identities and aspects of identities interact with each other simultaneously and affect each other. One such conflict that I observed through three specific religious rituals: the White Dress, engagement with the Pastor and engagement with the Bible, is how being a member of a religiously persecuted community and a simultaneous renegotiation of religions identity that shapes their religiosity. Through this I argued that there are multiple ways in which members of Christian community experience religiosity through rituals in religious spaces in weddings and many times a conflict is created when being the member of a persecuted community shapes religiosity while one tries to experience religiosity of that ritual in a way that does not restrict one's religious identity to a narrative of persecution. Religiosity is thus experienced through continual reconciliation of this conflict in religious spaces in the weddings.

The particular intersectionalist analytic framework was meant to criticize a functionalist and reductionist understanding of the lived realities of people's lives. It also comes as a critique of an essentialist understanding of what it means to be Christian in Pakistan and the hollow caricature of persecution that is constructed in media. The intersection of identities at all times and processes of conflict and reconciliation shape other identities and this in turn molds the Christian experience of persecution at different levels which is not monolithic but is intricate and heterogeneous.

Appendix

Figure 1: The 2013 mob attack on Joseph Colony, Badami Bagh, Lahore (Source)

Figure 2: A view of the FC Kachi Abadi locality

Figure 3: Noreen on her wedding day in a traditional white dress

Figure 4: The Nikah Ceremony

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The Effects of Household Corrosive Chemicals on Pig Bone and Human Tissue

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Abstract: One of the most important goals in forensic anthropology is to provide skeletal analyses that lead to a positive identification of a victim. This can be challenging because attempts to hide the identity of a victim are frequent and diverse. One way to hide a victim's identity is to use easily obtainable household chemicals to disfigure or dissolve the body. The objective of this research was to study the effects of everyday household corrosive chemicals on pig bones, human hair, and human nails. The study consisted of two experiments. The first included recording the effects of the chemicals on the bones, hair, and nails for an extended period of time. The second experiment tested the same chemicals on burned, frozen, and chopped pig bone segments. It was hypothesized that the altered bones would dissolve and change faster than the unaltered bones. The most destructive chemical tested was the Pequa Drain Cleaner®, which contains potassium hydroxide. The altered bones dissolved or changed appearance at a faster rate than the unaltered bones. These results will add to our databank of knowledge about the effects corrosive chemicals have on the body.

Introduction

There are a variety of ways to hinder a body's identification. Criminals have been known to alter or hide the identity of a victim through dismemberment (i.e., the removal of body parts) in an attempt to thwart the identification process (Hartnett et al. 2011). Mutilation of the body is also a very common method that has been recognized and documented since ancient times. Examples date back to the days of the Roman Empire when mutilation was practiced by Octavius Caesar Augustus, who was known to execute large numbers of the enemy and offer them as sacrifices (Rajs et al. 1997).

In the past few decades there has been considerable research on the patterns and motives behind body mutilation cases. One motive studied was defensive mutilation, which is where the criminal's motive behind the mutilation act is to destroy the body to obstruct any means of identifying the victim (Rajs et al. 1997). Another method is the removal of the fingers, which eliminates the ability to perform fingerprint analysis (Hartnett et al. 2011). Teeth may also be destroyed to prevent dental record identification (Pretty and Sweet 2001). Other common attempts to hide a victim's identity include setting fire to the remains, burying the remains in

hopes of decomposition, or disposal of the remains in a body of water. These methods all attempt to conceal the body from conventional means of identification. A method that has recently garnered more attention is the dissolution of the body in corrosive chemicals. These chemicals are easily obtained and hide the identification of the victim by burning the tissue or dissolving it away. Since methods of positive identification involve both hard and soft tissues, it is important to understand how these chemicals affect all types of altered and unaltered human tissue (Hartnett et al. 2011).

There are several varieties of corrosive household chemicals. Some of the most common are pool chemicals, drain openers, septic tank cleaners, and household cleaners. Many household cleaning products are very harmful to humans, for many of these cleaners and antiseptics have high concentrations of chemicals such as hydrochloric acid or sulfuric acid. These strong acids and bases can cause corrosive injury such as skin burns or harmful eye irritation on living subjects. In a survey, it was found that 38% of household products were corrosive, meaning harmful to the skin or when ingested (Sharif and Ghandour 2010). In recent studies, the effects of these chemicals have been tested on human teeth, bones, hair, and nails. In an experiment by Cope and Dupras (2009), the effects of household corrosive chemicals on human dentition were examined. The authors used four corrosive chemicals: hydrochloric acid, sulfuric acid, phosphoric acid, and sodium hydroxide. Two commercial products were used in each of the four chemical categories. The results of this experiment suggest that hydrochloric acid was the most destructive. Similar results are seen in the study by Hartnett and colleagues (2011). The authors examined the effects of household corrosive chemicals on human teeth, hair, nails, and soft tissue. The chemicals included in their study were hydrochloric acid, sulfuric acid, household lye, bleach, and the soft drink Coca-Cola™. The hydrochloric acid was the most destructive agent, fully consuming all tissue in less than 24 hours. Sulfuric acid was the second most damaging chemical. These results were slightly different from the Cope and Dupras (2009) study where there was only minimal damage to the tooth submerged in sulfuric acid.

With these chemicals being so accessible, some perpetrators are taking advantage of their corrosive effects. This can be seen in both historical instances and in present cases. For example, exhumation, examination, and identification of remains of individuals executed in Komitet Gosudarstvennoy Bezopasnosti (Committee for State Security of the USSR, or KGB) headquarters in Vilnius between 1944–1947 revealed that when some of the victims were executed and disposed of in mass graves, they were also covered with corrosive agents (Jankauskas et al. 2005). In a recent case, the remains of three individuals were found in three separate 50-gallon metal drums in the desert west of Phoenix, Arizona. It was apparent by the condition of the bodies that corrosive agents were used. Two of the three remains were almost completely consumed by a chemical while the third had extensive damage. There were also a large number of safety seals, or seals covering the openings of dangerous agents, found in association with each of the victims. This may be an indication the chemicals used were easily accessible because safety seals are commonly used on corrosive household agents. This case

encouraged expanding upon research regarding corrosive chemicals and decomposition because so few studies have been done in this area (Hartnett et al. 2011).

The objective of this research is to study the effects of everyday household corrosive chemicals on pig bones, human hair, and human nails. It is hypothesized that the corrosive chemicals will dissolve or have some destructive effect on the pig bones, human hair, and human nails. Further, not only will bones, hair, and nails be tested, but alterations to the pig bones in the form of burning, freezing, and chopping will be tested as well. These alterations are hypothesized to cause a faster dissolution time, but this has never been proven or disproven in the field of forensic anthropology.

Materials and Methods

This research consisted of a pilot study and two subsequent experiments testing the effects of corrosive chemicals on bones and human tissue. The common chemical names and their main ingredients (in parentheses) used in all trials are: Acidic Toilet Bowl Cleaner® (hydrochloric acid), Lime-Away® (sulfamic acid), Septic Tank Cleaner® (hydrogen peroxide), Heavy Duty Stripper and Cleaner® (sodium hydroxide and diethylene glycol monobutyl ether), and Pequa Drain Cleaner® (potassium hydroxide). Water was used as the control throughout the experiments. Sixteen-ounce clear jars were used for each experiment and filled with 200mL of each chemical. Between each experiment, the jars were thoroughly cleaned with disinfectant soap and Clorox® bleach. The bones used were pig spareribs purchased at a local supermarket. Excess meat was cleaned off and the bones were cut into two to three inch segments. In this study, instead of using human bone, pig bone was substituted. In regard to bone anatomy, morphology, healing and remodeling, the pig is considered to be closely representative of human bone and therefore a suitable species of choice during scientific experimentation. A pig's bone composition also shows similarities in bone mineral density and bone mineral concentration to human bone (Pearce et al. 2007). The human tissue used consisted of hair and nails. The hair was obtained from a hair salon and the nails were obtained from personal nail clippings.

Pilot study

A pilot study was conducted prior to the research in order to establish a timetable to follow when monitoring the changes of the bones in the chemicals. One bone segment was placed in a jar filled with 200mL of each chemical. The bones were then monitored every 30 minutes for 10 hours and were weighed every 2 hours. This gave a better understanding of the dissolution rates for each chemical and allowed for optimal accuracy in the data collection for the two core experiments.

Experiment #1

Three sets of jars containing 200mL of each chemical (18 total) were used in this experiment. One bone segment was placed into each chemical in the first set of jars. The second set of jars consisted of a small sample of human hair in each chemical. The third set of jars held a small sample of human nail clippings in each chemical. After all materials were placed in the chemicals and the control they were periodically checked every 24 hours on the following schedule: every 30 minutes for 8 hours, and for the remaining 16 hours they were analyzed

every 2 hours where qualitative analysis was observed and recorded. The bones were removed from the chemicals, weighed, and photographed every 4 hours during the 24-hour period. After the first 24-hour period, the samples were then examined every 12 hours. During this time, the bones were taken out and weighed every 12 hours for the next six days.

Experiment #2

Three sets of jars (18 total) were again used to test the effects of the five household chemicals and water on burnt, frozen, or chopped pig bone. Each of the six jars contained either 200mL of a chemical or 200mL of water. One set of pig bone segments were frozen for two days, the second set of pig bones were burned over an open flame until charred, and the third set of bones was chopped up into small pieces using a hacksaw. These three different sets were then placed in the jars containing chemicals and monitored using the same timetable and procedure as Experiment #1, except the set of bones that were chopped into pieces were not taken out to be weighed.

Results

Pequa Drain Cleaner® was the most destructive chemical on bone and tissue. The second strongest was the Acidic Toilet Bowl Cleaner®. The tap water and the Septic Tank Cleaner® both showed no substantial effects throughout the course of both experiments, and therefore will not be discussed further.

In Experiment #1, the bone submerged in Pequa Drain Cleaner® became a dark red at 4 hours. At the 20-hour weigh-in, there was a foul odor present and pressure from the tongs caused dents in the bone segments. After three days of submersion in the chemical, the bone could no longer be weighed because all that was left was residue and small bone fragments at the bottom of the jar (Figure 1; Table 1).

Although none of the chemicals had as severe of an effect as the Pequa Drain Cleaner® did, the Acidic Toilet Bowl Cleaner® and the Lime-Away® were also destructive and had similar effects. Both immediately caused the bone to fizz and bubble and both illustrated a gradual loss of mass over the seven-day span (Table 1; Figure 5 and 6). The Heavy Duty Stripper and Cleaner® did not have destructive dissolution effects, but after 20 hours, the bone had absorbed the chemical, as can be seen by the increase in mass, and became gelatinous on the inside (Table 1).

The hair and nail samples tested in Experiment #1 did not present any substantial results for five out of the six chemicals observed. The only noteworthy change was that the Pequa Drain Cleaner® dissolved both the hair and nails until only tiny particles remained. The effect on the hair and nails will not be discussed further.

Experiment #2 consisted of the burnt, frozen, and chopped bone segments. The burnt bones showed the most significant changes. Again, Pequa Drain Cleaner® was the most destructive agent. It followed the same pattern as the first experiment, but this time the bone fell apart and became bone residue and fragments after only 24 hours of dissolution (Figure 2; Table 2). Another major difference was seen in the burnt bone segment submerged in the Acidic Toilet

Bowl Cleaner®, where it showed a more rapid rate of mass loss and became soft and paste-like around eight hours. The weight of this bone was not taken after two days because it broke in half (Figure 3; Table 2). The Lime-Away® in this experiment did not show as much mass loss as in Experiment #1, but the bone was more physically affected by the chemical in its burnt state. At 12 hours, the surface could be easily scraped, and by three days the bone segments were slightly pliable. Additionally, when picked up with tongs, the ends bent downward (Figure 6 and 8; Table 2). Finally, the Heavy Duy Stripper and Cleaner® had similar effects as in Experiment #1 (Figure 9; Table 1 and 2).

With the frozen bone segments, the only two notable differences were that the bone in Pequa Drain Cleaner® could not be weighed after two days rather than three because of major breakage, and the bone submerged in Acidic Toilet Bowl Cleaner® became rubbery on the outside after only two days. The bone submerged in the Acidic Toilet Bowl Cleaner® absorbed the chemical, making it pliable, and the chemical could be easily drained from the interior of the bone (Table 3; Figure 4).

Finally, the chopped bone segments showed no significant physical results. The dissolution rate was not significantly faster for bone segments than for whole bones. The only noticeable result was that the Pequa Drain Cleaner® disintegrated the bone pieces, but they were never fully dissolved. None of the samples in any of the chemicals had major observable changes over the seven-day span.

Discussion

The results of this study show that certain household corrosive chemicals are effective in damaging pig bone and human tissue. It also shows that burnt bone is more easily destroyed by these corrosive chemicals. Bone is a heterogeneous material made up of inorganic and organic components. The inorganic component is made up of calcium hydroxyapatite and the organic component is made up of collagen and other proteins. When you burn bone, the organic component is burned away and the inorganic component remains. This allows acid to act on the inorganic component thus it is likely for the bone to dissolve quicker (White and Folkens 2005). Out of the six chemicals tested, the Pequa Drain Cleaner®, whose main ingredient is potassium hydroxide, was by far the most destructive. This was observed by the destruction of every bone segment placed in the chemical over all experiments.

In Experiment #1, only small fragments of bone and residue remained after three days in the Pequa Drain Cleaner®. These results can be compared to a famous murder case from 1897. A man by the name of Adolph Leutgert was found guilty of killing his wife by means of dissolving her body in a vat of potash. Potash is a potassium compound and in chemical terms it is very similar to potassium hydroxide. All that was left of the woman's body the next day was decomposed tissue with a foul odor and bone fragments (Loerzel 2004). In both experiments, the process of bone dissolution was highly similar. The bone seemed to have first absorbed the chemical and then fragmented from the inside out, rather than dissolving from the outside in. In both instances, the bones were physically destroyed by the chemical.

The second strongest chemical was the Acidic Toilet Bowl Cleaner®, whose main ingredient is hydrochloric acid. The results from this chemical can be compared to the results of Hartnett and colleagues (2011). In their study, hydrochloric acid had the most destructive results by reducing human bone and teeth samples to stubble-like pieces in less than 24 hours. The effects of the hydrochloric acid in this study are not as significant as in Hartnett and colleagues's (2011) study, most likely because of the lower concentration of hydrochloric acid in the household chemicals used in the experiments presented in this paper. However, one major similarity was that in both studies the hydrochloric acid had no notable effects on the hair and nail samples.

The Heavy Duty Stripper and Cleaner®, or sodium hydroxide and diethylene glycol monobutyl ether, did not have any destructive effects. This is similarly compared with Cope and Dupras's (2009) study. They found that sodium hydroxide was the least effective agent they tested. In the study reported here, although it was not the least effective agent of those tested, it was absorbed by the marrow of the bone and turned it into a thick, gelatinous substance. This was seen in both experiments. It was likely that Cope and Dupras (2009) did not see a gelatinous result due to different concentrations of sodium hydroxide used. The tap water and Septic Tank Cleaner® had no notable changes or destructive effects. This is consistent with Hartnett and colleagues's (2011) findings.

As identification methods and technology improves, criminal attempts to hide the identification of victims must be more effective. In order to be more effectively prepared to understand the criminal psyche and make educated guesses on what methods these criminals will use to hide the identity of a victim, research must be consistently done. Research on the effects of corrosive chemicals can help forensic anthropologists to identify cases involving corrosive chemicals and can provide a foundation to direct future research. This research addressed the lack of data on the effects of chemicals on frozen, burned, or cut up bones, and attempted to validate Hartnett and colleagues (2011). One of the most important aspects of forensic science is validation, especially in light of the National Academy of Sciences report issued in 2009 by the Committee of Identifying the Needs of the Forensic Sciences Community and the National Research Council. In order for forensic processes to be valid in court, scientific evidence must be abundant and accepted by the community, must be tested and validated, and error rates must be provided. This ensures maximum accuracy when analyzing evidence in criminal cases. This study was able to replicate the results of Hartnett and colleagues (2011) and provide new data on the effects of chemicals on altered bone.

The chemicals used were all easily obtained from a typical hardware store rather than laboratory strength chemicals. Most perpetrators would opt for the cheaper and easier approach to dispose of his or her victim. This ties back similarly to the Hartnett and colleagues (2011) study, analyzing the effects of these chemicals in a realistic scenario such as the Phoenix, Arizona case mentioned. A criminal's initial approach to hide the victim could potentially be to burn, freeze, or cut the body into pieces to accelerate the dissolution process. This study took those potential outcomes and tested them to provide greater knowledge of their effects.

