CONFLICT AND AGRICULTURE DURING THE LATE PREHISTORIC PERIOD IN THE UPPER MISSISSIPPI VALLEY

By

Danielle Marie Krebsbach

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Danielle Krebsbach, B.S.

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The end of the prehistoric period is a time of drastic change in the lives of humans who inhabited the Upper Mississippi Valley. Approximately AD 1000 people began to practice corn agriculture rather than simple cultivation in order to compensate for a shortage of food resulting from population increase. During the same time period there is an escalation in conflict in the Upper Mississippi Valley. The purpose of this study is to observe the tends in both agriculture and conflict from AD 500- European contact and determine whether the early sites that adopted agriculture also experienced more conflict than sites with minimum corn consumption.

ACKNOWLEDGMENT

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INTRODUCTION

Early mobile hunter gatherer societies are commonly associated with having fairly peaceful lives with minimum conflict between neighboring groups. Mobile hunter gatherers do not generally have a strong sense of territory as they travel frequently and revisit areas they know will have available resources. If there is already another group in the area, they will move on to another place rather than engage in conflict. While this way of life may have existed throughout the majority of the United States for a time, it did not last. In the Midwest violence began to increase greatly during the Woodland period (500 BC- AD 1100/European contact) and continued into the Oneota period (ca. AD 1100/1250 - European contact). The rise in conflict correlates with a drastic increase in human population which then caused exhaustion of natural resources (Boszhardt and Theler 2006). Evidence that violence broke out between communities frequently beginning in the Late Woodland period appear in a number of sites. Characteristics of conflict can be seen in the archaeological record in the form of palisades, trophy skulls, and trauma present in skeletal remains.

In order to compensate for the scarcity of natural resources people began to harvest more labor intensive resources such as fresh water mussels and cultivated plants; early cultivated crops include squash, sunflowers, goosefoot, knotweed, and corn (Stevenson et al. 1997:153). Corn became the favored cultivated plant after AD 900 because it was high in carbohydrates, and it could be easily stored for months when food was scarce (Birmingham and Eisenberg 2000:102); (Stevenson et al. 1997). In the Upper Mississippi Valley region (figure 1), horticulture would have been easier because the soil near the Mississippi and its tributaries are rich in nutrients and

easily tillable (Fleming 2009); (Stevenson et al. 1997:141). Small-scale agriculture would have changed everyday life for people in the Woodland period, we can see the dietary impacts in skeletal remains and changes in settlement patterns as the land became more dependent on them, it would have also affected their relationship with other communities. Agriculture appears in the Upper Mississippi Valley shortly after the acceleration of conflict associated with a denser population and restricted resources, this may indicate that the adoption of agriculture had an impact on the amount of conflict occurring in a populated region.

By examining and analyzing field records of late prehistoric sites it can be determined whether successful agricultural sites were more likely to be attacked for their surplus of food compared to sites of the same period without agriculture. The sites chosen to be examined are within the Upper Mississippi Valley which encompasses southeastern Minnesota, southwestern Wisconsin, eastern Iowa, and north western Illinois.

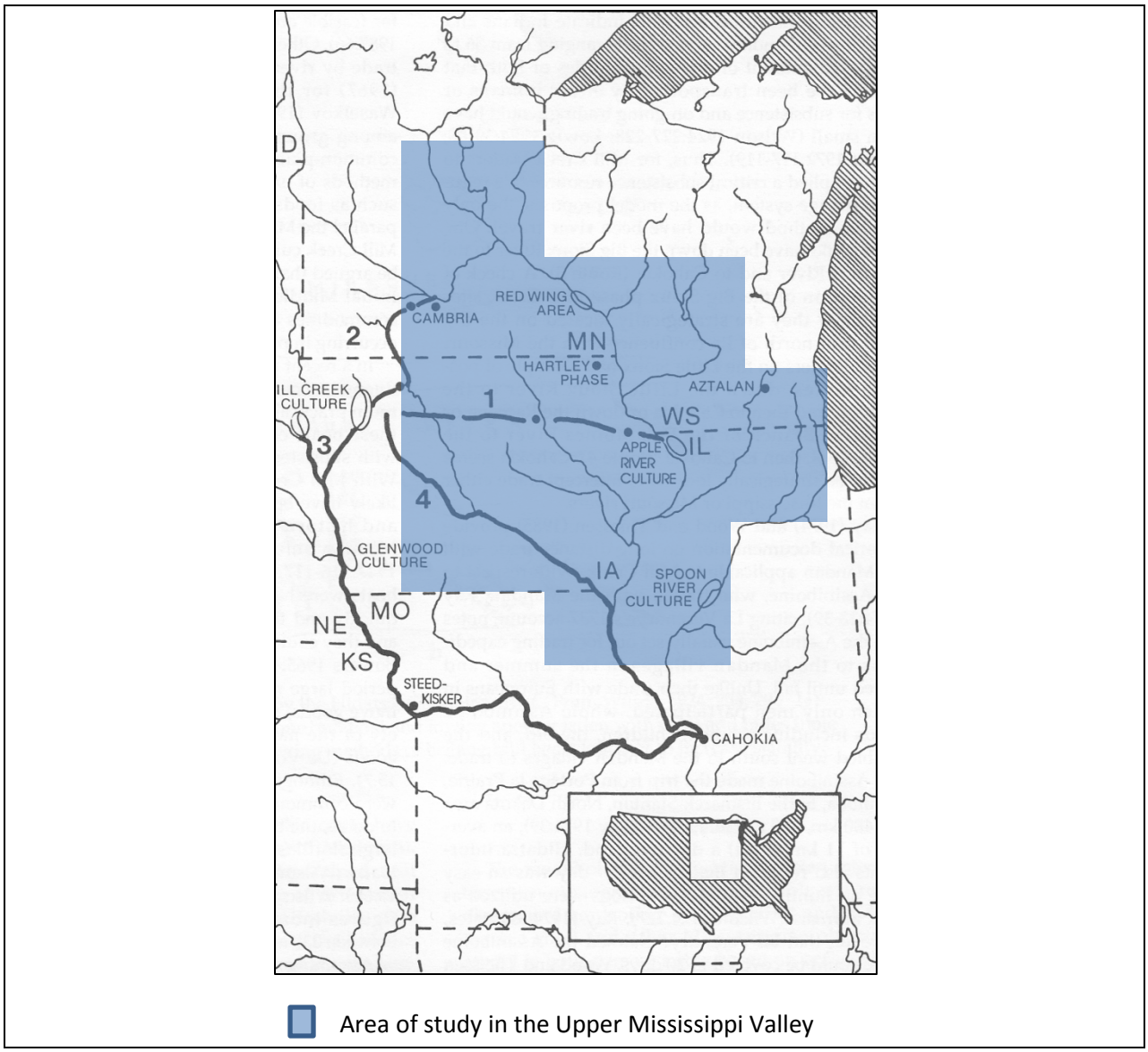


Figure 1. Map of the Upper Mississippian Valley with the area of focus for this study shaded. (Map taken from Tiffany 1991:339).

Quantifying the data for conflict at sites that stored food compared to sites that did not produce enough food for a surplus during the same time period in the Upper Mississippi Valley will give some insight on the role of agriculture in Late Woodland and Oneota settlements. Did agriculture give early inhabitants of the Mississippi River an edge over those without it during a time with limited resources, or did a storable food source make early agricultural sites targets for

neighboring rivals? By examining data from site records and reports the correlation between early agriculture and rate of conflict can be determined.

BACKGROUND

Climate and Environment

The climate of the Upper Mississippi Valley during the Woodland and Oneota periods was similar to the present climate, though there was a period of a warmer, moist climate called the Neo Atlantic lasting from AD 1000 to AD1250 and followed a dryer period called the Pacific which lasted until AD 1450 (Theler and Boszhardt 2003:37).

