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Honey or Vinegar: Oneota Interaction in the Central and Northeastern Plains

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Honey or Vinegar: Oneota Interaction in the Central and Northeastern Plains

by

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Abstract

Beginning AD 1150 and extending until European contact, the archaeological culture referred to as "Oneota" underwent an explosive spread across the American midcontinent. As Oneota ideas, people, or some combination thereof moved westward, they encountered people from other cultures. Along the western frontier of Oneota culture, evidence suggests that relations between Oneota and Plains indigenes took a variety of forms. To better understand how various environmental and cultural factors may have informed the decision-making process with regard to inter-group interaction, four sites along this western Oneota periphery were selected for analysis: Shea and Sprunk in eastern North Dakota, White Rock in north-central Kansas, and Dixon in northwest Iowa. The evidence for both inter-group contact and site function is evaluated and compared across these four sites, and ultimately synthesized with existing knowledge and theories of Oneota interaction. It is suggested that Oneota social relations may have been partially dependent on whether other groups were in competition for a similar resource base; this process allowed a relationship between Oneota and Psinomani peoples to flourish, while minimizing the possibility of positive relations with Central Plains Tradition peoples. This hypothesis offers directions for future research, including the extent of the relationship between Oneota and Psinomani peoples and the movement of commodities from western Oneota outposts to the Great Lakes and Upper Midwest regions often viewed as the Oneota heartland.

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Table of Contents

Chapter Page

List of Tables

List of Figures

Figure Page

Chapter 1: Introduction

Beginning roughly AD 1000, people whose material culture archaeologists identify as Oneota rapidly expanded across the midcontinent from their Upper Mississippi origins, their presence recorded in sites as far west as central Kansas and as far north as Manitoba (Gibbon 1995; Henning 2007; Michlovic and Holley 2010). As Oneota culture expanded, Oneota groups on the frontiers engaged with extant populations in a number of ways; this thesis concerns itself with variations in how Oneota influence or contact manifests across the western periphery of the Oneota culture. In particular, I am interested in Oneota movement into the Central Plains as well as the presence of Oneota artifacts and motifs in the Northeastern Plains.

To explore variation along the Oneota western frontier, I have selected four sites for further investigation: the White Rock (14JW1) site in north-central Kansas, the Shea (32CS101) and Sprunk (32CS4478) sites on the Maple River in southeastern North Dakota, and the Dixon (13WD8) site of western Iowa (Figure 1.1). Using published data from these sites, I undertook quantitative analyses, focusing on variations in the lithic toolkit, the abundance and diversity of faunal and botanical remains, the different permutations of surface treatment, temper, and decorative motif on ceramic artifacts, the presence of distinctive artifact types such as catlinite pipes, and the evidence for seasonality or multiple occupations at each site. The purpose of the quantitative analyses is to isolate particular factors that may be structuring the data from these four sites, and then tie those variables to the human behavior they represent. Quantitative analyses are synthesized with previous research on Late Prehistoric peoples of the Central and Northeastern Plains, with the ultimate goal of exploring variation in Oneota interaction with other groups, and how that variation impacts our understanding of Oneota social strategies and relations with other cultures, such as the Central Plains Tradition (CPT) and Northeastern Plains

Village (NEPV) people. Data relating to subsistence and the range of activities carried out at each site clarifies factors that could have influenced the decision-making process regarding group interaction.

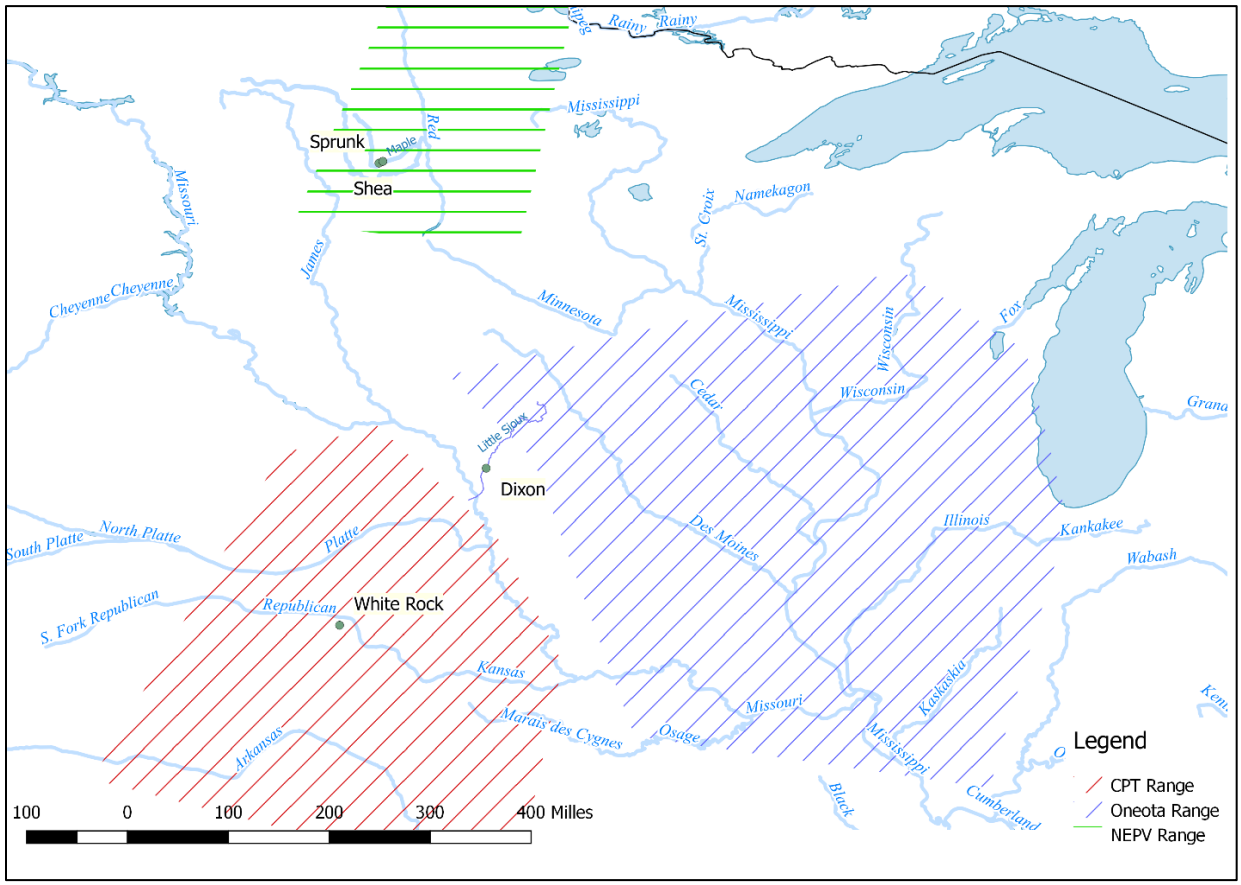

Figure 1.1: Location of the Shea, Sprunk, Dixon, and White Rock sites relative to Central Plains Tradition (CPT), Northeastern Plains Village (NEPV), and Oneota ranges.

In this thesis I follow Henning in conceiving of Oneota as a "loose aggregate of 'related' bands" (Henning 2007:72) who likely shared a language and were able to communicate and interact with one another. Oneota sites are generally identified based on the distinctive ceramic technology: shell-tempered globular pots with straight to slightly everted rims, bearing incised lines and punctate decorations on the upper body and shoulders. Ceramic motifs vary across

time and space, but chevrons and punctate-filled zones delineated by vertical lines are common. Although Oneota ceramics are the most readily identified artifacts, Oneota represents "an entirely new approach to living" (Henning 2007:72). Larger village sizes, an increased emphasis on maize agriculture, and the growing importance of bison as a source of meat, hides, and tools all mark the departure of Oneota lifeways from the Late Woodland groups in which Oneota culture was rooted (Theler and Boszhardt 2006). Although lithic raw materials and the movement of bison bone tools suggest sustained contact between far-flung Oneota groups, there is no evidence to support the idea that Oneota were beholden to a central authority. Interaction between Oneota groups was likely facilitated by shared language and cosmologies as well as extended kin ties, not membership in a political entity of any kind.

Time and Space

For the purposes of this thesis, the Central Plains corresponds to the subarea of the Great Plains identified as such by Willey and Phillips (1958): Nebraska, Kansas, and eastern Colorado, as well as Iowa's Loess Hills. The Northeastern Plains subarea, originally defined as the Northeastern Periphery (Wedel 1961) consists of eastern North Dakota and South Dakota, western Minnesota, northwest Iowa, southwestern Manitoba and southeastern Saskatchewan. Archaeologists have suggested that in the Central Plains there is evidence to support long distance bison hunting and immigration by Oneota groups (Ritterbush and Logan 2000). In the Northeastern Plains region, however, our understanding of Oneota influence and interaction is less refined. The use of the Dixon Oneota site for comparison makes sense because not only were occupations at that site roughly contemporaneous with those of the other case study sites, the Dixon site provides an example of a site that adheres to a "western Oneota" (Henning 1998:238) or "prairie Oneota" (Gibbon 1995:189) pattern. A greater reliance on bison hunting,

evidence of large-scale population movement or even seasonal abandonment to engage in bison hunting, and greater influences from nearby Plains cultures, such as the increased use of bell-shaped storage pits as opposed to the bowl shaped pits of more eastern Oneota peoples and the higher incidence of side-notched projectile points (Alex 2000:205; Fishel 1999) all typify western Oneota and occur at the Dixon site.