Conclusions

This research demonstrated that household corrosive chemicals do have destructive effects on bone and tissue. It can also be concluded that certain alterations to the bone play a significant role in dissolution rate and overall physical damage to the bone. This is a major finding since this is the first study to find a relationship between altered bones and their dissolution rates. The most significant changes yielded in these experiments were a result of exposure to the Pequa Drain Cleaner®. It caused the fastest dissolution rate on the burnt bone segment in Experiment #2, although changes were seen in both experiments by other chemicals such as the Acidic Toilet Bowl Cleaner®**.** An area for future research could be to create a catalog system identifying different corrosive chemicals and detailing their effects on bone and tissue. This study is vital because it would add a significant amount of information that could be applied to a catalog or database system. Future studies can replicate this process using human bone rather than pig bone, as well as adding human teeth to the experiments. This addition would further validate Hartnett and colleagues's (2011) study as well as add another important aspect to the research presented here. Another future study would be to test the changes of bones submerged in chemicals on a molecular level by conducting DNA extraction. The findings of such an experiment could act as a guide when anthropologists are faced with similar cases of altered bone in the sense of allowing easier means of identification. This research on the effects of household corrosive chemicals is essential in broadening the knowledge in the field of forensic anthropology.

Table 1: Experiment #1 Qualitative Results

Experiment #1	**Acidic Toilet Bowl Cleaner®**	**Lime- Away®**	**Heavy Duty Stripper and Cleaner®**	**Pequa Drain Cleaner®**
2-4 hours	-Marrow bleeding -Slight bubbling	-Marrow bleeding -Slight bubbling	-Peeling away excess tissue -Ends become green	-Color change to dark red -Slight bubbling at ends
6-8 hours	-Residue in container -Ends slightly disintegrating	-Ends slightly disintegrating -Chemical turns brown	-No change	-Peeling of leftover skin -Disintegration at ends
12-16 hours	-Stopped bubbling	-No change	-Gelatinous on ends	-No change
20-24 hours	-No change	-Bubbling stopped	- Inside is completely gelatinous	-Foul odor - Bone starts to splinter and dent when picked up
2-3 days	-Starting to absorb the blue chemical color	-Chemical in jar in completely brown in color	-Absorbs chemical and becomes gelatinous	-Bone is softened and is no longer being weighed -Residue and bone fragments left
4-7 days	-No change	-No change	-No change	-Only bone residue remains

Major qualitative results from Experiment #1 are shown. Explained here are the visually analyzed changes in the different bone samples. The time segments are split into specific intervals to show the most major changes and analysis.

Table 2: Experiment #2 Qualitative Results of Burnt Bone

Experiment #2	**Acidic Toilet Bowl Cleaner®**	**Lime- Away®**	**Heavy Duty Stripper and Cleaner®**	**Pequa Drain Cleaner®**
2-4 hours	-Floating on surface	-Chemical becomes yellow -Slight bubbling	-Peeling away excess tissue -Ends become green	-Bone color becomes brown -Contents of jar becomes cloudy
6-8 hours	-Jar is cloudy -Bone is softened and has a foul odor	-No change	-No change	-Bone starting to break and splinter
12-16 hours	-No change	-Surface appears easily scraped	-Gelatinous on ends	-Pieces breaking off
20-24 hours	-No change	-No change	- Inside is completely gelatinous	-Last time bone is weighed
2-3 days	-Bone becomes fragile -Bone broke in half and no longer weighed	-Bone is pliable and ends bend downward from middle	-Absorbs chemical and becomes gelatinous	-Bone residue remains
4-7 days	-Bone pieces remain	-No change	-No longer contains gelatinous substance	-Only bone residue remains

Major qualitative results are shown from burnt bone in Experiment #2. Explained here are the visually analyzed changes in the different bone samples. The time segments are split into specific intervals to show the most major changes and analysis.

Table 3: Experiment #2 Qualitative Results of Frozen Bone

Experiment #2	**Acidic Toilet Bowl Cleaner®**	**Lime- Away®**	**Heavy Duty Stripper and Cleaner®**	**Pequa Drain Cleaner®**
2-4 hours	-Marrow bleeding out of the surface -Slight bubbling	-Marrow bleeding out of surface -Slight bubbling	-Slight marrow bleeding -Ends become green	-Color change to dark red -Slightly cloudy jar
6-8 hours	-No change	-Slight residue in jar	-No change	-Peeling of leftover skin
12-16 hours	-Slight softening of outside	-Very residual in jar	-Gelatinous on ends	-No change
20-24 hours	-No change	-No change	- Inside is all gelatinous	-Foul odor - Bone starts to splinter and dent when picked up
2-3 days	-Elastic-like on exterior	-No change	-No longer gelatinous	-Bone is softened and no longer weighed -Residue and bone fragments left
4-7 days	-Chemical absorption -Fluid can be squeezed out	-No change	-No change	-Only bone residue remains

Major qualitative results shown from frozen bone in Experiment #2. Explained here are the visually analyzed changes in the different bone samples. The time segments are split into specific intervals to show the most major changes and analysis.

Figure 1: Experiment #1 Pequa Drain Cleaner® Bone


A


B

Before and after photo of bone segment from Experiment #1 submerged in Pequa Drain Cleaner®. Picture A is the bone before it was placed into the chemical. Picture B is the bone after three days of exposure to the chemical. In picture B the splintering of the bone and the softening of the interior is apparent.

Figure 2: Experiment #2 Burnt Pequa Drain Cleaner® Bone

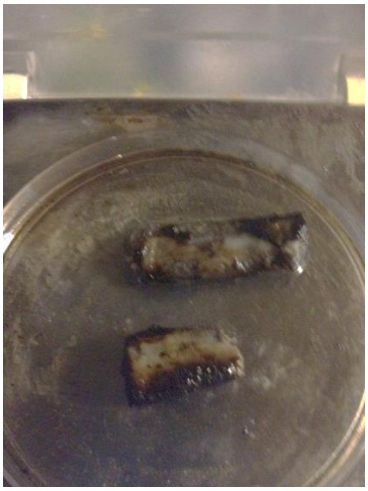

A


B

Before and after photo of burnt bone segment from Experiment #2 submerged in Pequa Drain Cleaner®. Picture A shows the bone before being submerged into the chemical. Picture B shows the bone after 24 hours of exposure to the chemical. In Picture B, the splintering of the bone and the softening of the interior is apparent.

Figure 3: Experiment #2 Burnt Acidic Toilet Bowl Cleaner® Bone

A



B

Before and after photo of burnt bone segment from Experiment #2 submerged in Acidic Toilet Bowl Cleaner®. Picture A is the bone before being submerged into the chemical. Picture B is the bone after two days of exposure to the chemical.

Figure 4: Experiment #2 Frozen Acidic Toilet Bowl Cleaner® Bone

A

B

Before and after photo of burnt bone segment from Experiment #2 submerged in Acidic Toilet Bowl Cleaner®. Picture A is the bone at four hours of being submerged in the chemical. Picture B is after seven days. The arrow shows the indentation from the tongs and how the exterior became pliable.

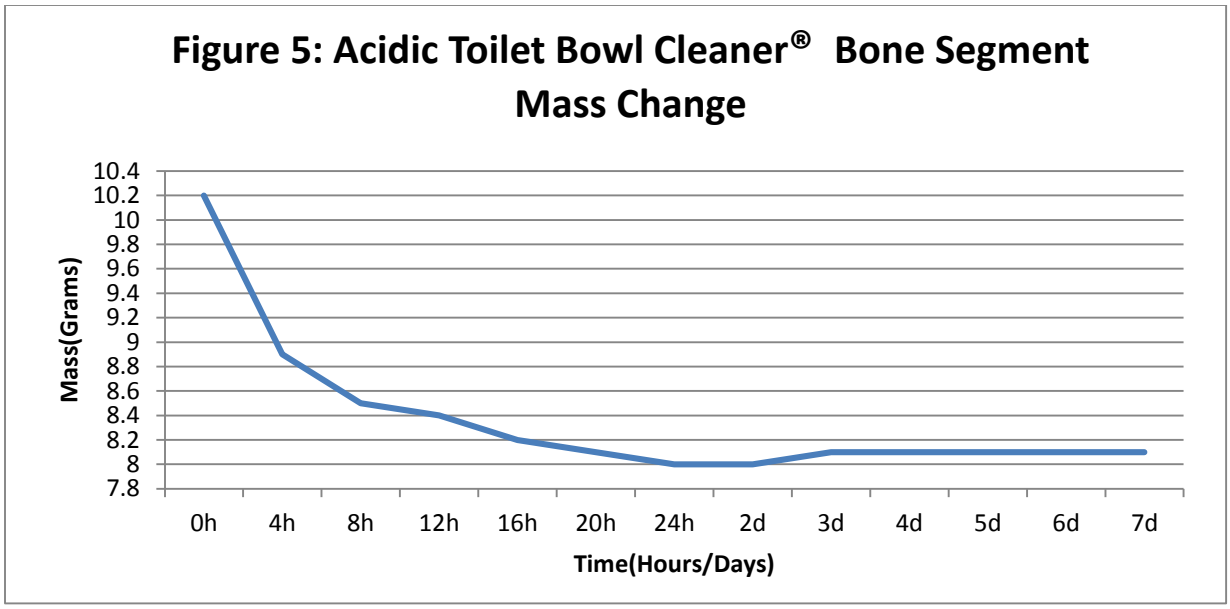


Figure 5 shows the mass change of the bone segment over the seven day time span, submerged in Acidic Toilet Bowl Cleaner® in Experiment #1. It shows a gradual decrease in mass over the first 24 hours, a slight increase in mass from day two to three, then remained constant for the rest of the experiment.

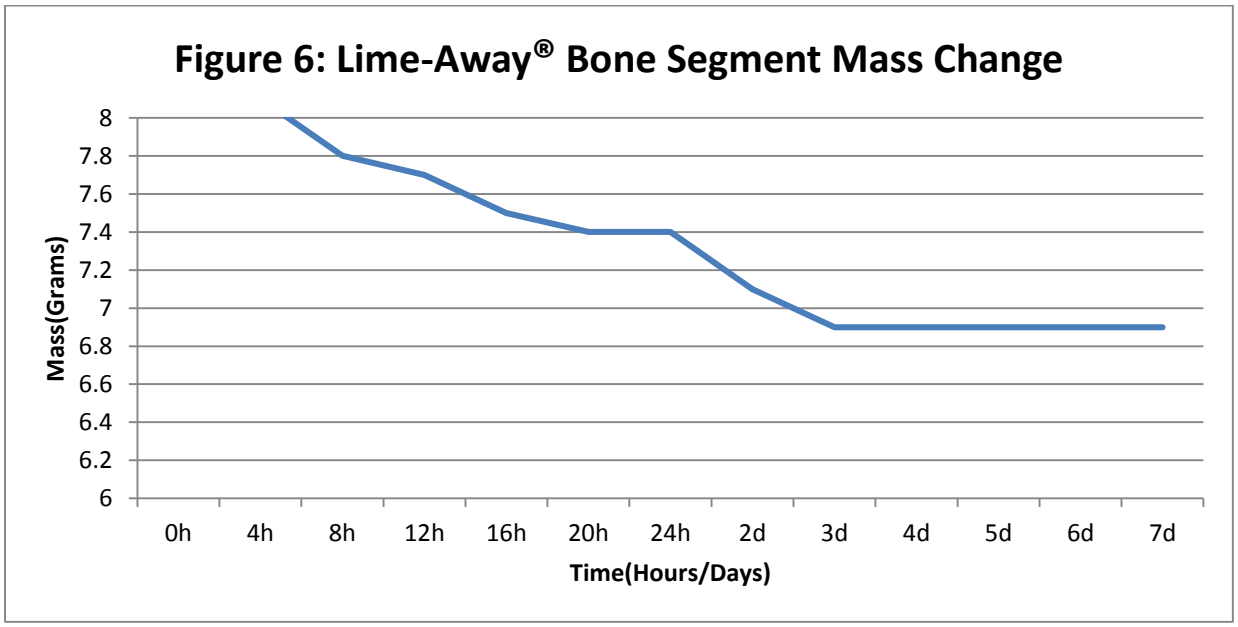


Figure 6 shows the mass change of the bone segment over the seven day time span, submerged in Lime-Away® in Experiment #1. It shows a gradual decrease in mass over the first three days and then stays at a constant mass for the rest of the allotted time.

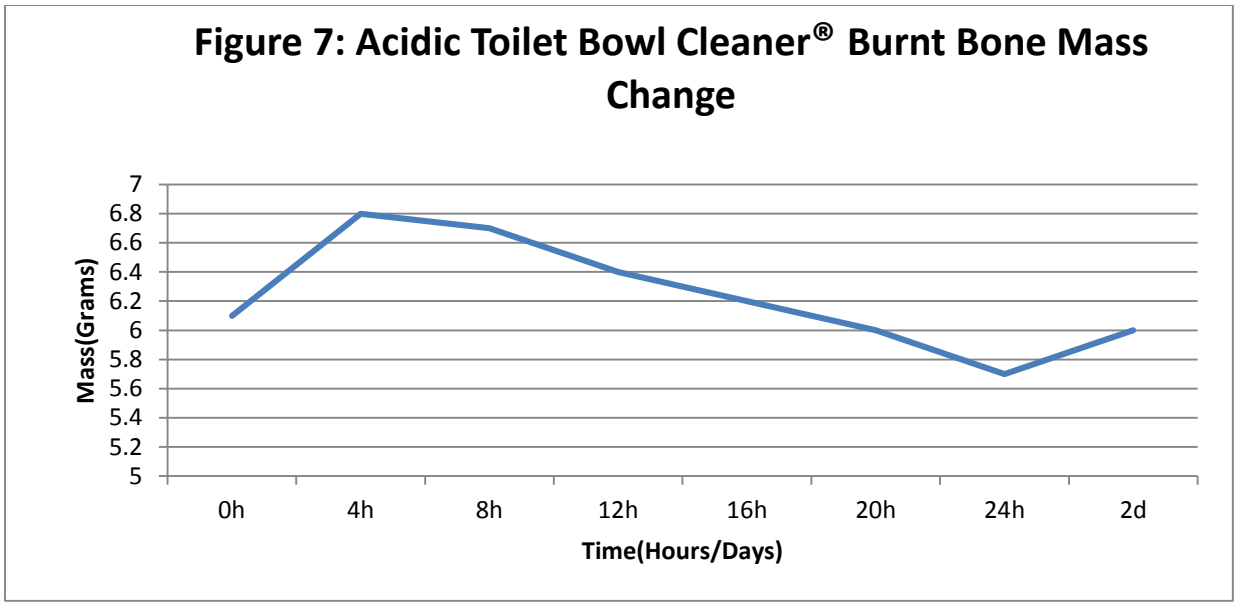


Figure 7 shows the mass of the burnt bone segment over the two day time span, submerged in Acidic Toilet Bowl Cleaner® in Experiment #2. It shows a spiked increase in the first four hours and then a gradual decrease in mass over the next 20 hours. It then gained mass over the next 24 hours. At two days the bone was no longer weighed because it fell apart.