The environment during the Woodland and Oneota periods was partly prairie grasslands and partly oak savanna, with patches of deciduous forest. The land had a temperate climate, similar to the modern climate, with warm humid summers and frigid sub-arctic winters. The climate combined with the Mississippi River and its tributaries, created a fertile environment rich with natural resources (Stevenson et al. 1997:142). Before the Middle Woodland period, the fertile land of the Upper Mississippi Valley provided enough resources to allow mobile hunter-gatherers to migrate over large area of land without encountering much confrontation with other hunter gatherer populations (Theler and Boszhardt 2003). In order to optimize their resources they moved seasonally, which allowed them to harvest the most resources available throughout the year.

The most important resource of this region was the white-tailed deer, which was used for food, clothing, and tools, though people in the late prehistoric period also relied on elk, beaver, raccoons, turkeys, grouse, prairie chickens, other small mammals, turtles, fish, aquatic birds,

fresh water mussels, nuts, acorns, berries, and other edible plants (Stevenson et al. 1997:14); (Theler and Boszhardt 2006). White-tailed deer were only hunted during the fall and winter seasons when the spring juveniles had a chance to mature and other subsistence was hard to find.

The Beginning of Agriculture

Maize did not enter the Mississippi Valley region until the Middle Woodland period. The earliest findings of maize date between 170 BC- AD 60 and were found in an Illinois Hopewell hamlet (Riley et al. 1994). Natural resources in the Upper Mississippi Valley were abundant and although maize was not introduced until the Middle Woodland period, people cultivated wild plants beginning in the Archaic period hundreds of years before maize was introduced. Early cultigens in the Upper Mississippi Valley include, squash, sunflower, and maygrass. Mobile hunter gatherers would care to wild plants by weeding and replanting seeds from plants with favorable traits, revisiting these areas seasonally. People tended to seasonal gardens into the Woodland period; they did not intensively use crops as a food source until later in the Late Woodland period.

Increased consumption of corn is shown through analysis of ^{12}C and ^{13}C ratios in human skeletal remains, the ratio is determined by the amount of C-3 and C-4 plants one consumes (Buikstra and Milner 1991); (Stothers and Bechtel 1988); (Vogel and van der Merwe 1977). Almost all wild plants in the Upper Mississippi Valley are C-3 type plants which according. Most wild plants are C-3 plant types and result in a high negative $^{12}C/^{13}C$ ratio or $\delta^{13}C$; "…the $\delta^{13}C$ values of these food resources range from -22% to -38%, with an average of about -26.5%" this is reflected in bones, "…$\delta^{13}C$ values of - 24.1, - 22.7, and - 21.2%…Such negative $\delta^{13}C$ values are generally accepted as firm evidence of a diet devoid of C-4, plants" and is typically seen in hunter gatherer remains (Buikstra and Milner 1991) (Hedman, Hargrave, and Ambors

2002:239);. However, corn is a C-4 plant and at some point consumption of C-4 plants will changed the $^{12}C/^{13}C$ ratio to a higher percentage, this is due to the fact that "C-4 plants have $\delta^{13}C$ values that range from -8 to -14%, with an average of -12.5%" (Hedman, Hargrave, and Ambors 2002:239). Based stable carbon isotope analysis on prehistoric skeletal remains, corn became a primary food source and consumption of crop at least doubled around AD 1000/1100. Beans and squash remains are commonly found in late prehistoric sites, though in much smaller numbers compared to corn (Overstreet 1997); (Stevenson 1985). Including these crops in their diets was important for a maintaining balanced nutrition; beans for example are an excellent source of protein when meat is scarce.

Even when groups adopted agriculture they did not become completely sedentary. During the Oneota period people would still migrate west during the fall to hunt bison, except people who were too old or ill to travel. The remainder of the year Oneota populations would stay at one site to plant, grow, and harvest their crops in the same village for several years before relocating to a different area. We see this to an extent in Late Woodland settlements, but they did not stay in one place as long as their predecessors in the end of the Late Woodland period and in the Oneota period.

Population Increase

Given the abundance of natural resources and few predators in the region, human population in the Upper Mississippi Valley increased to the point of reaching its packing threshold. A packing threshold is the point where natural resources can no longer support the number of people in one area. According to Theler and Boszhardt, "'packing' of the landscape begins at about 1.6 persons/100 km² and reaches a 'packing threshold' at 9.1 persons/100 km²", (Theler and Boszhardt 2006:434). Packing threshold may have been reached around AD 950 based

settlement patterns and changes in subsistence. Settlements patterns reveal that groups began to migrate less often and migrated over a smaller area of land (Theler and Boszhardt 2006:445). This type of migration would not have been as beneficial or efficient compared to previous migration patterns. First, it would have restricted the amount of food collected because people would travel more often to collect the most food in an area depending on the season. It would have also created a greater risk of depleting the area's natural resources.

As population increased people began to change their subsistence patterns. The white-tailed deer was one of the first resources to be affected by population pressure. Deer remains are still prevalent at sites, showing their importance to late prehistoric people, but there are indications that deer population were strained by the human population. In Tainter Cave, WI charcoal pictographs depict a prehistoric hunting party shooting pregnant deer with bows and arrows (Theler and Boszhardt 2003:137). This would mean that the hunt had to take place during the late winter or early spring because that is the only time deer are pregnant in the year. Hunts during the late winter/ early spring seasons are rare because by killing the pregnant does for food and clothes, it would also kill the off most of the following generation in an area. It would be very unlikely that people whose ancestors had lived in the region for thousands of years and were quite familiar with the wildlife they hunted would hunt during that particular season, unless it was necessary to survive until spring. Once primary resources begin to dwindle in the region people were forced to expand their reliance on secondary subsistence resources (Theler and Boszhardt 2006:343). Emphasis on agriculture was one way to compensate for high population by adding another food source that was reliable and storable. In some ways it is greatly beneficial to the people who use it, however it is more labor intensive than hunting and gathering and is typically seen as a last resort method. Increased fresh water mussel shell middens is

another sign that people needed to use more labor intensive resources in order to compensate for a lack of preferred resources. While mussels are an excellent of protein, omega 3 fats, and other nutrients the amount of meat on a mussels is small (The Freshwater Mollusk Conservation). In fact a study conducted by the University of Illinois to measure the amount of "meat for protein and caloric content" mussels can contribute to our diet concluded that it would take 57,000 to 67,000 mussels to feed 25 individuals for a month (The Freshwater Mollusk Conservation). Even if the environment could have provide the population with that many mussels, gathering, shelling, and cooking would have been tedious work.

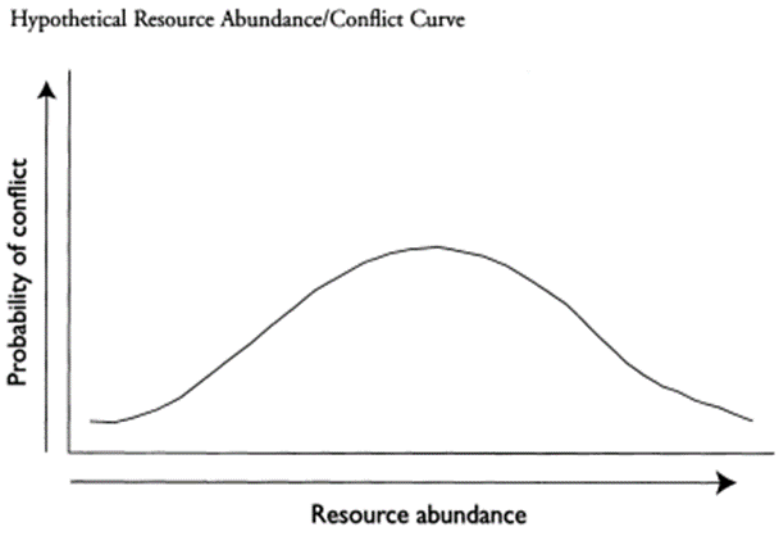
Figure 2. Pictographs in Tainter Cave, Wisconsin. (From Theler and Boszhardt 200:137).