While there are reliable data to suggest general facts about subsistence strategy and settlement patterning, the extent and nature of Oneota interaction with peoples of the Central and Northeastern Plains are largely unknown, particularly during the early period of Oneota expansion westward. This thesis confines itself to the time period between Oneota entry into the Northeast and Central Plains (roughly AD 1250-1300) and the secondary movement of Oneota peoples into the Plains/Prairie ecotone around AD 1500, in part because the social milieu of the 16th century onwards is informed not only by the social interactions I wish to study, but a host of other processes, including the coalescence of groups into the antecedents of historic tribes and the first impacts of European contact. There is limited chronological overlap (Figure 1.2) between the sites chosen for analysis.

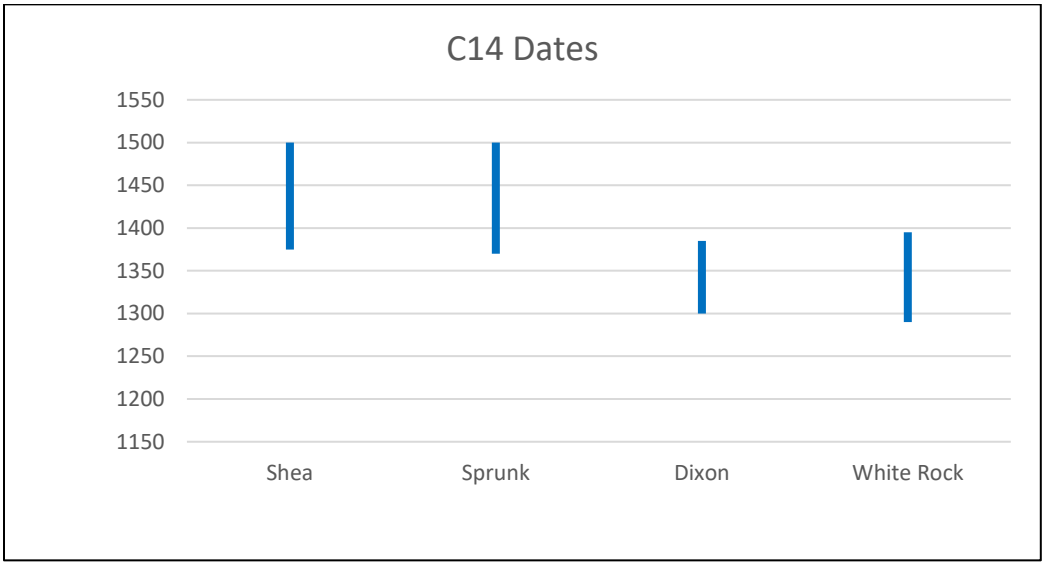

Figure 1.2: Radiocarbon dates (Cal. AD) for Shea, Sprunk, Dixon, White Rock. Dates presented as two SE, 95% confidence interval. (Anderson 2019; Logan 2010b; Michlovic and Holley 2009; Michlovic and Schneider 1988).

Interpretive Framework

This thesis follows an inductive mode of inquiry. Rather than testing a particular hypothesis, the intent is to analyze and compare all four sites and formulate an explanation for the similarities and differences based on that comparison. That said, induction is a dangerous process in a vacuum; without any reference to existing paradigms there is little to ground one's thinking, and no way to know when a project has ended or even necessarily reached valuable insights.

Results are examined through the lens of Benn (1989) and Gibbon (1995), with the understanding that their respective models represent a starting point from which to launch my own inquiry as well as offering guidance for future research. In brief, Benn (1989) focuses on Oneota as an aggressive, inherently expansionist culture, in which hegemonic expansion and the maintenance of the social order are interdependent. Leaders of kin groups direct the daily labor

of their kin, securing access to resources and prestige—their dominance is continually reproduced and perpetuated through the use of stylized bird or hawk motifs as well as martial iconography. Prestige derives from martial and hunting exploits, which also offer an opportunity to impress this mode of production and belief system onto other groups. This model posits the spread of Oneota material culture as the results of forced assimilation and fission as kin groups break away to establish their own settlements.

Gibbon posits three models and associated avenues of inquiry for understanding Oneota social interaction, particularly on the Northeastern Plains (Gibbon 1995). In brief, these are trade systems, power and political networking, and ethnic boundaries. In the first model, the Oneota interaction with other groups is driven by the need to acquire resources such as food and raw materials. The Oneota were ideally positioned along the Prairie Peninsula to serve as middlemen for trade networks extending both east and west. A trade systems model can be explored through the identification of trade goods as well as trade centers at which different cultures aggregated. The power and political networking model posits that interaction with other groups was a way not only to acquire goods and resources but also forge relationships with other groups and perhaps create imbalances in exchange that would leave others indebted to Oneota leaders. Exploring this model, according to Gibbon, would involve seeking evidence for not only trade goods but the elaborate rituals that often accompanied exchange of this nature. Finally, Gibbon describes the ethnic boundaries model as one in which the expansion of Oneota culture across the midcontinent is as much an expansion of Oneota identity as it is the movement of Oneota people. Rather than bounded groups moving across the landscape, Oneota sites are the result of people adopting an Oneota lifeway and associated material culture. Exploration of this model would entail looking for evidence of Oneota relationships with other groups, as well as defining

distinctive styles or style provinces that could represent assimilation or adoption of non-Oneota people. This would also involve examining the differences between Oneota sites and looking for practices retained from non-Oneota groups that are perhaps obscured by the larger similarities that the term "Oneota" connotes for some (Gibbon 1995). These models, and their role in Oneota historiography, are further discussed in chapter two. They offer a starting point for interpretation, with the expectation that none of them will fully capture the nuances of Oneota relations.

Chapter 2: Background and Literature Review

Oneota Chronology

While the exact origins of Oneota people are not clear, the archaeological evidence suggests the earliest Oneota sites with distinctive ceramics and other material culture are found in the Driftless Area of Wisconsin, dating to AD 1050 (Boszhardt and Theler 2006). The precise events that precipitated the appearance of Oneota in the Upper Midwest—whether it represents an external invasion, a transformation of Late Woodland cultures, the amalgamation of Middle Mississippian and Late Woodland traits, or some combination of all these factors—are still the subject of much debate. What is clear, however, is that by AD 1150 groups and villages had begun to form populated by people whose practices differed substantially from their Late Woodland predecessors (Boszhardt and Theler 2006). These people subsisted on maize agriculture to a much greater degree than before, supplemented with all the resources of the Mississippi floodplains and with bison procured in hunting expeditions. They produced globular shell-tempered jars with incised upper bodies, and they lived in more permanent villages. Between AD 1150 and European contact, people sharing at least some aspects of this material culture were found across the midcontinent and fall under the broad archaeological designation of Oneota.

There are three localities recognized as central to Oneota ethnogenesis: southeastern Wisconsin near Lake Koshknong, northeastern Illinois near Lake Michigan, and southeastern Minnesota in the Red Wing area. In all of these areas, early Oneota artifacts are commingled with Middle Mississippian and Late Woodland artifacts. Though there is a simplistic formula that has been applied to Oneota—roughly, that Late Woodland people adopting Middle Mississippian influences results in Oneota—this does not reflect the complicated realities of

Oneota ethnogenesis nor does it align with the radiocarbon dates (Schirmer 2016). Rather than viewing Oneota as an extension of Middle Mississippian culture, it has been suggested that the Oneota lifeway emerged as a response to resource shortages and the stresses of the Pacific Climatic Episode (Gibbon 1995; Theler and Boszhardt 2006). From this perspective, Oneota culture has its roots in the Late Woodland peoples of the upper Midwest and Great Lakes regions. Although Oneota sites without evidence of Middle Mississippian or Late Woodland presence date to AD 1150, the radiocarbon dates of sites yielding a variety of Oneota pottery types suggest that this transformation was not something experienced by a single group. Instead, different Oneota ceramic types—such as Blue Earth and Bartron— have divergent appearances despite their contemporaneity (Schirmer 2016). This reinforces the idea that Oneota does not represent one single "group" but is instead the archaeological signature of a number of Siouan speaking peoples (Schirmer 2016). Broadly similar worldviews and the accompanying consistency of ceramics across the Oneota world are a legacy of the common roots of different Oneota groups, which also would have facilitated easy interaction and exchange between Oneota groups.

By AD 1150, there was a concentration of Oneota sites near present-day Red Wing, Minnesota on the northern edge of the Driftless Area along the Upper Mississippi River (Boszhardt and Theler 2006). While there is evidence of significant contact with Middle Mississippian influences during this time period, by AD 1250 Oneota traits have fully supplanted the Middle Mississippian attributes, and we begin to see Oneota sites in the Blue Earth River area of south-central Minnesota. Driven by the pull factor of bison (Ritterbush and Logan 2000), the violence that was becoming increasingly rampant in the densely populated Upper Mississippi region (Hollinger 2018), or some combination thereof, Oneota groups continued

pushing westwards, eventually reaching the Blue Earth River by ~1300 AD. The Blue Earth phase, as the occupation of that region is known, is marked by ceramic motifs of nested chevrons that closely match those of the earliest Oneota sites on the Little Sioux River in Iowa (Fishel 1999: 77). It was long believed that the Blue Earth phase represented an abandonment and subsequent westward movement from the Red Wing locality. However, more recent radiocarbon dates (Schirmer 2016) suggest that Red Wing locality sites were occupied contemporaneously with Blue Earth phase sites.

As Oneota groups entered central and southern Minnesota, they were not traveling through an empty territory. From AD 1100-1750, the lakes and woodlands of central Minnesota were inhabited by members of the Psinomani complex. Much like Oneota, Psinomani (from the Dakota word for "wild rice gatherers") is an archaeological complex, and so historic period sites that are affiliated with the Psinomani complex are more often identified with historic tribes, particularly the Mdewakanton Dakota in central Minnesota (Arzigian 2008: 126).

