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DYNAMIC RECONFIGURATION OF PAWNEE SOCIAL ORGANIZATION IN THE PROTO-HISTORIC AND HISTORIC ERAS

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by

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The standardized practices and closed context of burials has created an excellent opportunity to observe social change among the Pawnee over time. The Proto-historic Period and Historic Period on the Plains are marked by external trade with Euro-Americans, requiring adaptation among Plains tribes to trade goods from the east. External and internal economies were altered by this trade. Levels of material wealth changed dramatically during these two periods. The purpose of this research is to gauge economic changes that occurred, and, if possible, make determinations based on ethnohistorical data as to why these changes transpired. Additionally, it may be possible to correlate mortality rates to known mass historic traumas; observe changes in cosmology; and observe other larger social changes as reflected by mortuary context. Multivariate comparisons of mortuary attributes at three Pawnee sites that span the Prehistoric, Proto-historic, and Historic Periods will be conducted utilizing SPSS (Statistical Package for the Social Sciences) to achieve these goals.

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LITERATURE REVIEW

Introduction

The standardized practices and closed context of burials has created an excellent opportunity to observe social change among the Pawnee over time. The Proto-historic Period and Historic Period on the Plains are marked by external trade with Euro-Americans, requiring adaptation among Plains tribes to trade goods from the east. External and internal economies were altered by this trade. Levels of material wealth changed dramatically during these two periods.

The purpose of this research is to gauge economic changes that occurred, and, if possible, make determinations based on ethnohistorical data as to why these changes transpired. Additionally, it may be possible to correlate mortality rates to known mass historic traumas; observe changes in cosmology; and observe other larger social changes as reflected by mortuary context. In order to probe deeper into these contexts a survey of the literature associated with the ethnographic history of the Pawnee and the Euro-American motivations of trade will be addressed. Additionally, a synthesis of mortuary analysis methodology as well as the physiological, climactic, and cultural sequences of the area in order to gain insight into many varied contexts that may have influenced the people who inhabited the region.

Multivariate comparisons of mortuary attributes at three Pawnee sites that span the Prehistoric, Proto-historic, and Historic Periods will be conducted utilizing SPSS (Statistical Package for the Social Sciences) to achieve these goals.

Recent changes in theoretical perspectives are moving beyond evaluating networks as simply trade or exchange (Kelly 2010). Previous studies that evaluated trade and exchange[1] through world-system approaches and acculturation models are now critiqued as having stifled the interpretation of archaeological assemblages as well as having portrayed indigenous populations as passive participants in a system that often evaluated only one aspect of trade (Stein 2002). These approaches not only ignored trade as a two way exchange, but they also failed to acknowledge any motivation beyond that of the colonizer. Recently, in an effort to overcome this type of bias in the analysis of exchange and trade, the incorporation of social identity and social context has become a popular approach when evaluating colonial encounters in the archaeological record (Stein 2002). This new theoretical foundation firmly reinforces that the acts of trade and exchange demonstrate power, as well as identity between the groups engaged (Kelly 2010). However, the exertion of power does not require that one party be aware of the other party's perceived advantage (Stein 2002).

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[1] Sociologists define trade as encompassing all interpersonal contacts, meaning that social behavior can be viewed as an exchange of goods, in a broader sense this includes non-material concepts such as information, ideology and values. Realizing this highlights the importance and variance that occurs during the exchange transaction and the relationship between the exchangers.

Agbe-Davies and Bauer (2010:15) define exchange as referring to "the transfer of goods from one party to another through a wide range of mechanisms, from ritualized gift exchange to the negotiated transactions of barter and markets and the one way exchange of coercion and piracy." Additionally, they delineate trade as a subcategory of exchange describing it as

> ...a more specific category of activity in which the exchange is more formalized and market based, both in the individual interaction and on a systematic a scale. Trade is thus one type of exchange relationship in which each interaction is usually "closed," or completed in a single moment of exchange of x for y, and which often occurs across otherwise powerful social and geographic boundaries. [Agbe-Davies and Bauer 2010:15]

Just as trade and exchange was of vital importance to the colonial powers, the same can be said for the Pawnee for whom the act of trade was a social exchange - an opportunity to create, confirm and strengthen relationships. Ceremonial exchanges were often meant to establish and reinforce allies or to settle rivalries through competitive exchange (Rogers 1990). By understanding social roles and how exchange occurs we can better appreciate the many different types of social relationships between the exchangers and therefore gain insight beyond the mere function of material goods that were exchanged (Renfrew and Bahn 2000). Different types of trade and exchange can provide valuable perspectives into the social relationships between the exchangers (Kelly 1999). When acknowledging trade in an archaeological sense it is also vital to be aware of the consumption of the traded materials. Understanding how wares are utilized can provide insight into their social and economic value (Renfrew 1993).

When cultural material is analyzed while employing strategies that are often applied to social structure the researcher is capable of viewing the goods for how they were utilized, as opposed to merely acknowledging their utilitarian value. By imposing social theories onto the use of such wares social, socio-economic, and political agendas can also be addressed (Bauer 2010). Objects identified as foreign, when incorporated by cultures, are done so on their terms and cannot serve as indicators of power over said populations (Rogers 1990). Therefore, objects from outside sources are incapable of providing evidence for domination based interaction models indicating acculturation or control over a group (Stein 2002). Artifacts are, however, capable of facilitating the analysis of the variable frames of interaction between groups (Stein 2002).

Lassitude

Bauer and Doonan (2002) noticed a marked decline in scholarly literature relating to trade that coincided with the shift from the processual to the postprocessual period. Agbe-Davies and Bauer (2010) attribute this dramatic waning to the postprocessual movement in archaeology. They suggest that the shift from a culture-history perspective to interpretive archaeology guided by the positivist approach may have influenced archaeologists devoted to the interpretation of social processes away from the studies of exchange. Rectification of this malaise toward exchange in the past twenty years is promoted by Agbe-Davies and Bauer (2010) by the amalgamation of "the processual models and techniques so thoroughly developed in the 1970s and 1980s and more current postprocessual concepts."

Stein (2002) advocates for the incorporation of social identity and social context when conducting archaeological analyses of colonial encounters. In what he has dubbed "interregional interaction" the conclusion has been drawn that world-system approaches and acculturation models have stifled attempts to interpret archaeological assemblages, especially those dealing with colonial situations. Stein further criticizes these methods as viewing the indigenous participants "as passive recipients of unidirectional influences" (Stein 2002:907). He suggests a "top down" and "bottom up" viewpoint (2002:907) of both agencies participating in the exchange in order to fully comprehend and interpret the exchange network.

Traded Items

The types of items traded can be broken down into two main categories: high prestige gifts and commonplace commodities. As their names imply high prestige gifts are characterized by their value and prestige and are often ceremonial in nature. And

commonplace commodities are more mundane in nature such as food stuffs, and household items or utilitarian goods. It is also important to understand the sphere of exchange- that valuables and commonplace commodities are not exchanged the same way, nor are they utilized in similar fashions.

Ceremonial exchanges were often meant to establish and reinforce allies or to settle rivalries through competitive exchanges. By understanding social roles and how exchange occurs we can better understand social relationships between the exchangers and then have a better understanding of the material goods that were exchanged (Renfrew and Bahn 2000).

Types of Relevant Trade

Karl Polanyi (1968) suggests that exchange or trade implies a two way transaction. He describes the three main modes of exchange as follows: reciprocity, redistribution, and market exchange. Balanced reciprocity occurs between people who know each other, but aren't necessarily family and is carried out in a definite social context. Negative reciprocity, where the exchanger attempts to do better than the other operates between strangers or persons who are socially separated from one another (Polanyi 1968). Renfrew and Bahn (2000:368) further describe reciprocity in terms of the location where the exchange occurs. They identify two spaces where this occurs: "home base" and "boundary." Home base is described as one trader traveling to the other's territory, where the act of exchange then occurs. When a common or neutral meeting place has been established (often at or near the territorial boundary) this type of exchange is deemed boundary reciprocity.

The final mode of exchange described by Polyani (1968) is market exchange where a central location is utilized for the exchange of goods, often involving the

negotiation of price or bargaining. Socio-politically market exchange is generally considered "internal," meaning that it is comprised of people who share a cultural identity, this is not always true, however, as ports of trade fall into this category but are comprised of diverse peoples meeting freely to exchange wares (Polanyi 1968).

Emissary trading and colonial enclave trade both employ the use of a group representative to accomplish the goal of exchange. In emissary trading one group sends their representative (that they control) to exchange wares with the other group. When the colonial enclave method is applied one group sends emissaries to construct a colonial enclave near the other group in order to facilitate trade with them.

Examining Trade in the Archaeological Record

When written records are lacking (or non-existent) it can be difficult to determine the mechanism of distribution within a trade or exchange relationship. However, often it is possible to determine the type of trade and distribution that occurred by intensive study of the artifact distribution and quantity. An understanding of different types of trade and distribution can provide incredible insight into social relations between the exchangers. When acknowledging trade in an archaeological sense it is also vital to understand the consumption of the traded materials. Understanding how wares are utilized can provide insight into their social and economic value. Additionally, understanding what led to the deposition of the artifacts can help overcome bias in the archaeological record. As mentioned earlier trade does not only include material culture but can encompass non tangible articles as well, so when studying trade it also wise to seek to understand the cultural change that also occurs when goods are exchanged (Renfrew and Bahn 2000).

Agbe-Davies and Bauer (2010:15) suggest studying the "social aspects of exchange and the manifestation of these themes in the archeological record," by

understanding context, communication, and consumption. Context refers not only to the location where exchange occurs but to social value based on cultural, ideological, and historical contexts (Hodder 1982:207). "Attention to social context could also lead one to consider the extent to which trade connections exploit or enhance existing relationships or even forge new ones" (Agbe-Davies and Bauer 2010:16). Locations of exchange can present physical contexts that demonstrate projectable and patterned associations where archaeologically evaluations can be carried out (Agbe-Davies and Bauer 2010).

Communication represents the attempt of archaeologists to get "beyond the material" (Renfrew 1993:5). The analysis of artifacts coupled with the discussion of artifacts as social objects has created a divide that is "arguably nowhere more extreme than in archaeological studies of trade, which have been dominated by statistical models and distribution curves and have frequently ignored the fact that trade is at heart a social activity, depending on interactions among people" (Agbe-Davies and Bauer 2010:19). Bauer (2008) has conceptualized that foreign materials utilized by populations may provide more information when viewed as representations or social symbols of connections between groups and locales rather than as mundane material goods.

Consumption unites the people and the material culture together. It is the "medium through which social relations are constructed and maintained" (Miller 1995:143,154). Agbe-Davies and Bauer (2010) suggest that consumption be reevaluated in an environment where choices are organized by not only social standing but by consumer aesthetics, style and cost. Analyses involving consumption seems:

> to rest on the assumption that consumer acts are generated in a free, ideal space constrained only by tradition or a desire to communicate meanings, especially to communicate (high) social or economic status. We wish to

> combine this emphasis on the meanings of material culture with the strengths of production studies, which are good at getting us to think about structured interaction among social actors (if sometimes rendered "faceless"), and which acknowledge that agents often act because they want to accomplish some particular end in the world or because social structures constrain or channel their choices. [Agbe-Davies and Bauer 2010:21]

When cultural material is analyzed while employing strategies often applied to social structure, relationships, and interaction the researcher is capable of viewing the goods for how they were utilized as opposed to merely acknowledging their utilitarian value. By imposing social theories onto the use of such wares social, socio-economic, and political agenda can also be addressed.

Exchange as an Indicator of Power

Historically, in archaeology the study of trade and exchange has focused on the eurocentric perspective and viewed the indigenous traders as passive, if not unequal participants (Stein 2002). However, when analyzed utilizing Polanyi's (1968) negative reciprocity as the model of exchange, it becomes clear that typically trade is a two way system where both parties benefit. This is critical when examining colonial trade with indigenous populations. In negative reciprocity each agent attempts to assert their dominance over the other in a social context where the parties are socially separated from one another, as in "intertribal" trade (Polyani 1968). The same can be said for emissary trading and colonial enclave trading (Renfrew and Bahn 2000), where the goal is to establish exchange relationships to acquire material goods (Kelly 2010). Often the underlying goal is to set up networks "that fall under the rubric of trade or exchange" but ultimately "are directly associated with exhibition of and maintenance of power relations

and identity between individuals and groups" (Kelly 2010). Tactically this fundamental ambition is logical and it is sensible that it would apply to both participants. "Power takes different forms," Stein (2002:907) additionally states "the fact that a polity can exert one form of power does not imply that it exerts others as well," one could add to this statement that the exertion of power also does not require that the other party is aware of the perceived advantage.

Objects identified as foreign, when incorporated by cultures are done so on their terms and cannot serve as indicators of power over said populations (Rogers 1990). Therefore, objects from outside sources are incapable of providing evidence for domination based interaction models indicating acculturation or control over a group (Stein 2002). Artifacts are, however, capable of facilitating the analysis of the variable frames of interaction (Stein 2002), they are diaspora marginality, diaspora autonomy, and diaspora dominance. Stein has illustrated these categories in his paper *Passive Periphery to Active Agents: Emerging Perspectives in the Archaeology of Interregional Interaction* with types of artifacts expected to occur in each instance.

Relevance

Kelly (2010:110) states that "the Hueda elite used the European presence to communicate essential elements of status to their neighbors and rivals." Furthermore he states that:

> ...the Europeans who brought trade goods were as important a commodity as the goods themselves. Furthermore, the European trading presence was a commodity that was consumed by Hueda and Dahomey to exercise social power, as were the goods. [Kelly 2010: 113]

Kelly (2010:104) in his essay on *Arenas of Action: Trade as Power, Trade as Identity* acknowledges that the Hueda (a Coastal West African tribe who traded with Europeans during the 17th century) "did not live in a vacuum." He suggests that European contact with neighboring tribes during the previous 150 years had allowed the Hueda the opportunity to observe the "consequences of exclusive alliance with specific European trading nations." This knowledge gave the Hueda the ability to control and exert power over the arena of exchange. It could be inferred then that Pawnee, who also witnessed contact between Euro-Americans and other tribes attempted to exert a similar control (or power) over their circumstances by aligning themselves in such a way to create a partnership with Euro-Americans. It is unclear what this alliance looked like from a material culture perspective. While the Pawnee adopted material culture from the Euro-Americans, records are opaque as to what degree this took place. The purpose of this investigation is to elucidate this vagarity at the least, and establish a baseline for future research into the adoption of foreign material culture by Proto-historic fringe groups at best.

Application

The utilization of a multidisciplinary approach combined with both processual and postprocessual theories provides the strongest foundation to approach the evaluation of exchange and trade relationships. By recognizing the types of trade that occurred between groups, acknowledging the value of social processes, and their influence on material culture a researcher can begin the process of addressing the various social, cultural, economic, and political associations affiliated with the material culture left in the archaeological record. This all-encompassing methodology has been well established within the last ten years in the field of archaeology. It is proving to provide a well

rounded overview of not only the material culture archaeologists deal with but also in supplying a great detail of data about the world view of the people being studied, gleaning great insight into their everyday life.

COLONIAL SOCIAL CONTEXT

The Louisiana Purchase

The intentions of the colonial powers: the Americans, the Spanish, the French and to a lesser extent, the British towards the Plains tribes, including the Pawnee, are clearly recorded in the journals of people such as: Lt. Zebulon Montgomery Pike, General James Wilkinson, and Lt. Facundo Melgares (Olivia 2006). The relationships between these colonial powers and the Native Americans who populated the areas west of the Mississippi were of great importance during the late 1700s and the early 1800s.

France was concerned about the English gaining more power in the Antilles Region, since the Spanish had lost Florida to them (Shepherd 1904:450). Initially, France had offered Louisiana to England (Shepherd 1904:451), who rejected the territory (Shepherd 1904:452). Louis XV ceded Louisiana to Charles III of Spain in 1762 (Shepherd 1904:450). Disguised as a political act of appreciation (for the loss of Florida by Spain) the cession of Louisiana to Spain was actually an economically motivated act (Shepherd 1904:453). The French colonies were failing and the possession of Louisiana was a costly burden for the French to bear (Shepherd 1904:452). Spain retrocessioned the area known today as the Louisiana Purchase back to France in October of 1802, to Napoleon (Stenberg 1934:42).

The understanding of political and economic motivations post-revolution is dependent on the understanding of Manifest Destiny, and the development of the American mercantilism movement (1763 – 1825) (Williams 1958: 421). Leaders during

this period (James Monroe, Thomas Jefferson, John Quincy Adams, George Washington, John Livingston, and Thomas Lee, *etc*.) were all supporters of expanding the United States territorially, but also economically (Williams 1958: 436). Generally speaking, the overall political attitude was expansionist with mercantilism being the main motivation for such a philosophy (Williams 1958: 434). The desire to become a powerful nation and to build an American Empire meant that any interference must be quickly remedied, by force if necessary – this included the Spaniards and the Native populations (Williams 1958: 435), as well the Barbary Pirates (Williams 1958: 434) and any other entity that inhibited American trade. The Louisiana Purchase was a prime opportunity to pursue such a philosophy (Williams 1958: 434).

It was during this period when the ownership of this area, now known as the Louisiana Purchase, whose western boundary had yet to be defined, was being contested by Spain after its sale to the United States from France. The United States and Spain also argued over the territorial rights to Texas and West Florida from 1803 – 1818 (Stenberg 1934: 53). Tactics employed by colonial powers include attempts to secure control over trade in an effort to dominate the tribes and the land which they occupied (Olivia 2006). But methods also involved the provisioning of tribes with arms and ammunition so they could defend their colonial allies if necessary (Olivia 2006). While the establishment of new colonial territories was important for these colonial powers, for the United States – a newly independent country as of the 1783 Treaty of Paris, and whose western border now had the potential to be shared by more well established countries, they were especially anxious to secure the lands west of the Mississippi (Olivia 2006).

Robert R. Livingston and James Monroe negotiated for the Louisiana Purchase for Secretary of State James Madison and President Thomas Jefferson (Kastor 2001: 819). They intended to acquire New Orleans and the Floridas, however, Napoleon would not offer any smaller amount of land than the Louisiana Purchase in 1803 (Kastor 2001: 819). For the United States this acquisition meant a territory whose borders were under dispute and the sudden governing over people who were previously loyal to other nations (Kastor 2001:820). With the acquisition of the Louisiana Purchase, the removal of the eastern tribes became a feasible alternative to acculturation (Keller 2000: 57). In fact it seems that one of the main motivations for the Lewis and Clark expedition was to gather information about the tribes west of the Mississippi, and to contrast that data with what was known about the eastern tribes in order to gauge how displacement of the eastern tribes into western tribe's lands would affect each group (Keller 2000:58).

The acquisition of the Louisiana Purchase by the United States changed people's nationality (Kastor 2001:822). The American government met with issues when it attempted to govern the newly acquired territory as communication between the Capital (Washington, DC) and New Orleans took nearly one month (Kastor 2001:826). There were four major issues the United States dealt with between 1803 – 1815: attempts to govern the newly acquired land, dealing with the contested border between Texas and Louisiana, attempts to acquire Florida, and the War of 1812 (Kastor 2001:827). Madison argued that West Florida had been included in the Louisiana Purchase (Kastor 2001:837). Late in 1810 the West Florida Convention declared themselves an independent republic, which led to the dispatching of troops, this independence was short lived ending in early 1811 (Kastor 2001: 839 – 840). The War of 1812 gave the United States the grounds with

which to seize the remaining portions of Florida, finally giving the United States control over this entire region of land (Kastor 2001:845). The 1819 (ratified in 1821) Treaty with Spain firmed up the boundaries of the Louisiana Purchase (Beers 1937:341).

Attitudes toward the Native Americans

Jefferson was a proponent of the "gradual acculturation" of Native Americans, a system by which amicable contact via government agents and missionaries would transform them into agriculturalists, which would make them private property owners, and remove the need for large territories, thus opening up these lands for settlers (Keller 2000:45). Essentially, the native tribes would be absorbed into the expanding Euro-American society, and be contented to do so (Keller 2000:45). This notion, however, was flawed. The tribes were content with their way of life and had no aspirations of emulating the foreigners that approached them (Keller 2000:46).

In 1802 a stipend of $15,000 was appropriated annually for Indian affairs (Keller 2000:47). Some of which was to be distributed to the tribes in the form of supplies or cash, and the rest was appropriated to the Indian Office of the War Department (Keller 2000:47). It was through this office that Indian agents were appointed to tribes, the underlying goal being to make available for a price "essentials for civilization" such as clothing, gunpowder, farm implements, and other goods. These goods were meant to initiate costly exchanges that were not covered by the annual appropriation, thus creating large debts that the native populations could not afford, forcing them to make compensation by ceding large areas of land (Keller 2000:47).

Missionaries were utilized to spread Christianity and lead by example what was expected of the tribes (Keller 2000:47). Among these programs were the ABCFM [American Board of Commissioners for Foreign Mission] (Keller 2000:47) from which

John Dunbar and Samuel Allis hailed. The War of 1812 disrupted the Indian policy (Keller 2000:48). Many tribes fought on the side of the British, which left many Americans against the idea of acculturation, including Thomas Jefferson (Keller 2000:56).

Initially the lands west of the Mississippi (Louisiana Purchase) were divided into two main regions: Indian Territory and lands suitable for settlement as distinguished by a law dated to May 28, 1830 (Gittinger 1917: 442). Settlers were directed to the south and into Texas and Iowa, often traveling along the Oregon and Santa Fe Trails (which went through the Indian Territory) (Gittinger 1917: 442 – 443). This arrangement seemed to work out well, so long as land was available to the settlers (Gittinger 1917: 442). By 1840, however, the desire to open up the west to settlers overrode the reluctance to settle the Indian Territory (Gittinger 1917: 443). The first proposal to make advances into Indian Territory was in 1844, when it was suggested that a corridor along either side of the Santa Fe and Oregon Trails be opened up and the indigenous populations living there be pushed north and south of the area (Gittinger 1917: 444).

In 1845 a bill was introduced by Stephen A. Douglas to create the territory of Nebraska, and along with it the creation of military posts to support the emigrating settlers and the trade routes that had been established there (Gittinger 1917: 444). Proposals were made a gain in March and December of 1848 to establish the territory of Nebraska (Gittinger 1917: 445). It was during this time (Gittinger 1917: 1848) that the commissioner of Indian affairs made attempts to remove native populations between the Platte and Kansas Rivers in order to make safe passage for settlers heading west to the newly acquired area of California (Gittinger 1917: 445). Yet another bill was introduced

in 1851 to form the territory of Nebraska (Gittinger 1917: 448). The Indian appropriation bill was passed in 1853 which allowed the president to negotiate for the procurement of native lands west of Missouri and Iowa (Gittinger 1917: 451). The territories of Kansas and Nebraska were established in 1853 (Gittinger 1917: 459).

Summary of Colonial Social Context

The state of affairs between the late 1700s and the mid-1800s were comprised of complex social, political, and economic conditions for both the Native Americans and the Euro-Americans involved. For the tribes on the Plains significant social restructuring due to contact with Euro-Americans coupled with unpredictable climate changes had left the tribes vulnerable to disease, starvation and the loss of traditional lifestyles. For the American government changes in political motivations altered the ways in which they regarded and treated the native populations. Initial desires to create amicable relationships with the native populations quickly dissolved once the issues surrounding the Louisiana Purchase were stabilized and it was recognized that the tribes (much to Jefferson's dismay) had no intention of being absorbed into Euro-American society.

PAWNEE SOCIAL CONTEXT

In order to evaluate the colonial encounter between the Pawnee and the Euro-Americans that began making consistent contact with them around 1777, it is necessary to understand the social contexts, social identity, and motivations of both groups, where that information is available. The records pertaining to Pawnee do not include firsthand accounts, therefore it is necessary to "set the stage" as it were using what is known about the economies, climate, intertribal and intratribal, relations, *etc*. so that an understanding

may be obtained as to the circumstances surrounding them during the Proto-historic and Historic Periods.

Intertribal Relations

Here, intertribal relations refer to the relationships between the Pawnee as a unified group (despite the fact that they were comprised of four bands) towards all other groups including other tribes and Euro-Americans. As will be demonstrated these relationships were often very complicated, with aspects of one relationship having dramatic influence over characteristics of another area. In fact, the environment on the Plains (climate, economy, trade, disease, *etc*.) has been described by other authors as geodialectic (Sherow 1992: 64). This term refers to the relationship between the Native Americans and their environment (climate, horses, drought, and wind) and how changes within one area caused sweeping transformations to the other components.

While it can be asserted that the Pawnee had relations (whether peaceable or hostile) with neighboring tribes the earliest historic records that demonstrate interaction with Euro-Americans and the Pawnee come from Spanish church records in the southwest dating to as early as the first decade of the 1700s (Brugge 1965: 185). Most of these records concern the baptism or burials of Pawnee, with there being a separate category for "Baptism of children of Pawnee captives and converts" (Brugge 1965: 185). Records indicate that most of the Pawnee mentioned had either themselves been taken captive against their will and sold as slaves (Brugge 1965: 187). There is also reference to an incident in 1694 where Navajos took the lives of captive Pawnee when the Spanish refused to ransom them (Magnaghi 1990: 87). Early records indicate that the Pawnee initially allied with the Spanish during the late 1700s, but by 1805 had all but ceased trade relations with them (Olivia 2006). In the "Report of the Indian Tribes who Receive

Presents at St. Louis" dated to 1777 the Pawnee are mentioned (Wedel 1936: 14). It seems likely that the cost of traveling to the southwest to trade with the Spanish may have had something to do with the ceased relations in the early 1800s. The Spanish sensing the tension sent an expedition to the Pawnee encouraging them to cease cooperating with the United States and requested their assistance in intercepting the Lewis and Clark expedition (Olivia 2006). This act did little to persuade the Pawnee to pursue further relations with the Spanish. In fact, the Pawnee are recorded as having fairly hostile relations with numerous Euro-Americans as well as other tribes between the early 1800s and about 1820 – 1825.

In 1825 Colorado tribes warred with the Pawnee in order to secure their hunting grounds near the Republican River (Flores 1991: 475). This created a "buffer zone" between them that would have been in present day western Kansas (Flores 1991: 476). In the early 1830s the Pawnee were at war with the Delaware, in order to maintain peace along the Platte the Indian Agent John Dougherty, the Indian Commissioner (Henry L. Ellsworth) and seven soldiers traveled to them, which resulted in the Oct. 9, 1833 Treaty with the Pawnee whereby they ceded the land south of the Platte in an effort to maintain peaceful relations in the areas along the trail westward (Beers 1937:350). In November of the same year (1833) the Pawnee and Otoes met again with the Delaware to create peace between the immigrant tribe (the Delaware) and the Pawnee and Otoes (Beers 1937:350).

The Pawnee had other tribes they continued to have conflicts with, such as the: Osages, Kansas, Cheyennes, and Sioux (Beers 1937:350). To stymie this in 1833 the First Dragoons made a display of power to the Otoes, Omahas, Arikara, and Pawnee (Beers 1937:351). A force of approximately 100 dragoons marched from Ft. Leavenworth to the

Rockies, where they cautioned the tribes to maintain peaceable relations and distributed gifts to them (Beers 1937:351). The dragoons remained in the area for a month where they threatened retribution would be had for acts of violence (Beers 1937:351). In 1843 the Sioux set out to exterminate the Pawnee (Beers 1937:359). In 1844, a display of howitzers was made to the Pawnee to exhibit the power of the American government; this was after disclosure of an apparent scheme to attack the Fremont party by the Pawnee (Beers 1937:360). During the 1850s – 1860s the Dakota (Sioux) [a nomadic tribe] occupied a portion of the Pawnee hunting grounds, and often had more frequent conflicts with them (Ewers 1975: 407).

Horses and Bison

Intertribal conflicts often resulted from competition over hunting grounds; the unlawful acquisition of women, horses, and other property; the quest for war honors; as well the general concept of otherness associated with outsiders (Ewers 1975: 397 – 398). Once these conflicts arose it was difficult, if not impossible to cease the associated hostile relations, and these antagonistic relationships were often continued by subsequent generations (Ewers 1975: 398).

There were numerous factors that led to the changes in economy, both within tribes, as well as between them (Sherow 1992: 67). For instance, Plains tribes had to adapt to the new economy produced by the horse trade (Sherow 1992: 67). Horses were traded west from the Spanish to Native Americans, then from the tribes to both other tribes as well as Euro-Americans to the east (Sherow 1992: 67). The introduction of the horse spurred the expansion of tribal territories, which also rearranged intertribal relationships (Flores 1991: 467). Horse raids (during the latter half of the 1700s) became the preferred method of military conflict (Ewers 1975: 402). These organized expeditions

required fewer participants (than battle) and the purpose was to secure horses, with little to no loss to the offense (Ewers 1975: 402).

Plains tribes (including the Pawnee) used horses for hunting and status (Sherow 1992: 67; Flores 1991: 483). Certainly trade existed in the New World prior to the emergence of Euro-Americans, however, they changed the trade patterns, materials, and the amount of trade that existed (Flores 1991: 467). The influx of trade goods from the east, such as awls (and other metal tools), guns, pots and pans, *etc*. all which reduced the time necessary to process hides which increased the output of goods, which increased the influx of more traded items (Sherow 1992: 67).

The increased hunting efficiency created by utilizing horses made the acquisition of bison easier for the Plains tribes (Sherow 1992: 67). Before the utilization of horses for hunting, Plains tribes often used the drive method as a hunting strategy (also to a lesser extent surrounds and fire drives) (Bamforth 1987:8). However, when horses began to be used this technique was all but abandoned (the Assiniboine and Cree, both horse poor groups, still used the traditional hunting techniques) (Bamforth 1987:8). Prior to regular horse use, after their biannual hunts the Pawnee would move the entire encampment to the kill site, after the incorporation of horses this practice became less frequent (as beasts of burden they "lessened the cost" of moving the kill to the camp, as opposed to moving the camp to the kill). The only exemption to this, even well into the Historic Period (~1830s), were very large kill sites, when camps would be moved to the kill site (Roper 1992: 357).

Given the data for inferred acquisition of horses, it is reasonable to assume that the Pawnee had generally well established herds by about the 1750s. Roper (1992: 360)

argues that the Pawnee were never rich in horses and that the introduction of the horse did not cause the expansion of their territory, though the Pawnee hunting range appears to have expanded around the mid portion of the 1700s (Roper 1992: 359), which coincides with the dates for established herds. Since archaeological records indicate a shift in hunting style after the acquisition of horses (Bamforth 1987:8), it seems reasonable to argue that the number of horses was sufficient enough to alter traditional hunting strategies, which would include not only the methods used for hunting, but also the territory utilized as hunting grounds.

Horses dietary needs mirror the needs of bison by 80%, the influx of horse populations, therefore, certainly effected bison populations, not only by grazing areas utilized by bison, but also by the amount of water required to maintain horse populations (Flores 1991: 481). Each horse required 10 -12 gallons of water per week (Sherow 1992: 69). Droughts in the early 1800s affected the grazing needs of the horses and general foraging patterns of bison indicate that they tend to congregate in the summer when food sources are more plentiful (with an exception being made for drought periods) (Bamforth 1987:3).

Watering sources are generally available in a few limited locales, which forces animals that are incapable of deriving the necessary amount of water from their food sources (grasses) to access watering sites (Bamforth 1987:3). However, during the winter their movements can be less predictable, as snowfall can compensate for the need to access water sources, until the accumulation of snowfall inhibits their ability to graze (Bamforth 1987:3).

Their appetites were demanding even during years with above average rainfall when the grasses would be the most nutritious. The short grasses can lose more than half their protein during the winter months (Sherow 1992: 71; Bamforth 1987: 4). However, during years of drought (especially the 1850s) the gastronomical needs of the horses would be exceptionally difficult to provide. During abundant rainfall one acre yielded on average 3000 lbs of grass, but during a drought it was reduced to a mere 450 lbs. During periods of normal rainfall one thousand horses needed about seven acres per day, which was increased during droughts to forty-two acres per day per one thousand horses (Sherow 1992: 69). Despite the winter migrations for hunting, the horses still lost significant weight during the winter.

Ethnohistorical Data on the Pawnee

Among the Pawnee, sororal polygamy was common, and the women found this arrangement advantageous (Wishart 1995: 513). Household work was shared between the wives. The senior wife distributed the food and made the major decisions for the lodge (Wishart 1995:514). Exogamous marriages between bands was the norm and levirate and junior levirate systems were also in place.

Pawnee women owned their lodges, farm plots, seeds, as well as the farming tools (Wishart 1995:513). Women manufactured most of the goods for trade (clothing, hides, pipestems, *et cetera*); as well as utilitarian wares such as: wooden bowls and spoons, and tipi covers (Wishart 1995: 514). Because women were largely responsible for manufacture, their skill level and production contributed enormously to her husband's status (Wishart 1995: 514). Men manufactured the weaponry, were mostly responsible for the political and religious duties; and were the primary hunters and defensive forces for the community (Wishart 1995: 515).

The ranks of chief and priest were passed down patrilinealy (White 1988: 173). Men with hereditary status and the appropriate knowledge gained political power (White 1988: 173). This knowledge could only be gained by learning from elder, experienced priests (White 1988: 173). The elder priest taught the aspirant priest over the course of a along apprenticeship, and he always "held back some of the secrets of the bundles and communicated them only when ready to die" (White 1988: 173). The link to the supernatural world was only accessible through chiefs and priests via the use of these sacred bundles (White 1988: 173). These sacred bundles "maintained and ordered the Pawnee world" (White 1988: 208).

There were also a number of societies that Pawnee men could participate in to distinguish themselves (White1988: 174). Warriors, war leaders, and doctors (shamans) were specialized groups of men who mastered the rituals and techniques of their respective society (White 1988:174). Though status was passed down patrilinealy, the kinship descent pattern was matrilineal (White 1988: 175). In the event that a marriage dissolved, the man left the lodge (White 1988:157), as the post marital residence pattern was matrilocal.

Economically, wealth was distributed horizontally through kinship, as well as vertically by status (White 1988: 176). Due to the nature of their social order, the "best" goods (high quality and those symbolic of status) were retained by the highest status individuals (White 1988: 176). Horses seem to be the only exception to this rule, they were not redistributed, and remained personal property (White 1988: 180).