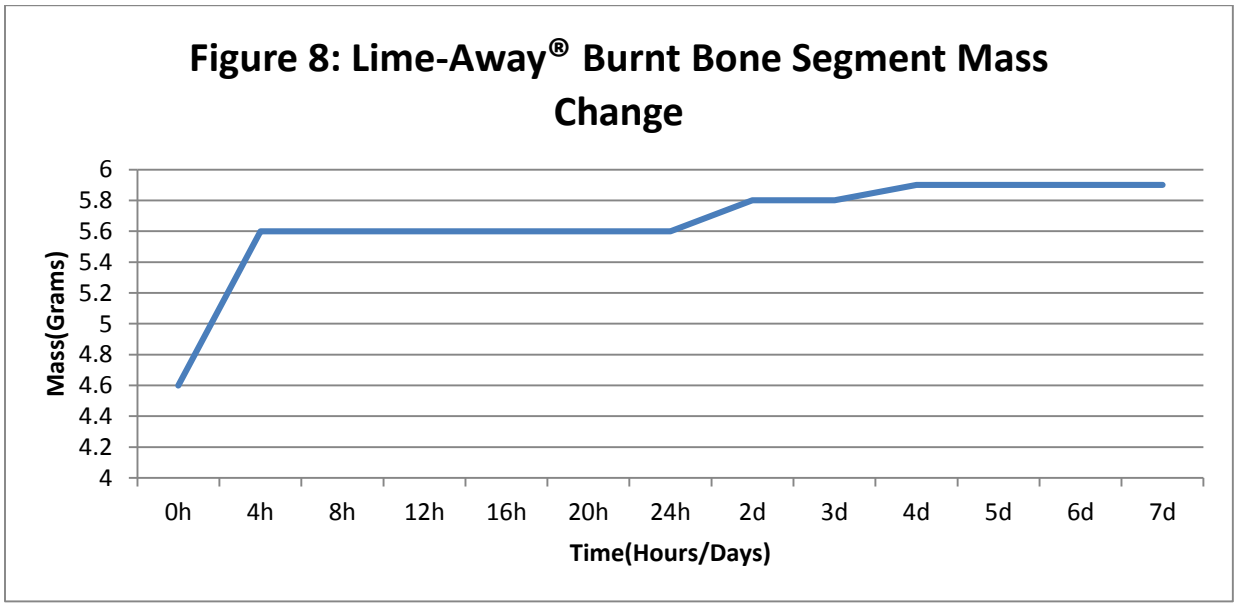


Figure 8 shows the mass of the burnt bone segment over the seven day time span, submerged in Lime-Away® in Experiment #2. It shows a spiked increase in the first four hours then stays at a constant mass for the next 20 hours. The bone then gains mass over the next three days becoming constant for the last three days.

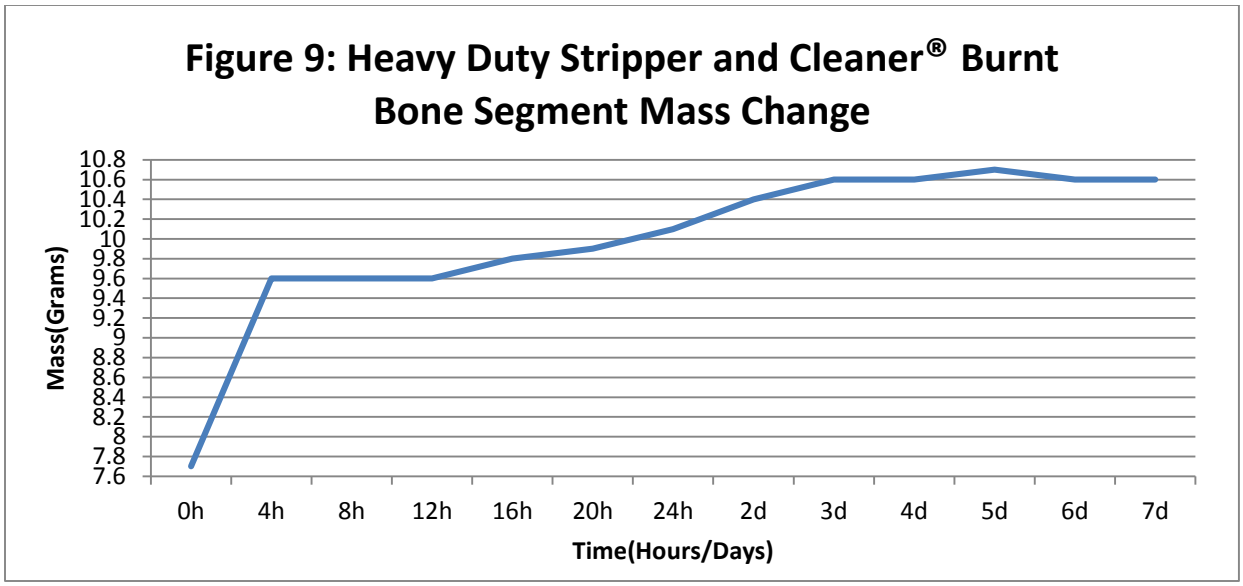


Figure 9 shows the mass of the burnt bone segment over the seven day time span, submerged in the Heavy Duty Stripper and Cleaner® in Experiment #2. It shows a spiked increase in the first four hours then stays at a constant mass for the next eight hours. The bone then gains mass over the rest of the allotted time.

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Ceramic Analysis of the Northern San Juan Region

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Abstract: The Great Migration of AD 1130-1180 from Chaco Canyon to the Northern San Juan Region in Colorado and Utah produced a shift in Ancestral Puebloan culture and settlements. Ancestral Pueblo people migrated north in search of better land, resources, access to water, and protection. In the north, during the Pueblo III phase, 1150-1350, the Ancestral Pueblo people clustered near canyon heads and created aggregated communities that were very different from the great houses occupied during the Pueblo II phase at Chaco Canyon. Archaeologists have argued that Chaco Canyon acted as the social glue holding the Ancestral Pueblo society together and consequently, the collapse of Chaco Canyon around 1180 AD unhinged the society into instability. The northern migration from Chaco Canyon led Ancestral Pueblo people to change their ceramic style from McElmo Black on White to Mesa Verde Black on White. The reason for a change in the style of pottery was due to differences in regional materials, influences from outsiders, population shifts, and religious revitalization movements. This paper will explore the shift in pottery between the end of Pueblo II and the Pueblo III Period in the Northern San Juan Region by examining in detail the changes in pottery styles and applications, as well as other material culture changes at Sand Canyon Pueblo locality, Mesa Verde, Yellow Jacket Pueblo and Castle Rock Canyon.

Background

The Ancestral Pueblo people lived in the Four Corners region of the American Southwest. Sites dating to the 1000s AD have been found at Chaco Canyon. Chaco Canyon, located in New Mexico, was a complex structure of numerous great kivas, 3-4 story roomblocks, and great houses. An extensive trade network, evidenced by artifacts and trade routes, connected Chaco Canyon to Pueblo peoples' communities north, south and west of the Chuska Mountains and Mesoamerica. Pottery associated with Chaco was the Black-on-White McElmo style. Large numbers of pots were imported from the Chuska Mountains (Lekson and Cameron 1995).

Around AD 1130 people began emigrating from Chaco Canyon due to various factors including environmental change (evidenced by a severe drought in 1050 AD), sociopolitical change, and to escape the threat of violence (Bradley 2002). Ancestral Pueblo people went north in search of better land and stability and settled in the Northern San Juan Region, especially in the Mesa Verde area in Colorado. Some aspects seen in the Northern San Juan are similar to older practices found in Chaco Canyon. Chaco-like mugs found at Sand Canyon Pueblo, resemble Chaco pitchers from Pueblo Bonito. The evidence of a D-shaped settlement at Sand Canyon Pueblo suggests an attempt to reconstruct a smaller Chaco structure (Varien 1999).

The "Chaco phenomenon" explains this unique settlement in Pueblo history and its function of holding together the society as a social glue. The fall of Chaco brought on instability in the Pueblo world during the Pueblo III period. This is evidenced by increased tension between peoples and brutal violence, supported by the skeleton remains and defensive architecture at sites such as Sand Canyon Pueblo (Kuckleman 2007). The exact reasons for the unhinging of society due to the fall of Chaco are uncertain. However, its effect transformed Pueblo III society dramatically. Migrating to the Northern San Juan Region in Colorado and Utah, including Mesa Verde, began to change their material culture. Sites in this region contained various pottery vessels, including mugs, bowls, and jars. Pueblo people set up aggregated communities near canyon heads or cliff walls. The location of their settlements suggested a reduction of instability. These communities provided protection from enemies and natural climatic elements. Other settlements of the time were Sand Canyon Pueblo, Castle Rock Pueblo, and Yellow Jacket Pueblo.

Sand Canyon Pueblo

Sand Canyon Pueblo, located in southwest Colorado, was constructed around 1250 AD, which dates to the Pueblo III period. From 1984 to 1985 Crow Canyon archaeologists, Bruce Bradley and E. Charles Adams conducted archaeological excavations at the site. Bruce Bradley analyzed the pottery found at Sand Canyon Pueblo. Sand Canyon Pueblo contained 420 rooms, 90 kivas, 14 towers, and a large enclosed plaza and a D-shaped building (Bradley 1992). He compared the Mesa Verde style mugs to the pitchers found at Chaco. At the site it appears that within the enclosed wall the structures were clustered into separate clusters called "architectural blocks". During this time in this region, it was common to find villages that were divided into two parts by a natural feature like a river (Ortman and Bradley 2002).

The Sand Canyon Pueblo site was divided into the Lower Sand Canyon Pueblo and Upper Sand Canyon Pueblo. Sand Canyon Pueblo is located at a head of a canyon near a spring which divides the site into east and west regions. The east side contained the majority of the standard architectural blocks and the west side contained most of the kiva-dominated blocks, room-dominated blocks, and the civic architecture. Bradley suggested that the settlement was planned with functional domestic, special, and community zones (2008). The site contained an estimated 500 structures. Excavation included archaeological testing done in a D-shaped

building, a great kiva, roomblocks, and standard kivas. Research has examined architecture and artifacts to figure out why this shift in material culture occurred in the Pueblo III Period (Bradley 2006), (Cordell et al 2007), (Lekson and Cameron 1995).

Mugs and Pitchers – A Chaco Revival?

Bruce Bradley (2008) looked at different morphologies and vessel forms to understand the pottery change and the connection from Chaco Canyon to the San Juan Region. Specifically he looked at the Chaco-McElmo Black-on-White pitchers and compared them to Mesa Verde Black-on-White mugs in the Mesa Verde area. Typical pottery found in Chaco Canyon was a black design on a white background and was usually slipped and polished. Mesa Verde pottery had a distinct design with fine hatcher mark lines. Chaco Canyon and Mesa Verde pottery both used geometric shapes. The Chaco Black-on-White pitcher's diagnostic attributes were organic paint, dotted rim, concave base and cylindrical to conical necks. The pitcher shared similar attributes with the Mesa Verde mugs. Among these shared characteristics were the use of organic paints, ticked rims, design similarities, vertical strap handles, and bases designed for flat surfaces. Both were fired in an oxidizing atmosphere. Bradley stated that the "Mesa Verde mugs look like Chaco-McElmo pitchers with the bottom lopped off" (Bradley 2008:353). Bradley argued that these Mesa Verde mugs are actually a late development from the earlier pitcher form.

During the Pueblo III period there is no evidence of pitchers in the Northern San Juan Region. This new form may have replaced the old form. It is interesting that near the end of the Pueblo III period, 14th century, the mug design disappears. The function of these mugs and pitchers is unknown. They both were designed to hold liquid and are cylindrical. Based on the majority of pitchers being associated with burials at Pueblo Bonito in Chaco Canyon and the majority of mugs found in burials in the Mesa Verde area, Bradley suggested that their function was ritualistic. At the Mesa Verde region sites, Mug House and Long House mugs were more prevalent than bowls at the burials. Pottery vessels were associated with 10 out of the 27 formal burial sites excavated at the Long House Pueblo. Other forms of pottery vessels found were corrugated jars, whiteware bowls, and mugs (Bradley 2008).

Results are less conclusive about the purpose of the mugs at Sand Canyon. Mugs were found in long term storage rooms, kivas and open spaces. The discovery of mugs in open spaces leads to skepticism about their use in rituals. Mugs were not found in short term storage rooms, living rooms, and towers which suggests that they were not used in everyday activities. Using Arthur Rohn's formula, archeologists estimated from 515 mug sherds and 21,584 bowl sherds that they comprised 440 bowls and 22 mugs (Bradley 2008). Mugs were found in greater proportions in burials. Archaeologists proposed that this a change in design or an attempt to revitalize an earlier form (Bradley 2008). Kiva jars and mugs were associated with kivas and courtyards. At Sand Canyon Pueblo, ollas, bowls, ladles, corrugated jars, and other forms were more widely distributed at the site then the mugs and kiva jars (Bradley 2008). Kiva jars and

mugs did not carry over into the fourteenth century. This suggests that the kiva jars and mugs had more of ritualistic or symbolic use than a utilitarian function.

Chaco Influence on Settlement Structures

The revival of Chaco components is not only seen in the pottery, but also in the settlement structure of the Pueblo III communities. During this time, Pueblo people formed aggregated communities resembling Chaco structures. Unlike Chaco there is no evidence of a great house or large central gathering place at Sand Canyon Pueblo. Although there is a Great Kiva at Sand Canyon Pueblo, it is not certain how the Pueblo people used it. The existence of a Great Kiva at Sand Canyon Pueblo suggests a continuation of the Chaco phenomenon. Migrants built a D-shaped bi-wall structure around the Sand Canyon site similar to Pueblo Bonito in Chaco Canyon. The D-wall was created as a community scale public work (Bradley 1992). In a sense, the migrants created a mini-Chaco in the Northern San Juan region.

Habitation Settlement Analysis

Mark Varien looked at the accumulation of cooking pot sherds at habitation sites in the Sand Canyon locality (Varien 1999). Varien concluded that habitation increased with time. Pueblo II structures were used for a shorter time of about 20 years than the Pueblo III structures which were used for about 40 years.

Mark Varien looked at the accumulation rate of corrugated cooking-pot sherds to determine the length of the settlement and the frequency of the household movement in the Sand Canyon locality. To do this he looked at the total weight of corrugated-pot sherds at the 13 sites. The total weight estimates were divided by the annual household accumulation rate. This figure was then divided by the number of kivas or pit structures at each site which controls for the differences in site size. This produces a range of the average length of occupation per household (Varien 1999). In conjunction with this data, archaeologists looked at architecture and stratigraphy to determine if there were multiple households and if they were occupied simultaneously or sequentially. Eleven of the thirteen sites were considered year-round habitations in existence from AD 1180 to 1280. Some of these sites contained Pueblo II settlements and some contained Pueblo III settlements. During both Pueblo II and Pueblo III periods the corrugated cooking pot was the only vessel used for cooking. Consequently, it is impossible to distinguish the corrugated sherds between Pueblo II and Pueblo III. Varien (1999) solved this problem by estimating how much corrugated pottery was associated with each component. Furthermore, to calculate the occupation span, taken into account were four variables, the number of kivas at the site, the point estimates, the 80 percent confidence interval for the total accumulation of corrugated cooking pot sherds, and the upper end of the Duckfoot site accumulation rate (Varien 1999).

Castle Rock Pueblo

The largest site excavated during Varien's study was Castle Rock Pueblo in southwest Colorado eight kilometers from Sand Canyon Pueblo, dated to 1240 AD based on tree-ring dates. Castle Rock Pueblo contained an estimate of 16 kivas, 40-75 masonry rooms and associated refuse deposits. The estimated occupation of this settlement is 40- 45 years which is supported by tree-ring dating, pottery dating and structure abandonment. It is further evidenced by an estimate of 33 years based on cooking-pot sherd accumulation. Based on the tree-ring dating and length of occupation, most of the residences at Castle Rock Pueblo were inhabited contemporaneously. This occupation must have been settled by a large group of households and did not grow through migration (Varien 1999).

The excavation results demonstrate that inhabitants lived in Pueblo III settlements longer than in Pueblo II settlements. Pueblo II structures were used for about 20 years versus 40 years for the Pueblo III structures. In this study the two Pueblo II sites, G and G Hamlet and Kenzie Dawn Hamlet, habitation spanned 16 to 23 years. Both G and G Hamlet and Kenzie Dawn Hamlet had Pueblo II and Pueblo III habitation components (Varien 1999). G and G Hamlet was situated on a mesa top. The Pueblo II components of G and G Hamlet include a roomblock, a pit structure, and a well-defined midden. Using dendrochronology the site was dated to between AD 1065 and 1070. It is demonstrated that these two occupations were separated by about 100 years and it could not be a continuation of the first occupation. Pottery dates the Pueblo III occupation to between AD 1180 and 1220 (Varien 1999). Architecture changed from Pueblo II post-adobe-roomblocks and earthen ware to Pueblo III style masonry features. This material change suggests why Pueblo III structures were used for longer than the earthen buildings (Varien 1999). The location of sites and the residential mobility were presumably due to some environmental stress since the sites were situated near running water. However, the variation in occupation spans suggests that there was no single factor that contributed to mobility.