Psinomani sites are identified on the basis of small triangular points as well as their ceramic assemblage. Ceramics typical of Psinomani sites include shell-tempered, cord-marked Sandy Lake wares as well as Ogechie ceramics, sometimes identified as a local variant of Oneota ceramics. Pottery bearing a resemblance to both Oneota and Sandy Lake wares is not uncommon, and is often referred to as "sandyota". As the name would suggest, Psinomani peoples are believed to have relied on wild rice among other wild resources. Hunting bison, gathering wild rice, and exploiting aquatic resources of both riverine and lacustrine environments, archaeological evidence for Psinomani ranges from the Red River valley of North Dakota to the St. Croix River in the east, and north up to the Rainy River. Although some corn has been recovered from Psinomani sites, there is no evidence of storage pits or artifacts that

would reflect a major reliance on agriculture such as the Oneota or Middle Missouri peoples practiced (Arzigian 2008:127).

The Oneota sites of northwest Iowa, largely restricted to the Little Sioux River and the Iowa Great Lakes, are not the earliest Oneota sites in Iowa. The Moingona phase sites, clustered in the central Des Moines River valley, date as early as AD 1250. Interestingly, there are similarities between the Blue Earth, Correctionville, and Moingona ceramics. Nested chevrons are ubiquitous in the ceramic assemblages from early Iowa Oneota sites (Fishel 1999). It is possible that this reflects continuity from the Blue Earth phase to Moingona and Correctionville-phase sites; the Blue Earth River valley would be a natural point of divergence to either continue southward along the Des Moines River or head west towards the Northeastern Plains, an explanation that seems to track with the archaeological evidence and radiocarbon dates (Figure 2.1).

As the Oneota moved into northwest Iowa, they occupied three primary areas along the Little Sioux River; the Correctionville locality, Cherokee locality, and the Iowa Great Lakes. Correctionville, farthest south along the Little Sioux River, was occupied earliest. Given the hypothesis that Oneota groups in northwest Iowa were arriving from the Blue Earth River valley, the fact that the earliest sites along the Little Sioux are those farthest south seems counterintuitive but based on current research that is the case.

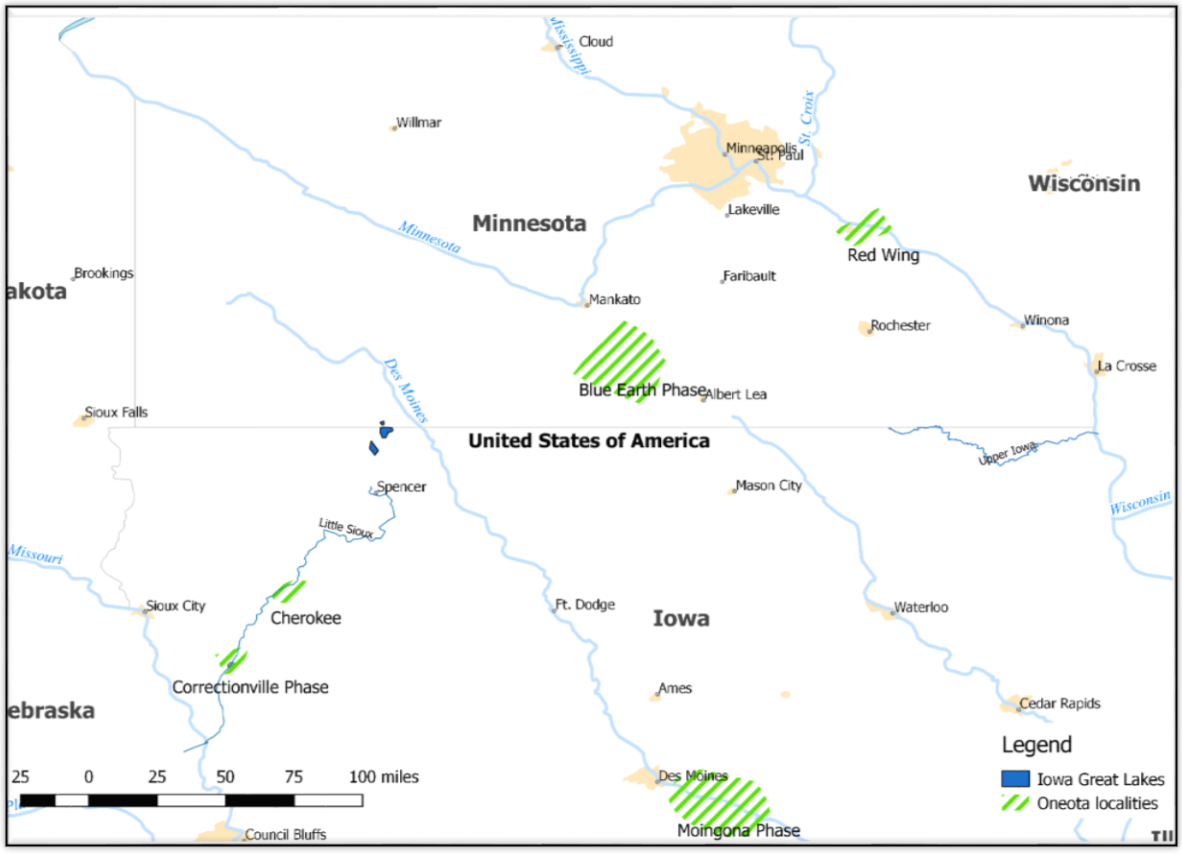

Figure 2.1: Oneota localities of northern Iowa and southern Minnesota.

Recent excavations at the Dixon site (Anderson 2019) demonstrate that within a 50-year span, ceramics of types attributed to both late and early Oneota occupation of the Correctionville locality were deposited by site inhabitants. Tighter radiocarbon dates (Anderson 2019;Fishel 1999;Logan 2010) and this demonstration of the limits of the Correctionville-phase ceramics for cross-dating purposes cast some doubt over the sequence of events and movement of people within the Correctionville locality, but by the sixteenth century AD Oneota occupation of the Correctionville locality had ended, with people inhabiting areas farther north up the Little Sioux River towards the contact period sites of Gillett Grove and Milford. After European contact, there are no "Oneota" people in the Midwest; rather, the tradition garners its name from an

archaic name for what is now the Upper Iowa River in northeast Iowa (Figure 2.1). Those people whom we identify as Oneota in the archaeological record are known by other names in the historical records of early contact; likely the Ioway, Oto, Missouria, and a host of other Siouan-speaking peoples could at some point in their history be subsumed under the archaeological culture of "Oneota" (Betts 2015).

For much of the 20th century, the Oneota timeline was divided into Emergent, Developmental, and Classic Horizons, with the underlying implication that these horizons reflected a progression towards people who were "more Oneota" than those before (Fishel 1999:118), hence the distinction between "Emergent" and "Classic." The horizons provided a scaffold on which to build an understanding of Oneota chronology. However, the number of groups participating in the Oneota tradition and the spatial distribution of those groups means that the horizons do not apply equally across time and space (Fishel 1999). Because of these complications, I do not use *horizons* as a chronological or cultural marker in this thesis. When *phases* are described, it is as both cultural and chronological markers, based on the assumption that the sites contributing to a particular archaeological phase were formed by the same, or related, group of people.

To summarize, Oneota, likely traveling from eastern Minnesota, eventually arrive in northwestern Iowa by AD 1300 and inhabit the Correctionville locality until AD 1500, leaving Oneota communities in their wake in the Blue Earth River valley (Blue Earth phase) and perhaps Des Moines River valley as well (Moingona phase). It was during the early years of this period of westward movement that the Dixon site was populated, and Oneota culture began making its influence known on the Central and Northeastern Plains of North America. For reasons that

remain unclear, the long-term westward migration of Oneota groups that had characterized the previous two centuries seems to have ended as the Oneota reached the plains-prairie ecotone.

The apparent end of western Oneota movement left in its wake a string of villages and activity sites that connected Oneota people across the wide geographic range of that culture—sites in the Blue Earth River valley and the Red Wing locality were occupied well into the fifteenth century (Schirmer 2016), and Red Wing in particular likely functioned as a gathering place for different Oneota groups (Henning 2007). Further north in Minnesota, the evidence for long-term Oneota presence is thin at best (Michlovic and Holley 2010). Instead, the lakes, rivers, and forests of northern Minnesota were occupied largely by Psinomani groups (Arzigian 2008), who harvested wild rice along the rivers and lakes. Westward towards the Red River and the Plains, Psinomani sites display a higher focus on bison, deer, and elk than on plant products; the reverse is true for Psinomani sites located along the major tributaries of the Mississippi and the lakes of central Minnesota, where wild rice seems to have held a high importance. Taken together, this suggests a seasonal occupation pattern by Psinomani people, regional specializations within Psinomani groups, or a combination of these factors (Arzigian 2008).

Oneota on the Northeastern Plains

Though Oneota and Oneota-like ceramics have been recognized in site assemblages from the Northeastern Plains, the nature of interaction between Oneota-affiliated groups and the local NEPV inhabitants remains unclear (Michlovic and Holley 2010:13). This is doubtless a reflection of both the archaeological record and the history of archaeological investigations in the region. At terminal Late Woodland/Late Prehistoric Minnesota sites of the lake-forest region there is certainly evidence suggesting Oneota presence, particularly in conjunction with Sandy Lake wares, but due to the distance from the largely-accepted Oneota heartland the ceramics at

these sites are assigned to an Ogechie, or "northern Oneota," type rather than Oneota proper (Anfinson 1979: 143; Gibbon 2012:189). The frequent association of Oneota ceramics with Sandy Lake ceramics in Minnesota led to the portmanteau "Sandyota" as an indicator of the apparently close relations between these two cultures (Arzigian 2008:132), as well as the suggestion that Psinomani people responsible for Sandy Lake ceramics may have been a Siouan-speaking people who shared a common language with Oneota groups (Michlovic 1983; Gibbon 1995:190).