Pawnee Division of Labor by Gender	Males	Females
Primary Subsistence Activities	Hunting	Plant crops
		Tend Crops
		Harvest Crops
Secondary Subsistence Activities & Household Activities		Butcher Animals
		Preserve Meat
		Care of Infants
		Care of Children
		Cook
		Collect Fuel
		Care for Ill
Other	Combat/Military	Prepare Skins
	Weapon Production	Make Leather Products
	Medicine	Basket/Mat weaving
	Political Decisions	Pottery Production
	Sacred Matters	Set up/Care for Tipis
		Care of Horses
		Pack/Haul Possessions

Table 1 Pawnee Division of Labor by Gender.
Table adapted from: Powers and Leiker 1998; Trimble 1985; Wedel 1985; White 1988; Wishart 1995.

Epidemics

Epidemics became one of the main causes for disrupting Native American societies on the Plains. Data dealing with endemic and epidemic diseases has been modeled as a continuous temporal loss; however, these events are indiscriminate, and are more closely associated with random spikes that affected the population's cultural and biological repositories. Morbidity rates in virgin soil populations, which are associated with communities that had no prior immunity, effected the entire population. Subsequent epidemics and endemics created disproportionate loss of life with higher mortality rates among children and the elderly (Trimble 1985).

Tribes that practice horticultural modes of subsistence promote a more sedentary lifestyle, and were afflicted at much higher rates than their nomadic neighbors (Powers and Leiker 1998). Smallpox and measles are both communicable before symptoms present themselves, consequently, carriers are unaware that they are infected and are more likely to continue interacting with society - leading to higher rates of infection than diseases that present symptoms during the infectious period (Trimble 1985). (See table below: Adapted from: http://www.bt.cdc.gov/agent/smallpox/overview/disease-facts.asp).

Stage	Duration	Transmission
Exposure	Beginning of Infection	Not contagious
Incubation Period	7-17 days	Not contagious
Prodrome (Initial Symptoms)	2-4 days	Sometimes contagious
Early Rash	about 4 days	Most Contagious
Pustular Rash	about 5 days	Contagious
Pustules and Scabs	about 5 days	Contagious
Resolving Scabs	about 6 days	Contagious
Scabs Resolved	No longer Infected	Not Contagious

Table 2 Smallpox Stages, Duration, and Transmission.

Significant increases in contact between native peoples and fur traders began around 1790 (Trimble 1985). As Euro-American contact and trade became more commonplace, the sharing of trails and water sources also became routine, which exacerbated the spread of disease (Powers and Leiker). Between 1780 – 1837 there were 8 – 10 major outbreaks of disease that affected the Plains Tribes (Trimble 1985). It is suggested that after 1831, smallpox struck much more frequently and was the main cause for the greatly diminished population of the Pawnee (Wishart 2009). Both indirect and direct contacts with infected Euro-Americans lead to the transmission of diseases intra-tribally and inter-tribally. (Trimble 1985). While trade with Euro-Americans is causatively a highly responsible vector of disease transmission, other infected indigenous groups are also responsible for unknowingly transmitting disease. Horse raids and war parties were responsible for disease transmissions, as were other non-hostile interactions (Trimble 1985).

Year	**Disease**
1780-1784	smallpox
pre-1795	smallpox
1801-1802	smallpox/cholera
1830	smallpox
1831-1832	smallpox
1837-1838	smallpox

Figure 1 Pawnee Major Outbreaks of Disease.
Adapted from Trimble 1985 Table 2; Wedel 1936.

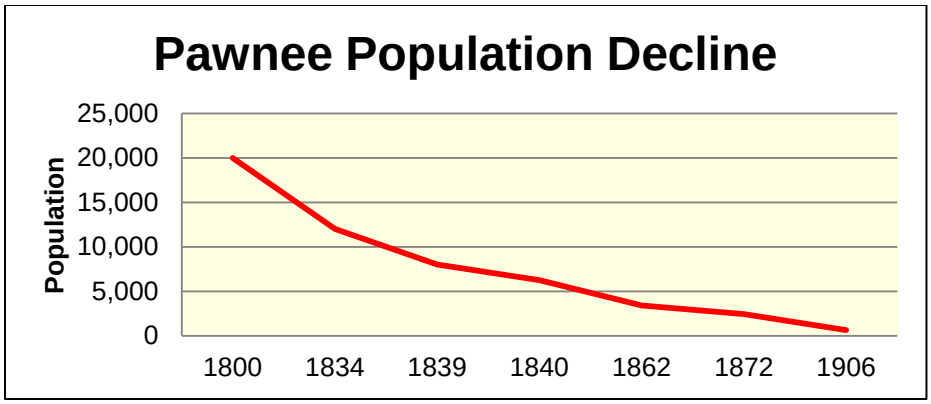


Figure 2 Pawnee Population Estimates and Census adapted from: US Government Census 1862, 1872, 1876, 1906; Wedel 1936; Wishart 2009.

During the Historic Period male to female ratios in Pawnee society fluctuated; in 1840 it was 41/59; in 1872 it was 36.7/63.3; and in 1887 it was 48.3/51.7 (Wishart 1995: 515). The increased ratio of men to women in 1887 is mostly attributed to the decrease in hunting and raiding by the male population during the late 1800s (Wishart 1995: 516). Population counts (overall population) for the Pawnee drop dramatically from the early 1800s to the 1890s. Adult population counts also are dramatically reduced, with 3,534 adults in 1840; 1,385 in 1872; and only 709 Pawnee adults in 1887 (Wishart 1995: 515).

Many Native American tribes, including the Pawnee, had traditions of visiting ill family members and relatives. Inter-village associations and relationships would have prompted travel to call on the infected, resulting in cross contamination of unaffected communities. The likelihood of women tending to the infected has been recognized by epidemiologists as the probable reason that they suffered higher rates of mortality than men (Trimble 1985). Often, Plains tribes attributed the contraction of Euro-American diseases to contact with them, which significantly altered their perception of Euro-Americans (Powers and Leiker 1998). The perception of the cause of the disease determined their reaction to subsequent outbreaks, which later resulted in higher

mortality rates due to abandonment of the infected due to fear (Powers and Leiker 1998). Later during the Historic Period, fear of the diseased led them to abandon the infected, which created higher mortality rates than those who were tended to, but also led to the dissolution of once functioning social units (Trimble 1985).

Disease caused massive intra-tribal restructuring. Mortality from disease directly contributed to the collapse of cultural values, cosmology, indigenous practices, and other knowledge that would have been passed down generationally (Trimble 1985). Severe population loss lead to the coalescing of tribal groups that prior to non-native disease introduction, would not have resided collectively. This merging behavior itself brought on intra-tribal restructuring, but also created an environment of vulnerability, where populations were more susceptible to attack due to their amalgamated state (Trimble 1985). Mortuary practices were also altered, and in some cases abandoned due to the extremely high mortality rates (Powers and Leiker 1998).

Effects of Disproportionate Loss of Life

Age is a widely known factor in morbidity rates among infected populations, with the immune suppressed being highly afflicted – typically this means that children and the elderly are more susceptible to both infection and mortality. The loss of elders caused traditional cultural knowledge and memory to be lost. Traditional knowledge has been interpreted to mean (Amiott 2003:8):

> *the knowledge, innovations and practices of indigenous and local communities around the world*. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds. Traditional knowledge is mainly of a practical nature,

> particularly in such fields as agriculture, fisheries, health, horticulture, and forestry.

When a sudden loss of life occurred, such as that from epidemics, that information was lost forever. The loss of knowledge about the sacred bundles, and the sudden deaths of priests and chiefs disrupted the basic elements of their culture (White 1988: 208). Pawnee priests who died suddenly had not fully passed down their knowledge to their aspirant priests, their loss meant a loss of connection to the supernatural world via the sacred bundles; as well a loss of knowledge regarding the use of medicinal plants. This would essentially destroy the tribe's connection to the supernatural world (Powers and Leiker 1998).

The loss of political, social, and religious leaders would have disrupted the order by which leadership roles were passed down. The loss of adult males left the villages with no means by which to hunt, and the reduction of territory - which was easily expanded into by neighboring groups. Vulnerability created by the loss of this population left them unable to defend themselves.

This disproportionate loss of life meant that middle aged adults, with little to no knowledge of the tribe's customs had the greatest chance of survival. This left inexperienced, younger members of the tribe in positions of power. While in many Plains tribes this meant the redistribution of power to young, eager warriors – for the Pawnee it caused increased dependency on Euro-Americans (Powers and Leiker 1998). Socially, the effects were: a loss of labor, loss of cultural knowledge, loss of economic stability, and the loss of territory due to coalescing behaviors (Trimble 1985).

Furthermore, after such large population losses the priests and chiefs who had not succumbed were regarded as ineffectual as crops failed and hunts were unsuccessful (White 1988: 208). Disproportionate loss of life, which reduced the number of warriors, forced the chiefs to engage in combat, this further alienated them from their traditional standing in the community, and caused the warrior's status to surpass those of the chief further disrupting the social ranking systems that were traditional (White 1988: 210).

The loss of women and children meant the loss of agriculture and labor, as well as the creation of a generational gap, with little to no means to regenerate wives and future generations (Trimble 1985). This often caused a shift from exogamy to endogamy or the increase in raiding to acquire suitable partners (Powers and Leiker 1998). When a wife engaged in sororal polygyny died, there was the potential for her sisters to take over her duties, while this would have increased the duties for the women in the household - there would have still been wives present to perform agricultural duties, tend children, process food, *et cetera*. This would have also permitted the husband to remain in residence in the earth lodge. If the wife that died had a child under the age of two, it is likely the loss of mother would cause the loss of the child (Sear *et al* 2004). However, because the Pawnee practiced matrilocality; there was an increased chance that a child over the age of two would survive; though the child would still have a higher potential risk of death through the age of five (Sear *et al* 2004). If the wife who died was the senior wife, at a minimum a shift in household organization would occur; at least until internal order was re-established.

The loss of a wife in a monogamous marriage would have had a much more devastating effect. The husband would have no rights to her farm plots, and would no

longer have marriage ties to her parents, which would displace him from his residence (Wishart 1995). Infant mortality rates would be increased and the lack of matrilineal kin (co-wives, in this instance) could potentially increase the mortality rates for older children as well. When the widowed husband returned to his family, the wife's family lost a source of food and protection.

The loss of children would also have created a need to procreate. However, this would have been problematic with the decreased numbers of potential marriageable prospects. The loss of children created a generational gap, as well as a loss of labor. Male children assisted the females with caring for the horses; and children participated in farming activities (Wishart 1995). While the overall level of labor they provided was a much smaller percentage than the adults; their loss would have increased the labor load of adults, particularly females members of the household. Children (especially female children) would have also been instructed in the production of crafts by their mothers, as well as other adult females, and often fees were paid to the instructor when they were not family members; this would have resulted in the loss of not only the commodity, the associated transmission of knowledge, but also a source of income for the family (Wishart 1995: 514).

Since matrilocality and patrilocality are strongly tied to subsistence strategies (Ember and Ember 1995: 97); it is logical that predictions of subsistence stress can be modeled within a population effected by disproportionate loss of life. Shifts from unilocal residence patterns to bilocal residence patterns may be contributed to the introduction of European diseases (such as smallpox) to indigenous societies (Ember and Ember 2011: 226). Predictive relationships are capable of forecasting noncausal associations (Ember

and Ember 1995:102), therefore, in instances where causality of the relationship can be directly inferred; such predictive relationships should provide a stronger foundation with which to construct the theory.

Victim	Consequences	Result
Adult Males	Loss of Hunters	Inadequate Food Supply/ Starvation
Warriors	Loss of Defense	Vulnerability; Loss of Territory
Elder Males	Loss of Leadership	Leaves Inexperienced Members in Charge
Chiefs	Political	Loss of Leadership
	Social	Loss of Cultural Values/Knowledge
Priests	Religious	Loss of Cosmology
		Loss of Connection to Supernatural World
Doctors	Loss of Medicine	Loss of Medical Knowledge
		Loss of Knowledge of Medicinal Plants
Elder Females	Loss of Labor	Loss of Production of Trade Items
		Loss of Economic Stability
	Loss of Agriculture	Inadequate Food Supply/ Starvation
	Loss of Food Processing	Inadequate Food Supply/ Starvation
Adult Females	Loss of Labor	Loss of Economic Stability
		Loss of Production of Trade Items
	Loss of Agriculture	Inadequate Food Supply/ Starvation
	Loss of Food Processing	Inadequate Food Supply/ Starvation
	Loss of Domestic Units	Loss of Potential Future Generations
	Loss of Marriageable Prospects	Shift from Exogamy to Endogamy
		Increased Raiding
	Loss of Children	Generational Gap
Children	Loss of Labor	Reduction in Agriculture
	Reduction of Agriculture	Inadequate Food Supply
	Generational Gap	Inability to Regenerate Population
	Loss of Future Leaders	Loss of Hereditary Status
Male	Loss of Labor	Small Game Hunting
		Tending Horses
Female	Loss of Labor	Loss of Economic Stability

Figure 3 Effects of Disproportionate Loss of Life on Pawnee Populations. Adapted from: White 1988; Wishart 1995; Wedel 1985; Powers and Leiker 1998; Trimble 1985.

During the Historic Period male to female ratios in Pawnee society fluctuated; as hunting and warfare among the decreased the ratio of men to women increased. During the Proto-historic and Prehistoric Period a higher ratio of women to men, may have led to

sororal polygygny; however, as the ratio decreased there were more men available for marriage - this in combination with contact with groups who preferred monogamy likely led to a shift from polygyny to monogamy.

Sororal polygyny was advantageous to the Pawnee household: labor was divided between wives, infant mortality rates were lower, and disproportionate loss of life (especially among females) would have had a less devastating effect on the domestic unit as compared to monogamous marriages. Economically, sororal polygyny provides more labor, which often equates to more food and less household duties per wife. Socially, soraral polygyny offers the continuation of familial ties, assistance with child care, and companionship (Ember and Ember 2011: 203). While sororal polygyny in a patrilocal society would still offer these benefits, it stands to reason that in a matrilocal society the beneficial effects would be greatly increased. Matrilineal kin also show high investment rates in child rearing, particularly older sisters, older female relatives (such as grandmothers, and aunts) (Sear *et al* 2004:44).

Post marital residence patterns, division of labor by gender, and marriage organization (monogamy *versus* polygamy) are highly indicative of social changes caused by historic mass trauma, such as epidemics where disproportionate loss of life occurs. Matrilocality can be directly correlated to lower infant and child mortality rates, vulnerability during warfare, and loss of agriculture. Division of labor by gender can provide a model to gauge economic and subsistence stress when populations are afflicted by disproportionate loss of life. Marriage organization can model internal stress (household), as well as community hardship. Monogamous relationships would be affected a much higher rates by the death of a parent, than polygamous (particularly

sororal polygynous) relationships where the labor could be redistributed through the remaining survivors. Sororal polygyny would have been advantageous not only economically, socially (child rearing and child mortality rates), but also provided overall subsistence reliability.

Land Use and Climate

Horticulture occurred along the alluvial zones, due to the difficulty in working the harder prairie soils, often these plots were located near creek banks and ravines (Wedel 1947: 7). It seems likely that due to the tertiary nature of these horticultural areas they would have been highly affected by even small changes in the amount of moisture available. Overuse of land by Native populations and the increasing Euro-American populations, as well as drought meant that reliable pasturing areas were either not present or had already been consumed (Sherow 1992: 80). Settlements along water sources (such as rivers) would prevent bison from accessing that water source for two reasons: they were already being used (Bamforth 1987:7) and increased hunting caused an increase in caution by the bison towards people, causing them to avoid the areas frequented by humans (Bamforth 1987:5). This becomes especially true after about 1840, when extensive settlement began to occur in the Plains (Bamforth 1987:7). The slaughtering of the bison by Euro-Americans began in earnest around the 1830s and increased until they were nearly extinct around 1890 (Bamforth 1987:9).

The Pawnee area of the Plains normally produces barley sufficient rainfall for crop growth, with about half of the years producing rainfall insufficient for growth (Wedel 1947: 4). Droughts are common and result from warm high speed southern winds that promote evaporation of the much needed moisture (Wedel 1947: 4). In the 1800s droughts that lasted at least five years occurred almost every twenty years, with the time

between droughts decreasing by the 1850s (Flores 1991: 469 -470). While 1844 is considered to have had optimal rainfall, the following few years (1846, 1851, and 1854) presented drought conditions that coincided with increased Euro-American travelers on the Santa Fe Trail, and other routes along the Republican and Smoky Hill Rivers (Flores 1991: 482; Sherow 1992: 80). The affected area spanned for miles around the routes, diminishing water supplies, grasses, and severely devastating the Plains environment (Sherow 1992: 80). This push westward in the mid-1800s seems to have been precipitated by the decreasing number of buffalo available in these areas (Ewers 1975: 407).

MORTUARY ANALYSIS

Foundations of Mortuary Analysis

It is of the utmost importance to apply the evaluation of mortuary analysis to the understanding of social change (Tainter 1978:105). This should be done in an effort to indicate social phenomena as it is represented by mortuary practices, and how change over the course of time can indicate larger social change as reflected by mortuary context (Tainter 1978:106). For societies that employ class ranking systems, patterns associated with grave goods should follow the general outline first explored by Stickel in 1968. It is composed of four major components, which are: the inclusion of status symbols with increasing frequency according to rank; the inclusion of grave goods that symbolize status recognizable by the community; mortuary contexts should display high levels of variation between individual interments; and the use of inherited symbols of status (Tainter 1978:120).

Burial of the dead not only disposes of the corpse - the technical act of removing a potential vector of disease; it also involves ritual acts whose symbolic meaning is

recognized within the community (Binford 1971: 16). There are four main principles established by O'Shea (1984) that are conventional to the understanding of mortuary variability. These universal principles serve to identity the variability observed with mortuary archaeological contexts (O'Shea 1984:33). As with all assumptions about human behavior there are deviations from the norm that can hinder the interpretation of the behavioral pattern- whether they are intentional, coincidental, or accidental (O'Shea 1984:27). These principles and their qualifications as adapted from O'Shea (1984) are described below (in italics).

All humans have developed a method of disposing of the deceased. The methods of dealing with the dead may differ depending on inclusion versus exclusion from the group. For example, the taking of trophies (such as scalps) from defeated enemies. Additionally, when human remains are cannibalized they are typically disposed of unceremoniously along with the other household waste (O'Shea 1984:34). For some cultures the methods of discard are more focused on symbolism than the actual removal of the remains (O'Shea 1984:38). Disparities in mortuary practice often occur post-catastrophe, when the number of deaths inhibits the ability to deal with interment individually (O'Shea 1984:34).

It is assumed that cemeteries will reflect the living population. However, when remains are poorly preserved or not fully excavated this will cause bias or distortion in the understanding of the recovered remains (O'Shea 1984:38). There are other cultural phenomena that can exacerbate the ability of the data to accurately reflect the living population such as differential treatment of certain members of the group. The interim usage of burial areas, such as demonstrated by groups who are semi-nomadic only

utilizing the cemetery biannually. Also, postdepositional processes can affect the preservation of remains, whether the acts are intentional, coincidental, or accidental (O'Shea 1984:27, 34).

Cultural values dictate that interments are standardized throughout the group in accordance with rank and status and that differential treatment will represent the shared standards of the community as ritual acts that employ symbolism (Binford 1971: 16; O'Shea 1984:38). However, the full range of differential treatment may not be wholly represented by the recovered remains from the depository. Often this occurs when differential treatment of remains involves a method of disposal that is not conducive to archaeological recovery, or is removed from the remaining population (O'Shea 1984: 35). Examples of such behaviors would include, but not be limited to: specialized burials that are removed from the remaining primary deposit site (such as in elite burials, or the burial of the fringe members of society *i.e.* witches, or other community members that are considered outcast). Additionally, cremations, burials at sea, and persons left where they lay (which are considered respectable among the Pawnee for fallen warriors) are unlikely to be encountered in the archaeological record. This principle relies on the assumption that the treatment of the deceased is representative of their social status when they were alive (O'Shea 1984:36). In order for the ritual acts to be recognizable within the community there must be a functional knowledge behind the symbols utilized (Binford 1971: 16). It is this shared knowledge which provides the foundation for a method of establishing cultural norms regarding the interment of individuals based on social rank. The assumption is that burials that share commonality in context (burial type, grave goods, *et cetera*) also shared a similar social rank during their lifetime (Binford 1971:17).

In some societies death elevates the social status of an individual to ancestor. Grave goods associated with this promoted status would not be an accurate representation of their social status when they were alive and thusly this principle would not be applicable (Binford 1971:14; Gamble *et al* 2001).

The final main principle that serves as the foundation of mortuary studies relies upon the belief that the burial(s) are what archaeologists refer to as a closed context. The act of burial is considered to be a short-lived event that acts as a time capsule of sorts. Therefore the grave shaft, grave goods, and the inhumation are all regarded as contemporary to each other. Certain types of burials are not favorable to this assumption (O'Shea 1984: 37). Sepulchers, mausoleums, vaults, and charnal houses are all burial sites that utilize the same structure for multiple burials over long periods of time. Natural postdepositional processes can disturb burials as well. Bioturbation from flora and fauna as well as natural disasters can both disturb single inhumations as well entire repositories. There are also cultural practices that need to be taken into consideration such as the intentional, coincidental, or accidental disturbance of burials.

The Application of Ethnographic and Ethnohistorical Data

Ethnographic and ethnohistorical data are vital to interpreting archaeological assemblages comprised of data acquired from burials. In fact, ethnographic information is so important to the analysis of mortuary practices that without it, there arises the possibility that attempts to reconstruct social relationships (rank/status, ideology, cosmology, ritual, *et cetera*) could be misleading. When ethnographic data is combined with archaeological data, the results of interpretation are much more effective (Gamble *et al* 2001: 186).

In groups that have been well documented, the utilization of independent data sources when corroborated with the archaeological evidence make for a strong explanation regarding comprehension of the group's behaviors (Gamble *et al* 2001:186). The use of the Direct Historical Approach utilizes the information from the Historic Period (documents) to establish cultural norms that can then be retro applied to model past behaviors (Davidson 2010:625). Therefore, items associated with the rank and status of individuals during the early periods of contact can provide a foundation with which to analyze burials for evidence of status, whether hereditary or earned; it can also provide the basis on which to understand the cosmological underpinnings of such items. Standardized practices associated with burials, such as orientation, burial position, and flexing, if present in mortuary contexts for multiple periods, can indicate the presence of long lasting religious traditions, whereas changes in these rituals can signify changes to ideology (Gamble *et al* 2001:207).

The comparison of archaeological evidence with historical ethnographic data should focus on social organization (hierarchies within the society) as well as mortuary practices in order to provide a foundation with which to gauge the symbolic associations of the grave goods with the individual interred. Differences in how status is achieved, whether it is hereditary or earned, as well as how these distinctions were differentiated through materials goods is significant in interpreting the burials (Gamble *et al* 2001:195).

Social Hierarchy in Mortuary Contexts

Mortuary practices are a means by which competitive displays of social and economic ideals can be displayed (Cannon *et al* 1989:437). This behavior can be advantageous to archaeologists who are capable of evaluating this behavior for temporal trends (Cannon *et al* 1989:437). As wares saturate the economy their value is lessened

over time, therefore, as the once exotic goods become more commonplace their presence in a mortuary context no longer reflects the value they once commanded (Cannon *et al* 1989:437). Archaeologically, this can be represented in two main ways. The first is that a once rare commodity that had a high economic as well as social value within the community, and was recognized as symbolically representing a higher status due to the value of the commodity loses its value over time, and ceases to symbolically represent the status it once represented causing the item to no longer be used as a funerary object (disuse). The second scenario that can occur is the item in its devalued state becomes much more commonplace and its frequency of use increases, while its symbolic value decreases (overuse).

Differential treatment of individuals in mortuary contexts generally involve the symbolic distinction of: age, gender, rank, and membership in village organizations (Binford 1971:14). This status is often associated with either achievement or hereditary, with indirect determinants of status including sex and age. Status must be a social relationship that is recognizable by other members of the society. Differential status is often determined archaeologically by differential burial techniques. Artifacts are associated with different ranks and therefore, their inclusion in a burial is indicative of the deceased's social rank. Differential mortuary treatment can determine rank based on the social and economic value of the wares associated with the burial. Additionally, behaviors associated with mortuary practices can infer social concepts adhered to by social group involved in the burial (Prentice 1987:196).

Differential burials do appear to correspond with the relationship between the differential treatment of persons during interment and with ethnographic studies that

demonstrate the treatment of the deceased during burial as corresponding to their status when they were alive (Pearson 1982:99). Three main variables have been identified, each with distinctions that can be evaluated to determine differential treatment of individuals during mortuary practices (Binford 1971:21). The first variable involves the treatment of the individual's body which includes: preparation, treatment (cremation, mummification, or mutilation), and disposal (Binford 1971:21). The second variable addresses the disposal of the body, which includes: the type of burial (differential treatments that represent the status of the individual during their life, as in subsurface burial, scaffold burial, *et cetera* as the practice pertains to rites reserved for differential treatment), the orientation of the burial, and the location of the burial (Binford 1971:21). The third and final category involves the grave goods. The distinctions associated with this variable involves the: type of grave goods and the amount of grave goods (Binford 1971:21). Binford (Binford 1971:25) highlights the necessity of understanding the cultural context of the differential treatment, and warns against the application of frequency and distribution alone to determine differential treatment of individuals in a mortuary context.

The Pawnee were separated into three distinct social groups based on rank. The highest ranked individuals were the chiefs, secondary chiefs, owners of village bundles, and priests. All of these positions were passed on hereditarily from one person to another. The secondary rank included high ranking warriors and high ranking members of different village organizations. These intermediate rankings were generally passed through hereditary lines (father to son), however, these positions oscillated between generations. The remainder of village comprised the third or lowest rank status. There was the potential to move between ranks based on personal achievements achieved

through warfare, horse raiding, and other social rivalries, however, these positions never attained a status that would have been equivalent to one achieved by hereditary means (O'Shea 1989:62-63).

Grave Goods

As important as grave goods are in determining status, it is the entire context of the burial, including Binford's (1971) three variables used to determine differential treatment in mortuary context that should be considered when evaluating mortuary contexts as a predictor of social change (Tainter 1978: 121). There are three main interpretations for artifacts associated with burials, these are: incidental inclusions, or items accidently included with the backfill when burial occurred; artifacts left with the burial by the person who buried the deceased (whether intentional or accidental); and artifacts placed in the grave with the deceased by their family or friends intentionally. These items in the third category, the intentionally left artifacts are the ones that provide the greatest glimpse into the social customs, cosmology, and identity of the interred (Davidson 2010: 615).

One issue in deriving information from mortuary contexts is discerning whether or not the deceased owned the goods they were interred with (Gamble *et al* 2001: 191). For the Pawnee, higher status women were often interred with all of their belongings which included their clothing, and sometimes the umbilical cords of their children which had been placed inside of a hide within a box and sacred bundles and medicinal objects were often buried with their owners (Echo Hawk 1992:82). Not all of the burial goods were buried with the deceased, in the case of chiefs it was common to find associated objects in the fill above, or on top of the gravesite; these items included axes, ropes, hoes and other items that would have been associated with horticultural instrumentation.

Therefore, it can be inferred from ethnohistoric data that the items associated with the interred individual can be assumed to have been possessions of the person during their life, and therefore represent their status during life as well as in death (Gamble *et al* 2001: 101).

It is important to note here that the perception of the value of an artifact by a researcher may not accurately represent its social value, *i.e.* an item may appear to have a higher value than it actually possessed. These items are often referred to as wealth items, they are attainable by any rank within the society, this is contrasted with status items whose usage is restricted to those whose rank or status allows them to possess said item. It is the prohibition of ownership that differentiates between types of items (Prentice 1987:198). As an example of this, Pawnee chief Iskatappe would not accept a medal offered to him by Lt. Wilkinson (an officer of Lt. Col. Pike) due to two youths having been given medals during their trip to Washington, D. C. this instance can be inferred as the medal being devalued due to the access of the item no longer being restricted (Grange 1997:107).

Status items associated with the highest ranking members of Pawnee society (chiefs and priests) include: medals, silver gorgets, silver headed canes, military paraphernalia, and flags. Wealth items include: guns and other traded items (Grange 1997:105). Chief symbols of European origin increase in frequency throughout the eighteenth and nineteenth centuries, there are two theories that seek to explain this phenomenon. The first is that contact with Euro-Americans affected the social structure of the Pawnee causing more emphasis on these goods, the second theory suggests that

over time as contact increased these goods became available in larger quantities and this is reflected in their wide spread usage (Grange 1997:107).

Grange (1997: 101) argues that artifacts associated with Pawnee burials fall into one of two categories: technological or social systems. The utilitarian value of the technological artifacts can be easily derived from their function. Other items that indicate rank changes over time, in accordance with their availability. Grange (Grange 1997: 101) describes these items by two subcategories which are: personal adornment and symbols of rank. These two subcategories include both indigenous and traded items.

Burial as a Social Phenomenon

Ritual acts are slower to change over time than are other social behaviors; as a result they are more likely to lose their original meaning and become vague over time. The result is that the knowledge of *how* to perform the ritual persists, but reason behind *why* it is performed becomes lost or ambiguous (Pearson 1982:100). Social disorganization within Pawnee society during the nineteenth century contributed to increased rivalry and competition as populations fluctuated and the bands began to coalesce (O'Shea 1989:63). This change is indicated by the shift from indigenous technological artifacts to traded items with social value over time within burial contexts (Grange 1997: 102).

When ethnographic research conflicts with the archaeological evidence, it does not necessarily indicate that the ethnographic data being used is not valuable for interpretation. There may be other evidence that can shed light on the interpretation of the data (Gamble *et al* 2001:192). For example, when Pawnee warriors were killed in battle, they would frequently be left where they had perished; or as occurred in 1843, those who were buried (most were left where they lay) were hurriedly buried in caches (Echo Hawk

1992: 91). Examples like this (when a large number of deaths occur within a short period of time as in victims of warfare or epidemic) it is common for the community to deal with the entire group simultaneously, these types of burial treatments are often referred to as corporate graves or mass graves (Binford 1971:14). These examples of non-traditional treatment of the dead are more easily explained in conjunction with historical documents. Further examples that may be difficult to describe based on archaeological evidence alone there are few instances in which the disturbance of the grave was permissible. These almost always involve the organizing of the grave goods, whether they remained intact or were removed, such as in the Skull bundle ceremony where the skull of the deceased was removed for placement within the sacred bundle (Echo Hawk 1992:84). All other forms of grave disturbance were abhorred; these include Pawnee witchcraft, and the removal of grave goods (without permission of the family) which are considered sacrilegious (Echo Hawk 1992:86).

Pawnee Mortuary Practices

Coalescent Pawnee burials are typified by single inhumations, which are generally flexed in nature; various grave goods accompany the deceased that are both indigenous and Euro-American in origin (Tibesar 1989:43). Hilltops and terraces located near the villages were often utilized for the burial of the dead (Echo Hawk 1992:90), where shallow (around two feet deep) graves were dug to place the body of the deceased in (Echo Hawk 1992:81). The bodies of the deceased were often wrapped in buffalo robes, blankets or matting tied with a rope before interment (Echo Hawk 1992:78; O'Shea 1989:79). Typically, the bodies are oriented with the head facing towards the east (Echo Hawk 1992:80). Often, platforms were constructed to place the body on; these were then covered with earth and grass so that a mound was formed (Echo Hawk

1992:81). Graves were typically one to five feet in depth and often flexed with objects relating to the deceased's age and rank included in the burial (O'Shea 1989: 72). The structures that were built around the individual were often referred to as houses.

Projectile points were often interred with great warriors. Tribal leaders often were buried with eagle feathers, bear claws, scalps, knives, guns, and moccasins. The burial of deceased males often included weaponry (Echo Hawk 1992:82). Female burials often contained shell scrapers, which were typically used for removing corn kernels from the cob (Echo Hawk 1992:83) or beads (Grange 1997:101). By 1700 about fifty percent of the beads associated with the Pawnee were trade beads; these are mostly associated with burials and are viewed as indicating social status (Grange 1997:99).

Pawnee burials appear to be arranged in groups, which may be attributed to familial relationships (O'Shea 1989:72). When the Chumash utilized family burial areas, one feature of this highly important ritual was that when new burials were required, old burials would sometimes be disturbed; the remains would be carefully moved and then reburied as the newer burial was covered (Gamble *et al* 2001:191). An example that supports the theory of familial burial grounds for the Pawnee is the permissible reopening of a burial to include the remains of a child in the grave of its mother (O'Shea 1989:72). Hereditary status has been associated with some burials of Pawnee children, whose grave goods include those that indicate the status of chief (Grange 1997:107). This supports their hereditary status because for children the inclusion of grave goods can serve as an indicator of their expected adult status (Gamble *et al* 2001:196).

Chapter 2 HISTORY

Physiographic Setting

The Sand Hills lie within the Great Plains Physiographical Province (Bates and Biemesderfer 1960). This area of interest lies within the Ogallala Aquifer and other areas of the High Plains Aquifer (Shelbourn 1998). Geographically, the region know as the Sand Hills covers almost 19,300 square miles (Shelbourn 1998) or 50,000 km² (Zlotnik 2007) and measures approximately 265 miles east - west across west-central Nebraska and a diminutive portion of south-central South Dakota (Shelbourn 1998). The Sand Hills region encompass twenty-one counties and is bordered on the west by the Western Nebraska Region, on the south by the Prairie Lakes and Frontier Trails Region, on the east by the Lewis and Clark Region, and on the north by a southern portion of South Dakota (Nebraska Tourism Industry Development Plan 2004). The Sand Hills are comprised of sand dune fields and the area is the largest in the Western Hemisphere (Zlotnik 2007).

Climactic History

Holocene climactic change schema for the Great Plains have been created and are reviewed by Johnson and Park (1996), Kay (1998), Mandel and Bettis (2000), W. Wedel and Frison (2001) as well as many others. The multidisciplinary approach taken by the aforementioned authors includes, but is not limited to, the following data types: pollen, diatom inferred lake salinity, macrobotanical material, micromammals, stable carbon isotopes, and geomorphology.