Architecture Changes

There was numerous and diverse public architecture present during the Pueblo III period which suggests an increase in mobilization and displays of social power. During the Pueblo III period migrants set up communities and structures different from what was built at Chaco Canyon. A typical unit pueblo residence in central Mesa Verde region contains a small kiva with four to ten associated surface rooms. Sand Canyon Pueblo contained what Ortman and Bradley (2002) called kiva suites specifically in blocks 100 and 1600. The ratio of kivas to other structures in these blocks is much higher than typical unit pueblo residences (Ortman and Bradley 2002). Bradley speculated Block 100 was for a special purpose. The increase in individual Kivas is suggestive of a change in social structure or ritual organization. The architecture at Chaco Canyon relied on the social difference between public and private with secret access to certain features. At Chaco, the Pueblo people used core and veneer style to create

buildings four stories high. After Chaco, during the Pueblo III period, the pueblo people set up aggregated communities.

Communal Feasting

Archaeologists looked at the presence of communal feasting by calculating the ratio of serving vessels to non-serving vessels at Pueblo Alto in Chaco Canyon and Castle Rock Pueblo, in San Juan Region (Ortman and Bradley 2002). Ortman and Bradley concluded, based on the ratio, that there it is plausible that more communal feasting occurred in the Pueblo III period than during the Pueblo II period. The vessel size pattern suggested food consumption groups grew larger as canyon-rim villages formed. Vessel measurements and rim-arc-data from Sand Canyon locality sites indicate pueblo people made large and small sized serving bowls. Fewer bowls of intermediate size were found. This similar pattern is seen at Castle Rock Pueblo. Corrugated jar sherds were less common at Pueblo Alto and whiteware jar bowls were more common.

Sand Canyon Pueblo had more domestic and maintenance tasks than Pueblo Alto. Pueblo Alto was associated with rituals while Sand Canyon was used year round as a residence. There is evidence of large cooking pots based on rim arc data. More large pots were deposited at Sand Canyon Pueblo than in any other community in the locality. However, no evidence of large communal food preparation has been found. There are two possible explanations for these large pottery vessels. One explanation is that food consumption groups grew larger as communities aggregated and more relatives migrated in to the site. The second explanation is that communal feasting and public rituals increased at Sand Canyon. Faunal remains contribute to the idea of an increased feasting community. More artiodactyl bones, mostly deer, were deposited more often at Sand Canyon Pueblo than in earlier sites (Ortman and Varien 2002). Based on pottery sizes and faunal remains it is plausible to suggest that Sand Canyon Pueblo in the Pueblo III period experienced an increase in communal feasting despite the loss of a center place, Chaco Canyon.

Ceramic Production/Distribution

Pierce, Glowacki and Thurs (2002) studied pottery production and distribution in Pueblo society at three communities, upper Sand Canyon locality, Lower Sand Canyon locality, and Goodman Point. The archaeologists looked at direct indicators of pottery production in the form of materials and pottery manufacture. They compared the compositional variation of vessels by using Instrumental Neutron Activation Analysis (INAA). Pierce et al looked at a microscopic analysis of the temper and chemical characteristics of pottery or raw clay. Excavations were conducted from 1984-1994 on fifteen Pueblo III settlements. Due to geological variations, the raw clay samples had to have come from ancient marine and alluvial formations (Pierce et al. 2002). Potential tempers were sandstone and intrusive igneous formations. Evidence of pottery manufacture was seen in tools, facilities, raw materials, and other byproducts. Tools found indicating production were molds or pukis, scrapers, and polishing stones. Since pottery kilns and pottery debris are most often outside the settlement, it is difficult to link them to production. Fourteen sites contained evidence of pottery production (Pierce et al. 2002).

To investigate exchange between settlements, archaeologists, Glowacki et al., identified pottery produced in one area and recovered in another (1998). Rim fragments of Mesa Verde Black-and-White bowls and Mesa Verde corrugated jars, which were the most common vessel in the 13th century, were analyzed. Archaeologists looked at rim fragments from 30 bowls and concluded the temper consisted of crushed sandstone, crushed sherd, and crushed igneous rock. Raw Clay samples were analyzed from 19 sources in the Sand Canyon and McElmo drainage. The individual pottery samples were prepared by removing the exterior surface to avoid contamination from paint, slip and other adhering material. In the study, the clay samples were fired to 700°C and crushed to fine powder. The results showed that whitewares were not fired and must have been preserved differently. The material matched crushed igneous rock pottery temper. The variation in production shows that this is a result of differences in sample size.

The results of the INNA analysis found that most Pueblo III settlements in the Sand Canyon locality were involved in pottery manufacture to some degree (Pierce et al 2002). Production was a small scale organization. Igneous rock as a temper was a restricted source within the locality. The nearest sources of igneous rocks were traced to the Sleeping Ute Mountains and alluvial terrain of McElmo Creek near Sand Canyon. Fifteen sites contained pottery with sandstone temper. (Pierce et al 2002). Most settlements made pottery and relied on locally available temper and clay raw materials. White ware bowls with igneous rock temper may have not been made in the upper Sand Canyon sites, but rather traded from Lower Sand Canyon. Ortman looked at the distance decay pattern and concluded that pottery distribution must be a down the line pottery exchange (Ortman and Bradley 2002).

The Glowacki et al. study concluded that vessels found at Castle Rock Pueblo were produced at Sand Canyon Pueblo. Mesa Verde black on white bowls fall into three distinct compositional groups which are linked with clay sources near Sand Canyon, Castle Rock and Mesa Verde. Corrugated jars were imported or procurement zones of materials overlapped. It is more probable that the corrugated jars were imported from outside the community due to the long-distance movement. (Glowacki et al. 1998). The study also determined that pueblo potters were actively selecting clays from different sources depending on the vessel type.

Religious Revitalization

The change in pottery style could have been a result of a change in religious idealization or a revitalization (Bradley 2008). During the Pueblo III period, ritual practices became more accessible and public. Archaeologists have made this conclusion based on the large number of kivas found in Sand Canyon Pueblo. As opposed to having Pueblo II great kivas, it is estimated that every family had its own kiva. This is demonstrated by the low room to kiva ratio suggesting that kivas were used by small social groups (Varien 1999). Other features associated with kivas were surface rooms, a courtyard, and a midden making it a “kiva suite” (Ortman and Bradley 2002). Domestic and ritual practices took place in the kiva suite based on associated material evidence found in the kiva suite.

In kiva 108 there was an image of a Kokopelli and a sipapu in the ground symbolizing a religious kiva. The Kokopelli was pressed into the ground floor during the construction of the kiva. Other petroglyphs, symbolic of religion, were found in the kivas. Evidence for domestic use included manos and metates for corn-grinding which were found in one of the rooms and midden deposits. The ideology of the Kokopelli could suggest a different religious cult and the influence of outsider ideas which could have changed the pottery style (Ortman and Bradley 2002).

During the Pueblo III period, there may have been influence from proto-Kachina ideology (Lekson and Cameron). The practices of 13th century Pueblo people resemble what would emerge in the 14th and 15th centuries as the Kachina religion. The Kachina religion never took hold in Mesa Verde where communities never aggregated. The link between aggregation and the Kachina religion has been suggested. This evidenced by the Kachina imagery and pueblo-style settlements that evolved together in the 11th and 12th century, The emphasis on plaza oriented structures gave a space for public rituals (Lekson and Cameron 1995). The feathers, which were found at Sand Canyon Pueblo, may be an early representation of the Kachina ideology which uses bird imagery (Lipe 2002). The macaw and trade of the macaw from Mesoamerica to the Southwest is associated with the Kachina religion. In the 15th century there is evidence of kiva murals associated with Kachina ceremonialism depicting parrots. What emerged in the 15th century may have had roots in sites of Mimbres and Chaco, where macaws and parrots were traded. There is evidence of Kachina imagery in the form of parrots and macaw icons on pottery at Mimbres sites (Lekson and Cameron 1995). The change in pottery may have been the result of a new religious orientation.

Yellow Jacket Pueblo

Yellow Jacket is a Pueblo III site, located in southwest Colorado, north of Sand Canyon Pueblo. It is dated to the years 1100s-1200s AD. The site contains 195 kivas (one great kiva), 19 towers, a Chaco-era great house, and 1,200 surface rooms. From 1995 to 1997 the Crow Canyon Archaeological Center excavated Yellow Jacket (Kuckleman 2003). Yellow Jacket was a large community built at the head of Yellow Jacket Canyon. It is estimated that it was occupied by hundreds of people. In the 1960s, archaeologists found a big aggregated Pueblo during excavation. An expansion of families or the influx of individuals is evidenced by the added on rooms with abutted walls at sites. The abutted walls suggest that the site was not highly planned out before building. There was no planning found in Yellow Jacket Pueblo like there was in Chaco Canyon. Other structures found at the site are unroofed Kiva and towers. There is no actual great house like in the Pueblo II Period in Chaco canyon. The settlement clusters around sources of water, springs, and arroyos. During the Pueblo III period the Pueblo people modified the springs, collected water, and lived near the water source in order to protect the water.

Trade and Interaction

At Sand Canyon Pueblo there is little evidence of trade of exotic materials. There was a small frequency of White Mountain Redware, Tsegi Orange ware, and other non-Mesa Verdean ceramics that were traded from other parts of the Southwest (Lipe 2002). There seems to have been a decline in interregional trade that was prominent in the Pueblo II period. The inhabitants at Mesa Verde put less focus on prestige goods. In the Sand Canyon locality there were few cases of the exhibition of exotic ornaments. Compared to the amount of corrugated sherds found, the number of exotic materials was relatively small. However, in the D-shaped structure of Sand Canyon Pueblo bird feathers were found in association with the structure. It was speculated that these bird feathers might have been ritual paraphernalia as opposed to personal adornments since it was found in this structure. The ratios of turquoise and shell to the total of corrugated sherds is significantly smaller than the ratio of these materials excavated by the Chaco Archaeological Project at Chaco Canyon during the Pueblo II period (Lipe 2002). A reduction in the importance of displaying wealth could be attributed to the unstable environment in the Northern San Juan Region.

Evidence of Violence

During the unstable time after Chaco's demise in the 1200 AD there is evidence of brutal violence in the Pueblo world. Burned rooms and skeletons with brutal injuries like bashed heads indicate a violent destruction. Most of the individuals appear to have been formally buried, but 23 skeletons were found in the open. The skeletons could be the remains of invaders, but there is little evidence for this conclusion. However, the material evidence found with the remains consists of projectile points that were made from non-local materials (Kuckleman and Martin 2007).

Archaeologists determined that since most of the individuals met violent deaths around the end of Sand Canyon, some of the remains must have been from the invaders that initiated a battle with the residents of Sand Canyon Pueblo. On four of the skeletons there was evidence of healed fractures suggesting they were engaged in combat. Six individuals had fractures around the time of death. (Kuckleman and Martin 2007). 2,060 human bones and identifiable bone fragments were found. Among the remains were nearly complete skeletons, clusters of disarticulated bones, and other scattered remains. 32 individuals were formally buried and 23 individuals were found in on occupied rooms. The 23 individuals showed evidence of violence and were not formally interred. The skeleton evidence along with defensive architecture of the enclosure walls suggested warfare took place during Pueblo III in the San Juan Region (Kuckleman and Martin 2007).

Discussion/Conclusion

The migration from Chaco Canyon in AD 1200 changed the atmosphere of the Pueblo world by creating instability and the need for revitalization efforts. The material culture of the Pueblo III period changed significantly from the Pueblo II period, but held on to some aspects found at Chaco. The styles of pottery transformed from McElmo Black-on-White pottery to

Mesa Verde Black-on-White pottery. Although the designs changed slightly, there appears to have been a conscious effort to reconstruct vessels similar to the style of Pueblo II pottery. The Mesa Verde Black-on-White mugs resemble the Chaco older vessels, the McElmo Black-on-White pitcher. The exact use of the mugs is speculative, but it has been suggested that they were ritualistic based on their association with burials (Bradley 2008). Furthermore, the Black-on-White mug must have been specially linked to the Mesa Verde area Pueblo III sites since in the fourteenth century they disappear completely.

The increasing turmoil of the Pueblo III period, as evidenced by violent episodes and strategically placed aggregated communities near canyon heads, may suggest the reason for a decrease in the need to show off one's wealth through prestige items. Moreover, less importance was given to exotic items like turquoise and shell (Lipe 2002). The decrease in social wealth displays cut the Sand Canyon locality off from the rest of the southwest and stalled trade with outsiders. The lack of trade with outsiders is seen by the limited quantities of outsider designed pottery. Mobility and household occupation were dependent upon environmental and societal pressures. The use of more permanent structures during the Pueblo III period allowed for longer time spent at the sites and for more community integration. Applying corrugated cooking pot sherd counts and tree-ring dates, it was estimated how long inhabitants lived at one settlement.

Pueblo II and Pueblo III pottery share similar attributes and could suggest a continuation of the traditions with some new elements. Potters procured their raw clay from local sites and trading was seen between close sites within the locality. Most settlements made pottery and relied on local available temper and clay raw materials.

New religious ideologies such as the ideas circulating prior to Kachinism may have influenced the designs of Sand Canyon locality pottery (Lekson and Cameron 1995). Archaeologists have associated the new pottery style and associated feathers with ritual. Such new pottery styles may reflect an effort of religious revitalization. Further research is required to determine how new religious ideas affected Pueblo III society.

During the Pueblo III period there was an increase in communal feasting and public gatherings evidenced by the use of large vessels and faunal remains of deer bones (Ortman and Bradley 2002). However, since there is no evidence of mass food preparation at Sand Canyon Pueblo, further studies are necessary to look for mass produced food.

The change in Pueblo society in the Northern San Juan Region is most likely due to environmental stress, instability, increased violence, revitalization and new religious ideas. Pueblo III pottery changed as groups settled in aggregated communities and began to procure materials from local areas. An influx of migrants and invaders could also have influenced pottery styles. Without Chaco holding together the society, Pueblo people sought to hold on to the ties of Chaco through revitalization while adapting to the new environment and changes of importance of social wealth.

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CLIMATE CHANGE AS A CATALYST FOR THE RISE AND FALL OF CIVILIZATION IN THE PERUVIAN ANDES, 500-1532 A.D.

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Abstract: Over the period of a millennium, three major Andean civilizations established hegemony in the central Andes, and collapsed. Climate appears to have had both positive and negative influences on these three societies, as colder, drier periods contributed to the development of intensive agricultural techniques, and warmer climates brought about a surplus of water from glacial melting. Agriculture was the determinant factor for all three of these societies, and when environmental and climatological factors benefited agricultural production, these civilizations thrived; when these factors hindered production, these societies weakened. This paper intends to prove that climatological fluctuation during the period 500-1532 A.D. caused drought in the central Andes, which in turn sparked competition over water resources. This competition led to social unrest, decreased agricultural production, and eventually, the collapse of the Wari and Tiwanaku civilizations. Furthermore, I intend to show how the climatological change that decimated the pre-Inca societies fostered Inca expansion, but at the same time, facilitated the spread of Old World pathogens upon the arrival of the Europeans.

Introduction

The Central Andes possesses an extreme environment that requires a significant amount of agricultural innovation to successfully harvest foodstuffs. Despite the difficulties of harvesting crops in the Andes, many societies have managed to gain significant influence and supremacy in the area due to modification of the landscape. Three major civilizations that emerged in the Peruvian Andes were the Wari, Tiwanaku, and the Inca, all of which altered their environments in order to adapt to the harsh conditions present in the area. Between the time period of circa 500 and 1532 A.D., significant climatological fluctuations put these civilizations to the test; some succeeded, and others failed. In terms of climate change, there are two major schools of thought as to its significance in the success and failure of empires. First, there are scholars such as Charles Ortloff and Alan Kolata (1993) who claim that "chronic drought conditions led to sequential collapse of…distinct agricultural systems" (Ortloff and Kolata 1993, 195), which in turn caused the political collapse of the Tiwanaku society. Second, there are those who claim that climate

unequivocally played an important role in the survival of Andean cultures, (Thompson, Davis and Mosley-Thompson 1994, 86) but had no adverse effects on the survival of societies.

In the following paper, I will assert that the severity of climate change in the post-1000 A.D. time period, specifically relating to prolonged drought, was crucial in the weakening of the agro-economic structures of the Tiwanaku and Wari states. Furthermore, I will show how the same environmental fluctuations that decimated the Pre-Inca societies proved favorable to the expansion of the Inca Empire, especially in terms of agro-economics. However, the climate also led to the proliferation of Old World pathogens upon the arrival of the Spanish in the early 16th century, which resulted in the demise of the Inca.