During the Late Woodland period the Effigy Mound culture emerged and lived in the Driftless Area and much of southern Wisconsin. These people were most known for their unique mounds which along with traditional conical and linear forms, included animal shaped mounds known as "Effigy Mounds" (Theler and Boszhardt 2003:127-128). The Effigy Mound types consisted of three subgroups; avian, quadrupeds, and long-tailed animal mounds. It is hypothesized that individual effigy mound shapes represent regional clans and that one purpose

of their construction was to mark a clan's territory. One mound group located in Effigy Mounds National Monument called the Marching Bear Group consists of ten bear mounds in a row, spanning across a high bluff. The mound group would have been very visible, positioned in a way that would have enabled them to be seen from a distance (Theler and Boszhardt 2003:128). Such displays support the idea of rising conflict between neighboring groups.

Conflict

Conflict exists in all stages of society, it is unavoidable once there is multiple human beings living together. Conflict in hunter gatherer societies is fairly rare, people are able to deal with deviance in their own groups and when meeting strangers most hunter gatherer groups will try and avoid conflict as much as possible. However, when outside pressures add stress to communities the likelihood of conflict increases. Population growth is one pressure that caused a number of problems in the Upper Mississippi Valley. Limited land and resources that resulted from population increase can cause enough stress between groups that will break out into violence (Theler and Boszhardt 2006:343). Competition for resources is a common cause of conflict and is present even in modern warfare. According to Mark and Meredith Giordano, and Aaron Wolf conflict over resources hardly occurs when there is an abundance of resources or when amount of resources are low to the point that gaining the small amount is not worth the effort of violence. Conflict becomes heightened only when resources are scare enough to be desired and the benefits of acquiring the resource outweigh the risks (Giordano et al. 2005).



Where resources do not exist, or exist in low quantities, resource conflict is unlikely, because the potential payoff from conflict is low. As resource availability rises, the potential payoff from conflict rises and with it the probability of conflict. However, when abundance reaches some level, the resource's marginal value begins to decline, reducing again the probability of conflict.

Figure 3. Shows the likelihood of conflict in relation to the abundance of resources in the area. (From Giordano et al. 2005:51).

There is direct evidence for conflict during the Late Woodland and Oneota period as seen through an increase in violent deaths, fortification structures and human trophies. Defining palisades begin to appear in the Upper Mississippi Valley at about AD 1000, the practice was most likely brought in by the Middle Mississippians near Cahokia, although it has been suggested that smaller palisades were constructed in the Late Woodland period (Emerson 2007:136). Some researchers have hypothesized that the cause of intensified conflict resulted from migrating groups traveling up from Cahokia. Cahokia was the largest prehistoric settlement in North America, as a complex chiefdom level society it had an estimated population between ten thousand and sixteen thousand people during its peak (Pauketat 2009:26). In order support the population trade routes were established, but while we see Cahokian artifacts in the North there are few preservable artifacts that reach Cahokia (Finney 2000:359); (Young and Fowler

2000:296). A lack of preservable artifacts may mean that poorly preserved goods like deer, other food, and fire wood were making their way back to Cahokia and other parts of the southern Mississippi Valley region. If this was the case then the strain on natural resources would have been worse.

Clear indications of violence are seen through skeletal analysis in mortuary context. Projectile points found imbedded in bone or in an unusual place in the burial where it may have penetrated the flesh before the body decomposed. Blunt-force trauma, sharp-force trauma, cuts in scalping pattern, and decapitation are also clear indication of a violent cause of death.

> "The usual scalping technique apparently involved first making an incision across the forehead with a series of short knife strokes. The scalp was then raised and cut along the sides of the head above and behind the ears. Finally, the scalp was pulled free by cutting transversely across the back of the head."
> (Santure et al. 1990:145)

Although these causes of death can be a result of intragroup violence and this of course occurred throughout time. Intragroup violence however, is infrequent for the most part and while finding a few remains exhibiting violence may be a victim of intragroup violence, violence becomes more frequent in the late prehistoric period indicating intergroup violence (Emerson 2007); (Milner 1999).

Figure 4. Image of a skull with distinct scalping cut marks. (Santure et al. 1990:145)

Trophy collecting and displaying is a commonly associated with conflict whether during warfare or individual disputes and has been practiced globally and throughout history (Chacon and Dye 2007:8-21). It is the act of taking a part of one's enemy, most common parts are heads, scalps, long bones, and phalanges, as proof of their skill (Mensforth 2007:222); (Owsley et al 2007). Signs of trophies include, modified bones which look like they have been decorated or holes were drilled manually, disarticulated body parts found in a habitation site especially those with cut marks on them, and single skulls found in burials (Mensforth 2007).

Within the Late Woodland period the bow and arrow difussed and speedily utilized in the Upper Mississippi Valley. The bow and arrow becomes introduced sometime between AD 500 and AD 700 (Railey 2010); (Stevenson et al. 1997); (Theler and Boszhardt 2003). The bow and arrow became a preferred weapon over spears and the atlatl for a number of reasons: (1) The bow and arrow allowed the hunter to send an arrow a great distance without giving away his position; (2) the shaft and point of an arrow is lighter than an atlatl dart and would have been easier to transport; (3) the light weight arrows and stance one takes while releasing the arrow made the bow and arrow faster and more accurate; (4) reloading a bow is faster than an atlatl; (5) arrow head points were typically smaller and took less time and effort to make than spear and dart points (Otterbein 2004:64); (Railey 2010:263). A common projectile point type associated with bow and arrow is Madison Triangular point which are small triangular points with little distinguishing features other than their size and shape, few are longer than an inch. The Madison Triangular point is diagnostic, but has a long range starting at AD 700 becoming the most prominent point style after AD 1150 and continued to be used into the historic period (Boszhardt

and Theler 2003:135). These points were used for both hunting and warfare, making it difficult to determine how often they were used for warfare (Milner 1999); (Boszhardt and Theler 2003:135).

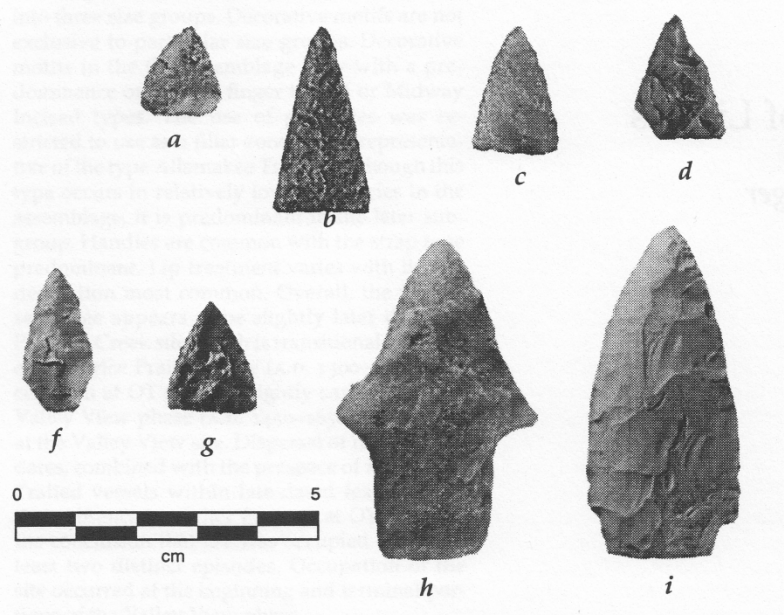


Figure 5. Artifacts a-d and g are triangular bifaces from the Ot site (O'Gorman 1993: 74)

METHODOLOGY

The goal of the study was to measure the rate of conflict over time in relation to the amount of agricultural food produced at a site. After excluding sites outside of the Upper Mississippi Valley, and those dating prior to AD 500 and historical sites, 42 sites were left for analysis. The sites were divided into three categories based on the radio carbon dates of the site; Late Woodland (AD500-1000), Mississippian contact/transition period (AD 1000-1300), and Oneota

(AD 1300-pre-eruopean contact). This enables the researcher to view the difference in conflict and agriculture between sites of the same time period and the difference over time.