Since the end of the Pleistocene through today there have been numerous climactic and environmental changes in the Great Plains region. The Late Pleistocene is

associated with mountain and continental glaciers that began to retreat about 18,000 years, completely opening up by 12,000 years ago (Bozell 2005). During the Early Paleoindian Period the Plains were cool, dry and partially wooded. This environment created the perfect ecology for bison, mastodon, and mammoth (Whitcomb 1989). By 10,000 years ago (Early Postglacial) this climate changed yet again to a warmer environment causing the forests to shift northward, the grasslands to expand and the extinction of the mega fauna which led the Folsom and late Paleoindian Period people to primarily hunt bison and smaller mammals (Bozell 2005, Whitcomb 1989).

The Hypsithermal Period environment (8500 - 4000 years ago) is characterized by a shift to warmer temperatures caused by Milankovitch cycles (NOAA 2008) which resulted in the expansion of grasslands across much of the Great Plains (Bozell 2005). In addition to the warmer climate numerous droughts characterize the environment during this period (Meltzer 1999). Early Archaic occupations during this time period are scarce (Bozell 2005) though Meltzer (1999) asserts that Middle Holocene archaeological sites are more likely to be buried under thick deposits that created a bias in the location of sites. Paleoclimactic data suggests that by 5000 years ago a shift toward less arid conditions had begun, though the area was still plagued by drought for the next millennia (Wells 1970).

Approximately 5000 - 3000 years ago the Sand Hills gradually began to become cooler and damper. Groundwater levels appear to have increased along with the climactic shift creating lakes in low lying areas nearly 3700 years ago during the beginning of the Neoglacial Period (Kay 1998). The occupation of the Sand Hills during the Middle Archaic (4000 - 3000 years ago) appears to have increased in conjunction with the

transition to a more temperate environment (Bozell 2005). Archaeological evidence suggests that the newly formed lakes and active streams were being heavily utilized for agriculture during most of the Archaic Period (Whitcomb 1998, Bozell 2005).

The Medieval Optimum (or Medieval Warm Period) occurred between 1090 and 1230 AD and is characterized as a period of warmth with increased aridity. The Medieval Optimum is currently thought to be the last period when the sand dunes of the Nebraska Sand Hills were completely active. The previously stable dunes would have experienced the loss of vegetation due to the increased heat and reduction of water resultant from the shift from south to southeast winds to a more northwesterly wind (Sridhar et al 2006).

Following this temporary climactic shift was another episode of cooler and moister conditions dubbed the "Little Ice Age" which occurred from 1230 through the mid-19th century AD (Bozell 2005). In the Great Plains the "Little Ice Age" is described as a loss of winds carrying tropical air from the south which resulted in cooler summers and colder winters (Bowden 1977). There appears to have been at least one major period of drought during this period in the Nebraska Sand Hills between 800 - 700 years ago, with significant aridity present approximately 300 - 200 years ago. Drought like conditions are apparent due to an activation of various dunes during this period which lasted well into the Historic Period (Halfen 2010).

At present, the semiarid climate of the Nebraska Sand Hills consists of cold winters and hot summers with a low humidity (Hopkins 1951; Anderson 1999) with a mean annual temperature gradient varying from 8°C (46°F) to 11°C (51°F) south to north (Jacobs and Mason 2004). Temperatures can vary dramatically seasonally and these extremes are often accompanied by high winds and bouts of drought (Jacobs and Mason

2004; Anderson 1999; Bleed and Flowerday 1991). On average wind speeds are 9 -15 mph throughout the year (Anderson 1999). The Sand Hills growing season consists of 148 days on average (Hopkins 1951). Today the average rainfall is 23 inches in the east diminishing to 17 inches per year in the western portion of the Sand Hills while the accumulation of snowfall is 22 inches along the southern perimeter that increases to 45 inches per year along the northern boundary (Shelbourn 1998). Most rainfall occurs April through September (Jacobs and Mason 2004) and June is the month when the average maximum of four inches of rainfall occurs and it is mostly resultant from thundershowers that generate an uneven distribution of rainfall (Hopkins 1951; Anderson 1999). The precipitation that occurs during this period is stored for evapotranspiration (Jacobs and Mason 2004). At present the water table is at ground level or slightly below (3 - 4 feet below ground surface) creating many lakes, marshes, and wet meadows (riprarian strips) in low lying zones. Riprarian zones are occupied by subirrigated meadows, bench meadows contiguous to waterways and woodland regions that neighbor the Niobrara and its tributaries (Shelbourn 1998).

Flora

At present, warm season grasses (sand bluestem [Andropogon halli], prairie sandreed [Calamovilfa lonoifolia], little bluestem [Andropogon scopariuss], switchgrass [Panicum virgatum], indiangrass [Sorghastrum nutans], blue grama [Bouteloua gracillis], sand lovegrass [Eragrostis trichoides] and sand dropseed [Sporobolus Dryptandrus]) are located on upland areas (terraces). Cool season grasses (needleandthread [*Stipa comata*], prairie junegrass [Koeleria macrantha], western wheatgrass [Pascopyrum smithii], and sedges [Carex spp. and Cyperus spp]) are also located on upland areas. Wet meadow (subirrigated and wet subirrigated areas) populations of grasses include: bluejoint

reedgrass [Calamagrostis canadensis], northern reedgrass [Calamagrostis] and sedges [Carex spp. and Cyperus spp]. Currently, several invasive species are also abundant (reed canarygrass [Phalaris arundinacea], timothy [Phleum pratense], redtop [Agrostis stolonifera], Kentucky bluegrass [Poa pratensis] and red clover [Trifolium pratense]). Riprarian zones are occupied by subirrigated meadows, bench meadows contiguous to waterways and woodland regions that neighbor the Niobrara and its tributaries (Adams et al 1998; Shelbourn 1998).

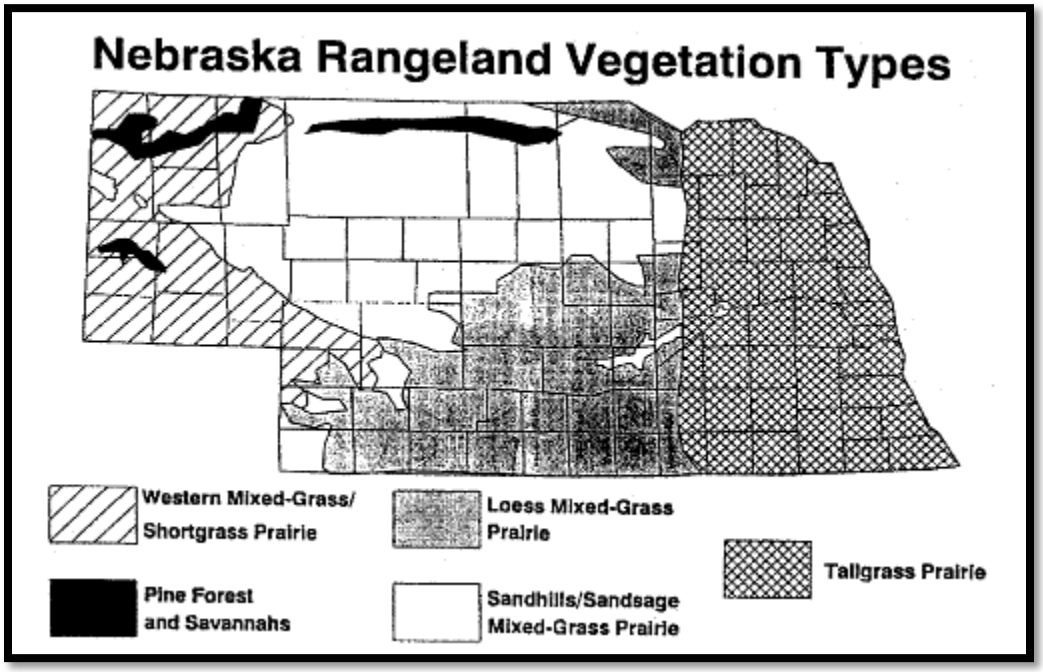


Figure 4 Nebraska Rangeland Vegetation Types (Anderson 1999).

Fauna

"The Sand Hills fauna is very rich, reflecting eastern and western, northern, and southern influences" (Whitcomb 1989). In terms of fish, more than 75 species were recorded during historic times. The lakes in the Sand Hills tend to be higher in alkaline, as a result, fewer species of resident fish are adapted to this type of condition. In terms of amphibians and reptiles, only twenty-seven species have been documented. Mammals, on the other hand, are more abundant with 58 out of the 81 Nebraska mammals located in

the Sand Hills. “In the late Pleistocene, mammoth, mastodon, horse, and camel were present in this area till around 11,000 YBP with their extinctions” (Whitcomb 1989).

Today, the Sand Hills region acts as a barrier for dividing animal ranges. All of the animals present in the Sand Hills currently can be divided up into two habitat zones- wet and dry (Whitcomb 1989). In terms of birds, the high percentage of lakes, the size of the region, the Niobrara River Valley, and the pine forests, all provide successful refuge and breeding ground environments. These factors contribute to an interest of North American avifaunal conservationists. Other fauna located on the Sand Hills are the invertebrate fauna and the diversity of biota (Whitcomb 1989).

Geology

The Nebraska Sand Hills are described as consisting of dunes and swales with shallow lakes and occasional streams (Anderson 1999; Smith 1965). Predominantly, the area is characterized by fine and very fine sands (Anderson 1999), specifically Valentine Hilly Dune Sand, Valentine Fine Sand, Dunday, Elsmere, and Gannett (McIntosh 1974) that rest on top of primarily Tertiary and Pleistocene deposits with intermittent Cretaceous formations to the north and east (Smith 1965). Generally, the boundaries of the Sand Hills are largely of the Pliocene Ogallala group, save for the west where Tertiary formations of Hemingford-Arikaree are located (Smith 1965; University Nebraska-Lincoln [UNL] 2009).

The dunes in the Nebraska Sand Hills are comprised of both simple and complex dunes (Melton 1940) further described as Series I, II, and III (Smith 1965, Melton 1940). Series I is thought to have first began forming during the Holocene Wisconsin Glacial Period (125,000 bpa) (Smith 1965; Schuchert and Dunbar 1964). This initial dune

building period was ended by climatic amelioration which permitted the growth of flora species on the dunes whose root structures stabilized the dunes. The next period of eolian transformation occurred during the Hypsithermal (Altithermal, Climactic Optimium) (Smith 1965) 7,000 - 5,000 years ago (NOAA 2008). These sand dunes can reach a height of up to 300 feet (100m) (McIntosh 1974) and are extremely permeable (Bleed and Flowerday 1991). This porosity has lead to the formation of numerous lakes, marshes and a substantial reservoir of groundwater that exists very close to ground surface (Zlotnik 2007, Bleed and Flowerday 1991, Anderson 1999).

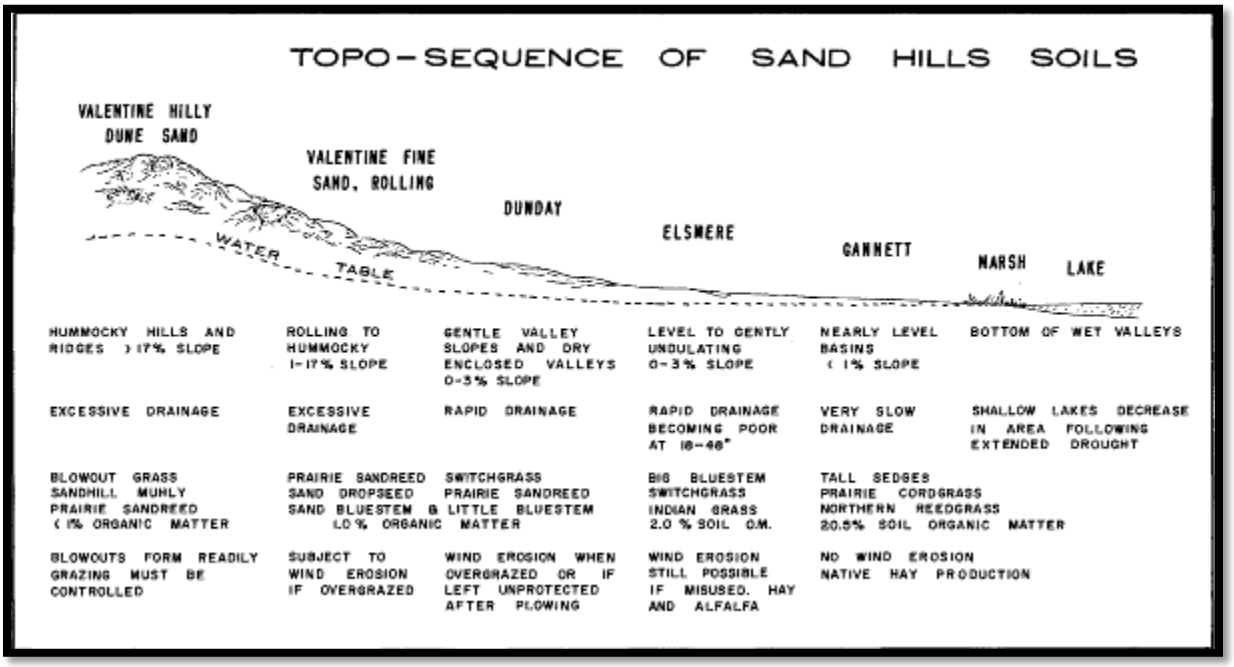


Figure 5 Topo-Sequence of Sand Hills Soils (McIntosh 1974).

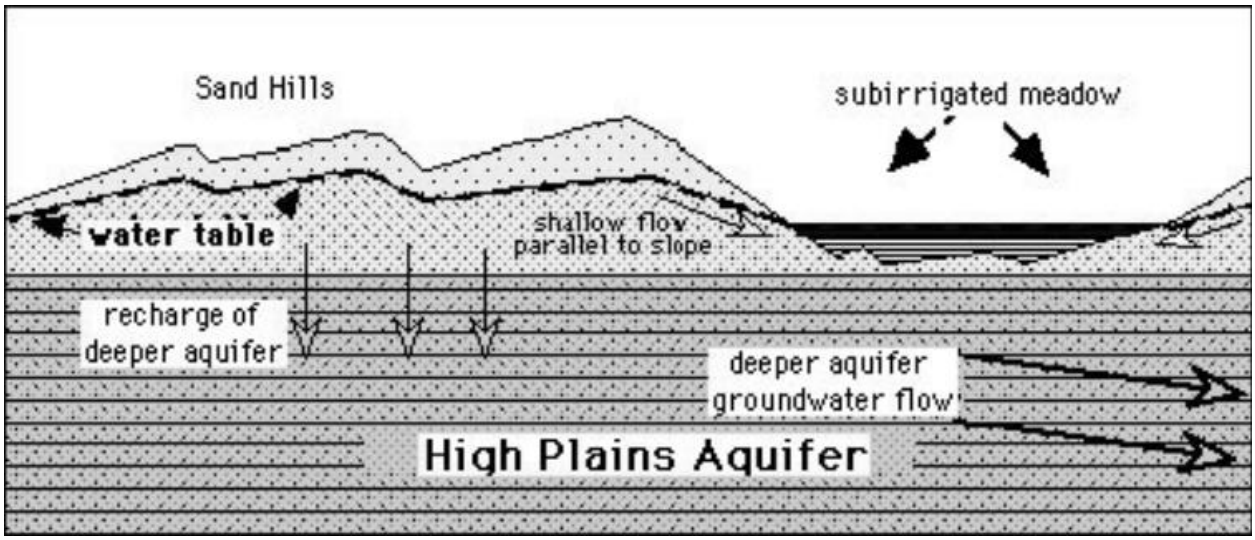


Figure 6 Diagram denoting the relationship between the Sand Hills Aquifer, Subirrigated Meadows/Lakes, Interdune Areas and the High Plains Aquifer (University of Omaha 2010).

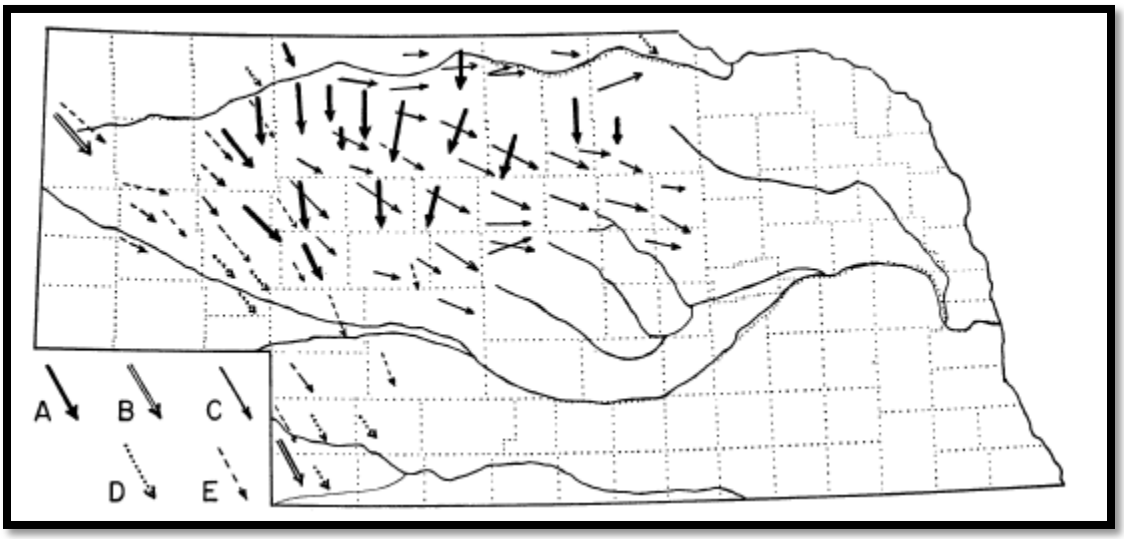


Figure 7 Map showing inferred directions of dune-building winds (Smith 1965).

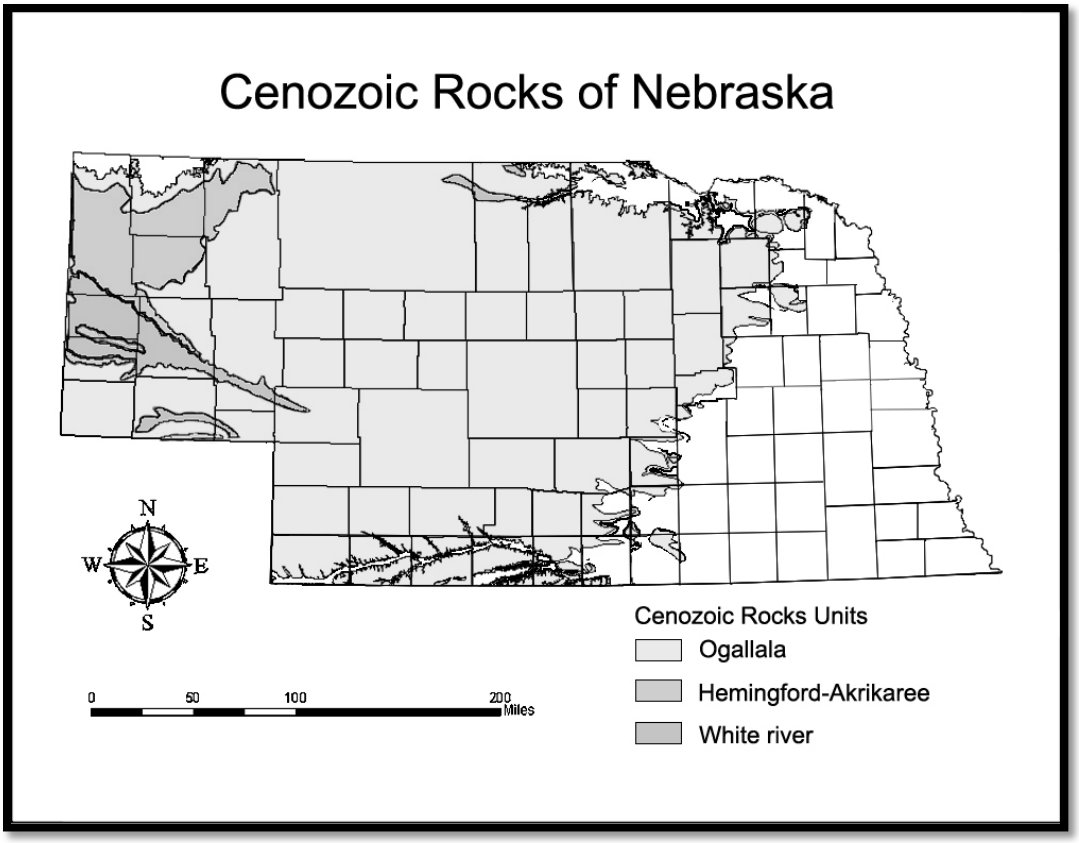


Figure 8 Cenozoic Rocks of Nebraska (UNL 2009).

Age (m.y.a)	Period	Group	Pine Ridge Area	Upper Niobrara River	Lower Niobrara River	North Platte River	Lithology
23	Miocene	Ogallala Group		Snake Creek fm. Olcott fm. Sheep Creek & Box Butte fm.	Ash Hollow fm. Valentine fm.	Ash Hollow fm.	sandstone and sone gravels
	Oligocene	Arikaree Group	Harrison fm. Monroe Creek fm. Ash Creek beds	Upper Harrison fm. Harrison formation Monroe Creek fm.	Rosebud fm.	Monroe Creek-Harrison fm. Gering fm.	Volcanic ash, former plant roots and insect burrows mark where soils developed
34	Eocene	White River Group	Brule fm. Chadron fm. Chamberlain Pass fm.			Brule fm. Chadron fm.	Fine siltstone, claystone with gravels and sandstone
56							

Figure 9 The Neogene Period (23 mya through present) deposition of rocks and sediments (UNL 2009).

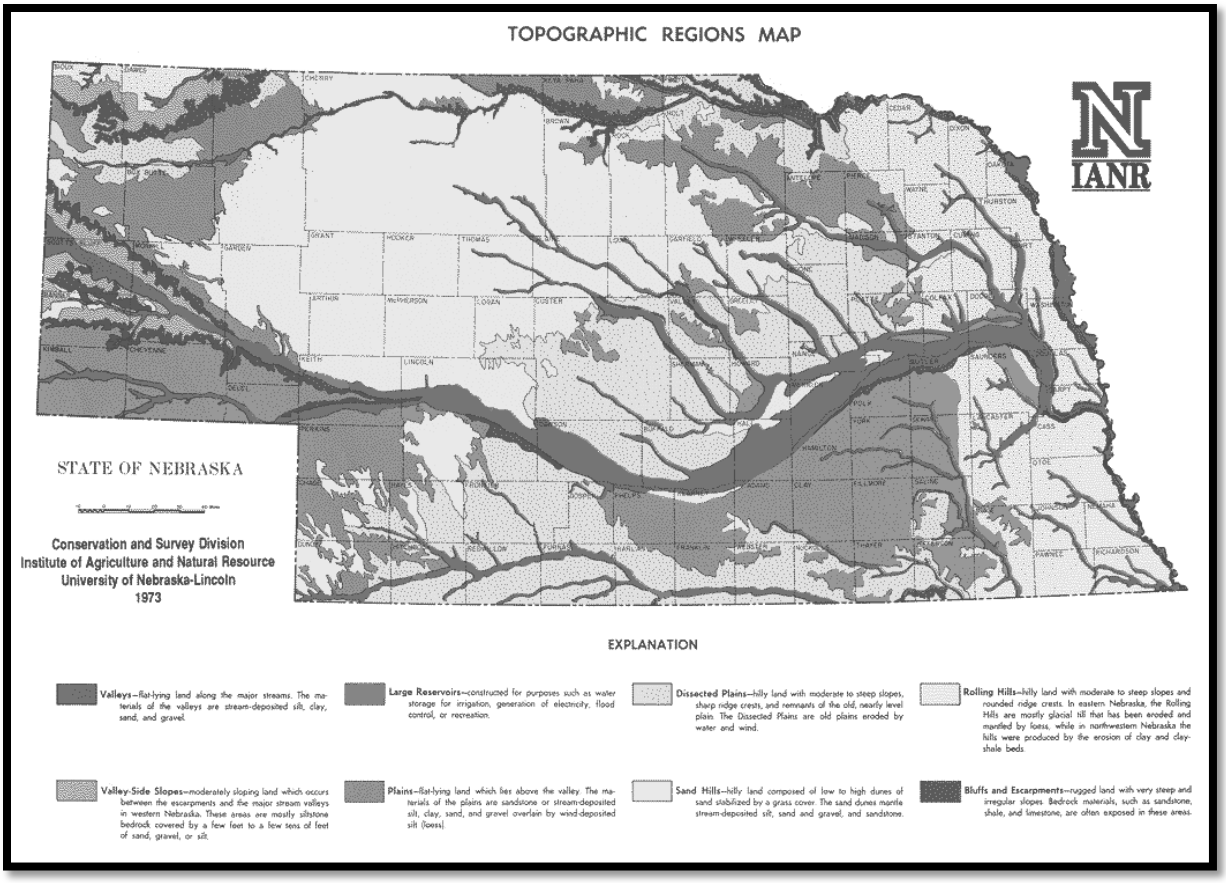


Figure 10 Topographic Regions Map (UNL 2009).

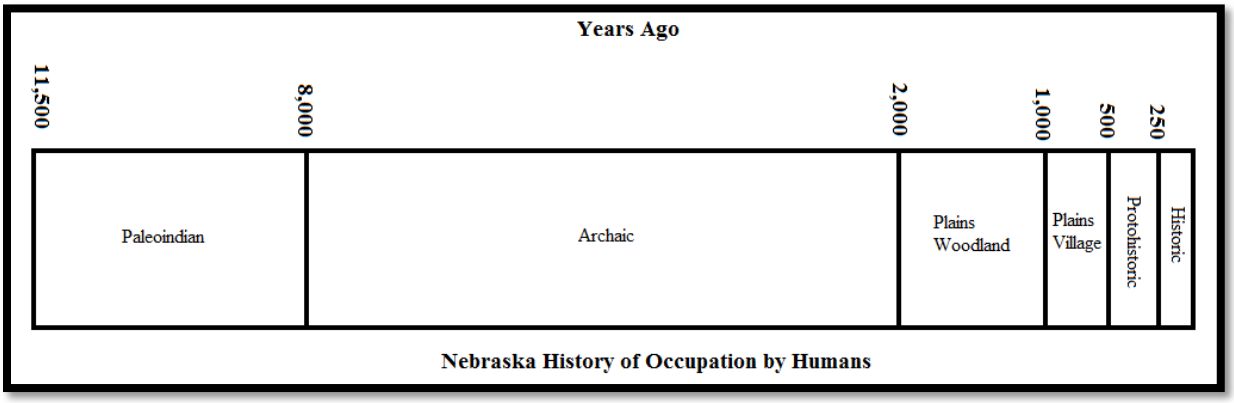


Figure 11 Nebraska History of Occupation by Humans.

Paleoindian

The Paleoindian Period is associated with the end of the Wisconsinan glaciation (Whitcomb 1989) beginning approximately 11,500 - 10,800 BP and lasting until the Early Archaic around 8000 BP (Koch 1999). During the Paleoperiod the Sand Hills would have been a relatively cool, dry climate containing forested areas and the mega-

fauna of the Ice Age (Nebraska Studies 2011, Bozell 2005). The earliest verifiable cultural occupation in North America (and therefore, the Great Plains and the Nebraska Sand Hills) is the Clovis occupation and they are considered big game hunters (Stanford 1999, Koch 1999).

The Clovis were a nomadic people who subsisted on mammoth, bison, and other extinct species that were once indigenous to the Sand Hills. These Paleoindians utilized lanceolate chipped stone spear points and they are found throughout the Sand Hills. Unfortunately, due to the aeolian nature of the deposits in the Sand Hills much of the Paleoindian sites are in a disturbed context (Koch 1999). Archaeological sites consist mainly of animal kill/butchering sites and small temporary camps (Native Arts 2011). Group bison kills have been located and date to 8000 - 10,000 YBP (Whitcomb 1989).

It is suggested that the projectile points utilized during this period were secured to a foreshaft that was then put into a lance. This method would have been most effective when the spear was plunged into the prey and then the foreshaft was broken off. The Clovis "tool kit" would have included bifacial fluted projectile points, large bifaces, blade cores, blades, cutting and scraping tools made on blades and flakes, gravers, end scrapers, and burins (Stanford 1999). Paleoindian cultural complexes and types of points found in Nebraska are: Clovis, Plainview, Folsom, Hell Gap, Agate Basin, Alberta, Scottsbluff, Eden, Frederick, Lusk, Meserve, and Brown's Valley (Native Arts 2011; Nebraska Studies 2011). The materials used by flintknappers was of the highest quality which suggests either substantial territories or the trade of raw materials (Stanford 1999, Myer 1995).

Archaic

The Archaic Period dates from 8000 - 2000 years ago, the people who inhabited the Great Plains during this period are considered foragers. Many species previously inhabiting the Nebraska Sand hills became extinct and left the bison as the most populous and dense resource for hunting during this time period. This reduction in the amount of available mammalian resources appears to have forced the Archaic people to rely more heavily on vegetative additions to their diet. The more diverse tool kits in addition to the regional variations in assemblages suggests that the Archaic people were less nomadic and more reliant on local resources (Koch 1999). In addition to the atlatl being added to the toolkit it appears also that both large and small mammals were preyed upon by the Archaic Period people. Archaic people also continued to be nomadic, as no permanent residential sites have been located, however, they show up in the archaeological record as being more localized in their patterns of movement. The Archaic Period is characterized by a warmer climate, the loss of the mega-fauna and the increased presence of much smaller mammals (Nebraska Studies 2011).

Plains Woodland

The Plains Woodland Period began about 500 BC and lasted until approximately 1000 AD (Duddleson 2008). This period demonstrates semi-sedentary populations who dwelled in kin based groups (most likely singular family units) who hunted and gathered for subsistence (Bozell and Winfrey 1994, Duddleson 2008). The Plains Woodland Period is defined by the first known usage of ceramics (Koch 1999, Bozell and Winfrey 1994). The archaeology of the Plains Woodland Period is described by Bozell (2005) as "more robust than the Paleoindian and Archaic Periods."

In general the Plains Woodland Tradition is described as small family units living in small semi-permanent villages associated with the development of horticulture (squash, beans, pigweed and corn). These earth and timber lodges are generally associated with storage/refuse pits, fireplaces and burials (Bozell 2005, Bozell and Winfrey 1994, Koch 2004). The introduction of ceramics during this period lead to their use as cooking and storage vessels (Bozell 2005) and the atlatl was replaced by the bow and arrow (Bozell 2005, Koch 2004). The archaeological deposits associated with this period are generally deemed shallower, with sites such as the McIntosh Site occurring between 5 - 20 cm below ground surface (Koch 2004). Bozell and Winfrey (1994) associate the Plains Woodland Period with "dynamic interaction among cultural complexes within and outside the Central Plains."

In the Sand Hills Plains Woodland sites tend to be located near lakes, with none having been discovered in the Calamus River Drainage. One major site has been fully excavated that lies completely within the Sand Hills (as opposed to on the periphery) the Kelso Site 25HO23 on the Middle Loup River (Koch 2004).

Central Plains Tradition

The Central Plains Tradition (CPT) (1000 - 1400 AD) is denoted by architectural changes most likely due to the fact that the CPT is "the first cultural complex in the Central Great Plains considered truly sedentary" (Bozell 2005). These permanent villages would have been occupied by groups of families who hunted and raised crops such as beans, corn and squash (Koch 2004). The CPT is thought to have led to the Coalescent Variant and is theorized to be associated with early Pawnee, Arikara, and Wichita tribes (Bozell 2005).

The Sand Hills were generally considered to have been utilized temporarily by small hunting parties until the discovery of the McIntosh Site, which uncovered evidence refuting that in the 1980s. Typical artifacts associated with this period are: side notched projectiles, stone knives, bison scapula digging tools, and globular ceramic vessels (Bozell 2005, Koch 2004) while residences tend to be rectangular earth lodges made of timber frames covered by sod and grasses (Koch 2004).

Proto-historic

The Late Prehistoric/Proto-historic is also called the Oneota Tradition in the Plains (Henning 1998, 2001; Ritterbush and Logan 2000; Bozell 2004). Two migrations appear to have occurred during this period. The Oneota Tradition is recognized by its high quality, shell tempered shoulder decorated ceramic, various lithic technologies, utilization of bone tools, and subsistence patterns related to diverse flora and fauna located on archaeological sites. This occupation appears to have diminished dramatically between 1400 - 1600 AD when the climate was drastically altered (Bozell 2005).

Around 1600 AD the Pawnee began establishing villages which contained earth lodges. Historically the Pawnee mainly resided in what is today portions of Nebraska. They mainly tended to have stayed in the areas of the Loup, Platte and Republican Rivers, moving as far North as the Missouri River and as far South as the Arkansas River (Wedel 1936). The Pawnee were nomadic seven months of the year, following and hunting the buffalo (July–Sept. and Oct.–March) (Wedel 1985). They were sedentary while they planted and harvested their crops, approximately five months of the year (March–July and Sept.–Oct.) (Wedel 1936). The field notes from the Burnt Village Site (25NC14) describe the side poles or "leaners" of the earthen lodges as having been constructed of in "many cases cedar." While the floor was littered with "grass – coarse,

probably blue stem." This "occurred in bunches and a matted layer up to 1 inch thick," (Nebraska State Historical Society (NSHS) 25NC14 1940:George Metcalf and A.T. Hill). The missionaries describe the "largest lodges having 4 - 5 families," (Wedel 1985).

At Contact

The first reliable sources for contact with Europeans occurred around 1777 and by 1800s we see continued and regular interaction between native populations and Europeans (Wedel 1936). This date is reinforced by evidence of a 1798 smallpox epidemic that substantially decreased the Pawnee population (Wishart 2009). In the 1720s horses, originally introduced by Spaniards, would have been available in the Great Plains region (Haines 1938). The introduction of horse into Native American societies created dramatic effects on the culture influencing their socioeconomic systems, disrupting subsistence economies, changing the environment (destroying grassland and bison ecology), disrupting the social structure (both creating social inequality and manipulating gender roles), and increasing competition for resources which in turn amplified warfare between tribes (Hamalainen 2003).