The Rise and Fall of the Wari and Tiwanaku Civilizations

The Wari and Tiwanaku civilizations began to emerge and expand between the time period of 500 to 800 A.D. in two separate parts of the Andes (Kolata 2013, 37-8). The Wari Empire reached from the northern edge of the Andean *altiplano* into the northern Peruvian highlands (Idem., 37). The Tiwanaku state established hegemony in the southern Andes, focusing their society around the Lake Titicaca Basin and southern *altiplano* regions (Idem., 41). The expansion of these societies is largely due to military force; many scholars of the Wari attribute their imperial conquest to vehement military campaigning, and the Tiwanaku state also expanded its territory through warfare, as well as through persuasion (Kolata 2013, 38). Besides military supremacy, the employment of agricultural enhancements, such as terracing and irrigation systems, were crucial to the expansion and survival of these societies.

Both states began their territorial conquests during the Andean Middle Horizon Period, which occurred between 600 and 1000 A.D. (Williams 2002, 361). During this era, the climate alternated between flood and drought conditions (Paulsen 1976, 127). The Quelccaya ice core record indicates periods of diminished precipitation beginning around 650 A.D. and continuing to A.D. 730. One of the primary reasons as to why the Wari Empire was able to expand during a period of substantial drought was the Empire's efficiency in its use of water resources (Idem., 365). Allison Paulsen claims that:

> Since we can show that climatic change was the under-lying cause of cultural changes on the Santa Elena Peninsula, and since we also know that the climate of the south-west coast of Ecuador and the climate of the south coast of Peru are determined by meteorological and oceanographic systems common to both areas, we may conclude that climatic change accompanied cultural change both in Ecuador and in Peru… (1976, 127)

Thus, climate variation, as well as the Wari and Tiwanaku states' ability to cope with these fluctuations, allowed for their expansion during the Middle Horizon.

The success of agriculture in all three societies – Wari, Tiwanaku, and Inca – had a direct impact on that society's success or failure as a state. In the Andes, there are eight ecological

zones, [19] all of which have distinctly different environmental conditions (Sandweiss and Richardson 2008). In order to make use of all eight zones to the greatest extent, landscape and agricultural management techniques had to be implemented throughout the Andes. Such methodologies included: "field scattering, sectional fallow systems, the ideology of reciprocity, scheduling of seasonal activities, high crop diversity, food storage technology, and land races appropriate for specific local conditions" (Erickson 2000, 315). Among the most widely employed methods of intensive agriculture throughout the Andes was irrigation. According to Armando Lamadrid, irrigation "became the economic adaptation that allowed them [Andean states] to expand into the hydrologically variable environments of the Andes" (Lamadrid 2013, 2). The fact that water was extremely unpredictable in this area may be one reason as to why it was so important to Andean societies. Hydrological features were often managed in order to accommodate multiple uses, including defense, flooding control, transportation, as well as ritual and religious uses (Scarborough 2003, 79).

Due to the irregularity of precipitation in the Andes, water was a highly important and well preserved resource. The Wari, Tiwanaku, and Inca were all agrarian societies, and so, if agriculture fails, the civilization fails. Therefore, water was regulated and conserved by these societies through means of agricultural techniques, which included rain-fed terraced agriculture and canal irrigated agro-field systems (Ortloff and Kolata 1993, 209-10). The most important aspect of water in the Andes, is that "irrigation is the basis of agricultural livelihood" (Lamadrid 2013, 10), and without water management, civilization cannot exist in this region. Therefore, it comes as no surprise that the climatological variations that led to prolonged drought appear to have the most significant impacts on Andean societies, such as the Tiwanaku and Wari Empires.

During the post-1000 A.D. time frame, climate oscillation was a "pan-Andean (and most likely, hemispheric) phenomenon" (Ortloff and Kolata 1993, 218). Due to this ubiquitous alteration in climate throughout the Americas, a linkage can be made with isotopic evidence – based in the presence of ^{18}O – from Lake Miragoane, in Haiti, which reveals "[a] trend toward distinctly drier climate in the circum-Caribbean…beginning about 3000 B.P. [years before present]" (Hodell, Brenner and Curtis 2000, 25). Further evidence comes from Lake Chichancanab, in Mexico, where the paleo-climatic record suggests that the trend towards desiccation which began at ca. 3000 B.P. culminated in extremely barren conditions between 1300 and 1100 B.P, which is equivalent with A.D. 800-1000 (Ibid.). Consequently, this time frame coincides with the collapse of the pre-Inca societies of the Wari (which lasted from 600-1000 A.D.), and Tiwanaku (which lasted from 400-1100 A.D.) (Kolata 2013, 38). The evidence from the Peruvian Andes is derived using similar methods to those mentioned above, in ways such as lake sediment cores, and also in different ways, such as ice core samples (Mosblech, et al. 2012, 1361-72; Thomson, et al. 1994, 83-95).

[19] The eight zones are ordered as follows: the *chala*, the *yunga*, the *quechua*, the *jalca*, the *puna*, the *yunga*, the *rupa-rupa*, and the *omagua* zones. Each subsequent zone increases in altitude until the *puna*, after which altitude decreases (Sandweiss and Richardson 2008, 94-7).

The in-filled lake of Maracocha, in the Patacancha Valley, shows major climatic and vegetation shifts during 100 and 1050 A.D., of which the latter date corresponds with the fall of the Tiwanaku Empire (Chepstow-Lusty, Bennett, et al. 1998, 169). Beginning in 100 A.D., there are indications of temperature cooling in Peru, as well as increasing aridity in Mexico (Ibid.). Due to the global climate flux during the Holocene period, these two climatological events are linked. The lake sediment from Maracocha also reveals a period of unrelenting aridity that commenced in 880 A.D., followed by ever increasing temperatures from 1100 A.D. that lasted Spanish arrival in 1532 (Chepstow-Lusty, Frogley, et al. 2009, 375). This warming allowed the Inca's to exploit higher elevations for agriculture by constructing terraces that engaged glacial-fed irrigation, as well as agroforestry (Ibid.). The Quelccaya ice core reveals oscillating periods of dry and wet periods which occurred over the last millennium in the Peruvian Andes (Thompson, Davis and Mosley-Thompson 1994, 92). The ice core also shows that during periods of reduced precipitation, conditions may have been more advantageous to human occupation and cultivation of crops such as potatoes, oca, olluco, quinoa, and other foodstuffs (Ibid.). Thus, climate did not entirely debilitate Andean societies. In contrast, it very much assisted in the stabilization of civilization in the area. However, in instances of extreme climatological change, the benefits were oftentimes outweighed by the detriments. Ortloff and Kolata (1993, 216) assert that enduring drought resulted in the failure of raised-field agricultural systems and with the breakdown of this essential agricultural foundation, the Tiwanaku state's political structure shattered.

The initial periods of drought beginning in the sixth century were hardly detrimental to the Wari Empire; on the contrary, the Wari exploited this period of aridity by introducing their irrigation and terracing techniques of agriculture to newly conquered regions in order to successfully expand their territorial control (Mosblech, et al. 2012, 1362). Records in the Quelccaya ice core dated to 600 A.D. and 920 A.D. indicate dust events which are interpreted by Clarke Erickson (2000, 322) as evidence of intensification of raised field agriculture. The increase in human-altered environments is directly related to the drastic climate change during this period, and was responsible for the success of agricultural production, which in turn resulted in political stability.

The obligation of Highland cultures – such as the Wari and Tiwanaku – to dealing with seasonal differentiations in rainfall, large temperature ranges between ecological zones, and steep terrain, helped to develop the raised-field system of the Tiwanaku, as well as the terracing and irrigation systems of the Wari Empire (Chepstow-Lusty, Frogley, et al. 2009, 375). The intensive agricultural methods of the Wari and Tiwanaku societies over the course of several hundred years may have caused environmental degradation. It is stated by Clark Erickson that "[d]eforestation [in the Lake Titicaca Basin] is attributed to long-term climate change, Precolumbian human degradation, and Colonial or modern degradation" (2000, 320). He goes on to suggest that the initial creation of terraces may have actually increased the rate of soil erosion through the removal of stones and slope flora (Erickson 2000, 322). Nonetheless, long-term effects of terraced agriculture "probably reduced the impact of major erosional events over the past millennium"

(Chepstow-Lusty, Bennett, et al. 1998, 166). Terraced agriculture and irrigation systems used by the Wari were more than twice as efficient in their water usage as Tiwanaku systems and allowed for practically uninterrupted maize production for many centuries (Williams 2002, 365; Mosblech et al. 2012, 1371). However, when drought conditions persist for centuries at a time – as they did during the period circa 600-1000 A.D. – agricultural yields will indubitably diminish.

Allison Paulsen (1976, 128-29) uses Malthusian theory to speculate that the intensification of agricultural strategies ultimately leads to population expansion and furthermore, a lengthy "Andean pluvial" between 500 B.C. and 600 A.D. led to population expansion in the Andean *altiplano*, which created demographic pressures that demanded an increase in agricultural production. Paulsen then claims that the drought that occurred during the Middle Horizon period

> …provided the extra subsistence pressures that triggered a series of military conquests which in a comparatively short time extended the Huari empire from Chicama to south Peru. About A.D. 800, the Huari centre collapsed, perhaps because the economic surplus necessary to underwrite the apparatus of empire could not be maintained in the face of a worsening Andean climate (Idem., 129-20).

The climate record that is documented by the lake sediment core from Maracocha shows a major erosional event that occurred around 700 A.D., and a general increase in inorganic content, which is further indication that humans were manipulating the environment unsustainably (Chepstow-Lusty, Bennett, et al. 1998, 165). Due to the fact that Maracocha is located just outside of Cuzco (which neared the center of the Wari Empire), it is likely that this period of sustained aridity, coupled with the unsustainable agricultural methods, caused agricultural yields to plummet. The lack of crop production – especially "prestige crops" such as maize – most likely resulted in massive food shortages (Kolata 2013, 39). This lack of produce would likely have caused social unrest, and political instability. In addition to the lack of fertile soil and the lack of agricultural production, competition over water resources led to intensifying conflict towards the late 600s into the 700s (Williams 2002, 367). This conflict was not just among the Wari peoples, but also between the Wari and Tiwanaku states (Idem., 361).

Although drought hit hard for the Wari Empire in the late seventh century, in the Lake Titicaca Basin, major drought did not strike until the mid-11th century (Chepstow-Lusty, Bennett, et al. 1998, 165). For this reason, the Tiwanaku civilization surpassed the Wari Empire in its longevity as a state. For the Wari, drought that began in the seventh century persisted until their collapse around 800 A.D., which I propose is chiefly due to unsustainable usage of intensive agricultural methods. Evidence for increased alteration of the environment is captured in the Quelccaya ice core: "Two major dust events centered on AD 920 and AD 600 provide evidence of the possible impact of man on the pre-Hispanic environment of the *altiplano* in southern Peru" (Thompson, Davis and Mosley-Thompson 1994, 93). It is also important to note that the dust event circa 600 A.D. lasted 130 years (Idem., 91), which almost certainly was caused by intensive agriculture – especially terracing – undertaken by the Wari Empire. Thus, sustained periods of

drought, accompanied by intensive agricultural projects, led to the aridification of soil, which in turn led to decreased agricultural yields. This decreased production of food, combined with an increasing population and competition over water resources, led to the collapse of the political infrastructure of the Wari, and the collapse of the empire.

The Tiwanaku state succumbed to similar climatic phenomena as their contemporary. From 1000-1400 A.D., there was a rise in temperature and a decrease in precipitation (Ortloff and Kolata 1993, 204). Similarly to the collapse of the Wari, Ortloff and Kolata argue that the ubiquity of lowered precipitation in the post-AD 1000 time-period was the catalyst that triggered the collapse of Tiwanaku agricultural foundation, and ultimately, the disintegration of the state as a whole (Ibid.). The Tiwanaku state relied heavily on rain-fed agricultural systems, as well as wetlands agriculture supplied by spring and groundwater seepage (Idem., 210). The severe drought that was recorded by the Quelccaya ice core resulted in severe water shortages at the end of the 11th century, causing many agricultural fields to fail (Idem., 211). The warming temperature that accompanied the chronic drought during this time period shifted agricultural "supply zones", which in turn spawned grave social catastrophe for a political system experiencing an aggregate of economic stress (Ibid.).[20] Thus, the collapse of the Tiwanaku state – although it occurs three centuries later – was precipitated by a nearly identical chain reaction that decimated the Wari; an extended period of drought caused the agricultural system of the state to fail, which led to the fragmentation of the political structure, and ultimately resulting in collapse. Nonetheless, the very same climate change that wreaked havoc on the Andean societies of Wari and Tiwanaku proved favorable to the Inca Empire in the following centuries.

The Rise of the Inca Empire

By the time the Tiwanaku state had disintegrated in the late-11th century, the Inca people were already beginning to gain power. Although the established "standard" of the emergence of the Inca Empire begins with King Pachakuti's ascension to the throne in 1438 (Kolata 2013, 35), the Inca roots can be traced back significantly earlier than the 15th century. Many aspects of Inca society, including religious beliefs and technological innovations, were built upon existing Wari practices (Mosblech, et al. 2012, 1371). Alan Kolata (2013, 40) states that "Wari organizational, logistical and infrastructural structures and processes likely served as significant historical models or templates for the architects of Inca imperium, facilitating the Inca's rapid geopolitical expansion." These "structures and processes" include the agricultural methods of terracing and irrigation employed by the Wari. Yet, the efficiency of the Wari agricultural techniques could not sustain agricultural production for the entire empire during prolonged and excessive drought, but the Inca systems could.

The underlying justification for this reality is climate change. Jared Diamond claims:

> …after AD 1100, during the Northern Hemisphere's Medieval Warm Period, temperatures rose, enabling the Incas to extend agriculture to higher elevations,

[20] This increase in economic stress is due to the fact that the Tiwanaku state had an agrarian economy (Ibid.).

> increase their arable-land area, exploit increased glacial meltwater for irrigation, store more food for their armies, and grow alder trees for nitrogen fixation and timber. Thus, although the Incas' military and administrative organization was essential to their conquests, climate amelioration played a part (2009, 480).

The increasing temperatures brought about during the "Medieval Warm Period" allowed for agricultural production to be extended into higher ecological zones, such as the *Jalca* and the *Puna* zones (Sandweiss and Richardson 2008, 96-7). Despite warming temperatures, precipitation remained low, as it had during the collapse of the Wari and Tiwanaku civilizations. This arid climate maintained the need for irrigation and terracing, but nevertheless, water was in abundant supply due to increases in glacial melting (Lamadrid 2013, 2). This augmented supply of water was not of such significance that intensive agriculture was unnecessary, rather the opposite.

The warm, and relatively stable climatic conditions present after 1100 A.D. allowed the Incas to adapt their irrigation technologies in order to make use of the year-round melt-water supply (Chepstow-Lusty, Frogley, et al. 2009, 385). This is a major contrast to the constantly fluctuating climate a few centuries earlier, where substantially cooler conditions constrained the ability of the Wari people from expanding their agricultural production to higher elevations (Ibid.). The climatic conditions during the rise of the Inca (post-1100 A.D.) permitted a massive amount of environmental manipulation and landscape transformation (Ibid.), which allowed for increased agricultural production. Just as agriculture was pivotal for the expansion of the Wari state, the Inca, too, was an agrarian society, and with a surplus of agricultural production came political unification and imperial expansionism.

When viewing Inca conquest through an environmental (and specifically climatological) lens, it can be asserted that a stable climate is the first condition that is required for the success of a civilization. The chain-reaction occurs in the following way: stable climatic conditions allow for successful, and excessive, agricultural production. This stable production of food allows for population expansion, as well as the successful development of societal and political structures, which results in the formation of a state. The expanding population results in a need for more territory, and so imperial conquest soon ensues to ease demographic pressures within the borders of the state. At this point, an empire is formed, and its success can be traced directly back to favorable climatic conditions. From this juncture, if the state effectively manages its ever-increasing population, and can successfully supply all of its people with the necessities for survival, then the empire will remain prosperous. However, if the state cannot supply its people with necessities, such as food and water, the society will begin to decline. Looking at decline as a factor of the environment results in another chain reaction.