While there are a number of locations in the Northeastern Plains at which Oneota influence has been tentatively identified (Michlovic and Holley 2010), the Shea and Sprunk sites (Figure 2.2) of southeastern North Dakota offer a particularly interesting test case. The Shea and Sprunk sites, together described as the Shea phase, are both fortified villages located on the Maple River of eastern North Dakota (Michlovic 2008). Their proximity to one another and the assumption that they are manifestations of similar cultural processes allows a more complete understanding of the overall material culture of the Shea phase as it relates to Oneota influence.

In the Northeastern Plains region, Oneota influence is largely inferred from the presence of Oneota ceramic motifs incorporated into local pottery types. In some instances, vessels that are constructed in the classic Oneota style—globular, shell tempered jars with rounded bottoms and incised designs around the shoulders—are also recovered from contexts in the Northeastern Plains (Gibbon 2012:169). The degree of Oneota influence seems to follow a clinal distribution, decreasing rapidly with distance from the Red River, which perhaps offers insight into how Oneota groups were navigating the Northeastern Plains.

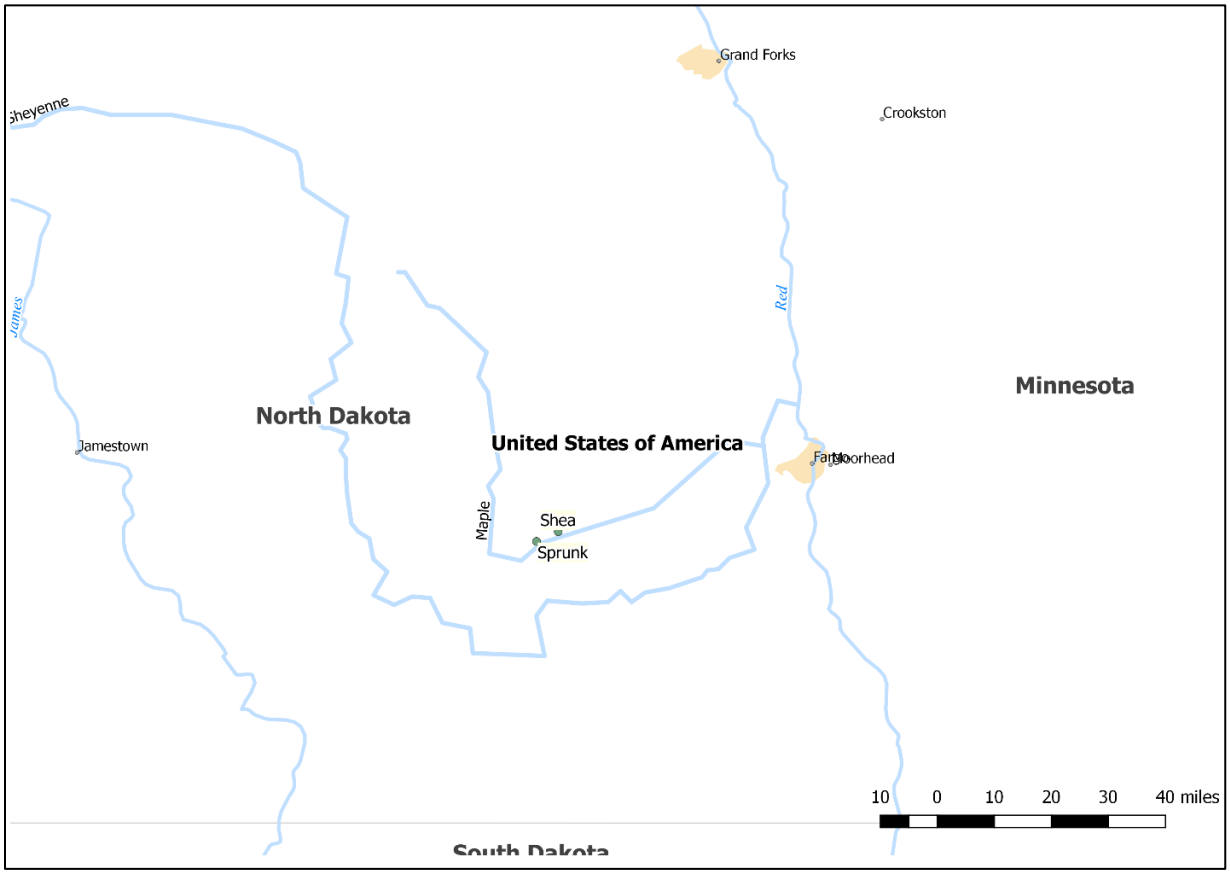

Figure 2.2: Location of Shea and Sprunk sites on Maple River.

The ceramics from sites along the Red River and its tributaries seem to bear the strongest resemblance to typical Oneota material culture, while those further in the interior of the Dakotas only slightly resemble Oneota ceramics, suggesting that Oneota influence dissipates with distance from the Red River drainage (Michlovic and Holley 2010).

Oneota has been referred to as a "ceramic culture" (Henning 2007), and as such sites are generally recognized through the ceramic assemblage. However, elements of lifestyle and subsistence strategy, as reflected by the lithic and faunal assemblage, also give some indication of the degree to which Oneota culture may have influenced people who were part of the NEPV tradition. For example, in discussion of the Shea site, Gibbon opines that it "has the 'feel' of an

Oneota adaptation" (Gibbon 1995:186-187) noting that all the material evidence, from unnotched triangular points to bison scapula hoes to red pipestone fragments to the apparent use (if not necessarily cultivation) of maize, conform to the Oneota pattern. In their analysis of the Shea site, Michlovic and Schneider (1988, 1993) indicate that much of the material culture bears a strong Oneota flavor, though the fortification of this site is incongruent with the normally unfortified Oneota sites. This should not be taken as an assertion that Shea or Sprunk are Oneota sites, merely that there are similarities.

Of course, the Northeastern Plains were more than an empty stage awaiting Oneota influence. Between AD 1200 and AD 1700, members of the Northeastern Plains Village tradition (NEPV) operated in the Northeastern Plains area as semi-nomadic hunter gatherers (Toom 2004). The origin of the NEPV tradition and their relations with other nearby peoples are not well understood, partially because of their limited archaeological footprint relative to their more sedentary contemporaries. Rather than practicing intensive horticulture like the Middle Missouri or Oneota, NEPV groups were more focused on hunting and wild resources. Ceramics are limited in number at NEPV sites, perhaps reflecting the lower importance of stored provisions, but where they do occur they are grit-tempered, globular pots, often cordmarked or stamped (Toom 2004).

Oneota on the Central Plains

There is abundant archaeological evidence to indicate the presence of Oneota people in the Central Plains as early as AD 1350 (Henning 1998, 2007; Ritterbush 2002). While there are conflicting theories as to the nature of that presence (Henning 2007; Logan 2010a), a growing body of literature (Pugh 2010; Ritterbush 2002) suggests that the Oneota engaged in some

combination of long-distance bison hunting or permanent migration into the Central Plains region between AD 1350 and AD 1450 (Logan 2010).

The Leary site (25RH1) provides strong evidence for an established Oneota presence in southeast Nebraska during the Late Prehistoric period. From first discovery of the Leary site, it was considered anomalous, an Oneota site west of the Missouri River and far from the accepted Oneota heartland. Multiple archaeologists undertook excavations at the Leary site and came away with the same impression; this site was unmistakably Oneota, from the ceramics to the spatial arrangement of the dwelling spaces (Logan and Ritterbush 2000; Ritterbush 2002). While it was accepted that the Leary site represented a genuine Oneota occupation, other sites in the Central Plains were described as "Oneota-like" or having possible Oneota components, without designation as Oneota (Logan 1995).

Among those "Oneota-like" sites is the White Rock site (Figure 2.3), the type site for the White Rock phase (Logan 1995). Originally interpreted as a historic or protohistoric site because of its clear deviation from the subsistence strategy and layout of Central Plains tradition villages, later work suggested that this site dated before the 15th century (Logan 1995). Rather than a diffuse economy, with broad reliance on fauna, opportunistic gathering and some horticulture, the White Rock site shows all the hallmarks of an Oneota site with a focus on bison hunting. In addition to Walnut Decorated Lip ceramics, which bear a strong resemblance to Correctionville-phase Oneota pottery, indicators of an Oneota presence are the abundant storage pits on the site, the evidence for corn horticulture, and the similarities between the White Rock lithic toolkit and that of other western Oneota sites. Other White Rock phase sites are smaller than White Rock itself and have not been extensively investigated; they are identified based on the presence of Walnut Decorated Lip pottery and may represent satellite hunting camps

(Blakeslee 2001). Rather than attribute the similarity to CPT people who have adopted elements of Oneota material culture, Logan characterizes White Rock phase sites as Oneota (Logan 1998; Ritterbush and Logan 2000; Ritterbush and Padilla 2005).

Even accepting that White Rock phase sites were inhabited by people who would identify themselves more closely with the Oneota of western Iowa or Missouri than with any groups native to the Central Plains region, there remains a question of whether these people were engaged in long-distance bison hunting, involving temporary forays into the Central Plains before returning to points of origin further east, or whether they remained in the area on a more permanent basis. Logan and Ritterbush contend (Logan 1998; Logan and Ritterbush 2000; Ritterbush 2007) that the White Rock site is best understood as evidence of migration, an argument based on the lithic procurement strategies and archaeological evidence of horticulture. The lithic raw materials are almost exclusively Central Plains-derived, including Florence cherts and Niobrara jasper. Logan and Ritterbush suggest that a group of people making an annual or seasonal journey from points east onto the Central Plains would bring tools made from raw materials found closer to their point of origin.