During the Historic Contact Period, a variety of tribes inhabited the Sand Hills region. "From 1540 to 1740, a mixed economy based on horticulture and hunting was practiced in the eastern plains" (Whitcomb 1989). Towards the western portion of the Sand Hills, other groups were mainly hunter-gatherers, following seasonal cycles with bison as the main food source. Both of these types of economies used the Sand Hills for hunting purposes (Whitcomb 1989).

The Skidi-Pawnee and the Grand band of Pawnees occupied the Loup River. The Skidi hunting territory covered the Platte River into the Sand Hills and to the Dismal River. The Omaha hunted on the eastern Sand Hills and the Ponca hunted towards the

west along the Niobrara River to the south. Further to the south, however, were the Brule, Oglala, and the Cheyenne. In the Central Sand Hills some areas were said to have been contested over by the Omaha and Cheyenne, as well as the Pawnee and Ponca (Whitcomb 1989).

"Initial American conceptions of the Plains were based on the records of exploring and trading missions. Such reports depicted the region as an east-west transit zone, an expanse that had to be crossed to reach good fur waters, the Mexican trade, or mines" (Shortridge 1988). In 1834 areas of what is now Kansas and Nebraska were utilized as Indian Territory for displaced tribes. Towards the mid-1800s, Americans had begun to view the plains as a "new agricultural frontier" resulting in the displacement of tribes and the entrance of Euro-American settlements (Shortridge 1988).

More specifically, in terms of the Sand Hills region European settlers were slow to enter. To the settlers, the Sand Hills "all looked alike, there were few landmarks, and the water was uncertain, often alkaline," this according to B. Richards Jr. (1980). Encouraged by access to railroads, a high number of settlers arrived in the 1880s for farming or cattle ranching. In 1879, a blizzard forces ranchers to allow access for their cattle to roam on the Sand Hills. They then discovered that the Sand Hills were prime cattle roaming lands (Whitcomb 1989).

Research History

The first professional archaeology conducted in the Sand Hills occurred in 1931. William Duncan Strong from the Smithsonian Institute, avocational archaeologist Asa T. Hill, and members of the University of Nebraska Archaeological Survey visited sites located along the Dismal River in Hooker County. Surface artifacts were collected and reported in *An Introduction to Nebraska Archaeology*. In the 1930s and 1940s, most of

the archeological sites were exposed by blowouts and artifacts collected by collectors. In 1940, Waldo Wedel started documenting sites along the Snake River and the proposal for the Mullen Reservoir area (that was never built) facilitated the documentation and testing of sites by the Historical Society and Smithsonian Institution River Basin Survey archaeologists (Koch 1999).

"Site discoveries in the Sand Hills since the 1950s have been products of small surveys, reports by local informants, large-scale cultural resource manage reconnaissance projects, and salvage efforts" (Koch 1999). Marvin Kivett excavated an Archaic Period site containing human remains in the southern Sand Hills in the 1950s. The Division of Archaeological Research at the University of Nebraska conducted salvage surveys in the 1980s on the Calamus River. Towards the 1980s, road salvage projects were carried out by the Nebraska Historical Society. The McIntosh site excavations, a Central Plains Tradition site, were a product of these surveys. Overall, the archaeological sites that have been located in the Sand Hills have mostly consisted of Late Archaic, Woodland, Proto-historic, and Historic cattle ranching sites.

Based of information gathered thus far, the Sand Hills is a region that has been utilized for more than 10,000 years. The lack of land development has preserved sites, but at the same time, little research funding is available for this region. Landowners and collectors seem to be the one link between archaeologists and the archaeology (Koch 1999). More recently, scholars such as: Donna Roper, Donald Blakeslee and Steve Holen, have done work at the Medicine Creek Site. Other scholars such as, Ann Bleed and Charles Flowerday have compiled Atlases of the Sand Hills region.

Chapter 3 PROCEDURES
METHODOLOGY

Site Selection

Using the model created by J. Daniel Rogers' (1990) publication *Objects of Change* as a foundation for this research, the selection of sites to be analyzed must include information that is usable for the specific goals outlined for research. The sites must meet the following criteria to be included:

1. The sites must be attributed to the Pawnee.
2. The sites must have a firm chronology associated with them.
3. The sites must be spatially near one another.
4. The sites must have undergone at a minimum, a partial Phase III excavation.
5. The sites must contain burials that have been fully excavated, with preference being given to those that boast more (as opposed to fewer) per time period.
6. Temporally, it is necessary that the totality of the subject matter cover the Proto-historic through the Historic Period (1600s - 1870s). Since the Pawnee were moved to a reservation 1876, preferentially, the sites should include an example from as close to this end date as possible.
7. The sites must have data that is available for research, and the available data must be representative of excavation procedures that were customary for the time period excavated.

In order to consistently utilize available data, sites were chosen based on their temporal as well as physical location. Burial data forms, as well as site histories were compiled from National Register Nominations, field notes, feature forms, *et cetera* on file at the NSHS. Burials that were denoted as having suffered from intentional post depositional processes (such as looting, mechanical stripping, *et cetera*) since the Historic Period were not included in this study. Therefore 25/29 burials from Burkett; 22/57 burials from Linwood; and 63/70 burials from Clarks Village were suitable for inclusion in the study.

The sites were also chosen using John M. O'Shea's (1989: 93-97) article entitled *Pawnee Archaeology*, as he has synthesized information regarding all the known Pawnee

Sites up to that year. Further research was conducted using ArcGIS 9.3 at the Nebraska State Historical Society as a filtering program to locate any additional sites that may have been excavated since 1989 that would yield pertinent data to the research. No additional sites were located that would fit the criteria of this project.

The oldest site the Burkett Site dates from 1600-1750 (Prehistoric); the Linwood Site dates to the Lower Loup Focus (1750s-1809); and the Clarks Village Site is recognized as representing the Historic Period (1823-1849). All of the sites were excavated between 1939-1941 by the NSHS, headed by Asa T. Hill in corroboration with Waldo Wedel. Having sites excavated during the same time frame, by the same institution, and Lead Archaeologist all contribute to overall consistency of the data. The graph below is an excerpt of Table 2 from O'Shea's article that outlines the available data for the project.

Table 3 Project Data, adapted from O'Shea 1989.

Site #	Name	Archaeological Features				Periods of Occupation	Band Affiliation
		Lodges	**Midden**	**Burials**	**Other**		
25NC01	Burkett Site	16	5	29	22	circa 1500	Skidi?
						1600-1750	Skidi?
25BU01	Linwood	7	1	57	15	1750,	Grand?
						1770s-1809,	Grand
						1850-1853	Grand, Republican
25PK01	Clarks Village	3	0	70	6	1823-1846,	Grand
						1846-1849	All Bands

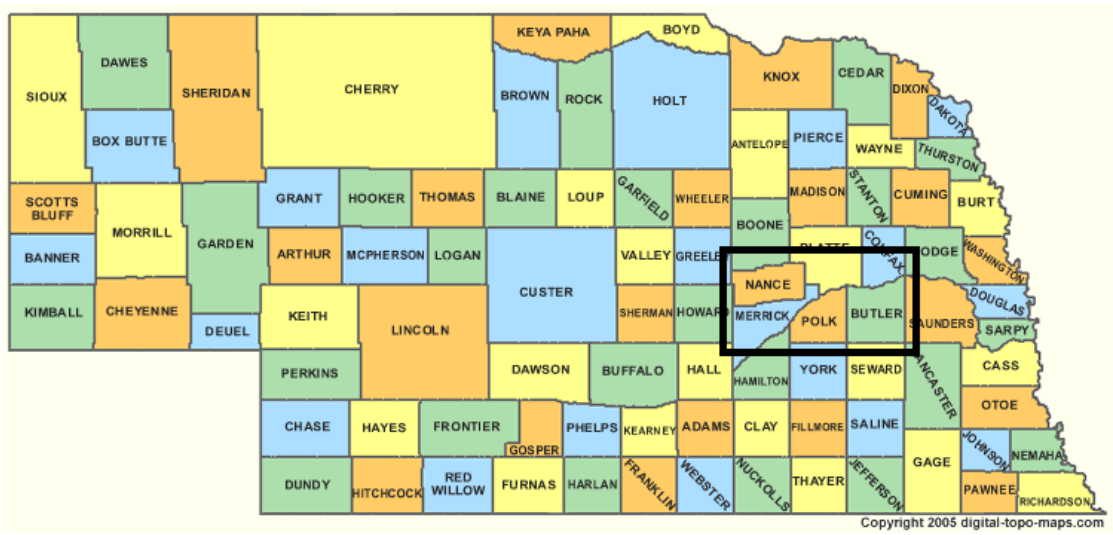


Figure 12 Map denoting area of study.

The Burkett Site

The Burkett Site (25NC1) is located near Genoa County, NE. It is located in the Beaver Creek Valley which is characterized in this location by rolling hills, deep ravines and an overall "rugged" appearance (NSHS National Register Nomination). Excavations at the site have revealed sixteen lodges, five middens, twenty-five burials, and twenty two other features present (O'Shea 1989: 93). The nearly eighty acre site is attributed to the Lower Loup Focus and more than likely the Skidi band of the Pawnee. It has had at least two occupational periods, one dating to circat 1500 AD, and the later carbon dated to the Proto-historic period (1600-1750) (O'Shea 1989: 93).

One of the two earth lodges, excavated in the spring of 1931 by the University of Nebraska Archeological Survey, contained some items of Euro-American origin – some scraps of sheet copper and three blue glass trade beads. These items were located on the on the buffalo altar, opposite the entranceway (NSHS NRM). The site was again excavated in 1940, which demonstrated the presence of the remaining features listed above (NSHS NRM).

The site indicates that the people who inhabited it were mainly horticultural with hunting contributing less to the overall subsistence patterns (NSHS files). The site is comprised of semi-permanent semi-subterranean earth lodges which generally demonstrate circular or nearly circular construction (NSHS on file). The entrances to the earth lodges generally face east or south and are constructed using the traditional four central post pattern (NSHS on file). The interiors of the lodges all contain a central hearth/fireplace and some contain a secondary smaller fireplace (NSHS on file).

Lithics present include: knives, scrapers, projectile points, abraders, hammer stones, pecking stones, awls, and grainers (NSHS on file). Ceramics are highly abundant in excess of 21,000 fragments were recovered (NSHS NRM). Ceramics are characterized by fine to medium grit tempered vessels, some with red washes or pseudo-slips applied to the exterior (NSHS on file). Many were impressed with a grooved paddle with either squared or rounded lips (NSHS on file).The majority of rim forms are plain high direct flaring, with occasional (rare) collared/braced and cloistered rims (NSHS on file). Generally, their shapes are common olla (medium to large in size), small bowls, and miniature pots (which have been identified as “toys”) (NSHS on file).

The Linwood Site

The Linwood Site (25BU1) is located near the town of Linwood in Butler County, NE. It is located near the Platte River and Skull Creek which is characterized by level terraces edged by steep bluffs with burial hills to the southwest (NSHS National Register Nomination). Excavations were conducted by the University of Nebraska in 1931, and again in 1939 by the NSHS (NSHS National Register Nomination; NSHS Field Notes). Excavations suggest habitation by the Grand Pawnee between about 1750 – 1809, and

then again briefly from 1850-1853 (O'Shea 1989:95). Seven earth lodges, one midden, numerous burials, and fifteen other features were excavated (O'Shea 1989). Unfortunately, of fifty-seven grave sites recorded, only thirty four had not been completely destroyed by looting activities; and of those thirty four only twenty two were wholly intact (NSHS Burial Notes).

Ceramics recovered in 1967 by the NSHS dated to the Lower Loup Phase and were typically stamped with a groove paddle or incised with either plain rims or incised/trailed herringbone designs present. Punctates on the rim were common (NSHS Highway Salvage Report Dec. 11-15, 1967).

The Clarks Village Site

The Clarks Village Site (also called Clarks Site; 25PK1) is located near the town of Osceola in Polk County, NE. It is located on the bank of the Platte River which is characterized by a level terrace with hills to the southeast, which were utilized as burial grounds (NSHS National Register Nomination). Excavations conducted in 1940, at the eighty acre site, revealed three earth lodges, numerous storage pits (NSHS National Register Nomination) and 70 burials (O'Shea 1989:96). The village was occupied by the Grand Band (Kitkehahki) of the Pawnee from 1820-1845 (NSHS National Register Nomination) and all four bands 1846-1849 (O'Shea 1989:96).

Of the artifacts located at the site, only twenty-four pieces of indigenous pottery were identified. The National Register Nomination states that "even by the early 1800s the Pawnee were losing most of their native crafts and relying more and more on the white traders for their existence." It is noted, however, that most of the trade material

recovered was located in the burials as grave goods (NSHS National Register Nomination).

The site was destroyed by fire by the Delaware tribe prior to 1835 while the tribe was away on a summer hunt (NSHS NRM). The excavation notes (NSHS) indicate that the earth lodges that were excavated had been destroyed by fire, this can likely be attributed to the Delaware attack. It is noted in the excavation notes (NSHS) that the village was rebuilt by 1835. In 1844, Major Clifton Wharton marched a detachment of the 1st Dragoons near the village, and he describes the village in his journal (NSHS Field Notes 25PK1).

One of the small (25' in diameter) earth lodges (House 1), which contained a small central fireplace (18" in diameter), which had an abundance of clam shells; is thought to be a menstruation lodge (NSHS Field Notes). Several of the burials were looted (NSHS Burial Notes).

Processing the Data

Data was entered into Excel spread sheets, utilizing the Burial Feature Form categories and attributes. Data that was present across all three temporal sequences was utilized to analyze changes in burial practices over time, which can indicate social change in cosmology, economy, status/hierarchy, and other social phenomena.

Thirty three categories of data were entered into the Excel spreadsheets. The first three categories deal specifically with site context, they are: site (which controls for the temporality of the burials); inter-site area (which controls for internal distinctions between burial areas); and the field burial number. The inclusion of this data provides the ability for replication by future researchers, so that each burial, burial mound, and site can be verified and correlated directly to the burial data forms.

Five categories deal specifically with treatment of the body during burial. These are: orientation (which identifies the direction of the body within the grave), the head direction (which details the direction the head was towards), flexing (whether or not the body was fully flexed, semi-flexed, or extended when buried), deposition (how the body was placed in the grave: back, stomach, right side, left side, or unknown), and leg direction (in correlation to the body's right or left side; when indicated).

Seven categories deal with the description of the grave shaft itself. These include: shaft type (pit, unknown, none), shaft shape (bell, oval, round, oblong, rectangular, right angle, and unknown), whether or not the burial was lined [lining was defined as a buffer between the body and the grave shaft; therefore matting, wood, *et cetera* were identified as lining, as were burials shrouds that were wrapped around the body - but clothing was not included in this definition], amount of lining (not present, single type, and combinations of two, three, and four materials), and combination types (which were broken down into categories that involved combinations of the following materials: wood, bark, leather, matting, poles, cloth, and metal). Additionally, maximum length and maximum width of the grave shaft were included.

Two categories address the skeletal remains, these are: sex (male, female, and indeterminate) and age set (unknown, infant, juvenile, adolescent, and adult). In many cases the age and sex of the individual was impossible to determine for a variety of reasons, the most common being either poor preservation, or in the cases of sex the specimens were children and therefore, impossible to identify.

The remaining sixteen categories deal with the grave goods. The first identifies the presence or absence of grave goods included in the burial. For the purposes of this

research, only goods located in the burial proper were considered grave goods. This is mainly due (despite the ethnohistorical data which suggests that it was common among the Pawnee to include grave goods in the back fill, as well as the surface of the grave) to post depositional activities such as: rodent burrowing, looting, and the reuse of burial mounds at later dates; and the inability to determine what was an incidental inclusion versus an intentional offering.

When grave goods were present, the origin of the materials was considered, therefore, this category was organized in the following method: not present (no grave goods associated with the burial), indigenous grave goods (grave goods are of native origin, with early copper assumed to be native in origin), Euro-American in origin (goods that could have only been acquired through trade, either through direct contact or middle man trading practices with Euro-Americans), and the final category which indicates that both native and Euro-American trade goods were present within the burial.

Grave goods were divided into seven categories based on their function. Much of this division was based on previous research by Echo Hawk (1992), Grange (1997), O'Shea (1989), and Tibesar (1989); which was correlated to the field notes and burial data forms for each burial. The seven categories are as follows: weaponry, weapon accessories, utilitarian items, agricultural items, personal adornment, personal items, and religious/ceremonial items. Each of the seven categories wholly represent all of the grave goods present within the burials across all three sites. Each category list (which will be provided below), is inclusive of all the grave goods present, so while there may be items that would fit into the category - but are not listed, it is due to their lack of presence, not due to an oversight, or error.

For each of the seven categories correlated with the function of the item two additional categories were created, one that denoted presence/absence; the other was an ordinal ranking scale designed for each category to express the abundance of the item. Due to the lack of a numeric representation for many items, and the need to compensate for large quantities of some items (such as beads and pot sherds) in *lieu* of a numeric quantification, an ordinal a scale was created to convey both the economic as well as social value of the items.

These distinctions were determined by evaluating the graves with the highest quantity (when numeric representations were available), or by gauging the description of the amount of the item, as compared to other descriptions of the same item, or category. The values are as follows: modest, moderate, intense, and extravagant. As an example to illustrate this point Clarks Village Burial #14 (in Burial Mound #4) had 5,034 beads (the highest numeric value of any burial) and Clarks Village Burial #5 (in Burial Mound #5) is described as having its "chest buried in blue and white beads;" these two burials formed the upper end of the spectrum for the extravagant designation for beads, however, because beads can outnumber other personal adornment items (by hundreds and/or thousands of specimens) in order for the personal adornment category to be labeled extravagant, it required the presence of other types of personal adornment. The total order of these values will be discussed in further detail below.

The weapons category includes items that commonly perceived as being weapons, there is no distinction made between warfare weapons and hunting weapons. Items included in this category are: bows, guns, and quirts. Weapons are denoted as present or

absent; and also as: modest (1 weapon), moderate (2 weapons), intense (3 weapons), and extravagant (4+ weapons).

The weapon accessories category is defined as any item that is used in conjunction with a weapon (such as projectiles, bullets, arrows, *et cetera*); but also any product, by product, or accessory associated with a weapon. The following items are considered weapon accessories: flints, projectile points, bullets, arrows, shaft straightners, shaft polishers, whetstones, debitage, and sheaths/holsters. While whetstones and sheaths would more associated with utilitarian objects (knives are under the label of the utilitarian category), in the grave they were associated other weapon accessories, or in the case of sheaths nearly indistinguishable from holsters (a weapon accessory); therefore, both items were put into the weapon accessories category. Weapon accessories are categorized by presence/absence, and additionally ordered as: modest (up to two items), moderate (3-4 items), intense (5-6 items), and extravagant (7+ items); except for debitage where its presence is counted as one item, no matter how much was present (the debitage from one point can number in the thousands). Since it was impossible to determine whether the debitage was associated with a weapon accessory, or a utilitarian item; and it was also generally located with the other weapon accessories, it too, was placed in the weapon accessory category.

The utilitarian category is meant to represent items that would have generally been regarded as utilitarian in nature. These items include: scrapers, pottery, clam shells (these were typically regarded as having been used to remove corn from the cob, when not associated with paint), awls, rasps, and knives. Pottery sherds always constitute one item, regardless of the number present (as one pot may shatter into hundreds of pieces, or

more). Utilitarian items are categorized by presence or absence and then ordered as: modest (1 item), moderate (2 items), intense (3-4 items), or extravagant (5+ items).

Agricultural items are items that are associated with agricultural and horticultural activities. These include: seeds, corn, vegetal material (which seems to be catch all designation for items such as seeds, that were unidentifiable), and hoes. These items must not have been located in a bundle bag in order to have this designation. They are categorized by presence and absence, as well as ordered by quantity: modest (1 item), moderate (2 items), intense (3 items), and extravagant (4+ items). Since seeds, corn, and vegetal material were not quantified in the burial data forms, they always represent one item each.

Religious and ceremonial items are identified as items associated with Pawnee cosmology. These items include: bundle bags, animal bones and parts (eagle claws, bison skulls, rodent jaws, *et cetera*), paint (and clam shells with paint inside them), pouches, catlinite pipes, and chalk. Religious and ceremonial items are categorized by presence/absence, as well by rank: modest (1 item), moderate (2-3 items), intense (4-5 items, or a bundle/pouch of items), extravagant (6+ items).

The next two categories deal with personal items and personal adornment, both are categorized first by presence/absence. Personal items are items that could not be placed into other category. They include: miscellaneous metal (often strips of braided metal), spoons, glass bottles, boxes, worked quartz, worked bone, worked wood, whistles, flutes, and cradle boards. Glass bottles and spoons were placed in the personal item category as nearly every one of these items were found in association with infants, therefore, it seems unlikely they would have served a utilitarian function *to* them (perhaps

for them), so they were included in the personal items category. These items are categorized also by order: modest (1 item), moderate (2-3 items), intense (4-5 items), and extravagant (6+ items).

Personal adornment items are items that would have been regarded as aesthetically pleasing to wear, but unnecessary to survival. Therefore, clothing itself is not a personal adornment item (which is a moot point, as nearly none of the burials had any clothing present), however, beads and/or jingles which may have been added to clothing are personal adornment items, as are: rings, bracelets, bells, buttons, and other items that were repurposed to create adornment. An example of such repurposed items include [from Clarks Village Burial #20 in Burial Mound #4] two coins of silver which were pierced and strung (1-1819 American half dollar, 1-1806 Spanish/Mexican coin). Additionally, buttons were also often described as being strung, or located in such a way (generally around a wrist) as to appear as if they were strung.

Personal adornment items are the most complicated category to order by quantity. Excluding beads (which will be addressed below) they are ordered in the following method: a modest amount would be comprised of two types of items, unless the quantity of one item is greater than ten. Therefore, to illustrate what is considered modest, the following example is provided. In the Linwood Site, Burial #52 has a copper bracelet and an iron ring present. Two actual items are present, and they are two different types, therefore, they are modest in nature. In contrast at the Clarks Village Site Burial #24, in Burial Mound #4 has the following personal adornment items present: three lead rings, and copper/brass foil. There are four actual items, but only two types of items, therefore, it is a modest amount. Also, at the Clarks Village Site, in Burial Mound#5, Feature 1,

Burial #6, there are more than fourteen lead rings, and a brass finger ring. Therefore, the burial has (greater than) fifteen items, but because the amount of one item is greater than ten, it counts as two types, and is therefore modest. A moderate amount is three to four types of items, unless the quantity is greater than fifteen for one item, in which case it starts another type count. Intense is categorized as: five to six types of items, unless one item has a quantity greater than twenty (which starts a new type count). Extravagant is seven or more types of items (a new type count is made for each item that has a quantity greater than twenty).

Because beads can be present in quantities that would introduce bias into the aforementioned methodology, they are still included in the personal adornment category, but have a separate quantity for each order. Also, it was important to differentiate between handmade indigenous beads, and glass trade beads. Bead values were based on the grave with the largest quantity, as compared to all other quantities present for both indigenous and trade beads. A modest amount of beads is less than 100 trade beads and less than two native beads. A moderate amount of beads was 101- 200 trade beads, and three to five native beads. An intense amount of beads was 201-500 trade beads and six - ten native beads. Extravagant was greater than 500 trade beads and greater than ten native beads.

While it may seem that this method of bead counting could introduce bias into the personal adornment category, quite the opposite was true. Since all other categories had been ordered and the personal adornment category was completed last, bead quantities, as they were divided helped to accentuate the perceived value of the grave goods. Graves with more beads, had more types of personal adornment present than did graves with

fewer beads. For example: at the Clarks Village Site, Burial Mound #5, Feature 1, Burial #17 included the following personal adornment items: greater than nine buttons (strung on leather and cloth), blue and white trade beads (unknown quantity), two lead rings, copper plating, wampum, as well as 79 indigenous beads. If the amount of indigenous beads was unknown, this burial would still have a personal adornment rank of 6 (Intense), however, the quantity of indigenous beads is greater than eleven and therefore, bumps the overall value up to extravagant (a value of 7 or greater). Another example is also from Clarks Village, Burial #16 in Burial Mound #4, personal adornment items included: a brass bracelet, three bone beads (indigenous), and 75 trade beads. Three types of items would categorize the burial as moderate. The fact that the burial has three bone beads would classify it as moderate, but the 75 trade beads (if alone) would have made the burial modest. The bead count system (if no values had been provided) would not have affected the outcome of the categorizing by count or type.

BIVARIATE ANALYSIS OF THE DATA

Bivariate analysis is one of the most simplistic forms of quantitative analysis. It is comprised of the use of a single variable and its attributes. Typically, bivariate analysis results in the formation of a frequency distribution of the attributes and their relation to the sample (variable). When graphically represented tables and bar charts are standard methods of presenting the data (Bernard 2006). The variable may be continuous or discrete. The continuous or discrete data may be presented in frequency or percent rates.

For the purpose of this research the application of bivariate analysis was too simplistic to describe the variable and the frequency distribution of the attributes of that variable. However, the addition of another variable (in this study, a temporal control) to

the data created a bivariate data set (Weisstein 2012). Bivariate data is used to determine relationships. In this study time is the independent variable, and the dependent variables are: orientation, head direction, flexing, deposition, leg direction, shaft type, shaft shape, lining, amount of lining, combinations of lining, age sets, sex, maximum length, and maximum width. The purpose of the addition of the independent variable (time) is establish whether the temporality of the sites influenced the dependent variable; and to determine if correlations occurred between the two variables. Data types include both discrete and continuous variables (Weisstein 2012).

Orientation of Burials

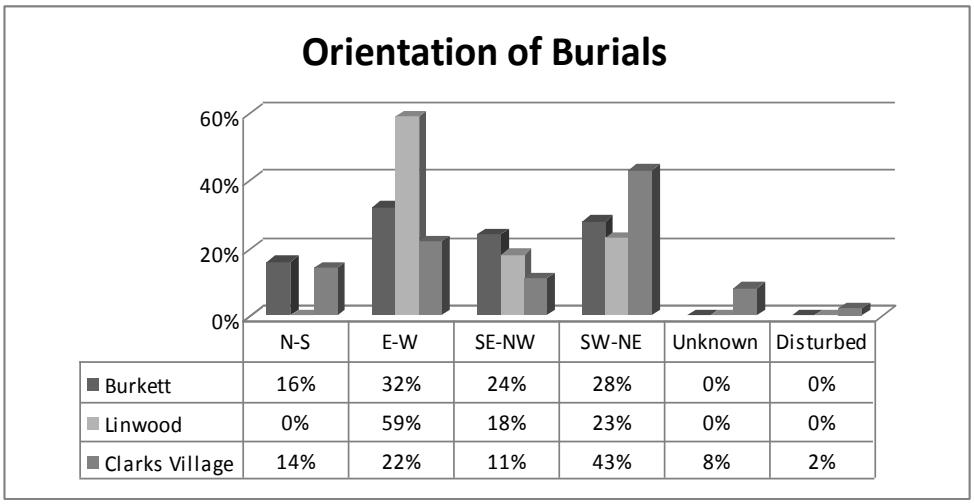
The data is comprised of two variables: the independent variable (time) is used to gauge the relationship between the temporality of the archaeological sites and the orientation of the burial (dependent variable). The attributes of the dependent variable are directional: North-South, East-West, Southeast-Northwest, Southwest-Northeast; and the last two indicate whether or not the burial was disturbed, or if the orientation was unknown. Since burials that were looted were excluded from the overall study disturbance in this portion of the study is attributed to the following factors: bioturbation, intrusive contemporary burials, and erosion.

It has typically been noted in ethnohistoric data that the bodies of interred Pawnee are oriented with the head facing towards the east (Echo Hawk 1992:80). Burial data suggests that during the Prehistoric Period at the Burkett Site that there was a stronger tendency (32% of the burials – the majority) to bury the dead with an East-West Orientation, however, SW-NE and SE-NW were also quite common, with rates of 28% and 24%, respectively; a North-South orientation had the lowest rate of burials at 16%.

The Proto-historic Period (Linwood Site) is marked by a strong tendency (59%) to bury the dead oriented E-W, with a distinct lack of burials oriented N-S. Correlations to SW-NE, and SE-NW burial orientation are similar to the Prehistoric Period at Burkett, and comprised 23%, and 18%, respectively of all burials.

The Clarks Village Site (Historic Period) indicates the majority presence of SW-NE orientation, at 43%, N-S orientation is at 14%, while E-W and SE-NW rate at 22% and 11%, respectively. Though 10% of the burials had suffered from natural bioturbation or were not indicated, which could skew the data.

At all three sites a cardinal orientation of N-S comprises the lowest percentage of all burials, while the majority of the E-W orientation appears to occur during the Proto-Historic Period. A generally E-W orientation (which could be argued to also be generally N-S) of SW-NE and SE-NW account for the next highest percentages of burial orientations. It would be fair to suggest that overall trends agree with the ethnohistorical data that there was tendency to bury the dead generally facing a mostly E-W direction, and that there was a significant decline over time in the preference of a SE-NW orientation, as well as an increased chance of contemporary disturbance in later periods.



	N-S	E-W	SE-NW	SW-NE	Unknown	Disturbed
Burkett	16%	32%	24%	28%	0%	0%
Linwood	0%	59%	18%	23%	0%	0%
Clarks Village	14%	22%	11%	43%	8%	2%

Table 4 Orientation of Burial Data from Bivariate Analysis.

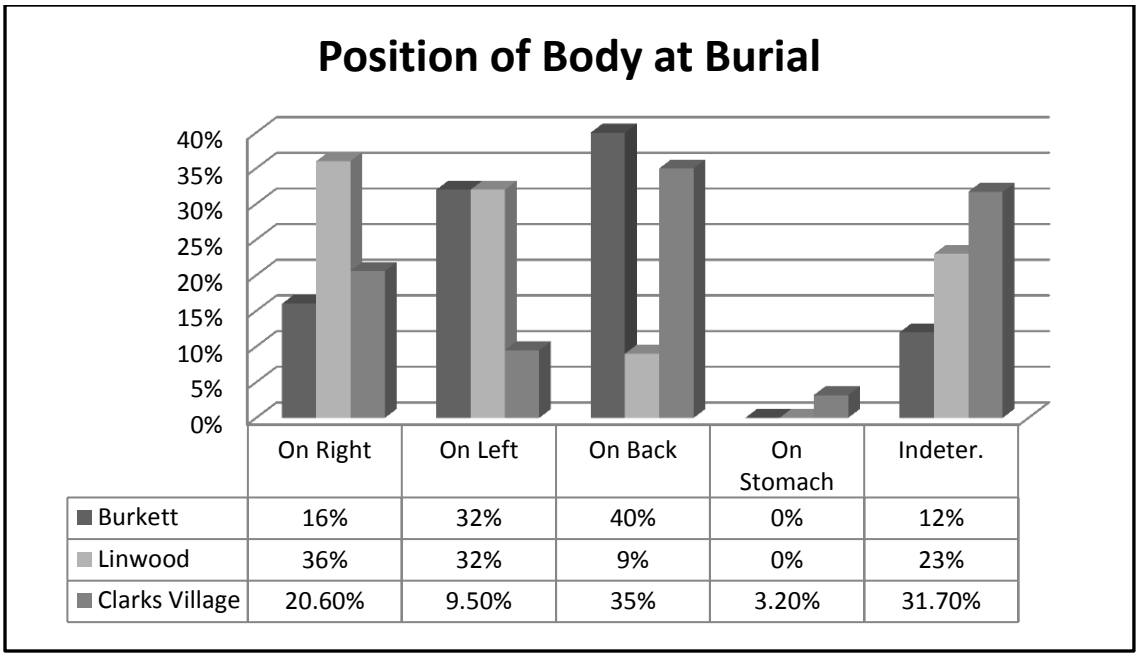
Position of the Body at Burial

The independent variable in this analysis is time, while the dependent variable is the position of the body at burial. The purpose of this study is determine if there is a recognizable change in the manner in which the bodies of the deceased were placed into the grave at burial. The attributes of the dependent variable are directional (on the deceased's): left side, right side, back, stomach, or indeterminate.

There is no ethnohistorical data that indicates a preference among the Pawnee regarding body deposition, most simply state that inhumations are flexed (O'Shea 1989). According to the data, during the Prehistoric Period (Burkett Site) the majority if the bodies were placed in the grave either on their back (40%) or on their left side (32%) only 16% were placed on their right side.

At the Linwood Site (Proto-historic) rates of burials on the left remain steady at 32%, but back inhumations drop to a much lower 9%, while burials on the right increase to 36%. Clarks Village (Historic Period) demonstrates the first occurrence of burial on the stomach, a very low 3.2%, while rates of back burials increase to very near the Prehistoric rates, coming in at 35%. Rates of burial on the left side are reduced to 9.5%, and rates of burial on the right side drop from the averages during the Proto-historic Period down to 20.6%.

Overall the data indicate that rates of burial on the left side remain steady from the Prehistoric to the Proto-historic Period, but decline during the Historic Period. Burials on the back are at the highest rates during the Proto-historic and Historic Period. Right side inhumations are most prevalent during the Proto-historic Period and stomach inhumations do not occur until the Historic Period.



	On Right	On Left	On Back	On Stomach	Indeter.
Burkett	16%	32%	40%	0%	12%
Linwood	36%	32%	9%	0%	23%
Clarks Village	20.60%	9.50%	35%	3.20%	31.70%

Table 5 Position of Body at Burial Data from Bivariate Analysis.