In order to measure the amount of conflict associated with each site, the data recorded from the sites was analyzed and characteristics of conflict were noted. Sites with multiple characteristics of conflict and large quantities of one characteristic of conflict are assumed to have experienced more conflict than sites with a single characteristic or small quantities of one characteristic. To measure conflict sites were noted if they had (1) a palisade or other fortified structures around or partially around the site, (2) had burials associated with the site that show physical trauma during death; remains that showed violent related deaths were then further sub categorized into either scalped/cuts on skull, blunt-force trauma, sharp-force trauma, and decapitation; (3)the percentage of traumatic deaths were to natural causes of death, (4) whether a site has evidence of human trophies (i.e. skulls, phalanges, long bones). Sites that have more conflict than others can be found by comparing the number and frequency of conflict traits at each site. After calculating the amount of conflict at each site, the results were cross-referenced with the amount of agricultural activity at each site. Agricultural activity was measured primarily by the C^{13}/C^{12} ratio in stable isotope samples from human remains. This ratio was used because it is an accurate measurement of the amount of corn a person consumed in his or her life.

Problems

The majority of data used for this study came from human osteology records, however overall preservation of human remains in prehistoric sites of the Upper Mississippi Valley is poor, especially in Late Woodland sites. There are a few rare exceptions such as the Oneota cemetery at Norris Farm 36 in west central Illinois, and the Mississippian influenced village of Aztalan (47JE01) in southeastern Wisconsin. Both have been extensively excavated and recorded

providing detailed information on the sites. The human osteology data presented below was taken from remains that were preserved well enough that researchers were able to come to some conclusion on the cause of death and diet of the individual. Many other sites examined within the Upper Mississippi Valley were not included in the analysis because the remains were too fragmented or fell outside of the time frame or Upper Mississippi Valley area.

ANALYSIS

Evidence of Conflict

A total of 42 sites throughout the Upper Mississippi Valley were examined for signs of conflict between AD500- AD1600 in order to examine the rate in conflict in the region over time with a total sample size of 673 skeletal analysis (Appendix A, Tables A1-A3). The total individuals found showing evidence of a traumatic death by violent means in the 12 early Late Woodland sites with human remains was 3 out of 95 human remains found (Appendix A, Table A1); (Figure 6). The total number of individuals showing violent related death in the 7 Transitional Period sites was 32 out of 74 human remains and the total number of individuals in the16 Oneota sites examined was 62 out of 517 human remains (Appendix A, Tables A1 and A2); (Figures 7-8). The Late Woodland sites had minimal occurrences of violence as would be expected and the occurrence of victims exhibiting violence increases substantially into the transitional period and the Oneota period.

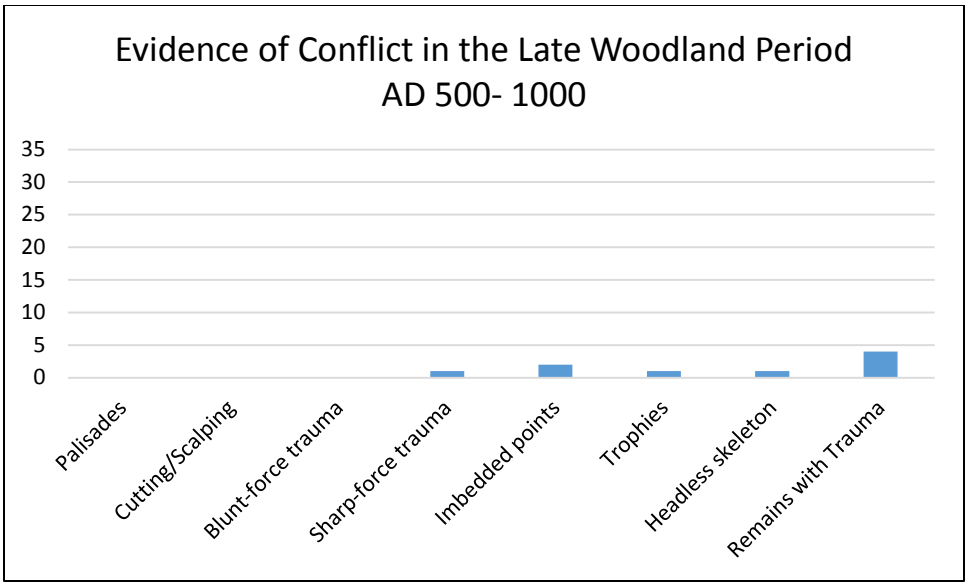


Figure 6. Shows the occurrence of each indication of violence in Late Woodland sites.

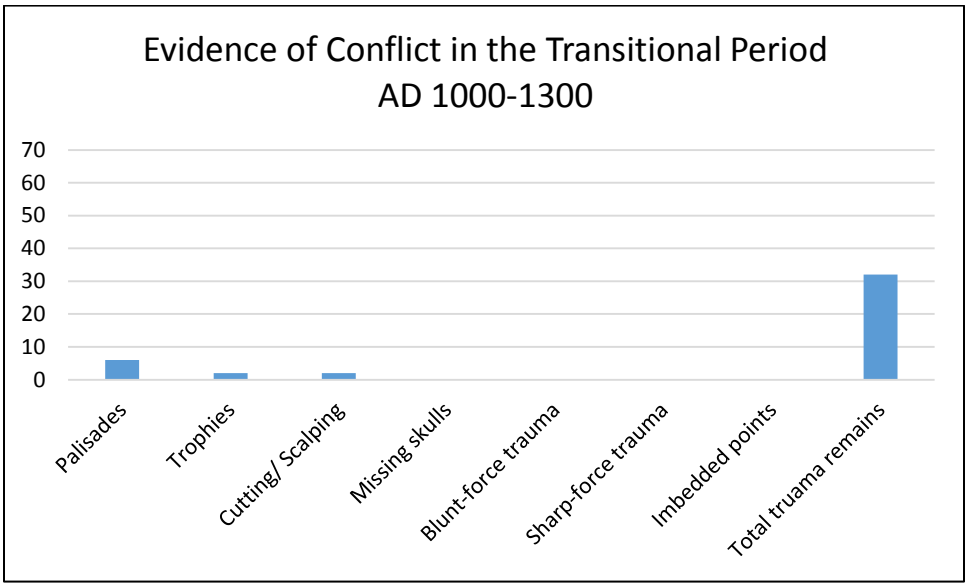


Figure 7. Shows the occurrence of each indication of violence in transitional Late Woodland sites.

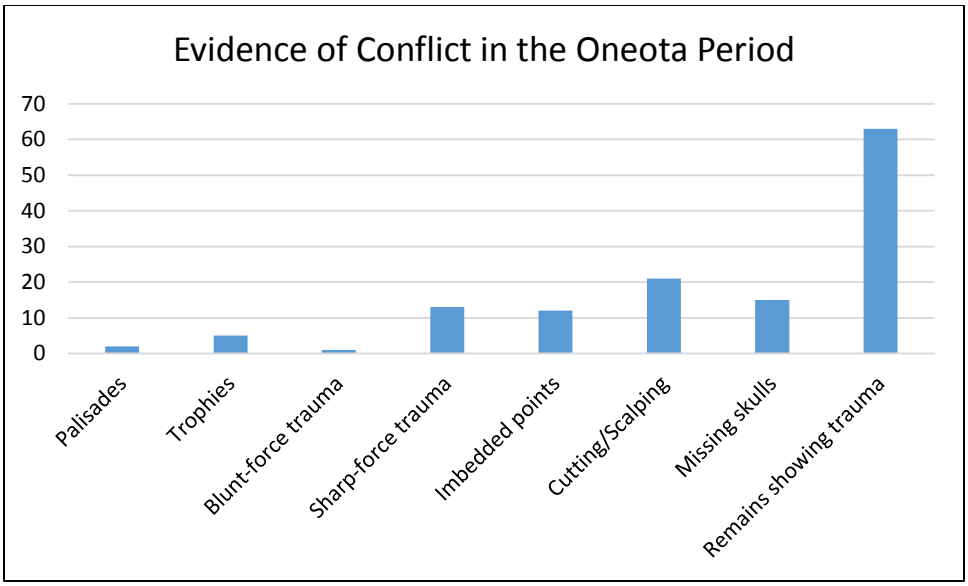


Figure 8. Shows the occurrence of each indication of violence in Oneota sites.