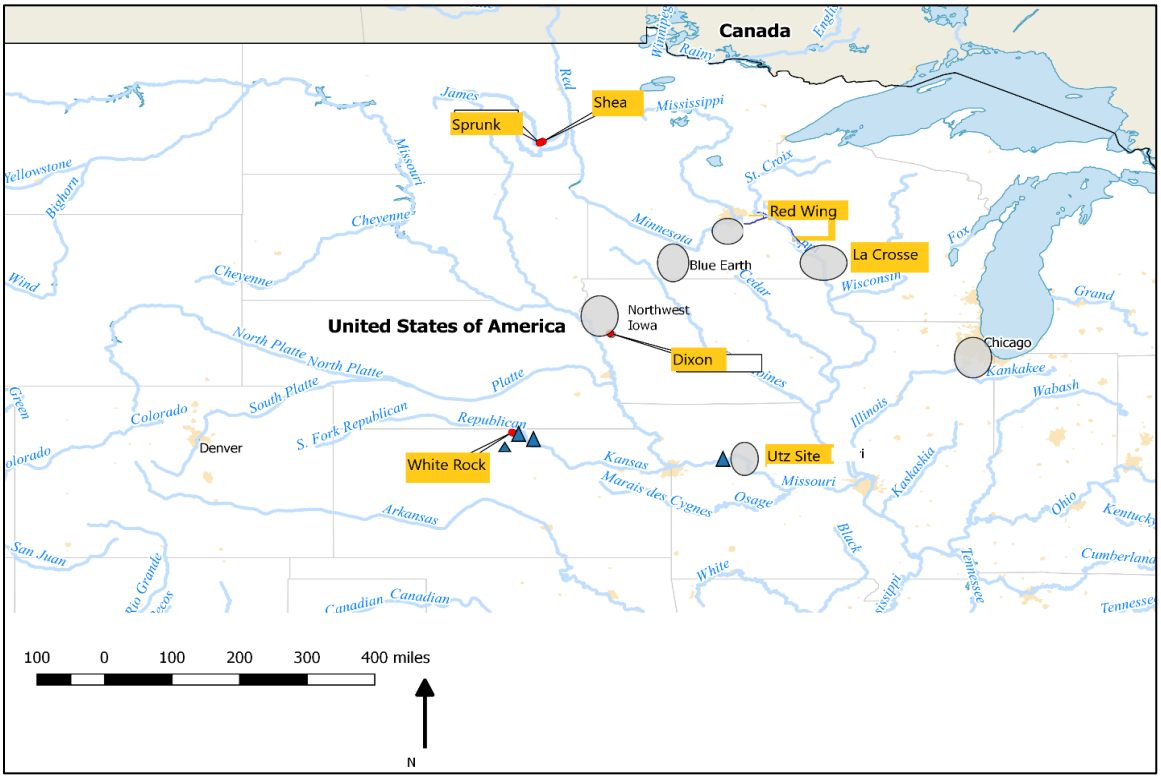

Figure 2.3: Oneota localities (shaded areas) and Western Oneota sites (triangles)

The absence of cherts from Iowa, Missouri, or Minnesota suggest that the White Rock inhabitants were not travelling back and forth between the Lovewell Reservoir area and points east. Ritterbush and Logan (2000:265) further contend that "it is difficult to imagine temporary occupation in association with gardening," citing charred corn kernels, squash knives, and bison scapula hoes as evidence that cultivation was occurring year round. However, this archaeological evidence does not rule out the possibility that only some people were involved with cultivation while others left to engage in other resource-gathering activities.

While western Oneota sites are positively linked to their eastern counterparts through ceramic material culture, an increase in the use of beveled knives and scrapers reflects rapid adaptation to a new set of resources available on the Plains and a greater emphasis on intensive bison processing relative to more easterly Oneota manifestations (Ritterbush and Padilla 2005).

This new process also contrasts with the subsistence strategy of CPT groups already living on the Central Plains, who had a much more diffuse economy that relied on a variety of wild plants and game that could be associated with the nearby environment (Ritterbush 2002:262). CPT groups practiced a subsistence strategy reliant on exploitation of locally available resources, venturing from their substantial earthlodges to procure a diverse array of flora and fauna. Western Oneota lifeways contrast sharply with those of CPT people, as evidenced by the greater focus on bison procurement and the lack of structures as permanent or labor-intensive as those of their CPT counterparts.

In their migration hypothesis, Logan and Ritterbush (2000) focus on bison as a pull factor, and link the movement of people to the Central Plains as not only a viable subsistence strategy but an opportunity to gain prestige and political or economic power from access to bison products such as meat, hides, and the scapula hoes that abound in Oneota assemblages farther east (Ritterbush and Logan 2000). This interpretation draws from a theoretical viewpoint that characterizes the Oneota as a rapidly expanding, aggressive population with strong social cohesion and the ability to force less organized groups out of their territory. The "Oneota as conquerors" theory springs largely from Benn (1989). In this work, he argues that the Oneota were able to successfully co-opt Middle Mississippian iconography to support their own class structure and mode of production. Although there is no suggestion that the Oneota were participants in a political system with centralized government as seen in Cahokia, there was still sufficient stratification that access to new resources or valuable territory may have been a way to gain social status and prestige (Benn 1995:128).

Benn's model further informs the idea of Oneota migration into the Central Plains by setting up comparisons between Oneota expansion into the Upper Midwest, into territory occupied by Late Woodland groups, and the Oneota movement into the Central Plains. The greater social cohesion, organization, and large population of Oneota groups meant that they were able to out-compete and ultimately either assimilate or force out Late Woodland groups, occupying their former territory and supplanting their material culture with distinctive Oneota sites. Ritterbush (2002:264) draws a comparison between these Late Woodland people and the CPT village people, noting that many of the same factors— a more organized social group, larger population size, and an aggressive ideology encoded in Hawkman iconography—may have shaped the expansion of Oneota groups into the Central Plains. It is still not entirely clear that there was ever any direct interaction between CPT people and the Oneota; there are Central Plains ceramics and Oneota ceramics at Leary, but they are interpreted as the result of sequential, not simultaneous, occupations (Ritterbush 2007). Even in other Central Plains Oneota sites, there is little evidence of interaction with CPT groups (Pugh 2010).

In the historiography of western Oneota, then, it is clear that there are definite trends: 1) a focus on bison; 2) a model that relies on migration and population influx to supplant local peoples, rather than a model of diffusion or information exchange; and 3) a willingness to link Oneota practices to those of the historic Plains tribes. This last is not difficult to understand as the Oneota remain a likely ancestor to many historic tribal groups, from the Otoe and Ioway to the Kansa (Betts 2015). Later sites, such as Blood Run, have helped to affirm these connections, and the interpretation of Oneota in the Plains as progenitors of those historic traditions does make for a rather streamlined story (Betts 2015:131). However, this becomes more complex as one moves up the Missouri River drainage.

While there are similarities, in some respects the western Oneota lifestyle stands in stark contrast to that of the Middle Missouri tradition cultures, as well as their forebears, the Mill Creek people (Alex 2000:169). Rather than evidence of permanent earthlodge homes and intensive floodplain agriculture, the western Oneota settlement pattern is more characterized by large villages with little material evidence of permanent structures, suggesting a higher level of mobility than the Middle Missouri or Mill Creek cultures practiced. Mill Creek material culture, restricted almost entirely to northwest Iowa, shows all the signs of an agricultural adaptation with a need to defend their villages and arable land as fortifications increase dramatically during the AD 1100-1200 period, coinciding with the arrival of Oneota peoples in the region. Because of this timing, it has been suggested that the Mill Creek peoples eventually left northwest Iowa because of pressure from the encroaching Oneota (Alex 2000:157), moving up the Missouri River where they would become the Over Phase of the Middle Missouri tradition.

This interpretation of a competitive if not outright hostile relationship between Oneota and Mill Creek peoples works well with the assertion that Mill Creek peoples are directly ancestral to the Initial Middle Missouri Variant (IMMV) groups (Anderson 1987). Oneota interaction with the peoples of the Initial Middle Missouri was either nonexistent or archaeologically invisible. Per Henning (1998:240), "if they were contemporaries, they practiced rather strict avoidance." Oneota influence on Middle Missouri region cultures is not prominent until the Initial Coalescent cultures of the 15th century onwards (Henning 2007).

While Middle Missouri tradition peoples had their roots in Mill Creek of northwest Iowa (and by extension, the Late Woodland cultures of the Middle Missouri region), the Coalescent variant represents an influx of Central Plains Village tradition people into the region, identified more strongly with Caddoan speaking groups (Benn 1989; Henning 2007;75). Oneota influences

become much more noticeable on Coalescent sites, such as Arzberger and Sully, (George Holley 2018, personal communication; Fox 1980) perhaps as a result of many of the same factors that ultimately led to the coalescence of Plains cultures into historically-known groups. Interestingly, descendant communities linked to Oneota are unanimously Siouan-speaking groups, suggesting that the relationship between Oneota and Coalescent groups was not based solely on language (Betts 2015).

To summarize, a review of the literature surrounding Oneota manifestations on the western periphery of that culture reveals wide variability in Oneota peoples' relationships with other cultures from the 14th through 16th centuries. From settlements in the Central Plains suggesting minimal though friendly interaction with local groups, to the near-total avoidance of Middle Missouri and Mill Creek groups, to the hybridization of styles that occurred at sites where Oneota interacted with other groups in the Northeastern Plains, there is no single model that best describes how Oneota moved into new territory and related to their new neighbors. If anything, the evidence suggests that Oneota social strategies were historically contingent, and may have been governed not only by material needs but by complex social networks and linguistic and ideological factors.