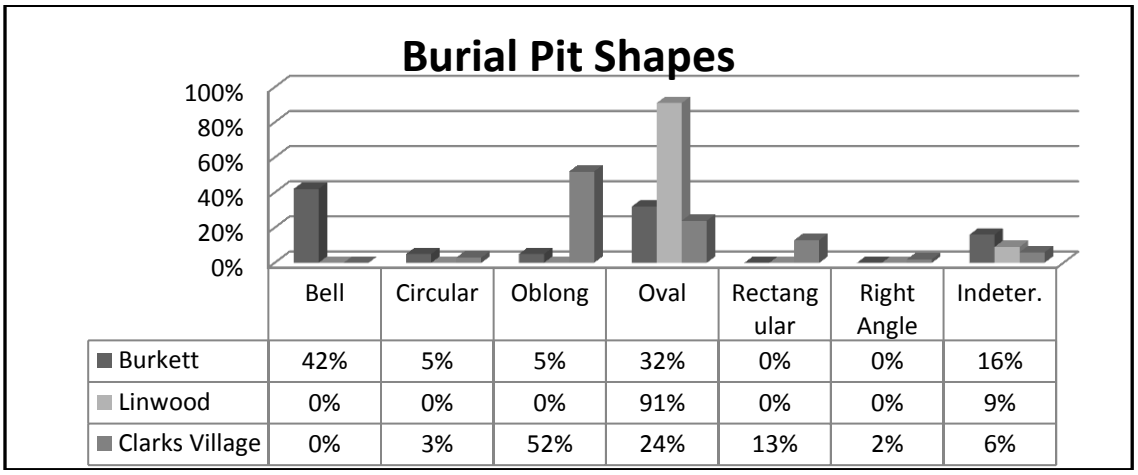
Burial Pit Shape

The independent variable in this analysis is time, while the dependent variable is the shape of the burial pit. The purpose of this study is to determine if there is a recognizable change in the shape of the burial pit over time. The attributes of the dependent variable are the following shapes: bell, circular, oblong, oval, rectangular, right angle, and indeterminate.

Ethnohistorical data states that shallow (around two feet deep) graves were dug to place the body of the deceased in (Echo Hawk 1992:81). There is no reference to the general shape of the pit that was dug. During the Prehistoric bell shapes dominate type used at 42%, while oval shapes were the next most common at 32%. Circular and oblong shapes make up 5% each. During the Proto-historic Period oval shaped burial pits dominate at 91%, with the remainder being of undetermined shape. Historic Period burials (Clarks Village) has more oblong (52%) shaped burial pits, 24% oval pits. It is

also during the Historic Period that rectangular shaped burial pits first appear, as well as one burial pit that is described as being shaped like a right angle.

Overall the Prehistoric Period can be described as having mostly bell and oval shaped burial pits. The Proto-historic Period is dominated by oval shaped burial pits, and while this shape continues to be used during the Historic Period, oblong shaped burial pits are most common, and more angular burial pits begin to be utilized. The introduction of more angular shaped burials may be attributable to Euro-American influences, such as the introduction of trade goods such as shovels and hoes; or the cultural transmission of more rectangular shapes by Euro-Americans for burial purposes.



	Bell	Circular	Oblong	Oval	Rectangular	Right Angle	Indeter.
Burkett	42%	5%	5%	32%	0%	0%	16%
Linwood	0%	0%	0%	91%	0%	0%	9%
Clarks Village	0%	3%	52%	24%	13%	2%	6%

Table 6 Burial Pit Shapes Data from Bivariate Analysis.

Presence and Types of Grave Lining

The independent variable in this analysis is time, while the dependent variable is the presence and type of grave lining. The purpose of this study is determine if there is a recognizable change in the presence and type of lining grave used (including combination types of lining) over time. The attributes of the dependent variable are presence and absence of grave lining; grave lining types; and single, combinations of two, three, and four types of grave lining.

Grave linings were defined as a buffer between the body and the grave shaft. This included anything the body may have been wrapped in such as: leather, or cloth; as well any material above or below the body that acted as a buffer, such as: matting, wood planks, bark, poles, or any combination thereof. The ethnohistoric data states that the bodies of the deceased were often wrapped in buffalo robes, blankets or matting tied with a rope before interment (Echo Hawk 1992:78; O'Shea 1989:79). Often, platforms were constructed to place the body on; these were then covered with earth and grass so that a mound was formed. These structures that were built around the individual were often referred to as houses (Echo Hawk 1992:81).

At the Burkett Site (Prehistoric) 68% of the grave possessed some type of grave lining. At the Linwood Site (Proto-historic) 50% of the graves that were suitable for the study possessed some sort of grave lining.[2] By the Historic Period (Clarks Village) there is an increase to 84% of the burials possessing a grave lining. Given the overall trends it appears that 50-70% of graves in the Prehistoric and Proto-historic had grave linings, and that by the Historic Period 84% of the graves possessed some type of grave lining.

[2] While the exclusion of the looted burials at the Linwood Site, for the remainder of the study, was advantageous, for this particular attribute it may have skewed the data. While the disturbed/looted burials were not suitable for the remainder of the study (looting activity disturbed the graft shaft, the skeletons, and removed grave goods; making orientation, deposition, pit shape, *et cetera* impossible to define) for this particular variable, the opinion of the researcher is that given the number of burials excluded that possessed grave lining, the value of 50% during the Proto-historic is far too low.

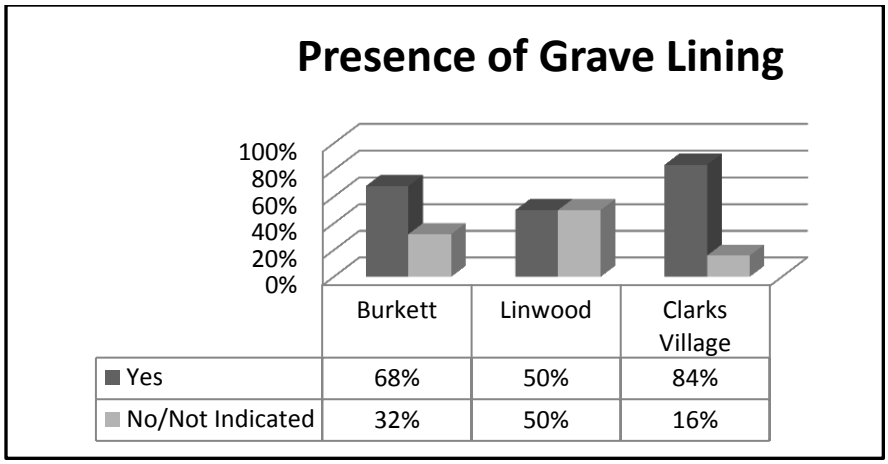


Table 7 Presence of Grave Lining Data from Bivariate Analysis.

Linings made of one material account for 48% of the Prehistoric types, while 63% of the Proto-historic types are one material, by the Historic Period 65% of the linings types are one material. Typical single materials types used during the Prehistoric Period are wood (24%), bark (12%), leather (6%), and poles (6%). The Proto-historic Period is typified by bark (36%), matting (18%), and wood (9%). The Historic Period is typified by matting (34%), leather (15%), wood (8%), poles (6%), and cloth (2%). There is a distinct lack of matting as a single type of lining present in the Prehistoric Period, however, its use increases through the Proto-historic and Historic Period.

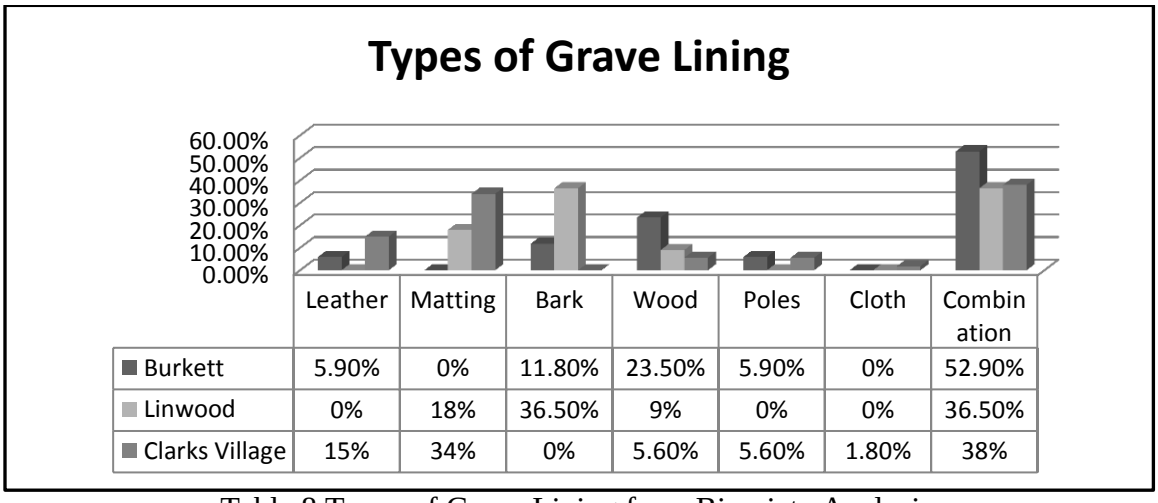
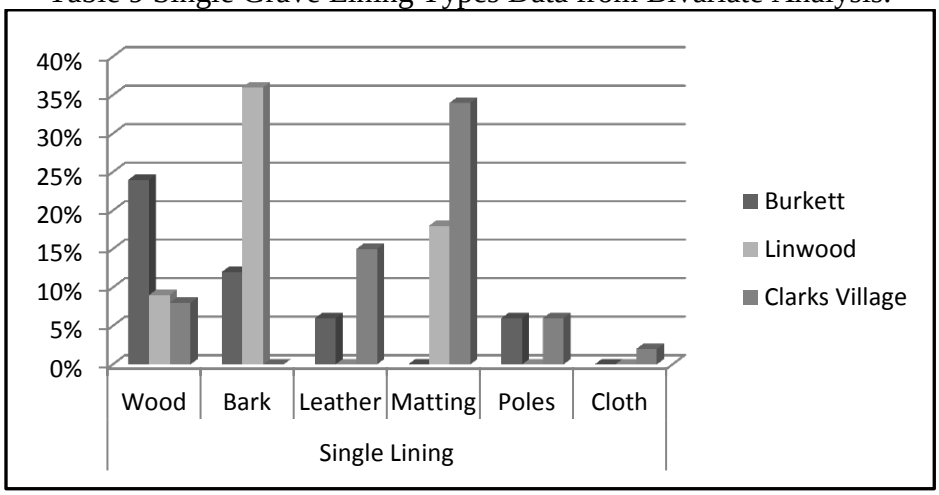


Table 8 Types of Grave Lining from Bivariate Analysis.

Table 9 Single Grave Lining Types Data from Bivariate Analysis.



Overall trends show the use of matting predictably increasing over time, this may be attributed to access to Euro-american goods that made it easier to process the materials, or it may be economically linked to the decline in the use of wood - which is likely attributed to its scarcity as Euro-americans immigrated to the area and began to harvest the already scarce commodity. The use of cloth only during the Historic is undoubtedly associated with trade practices with Euro-Americans.

Many burials contained multiple, or combination grave linings. Prehistoric burials averaged a 30% rate of inclusion for two types of grave lining, while the Proto-historic boasted a similar rate at 27%, the Historic Period was in the same range at 23%. While the percentage of burials with more than one type of burial is similar through the periods, the types of combinations changes in the Historic Period. The Prehistoric and Proto-historic are both typified by combinations of matting, bark, wood, and leather. The Historic Period adds to these combinations the use of poles, cloth, and metal.

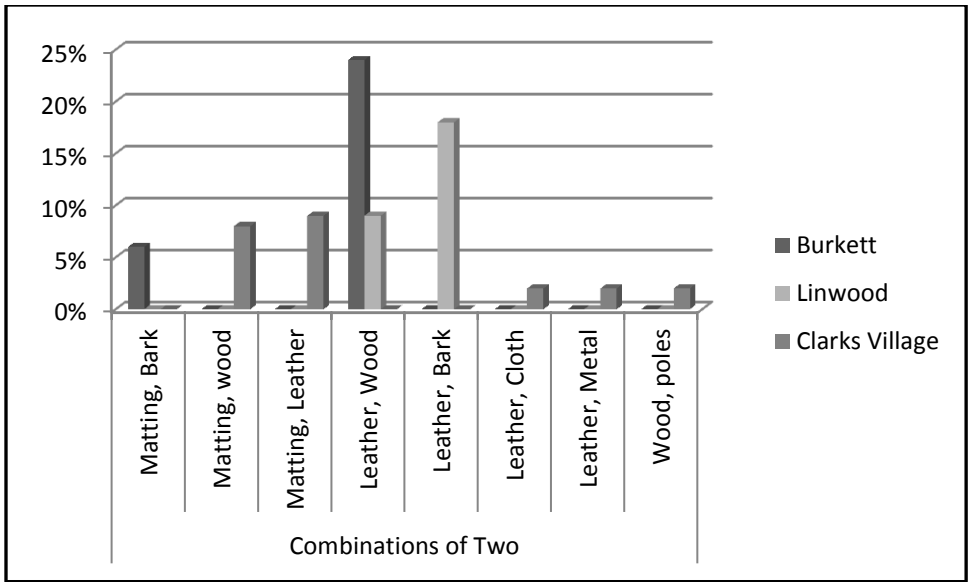


Table 10 Grave Linings Combinations of Two Data from Bivariate Analysis.

Matting and bark, decline in use over time. Matting and leather; matting and wood; leather and bark; leather and cloth; and wood and poles all increase in use over time. While overall rates of wood use decline over time, it seems logical that their scarcity post 1800 would have likely made their economic and social value increase - thus the usage of wood in combination with other types of grave lining is likely attributed to the socioeconomic standing of the deceased and thusly represents their high status within Pawnee society. Leather and wood combination decline in usage over time. This combination's decline may also be attributed to its socioeconomic value. As bison herds were depleted by over hunting, much like trees were over harvested, this particular combination is likely to have had far to great an economic and social value; which may have made it too costly for the majority of the population to afford.

While percentages of graves with combinations of three types of lining are lower overall, there are distinct patterns in their distribution. Combinations of: wood, matting, and bark; wood, leather, and bark; wood, leather, and poles dominate the Prehistoric

Period. Wood, poles, and bark are favored during the Proto-historic Period. Matting, poles, and leather; leather, wood, and matting; and matting, leather, and cloth are much more common in the Historic Period.

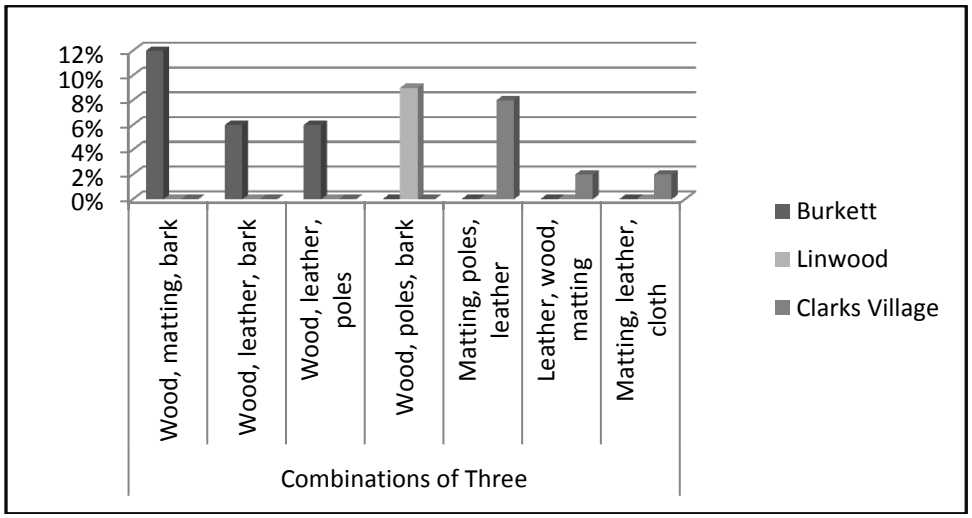


Table 11 Grave Linings Combinations of Three Data from Bivariate Analysis

Wood, matting, and bark; wood, leather, and poles; wood, leather, and bark all predictably decrease in usage over time. This is likely attributed to the increased value of wood and leather during the later periods, as was discussed above. Furthermore, each of three combinations of three types of grave lining utilize two materials derived from trees; likely making it quite costly in the later periods. Leather, wood, and matting; matting, leather, and cloth; and matting, poles, and leather all increase in use over time. Matting, as discussed earlier shows increased usage in general over time. Likely, it was less costly to use either one material derived from a tree (wood, and poles).

The Historic Period also accounts for the only instance of a combination of four materials used for lining. Matting, leather, wood, and bark are all utilized in this instance. It accounts for a mere 2% of the burials at Clarks Village.

Burials by Age-Set

The independent variable in this analysis is time, while the dependent variable is the age of the deceased. The purpose of this study is determine if there is a recognizable change in age sets of the deceased over time. The attributes of the dependent variable are continuous: infant, juvenile, adolescent, adult, and unknown. Age-sets were determined in the field by the excavators.

Burial data forms contained check boxes for: infant, child, juvenile, mature, and senile. Often these were accompanied with age estimates. Infants were typically noted as being 0-3 years of age; children were indicated as being 4-9, and juveniles as ranging from 10-14. Often, there would be notations on the field notes indicating that the excavators thought that there should be another category of sub-adult. In these cases the burial data forms would indicate a change to the form (generally with an asterisk) then hand write in sub-adult, in-field estimates on age for this category range from about 15-20. Mature indicated adults, or about 20+ years in age. Most often this was described in terms of the fusion of epiphyses, and the cranium (or in the sub-adult category, nearness to complete). Since there was no data provided (and very few burials were described as) senile, when it occurred these burials were added to the adult category, as no determination of age could be made.

In the Prehistoric there are a considerable lack of infant, and juvenile burials represented in the archaeological record. The majority (64%) of the burials consist of adults, while only 8% are adoloscent. The Proto-historic and the Historic Periods show a dramatic increase in the presence of infants (39.7%, 27%, repsectively), juveniles (6.3%, 18%, respectively), and adolescents (17.5%, 32%, respectively); with a large decrease in the number of adults (19%, 18%, respectively) represented. These highly

disproportionate losses of life may be attributed to documented diesease among the immunosuppressed, or be attributed to bias in the preservation of the archaeological record.

Unknown age decreases dramatically over time, which is perfectly logical, older burials would be much more difficult to determine the age of due to postdepositional processes, while newer burials would be easier to determine the age of. Since the highest infant burial rates are from the Linwood Site (Proto-historic), and because morbidity rates in virgin soil populations, which are associated with communities that had no prior immunity, effected the entire population at higher rates than subsequent infections and the immunosuppressed are more susceptible, it is logical that the Proto-historic Period (first contact) would have high infant mortality rates. Subsequent epidemics and endemics created disproportionate loss of life with higher mortality rates among children and the elderly (Trimble 1985).

Furthermore, based on the outbreak dates [see Epidemic section], the patterns associated with small pox, and immunity to the disease after having suffered from it, it is logical that subsequent outbreaks would lead to higher mortality rates (and therefore create more burials) for infants, juveniles, and adolescents as compared to adults. With outbreaks occurring in the early 1780s, around 1795, around 1801-1802, followed by about a thirty year gap - then occurring every few years thereafter it seems logical to see trends for higher for non-adults, than adults.

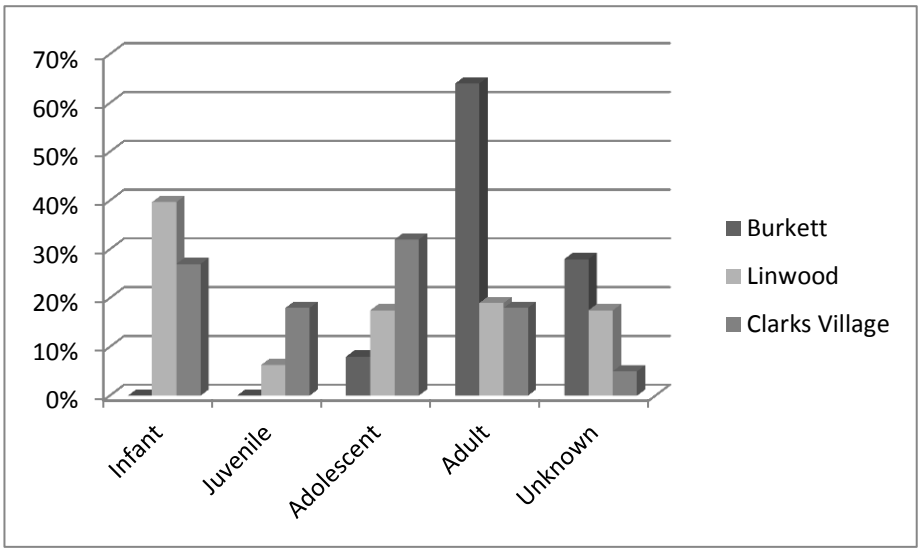


Table 12 Burials by Age-Set Data from Bivariate Analysis.

MULTIVARIATE ANALYSIS OF GRAVE FEATURES

Multivariate analysis (MVA) is used to analyze more than one variable simultaneously. For the purpose of this study Pearson's Chi square, and Cramer's V were used to analyze grave features because greater than two groups of nominal variables existed. Each of the dependent variables analyzed were evaluated based on their relationship to the independent variable. The independent variable in these cases are always temporal, by site. The dependent nominal variables are deemed significant or not significant in their relationship to the independent variable - time. For example: when the orientation of the burials was examined, the analysis question would be worded in this manner "Is there a significant relationship between orientation of the body, and the site (time period) it is associated with?" Additionally, it could be phrased in the following manner: "Is the direction of orientation significantly different across sites (time)?"

Pearson's Chi Squared test analyzes goodness of fit, as well as independence. Goodness of fit is a method of analysis that analyzes whether an observed frequency distribution is similar to a theoretical distribution (Plackett 1983). In other words, it measures the probability one would expect to find differences by chance alone. In the Pearson's Chi Squared test a value of 0 indicates that the probability of the observation occurring by chance is very low. In order for the expressed value to be statistically relevant it must less than .05. Five times out of 100 is the cut off for significance in the Pearson's Chi Squared test.

Cramer's V is a symmetric measurement that measures association. It is commonly used for nominal variables, when the amount of variables exceeds two; which

makes it well suited to this analysis. Cramer's V is also well suited to this study due to the fact that it is a symmetric measurement, the order of the columns and rows will not affect the outcome of the statistical operation (Sheskin 1997). Cramer's V has a scale of 0-1. Where 0 is no association, and 1 is a perfect association.

MVA analysis (Pearson Chi squared and Cramer's V) found several grave feature data sets to have no significance, often this was due to a low sample size. In low sample sizes (especially presence versus absence; where 1=presence and 0=absence) 0 values created false, or inflated significance. Data sets that were not significant included: position of the body at burial, flexing, leg direction, shaft type, burial maximum length, and burials by age set.

Orientation of Burials

When MVA of the orientation of burials was conducted 104/110 burials were utilized, this analysis was comprised of only those burials that had known orientation. The Pearson Chi Squared test demonstrates a significant but weak association temporally (0.029). Cramer's V analysis shows no association (0.260). Much like the bivariate analysis results indicated there is tendency to bury the dead in a generally east-west direction.

Table 13 Multivariate Analysis of Orientation of Burials

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Site * Orientation	104	100.0%	0	.0%	104	100.0%

Site * Orientation Crosstabulation

Count

		Orientation				Total
		N-S	E-W	SW-NE	SE-NW	
Site	Burkett	4	8	7	6	25
	Linwood	0	13	5	4	22
	Clarks Village	9	14	27	7	57
Total		13	35	39	17	104

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.019[a]	6	.029
Likelihood Ratio	16.166	6	.013
Linear-by-Linear Association	.036	1	.850
N of Valid Cases	104		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.75.

Burial Pit Shape

MVA of burial pit/shaft shape excluded all of the unknown shapes for a total of 95/110 shapes analyzed. The Pearson Chi Squared test shows a significant association of shaft shape by site, with a value of 0.00. Cramer's V shows a weak significance with a value of 0.662. Overall, there is a strong association at the Linwood Site for a preferred shaft shape of oval, and at the Clarks Village Site for the preference of oblong shaped burial shafts/pits.

Table 14 Multivariate Analysis of Burial Pit/Shaft Shape

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Site * Shaft Shape	95	100.0%	0	.0%	95	100.0%

Site * Shaft Shape Crosstabulation

Count

		Shaft Shape				
		bell	oval	round	oblong	rectangular
Site	Burkett	8	6	1	1	0
	Linwood	0	20	0	0	0
	Clarks Village	0	15	2	33	8
Total		8	41	3	34	8

Site * Shaft Shape Crosstabulation

Count

		Shaft Shape	
		right angle	Total
Site	Burkett	0	16
	Linwood	0	20
	Clarks Village	1	59
Total		1	95

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	83.256[a]	10	.000
Likelihood Ratio	80.752	10	.000
Linear-by-Linear Association	40.958	1	.000
N of Valid Cases	95		

a. 12 cells (66.7%) have expected count less than 5. The minimum expected count is .17.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.936			.000
	Cramer's V	.662			.000
Ordinal by Ordinal	Gamma	.924	.052	9.063	.000
N of Valid Cases		95			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Maximum Width of Burials

While maximum length was expected to have correlated to the Age-Set category, the results indicated that was no association between age of the individual and maximum length of the burial. Surprisingly, the maximum width of the burial shows very strong (perfect 0.00) association temporally. This analysis was completed without null values (unknown measurements).

Table 15 Kruskal-Wallis Test of Maximum Width of Burials.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of MaxLength is the same across categories of Site.	Independent-Samples Kruskal-Wallis Test	.150	Retain the null hypothesis.
2	The distribution of MaxWidth is the same across categories of Site.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The Kruska-Wallis Test is a one way mean standard deviation between groups. The test ranks low to high to make the distribution flat. A Bonferroni Post hoc pair wise comparison (the most conservative for multiple comparisons) correction was applied to correct for type two errors that can occur when multiple tests are run on the same data set. Additionally, ANOVA comparisons (A as compared to B,C; B as compared to A,C; C as compared to A,B) were made.

Burial widths at the Burkett Site (Prehistoric) are the smallest, Linwood Site (Proto-historic) burial widths are larger than Burkett. Linwood burial widths are also on average wider than Clarks Village (Historic), but not significantly. Linwood burial widths are the largest, but are not significantly larger than Clarks Village.

Table 16 Descriptive Statistics for Maximum Burial Widths at the Burkett Site.

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
MaxLength	25	24	48	38.08	7.193	-.624
MaxWidth	25	8.0	27.0	18.880	4.5946	-.138
Valid N (listwise)	25					

Descriptive Statistics[a]

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
MaxLength	.464	-.448	.902
MaxWidth	.464	-.132	.902
Valid N (listwise)			

a. Site = Burkett

Table 17 Descriptive Statistics for Maximum Burial Widths at the Linwood Site.

Site = Linwood

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
MaxLength	20	22	70	43.85	11.435	.212
MaxWidth	20	.0	48.0	28.550	9.4171	-1.113
Valid N (listwise)	20					

Descriptive Statistics[a]

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
MaxLength	.512	.348	.992
MaxWidth	.512	4.165	.992
Valid N (listwise)			

a. Site = Linwood

Table 18 Descriptive Statistics for Maximum Width at the Clarks Village Site.

Site = Clarks Village

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
MaxLength	61	18	78	42.16	12.434	.246
MaxWidth	61	8.0	43.0	24.156	8.7747	.603
Valid N (listwise)	61					

Descriptive Statistics[a]

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
MaxLength	.306	.187	.604
MaxWidth	.306	-.517	.604
Valid N (listwise)			

a. Site = Clarks Village

Table 19 Means Plot of Burial Widths.

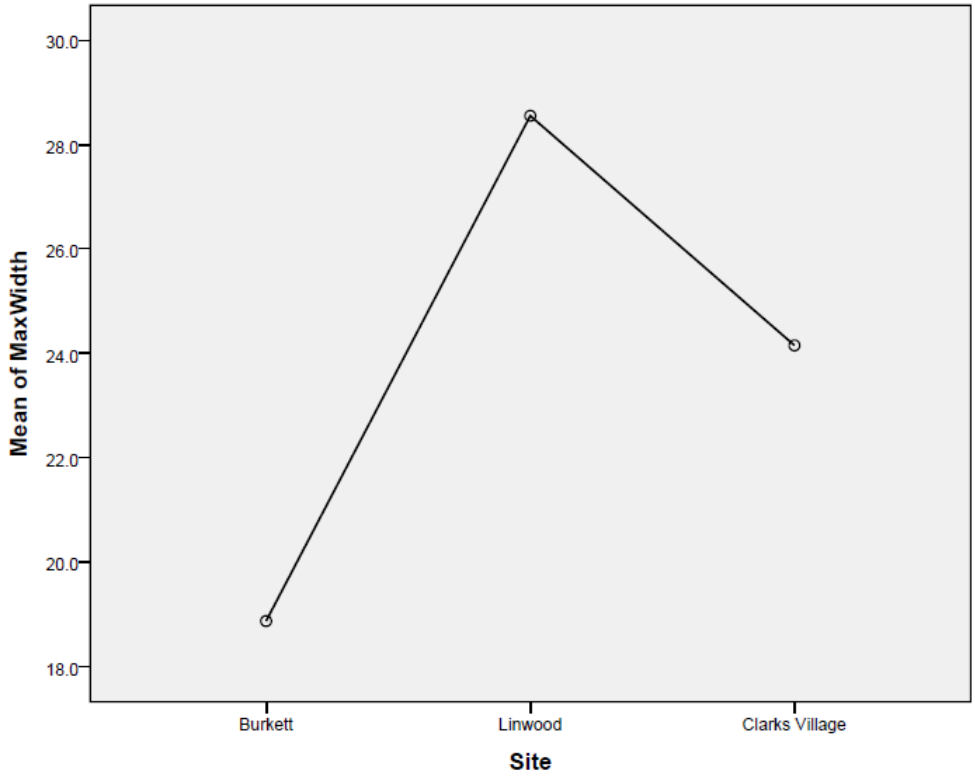


Table 20 Bonferroni Correction of Maximum Width of Burials.

Multiple Comparisons

Bonferroni

Dependent Variable	(I) Site	(J) Site	Mean Difference (I-J)	Std. Error	Sig.
MaxLength	Burkett	Linwood	-5.770	3.371	.270
		Clarks Village	-4.084	2.668	.387
	Linwood	Burkett	5.770	3.371	.270
		Clarks Village	1.686	2.895	1.000
	Clarks Village	Burkett	4.084	2.668	.387
		Linwood	-1.686	2.895	1.000
MaxWidth	Burkett	Linwood	-9.6700*	2.4396	.000
		Clarks Village	-5.2757*	1.9311	.022
	Linwood	Burkett	9.6700*	2.4396	.000
		Clarks Village	4.3943	2.0954	.115
	Clarks Village	Burkett	5.2757*	1.9311	.022
		Linwood	-4.3943	2.0954	.115

Multiple Comparisons

Bonferroni

Dependent Variable	(I) Site	(J) Site	95% Confidence Interval	
			Lower Bound	Upper Bound
MaxLength	Burkett	Linwood	-13.97	2.43
		Clarks Village	-10.58	2.41
	Linwood	Burkett	-2.43	13.97
		Clarks Village	-5.36	8.73
	Clarks Village	Burkett	-2.41	10.58
		Linwood	-8.73	5.36
MaxWidth	Burkett	Linwood	-15.607	-3.733
		Clarks Village	-9.976	-.576
	Linwood	Burkett	3.733	15.607
		Clarks Village	-.705	9.494
	Clarks Village	Burkett	.576	9.976
		Linwood	-9.494	.705

*. The mean difference is significant at the 0.05 level.

Table 21 ANOVA Comparisons of Maximum Width Calculations.

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
MaxLength	2.977	2	103	.055
MaxWidth	4.114	2	103	.019

ANOVA

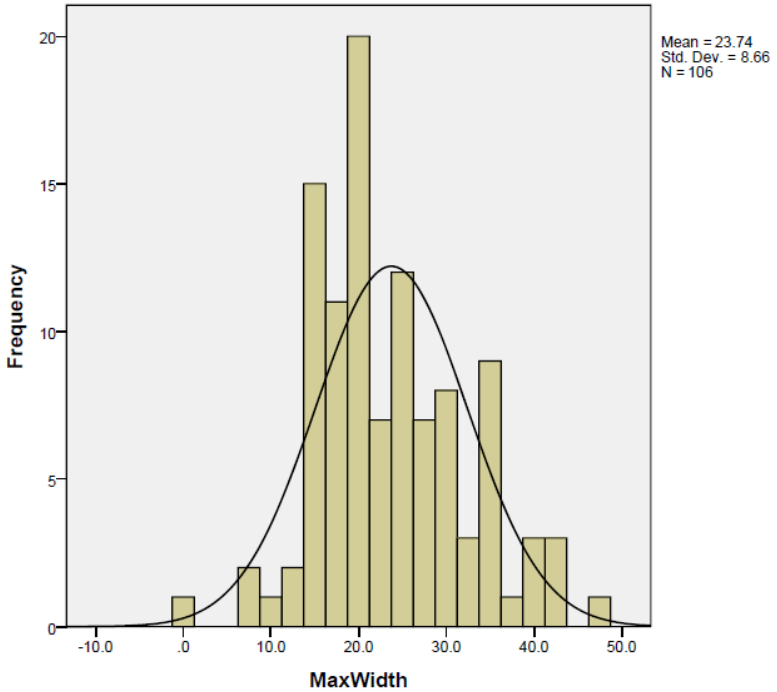
		Sum of Squares	df	Mean Square	F	Sig.
MaxLength	Between Groups	429.712	2	214.856	1.702	.187
	Within Groups	13002.751	103	126.240		
	Total	13432.462	105			
MaxWidth	Between Groups	1063.755	2	531.878	8.043	.001
	Within Groups	6811.360	103	66.130		
	Total	7875.116	105			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
MaxLength	Brown-Forsythe	2.034	2	61.197	.140
MaxWidth	Brown-Forsythe	8.808	2	48.437	.001

a. Asymptotically F distributed.

Table 22 Histogram of Maximum Width Calculations.



Presence and Types of Grave Lining

Overall, presence/absence (which utilized 110/110 burials) is not significant. Pearson Chi squared results have a value of 0.113, and Cramer's V shows a weak association of presence/absence of lined burials with a value of 0.243. When amounts of grave lining are analyzed (single, combinations of two, three, and four types) the measure of association over time is very significant. Pearson Chi squared results have a value of 0.00, and Cramer's V has a fairly strong (0.634) measure of significance. There is a decrease in time in the amount of wood utilized, and a general increase in the number of burials that have a single type of lining.

Table 23 Multivariate Analysis of Presence and Types of Grave Lining.