When looking at the percentage of human remains showing signs of violence compared to the total remains found in each period there is still evidence of an increase in hostility after the earlier part of the Late Woodland period, but instead of increasing exponentially over time there is a dramatic spike in violent deaths compared to non-violent deaths founds between AD 1000 and AD 1300 (Figure 9). However, this spike is most likely affected by the smaller sample size; only 7 sites had human remains or palisades during this transitional period had human remains while 13 Late Woodland and 16 Oneota sites were found with human remains or palisades (Appendix A, Tables A1-A3).

Percentage of Human Remains Showing Trauma in the Late Prehistoric Period.

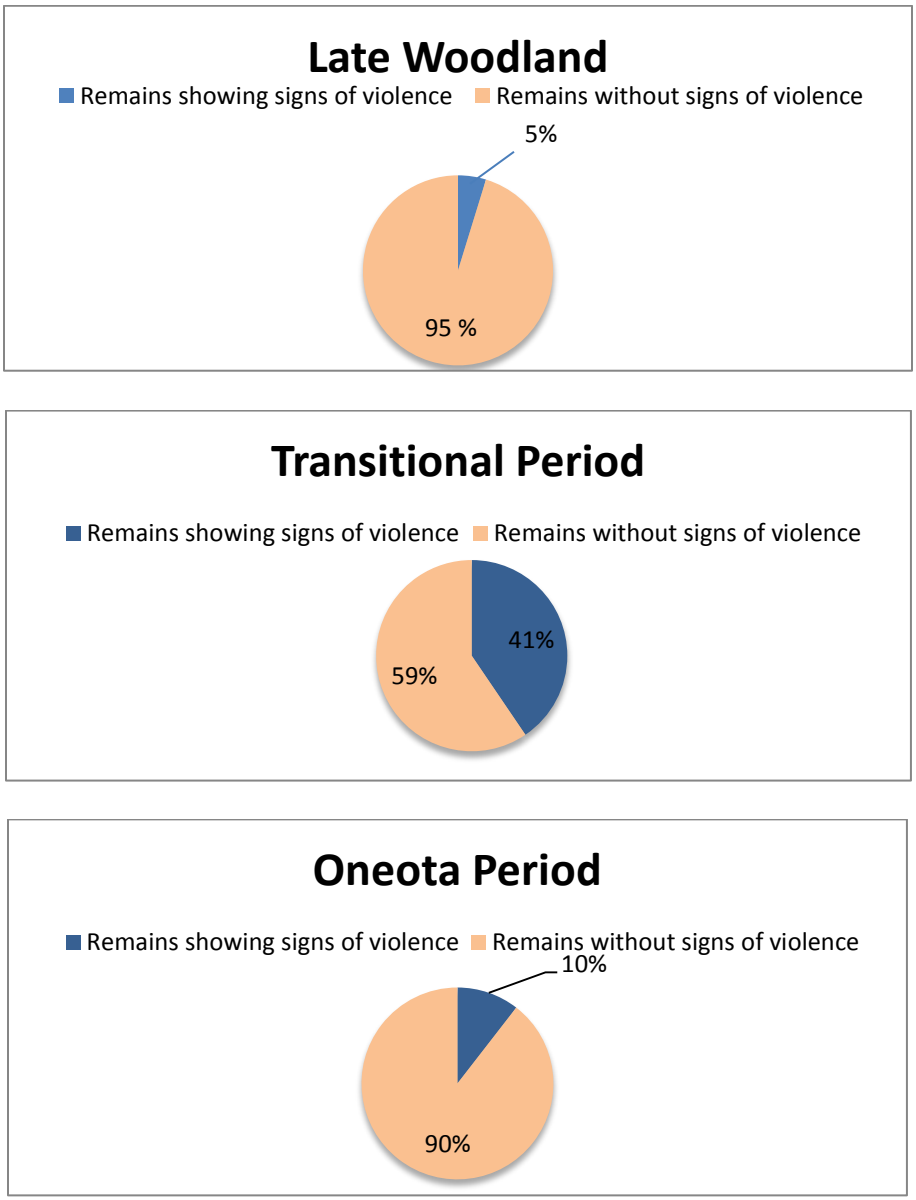


Figure 9. Percentage of human remains showing trauma in each period.

In each Late Woodland site where there was evidence of violence there was only one individual, but in later periods there are more instances of multiple victims found on site. The three individuals, exhibiting signs of violence in their death and dating within AD 500-AD 1000 were found in Kratz Creek site, Wisconsin, Berscheid (21TO03) Minnesota, and Sand Run West (13LA38), Iowa (Appendix A, Table A1.). One individual from the Late Woodland site of Kratz Creek, Wisconsin was found with a projectile point imbedded into the pelvis (Benchley et al. 1997: 260). In the Berscheid site in Minnesota, a total of 18 individuals were found ranging from around 17-45 years of age. Only one of these individuals showed signs of violence in the form of sharp-force trauma to the skull (Benchley et al. 1997: 288). Only one individual was found in the Sand Run West site, but this adult male was found with "five projectile points in his left torso region" and his missing skull was missing, possibly decapitated (Benchley et al. 1997: 228).

Two sites dating within the Transitional Period had human remains with signs of violence (Appendix A, Table A2). Poor Man's Farrah site and Bade site are usually recorded together because of their close proximity and time of occupancy. Two skull fragments were found at Poor Man's Farrah with cut marks that were indisputably made from scalping, and about four other individuals had similar cuts on their skulls, but because they were secondary burials it was not conclusive whether the cuts were made from scalping or from de-fleshing the body for mortuary purposes (Riggs 1985). The majority of human remains indicating violence were found in another Transitional Period site Aztalan. A minimum of 28 individuals were represented at Aztalan, due to the large sample and unusual context it will be discussed in more detail later in this thesis (Appendix A, Table A2).

Five sites from the Oneota period had burials with people showing a violent death; Burke Site (13AM67), McKinney site (13LA1), Norris Farm 36, State Road Coulee (47LC176), and the

Tremaine site (47LC95) (Table A3). One individual was recovered from the Burke site with a projectile point imbedded in the sternum (Benchley et al. 1997: 239). One individual was found in State Road Coulee site, an adult male who was missing a skull and had cut marks on the first three cervical vertebrae, an indication of purposeful decapitation (Benchley et al. 1997: 266). There were 92 individuals represented at the Tremaine site in southwestern Wisconsin six of which showed signs of violence at the time of their death. The first, had several punctures and cut mark in the skull, with three projectile points found with him; one associated with the occipital bone, one in the rib cage, and one found in association with the lower part of the right arm and pelvis (Benchley et al. 1997: 266). Another had three projectile points in his left humerus and one in the fourth thoracic vertebra (Benchley et al. 1997: 266). A fourth individual was also found without a skull and the first two cervical vertebrae and two projectile points were found inside of the rib cage. Two additional burials in the site were found without skulls (Benchley et al. 1997: 266). Norris Farm 36 like Aztalan is a large sample size and will be discussed in greater detail below.