The Dixon Oneota Site and Western Oneota

Based on the ceramic and lithic assemblage as well as radiocarbon dates (Ritterbush and Logan 2000) there is a credible argument that the occupants of the Dixon Site (13WD8) had strong ties to Central Plains Oneota sites. The Dixon Oneota site is located on the Little Sioux River in western Iowa, south of the town of Anthon. Situated in the northwest corner of the Southern Iowa Drift Plain, 13WD8 is a Correctionville-phase Oneota village. Radiocarbon dates cluster around AD 1350, with the most recent radiocarbon dates suggesting an occupation period

of roughly 50 years between AD 1320 and AD 1370 (Anderson 2019). The site rests on the southern bank of the old river course, though artificial straightening of the river in 1912 cut a channel through the middle of the site. As a result, major portions of the site are doubtless under the river or washed downstream. The artificial channelizing also created the potential for cutbank erosion and exposed significant portions of the site profile to both the elements and pothunters, whose activities at the Dixon site are well documented in even the earliest professional investigations (Fishel 1999:6).

The putative connection between the Dixon Oneota site and Central Plains Oneota manifestation is based largely on the lithic assemblage. While locally available Tongue River silica is used throughout the site, more than 20% of the chipped stone tool assemblage is made from Florence cherts deriving from the Central Plains (Fishel 1999:59) and other exotic raw materials abound in the assemblage, with a total of 27 raw materials being used for chipped stone tools (Fishel 1999:59). The reliance on Florence cherts is striking considering that the White Rock site shows a similar preference for Florence and is near the procurement area for that resource (Figure 2.4) (Ritterbush and Logan 2002). However, more recent excavations at the Dixon Site (Anderson 2019) suggest that this understanding of the lithic assemblage may not be an accurate reflection of the actual material on-site, and new information may alter this considerably (see “Lithic Artifacts” in Chapter IV, below)

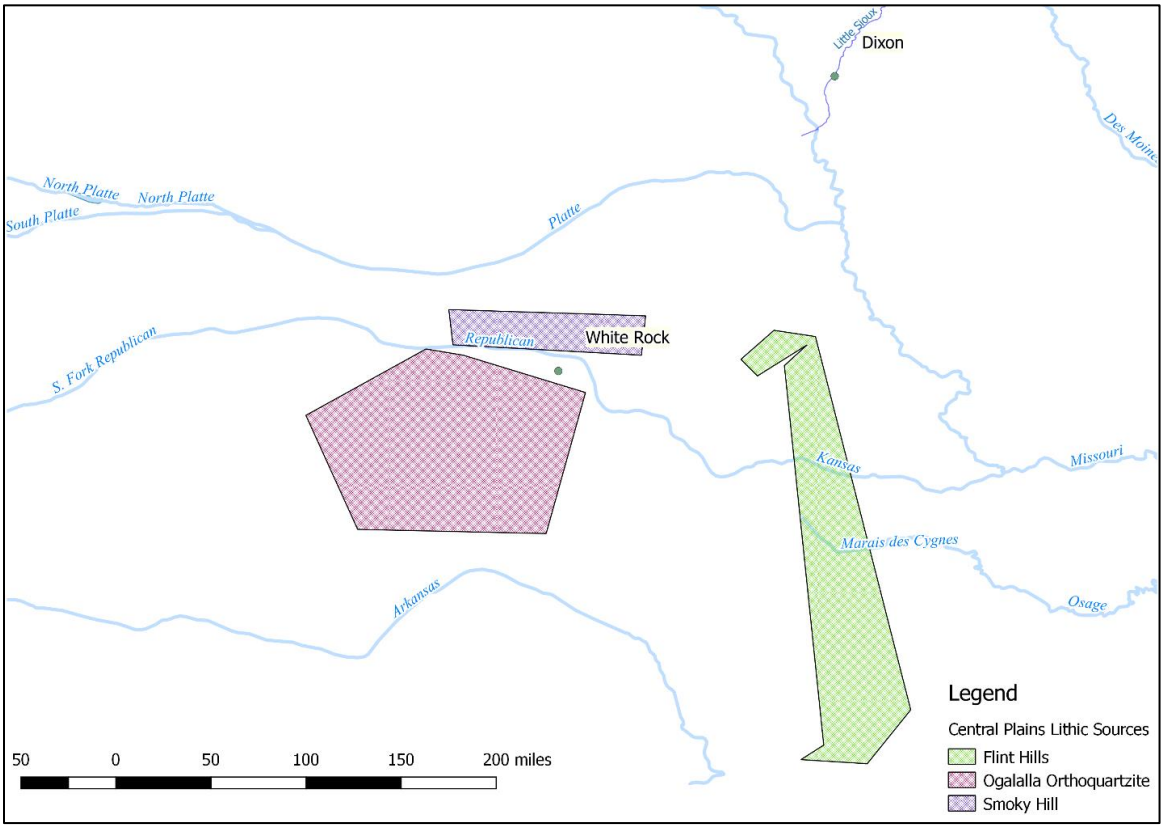

Figure 2.4: Sources of Central Plains lithic raw materials found at White Rock and Dixon.

The high quantity of Central Plains lithic materials from the Dixon site suggests strong connections to that region, while yielding no material culture that can be definitively attributed to trade or interaction with CPT peoples. Instead, the procurement of Central Plains raw materials is interpreted as the result of forays into the Central Plains or trade with the White Rock phase inhabitants (Henning 1998:241). The Leary site, located on the Big Nemaha River, contains Correctionville-phase ceramics that may indicate contact with the Oneota of northwest Iowa, and stands as a possible waypoint for Oneota people seeking to engage in hunting, trade, or other activities on the Central Plains.

The interpretation of the results from the 1994 excavations at the Dixon site is that the occupants were engaged in long-distance bison hunting in the Central Plains (Fishel 1999).

Fishel (1999) identifies the Leary site as one possible gathering point or locus for this long-range hunting, suggesting that Correctionville-phase people of northwest Iowa could have traveled down the Little Sioux River valley to the juncture with the Missouri, and then down the Missouri River Valley to reach the Leary site. Access to the Leary Site raises the possibility of long-distance bison hunting as an annual or semi-annual event, an interpretation strengthened by signs of periodic abandonment of the Dixon site, such as multiple filling episodes of storage features and the sparse artifactual material found within house floors (Fishel 1999).

Dixon serves as an exemplar of a sort of Western Oneota lifeway: a strong reliance on bison hunting supplemented by maize horticulture, large village sites with scant evidence of permanent structures, and indicators of long-distance relationships with other groups, although the items sourced from distant areas are more often raw materials than finished goods crafted by other groups. The high quantity of Central Plains lithic material recovered in the 1994 excavation suggests ties to that region, an interpretation which is strengthened by the existence of the White Rock phase sites. The more recent 2016-2017 excavations, however, supplement this information with the presence of numerous lithic raw materials that suggest links to the north (Red River jasper), into the Blue Earth River valley (Grand Meadow chert) and deep into the interior of North Dakota (Knife River flint) (Anderson 2019). It is also worth noting that Dixon is part of a longer tradition of Correctionville-phase occupation in the Little Sioux River valley, with Dixon standing as the earliest occupied site and the latest occupation possibly represented by the Bastian site (13CK28) probably abandoned ca AD 1500 (Fishel 1999:125). As discussed above, the relationship between the occupants of later Oneota sites in northwest Iowa and those of the earlier Correctionville-phase sites is unclear with the later sites possibly representing the

descendants of the same group moving up the Little Sioux River, or successive immigration of additional people from Oneota communities in Minnesota or Iowa (Fishel 1999:125).

Additional Sources and Theoretical Approach

To better interpret the results of my analyses, I rely on a number of sources that inform my understanding of Late Prehistoric social dynamics in the Plains and help to better situate my findings. My conception of the Northeastern Plains region during this period draws heavily from the idea of the Co-Influence Sphere (Syms 1977), which "emphasizes the importance of a constant consideration of more than one ethnic group at any season or year in a region. It also emphasizes the need to consider developments taking place outside of the region." The influence of different groups is visible in both positive data, such as the presence of different ceramic types or indicators of interaction, as well as negative data where avoidance of a different group can be inferred. A single group may use different territories for different purposes and engage in distinct activities in particular landscapes, while multiple groups may use a single territory simultaneously, though not necessarily for the same purpose.

Benn's (1989) work on how the Oneota were able to rapidly expand into Late Woodland territories, as well as his 1995 update of this earlier work, have left a lasting impression on Oneota studies, and it is difficult to discuss Oneota social interaction without grappling with Benn's ideas. The argument put forth is that Oneota peoples were able to leverage Middle Mississippian iconography and a strong kin-based social network to expand aggressively through territory of Late Woodland cultures of the Upper Midwest. Benn's interpretation relies on an understanding of Oneota chevron motifs as stylized Hawkman symbols, tied to a warlike, aggressive ideology that fueled the rapid establishment of Oneota settlements in new territory. The 1995 update emphasizes that the kinship-based system, and the transition from Late

Woodland to an Oneota lifestyle, took a dramatically different turn from the more stratified society of Mississippian peoples. Benn takes great pains to incorporate how Oneota expansion would have been gendered and result in different experiences for men and women. He further postulates that with the advent of the Oneota lifestyle gendered labor relations took on a whole new shape, entirely distinct from the gender relations and formal power structures of Mississippian culture. According to Benn (1995:128), "[V]iewing the Oneota culture as being derived from a dominant Mississippian system presumes the presence of a regional political structure and a market system for which there is no evidence among the Oneota."