Crosstab

Count

		Amount of Lining					
		not present	Single	Combo of 2	Combo of 3	Combo of 4	Total
Site	Burkett	8	8	5	4	0	25
	Linwood	11	7	3	1	0	22
	Clarks Village	10	34	11	7	1	63
Total		29	49	19	12	1	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.969[a]	8	.113
Likelihood Ratio	13.049	8	.110
Linear-by-Linear Association	.722	1	.395
N of Valid Cases	110		

a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.343			.113
	Cramer's V	.243			.113
Ordinal by Ordinal	Gamma	.177	.134	1.333	.183
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Crosstab

Count

		CombinationTypes						
		none	wood	bark	leather	matting	poles	cloth
Site	Burkett	8	4	2	1	0	1	0
	Linwood	11	1	4	0	2	0	0
	Clarks Village	10	4	0	8	18	3	1
Total		29	9	6	9	20	4	1

Crosstab

Count

		CombinationTypes			
		matting & bark	matting & wood	matting & leather	leather & wood
Site	Burkett	1	0	0	4
	Linwood	0	0	0	1
	Clarks Village	0	4	5	0
Total		1	4	5	5

Crosstab

Count

		CombinationTypes				
		leather & bark	leather & cloth	leather & metal	wood & poles	wood, matting & bark
Site	Burkett	0	0	0	0	2
	Linwood	2	0	0	0	0
	Clarks Village	0	1	1	1	0
Total		2	1	1	1	2

Crosstab

Count

		CombinationTypes				
		wood, leather & bark	wood, leather & poles	wood, poles & bark	matting, leather & poles	matting, leather & cloth
Site	Burkett	1	1	0	0	0
	Linwood	0	0	1	0	0
	Clarks Village	0	0	0	5	1
Total		1	1	1	5	1

Crosstab

Count

		Combination Types	
		matting, leather, bark & wood	Total
Site	Burkett	0	25
	Linwood	0	22
	Clarks Village	1	63
Total		1	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	88.562[a]	42	.000
Likelihood Ratio	98.102	42	.000
Linear-by-Linear Association	1.076	1	.300
N of Valid Cases	110		

a. 60 cells (90.9%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.897			.000
	Cramer's V	.634			.000
Ordinal by Ordinal	Gamma	.236	.112	2.150	.032
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

MULTIVARIATE ANALYSIS OF GRAVE GOODS

Nominal variables (presence/absence) continue to utilize the Pearson Chi squared test as well as the Cramer's V symmetric measurement. Data sets that were not significant included: presence/absence of agricultural grave goods, and presence/absence of utilitarian grave goods. However, ordinal ranking associated with the additional MVA requires the addition of more appropriate statistical analyses. For ordinal ranked variables (modest, moderate, intense, and extravagant) a Gamma symmetric measurement (ordinal by ordinal) was performed. Numerically, when the symmetric measurement of Gamma has a value closer to one, the data set is significant.

In low sample sizes (especially ordinal values; where 1+=rank and 0=absence) 0 values created false, or inflated significance. Data sets that were not significant included: quantity of agricultural grave goods, quantity of utilitarian grave goods, quantity of grave goods that are weapons, quantity of grave goods that are weapon accessories, quantity of grave goods that are personal adornment, quantity of items that are personal items, and quantity of items that are religious/ceremonial.

Presence and Absence of Grave Goods

The Pearson Chi squared test indicates that there is a significant, but not strong association (0.033) of the inclusion of grave goods over time. Cramer's V also indicates a weak significance in the increase of grave goods temporally. Overall trends indicate that there is an increase in the presence of grave goods in burials through time, but the association is somewhat weak.

Table 24 Multivariate Analysis of the Presence/Absence of Grave Goods.

Crosstab

Count

		GG P/A		
		absent	present	Total
Site	Burkett	8	17	25
	Linwood	2	20	22
	Clarks Village	7	56	63
Total		17	93	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.829[a]	2	.033
Likelihood Ratio	6.013	2	.049
Linear-by-Linear Association	4.784	1	.029
N of Valid Cases	110		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.249			.033
	Cramer's V	.249			.033
Ordinal by Ordinal	Gamma	.422	.198	1.755	.079
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Grave Goods Origins

As expected, when the origins of grave goods are analyzed the results are highly significant. This data analyzes the grave goods based on whether the material is indigenous in nature, a trade item (Euro-American in origin), or if the grave goods contain both indigenous and Euro-American materials. The Pearson Chi squared test demonstrates perfect association (0.00) between the temporal context and the materials

found. There are no grave goods of Euro-American origin at the Burkett Site (Prehistoric) and by the Historic Period, nearly all of the materials present include traded items.

Table 25 Multivariate Analysis of Origin of Grave Goods.

Crosstab

Count

		GG I/E				
		not present	Indigenous	Euro-American	Both	Total
Site	Burkett	8	17	0	0	25
	Linwood	2	2	7	11	22
	Clarks Village	6	6	10	40	62
Total		16	25	17	51	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	58.892[a]	6	.000
Likelihood Ratio	66.264	6	.000
Linear-by-Linear Association	33.793	1	.000
N of Valid Cases	109		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 3.23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.735			.000
	Cramer's V	.520			.000
Ordinal by Ordinal	Gamma	.653	.082	6.194	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Presence and Absence of Weapons

The Pearson Chi squared test for the presence/absence of weaponry as a grave good shows significance (0.05), but it is right at the cutoff point (0.05). Of the 109 burials utilized for this analysis 11 burials contained weaponry. Ten of these were from Clarks Village (Historic Period), one was from the Burkett Site (Prehistoric). Therefore, weaponry as a grave good tends to be associated with the Historic Period, and was rarely used in prior periods.

Table 26 Multivariate Analysis of the Presence/Absence of Weaponry as a Grave Good.

Crosstab

Count

		Weapon P/A		
		Absent	Present	Total
Site	Burkett	24	1	25
	Linwood	22	0	22
	Clarks Village	52	10	62
Total		98	11	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.983[a]	2	.050
Likelihood Ratio	8.126	2	.017
Linear-by-Linear Association	4.068	1	.044
N of Valid Cases	109		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.22.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.234			.050
	Cramer's V	.234			.050
Ordinal by Ordinal	Gamma	.723	.253	2.422	.015
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Presence and Absence of Personal Adornment as Grave Goods

The Pearson Chi squared test for the presence/absence of personal adornment items as grave goods shows strong association (perfect significance 0.00). There is a significant shift in mortuary treatment indicated by this variable. There is a significant increase in the number of burials over time that include personal adornment items.

Table 27 Multivariate Analysis of Presence/Absence of Personal Adornment Items as Grave Goods.

Crosstab

Count

		Pers Adorn P/A		
		Absent	Present	Total
Site	Burkett	24	1	25
	Linwood	11	11	22
	Clarks Village	17	45	62
Total		52	57	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	33.647[a]	2	.000
Likelihood Ratio	39.145	2	.000
Linear-by-Linear Association	32.422	1	.000
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.50.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.556			.000
	Cramer's V	.556			.000
Ordinal by Ordinal	Gamma	.791	.075	6.705	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Presence/Absence of Personal Items

The presence and absence of personal items as grave goods shows strong association (0.00) over time when analyzed utilizing the Pearson Chi squared test. This type of grave good increases in frequency over time, denoting a significant shift in mortuary treatment. These items were a rare inclusion during the Prehistoric Period, but by the Historic Period more than half of the burial sample included items of a personal nature.

Table 28 Multivariate Analysis of the Presence/Absence of Personal Items as Grave Goods.

Crosstab

Count

		Pers Item P/A		
		Absent	Present	Total
Site	Burkett	23	2	25
	Linwood	11	11	22
	Clarks Village	27	35	62
Total		61	48	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.369[a]	2	.000
Likelihood Ratio	20.200	2	.000
Linear-by-Linear Association	15.074	1	.000
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.69.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.399			.000
	Cramer's V	.399			.000
Ordinal by Ordinal	Gamma	.589	.120	4.142	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Presence/Absence of Religious/Ceremonial Items as Grave Goods

There is a very strong association between the inclusion of religious/ceremonial items as grave goods over time, 0.001 is the value that is assigned to this type of artifact using the Pearson Chi squared test. This is a near perfect numeric value for association. There is a significant increase in the amount of graves that include religious/ceremonial items as grave goods over time. This is a significant shift in mortuary treatment over time.

Table 29 Multivariate Analysis of Presence/Absence of Religious/Ceremonial Items as Grave Goods.

Crosstab

Count

		Religious/Cer P/A		
		Absent	Present	Total
Site	Burkett	24	1	25
	Linwood	16	6	22
	Clarks Village	35	27	62
Total		75	34	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.181[a]	2	.001
Likelihood Ratio	16.204	2	.000
Linear-by-Linear Association	12.965	1	.000
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.86.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.348			.001
	Cramer's V	.348			.001
Ordinal by Ordinal	Gamma	.648	.127	4.257	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Chapter 4 CONCLUSIONS

Shifts in differential treatment of individuals in mortuary contexts correlate to shifts in the social systems of the society. The Pawnee were separated into three distinct social groups based on rank. The highest ranked individuals were the chiefs, secondary chiefs, owners of village bundles, and priests. All of these positions were passed on hereditarily from one person to another. The secondary rank included high ranking warriors and high ranking members of different village organizations. These intermediate rankings were generally passed through hereditary lines (father to son), however, these positions oscillated between generations. The remainder of village comprised the third or lowest rank status. There was the potential to move between ranks based on personal achievements achieved through warfare, horse raiding, and other social rivalries (O'Shea 1989:62-63).

The introduction of non-native goods (such as horses and trade goods) clearly altered the structure of social status within Pawnee society. In addition to hereditary ranking, a new means to achieve status was introduced - personal achievements. Though, these positions never attained a status that would have been equivalent to those acquired by hereditary means (O'Shea 1989:62-63) their introduction clearly disrupted the social structure of the Pawnee. There are currently two theories that address the changes in Pawnee mortuary practices over time. The first is that contact with Euro-Americans affected the social structure of the Pawnee causing more emphasis on trade goods, the second theory suggests that over time as contact increased trade goods became available in larger quantities and this is reflected in their wide spread usage (Grange 1997:107).

Since mortuary practices are a means by which competitive displays of social and economic ideals can be displayed (Cannon *et al* 1989:437), it seems more likely that the changes in Pawnee mortuary practices signify larger changes in Pawnee social structure. As the methods with which a Pawnee could attain higher status expanded to include non-hereditary means; the way in which the Pawnee socially signaled their status also became more complicated. This explanation rationally describes the changes in material culture present in increasing quantities in mortuary contexts.

This is not to negate the suggestion that contact with Euro-Americans spurred these changes, nor that increased access to trade goods disrupted the Pawnee economic systems. It would, in fact, appear that it was the influx of Euro-American goods that spurred this social change altering the relative poverty[3] of the Pawnee. That is to say that even modest burials from the Historic Period are much more extravagant relative to extravagant burials from the Prehistoric Period. This change is due to social and economic transformations in the relative poverty (or relative wealth) of Pawnee society during the respective time periods. This is further reinforced by the fact that the inclusion of grave goods of Euro-American origin was found to be statistically significant temporally.

Social disorganization within Pawnee society during the nineteenth century contributed to increased rivalry and competition as populations fluctuated and the bands began to coalesce (O'Shea 1989:63). This change is indicated by the shift from indigenous technological artifacts to traded items with social value over time within

[3] Absolute poverty is defined as the inability to access food, water, clothing, and shelter; whereas relative poverty is a socially defined phenomena that is a measure of income inequality (Encyclopaedia Britannica 2012).

burial contexts (Grange 1997: 102). Logically, when the influx of new commodities (such as trade goods) altered the relative poverty (or relative wealth), social changes in signaling were necessary to effectively communicate status and wealth.

Further supporting changes to the relative wealth of the Pawnee over time are the increase in amounts of grave lining present temporally, as well as the materials used in the different time periods. Analysis of the amounts of grave lining present (one type, two types, three types, and four types) demonstrate some strong temporal associations. There is a strong statistical association between the increase in graves that are lined from the Prehistoric Period through the Historic Period. When amounts of grave lining are analyzed (single, combinations of two, three, and four types) the measure of association over time is very significant. An increase in the number of burials that have a single type of lining clearly supports the assertion that the relative wealth of the Pawnee was altered by shifts in their economy.

Overall rates of wood use decline over time. The decrease in the use of wood as lining is likely due to its scarcity in the Historic Period when Euro-American settlers began cutting down the already scarce trees. Other trends such as the use of matting predictably increasing over time, may be attributed to access to Euro-American goods that made it easier to process the materials, or it may be economically linked to the decline in the use of wood. While wood was still utilized into the Historic Period, its overall usage decreased dramatically. It seems logical that their scarcity post 1800 would have made their economic and social value increase - thus the usage of wood in combination with other types of grave lining is likely attributed to the socioeconomic standing of the deceased, and thusly represents their high status within Pawnee society. It

is likely that the burials containing wood in the Historic Period were those who possessed higher rank within the society, given the item's scarcity.

Leather combination types also declined in usage over time. The decline of this combination may also be attributed to its socioeconomic value. As bison herds were depleted by over hunting, much like trees were over harvested, this particular combination is likely to have had far too great an economic and social value; which may have made it too costly for the majority of the population to afford. The use of cloth only during the Historic Period is undoubtedly associated with trade practices with Euro-Americans.

On a macro level shifts are visible in the mortuary record that indicate changes in the relative wealth of Pawnee society. An increase in the amount of graves that are lined with one (or more) types of lining indicate that a shift has occurred in the economy that makes it affordable for a larger proportion of the population to inter their relatives utilizing higher status burial practices. Logically, this shift makes it necessary for the wealthier portion of the population to also perform more elaborate differential burial practices. On a micro level the overall decrease in wood products and leather as single lining types (and their inclusion into more elaborate combination types) signifies that the socioeconomic value of wood products and leather lining types increases through time as the rarity of commodity increases. The inference of such social concepts/behaviors and their associated mortuary practices was reviewed in depth by Prentice (1987:196).

Other significant shifts in mortuary treatment are visible in the increased inclusion of personal adornment, personal items, and religious/ceremonial items. Again, these

categories support the changes in relative wealth visible using mortuary treatment as a proxy with which to gauge shifts in both the social and economic values of the Pawnee.

Hereditary status has been associated with some burials of Pawnee children, whose grave goods include those that indicate the status of chief (Grange 1997:107). This supports their hereditary status because for children the inclusion of grave goods can serve as an indicator of their expected adult status (Gamble *et al* 2001:196). Furthermore, it reinforces the need to signal the origin of the status, as well as the increase in relative wealth apparent in the archaeological record. It is also likely that as child mortality rates increased from Euro-American introduced diseases, that disproportionate loss of life caused a social change in mortuary practices involving non-adults.

Statistical analysis showed significant and strong associations in the decrease of adult burials over time; and dramatically increasing juvenile and adoloscent burial rates. The highest infant burial rates were from the Linwood Site (Proto-historic). Morbidity rates for small pox in virgin soil populations effected the entire population at higher rates than subsequent infections. The immunosuppressed are more susceptible so it is logical that the Proto-historic Period (first contact) would have high infant mortality rates. Subsequent epidemics and endemics created disproportionate loss of life with higher mortality rates among children and the elderly (Trimble 1985).

Furthermore, based on the outbreak dates [see Epidemic section], the patterns associated with small pox, and immunity to the disease after having suffered from it, it is logical that subsequent outbreaks would lead to higher mortality rates (and therefore create more burials) for infants, juveniles, and adolescents as compared to adults. With

outbreaks occurring in the early 1780s, around 1795, around 1801-1802, followed by about a thirty year gap - then occurring every few years thereafter. It seems logical to see trends for higher mortality rates for non-adults, than adults.

This shift in mortality rates over time, due to epidemics, may have caused a social change in the acceptable mortuary treatment for children during the Proto-historic and Historic Periods. The need to signify the social stress the loss of the child created in the social hierarchy of the Pawnee may have contributed to more elaborate funerary displays for children in the later periods. Certainly, there was an increase in the amount and classification types of grave goods included in non-adult burials. Whether this shift occurred because of relative wealth changes, or the disproportionate loss of life due to epidemics- it is clear that social changes in the mortuary treatment of children occurred in later periods [see Processing the Data: Personal Items; Appendix B].

There are two statistically significant changes that occurred with the grave features of Pawnee burials through time. The first is that grave maximum widths increased over time, they are widest during the Proto-historic and only slightly less wide during the Historic Period. This is a significant change from the Prehistoric Period when burials were much narrower than later periods. This may be attributed to the introduction of metal tools acquired through trade with Euro-Americans, or it may be related to increased amount of grave goods that began to be included in mortuary contexts.

The second statistically significant change that is the overall shape of the grave shaft itself. There is a shift from a bell shaped grave shaft in the Prehistoric to an oval shape in the Proto-historic to an oblong shape in the Historic Period. Likely, this change is associated with the widening of grave shafts through time. Similarly, it may be related

to the acquisition of metal tools or an increased amount of grave goods that were interred with the deceased.

Overall, the statistical analysis of dynamic reconfiguration of Pawnee social organization in the Proto-historic and Historic eras utilizing differential burials as a vector with which to gauge social change was successful. Both macro and micro level socioeconomic changes were observed. Ethno-historical data was corroborated with archaeological data. A new theory regarding the relative wealth levels, and the associated social signaling required to deal with altered social and economic conditions was developed. This theory explains the increases in material culture as well as the changes to the social hierarchies that were formed in response to developing social systems and economies as a response to outside stimuli.

APPENDIX A

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Site * InterSiteArea	110	100.0%	0	.0%	110	100.0%
Site * Orientation	110	100.0%	0	.0%	110	100.0%
Site * HeadDirection	110	100.0%	0	.0%	110	100.0%
Site * Flexing	110	100.0%	0	.0%	110	100.0%
Site * Deposition	110	100.0%	0	.0%	110	100.0%
Site * Leg Direction	110	100.0%	0	.0%	110	100.0%
Site * Shaft Type	110	100.0%	0	.0%	110	100.0%
Site * Shaft Shape	110	100.0%	0	.0%	110	100.0%
Site * LinedBurial	110	100.0%	0	.0%	110	100.0%
Site * Amount of Lining	110	100.0%	0	.0%	110	100.0%
Site * CombinationTypes	110	100.0%	0	.0%	110	100.0%
Site * Age Group	110	100.0%	0	.0%	110	100.0%
Site * Sex	110	100.0%	0	.0%	110	100.0%
Site * MaxLength	110	100.0%	0	.0%	110	100.0%
Site * MaxWidth	110	100.0%	0	.0%	110	100.0%
Site * GG P/A	110	100.0%	0	.0%	110	100.0%
Site * GG I/E	109	99.1%	1	.9%	110	100.0%
Site * Weapon P/A	109	99.1%	1	.9%	110	100.0%
Site * Weapon Acces P/A	109	99.1%	1	.9%	110	100.0%
Site * Pers Adorn P/A	109	99.1%	1	.9%	110	100.0%
Site * Pers Item P/A	109	99.1%	1	.9%	110	100.0%
Site * Util P/A	109	99.1%	1	.9%	110	100.0%
Site * Agric P/A	109	99.1%	1	.9%	110	100.0%
Site * Religious/Cer P/A	109	99.1%	1	.9%	110	100.0%
Site * WeaponQuan	109	99.1%	1	.9%	110	100.0%
Site * Weapon Acces Quan	109	99.1%	1	.9%	110	100.0%
Site * Pers AdornQuan	109	99.1%	1	.9%	110	100.0%
Site * Pers Item Quan	109	99.1%	1	.9%	110	100.0%
Site * UtilQuan	109	99.1%	1	.9%	110	100.0%
Site * AgricQuan	109	99.1%	1	.9%	110	100.0%
Site * Religious/Cer Quan	109	99.1%	1	.9%	110	100.0%

Site * InterSiteArea

Crosstab

Count

		InterSiteArea					
		Burk.N1-M2	Burk.N-1 GT2	LinArea1	CV.BH1	CV.BH2	CV.BH4
Site	Burkett	10	15	0	0	0	0
	Linwood	0	0	22	0	0	0
	Clarks Village	0	0	0	2	1	28
Total		10	15	22	2	1	28

Crosstab

Count

		InterSiteArea			Total
		CV.BH5	CV.BH6	CV.BH7	
Site	Burkett	0	0	0	25
	Linwood	0	0	0	22
	Clarks Village	22	4	6	63
Total		22	4	6	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	220.000[a]	16	.000
Likelihood Ratio	215.121	16	.000
Linear-by-Linear Association	91.723	1	.000
N of Valid Cases	110		

a. 18 cells (66.7%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	1.414			.000
	Cramer's V	1.000			.000
Ordinal by Ordinal	Gamma	1.000	.000	17.152	.000
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Flexing

Crosstab

Count

		Flexing				
		No	Fully	Semi Flexed	Unk.	Total
Site	Burkett	1	0	22	2	25
	Linwood	0	1	16	5	22
	Clarks Village	3	0	43	17	63
Total		4	1	81	24	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.946[a]	6	.177
Likelihood Ratio	9.563	6	.144
Linear-by-Linear Association	1.265	1	.261
N of Valid Cases	110		

a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.285			.177
	Cramer's V	.202			.177
Ordinal by Ordinal	Gamma	.289	.169	1.688	.091
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Shaft Type

Crosstab

Count

		Shaft Type			
		none	pit	unk	Total
Site	Burkett	1	20	4	25
	Linwood	0	20	2	22
	Clarks Village	0	61	2	63
Total		1	101	8	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.127[a]	4	.087
Likelihood Ratio	7.416	4	.115
Linear-by-Linear Association	1.988	1	.159
N of Valid Cases	110		

a. 6 cells (66.7%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.272			.087
	Cramer's V	.192			.087
Ordinal by Ordinal	Gamma	-.370	.273	-1.208	.227
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Amount of Lining

Crosstab

Count

		Amount of Lining					
		not present	Single	Combo of 2	Combo of 3	Combo of 4	Total
Site	Burkett	8	8	5	4	0	25
	Linwood	11	7	3	1	0	22
	Clarks Village	10	34	11	7	1	63
Total		29	49	19	12	1	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.969[a]	8	.113
Likelihood Ratio	13.049	8	.110
Linear-by-Linear Association	.722	1	.395
N of Valid Cases	110		

a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.343			.113
	Cramer's V	.243			.113
Ordinal by Ordinal	Gamma	.177	.134	1.333	.183
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * CombinationTypes

Crosstab

Count

		CombinationTypes						
		none	wood	bark	leather	matting	poles	cloth
Site	Burkett	8	4	2	1	0	1	0
	Linwood	11	1	4	0	2	0	0
	Clarks Village	10	4	0	8	18	3	1
Total		29	9	6	9	20	4	1

Crosstab

Count

		CombinationTypes			
		matting & bark	matting & wood	matting & leather	leather & wood
Site	Burkett	1	0	0	4
	Linwood	0	0	0	1
	Clarks Village	0	4	5	0
Total		1	4	5	5

Crosstab

Count

		CombinationTypes				
		leather & bark	leather & cloth	leather & metal	wood & poles	wood, matting & bark
Site	Burkett	0	0	0	0	2
	Linwood	2	0	0	0	0
	Clarks Village	0	1	1	1	0
Total		2	1	1	1	2

Crosstab

Count

		CombinationTypes				
		wood, leather & bark	wood, leather & poles	wood, poles & bark	matting, leather & poles	matting, leather & cloth
Site	Burkett	1	1	0	0	0
	Linwood	0	0	1	0	0
	Clarks Village	0	0	0	5	1
Total		1	1	1	5	1

Crosstab

Count

		Combination Types	
		matting, leather, bark & wood	Total
Site	Burkett	0	25
	Linwood	0	22
	Clarks Village	1	63
Total		1	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	88.562[a]	42	.000
Likelihood Ratio	98.102	42	.000
Linear-by-Linear Association	1.076	1	.300
N of Valid Cases	110		

a. 60 cells (90.9%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.897			.000
	Cramer's V	.634			.000
Ordinal by Ordinal	Gamma	.236	.112	2.150	.032
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * GG P/A

Crosstab

Count

		GG P/A		
		absent	present	Total
Site	Burkett	8	17	25
	Linwood	2	20	22
	Clarks Village	7	56	63
Total		17	93	110

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.829[a]	2	.033
Likelihood Ratio	6.013	2	.049
Linear-by-Linear Association	4.784	1	.029
N of Valid Cases	110		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.249			.033
	Cramer's V	.249			.033
Ordinal by Ordinal	Gamma	.422	.198	1.755	.079
N of Valid Cases		110			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * GG I/E

Crosstab

Count

		GG I/E				
		not present	Indigenous	Euro-American	Both	Total
Site	Burkett	8	17	0	0	25
	Linwood	2	2	7	11	22
	Clarks Village	6	6	10	40	62
Total		16	25	17	51	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	58.892[a]	6	.000
Likelihood Ratio	66.264	6	.000
Linear-by-Linear Association	33.793	1	.000
N of Valid Cases	109		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 3.23.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.735			.000
	Cramer's V	.520			.000
Ordinal by Ordinal	Gamma	.653	.082	6.194	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Weapon P/A

Crosstab

Count

		Weapon P/A		Total
		Absent	Present	
Site	Burkett	24	1	25
	Linwood	22	0	22
	Clarks Village	52	10	62
Total		98	11	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.983[a]	2	.050
Likelihood Ratio	8.126	2	.017
Linear-by-Linear Association	4.068	1	.044
N of Valid Cases	109		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.22.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.234			.050
	Cramer's V	.234			.050
Ordinal by Ordinal	Gamma	.723	.253	2.422	.015
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Weapon Acces P/A

Crosstab

Count

		Weapon Acces P/A		Total
		Absent	Present	
Site	Burkett	18	7	25
	Linwood	18	4	22
	Clarks Village	41	21	62
Total		77	32	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.956[a]	2	.376
Likelihood Ratio	2.069	2	.355
Linear-by-Linear Association	.632	1	.427
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.46.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.134			.376
	Cramer's V	.134			.376
Ordinal by Ordinal	Gamma	.179	.192	.941	.347
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Pers Adorn P/A

Crosstab

Count

		Pers Adorn P/A		
		Absent	Present	Total
Site	Burkett	24	1	25
	Linwood	11	11	22
	Clarks Village	17	45	62
Total		52	57	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	33.647[a]	2	.000
Likelihood Ratio	39.145	2	.000
Linear-by-Linear Association	32.422	1	.000
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.50.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.556			.000
	Cramer's V	.556			.000
Ordinal by Ordinal	Gamma	.791	.075	6.705	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Pers Item P/A

Crosstab

Count

		Pers Item P/A		
		Absent	Present	Total
Site	Burkett	23	2	25
	Linwood	11	11	22
	Clarks Village	27	35	62
Total		61	48	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.369[a]	2	.000
Likelihood Ratio	20.200	2	.000
Linear-by-Linear Association	15.074	1	.000
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.69.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.399			.000
	Cramer's V	.399			.000
Ordinal by Ordinal	Gamma	.589	.120	4.142	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Util P/A

Crosstab

Count

		Util P/A		Total
		Absent	Present	
Site	Burkett	11	14	25
	Linwood	17	5	22
	Clarks Village	39	23	62
Total		67	42	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.595[a]	2	.061
Likelihood Ratio	5.668	2	.059
Linear-by-Linear Association	1.553	1	.213
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.48.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.227			.061
	Cramer's V	.227			.061
Ordinal by Ordinal	Gamma	-.167	.171	-.949	.343
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Agric P/A

Crosstab

Count

		Agric P/A		Total
		Absent	Present	
Site	Burkett	22	3	25
	Linwood	20	2	22
	Clarks Village	55	7	62
Total		97	12	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.113[a]	2	.945
Likelihood Ratio	.117	2	.943
Linear-by-Linear Association	.001	1	.978
N of Valid Cases	109		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.42.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.032			.945
	Cramer's V	.032			.945
Ordinal by Ordinal	Gamma	.004	.278	.016	.987
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Religious/Cer P/A

Crosstab

Count

		Religious/Cer P/A		
		Absent	Present	Total
Site	Burkett	24	1	25
	Linwood	16	6	22
	Clarks Village	35	27	62
Total		75	34	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.181[a]	2	.001
Likelihood Ratio	16.204	2	.000
Linear-by-Linear Association	12.965	1	.000
N of Valid Cases	109		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.86.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.348			.001
	Cramer's V	.348			.001
Ordinal by Ordinal	Gamma	.648	.127	4.257	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * WeaponQuan

Crosstab

Count

		WeaponQuan			
		Absence	Modest	Moderate	Total
Site	Burkett	24	1	0	25
	Linwood	22	0	0	22
	Clarks Village	52	8	2	62
Total		98	9	2	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.106[a]	4	.191
Likelihood Ratio	8.549	4	.073
Linear-by-Linear Association	4.075	1	.044
N of Valid Cases	109		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.237			.191
	Cramer's V	.167			.191
Ordinal by Ordinal	Gamma	.724	.251	2.442	.015
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Weapon Acces Quan

Crosstab

Count

		Weapon Acces Quan					Total
		Absent	Modest	Moderate	Intense	Extravagent	
Site	Burkett	18	5	0	2	0	25
	Linwood	18	3	1	0	0	22
	Clarks Village	41	11	2	6	2	62
Total		77	19	3	8	2	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.457[a]	8	.708
Likelihood Ratio	8.408	8	.395
Linear-by-Linear Association	1.565	1	.211
N of Valid Cases	109		

a. 11 cells (73.3%) have expected count less than 5. The minimum expected count is .40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.224			.708
	Cramer's V	.158			.708
Ordinal by Ordinal	Gamma	.196	.177	1.128	.259
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Pers AdornQuan

Crosstab

Count

		Pers AdornQuan					Total
		Absent	Modest	Moderate	Intense	Extravagent	
Site	Burkett	24	1	0	0	0	25
	Linwood	11	11	0	0	0	22
	Clarks Village	17	18	17	3	7	62
Total		52	30	17	3	7	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	47.179[a]	8	.000
Likelihood Ratio	57.435	8	.000
Linear-by-Linear Association	29.190	1	.000
N of Valid Cases	109		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is .61.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.658			.000
	Cramer's V	.465			.000
Ordinal by Ordinal	Gamma	.819	.061	8.370	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Pers Item Quan

Crosstab

Count

		Pers Item Quan					Total
		Absent	Modest	Moderate	Intense	Extravagent	
Site	Burkett	23	1	1	0	0	25
	Linwood	11	9	2	0	0	22
	Clarks Village	27	15	15	4	1	62
Total		61	25	18	4	1	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.808[a]	8	.002
Likelihood Ratio	27.243	8	.001
Linear-by-Linear Association	15.569	1	.000
N of Valid Cases	109		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.467			.002
	Cramer's V	.330			.002
Ordinal by Ordinal	Gamma	.591	.111	4.667	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * UtilQuan

Crosstab

Count

		UtilQuan					Total
		Absent	Modest	Moderate	Intense	Extravagent	
Site	Burkett	11	9	4	1	0	25
	Linwood	17	5	0	0	0	22
	Clarks Village	39	15	5	2	1	62
Total		67	29	9	3	1	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.435[a]	8	.392
Likelihood Ratio	10.810	8	.213
Linear-by-Linear Association	.557	1	.455
N of Valid Cases	109		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is .20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.278			.392
	Cramer's V	.197			.392
Ordinal by Ordinal	Gamma	-.136	.158	-.839	.401
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * AgricQuan

Crosstab

Count

		AgricQuan			Total
		Absent	Modest	Moderate	
Site	Burkett	22	2	1	25
	Linwood	20	0	2	22
	Clarks Village	55	5	2	62
Total		97	7	5	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.025[a]	4	.554
Likelihood Ratio	4.222	4	.377
Linear-by-Linear Association	.035	1	.851
N of Valid Cases	109		

a. 6 cells (66.7%) have expected count less than 5. The minimum expected count is 1.01.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.167			.554
	Cramer's V	.118			.554
Ordinal by Ordinal	Gamma	-.006	.265	-.022	.983
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Site * Religious/Cer Quan

Crosstab

Count

		Religious/Cer Quan				
		Absent	Modest	Moderate	Intense	Total
Site	Burkett	24	1	0	0	25
	Linwood	16	4	0	2	22
	Clarks Village	35	13	8	6	62
Total		75	18	8	8	109

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.717[a]	6	.015
Likelihood Ratio	21.248	6	.002
Linear-by-Linear Association	11.021	1	.001
N of Valid Cases	109		

a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is 1.61.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.380			.015
	Cramer's V	.269			.015
Ordinal by Ordinal	Gamma	.621	.126	4.381	.000
N of Valid Cases		109			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

```
USE ALL.
COMPUTE filter_$=(Orientation > 0).
```

```
VARIABLE LABELS filter_$ 'Orientation > 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES BY Orientation (A).
CROSSTABS
  /TABLES=Site BY Orientation
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI GAMMA
  /CELLS=COUNT
  /COUNT ROUND CELL.
```

Crosstabs

[DataSet1] E:\ThesisBurialDataSPSS.sav

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Site * Orientation	104	100.0%	0	.0%	104	100.0%

Site * Orientation Crosstabulation

Count

		Orientation				Total
		N-S	E-W	SW-NE	SE-NW	
Site	Burkett	4	8	7	6	25
	Linwood	0	13	5	4	22
	Clarks Village	9	14	27	7	57
Total		13	35	39	17	104

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.019[a]	6	.029
Likelihood Ratio	16.166	6	.013
Linear-by-Linear Association	.036	1	.850
N of Valid Cases	104		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.75.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.367			.029
	Cramer's V	.260			.029
Ordinal by Ordinal	Gamma	.006	.139	.043	.966
N of Valid Cases		104			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

```
USE ALL.
COMPUTE filter_$=(ShaftType > 0).
VARIABLE LABELS filter_$ 'ShaftType > 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
CROSSTABS
  /TABLES=Site BY ShaftType
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI GAMMA
  /CELLS=COUNT
  /COUNT ROUND CELL.

USE ALL.
COMPUTE filter_$=(LinedBurial > 0).
VARIABLE LABELS filter_$ 'LinedBurial > 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
CROSSTABS
  /TABLES=Site BY LinedBurial
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI GAMMA
  /CELLS=COUNT
  /COUNT ROUND CELL.
```

Crosstabs

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Site * LinedBurial	86	100.0%	0	.0%	86	100.0%

Site * LinedBurial Crosstabulation

Count

		LinedBurial		Total
		yes	unk	
Site	Burkett	17	0	17
	Linwood	11	0	11
	Clarks Village	53	5	58
Total		81	5	86

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.563[a]	2	.278
Likelihood Ratio	4.087	2	.130
Linear-by-Linear Association	2.228	1	.136
N of Valid Cases	86		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .64.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.173			.278
	Cramer's V	.173			.278
Ordinal by Ordinal	Gamma	1.000	.000	2.299	.022
N of Valid Cases		86			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

```
USE ALL.
COMPUTE filter_$=(ShaftShape > 0).
VARIABLE LABELS filter_$ 'ShaftShape > 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
```

```
DESCRIPTIVES VARIABLES=ShaftShape
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Shaft Shape	95	1	6	2.96	1.254
Valid N (listwise)	95				

```
CROSSTABS
  /TABLES=Site BY ShaftShape
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI GAMMA
  /CELLS=COUNT
  /COUNT ROUND CELL.
```

Crosstabs

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Site * Shaft Shape	95	100.0%	0	.0%	95	100.0%

Site * Shaft Shape Crosstabulation

Count

		Shaft Shape				
		bell	oval	round	oblong	rectangular
Site	Burkett	8	6	1	1	0
	Linwood	0	20	0	0	0
	Clarks Village	0	15	2	33	8
Total		8	41	3	34	8

Site * Shaft Shape Crosstabulation

Count

		Shaft Shape	
		right angle	Total
Site	Burkett	0	16
	Linwood	0	20
	Clarks Village	1	59
Total		1	95

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	83.256[a]	10	.000
Likelihood Ratio	80.752	10	.000
Linear-by-Linear Association	40.958	1	.000
N of Valid Cases	95		

a. 12 cells (66.7%) have expected count less than 5. The minimum expected count is .17.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.936			.000
	Cramer's V	.662			.000
Ordinal by Ordinal	Gamma	.924	.052	9.063	.000
N of Valid Cases		95			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

```
FILTER OFF.
USE ALL.
EXECUTE.
*Nonparametric Tests: Independent Samples.
NPTESTS
  /INDEPENDENT TEST (MaxLength MaxWidth) GROUP (Site) KRUSKAL_WALLIS(COMPARE=P
AIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.