Human trophies and palisades are for the most part, absent from the Late Woodland data, with the exception of one polished and modified mandible found in a Late Woodland component of the Quandahl Rockshelter (13WH35) in Iowa (Benchley et al. 1997: 229). The mandible is thought to have been worn as a pendant indicated by small holes and drill marks on either side of the mandible. Wearing mandible pendants is a practice that began in the Archaic period and continued to be used into the Mississippian culture (Benchley et al. 1997: 229). The only Transitional period site with trophies, other than Aztalan, is the Bryan site (21GD4) in the Red Wing locality. Two skulls identified as trophy skulls were found associated with the burnt remains of a house in a 1954 excavation (Fleming 2009:34). One burial in the Oneota Flynn

Cemetery site was found with an additional skull minus the mandible position by the left knee. The single skull may have been a trophy of the complete individual as people were sometimes buried with their trophies, the absence of the mandible also suggests some sort of modification associated with trophy display. Since 1970 excavation at the McKinney Village site (13LA1) have produced four modified human skull fragments, representing three individuals. One fragments was polished and burnt, two fragments had shallow, fine incised lines purposefully etched into the skull, and one fragment was polished, burnt, and had a crosspatch pattern etched on it (Benchley et al. 1997: 241). One individual in the Tremaine site was buried with another human skull with the first five cervical vertebrae (Benchley et al. 1997: 266). Six sites in the Transitional period had palisades around the site; Aztalan (47JE01), Bartron (21GD2), Bryan (21GD4), Mero 1 (47PI2), Fred Edwards (47GT377), and Hartley Fort (Benchley et al. 1997); (Birmingham and Goldstein 2005); (Finney 2000); (Fleming 2009) (Personal communication with Dr. Joseph A. Tiffany 2013). Four Oneota sites had palisades around the site; Howard Goodhue (13PK1), Lane Farm Enclosure (13AM200), McKinney Oneota village site (13LA1), and Valley View (47LC34) (Benchley et al. 1997); (Stevenson 1985).

The data from the Transitional Period is from a smaller sample size than the data from the other periods and therefore, the percentage of violent deaths may not accurately represent the actual population (Figure 9); (Appendix A, Table A2). However, the remains found in the Bryan site, Poor Man's Farrah site, Bade site and the Woodland/Mississippian village Aztalan with the sudden appearance of palisades are evident of the escalation of hostility in the region. More data is needed in order to accurately measure the amount of conflict that took place in the region AD 1000- AD 1300, but compared to the previous Late Woodland sites the change in conflict is seen

after AD 1000 and continues into the Oneota period, as seen by the sheer number of traumatic deaths, trophies, and the continued use of palisades.

Aztalan (47JE01)

Aztalan was a late prehistoric village occupied between AD1100- AD1250. Aztalan was heavily influenced by Mississippian culture and seemed to have direct contact with Cahokia (Birmingham and Goldstein 2005). All the formal burials in Aztalan show no traces of violence, though a few reflect a stratified society with a large amount of ritual activity. The evidence of conflict is seen in the palisade, which surrounds most of the site, excluding the portion of the village which bordered the Crawfish river, and in the many body parts found in refuse pits (Barrett 1933); (Birmingham and Goldstein 2005). In 1933 Barrett recovered a number of body parts found in both hearth and refuse features in the habitation area of Aztalan. There are no fully buried individual, but the MNI of humans found in the refuse and hearth pits based on the remains recovered is 28 individuals (Holcomb 1952). These body parts, which include skulls, long bones, metacarpals, metatarsals, and phalanges are found many times in association with fragments of animal bones, flakes, and other refuse. In some cases these bones were burned and others, such as the long bones were splintered open in a similar way that a person would treat an animal bone when they harvest bone marrow (Barrett 1933:109.). This lead Barrett and others to conclude that the people of Aztalan were practicing some sort of cannibalism, either for ritual or of necessity (Barrett 1933:114). The majority of the body parts were found unburned, even those found directly on top of ash and fire cracked rock, and a few seemed to be deposited with the flesh intact. In feature 83 Barrett's team found a completely articulated hand, phalanges and metacarpals all in place. This would suggest that the cannibalism was not the case at least for some individuals. This practice is unique to the Upper Mississippi Valley and not completely

understood, however, it is generally agreed that this does not reflect ancestor worship and was associated with warfare (Birmingham and Goldstein 2005:100-101).

Norris Farm 36

Information on the Norris Farm 36 was taken from the Illinois state museum report on the salvage excavation of the site in September 1984 to 1985. Due to road construction it was advised by the Illinois Department of Transportation to excavate the entire cemetery and adjacent areas including a portion of the Morton Village (Santure et al 1990:1). Norris Farm 36 located in west central Illinois is a multi-component site with Late Archaic, Early Woodland, Middle Woodland, Late Woodland, Mississippian, and Oneota components in the site with indeterminate Woodland remains. Five individuals were recovered dating to AD 620±80, all bundle burials with no evidence of violence without floral remains (Santure et al. 1990:22). While no bodies were found in the Mississippian component, floral analysis shows that corn appears in three features, showing in 27.3% of the samples making it the second most common floral remain after charcoaled wood. The excavation of the Oneota cemetery uncovered a total of 293 human remains 50 of which showed signs of a violent death; 16 individuals had been scalped three more had been scalped, survived, and died of other causes, 12 had experienced sharp-force trauma, 11 had been decapitated, and 8 had projectile points imbedded in the body (Santure 1990:140-148). Only 24 of the 50 individuals were in single burials, the rest were buried in small groups at different times (Santure 1990:154-158). The team concluded that the individuals in Norris Farm 36 were victims of surprise raids away from the village. The majority of the injuries were administered from behind or to the side of the body and 24 individuals have bite marks from carnivores gnawing on them, which suggests that they were left in the open for a number of days before other people in the village found them (Santure 1990:154-158). Also, the

number of males and females who died violently is almost equal. Usually, males are the dominate gender by a large margin, this also supports the idea that attacks occurred during everyday tasks away from the village like hunting and gathering (Santure 1990:154-158). The high number of females in the data and the lack of trophies found in the site also suggests that the Morton Village did not generally initiate a fight.

In the Oneota component corn remains are most common floral remain found in the site, and are found in ten of the features and are present in 45.6% of the flotation samples. The next most common floral remains besides wood are hickory and acorn nuts which are present in 5.1% and 7.6% of the floatation samples. These remains along with the isotope value of -12.5% indicates that the village utilized agriculture and consumed mostly corn (Santure et al. 1990:63).

Agriculture

For this study, stable isotope samples were used to measure the amount of corn consumed in the time periods under study, while it does not directly show how much corn was being produced at a site, it shows how much corn a site was able to acquire. Stable isotopes are a more consistent and reliable measurement of corn horticulture when examining multiple sites within a time period and over a longer period of time. Originally the number of storage pits and floral remains were going to be used to measure the stage of agriculture and the amount of corn was produced. While both of these features gave insight into individual sites, it was difficult to provide consistent measurements of storage pits and floral remains between the sites especially with partially excavated sites. Stable isotopes show if a group were able to produce or trade for enough corn to change the carbon ratios in their bodies and to what extent.

Table 1 shows the stable isotope values for seven sites in the Upper Mississippi Valley, three from the Transitional/Mississippian period; Aztalan, Bryan, and the Poor Man's

Farrah/Bade site, and four from the Oneota period (Stothers and Bechtel 1987:148); (Benchley et al. 1997). There is no stable isotope analysis data available for sites in the early Late Woodland period in the Upper Mississippi Valley, but values analyzed from Late Woodland sites in southeast Missouri and northern Arkansas in a study conducted by Mark Lynott, Thomas Boutton, James Price, and Dwight Nelson should have a similar values to the Late Woodland sites in the Upper Mississippi Valley. The sites in Missouri and Arkansas would have a similar resources as the northern site and the $\delta^{13}C$ values for the sites after AD 1000 fall within the same range as the sites in the north during the Transitional period and Oneota periods. Therefore, using the values from Lynott et al.'s work should be an accurate substitute for Late Woodland sites in the Upper Mississippi Valley. The average $\delta^{13}C$ value for the Late Woodland period (relatively) is -20.6, the average for the Transitional period is -15.9 and the average for the Oneota period is -12.9 (Table 1). The increase in $\delta^{13}C$ value over time supports the idea that the agriculture continued to be practiced into the Oneota period and that corn production increased over time. All sites during the Transitional period have multiple storage pits and remains of corn present (Finney and Stoltman 1991); (Fleming 2009); (Birmingham and Goldstein 2005). The $\delta^{13}C$ value with the additional evidence of corn agriculture show that people adapted from corn cultivation to corn agriculture in a very short time.