In light of the many links between Oneota and historic period tribes (Betts 2015; Zedeño and Basaldú 2004), direct historical comparison becomes more applicable. Of course, the intervening centuries between the 14th century and Euro-American contact were not a static time for indigenous cultures, and many of the cultural institutions found in historic tribes likely had their antecedents in the precontact period (Hollinger 2015). In particular, I am interested in the role that exchange and trade played in sustaining social relationships, and the ways in which exchange was facilitated. Trade could occur in different contexts, from the straightforward exchange of commodities to acts of "gift-giving" between kin (Mann 2004). While this included blood relatives, participation in pipe ceremonialism served to create a liminal space in which members of other groups could be considered kin for the purposes of exchange (Anderson 1985; Mann 2004). Exchanged objects were not only economically valuable but helped create and sustain social ties. In this way, social boundaries retained a level of permeability, creating unique spaces in which people from varying identities could be family and engage in gift-giving (Mann 2004). This gives some insight into the multiple roles exchange served in precontact

societies, as well as the fluid nature of kin and identity and the importance of ritual in forming and maintaining social ties.

In modeling Western Oneota social strategies, Gibbon's (1995:170) various explanations for Oneota manifestations on the Northeastern Plains inform my understanding and provide models with which to evaluate research findings and offer directions of inquiry. Gibbon suggests that Oneota influence on the Northeastern Plains is the result of multiple processes, and thus investigating the different social and material dimensions of these processes allows archaeologists to approach the matter from several different angles. These are not mutually exclusive hypotheses, but rather different avenues of investigation, centering on Oneota influence as it pertains to trade, power networking, and the shifting of permeable ethnic boundaries.

Gibbon envisions trade occurring at the intertribal level, somewhat akin to the Middle Missouri system in the early historic northern Plains. There is a recognition in this model that exchanged items have multiple layers of meaning, and that in the context of exchange there is a strong element of ceremony and ritual (Gibbon 1995:190). In this historic context, ritual or ceremonial items may have been traded, but the sedentary peoples of the Middle Missouri also exchanged more mundane goods, such as squash, beans, or maize for the hides and meat offered by more nomadic tribes (Gibbon 1995:190). A research program seeking to investigate this model for Oneota, according to Gibbon, would attempt to source clay and other raw materials of trade goods, identify the exchange centers in the network, and determine what was actually being traded and how trade value impacted the social life of the trade goods (Gibbon 1995:190).

A "network building and political power" approach, on the other hand, does not look for exchange occurring at the intertribal level, but rather as part of a larger strategy by particular kin groups who wish to consolidate power and perpetuate a mode of production in which they are in charge (Benn 1989; Gibbon 1995:191). A research program based on this approach, according to Gibbon, would analyze the Oneota ceramic motifs along the Oneota periphery to determine if they are being used in a manner consistent with Benn's aggressive iconography interpretation, search for evidence of the ceremony and ritual that often accompanies power consolidation, and attempt to better understand Oneota internal social structure.

The final approach Gibbon (1995:192) offers is of "ethnic styles and ethnic boundaries." In this, the evidence of Oneota influence should be investigated not as the material culture of bounded cultural units moving across the landscape and displacing local residents, but instead the product of a growing permeability of social and ethnic boundaries. As new people from different cultures encounter and in turn shape Oneota cultures, these meetings leave their mark on the material culture of both Oneota groups and the local people they encounter. In Gibbon's (1995:192) terms "The materiality of the transformation is visible archaeologically in the shift to new ceramic forms, cemetery burial, new forms of settlement, and a more balanced…subsistence base." A research program seeking to explore the "ethnic styles and boundaries model" would define spatial limits of particular styles, examine how the incorporation of new people changed the content of style provinces, and examine the oral histories and genetics of descendant communities for disparate narratives that may be the result of multiple points of origin (Gibbon 1995:193). The focus of this approach on tracing the path of particular groups through space and time means that strong chronological control is also critical.

Gibbon's models are far from mutually exclusive, and, as he admits, heavily speculative. However, they offer a starting point, a theoretical basis from which I can proceed with the understanding that exchange, political power, and ethnic identity were doubtless bound together inextricably yet were also influenced by independent outside factors. The goal of this thesis is not to definitively explain Oneota social systems, but to explore how the evidence from a wider variety of sites and regions can be used to further our understanding, particularly when these models are applied to Oneota influences in the Central Plains as well as the Northeastern Plains, along the periphery of their traditional heartland.

Chapter 3: Research Questions and Methodology

At the heart of this thesis is an inductive question; how does the archaeological signature of Oneota influence vary along the western periphery of that tradition, and what processes could potentially explain that variability? In order to understand the different manifestations of Oneota culture, I will compare four different sites: the Shea and Sprunk sites on the Maple River of North Dakota, the White Rock site in the Lovewell Reservoir region of northern Kansas, and the Dixon site in the Little Sioux River Valley of western Iowa. I will be comparing the lithic, ceramic, faunal, and botanical data from those sites. In addition to statistical analyses of those assemblages (discussed below) other artifact types or data from the sites may offer insights into the human practices responsible for creating unique signatures. In particular, I am interested in the presence of catlinite or other carved stone pipes, the seasonality of occupation, the environmental settings exploited by the inhabitants of the sites, and whether the archaeological evidence suggests multiple episodes of occupation at each of the sites. These sites were selected for comparison for the following reasons. First, the Dixon site is included because not only were occupations at that site roughly contemporaneous with those of the other case study sites, the Dixon site provides an example of a site that adheres to a "western Oneota" (Henning 1998:238) or "prairie Oneota" (Gibbon 1995:189) pattern. A greater reliance on bison hunting, evidence of large-scale population movement or even seasonal abandonment to engage in bison hunting, and greater influences from nearby Plains cultures, such as the increased use of bell-shaped storage pits as opposed to the bowl shaped pits of more eastern Oneota peoples and the higher incidence of side-notched projectile points (Alex 2000:205; Fishel 1999) all typify western Oneota and occur at the Dixon site. Although they represent an adaptation to the plains and prairies, western

Oneota sites still demonstrate the core diagnostic features of Oneota sites, including the ceramic assemblage and large village size as well as a mixed hunting-gathering-gardening economy.

Second, the White Rock site, the type site for its eponymous phase, is one of the farthest west Oneota manifestations, which would have put the inhabitants deep into territory more traditionally associated with CPT peoples, increasing the potential for social interaction with non-Oneota groups and offering potential clues to how the Oneota were interacting with their neighbors in the Central Plains.

Third, the Shea and Sprunk sites, grouped by Michlovic as part of the Shea phase, are both fortified NEPV villages dating to the late 14th-early 15th century with similar diagnostic artifacts and assemblages, suggesting that similar processes may have occurred at both sites. Together, they offer a more complete picture of social interaction in southeastern North Dakota, including the influence Oneota people may have exerted far from their traditional territory. All of the sites selected overlap temporally, with Dixon and White Rock occupied in the mid-fourteenth to early fifteenth centuries, and the Shea phase sites occupied during the early-fifteenth to early sixteenth centuries. Thus, the White Rock and Dixon sites overlap occupation of Shea phase sites during the late fourteenth and early fifteenth centuries (Anderson 2019; Logan 2010a; Michlovic and Holley 2009; Michlovic and Schneider 1988).

Quantitative Data

In order to compare the Shea and Sprunk sites (the Shea phase) with the White Rock and Dixon sites, both quantitative and qualitative data were pulled from the respective site reports. For the Dixon site, information was pulled from the contract completion report and associated published volume (Fishel 1995, 1999) for mitigation work, while the White Rock site information is based on a report submitted to the Bureau of Reclamation following the 1994

Kansas Archaeological Field School (Logan 1995). Shea site excavations (Michlovic and Schneider 1988) were a joint venture between the University of North Dakota, State Historical Society of North Dakota, and Moorhead State University, and the Sprunk report (Michlovic and Holly 2009) is also the product of a Moorhead State University field school. The Dixon site data are also supplemented by a more recent excavation conducted by the Iowa Office of the State Archaeologist in which I participated. This excavation ran from autumn 2016 into the summer of 2017, triggered by an Iowa DOT project to rip-rap the western banks the Little Sioux River. This undertaking, permitted by the Army Corps of Engineers, was necessary to prevent cut bank erosion that would eventually impact a section of Highway 31 in Woodbury County, Iowa.

Given the different goals, techniques, and regional backgrounds of the various principal investigators attached to each project, as well as the different scales at which work was conducted, from intensive archaeological mitigation conducted on a small portion of a large village site (Dixon) to field school excavations (Shea, Sprunk, White Rock), it is unsurprising that the data do not overlap seamlessly. Indeed, limiting analysis to quantitative data that are available from every site restricts the possibilities for comparison somewhat, and raises the possibility that some perceived differences between sites are the result of recovery bias rather than stemming from actual differences in human behavior. Not only did the recovery methods and subsequent analyses differ, but the proportion of each site excavated varies. Nevertheless, by using both quantitative and qualitative data and keeping these caveats firmly in mind there are still meaningful comparisons to be made between these different sites sampled with somewhat different methodologies, especially regarding their ability to shed light on Oneota movement into the Plains.

To approach questions of cultural ecology and social interaction requires an understanding of the subsistence base and activities of each site, as well as any evidence for variation that can be attributed to inter-cultural exchange. To this end, categories were constructed that would offer insight into the different activities carried out at each site and signs of cultural exchange, while restricting analysis to categories for which each site report could provide values. These data include the faunal, lithic, botanical, and ceramic assemblages, as well as features represented at each site and information on human remains at each site. The specific categories within these broader headings are discussed below, and the qualitative data are discussed in the analysis.

Lithic Artifacts

Of all the material categories examined, the lithic tools and debitage had the most universally available information. Reports provided information necessary to compare the proportion of formal chipped stone tools, number of raw materials, morphology of projectile points, presence of groundstone tools and pipestone artifacts, and the percentage of the overall assemblage that each tool type comprised. This information allows comparisons of tool type proportions at each site, which may offer insight into the range of activities performed there, as well as the variability of projectile point morphologies at each site. For Dixon, all the quantitative data derive from Fishel's (1999) report except for lithic raw material sources, which are based off of the more recent 2016-2017 excavations. Distances to raw material sources are measured from the center of sites to the edge of geologic boundaries for sources.