SORT CASES BY MaxLength (A).
*Nonparametric Tests: Independent Samples.
NPTESTS
```

```
  /INDEPENDENT TEST (MaxLength MaxWidth) GROUP (Site) KRUSKAL_WALLIS(COMPARE=P
AIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
```

Nonparametric Tests

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of MaxLength is the same across categories of Site.	Independent-Samples Kruskal-Wallis Test	.150	Retain the null hypothesis.
2	The distribution of MaxWidth is the same across categories of Site.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

```
SORT CASES  BY Site.
SPLIT FILE SEPARATE BY Site.
DESCRIPTIVES VARIABLES=MaxLength MaxWidth
  /STATISTICS=MEAN STDDEV MIN MAX KURTOSIS SKEWNESS.
```

Descriptives

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```

Site = Burkett

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
MaxLength	25	24	48	38.08	7.193	-.624
MaxWidth	25	8.0	27.0	18.880	4.5946	-.138
Valid N (listwise)	25					

Descriptive Statistics[a]

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
MaxLength	.464	-.448	.902
MaxWidth	.464	-.132	.902
Valid N (listwise)			

a. Site = Burkett

Site = Linwood

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
MaxLength	20	22	70	43.85	11.435	.212
MaxWidth	20	.0	48.0	28.550	9.4171	-1.113
Valid N (listwise)	20					

Descriptive Statistics[a]

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
MaxLength	.512	.348	.992
MaxWidth	.512	4.165	.992
Valid N (listwise)			

a. Site = Linwood

Site = Clarks Village

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
MaxLength	61	18	78	42.16	12.434	.246
MaxWidth	61	8.0	43.0	24.156	8.7747	.603
Valid N (listwise)	61					

Descriptive Statistics[a]

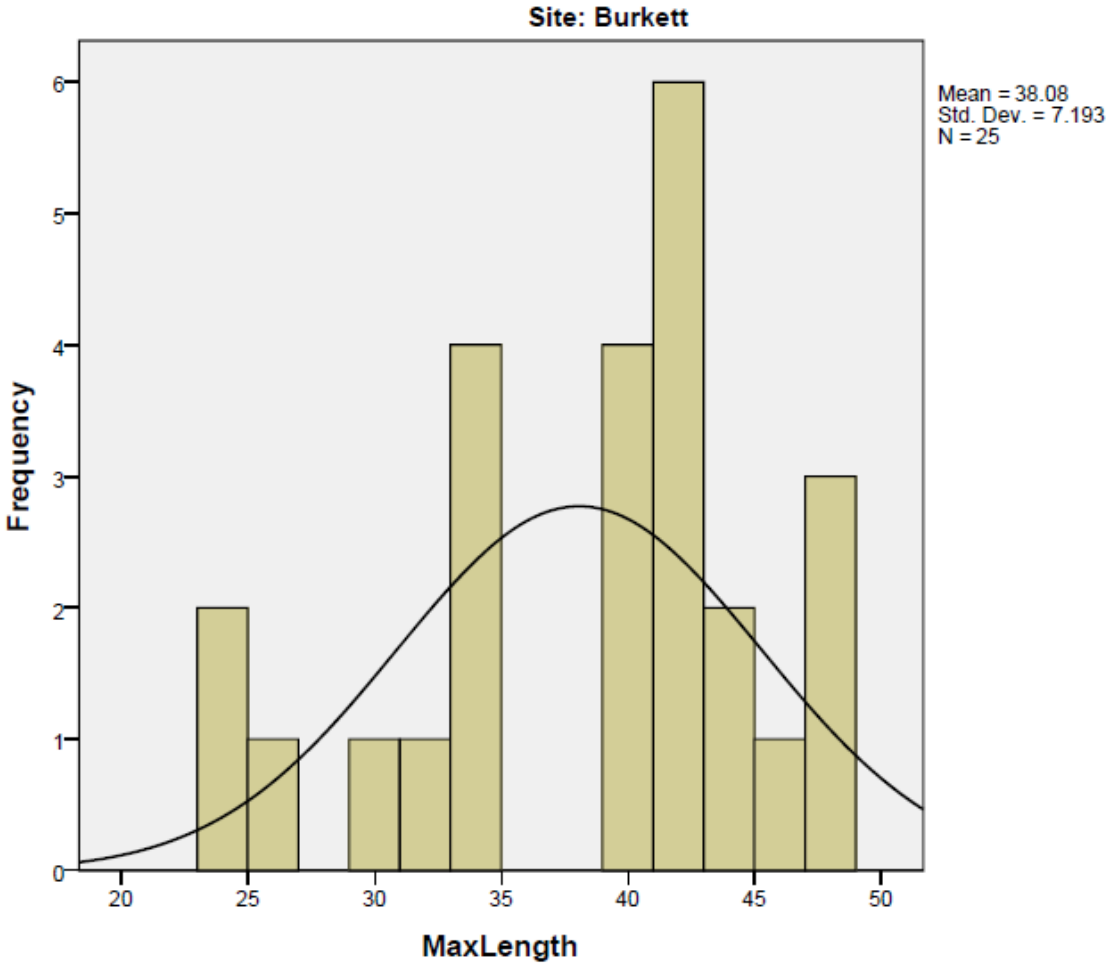
	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
MaxLength	.306	.187	.604
MaxWidth	.306	-.517	.604
Valid N (listwise)			

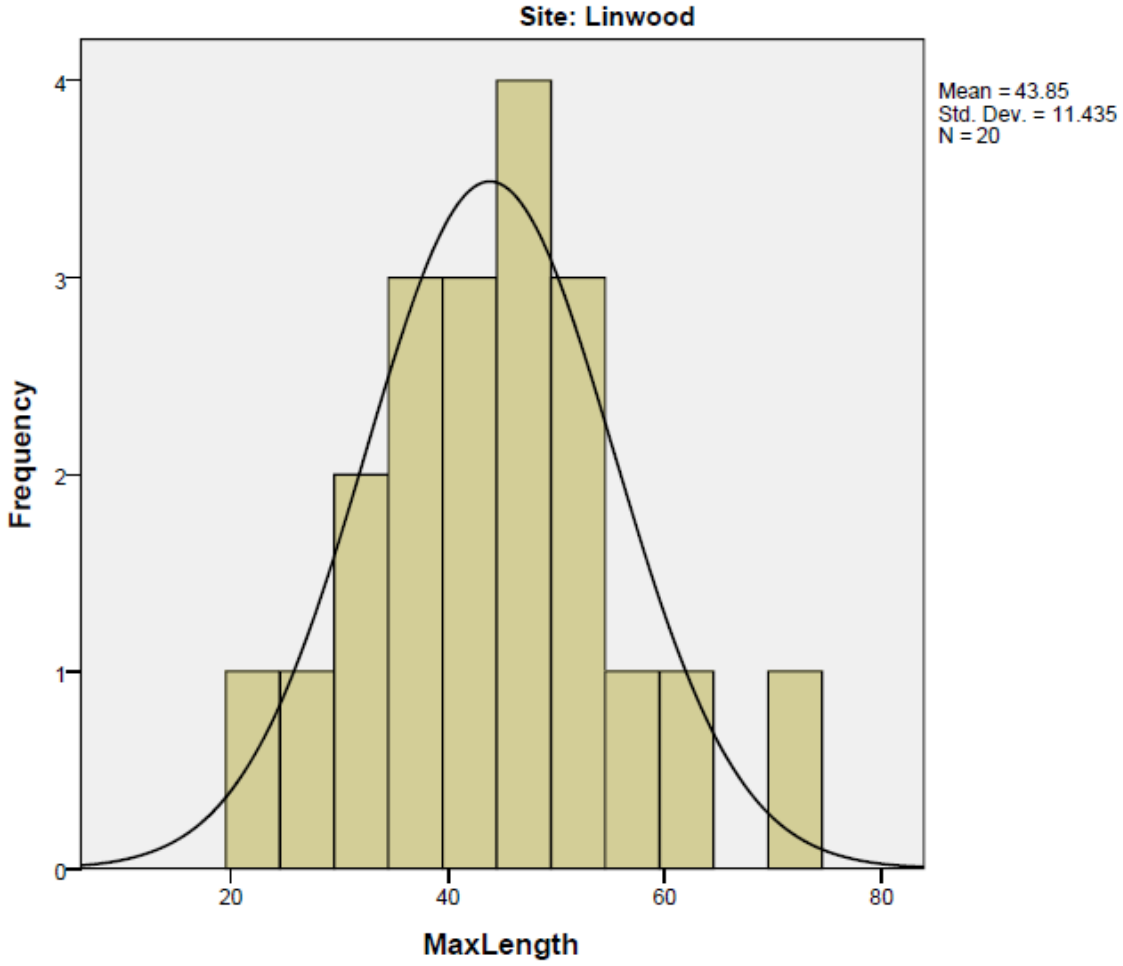
a. Site = Clarks Village

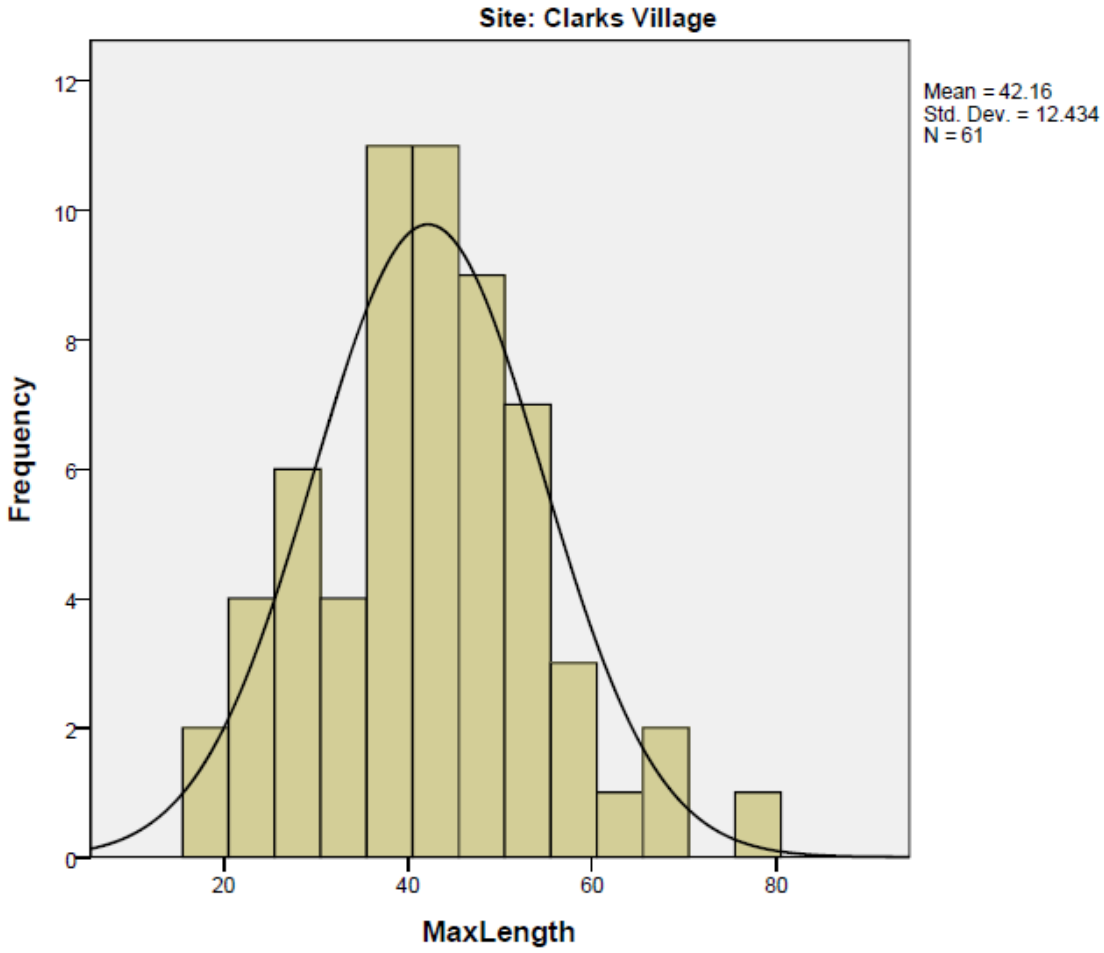
```
GRAPH
  /HISTOGRAM(NORMAL)=MaxLength.
```

Graph

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```



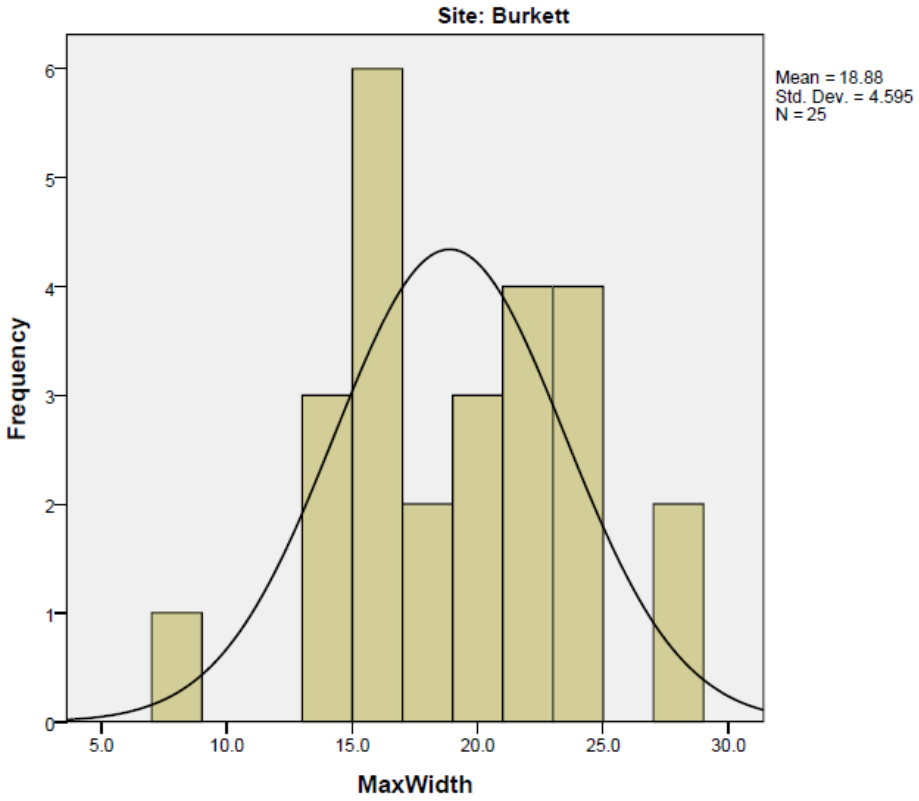

Site: Linwood
Mean = 43.85
Std. Dev. = 11.435
N = 20
Frequency
0
1
2
3
4
20
40
60
80
MaxLength

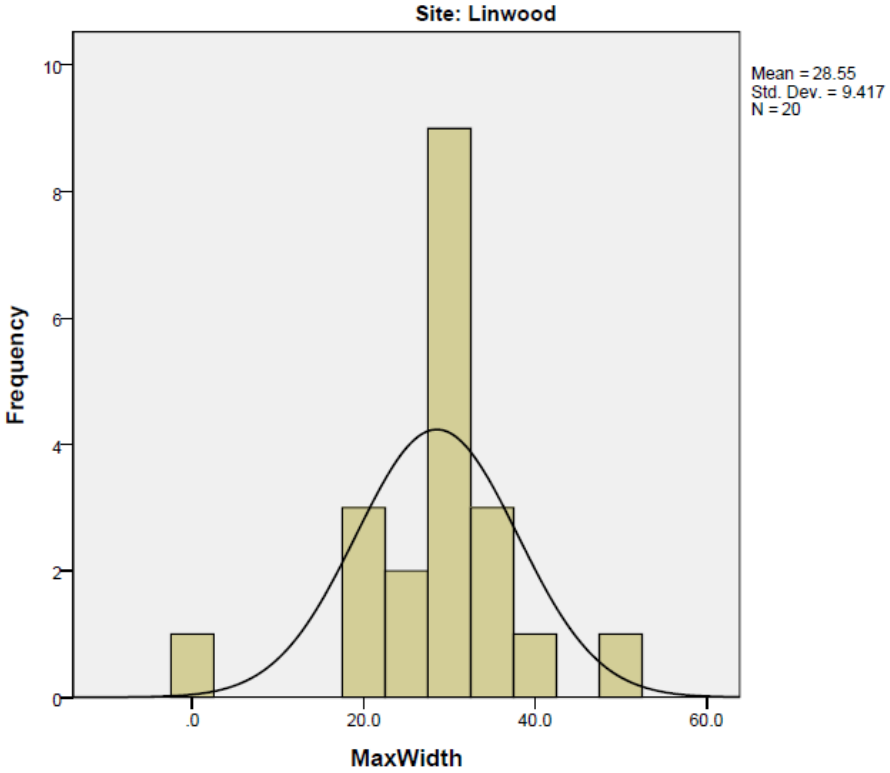


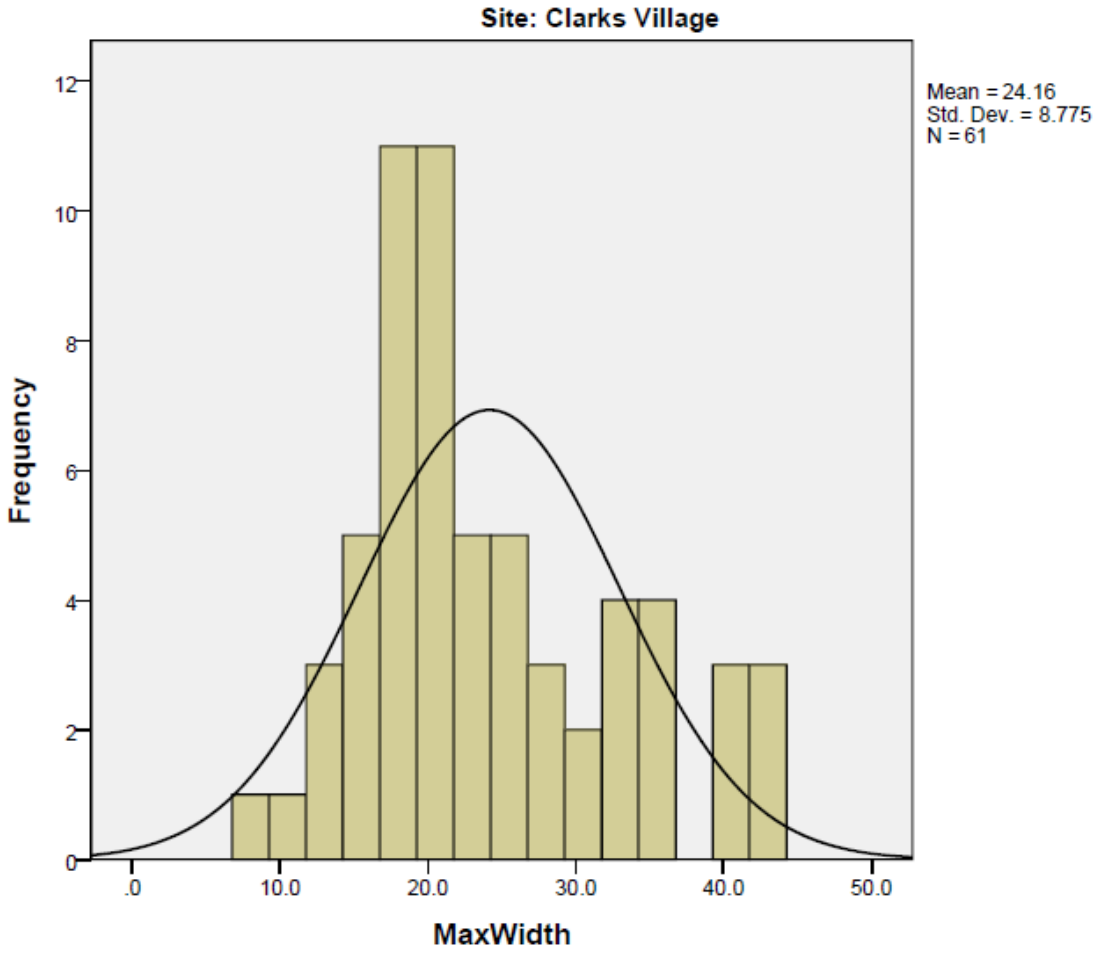

```
GRAPH
  /HISTOGRAM(NORMAL)=MaxWidth.
```

Graph

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```


Site: Burkett
Mean = 18.88
Std. Dev. = 4.595
N = 25
Frequency
MaxWidth
0
1
2
3
4
5
6
5.0
10.0
15.0
20.0
25.0
30.0

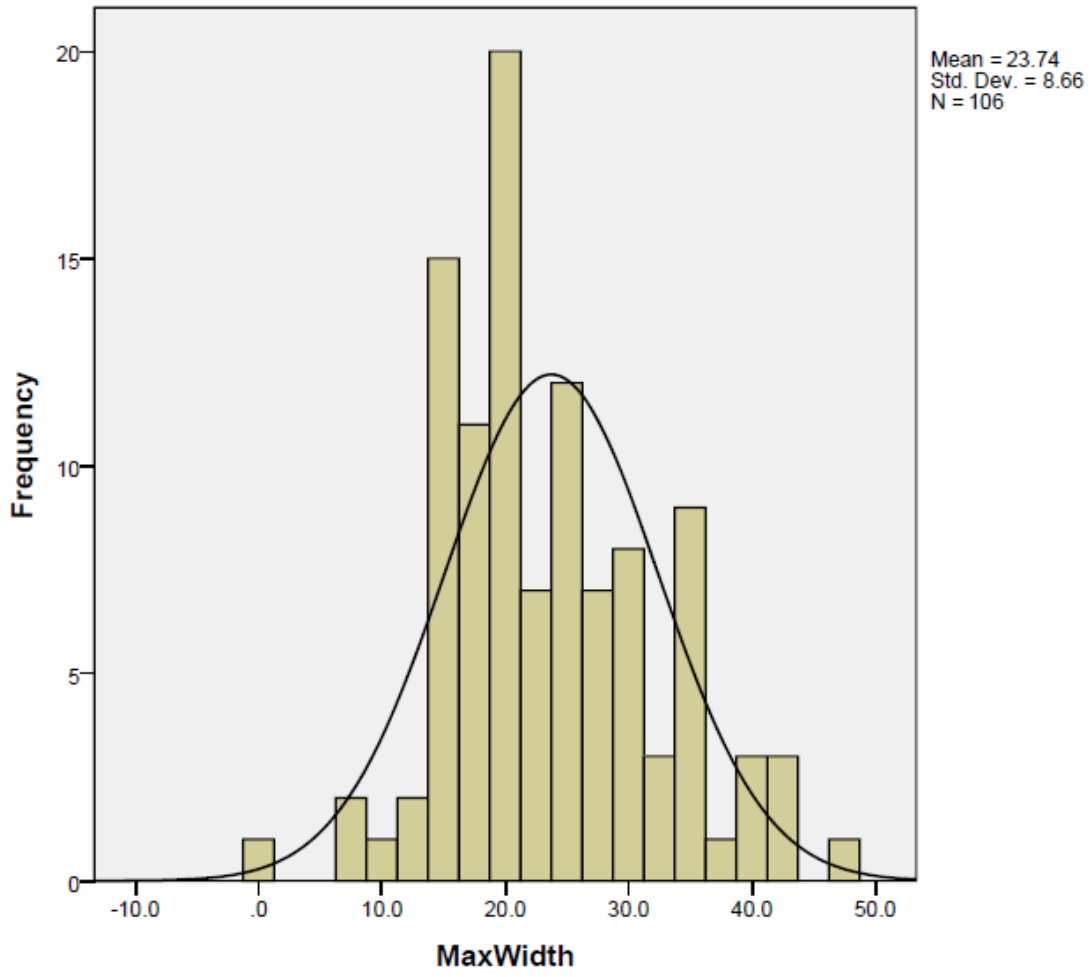

Site: Linwood
Mean = 28.55
Std. Dev. = 9.417
N = 20
Frequency
MaxWidth
0
2
4
6
8
10
.0
20.0
40.0
60.0




```
SPLIT FILE OFF.
GRAPH
  /HISTOGRAM(NORMAL)=MaxWidth.
```

Graph

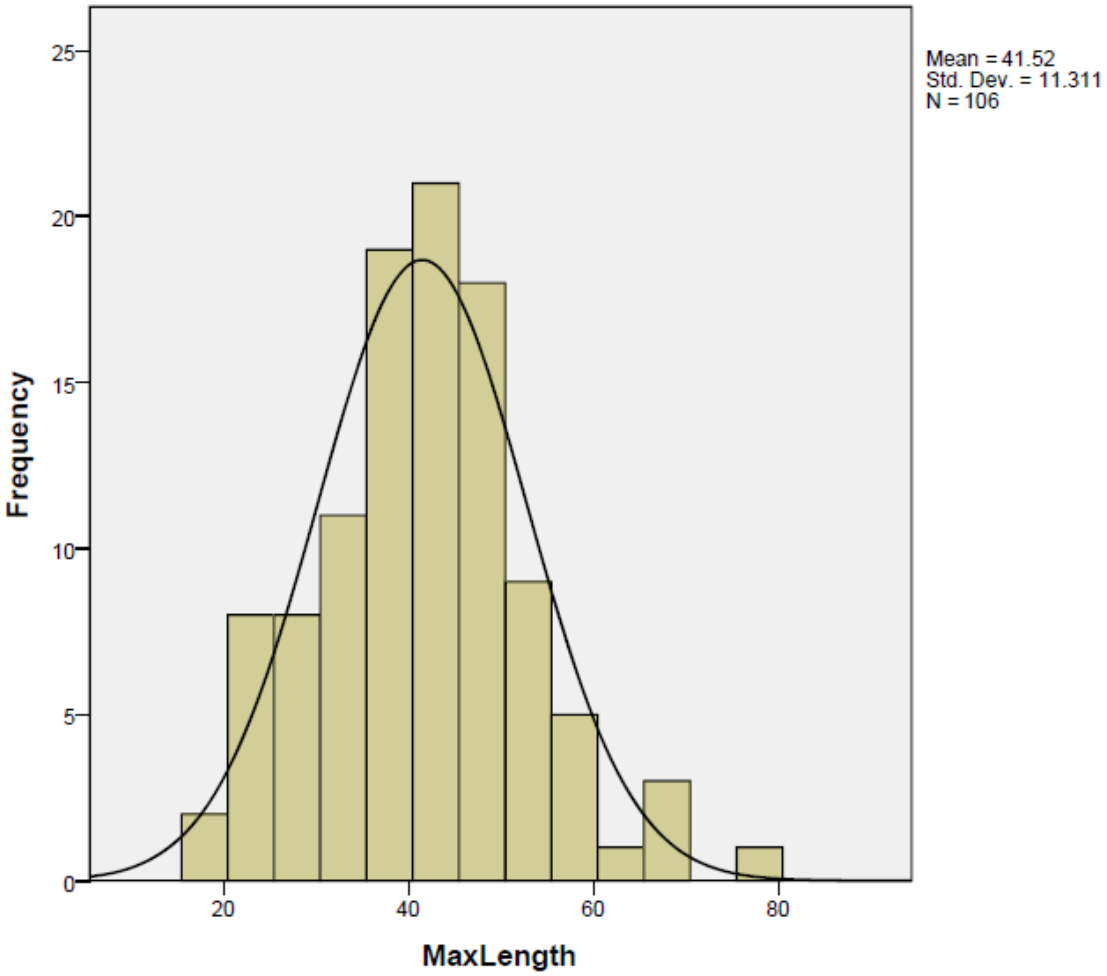
```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```




```
GRAPH
  /HISTOGRAM(NORMAL)=MaxLength.
```

Graph

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```




```
DESCRIPTIVES VARIABLES=MaxLength MaxWidth
  /STATISTICS=MEAN STDDEV MIN MAX KURTOSIS SKEWNESS.
```

Descriptives

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
MaxLength	106	18	78	41.52	11.311	.332
MaxWidth	106	.0	48.0	23.741	8.6603	.441
Valid N (listwise)	106					

Descriptive Statistics

	Skewness	Kurtosis	
	Std. Error	Statistic	Std. Error
MaxLength	.235	.483	.465
MaxWidth	.235	.121	.465
Valid N (listwise)			

```
ONEWAY MaxLength MaxWidth BY Site
  /STATISTICS HOMOGENEITY BROWNFORSYTHE
  /PLOT MEANS
  /MISSING ANALYSIS
  /POSTHOC=BONFERRONI ALPHA(0.05).
```

Oneway

```
[DataSet1] E:\ThesisBurialDataSPSS.sav
```

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
MaxLength	2.977	2	103	.055
MaxWidth	4.114	2	103	.019

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
MaxLength	Between Groups	429.712	2	214.856	1.702	.187
	Within Groups	13002.751	103	126.240		
	Total	13432.462	105			
MaxWidth	Between Groups	1063.755	2	531.878	8.043	.001
	Within Groups	6811.360	103	66.130		
	Total	7875.116	105			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
MaxLength	Brown-Forsythe	2.034	2	61.197	.140
MaxWidth	Brown-Forsythe	8.808	2	48.437	.001

a. Asymptotically F distributed.

Post Hoc Tests

Multiple Comparisons

Bonferroni

Dependent Variable	(I) Site	(J) Site	Mean Difference (I-J)	Std. Error	Sig.
MaxLength	Burkett	Linwood	-5.770	3.371	.270
		Clarks Village	-4.084	2.668	.387
	Linwood	Burkett	5.770	3.371	.270
		Clarks Village	1.686	2.895	1.000
	Clarks Village	Burkett	4.084	2.668	.387
		Linwood	-1.686	2.895	1.000
MaxWidth	Burkett	Linwood	-9.6700*	2.4396	.000
		Clarks Village	-5.2757*	1.9311	.022
	Linwood	Burkett	9.6700*	2.4396	.000
		Clarks Village	4.3943	2.0954	.115
	Clarks Village	Burkett	5.2757*	1.9311	.022
		Linwood	-4.3943	2.0954	.115

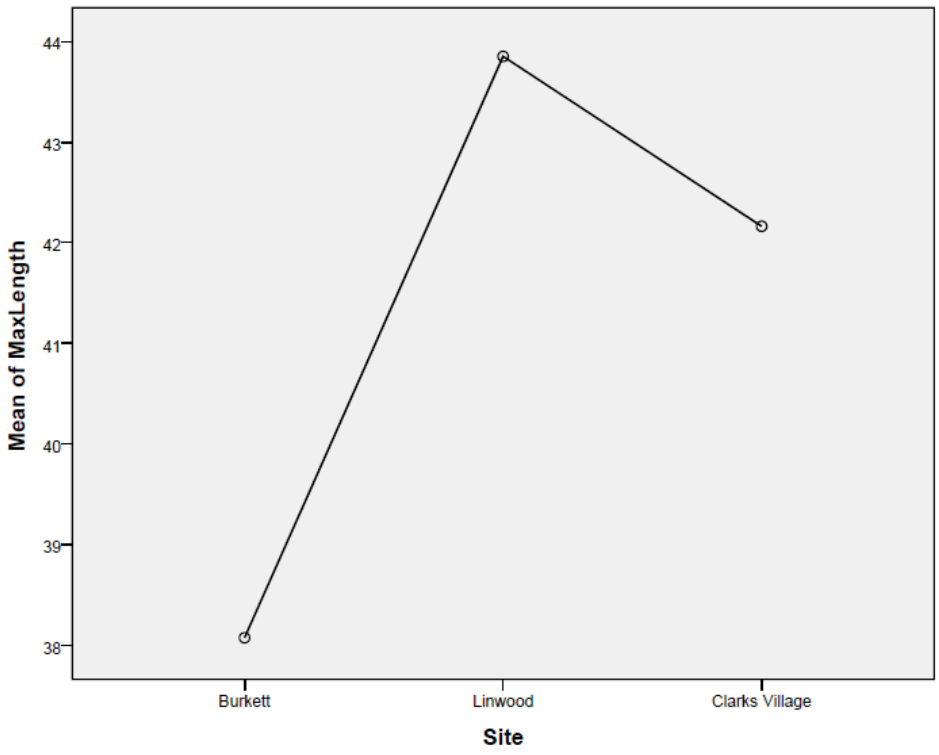
Multiple Comparisons

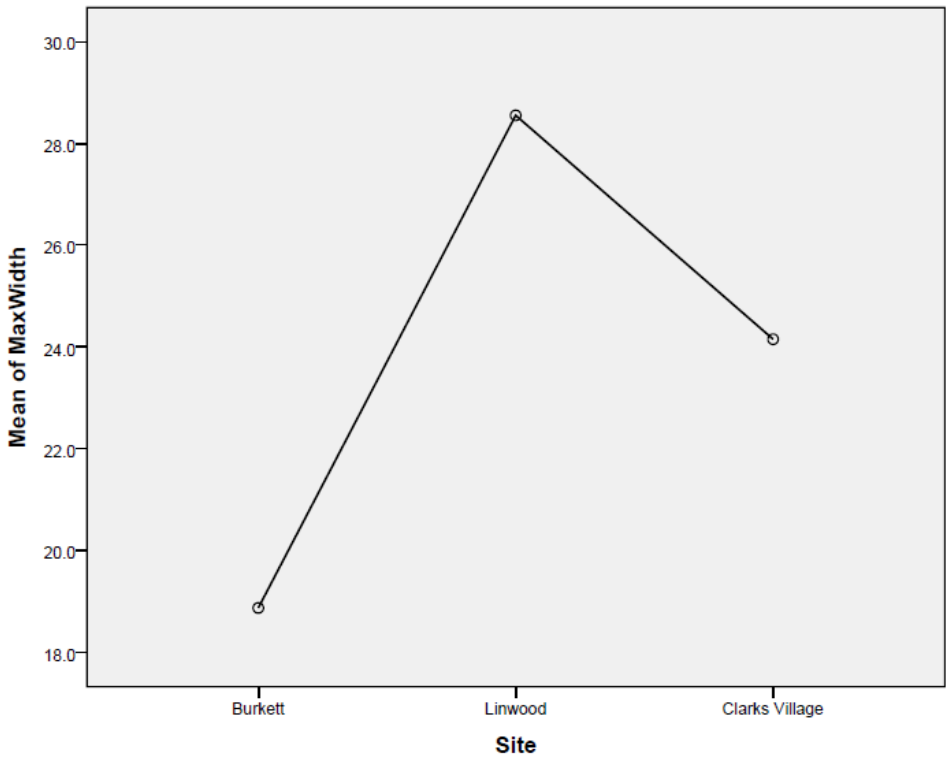
Bonferroni

Dependent Variable	(I) Site	(J) Site	95% Confidence Interval	
			Lower Bound	Upper Bound
MaxLength	Burkett	Linwood	-13.97	2.43
		Clarks Village	-10.58	2.41
	Linwood	Burkett	-2.43	13.97
		Clarks Village	-5.36	8.73
	Clarks Village	Burkett	-2.41	10.58
		Linwood	-8.73	5.36
MaxWidth	Burkett	Linwood	-15.607	-3.733
		Clarks Village	-9.976	-.576
	Linwood	Burkett	3.733	15.607
		Clarks Village	-.705	9.494
	Clarks Village	Burkett	.576	9.976
		Linwood	-9.494	.705

*. The mean difference is significant at the 0.05 level.