Table 1. Isotope values for the Upper Mississippi Valley (Late Woodland values taken from sites in southeaster Missouri and northern Arkansas

Stable Isotope Values in the Late Prehistoric Periods

Site	$\delta^{13}C$	Period
Christensen Cave	-19.9	Late Woodland
Nevins Cairn (23PU200)	-20.1	Late Woodland
Zebree (3MS20)	-21.2	Late Woodland
Zebree (3MS20)	-20.5	Late Woodland
Zebree (3MS20)	-21.2	Late Woodland
Round Spring (23SH19)	-20.7	Late Woodland
Aztalan (47JE01)	-19.2	Transitional
Aztalan (47JE01)	-18.5	Transitional
Aztalan (47JE01)	-17.1	Transitional
Aztalan (47JE01)	-17.0	Transitional
Aztalan (47JE01)	-16.4	Transitional
Aztalan (47JE01)	-14.5	Transitional
Aztalan (47JE01)	-14.4	Transitional
Aztalan (47JE01)	-12.0	Transitional
Poor Man's Farrah (47GT56) and Bade site (47GT365)	-17.7	Transitional
Poor Man's Farrah (47GT56) and Bade site (47GT365)	-18.1	Transitional
Bryan (21GD4)	-13.9	Transitional
Bryan (21GD4)	-12.6	Transitional
Hogback (21HU01)	-14.4	Oneota
Hogback (21HU01)	-12.5	Oneota
Tremaine (47LC95)	-13.5	Oneota
Norris Farm 36	-12.5	Oneota
OT(47LC262)	-13.4	Oneota
OT(47LC262)	-11.9	Oneota
Mean	**-20.6**	**Late Woodland**
SD	**0.54**	
	-15.9	**Transitional**
	2.4	
	-13.0	
	0.9	**Oneota**

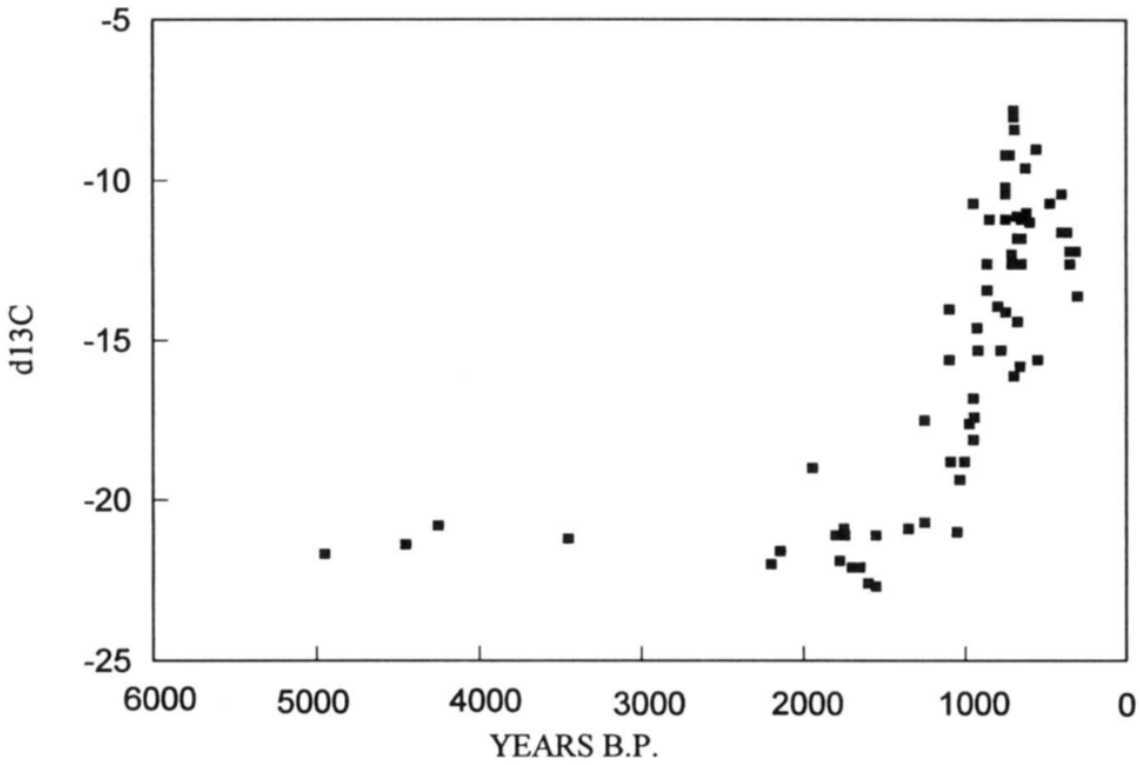


Figure 10. Shows the distribution of stable isotope of C^{13} ratios in the Eastern Woodlands. (Taken from Hart 1999:166).

In order to understand the impact corn agriculture had on a site, whether it helped relieve tension caused by population pressure or created more cause for conflict over food and suitable land to grow the storable food source, the rate of conflict was examined within the transitional and Oneota period compared to the amount of corn consumed and is shown in Table 2. The data size is again a bit low, but within the Oneota sites there does not seem to be a correlation between the two as the sites with the highest and lowest $\delta^{13}C$ values, the OT site and the Hogback, do not have any signs of conflict at the site. The Norris Farm 36 site having the most instances of conflict has a $\delta^{13}C$ value that falls within the mean value. Within the Transitional period sites there may be a slight correlation between the two. While Aztalan and the Bryan site fall within the mean and exhibit mild to great conflict, the Poor Man's Farrah and Bade site have below average corn consumption and the least amount of violence (Table 2).

Table 2. The data is divided with the Transitional period data on top and Oneota data on the bottom

$\delta^{13}C$ Values Compared to Instances of Violence in the Late Prehistoric Period

Site	$\delta^{13}C$	Remains Showing Violence	Palisades
Aztalan (47JE01)	-19.2	-	-
Aztalan (47JE01)	-18.5	-	-
Aztalan (47JE01)	-17.1	-	-
Aztalan (47JE01)	-17.0	-	-
Aztalan (47JE01)	-16.4	-	-
Aztalan (47JE01)	-14.5	-	-
Aztalan (47JE01)	-14.4	-	-
Aztalan (47JE01)	-12.0	28	Yes
Poor Man's Farrah (47GT56) and Bade site (47GT365)	-17.7	-	-
Poor Man's Farrah (47GT56) and Bade site (47GT365)	-18.1	2	No
Bryan (21GD4)	-13.9	-	-
Bryan (21GD4)	-12.6	2	Yes
Hogback (21HU01)	-14.4	-	-
Hogback (21HU01)	-12.5	0	No
Tremaine (47LC95)	-13.5	7	No
Norris Farm 36	-12.5	50	No
OT(47LC262)	-13.4	-	-
OT(47LC262)	-11.9	0	No

RESULTS

Examining the percentage of deaths by violent means from the total remains found there is a 35% increase from the Late Woodland to the Transitional Period in addition to the six palisades found (Figure 9). This percentage is a drastic increase in violence and larger than what would be expected. There is also a noticeable difference in the sample size between the two periods, the Transitional period have fewer sites with human remains, therefore, there is not enough data at this time to confirm if this sample is an accurate representation of the population. There is certainly an increase in violence based on the appearance of palisades and number of remains found in Aztalan, but to what degree is still undetermined. Most of the sites examined dating to the Transitional period have a strong Mississippian presence shown which may better explain the change in the rate of violence seen, rather than competition over good agricultural land and access to a storable food source for winter and early spring seasons. Competition over land for agricultural reasons, seems unlikely because the majority of the land is favorable for farming corn throughout the region since corn became a hearty plant once it adapted to the region's climate (Plants for a Future 1996-2012). There are also little to no signs of raids occurring at villages, which would have occurred if violence broke out in order to steal a village's food supply.