When the climate enters a state of oscillation, many crucial institutions of a society – such as agricultural production and water availability – can also become unpredictable. In the instance of drought (as in the case of the Wari and Tiwanaku cultures), the climatological transference from wet to dry required agricultural innovation. After a sustained period of drought however, the

agricultural systems of both societies collapsed. The decline of agricultural systems in a society causes societal unrest, which can lead to increased internal and external conflict over resources. Thus, climate which causes agricultural failure will likely result in political fragmentation, leading to collapse of state structures. For the Wari and Tiwanaku civilizations, this domino-effect led to their demise. For the Inca, however, the cause for collapse was related to a different result of climate variation.

The Collapse of the Inca

By the 16th century, the Inca Empire was the unquestioned hegemonic power in the Peruvian Andes. Unfortunately for the Inca, a foreign threat was approaching: this threat was the Spanish. More specifically however, the threat was disease (Crosby 1967, 321). There are many other explanations as to the fall of American empires to the Spanish conquistadors. Alfred Crosby states:

> …the advantage of steel over stone, of cannon and firearms over bows and arrows and slings; the terrorizing effect of horses on foot-soldiers who had never seen such beasts before; the lack of unity in the Aztec and Incan empires; the prophecies in Indian mythology about the arrival of white gods. All of these factors combined to deal to the Indians a shock… (Ibid.).

Regardless of these factors – some of which were caused by environmental stress, such as the "lack of unity" – climate was the precursor for collapse of the Inca. This is for the sole reason that warmer climate and increased demographic pressures provided ideal environments for the spread of pathogens, such as smallpox.

Smallpox is an airborne pathogen, and in hosts with no prior contact with the disease, the infection spreads rapidly (Geddes 2006, 152; Crosby 1967, 324-5). Symptoms of smallpox include high fever and vomiting, followed by skin legions and pustules (Crosby 1967, 326). If the person survives this stage of the infection, the pustules dry up and form scabs which fall off and leave pocks, for which the disease is named (Ibid.). The entire infection process lasts roughly a month, and if the person survives, they are immune (Ibid.).

This disease, along with other pathogens, spread quickly from the Caribbean to the Yucatán Peninsula, where smallpox ravaged the Aztec Empire, leaving it vulnerable to Spanish conquest (Crosby 1967, 328-29). Smallpox (and possibly malaria) then made its way down through the Isthmus of Panama and into South America, where the infection quickly spread throughout the Inca domain (Idem., 331). Between the years 1525 and 1528, smallpox, measles, or possibly a combination of the two viruses, began to devastate the indigenous population within the Inca realm (Kolata 2013, 243). The lack of immunity among the aboriginal populations led to massive mortality rates, exterminating a large portion of the Inca Empire's population (Geddes 2006, 153), however, the exponential death rate was not enough to completely destabilize the Inca Empire; this required the death of a more powerful figure.

The warm climate and the large population of the Inca state helped to facilitate the spread of smallpox. The chain-reaction towards collapse however, is not put into motion until the death of Wayna Qhapaq, the Inca King (Kolata 2013, 244). Wayna Qhapaq died of hemorrhagic fever in Tumipampa, Ecuador around the year 1527 (Ibid.). The king's death was followed by the fatality of his son, Ninan Kuyuchi, and "[i]n one swift stroke, the Inca Empire had been decapitated, and the royal succession cast into a state of uncertainty" (Ibid.). This pandemic killed approximately one-half of the population (Crosby 1967, 333), and successfully assassinated the political leader of the empire, along with a majority of his family.

Following the death of Wayna Qhapaq, a brutal civil war erupted between two of the king's sons, Waskhar and Atawallpa (Kolata 2013, 245). At the culmination of the conflict, Atawallpa was successful, but simultaneously lost the war. The true victor of the Incan Civil War was Francisco Pizarro and the Spanish conquistadors. On November 16, 1532, the Inca Empire fell to the Spanish (Idem., 252). Although resistance to Spanish rule would continue for centuries, the political system of the Inca was dismantled with the death of Atawallpa. Regardless, how does the demise of the Inca Empire relate to climate change? Simply stated, the increasingly warming climate, accompanied by increasing population, allowed for the transmission of Old World pathogens brought by the Spanish explorers in the 16th century. Diseases, such as smallpox, quickly spread throughout the Americas, decimating the native populations that they came in contact with. The pandemic successfully exterminated roughly half of the Inca population, among the death toll the Inca emperor himself and his successor. In Mexico alone, the population was reduced from "30 million to less than 2 million" in just 50 years (Geddes 2006, 153). Thus, the climatological alterations facilitated the spread of disease that disrupted the political system of the Inca Empire, causing further fragmentation through civil war, leading to a severely weakened political structure. This allowed the Spanish to conquer the Incas without substantial resistance.

Conclusion

Between the years 500 and 1532 A.D., three major Andean societies established hegemony in the Andes, and all three collapsed. Many factors influenced the success and failure of these civilizations, but one of the most significant was climate. Climate, unlike many other factors, seems to have caused both positive and negative impacts on these civilizations. Periods of aridity and cooling temperatures contributed to the development of intensive agricultural techniques, including terracing and irrigation. Conversely, periods of warming brought about a surplus of water from glacial melting. Due to the fact that all three civilizations were agrarian in nature, agriculture was a determining factor of success or failure for the Wari, Tiwanaku, and Inca states, and when environmental and climatological factors benefited agricultural production, these societies thrived. However, when these factors hindered production, these civilizations weakened.

For the Inca, due to the globalization efforts of the Europeans, successful agriculture was not enough to prevent collapse. The warm climate that was beneficial to agricultural production, also proved beneficial to pathogen dissemination. As a result, the Inca demise was a unique occurrence for an Andean society, due to the influence of foreign biological agents, specifically smallpox,

which had not been seen before in South America, and to which the native populations lacked any immunity.

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Experimental Archaeology: Vinette I Production during the Northeastern Early Woodland period

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Introduction

The field of experimental archaeology has long attempted to reproduce Native American pottery in authentic ways with local materials. Unfortunately, the Northeast of North America is an under explored region and therefore the archaeological record is currently incomplete. We have a tenuous understanding of the prehistoric periods, protohistoric cultures, and historic Native American groups, but a temporal record is insufficient when considering the goal of understanding the first Northeasterners. The lack of information on pre-Iroquoian people is an unacceptable truth, which our research attempted to reconcile. In an attempt to explore the people of the Early Woodland period through their pottery-style and gather a notion of their material culture, we investigated the properties of the earliest ceramics found in the region; Vinette 1.

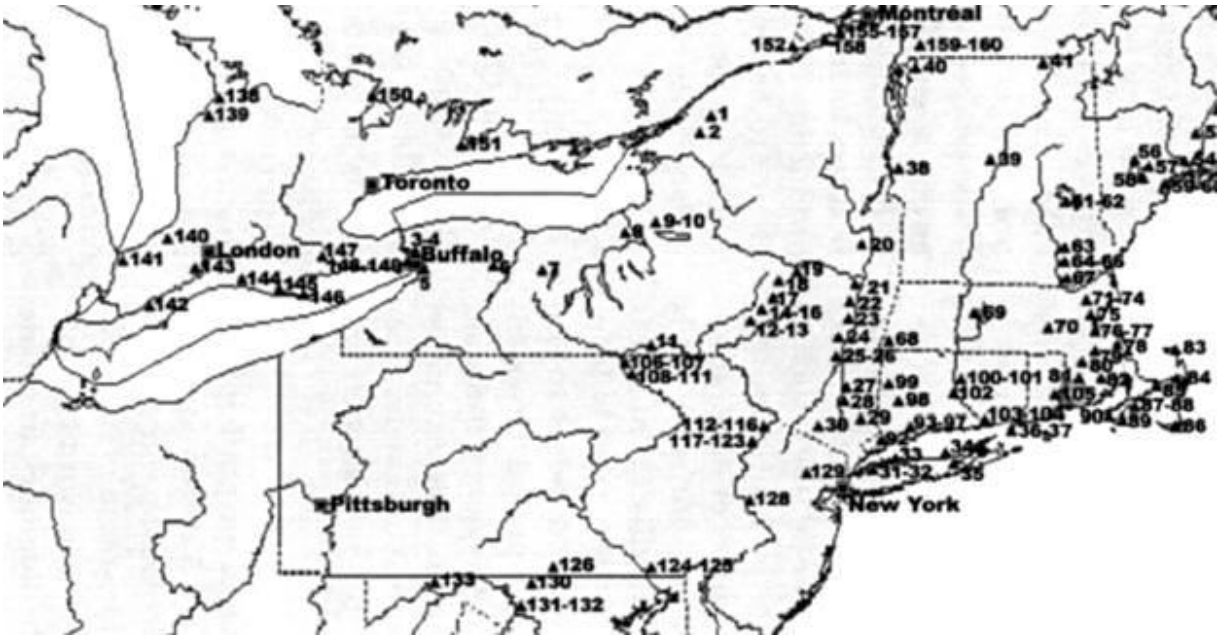
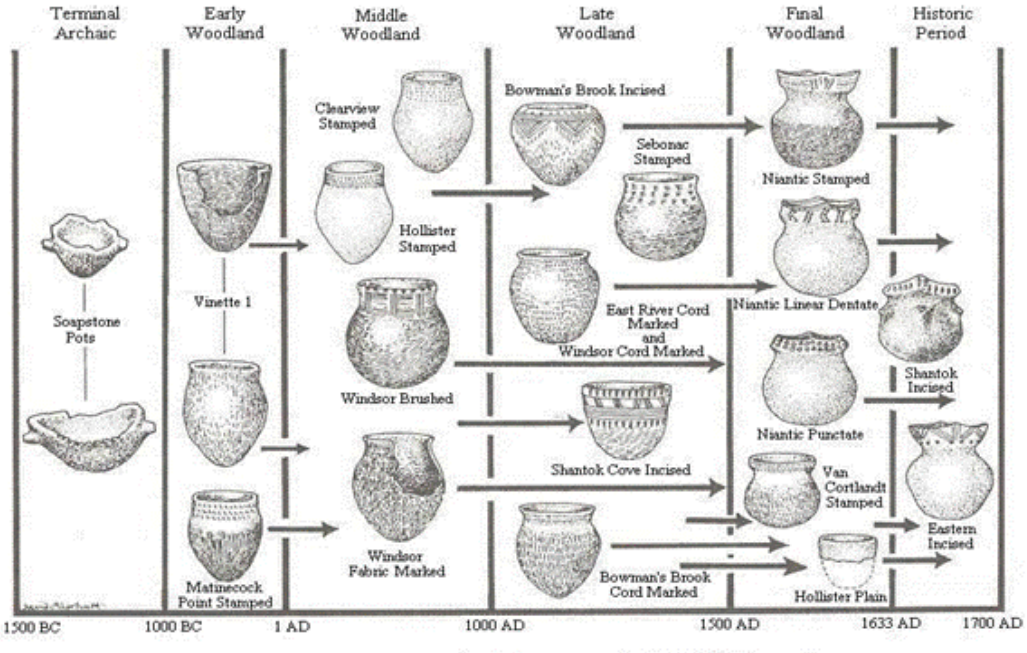


Fig.1: Northeastern sites containing Vinette 1 pottery

There is a wide distribution of Vinette 1 pottery across much of the Northeast United States. First identified at a site in Brewerton, New York, Vinette 1 ceramics are the most common early form of pottery found in the region and date to roughly 1,000 BC (Tache 2005). Vinette 1 is characterized as coil-constructed, thick-walled, and cord-pressed pottery (Jackson 1986). Richie and MacNeish outline the properties of Vinette 1 as being tempered by fine and

coarse grit containing quartz, and textured on the interior and exterior using a corded paddle (Ritchie and MacNeish 1949). The pottery is conoidal and elongated with straight-rounded rims and ranges in color from grey to black (Ritchie and MacNeish 1949). In spite of our recognition of Vinette 1 pottery, very little is known about its production, function, and cultural value. This is a direct result of the crude characteristics of the crumbly ceramics, which fail to survive in Northeastern climate. Additionally, the homogeneity of the pottery results in an incomplete record of the wares, as well as a lack of recognition of spatio-temporal variations (Tache 2005). Consequently, it is necessary to explore the properties and production of Vinette 1 because it has the distinction of being the first type of ceramics produced by Northeasterners and the archaeological record suffers from a lack of information.

Figure 2. Timeline of Northeast U.S. Pottery



Our research is a pilot study meant to explore Vinette 1 production with emphasis on tempers and resulted in a number of new questions which future research could attempt to solve. As a result, our research reproduced Vinette 1 pottery using a variety of tempers in order to explore why the archeological record presents findings that suggest the earliest Northeastern potters used primarily quartz-grit temper although other resources were available for use.

Experiment

In order to explore why people used different types of temper, as well as why grit temper is most often found in the archaeological record of the Northeast in North America, ceramics need to be made using accurate resources and analyzed. Authentic materials, as well as firing methods used in this experiment attempted to produce ceramics as close to those found in the archaeological record.

Materials

To maintain authenticity as well as create genuine vessels similar to those found in the archaeological record, many of the materials gathered for the experiment are sourced New York State the area because Vinette I was found only in the Northeast of the continental United States (Ritchie and MacNeish 1949). In experiments based on a specific archaeological context, the materials used must remain as authentic as possible. The materials we chose for our experiment were chosen due to how authentic they were and how similar they were to the archaeological record. The clay chosen was from a modern clay company that advertised their clay as being Northeastern U.S. clay. The tempers were sourced from Lake Ontario. It is found in the archaeological record that sites used two different types of tempers, the two types of tempers being grit and shell (Tachè 2005). The grit used is found to be two different sizes, fine and coarse, while the shell is shattered into fine pieces (Ritchie and MacNeish 1949).

A. Clay

The clay chosen for this experiment was a blend of Laguna Clay purchased from Clayscapes Pottery Inc. in Syracuse, New York. The formula for the clay consists of a formula found in the Northeast. Although the clay that Native Americans used thousands of years ago is not readily available, it is as close to a naturally sourced Northeastern clay that can be found today, aside from making clay which is incredibly labor intensive. Additionally, we needed to control as many variables as possible and so it made sense to buy manufactured clay which offers a Material Safety Data Sheet listing contents. This specific clay was made up of very few materials including Cristobalite, Crystalline Silica, Talc, and Titanium Dioxide. As well as the company listing the materials that form that clay the percent for each material were also given.

Figure 3. Breakdown of elements in clay bought for the experiment.

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT NAME	Maximum Percent	CAS NUMBER	OSHA PEL TWA: (mg/m3)	NIOSH REL TWA: (mg/m3)	ACGIH TLV TWA: (mg/m3)
Cristobalite	11	14464-46-1	5 mg/m3 / % SiO2 + 2	0.05	0.05
Silica, Crystalline (Quartz)	33	14808-60-7	10 mg/m3 / %SiO2 + 2	0.05	0.05
Talc (non asbestiform)	12	14807-96-6	20 mppcf		2
Titanium Dioxide	2	13463-67-7	15		10

B. Temper

The tempers used were fine grit, coarse grit, and shell fragments. All materials were sourced from Lake Ontario. Fine grit is primarily quartz particles, while the coarser grit is large quartz particles mixed with small

Figure 4. Tempers

pebbles. The shells were found whole and were later smashed to be incorporated into the clay. It could be argued that shell should not be tested since grits are far more common, but anomalies occur in any archaeological record and therefore should be explored. We know that the Batiscan site in Quebec contains Vinette I pottery, as well as three other types of pottery of which the only difference was the presence of shell as a temper (Tachè 2005). Since both shell and grit were found within one site we hypothesize that other Early Woodland period sites might also contain ceramics tempered with both shell and grit.

Pictured are the tempers used in the experiment. On the top and left are larger fragments that were extracted from the coarser grained temper on bottom, and the crushed shell on the right. In both instances the largest pieces were sorted out so the tempers could remain the same size for even distribution. We also removed medium to large stones from the fine grit mixture for the same reason.

Ceramic Construction

After all of the tempers were sorted we began to create the pots needed for the experiment. The vessels we produced did not follow a strict adherence to the form of Vinette I ceramics, instead they resembled high sided bowls. We recognize some may question this choice, but because we are not testing the effectiveness of the size or shape of a Vinette I pot, form is not an issue. Instead, our experiment focused on how temper affects the characteristics of the clay.