Means Plots


Mean of MaxLength
44
43
42
41
40
39
38
Burkett
Linwood
Clarks Village
Site


Mean of MaxWidth
30.0
28.0
26.0
24.0
22.0
20.0
18.0
Burkett
Linwood
Clarks Village
Site

APPENDIX B

Site	InterSiteArea	Orientation	Head Direction	Flexing	Deposition	leg direction	Shaft Type
Burkett = 1	BURK.N1-M2 = 1	N-S=1	N=1	Fully=1	back=1	0=not indicated	pit=1
Linwood = 2	BURK.N-1 G.T. 2=2	E-W=2	S=2	Semi=2	stomach=2	1=left	unk=2
Clarks Village = 3	LIN= 1 area = 3	SW-NE=3	E=3	Unk=3	right=3	2=right	none=0
	CV.BH1 = 4	SE-NW=4	W=4	no=0	left=4		
	CV.BH2=5	Unk=0	SW=5		unk=0		
	CV.BH4=6		SE=6				
	CV.BH5=7		NW=7				
	CV.BH6=8		NE=8				
	CV.BH7=9		unk=0				

ShaftShape	LinedBurial	AmtOfLining	CombinationTypes	Age Group	Sex	MaxLength	MaxWidth
bell=1	yes=1	Single=1	n/a=0	Unk=0	Indeter=0	in inches	in inches
oval=2	no=0	ComboOf2=2	wood=1	Infant=1	Male=1	0=Nodata	0=nodata
round=3	unk=3	ComboOf3=3	bark=2	juvenile=2	Female=2		
oblong=4		ComboOf4=4	leather=3	Adolescent=3			
rectangular=5		0=not present	matting=4	Adult=4			
right angle=6			poles=5				
unk=0			cloth=6				
			matting, bark=7				
			matting, wood=8				
			matting, leather=9				
			leather, wood=10				
			leather, bark=11				
			leather, cloth=12				
			leather, metal=13				
			wood, poles=14				
			wood, matting, bark=15				
			wood, leather, bark=16				
			wood, leather, poles=17				
			wood, poles, bark=18				
			matting, leather, poles=19				
			matting, leather, cloth=20				
			matting, leather, bark, wood=21				

GG P/A	GG I/E	weapon P/A	weapon acces P/A	Pers Adorn P/A	Pers Item P/A	Util
grave goods	grave goods	Absent=0	Absent=0	Absent=0	Absent=0	Absent=0
1=present	1=indigenous	Present=1	Present=1	Present=1	Present=1	Present=1
0=absent	2=Euro-Amer					
	0=not present					
	3=both					
	early copper assumed to be native					

Agric	Religious/Cer	WeaponQuan	Weapon Acces Quan	Pers AdornQuan	Pers Item Quan	UtilQuan	AgricQuan
Absent=0	Absent=0	0=absence	0=absence	0=absence	0=absence	0=absence	0=absence
Present=1	Present=1	1=modest	1=modest	1=modest	1=modest	1=modest	1=modest
		2=moderate	2=moderate	2=moderate	2=moderate	2=moderate	2=moderate
		3=intense	3=intense	3=intense	3=intense	3=intense	3=intense
		4=extravagent	4=extravagent	4=extravagent	4=extravagent	4=extravagent	4=extravage
		Modest=1	up to 2 = modest	2 types, Qty<10	1=modest	1=modest	1=modest
		Moderate=2	3-4=moderate	3-4 types, Qty<15	2-3=moderate	2=moderate	2=moderate
		Intense=3	5-6=intense	4-6types, Qty<20	4-5=intense	3-4 =intense	3=intense
		Extra=4	7+ = extra	7+types, Qty>21	6+=extrav	5+=extra	4+=extra
				OR			
				Except beads:			
				1=<100trade,<2 indig			
				2=<200trade,<5indig			
				3=<500trade, <10indig			
				4=>500trade, >11indig			

Religious/Cer Quan	
0=absence	
1=modest	
2=moderate	
3=intense	
4=extravagent	
1=modest	
2-3=moderate	
4-5=intense (or a "bag")	
6+=extra	

APPENDIX C

Site	InterSiteArea	FieldBurial#	Orientation	HeadDirection	Flexing	Deposition	Leg Direction	Shaft Type	Shaft Shape
1	1	1	3	5	3	3	0	0	0
1	1	2	3	5	2	3	0	1	0
1	1	3	2	4	2	1	1	1	1
1	1	4	2	4	2	1	1	2	0
1	1	5	2	3	2	1	1	2	0
1	1	6	2	3	2	1	0	1	1
1	1	7	1	2	2	4	0	1	1
1	1	8 - M2	4	6	2	4	0	2	0
1	1	9	2	4	2	4	0	1	1
1	1	10	3	5	2	4	0	1	1
1	2	1a	2	4	2	1	0	1	1
1	2	1b	4	4	2	4	0	1	1
1	2	2	4	0	2	4	0	1	3
1	2	7	3	4	2	1	0	1	4
1	2	8a	2	4	2	4	0	1	1
1	2	8b	1	6	2	4	0	1	0
1	2	8c	1	2	3	3	0	1	0
1	2	9	4	4	2	1	0	1	2
1	2	10	2	0	0	0	0	2	0
1	2	11	3	2	2	1	0	1	2
1	2	12a	3	4	2	1	0	1	2
1	2	12b	4	6	2	3	0	1	2
1	2	12d	1	7	2	1	0	1	0
1	2	13a	3	0	2	0	0	1	2
1	2	13b	4	4	2	0	0	1	2
2	3	3	2	4	2	4	0	1	2
2	3	4	3	8	2	3	0	1	2
2	3	5	3	8	2	4	0	1	2

Site	InterSiteArea	FieldBurial#	Orientation	HeadDirection	Flexing	Deposition	Leg Direction	Shaft Type	Shaft Shape
2	3	6	4	6	2	3	0	1	2
2	3	7	4	6	2	4	0	1	2
2	3	12	2	3	2	4	0	1	2
2	3	14	3	5	2	3	0	1	2
2	3	15	2	3	2	4	0	1	2
2	3	22	2	4	2	4	0	1	2
2	3	24	2	4	2	3	0	1	2
2	3	26	3	5	1	4	0	1	2
2	3	35	2	4	3	1	0	1	2
2	3	37	2	4	2	1	0	1	2
2	3	38	4	6	2	3	0	1	2
2	3	40	3	8	2	3	0	2	0
2	3	41	2	3	2	0	0	1	2
2	3	43	2	3	2	3	0	2	0
2	3	46	2	3	3	0	0	1	2
2	3	47	2	3	3	0	0	1	2
2	3	48	2	3	2	3	0	1	2
2	3	51	2	3	3	0	0	1	2
2	3	52	4	0	3	0	0	1	2
3	4	1	3	1	2	1	2	1	2
3	4	2	3	1	2	4	1	1	4
3	5	5	0	0	3	0	0	1	2
3	6	1	4	7	2	2	1	1	4
3	6	2	3	8	2	4	0	1	5
3	6	4	3	8	2	3	0	1	5
3	6	5	3	1	2	4	0	1	5
3	6	6	3	8	2	0	0	1	4
3	6	7	4	7	2	3	0	1	4

Site	InterSiteArea	FieldBurial#	Orientation	HeadDirection	Flexing	Deposition	Leg Direction	Shaft Type	Shaft Shape
3	6	8	3	8	2	1	0	1	4
3	6	9	3	3	2	1	1	1	4
3	6	10	2	3	2	1	1	1	4
3	6	11	3	0	3	0	0	1	6
3	6	14	4	1	3	0	0	1	2
3	6	15b	3	8	2	1	1	1	4
3	6	15a	3	3	3	0	0	1	4
3	6	16	3	0	3	0	0	2	0
3	6	17	1	1	2	1	1	1	4
3	6	18	3	8	2	1	0	1	4
3	6	19	2	3	0	1	0	1	4
3	6	20	3	8	2	0	0	1	2
3	6	21	3	8	3	0	0	1	4
3	6	22	3	0	2	4	0	1	2
3	6	23	3	8	2	3	0	1	5
3	6	24	4	7	2	1	1	1	4
3	6	25	2	3	3	0	0	1	4
3	6	26	1	1	2	2	2	1	4
3	6	27	4	6	2	3	0	1	4
3	6	28	0	0	3	0	0	1	2
3	6	30	2	3	2	4	0	1	4
3	6	32	0	0	3	0	0	1	0
3	7	1	2	3	2	1	2	1	4
3	7	2	3	8	2	0	0	1	4
3	7	3	3	8	2	3	0	1	2
3	7	4a	3	8	2	1	1	1	4
3	7	4b	0	0	3	0	0	1	2
3	7	5	1	1	2	1	1	1	4

Site	InterSiteArea	FieldBurial#	Orientation	HeadDirection	Flexing	Deposition	Leg Direction	Shaft Type	Shaft Shape
3	7	6	1	1	2	1	2	1	4
3	7	7	4	6	2	1	2	1	2
3	7	8	3	8	2	1	1	1	2
3	7	9	2	3	2	1	2	1	2
3	7	10	2	3	2	3	0	1	4
3	7	11	3	1	2	3	0	1	4
3	7	12	2	3	2	3	0	1	4
3	7	13	2	3	2	4	0	1	4
3	7	14	1	1	2	1	2	1	4
3	7	15	3	8	2	1	2	2	0
3	7	16	3	8	2	3	0	1	4
3	7	17	3	5	3	0	0	1	2
3	7	18	1	1	2	3	0	1	4
3	7	19	4	7	0	1	0	1	3
3	7	21	2	4	2	1	1	1	5
3	7	22	2	3	2	3	0	1	2
3	8	1	1	8	2	3	0	1	5
3	8	2	2	0	3	0	0	1	4
3	8	3	0	0	3	0	0	1	0
3	8	4	1	1	2	3	0	1	4
3	9	2	0	0	3	0	0	1	4
3	9	3	3	8	2	1	2	1	2
3	9	4a	2	3	3	0	0	1	5
3	9	4b	2	3	3	0	0	1	5
3	9	5	3	8	0	1	0	1	3
3	9	6	1	1	3	0	0	1	2

Site	InterSiteArea	FieldBurial#	LinedBurial	Amount of Lining	CombinationTypes	Age Group	Sex	MaxLength	MaxWidth
1	1	1	0	0	0	4	0	39	21
1	1	2	0	0	0	4	2	34	23
1	1	3	1	3	15	4	2	46	23
1	1	4	0	0	0	4	1	25	21
1	1	5	0	0	0	4	0	44	22
1	1	6	1	2	10	4	0	48	16
1	1	7	1	2	10	4	0	24	17
1	1	8 - M2	1	1	1	4	0	47	14
1	1	9	1	2	7	4	0	32	16
1	1	10	1	3	15	0	1	42	14
1	2	1a	1	1	2	4	0	42	24
1	2	1b	1	2	10	4	0	34	18
1	2	2	0	0	0	4	1	24	22
1	2	7	0	0	0	4	0	48	16
1	2	8a	1	1	1	4	2	39	20
1	2	8b	1	1	1	3	2	41	15
1	2	8c	0	0	0	4	2	39	15
1	2	9	0	0	0	3	2	42	27
1	2	10	1	3	17	0	0	33	27
1	2	11	1	1	2	0	0	41	19
1	2	12a	1	1	3	4	0	40	20
1	2	12b	1	1	5	4	2	33	16
1	2	12d	1	3	16	0	0	44	24
1	2	13a	1	1	1	0	0	30	8
1	2	13b	1	2	10	4	0	41	14
2	3	3	0	0	0	3	0	40	20
2	3	4	1	1	4	1	0	42	36
2	3	5	1	1	2	3	0	0	0

Site	InterSiteArea	FieldBurial#	LinedBurial	Amount of Lining	CombinationTypes	Age Group	Sex	MaxLength	MaxWidth
2	3	6	0	0	0	1	0	32	24
2	3	7	0	0	0	1	0	48	32
2	3	12	0	0	0	3	0	48	36
2	3	14	0	0	0	3	0	32	22
2	3	15	1	1	4	1	0	37	29
2	3	22	1	1	2	4	0	60	48
2	3	24	1	1	2	3	0	50	31
2	3	26	0	0	0	2	0	51	38
2	3	35	0	0	0	4	1	70	30
2	3	37	0	0	0	4	1	51	34
2	3	38	1	1	2	1	0	36	28
2	3	40	0	0	0	1	0	22	0
2	3	41	1	2	11	3	0	44	30
2	3	43	0	0	0	2	0	0	0
2	3	46	1	2	11	2	0	27	19
2	3	47	1	2	10	0	0	56	30
2	3	48	0	0	0	4	2	46	30
2	3	51	1	1	1	3	0	47	28
2	3	52	1	3	18	2	0	38	26
3	4	1	0	0	0	4	1	44	20
3	4	2	1	1	3	4	1	42	21
3	5	5	1	1	4	0	0	48	42
3	6	1	1	1	3	3	1	0	0
3	6	2	1	3	8	3	1	46	24
3	6	4	1	1	3	0	0	23	20
3	6	5	1	1	4	0	0	53	33
3	6	6	1	2	9	0	0	31	15
3	6	7	1	1	1	0	0	21	13

Site	InterSiteArea	FieldBurial#	LinedBurial	Amount of Lining	CombinationTypes	Age Group	Sex	MaxLength	MaxWidth
3	6	8	0	0	0	0	0	48	18
3	6	9	1	1	4	3	0	50	30
3	6	10	1	1	4	3	2	45	31
3	6	11	1	1	4	0	0	60	21
3	6	14	1	2	12	0	0	29	20
3	6	15b	1	3	19	0	0	51	24
3	6	15a	3	0	0	1	0	0	0
3	6	16	1	2	8	1	0	45	26
3	6	17	1	1	5	3	1	63	33
3	6	18	1	2	13	4	0	44	26
3	6	19	1	1	4	2	0	45	21
3	6	20	1	1	4	1	0	38	25
3	6	21	1	1	4	1	0	39	18.5
3	6	22	0	0	0	4	0	50	43
3	6	23	0	0	0	4	0	50	40
3	6	24	1	1	6	4	1	51	27
3	6	25	1	1	4	1	0	30	15
3	6	26	1	1	1	4	2	54	34
3	6	27	1	1	4	4	1	55	41
3	6	28	1	2	9	1	0	23	17
3	6	30	1	3	19	1	0	33	17
3	6	32	1	1	4	0	0	28	19
3	7	1	1	3	19	1	0	45	21
3	7	2	1	1	4	1	0	39	21
3	7	3	1	1	3	1	0	36	15
3	7	4a	1	2	9	1	0	45	15
3	7	4b	0	0	0	1	0	20	11
3	7	5	1	4	21	1	0	37	14

Site	InterSiteArea	FieldBurial#	LinedBurial	Amount of Lining	CombinationTypes	Age Group	Sex	MaxLength	MaxWidth
3	7	6	1	3	20	1	0	35	17
3	7	7	1	3	19	3	2	52	40
3	7	8	1	1	4	1	0	18	8
3	7	9	1	1	4	2	0	36	21
3	7	10	3	0	0	4	1	66	28
3	7	11	1	1	5	3	1	53	26
3	7	12	3	0	0	3	0	40	21
3	7	13	3	0	0	1	0	34	22
3	7	14	1	1	5	2	0	56	22
3	7	15	1	1	3	3	0	37	18
3	7	16	1	3	19	3	1	67	34
3	7	17	1	2	9	1	0	39	18
3	7	18	1	1	3	4	0	56	36
3	7	19	1	2	9	1	0	42	42
3	7	21	1	1	3	1	0	36	18
3	7	22	1	2	14	1	0	41	18
3	8	1	1	1	4	4	0	78	26
3	8	2	1	1	4	1	0	22	12
3	8	3	1	1	4	1	0	27	21
3	8	4	1	1	3	3	1	48	28
3	9	2	1	1	4	2	0	42	24
3	9	3	3	0	0	4	0	48	36
3	9	4a	1	1	1	1	0	48	36
3	9	4b	1	1	1	1	0	28	15
3	9	5	1	2	8	1	0	36	36
3	9	6	1	2	8	0	0	26	19

Site	InterSiteArea	FieldBurial#	GG P/A	GG I/E	Weapon P/A	Weapon Acces P/A	Pers Adorn P/A	Pers Item P/A
1	1	1	1	1	0	0	0	0
1	1	2	1	1	0	1	0	0
1	1	3	1	1	0	1	0	0
1	1	4	1	1	0	0	0	0
1	1	5	1	1	0	1	1	0
1	1	6	0	0	0	0	0	0
1	1	7	0	0	0	0	0	0
1	1	8 - M2	1	1	0	0	0	1
1	1	9	0	0	0	0	0	0
1	1	10	1	1	0	1	0	0
1	2	1a	1	1	0	0	0	0
1	2	1b	1	1	0	0	0	1
1	2	2	1	1	0	0	0	0
1	2	7	1	1	0	0	0	0
1	2	8a	1	1	0	1	0	0
1	2	8b	1	1	0	0	0	0
1	2	8c	1	1	0	0	0	0
1	2	9	1	1	0	1	0	0
1	2	10	0	0	0	0	0	0
1	2	11	0	0	0	0	0	0
1	2	12a	1	1	1	0	0	0
1	2	12b	0	0	0	0	0	0
1	2	12d	0	0	0	0	0	0
1	2	13a	0	0	0	0	0	0
1	2	13b	1	1	0	1	0	0
2	3	3	1	3	0	0	0	1
2	3	4	0	0	0	0	0	0
2	3	5	1	2	0	0	1	1

Site	InterSiteArea	FieldBurial#	GG P/A	GG I/E	Weapon P/A	Weapon Acces P/A	Pers Adorn P/A	Pers Item P/A
2	3	6	1	2	0	0	0	1
2	3	7	1	2	0	0	1	1
2	3	12	1	3	0	0	1	1
2	3	14	1	2	0	0	0	1
2	3	15	0	0	0	0	0	0
2	3	22	1	3	0	1	0	0
2	3	24	1	3	0	1	1	0
2	3	26	1	3	0	0	1	0
2	3	35	1	3	0	0	1	1
2	3	37	1	3	0	1	0	1
2	3	38	1	1	0	0	0	0
2	3	40	1	3	0	0	0	1
2	3	41	1	3	0	0	1	1
2	3	43	1	2	0	0	1	0
2	3	46	1	3	0	0	0	1
2	3	47	1	3	0	1	1	0
2	3	48	1	1	0	0	0	0
2	3	51	1	2	0	0	1	0
2	3	52	1	2	0	0	1	0
3	4	1	1	3	0	1	1	1
3	4	2	1	3	0	1	1	1
3	5	5	1	1	0	0	1	0
3	6	1	1	2	0	0	1	0
3	6	2	1	3	1	1	0	0
3	6	4	1	3	1	0	1	0
3	6	5	1	3	0	0	1	1
3	6	6	1	3	0	0	1	1
3	6	7	0	0	0	0	0	0

Site	InterSiteArea	FieldBurial#	GG P/A	GG I/E	Weapon P/A	Weapon Acces P/A	Pers Adorn P/A	Pers Item P/A
3	6	8	0	0	0	0	0	0
3	6	9	1	3	0	0	0	1
3	6	10	1	3	0	1	0	1
3	6	11	1	1	0	1	0	0
3	6	14	1	2	0	0	1	1
3	6	15b	1	3	0	1	1	1
3	6	15a	0	0	0	0	0	0
3	6	16	1	3	0	0	1	1
3	6	17	1	3	1	0	1	1
3	6	18	1	3	0	0	1	0
3	6	19	1	3	1	1	1	1
3	6	20	1	2	1	1	1	0
3	6	21	1	3	0	0	1	1
3	6	22	1	2	0	1	1	0
3	6	23	1	1	0	0	0	0
3	6	24	1	3	0	1	1	1
3	6	25	1	3	0	0	1	1
3	6	26	1	1	0	0	0	0
3	6	27	1	3	1	1	1	1
3	6	28	1	1	0	0	0	1
3	6	30	1	3	1	1	1	1
3	6	32	1	2	0	0	1	0
3	7	1	1	3	0	0	1	1
3	7	2	1	2	0	0	1	1
3	7	3	1	3	0	0	1	0
3	7	4a	1	2	0	0	1	1
3	7	4b	0	0	0	0	0	0
3	7	5	1	2	0	0	1	1

Site	InterSiteArea	FieldBurial#	GG P/A	GG I/E	Weapon P/A	Weapon Acces P/A	Pers Adorn P/A	Pers Item P/A
3	7	6	1	2	0	0	1	0
3	7	7	1	3	0	0	1	1
3	7	8	0	0	0	0	0	0
3	7	9	1	3	0	0	0	1
3	7	10	1	3	1	1	1	1
3	7	11	1	3	0	0	1	1
3	7	12	1	3	1	0	1	0
3	7	13	1	1	0	0	1	0
3	7	14	1	3	1	1	1	1
3	7	15	1	3	0	0	1	0
3	7	16	1	3	0	1	0	0
3	7	17	1	3	0	1	1	1
3	7	18	1	3	0	1	1	0
3	7	19	1	2	0	0	0	1
3	7	21	0	0	0	0	0	0
3	7	22	1	3	0	1	1	1
3	8	1	1	3	0	1	1	1
3	8	2	1	3	0	1	1	1
3	8	3	1	3	0	1	1	0
3	8	4	1	3	0	0	0	1
3	9	2	1	3	0	0	1	0
3	9	3	1	3	0	0	1	0
3	9	4a	1	3	0	0	1	1
3	9	4b	1	3	0	0	1	1
3	9	5	1	3	0	0	1	1
3	9	6	0					

Site	InterSiteArea	FieldBurial#	Util P/A	Agric P/A	Religious/Cer P/A	WeaponQuan	Weapon Acces Quan
1	1	1	1	1	0	0	0
1	1	2	1	0	0	0	1
1	1	3	1	0	0	0	1
1	1	4	1	0	0	0	0
1	1	5	1	0	0	0	3
1	1	6	0	0	0	0	0
1	1	7	0	0	0	0	0
1	1	8 - M2	1	0	0	0	0
1	1	9	0	0	0	0	0
1	1	10	0	0	0	0	1
1	2	1a	1	0	0	0	0
1	2	1b	1	0	0	0	0
1	2	2	1	1	1	0	0
1	2	7	1	0	0	0	0
1	2	8a	1	0	0	0	1
1	2	8b	1	1	0	0	0
1	2	8c	1	0	0	0	0
1	2	9	0	0	0	0	1
1	2	10	0	0	0	0	0
1	2	11	0	0	0	0	0
1	2	12a	1	0	0	1	0
1	2	12b	0	0	0	0	0
1	2	12d	0	0	0	0	0
1	2	13a	0	0	0	0	0
1	2	13b	0	0	0	0	3
2	3	3	1	0	0	0	0
2	3	4	0	0	0	0	0
2	3	5	0	0	0	0	0

Site	InterSiteArea	FieldBurial#	Util P/A	Agric P/A	Religious/Cer P/A	WeaponQuan	Weapon Acces Quan
2	3	6	0	0	0	0	0
2	3	7	0	0	0	0	0
2	3	12	0	0	0	0	0
2	3	14	0	0	0	0	0
2	3	15	0	0	0	0	0
2	3	22	1	0	1	0	1
2	3	24	0	0	1	0	1
2	3	26	0	0	1	0	0
2	3	35	0	0	1	0	0
2	3	37	0	0	1	0	1
2	3	38	1	0	0	0	0
2	3	40	1	1	1	0	0
2	3	41	0	1	0	0	0
2	3	43	0	0	0	0	0
2	3	46	0	0	0	0	0
2	3	47	0	0	0	0	2
2	3	48	1	0	0	0	0
2	3	51	0	0	0	0	0
2	3	52	0	0	0	0	0
3	4	1	1	0	1	0	3
3	4	2	1	0	1	0	4
3	5	5	0	0	0	0	0
3	6	1	1	0	0	0	0
3	6	2	1	0	0	2	4
3	6	4	0	0	0	1	0
3	6	5	1	1	1	0	0
3	6	6	0	0	0	0	0
3	6	7	0	0	0	0	0

Site	InterSiteArea	FieldBurial#	Util P/A	Agric P/A	Religious/Cer P/A	WeaponQuan	Weapon Acces Quan
3	6	8	0	0	0	0	0
3	6	9	0	0	0	0	0
3	6	10	1	0	0	0	2
3	6	11	0	0	0	0	1
3	6	14	0	0	0	0	0
3	6	15b	1	0	1	0	1
3	6	15a	0	0	0	0	0
3	6	16	1	0	1	0	0
3	6	17	0	0	1	2	0
3	6	18	1	0	0	0	0
3	6	19	0	0	1	1	1
3	6	20	0	0	0	1	1
3	6	21	0	1	0	0	0
3	6	22	1	0	0	0	3
3	6	23	0	0	1	0	0
3	6	24	1	0	1	0	1
3	6	25	0	0	0	0	0
3	6	26	0	0	1	0	0
3	6	27	0	0	1	1	3
3	6	28	0	0	0	0	0
3	6	30	1	0	1	1	3
3	6	32	0	0	0	0	0
3	7	1	0	1	0	0	0
3	7	2	0	0	0	0	0
3	7	3	1	0	1	0	0
3	7	4a	0	0	0	0	0
3	7	4b	0	0	0	0	0
3	7	5	0	0	0	0	0

Site	InterSiteArea	FieldBurial#	Util P/A	Agric P/A	Religious/Cer P/A	WeaponQuan	Weapon Acces Quan
3	7	6	0	0	1	0	0
3	7	7	1	0	1	0	0
3	7	8	0	0	0	0	0
3	7	9	1	0	0	0	0
3	7	10	1	0	1	1	3
3	7	11	0	0	1	0	0
3	7	12	0	0	1	1	0
3	7	13	0	0	0	0	0
3	7	14	1	1	1	1	1
3	7	15	1	1	0	0	0
3	7	16	1	0	1	0	3
3	7	17	0	0	0	0	1
3	7	18	1	0	1	0	1
3	7	19	0	0	0	0	0
3	7	21	0	0	0	0	0
3	7	22	0	1	1	0	1
3	8	1	1	0	0	0	1
3	8	2	0	0	0	0	1
3	8	3	0	0	1	0	2
3	8	4	1	1	1	0	0
3	9	2	0	0	1	0	0
3	9	3	0	0	1	0	0
3	9	4a	1	0	0	0	0
3	9	4b	0	0	1	0	0
3	9	5	0	0	0	0	0
3	9	6					

Site	InterSiteArea	FieldBurial#	Pers AdornQuan	Pers Item Quan	UtilQuan	AgricQuan	Religious/Cer Quan
1	1	1	0	0	1	1	0
1	1	2	0	0	2	0	0
1	1	3	0	0	1	0	0
1	1	4	0	0	2	0	0
1	1	5	1	0	2	0	0
1	1	6	0	0	0	0	0
1	1	7	0	0	0	0	0
1	1	8 - M2	0	1	1	0	0
1	1	9	0	0	0	0	0
1	1	10	0	0	0	0	0
1	2	1a	0	0	1	0	0
1	2	1b	0	2	1	0	0
1	2	2	0	0	2	2	1
1	2	7	0	0	1	0	0
1	2	8a	0	0	1	0	0
1	2	8b	0	0	1	1	0
1	2	8c	0	0	1	0	0
1	2	9	0	0	0	0	0
1	2	10	0	0	0	0	0
1	2	11	0	0	0	0	0
1	2	12a	0	0	3	0	0
1	2	12b	0	0	0	0	0
1	2	12d	0	0	0	0	0
1	2	13a	0	0	0	0	0
1	2	13b	0	0	0	0	0
2	3	3	0	1	1	0	0
2	3	4	0	0	0	0	0
2	3	5	1	1	0	0	0

Site	InterSiteArea	FieldBurial#	Pers AdornQuan	Pers Item Quan	UtilQuan	AgricQuan	Religious/Cer Quan
2	3	6	0	2	0	0	0
2	3	7	1	1	0	0	0
2	3	12	1	1	0	0	0
2	3	14	0	1	0	0	0
2	3	15	0	0	0	0	0
2	3	22	0	0	1	0	3
2	3	24	1	0	0	0	1
2	3	26	1	0	0	0	1
2	3	35	1	1	0	0	1
2	3	37	0	1	0	0	3
2	3	38	0	0	1	0	0
2	3	40	0	1	1	2	1
2	3	41	1	1	0	2	0
2	3	43	1	0	0	0	0
2	3	46	0	2	0	0	0
2	3	47	1	0	0	0	0
2	3	48	0	0	1	0	0
2	3	51	1	0	0	0	0
2	3	52	1	0	0	0	0
3	4	1	1	1	1	0	3
3	4	2	1	2	1	0	3
3	5	5	1	0	0	0	0
3	6	1	2	0	1	0	0
3	6	2	0	0	2	0	0
3	6	4	2	0	0	0	0
3	6	5	1	2	1	1	1
3	6	6	2	3	0	0	0
3	6	7	0	0	0	0	0

Site	InterSiteArea	FieldBurial#	Pers AdornQuan	Pers Item Quan	UtilQuan	AgricQuan	Religious/Cer Quan
3	6	8	0	0	0	0	0
3	6	9	0	1	0	0	0
3	6	10	0	1	4	0	0
3	6	11	0	0	0	0	0
3	6	14	4	4	0	0	0
3	6	15b	2	2	2	0	2
3	6	15a	0	0	0	0	0
3	6	16	2	2	1	0	2
3	6	17	2	2	0	0	3
3	6	18	1	0	1	0	0
3	6	19	1	3	0	0	1
3	6	20	1	0	0	0	0
3	6	21	4	3	0	1	0
3	6	22	2	0	1	0	0
3	6	23	0	0	0	0	1
3	6	24	2	1	1	0	1
3	6	25	1	2	0	0	0
3	6	26	0	0	0	0	3
3	6	27	2	1	0	0	2
3	6	28	0	1	0	0	0
3	6	30	1	3	1	0	3
3	6	32	4	0	0	0	0
3	7	1	2	1	0	2	0
3	7	2	2	2	0	0	0
3	7	3	2	0	1	0	2
3	7	4a	2	2	0	0	0
3	7	4b	0	0	0	0	0
3	7	5	2	2	0	0	0

Site	InterSiteArea	FieldBurial#	Pers AdornQuan	Pers Item Quan	UtilQuan	AgricQuan	Religious/Cer Quan
3	7	6	3	0	0	0	1
3	7	7	2	1	1	0	3
3	7	8	0	0	0	0	0
3	7	9	0	2	2	0	0
3	7	10	2	2	3	0	1
3	7	11	1	2	0	0	2
3	7	12	2	0	0	0	1
3	7	13	1	0	0	0	0
3	7	14	3	1	2	1	2
3	7	15	4	0	1	1	0
3	7	16	0	0	3	0	1
3	7	17	4	2	0	0	0
3	7	18	1	0	2	0	1
3	7	19	0	1	0	0	0
3	7	21	0	0	0	0	0
3	7	22	3	2	0	2	1
3	8	1	1	1	1	0	0
3	8	2	1	1	0	0	0
3	8	3	1	0	0	0	2
3	8	4	0	1	1	1	2
3	9	2	1	0	0	0	1
3	9	3	1	0	0	0	1
3	9	4a	4	1	1	0	0
3	9	4b	4	2	0	0	1
3	9	5	1	1	0	0	0
3	9	6					

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