If people were raiding other villages there would be signs of frequently rebuilding palisades and mass burials. Besides evidence of the burning and rebuilding of the palisade at Aztalan twice, signs of village raids have been recorded in the Eastern Woodlands and on the Prairie at the Crow Creek initial Coalescent site in South Dakota, but similar signs are absent in the Upper Mississippi Valley (Emerson 2007:130); (Milner 1999:117); (Young and Fowler 2000:293). In fact, the largest site with violence shows that people fought away from the

settlement In Norris Farm 36 most of the bodies indicated that they had died away from the village and had been brought back to the village for burial days after the attack. It is more likely in this case that those who were attacked on the outskirts of their own territory or perhaps in a neighboring territory (Santure et al. 1990:148).

When examining the rate of conflict in sites the main focus were sites in the Transitional period because it is the more likely period where agriculture would have had an impact. Before AD 1000 there is little to no agriculture and earlier in the Late Woodland period corn was not a main component of many people's diet. In contrast, during the Oneota period corn agriculture is not expected to be a factor of violence because it is practiced by everyone in the Oneota culture. This assumption is supported by Table 2 which shows that Norris Farm 36, having the highest evidence of conflict had average corn consumption while sites with higher and lower isotope values have no signs of conflict (Table 2). The sites measured during the Transitional period do seem to have a slight correlation between sites that utilized corn agriculture and violence. The Poor Man's Farrah site and Bade site which had lower $\delta^{13}C$ values and the fewer instances of violent compared to the Bryan site and Aztalan (Table 2). Any possible correlation is again more likely caused by the small sample size or by the fact that the sites with high isotope values and conflict rates have indications of Mississippian culture present. Mississippian contact is a more reasonable explanation for the sudden increase in conflict and the sudden need for more corn production. Corn had been present in the area for centuries before it became an agricultural crop and only once the strain on resources became too great did groups in the region began to adopt the practice of agriculture roughly at the same time and rate. If the samples examined are assumed to be an accurate representation of the population then during the Transitional period the rate of violence increased around AD 1000, shortly after Mississippian culture appears in the

region, conflict then appears to have decreased slightly after the end of Mississippian presence in the region around AD 1300.

Population increase or aggradation of populations might be an explanation for the sudden increase in conflict and corn agriculture either from the ever increasing native population, or migration from Mississippian culture, which would explain the drop in violence after the fall of Cahokia and decreased interaction between the two cultures. Once the Mississippian people entered the region demand for deer, firewood, and food would have increased adding a substantial amount of stress on the region in addition to existing stress brought on by local population increase. The added stress from an outside population would have made it necessary for many populations to adapt to corn agriculture to support their populations and increased conflict over resources, which decreased after the Mississippians left, but tension still seems to have existed in the Oneota period into the historic period.

Based on existing data from mortuary remains in the Upper Mississippi Valley, agriculture does not affect the rate of conflict in the region, but increased population and demand of natural resources caused an increase in both. Future research may shed more light on the exact impact the Mississippians had on the Upper Mississippi Valley in the Late Prehistoric period and how much conflict increased when they entered the region and how much it decreased after they left.

Appendix A.

Table A1. Demographics of conflict in the Late Woodland Period.

Late Woodland Conflict									
Site	**Palisade**	**Cutting/ Scalping**	**Blunt-force trauma**	**Sharp-force trauma**	**Imbedded points**	**Trophies**	**Headless skeleton**	**Remains with Trauma**	**Total remains found (MNI)**
Berscheid site (21TO03)	no	0	0	1	0	0	0	1	18
Jollyville Hill (13LE12)	no	0	0	0	0	0	0	0	2
Keller (13AM69)	no	0	0	0	0	0	0	0	4
Kletzien Moun Group (47SB61)	no	0	0	0	0	0	0	0	4
Kratz Creek	no	0	0	0	1	0	0	1	1
McClaughry Mound Group (47MQ9003)	no	0	0	0	0	0	0	0	6
Nitschke (47DO27)	no	0	0	0	0	0	0	0	5
Norway Lake (21CA22)	no	0	0	0	0	0	0	0	1
Quandahl Rockshelter (13WH35) (Mandible)	no	0	0	0	0	1	0	1	2
Raisbeck Mounds (47GT112)	no	0	0	0	0	0	0	0	35
Sand Run West (13LA38)	no	0	0	0	1	0	1	1	1
Norris Farm 36	no	0	0	0	0	0	0	0	5
Total	**0**	**0**	**0**	**1**	**2**	**1**	**1**	**4**	**84**

Table A2. Demographics of conflict in the Transitional Period.

Transitional period Conflict									
Sites	**Palisades**	**Trophies**	**Cutting/ Scalping**	**Missing skulls**	**Blunt-force trauma**	**Sharp-force trauma**	**Imbedded points**	**Total truama remains**	**Total remains found (MNI)**
Poor Man's Farrah (47GT56) and Bade site (47GT365)	no	0	2	0	0	0	0	2	13
Aztalan (47JE01)	yes	0	0	0	0	0	0	28	49
Bartron (21GD2)	yes	0	0	0	0	0	0	0	0
Bryan (21GD4)	yes	2	0	0	0	0	0	2	8
Carcajou Point (47JE02)	no	0	0	0	0	0	0	0	9
Fred Edwards (47GT377)	yes	0	0	0	0	0	0	0	0
Mero 1 (47PI2)	yes	0	0	0	0	0	0	0	0
Hartley fort	yes	0	0	0	0	0	0	0	0
Total	**6**	**2**	**2**	**0**	**0**	**0**	**0**	**32**	**79**

Table A3. Demographics of conflict in the Oneota Period.

Oneota Conflict									
Site	**Palisades**	**Trophies**	**Blunt-force trauma**	**Sharp-force trauma**	**Imbedded points**	**Cutting/ Scalping**	**Missing skulls**	**Remains showing trauma**	**Total remains**
(13LE183)	no	0	0	0	0	0	0	0	1
Blosser (13BN125)	no	0	0	0	0	0	0	0	8
Burke Site (13AM67)	no	0	0	0	1	0	1	1	1
Clarkson site (13WA2)	no	0	0	0	0	0	0	0	1
Flynn Cemetery (13AM67)	no	1	0	0	0	0	0	1	17
Gunderson Clinic (47LC394	no	0	0	0	0	0	0	0	47
Hogback (21HU01)	no	0	0	0	0	0	0	0	9
Howard Goodhue (13PK1)	yes	0	0	0	0	0	0	0	55
Lane Farm Enclosure (13AM200)	no	0	0	0	1	0	0	0	0
Malone Cemetery (13AM60)	no	0	0	0	0	0	0	0	6
McKinney (13LA1)	no	3	0	0	0	1	0	3	18
Morton village/ Norris Farm 36	no	0	0	12	8	19	11	50	293
OT(47LC262)	no	0	0	0	0	0	0	0	10
State Road Coulee (47LC176)	no	0	0	0	0	0	1	1	1
Tremaine (47LC95)	no	1	1	1	2	1	2	7	92
Valley View (47LC34)	yes	0	0	0	0	0	0	0	1
DeCampe (13DA64)	no	0	0	0	0	0	0	0	28
Glen Oaks (13PK63)	no	0	0	0	0	0	0	0	12
Total	**2**	**5**	**1**	**13**	**12**	**21**	**15**	**63**	**600**

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