A. Wedging and Tempering

After the clay was measured out into uniform weights, the entire block of clay was wedged and temper was added. Wedging is the process of throwing clay at a hard surface which helps remove air bubbles. Air bubbles in clay can cause a vessel to be weak and even crack or explode when during firing. Each piece of clay was wedged for several minutes to ensure no air bubbles remained before adding temper. In the case of the control ceramics, the coils were made following wedging and no temper was added. We did not want tempers in our two controls because we needed to see how the clay reacted without temper in order to inform our findings and assess how the temper affected the different clay mixtures. Six clays contained temper: Two clays had ¼ cup of shell wedged into the clay, two others had ¼ cup of fine grit wedged in, and the last two had ¼ cup of coarse grit wedged into both.

B. Coiling

After each piece of clay was wedged and temper was added, or not, a base was made so the coils could be stacked. Each base was a uniform size of 5 inches in diameter with a thickness of about ½ inch. After the base was constructed, more pieces of clay were taken off the larger piece and further wedged. After the small piece of clay had been wedged, it was rolled into a uniformed sized coil of ½ inch. Six coils were made, stacked, and attached with a watery clay mixture called grog, which acts as cement to hold coils in place. The sixth and final coil was made to act as a sort of rim for the vessel. The goal was to create uniform wall-thickness, base-thickness, coil-size, height, and weight

Figure 5. Coil

Figure 6. Finished Pot

in order to produce ceramics with similar features.

C. Smoothing and Paddling

Following construction, a shell or flat sided wooden stick was used to smooth out the interior and exterior so as to blend the coils together create smooth walls and strengthening coil bonds (Jackson 1986). The smoothing of walls is a way to prevent any breakage during the firing. Many pots have been found which are broken along coil lines, so by smoothing out the walls and erasing the lines between coils it decreases breakage during firing. The shell was used as a more authentic option on smoothing out walls as it was a readily available tool all those years ago. Once the scraping and smoothing of the walls was done the next step was to texture the outside of the pot as seen on the pots and sherds found in the archaeological record (Ritchie and MacNeish 1949). The paddle used was made from a block of wood and some twine wrapped around it. Traditionally, the paddle may have been similar; a piece of wood with some type of organic fiber wrapped around it. The paddle was then used to texture both the inside and the outside of the vessel. The researcher placed their hand on the opposite side of clay where they would be paddling and texturing the clay or slowly pressed the cord into the clay. The choice was up to the potter and how they wished to make impressions were upon the pot, but the indentations essentially the same.

Figure 7. Tools used during experiment

D. Drying

After the pots were done being made they were set to dry in a cabinet until the following week when they could be fired. Four of the pots were done first so they were set to dry with a damp paper towel around them, which slowed the drying process, until the last four could be completed and begin drying entirely, as a group. Finally, we simply let the vessels dry until leather hard.

Figure 8. Pot drying until leather hard

III. Firing

Initially, our ceramics were to be fired in a kiln in order to ensure the pottery survived, so that the characteristics could be examined and any inconsistencies noted. However, acquiring a kiln for personal use is a difficult proposition and was ultimately unsuccessful. As a result, it was decided that a pit-fire would be constructed. Ultimately, members of the project came to the consensus that it worked in our advantage to attempt a pit-fire as it is a traditional means for producing pottery, is most likely the means by which Early Woodland potters performed their task, and only magnified the authenticity of our entire experiment. The firing process consisted of two parts: pit-fire construction and firing the ceramics.

A. Pit-fire Construction

In order to ensure the form and contents of the pit-fire were not only accurate, but also constructed in such a way that the ceramics would be fired successfully; advice was taken from contemporary potters practicing the traditional pit-firing method. A ceramic company, Ball Clay Studio, outlined the practice of pit-fire construction and excluding any modern technology (i.e. cardboard lining, paper combustibles, and lighter fluid), we constructed our pit. Upon the recommendation that the pit-lining be dry and as mentioned before, instead of using cardboard as suggested; we utilized a more authentic means for drying the pit. Over the period of an hour and a half, the pit was dug and a small-fire set within to expedite drying and remove moisture common in Northeastern U.S. soil. Following this step, construction of the pit began. Materials such as logs, sticks, leaves, and twigs had been collected beforehand in order to complete the firing uninterrupted and ensure dry resources. The pit-kiln was 3 feet in diameter with sloping walls which reached a maximum depth of 14 inches. The stratigraphy and contents of the pit were documented and the entire structure took half an hour to complete.

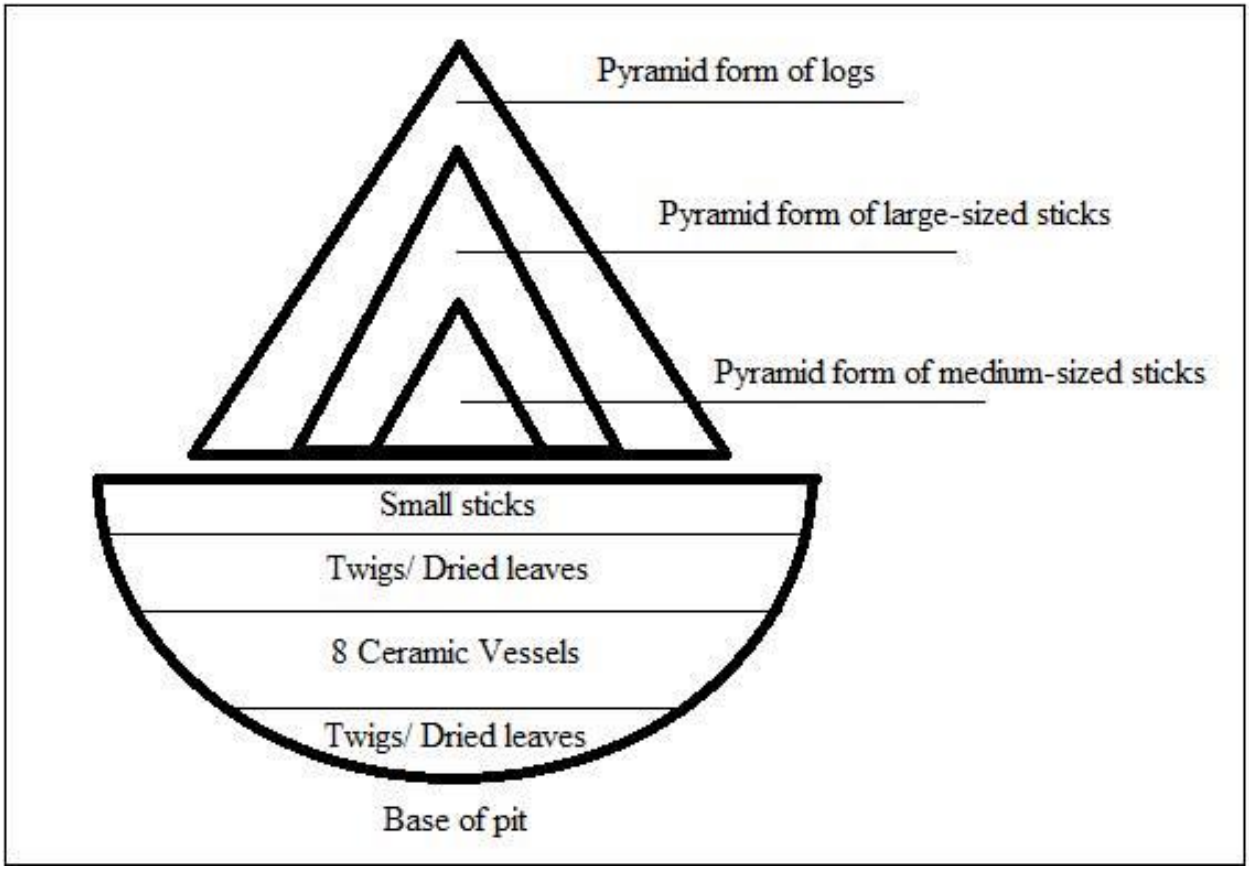


Fig.9: Pit-fire stratigraphy

B. Firing

Following the construction of the pit-fire, the process of firing began. The logs were set alight at 1:15pm and the firing continued for slightly over 3 hours when smoldering commenced at 4:45pm and ceased nearly an hour later. The goal of our pit-fire was simply to expose the ceramics to enough heat for long enough duration to vitrify the pottery. Additionally, upon completion of the actual fire, when smoldering begins, the pots must be left to absorb the heat before the ashes and charcoals burn out. Following this step, the pit was backfilled to retain heat and left overnight to continue baking, and cool. The following day the backfill was shoveled away down to the layer of ash and then hand-dug in order to find the pottery without damaging any. The process of production and firing of the pit-fire from start to finish took nearly 24 hours, but the entire experiment was far longer considering the time spent constructing vessels.

Fig.10: Results of ceramic firing upon excavation

Results

After the vessels had been buried for twelve hours, we removed the soil. Unfortunately, we did not find our eight vessels underneath. What we uncovered was a large pile of sherds. At some point during the firing process, the vessels either exploded or cracked along multiple faults, effectively destroying the shape. The sherds do not seem to follow the shape of the coils, but instead follow a seemingly random pattern of breakage.

The tiny sherds were large enough to discern their temper inclusions. The largest sherds came from the vessels made with fine temper grit. The shell tempered, coarse grit tempered, and control vessels all yielded smaller sherds.

Fig.11: Sherds recovered from pit-fire

Many different variables could have influenced these results. The first is simply an undesired reaction of the clay in the fire. The shattering of the vessels could have been a result of shrinkage during the firing process, which would have caused the vessels to implode. It also could have been a result of the addition of too much temper into the clay.

A temperature response could also be a reason for the failure. It is possible that the fire reached a higher heat than desired, and the excess heat led to an explosion of the vessels. Additionally, this experiment was conducted in the month of April, which is prone to temperature swings. If the temperature change from day to night was too drastic, the shock could have shattered the vessels.

Furthermore, despite the fact that the sherds do not follow the lines of the coils, it is possible that there were faults in our construction methods. However, we do not believe that the failure was a result of construction, because thin walls or air pockets would have led to cracks or weaknesses in the walls, but not an explosion.

Finally, the failure could have been a result of the use of the wrong firing technique. Based on our research and discussions with potters, we chose to utilize pit firing. However, there are

multitudes of different ways in which clay vessels could be fired, and it is possible that a different method could have been effective.

Conclusions

As previously stated, the fine grit sherds constituted the largest of the vessel remains. We believe that it is highly plausible that the reason fine grit is found most often in the archaeological record is because fine grit pottery is more resilient than pottery constructed with coarse grit or shell temper. We do acknowledge that this may not be the only reason for its significance in the archaeological record. However, we find it notable that in a location which had all three types of temper, an experiment in pottery making has indicated strength in fine grit in the firing process over the other two. We further hypothesize that this strength comes from the inclusion of quartz in the grit, which performs better than shell under heat as shell burns. Additionally, the smaller grain mixes into the clay to a more uniform consistency than the large grit.

Our vessels may have shattered, but the reason for the failure cannot be answered. Perhaps it was because we used too much temper. However, the amount of temper generally used in Early Woodlands pottery is not a subject that has been explored. The argument can also be made that the failure was a result of our choice of firing technique. A wood fire would have certainly been used over tools such as ovens or kilns. What we do not know is the exact contents of the fires, length of firing, placement of vessels, and other important factors and variables that were used. We did our utmost to make sure that we conducted our experiment in the most historically accurate way possible, but we feel it important to note that these variables may be inaccurate due to lack of base information, and could have seriously altered our results.

We believe that our experiment is not a failure, but rather calls attention to the significant gap in the existing knowledge of Early Woodland pottery. In our research, we found no information regarding pottery production methods, cultural practices, or pottery functions for the period. We simply found information regarding tempers, inclusions, regional variations, and aesthetic qualities. While this information was certainty useful, it was simply not enough to construct a completely historically accurate experiment.

The lack of information available is indicative of a gap in the archaeological record, which our research is most certainly representative of. However, there is value in attempting to better understand prehistoric people through their material culture and processes. Undoubtedly, Vinette 1 pottery is of great importance to the record, as it is the first type of Northeastern ceramics, but it is far more important for what it can tell us about some of the earliest inhabitants in the region and the first to produce pottery.

Questions for Further Research

In many ways, this experiment yielded more questions than answers. We find this an exciting opportunity to deepen the knowledge of Early Woodlands pottery. In order to strengthen our argument, we acknowledge the need for further research. We propose research on the following questions:

- What alternative firing techniques could have been used? Is a variation on wood firing and burying the proper method, or perhaps pots were unburied on the side of the flames?
- What can the extensive labor put into the creation of one vessel tell us? Was this a communal activity, or the result of specialization? Is the extensive labor a reason for the small amount of findings?
- What does the failure during the firing process tell us about the function of the pottery? Is their delicacy with fire an indication that they were used for storage rather than food preparation?
- What is the correct ratio of temper to clay? How does this impact the firing process or usage?

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Word, Sound, and Power: Transformation of Rastafarian Consciousness through Dread-talk

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Abstract: This article examines the types of language modification employed by Rastafarians in speech as well as the ideological concepts embedded in these modifications. The origins of Rastafarian word-play and linguistic innovation are rooted in Afro-Caribbean beliefs in the oppressing or uplifting power of the spoken or written word. "Dread-talk" is therefore regarded by Rastafarians as a means of subverting the negative effects of the use of Standard English and patois among Jamaicans and of actively resisting Western cultural imposition in Jamaica. Moreover, it is seen to produce a positive psychological transformation in the speaker by emphasizing personal empowerment and identification with the Rastafarian community as a whole and with Jah (God). Several categories of Rastafarian usage are examined in depth, including modifications to existing English words, "I-words," and the appropriation of English words for new, sacred meanings. Dread-talk is used both casually and in ritual settings such as Biblical recitation and interpretation and "reasonings," in which Rastafarians strive to express Rastafarian political and religious views through inventive word-play.

Introduction

In the Rastafarian worldview, modern Western society is associated with oppression, injustice, materialism, and lies, and is therefore known as "Babylon," the Biblical city of evil. Rastas do not respond to Babylon with passivity or escapism. Instead, they seek to actively overthrow Babylon in their daily lives by rejecting its imposed values and ideology and by expressing their own through diet, physical appearance, speech, and religious practice. The importance of Rastafarian language especially should not be underestimated: not only is "dread-talk," as it is commonly called, a means of rebellion and a unifying force among Rastas, it also works to transform Rastas' consciousness by allowing them to constantly reiterate the central tenets of their faith, keeping them spiritually uplifted and reminding them, every time they speak, of their own personal power.

Rastafarians are keenly aware of the power of the spoken word to oppress, degrade, or empower. Rastas often quote from the Gospel of John ("the Word was God, and the Word became flesh") in order to illustrate their conception of the word as "dynamic and forceful, not

just representative, arbitrary, and static" (Owens 1976: 178-179). The Rastafarian doxology "Word, Sound, and Power" correlates with their belief that the word is more valuable than material wealth and more powerful than violence as a tool for change (Owens 1976: 179). Barry Chevannes writes that the idea of language's ability "to acquire deeper levels of meaning than the literal, to create and to destroy" was present in Jamaican culture long before the appearance of dread-talk (Chevannes 1994: 226). Riddles, proverbs and pun-making are common and are considered to carry "almost the determining character of Fate" (Beckwith 1929: 199). Chevannes suggests that the Bantu concept of the *nommo*, a creative force that brings objects and living things into existence by naming them, may be at the root of the Jamaican folk beliefs surrounding the power of the spoken word (Chevannes 1994: 225).

Although Jamaican puns and proverbs may have been a point of departure for the Rastafarians, dread-talk developed far beyond simple word-play, and through its everyday use Rastas distance themselves from mainstream Jamaican society and Babylon as a whole. Rastafarians recognized Caribbean society under colonial power as a "pigmentocracy" in which blackness was "equated with lowliness and servility" and the Afro-Caribbean people "evaluate[d] their goodness in terms of their degree of approximation of the European ideal" (Pollard 1982: 19; Edmonds 1998: 30). According to the Rastas, the English language in Jamaica—including both the Standard English imposed by colonial Britain and the Jamaican Creole that evolved from it—is one of the tools that has historically been used by Babylon to deceive and debase the Jamaican people, reinforcing their belief in their own inferiority (Edmonds 1998: 32). In a culture where the ability to speak "proper" British English is a symbol of respectability, Rastas' creation of their own dialect is an act of defiance and a refusal to conform to Babylonian values (Edmonds 1998: 32). Furthermore, dread-talk acts as an "in-group" language, identifying the speaker as part of the Rastafari movement (Kebede and Knottnerus 1998: 509). Others may hear dread-talk terms as "linguistic crudities," but in fact these terms find their origins in Rastafarian ideology and "convey a whole range of meanings to the initiated" (Edmonds 1998: 32-33).

A close examination of dread-talk reveals that each term or phrase is deliberately chosen, and potential psychological effects on both the speaker and the hearer are carefully considered. One category of dread-talk usage is based on the perception that the spelling or pronunciation of Standard English words hide their true meaning (Pollard 1982: 21). In reaction, Rastas modify these words in a way that makes them more "truthful." For example, the first syllable of the word "oppression" is thought to phonologically resemble the word "up," and thus the word is changed to "downpression" in order to better illustrate the concept behind it (Pollard 1982: 21). Similarly, the dread-talk term "higherstand" is thought to better convey the empowering nature of knowledge than the Standard English "understand" (Pollard 1982, 33). From the Rastafarian point of view, one participates in one's own deception by using the confusing language of Babylon. Through use of the more "truthful" dread-talk terms, on the other hand, one begins to see reality.

Turning Standard English usage on its head also serves to reverse the oppressive values and worldview of Babylon and to promote the positive, liberating message of Rastafari. For

"there is...redemption in the pursuit of peace and love and in the uncompromising acceptance of self as the child of God (Jah)—black, proud, resourceful, and free" (Nettleford 1976: xiii). Rastafarians seek out what they perceive to be negative connotations in the spelling or pronunciation of Standard English words and replace them with words or sounds that imply a more positive emphasis (Simpson 288). Thus "sincerely" becomes "Icerely," "dedicate" ("*dead*-icate") becomes "livicate," and "appreciate" ("appreci-*hate*") becomes "apprecilove" (Kebede and Knottnerus 1998: 509). This practice belies an acute awareness among Rastafarians of the potentially negative psychological influence of the consistent use of negatively-charged words. For the Rasta, a word "can kill or cure" and "every word carries a vibration" (Simpson 1985: 289). Language thus becomes an important weapon for the Rasta in the struggle against Babylon.

A second major category of dread-talk vocabulary, that of the so-called "I-words," serves a similar purpose. This type of language modification developed as a reaction to the practice in Jamaican Creole of using the pronoun "me" in both the subjective and the objective case (Edmonds 1998: 33). For Rastas, this consistent use of the object pronoun is indicative of the Afro-Caribbean people's perception of their role in Jamaican society: they see themselves as "object[s] of hostile social and historical forces rather than...self directed being[s], capable of creative thought and action" (Nettleford 1976: ix). As an antidote to this "distressing obsequiousness," Rastas replace all first-person singular pronouns--subjective, objective, and possessive--with the subject pronoun "I," emphasizing the agency and dignity of the individual (Owens 1976: 46). Indeed, Rastas are "known by all to be proud individuals, imbued with a potent sense of their own dignity and self-worth" (Owens 1976: 46). Just as the use of "me" in Jamaican Creole both reflects and perpetuates Afro-Caribbean people's negative self-perception, Rastas' repetition of "I" in everyday speech reiterates the concept of self embedded in the word and effects a transformation of consciousness. The theoretical dignity of the Rastafarian as expressed in speech gives birth to the real, tangible dignity of the Rasta as observed by others and sensed by the Rasta himself.

The first-person plural pronoun "we" is replaced in dread-talk by the phrase "I-and-I" (pronounced "I-n-I"). In addition to affirming the dignity and agency of the self, "I-n-I" implicitly affirms an equal dignity and agency for the other and expresses the unity of the self with the other and with all Rastas (Kebede and Knottnerus 1998: 510). Furthermore, the use of "I-n-I" is a reaction to the tendency of political movements to lump Afro-Caribbean people into categories such as "the masses," "the proletariat," or the "little people" (Nettleford 1976: xv). "I-n-I" emphasizes the Rastafarian belief that each member of "the masses" has "a personality, an individual and finite identity, a divine dimension with direct routing to the Creator, Jah, himself" (Nettleford 1976: xv).

"I-n-I" is also sometimes used in place of first-person singular pronouns, suggesting an additional, deeply spiritual meaning. "I-n-I" represents a "harmonious synthesis of the empirical and the metaphysical": it implies that the speaker is one with Jah (God), whether the universal god principle or the Ethiopian emperor Haile Selassie I, Jah's earthly incarnation. It also illustrates the idea that Jah is an imminent presence available to the Rasta for aid and

communication, "an active force with which to be reckoned" (McFarlane 1998: 108). Here again, the use of a word charged with meaning has a psychological effect on the speaker: it creates a state of consciousness in which the individual is united with God and with his fellow man, and is empowered by this unity.

The "I-words" are perhaps the most prevalent and distinctive category of terms in dread-talk, attesting to the primary importance in Rastafarian ideology of personal empowerment and recognition of the unity of the self with Jah and with other Rastas. In addition to serving a pronominal function, "I" is also used to replace the first syllable of particularly important or spiritually significant words in Rastafarian vocabulary (Owens 1976: 67). Thus "creation" becomes "I-ration," "amen" becomes "I-man," and "brethren" becomes "I-dren" (Pollard 1982: 33-34).

Occasionally, seemingly everyday words become "I-words," as in the case of the word "I-tal" ("vital,") which is used to refer to the Rastafarian diet (Owens 1976: 66). "I-tal" food is usually vegetarian or vegan, consists mainly of fresh fruits and vegetables and other organic and unprocessed foods, and does not include salt, coffee, or alcohol (Owens 1976: 166). This diet is intended to be respectful towards God's creation (by avoiding animal cruelty and Babylonian processed and chemically-treated foods, which are detrimental to the health of the individual and the environment) while keeping the mind clear (Kebede and Knottnerus 1998: 503). By associating the word for "food" with the self, Rastas become aware of both their ability to elevate their consciousness and overthrow Babylon through simple lifestyle choices. Staple foods in this diet are sometimes elevated to "I-word" status, as in the case of "I-matis" for "tomato," "Inago" for "mango," and "Inana" for "banana" (Pollard 1982: 34). By using these everyday "I-words," the Rastafarian is conscious of the fact that the natural foods he eats are a part of Jah's creation, like the Rasta himself, and therefore part of the "I" that unites Jah, Rasta, and the universe.

A third category of dread-talk usage assigns new meanings to Standard English words in order to call the attention of the Rasta to the holiness of the world around him. For instance, the pipe used to smoke the sacred ganja is known as a "chalice" (Pollard 1982: 30). Rastas may greet one another with "blessings" and wish each other "guidance" from Jah in lieu of a farewell (Pollard 1982: 29 and 31). In contrast to many other religions, which reserve reverence for specially sanctified spaces and objects, the Rasta recognizes the sacred in everyday settings and acknowledges it through the use of dread-talk terms.

Other novel uses of English words are intended to elevate the consciousness towards recognition of the dignity of man and his unity with Jah. In many cases, emphasis is placed on a physical, upward movement. The word "heights" is often used as a greeting or a blessing, and "high" is used for positive emphasis (as in the Rastafarian version of Psalm 19:14, quoted below) (Owens 1976: 66). Rastas invariably replace the word "back" with "forward" as a way of emphasizing their hope for the progress of black people (Chevannes 1994, 168). Chevannes describes a humorous incident involving this particularity of dread-talk usage:

The fetishism was displayed at a 1975 youth conference, which included Dreadlocks and other youths influenced by the Rastafari, when a senior official of the government in addressing a

Plenary Session used the phrase "go back to our history." Interrupted with reproving shouts of "forward," he repeated the phrase. Again came the correction. This time he simply ignored them and continued. And the point he was making was one they were in agreement with. (Chevannes 1994: 169)

Chevannes argues that Rastafarians' insistence on the use of dread-talk terms goes too far, often becoming so complex as to be incomprehensible to outsiders (Chevannes 1994: 168). But observers note that Rastas have a markedly more positive notion of self than non-Rastafarian Jamaicans, and the influence of Rastafarian speech and ideology in Jamaica is growing (Owens 1976: 46; Pollard 1982: 29). One could argue that Rastafarians' pride is a result of the empowering ideology of their faith rather than a product of dread-talk specifically, but the power of the word should not be underestimated as a constant reinforcement and affirmation of Rastafari's positive message.

The verb "to see" is also significant in dread-talk. Babylon has, so to speak, pulled the wool over the eyes of the people, and only the wisdom of Rastafari can help them to rediscover the truth. The words "seen" or "sight" are used among Rastas as interjections in order to express agreement or understanding: "the Rastaman 'reasoning' with a group will frequently interrupt himself with this interjection, and his listeners on the other hand, are allowed to use the same sound to mean 'yes I understand'" (Pollard 1982: 21). The Rasta is not expressing opinions to be intellectually grasped by his fellow Rastafarians, but truths to be inwardly "seen" and recognized as truths.

Rastas frequently play on words involving sight and blindness. For example, University College of the West Indies was commonly referred to by Jamaicans in the 1970s as "U.C.". Rastafarians, on the other hand, believing the university to be a Babylonian institution that brainwashed its students, referred to it as "U Blind" (Chevannes 1994: 168). Likewise, the name of Jamaican politician Edward Seaga was changed to "Blin'aga" (Chevannes 1994: 168). Rastas sometimes play on the homonymity between "eye" and "I," as in a comment by one Rastafarian who compared the lack of awareness of Babylon with the awareness of his fellow Rastas: "But eyes have they and see not, only Fari could see..." (qtd. in Pollard 1982: 21).

Many of the types of dread-talk terms discussed above are embedded in the name of the emperor Haile Selassie I, giving it special significance to Rastas. "Haile" is pronounced by Rastas as a homonym of "highly", a word evoking upward movement and also used to refer to ganja, a sacred tool for Rastafarians (Owens 1976: 66). The sound "see" appears at the beginning and the end of the name "Selassie", indicating that Jah (in the form of Haile Selassie) will lead the Rasta to true knowledge and that he is the beginning and the end, the Alpha and Omega (Pollard 1982: 21). The Roman numeral *I* is read as "I", reminding the Rasta that he is "another Selassie", a part of God (Chevannes 1994: 167).

Even the emperor's pre-coronation name is significant: "Ras Tafari" was adopted as the name of the Rastafari movement and is often interpreted as "Rasta-for-I", "an ascription of Jah's care of his own and...a statement of faith, namely, that one has decided and is committed to follow Jah's guidance (McFarlane 1998: 108). Because the "I"—the "first principle of Rasta

life"—comes at the end of Rastafari, the name of the movement is seen to encapsulate the principle of reversal that is so important to Rastafarian ideology, the "conscious effort to transvalue existing patterns and principles in society" and to overthrow Babylon (Macfarlane 1998: 108).[21]

Dread-talk is used by Rastas both in casual, everyday conversation and in ritual settings. For Rastas, the King James version of the Bible brought to Jamaica by British colonizers is problematic: not only do Rastafarians believe that the English translation necessarily fails to capture the essence of the original scriptures, they also maintain that the white translators left out or drastically modified passages in the Bible in order to use it as a tool to justify the oppression of black people (Owens 1976: 31-32). The Bible requires extensive study and analysis if one is to arrive at its true, hidden meaning (Owens 1976: 33). Although many Rastafarians are intimately familiar with scripture and are able to quote it at length in conversation, they also place an emphasis on individual communication with Jah and "a book within, a book that was born in me, that has never been revealed" (qtd. in Owens 1976: 34-35). When used in ritual, in prayer, or in conversation, Biblical passages are often "translated" into dread-talk, as in this Rastafarian version of Psalm 19:14:

May the word of I mouth, the meditation of I heart, be accepted in thy sight, almighty Jehovyah Father, I-n-I strength, I-n-I redeemer, Jah, who liveth in Mount Zion high, Selassie-I, who liveth in the hearts of man, woman and children, O thou most high, Adoni-I high, Selassie-I. Thanksgiving and I-ses high, Jah-high, Selassie-I. Thanksgiving and I-ses high, Jah-high, Jehovyah-high, Jah, RastafarI. (qtd. in Owens 1976: 66)

These adaptations deepen the significance of traditional Christian scripture for Rastafarians and offer a myriad of new possibilities for interpretation.

An important context for the interpretation of scripture and for the creative use of dread-talk is the Rastafarian ritual of "reasoning." Joseph Owens points out that this form of conversation among Rastas is not a casual discussion nor even a philosophical dialogue but "a sacramental act which makes the Lord himself present and reveals the depths of reality to the brethren" (Owens 1976: 186). Reasonings are competitions of eloquence and rhetorical skill in which everyone is given a chance to speak and each speaker strives to best embody the spirit of Rastafari (Chevannes 1994: 226). They thus become stages for elaboration of Rastafarian ideology and creative developments in dread-talk: there is "free creation of words and symbols, long and intricate argumentation, effusive and spontaneous prayer, [and] sober analyses of local problems and world events" (Owens 1976: 186). Ganja is used "in abundance" to keep the discussion flowing, and Rastas are upset if the reasoning is interrupted or if distractions interfere

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Rastas' own names are also embedded with dread-talk symbolism: upon conversion, many Rastas change their names to reflect their new, empowering self-conception, so that "David" becomes "Ivid" and the surname "Everton" becomes "Iverton" (Kebede and Knottnerus 1998: 510).

(Owens 1976: 186). The act of speaking during a reasoning is known as "chanting," a word which hints at the near-meditative nature of this type of ritual speech, and at Rastas' sense of being inspired or possessed by Jah while speaking (Chevannes 1994: 168).

Dread-talk is not universally acknowledged as a creative and liberating form of self-expression. Richard Burton, for instance, points out that "the supposedly subversive 'Dread Talk' of the Rastafarian man-of-words cannot signify unless the dominant language it opposes is simultaneously present in the mind of the speaker and hearer alike" (Burton 1997: 134). Rastafarians may make modifications to Standard English as a way of rebelling against Babylon, but they are forced to stay within the confines of the language of their oppressors. Rastafarians are aware of this paradox, and indeed, many do learn Amharic, a language native to Ethiopia and held as sacred within the Rastafari movement (Owens 1976, 54). For Rastas, this is a way of reconnecting with their African roots and of expressing themselves in what they consider to be a more authentic way.

But Rastas have an additional response to Burton's argument, which can be explained by the popular Rastafarian phrase "Liberation before Repatriation." Many Rastas hope to one day physically relocate to Ethiopia, but others interpret "repatriation" in a metaphorical sense, seeking the "psychological and cultural reappropriation of their African identity and culture" (Edmonds 1998: 31). In both cases, repatriation is not given to the Rastas, but won by them: before a mass exodus from Babylon can occur, Rastafarians must overthrow Babylon in their own minds and lives. This concept has its origins in an address to the Jamaican people by Haile Selassie I during a visit in 1966. The emperor told Rastafarians that they would need to liberate themselves in Jamaica before repatriating to Africa (Kebede and Knottnerus 1998: 511). The Rastafarians seek not merely to escape from Babylon, but to win their freedom from it through thought and action. Thus, whereas the adoption by Rastas of a completely different language would represent an escape, the adaptation and advancement of English—the language of Babylon—represents a rebellion.

Dread-talk was originally intended to be a secret language, keeping outsiders excluded—and indeed, many non-Rastafarians are baffled by Rasta speech (Pollard 1986: 157; Chevannes 1994: 168). But the Rastafari movement has swiftly gained popularity; as of 2012, experts estimate that they make up 8 to 10 per cent of the Jamaican population, and their numbers are growing steadily in the United States, the United Kingdom, continental Europe, and elsewhere (McFadden 2012). Even outside the Rastafari movement, dread-talk has been adopted by many young people in Jamaica and dread-talk terms and usages have been assimilated into mainstream Jamaican Creole (Pollard 1982: 25). It is impossible to know whether the widespread popularization of dread-talk has effected the same kind of transformation in self-conception in the general population that the Rastas have experienced, but Rastafarians certainly believe this to be possible: the words a man uses are divine, for they "manifest the God that is within him" (Owens 1976: 182).

Dread-talk is far from set in stone. In fact, the constantly-evolving nature of the Rastafarian dialect is perhaps its most liberating feature. As the Rastafarian strives to reach ever-

higher states of consciousness, he is free to invent new terms, phrases, and usages to describe his experience. As these terms are adopted into dread-talk, they will serve as guides for the empowerment of other Rastas, revealing hidden meanings gradually through their use and variations. It is through this process that the Rasta discovers yet another meaning of "I-n-I": he, like Jah in the Gospel of John, possesses the power of the word and the ability to transform words into realities; he, like Jah, is a creator.

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