Ceramics

While the ceramic assemblage is a critical element of each site report used as source material, the measurements chosen to convey the different authors' findings are not always

comparable. However, the paucity of quantitative ceramic data from each site is offset by the detailed descriptions of vessels that occur in all four site reports. Information available from the ceramic record at each site includes the overall percentage of the ceramic assemblage with different types of temper, the surface treatment of rim sherds at each site, and sherds with specific combinations of temper and surface treatment as a percentage of the total ceramic assemblage.

Faunal Remains

Faunal remains have a clear relationship to subsistence activities carried out by the inhabitants of each site and offer insight into seasonal use patterns and the environments that people exploited for resources. Quantitative information from the site reports includes the number of taxa represented as well as the number of specimens of each taxon at each site, which in turn allows a calculation of what percentage of the sample each taxon comprises in order to compare diversity. Presence/absence data offer further insight into the range of species exploited at each site. The faunal data could not be compared in their raw form, however, because the resolution of the different analyses was not always equal. For example, where the Sprunk site includes identification of *Anatidae* (ducks, geese, and swans) at the species level, the Dixon site identifies some specimens at the genus level and others at the family level. In these cases, the family level is used for statistical comparison between sites, while the species identification can still factor into discussion of qualitative differences between the sites.

Botanical Remains

As with faunal remains, the botanicals from each site have a clear impact on how we understand the lifeways of the past inhabitants. This category is especially prone to recovery bias, due to the small size of many archaeobotanical remains and the resulting need for

specialized recovery techniques. A quantitative comparison is still worthwhile, but it is worth noting that of the sites discussed, the White Rock site has had the least thorough botanical analysis, a fact that is reflected in the limited botanical remains reported from that site. As with faunal remains, some authors and site reports use a greater or lesser degree of taxonomic precision. For the purposes of this thesis, I use the most precise taxon supported by the data in each case. As an example, the Dixon write up contains the categories "amaranth," "Chenopodium" and "amaranthus/Chenopodium." In order to compare use of amaranth and Chenopodium across sites, then, the hybrid category is used, while for discussion of resources exploited at the sites the number of specimens belonging to each genus is used. For botanicals, I was able to extract information about the number of seeds of the taxa identified at each site and the frequencies of each of those seeds. While not all the botanical remains at an archaeological site are necessarily associated with the human occupation, the seed frequencies reported by the various authors are based on charred seeds, which lends some weight to the idea that their presence is cultural. Of course, the different sites are located in different regions with different biotic communities; the intention of quantitative comparison is not to identify the obvious consequences of this geographic separation, but to consider these plants as they relate to the human occupation of the sites. Therefore, botanical remains have been further broken down into various categories related to their ethnographic usage; this both focuses on the underlying human behavior and ameliorates the issue of taxonomic concerns. These include starchy seeds, oily seeds, fleshy/dry fruit seeds, plants with documented medicinal uses, plants known to have been used in ritual or religious applications, and plants without a documented use (Moerman 2003). The latter may be incidental inclusions in the sample or simply have a usage that is unknown at this time. Information regarding the ethnographic use of different plants comes from the Native

American Ethnobotany Database (NAED) maintained by the University of Michigan, Dearborn and constructed from the research of Dr. Daniel Moerman.

Features

While detailed descriptions of feature contents were not available in all cases, I assigned the features from each site to categories based on the authors' interpretations. These are: 1) storage; 2) discard/refuse; 3) cooking; 4) house structures; 5) posts; and 6) unclassified. Because authors were not consistent in clarifying whether certain features (e.g., hearths) were considered part of other features, each feature is counted separately in its particular category. Thus, a hearth that is part of a house is counted the same as an outdoor hearth. Other than basic categorical information, little more was available from each site regarding the features.

Human Remains

Of the sites being considered, only Dixon has documented human burials, with several encountered during 1994 excavations, as well as reports indicating that the Iowa DOT encountered numerous burials on the east side of the Little Sioux River. Other than a single cranial fragment from feature matrix, no human remains are known from White Rock. Shea and Sprunk both lack human remains. As would be expected, the Dixon site report contains a thorough description of the human remains, while the single cranial fragment from White Rock provides minimal information. While this does not allow for much in the way of quantitative comparison, the presence or absence of human remains does affect our understanding of the activities conducted at a particular site. It is important to note that the recovery of human remains is impacted not only by sampling strategies, but by the nature of the excavation—a data recovery designed to salvage an archaeological site from erosion or mechanical destruction (such as Dixon) may actively attempt to preserve human remains, while a field school excavation on a

non-threatened site may wish to avoid exposure of burials for administrative, legal, and ethical reasons.

Statistical Testing and Analyses

The limited overlap of data from each site constrained, but did not prevent, statistical comparison of the various quantitative datasets from each site. Presented in the next chapter are side-by-side comparisons of data from each of the categories discussed above. Qualitative information will be presented alongside the quantitative data, and the PAST statistical package (version 3.22) will be used to calculate a variety of comparative statistics, including similarity indices that serve to illuminate the commonalities between sites and the degree to which the relationship between particular categories remains consistent across sites (Hammer 2018; Lomolino et al. 2010). There are also cases where anomalies are plainly visible without resorting to statistical testing, and in these instances no statistical assays were conducted.

Expectations and Interpretation

As stated in Chapter One, there is not a single hypothesis being tested here. At the most basic level, however, there are two outcomes possible: either all of these sites show evidence of a similar range of human activity, suggesting that differences in social strategies are due to factors unrelated to site function, or they do not. Going in, a cursory examination of the respective site reports is sufficient to indicate that site function and the range of activities practiced at each site are not identical. It follows, then, that differences in the evidence for inter-group contact may be in part the result of differences in site function. This broad statement, while defensible, is ultimately a shallow interpretation of the data. The focus of the comparative analysis, then, is not only whether there are differences between the sites with regards to subsistence strategies, inter-group contact, and the range of human activity, but the precise nature of those differences.

It is here that the inductive approach is useful, as it allows us to grapple with the nature of archaeological data; rigid controls with only a single variable are exceedingly rare in archaeology, and even statistically-based multivariate analyses cannot capture some of the qualitative differences between sites.

Chapter 4: Results

The results of statistical testing as well as observations based on the data are contained below.

4.1 provides some basic information regarding methodologies, site size, and the percentage of each site excavated, and helps to establish a sense of scale for artifact assemblages from each site. It should be noted that the collected number of ceramic artifacts from Dixon and White Rock does not match the number of ceramic artifacts analyzed; the original site reports instead reflect analysis of a subsample of recovered sherds large enough for analysis. Artifact densities are standardized by the cubic meters excavated. The calculation of cubic meters was done by calculating the volume of test units, then adding the volume of features. Because features often have irregular shapes, there is an inevitable margin of error in this process, but that error should apply more or less equally to all sites and the results should give at least some sense of the comparative artifact densities at each site. Where appropriate, the total number of sherds recovered is used; this includes situations such as calculating density of ceramic artifacts on-site or simply referring to the raw count of ceramic artifacts. When discussing characteristics such as temper, surface treatment, or design, *n* is based on the sample of sherds that the original authors analyzed.

Lithic Artifacts

As described above, the available information from each site allows a statistical comparison of the formal tool proportions as well as the projectile point morphologies. Where possible, additional information from each site report has been included to give a more complete understanding of the various lithic assemblages being compared and, by proxy, the human

activities connected to those assemblages. Presented below are the formal chipped stone tools by site (Table 4.2) and the projectile point morphologies by site (Table 4.3).

Table 4.1

General Statistics for the Shea, Sprunk, White Rock, and Dixon Sites.

	Shea	Sprunk	White Rock	Dixon
Features Excavated	37	15	36	43
Test Units Opened	19	24	34	29
Square Meters Opened	38	26	38	84
Cubic meters of matrix excavated (including features and test units)	37	21	33	80
Estimated site Size (m^2)	6,000	4075	16,000	262,640
Percent of Estimated Site Excavated	0.63	0.64	0.24	0.03
Faunal elements recovered	294	225	230	461
Screen Size	1/4"	1/4"	1/4"	1/4"
Flotation	0.85 mm mesh	2 mm	None	.25 mm mesh
Formal Stone Tools	56	40	47	130
Debitage	1788	839	160	5293
Ceramic Artifact Count	5234	2198	2404	10,839
Ceramic Artifacts analyzed	5234	2198	263	6,364
Ceramic Artifacts/m^3	141.46	104.67	72.85	135.49
Formal Stone Tools/m^3	1.51	1.90	1.42	1.63
Faunal elements/m^3	7.95	10.71	6.97	5.76

Table 4.2

Shows the Frequency of Projectile Points, Knives, and End Scrapers Recovered from Each Site

Chipped Stone Tools: Frequency by Site	Shea	Sprunk	White Rock	Dixon
Projectile Points	30	22	18	53
Knives	10	3	5	3
End Scrapers	16	15	24	74
Total	56	40	47	130

Table 4.3

Shows the Frequency of Corner Notched, Side Notched, and Unnotched Triangular Projectile Points at Each Site

Projectile Point Morphology	Shea	Sprunk	White Rock	Dixon
Corner Notched	0	1	0	0
Side Notched	1	5	1	0
Unnotched triangular	29	16	17	53
Total	30	22	18	53

The categorical data in these two tables lend themselves well to χ^2 testing. In this case, a χ^2 test is evaluating whether the distribution or frequency of different tool types or projectile point morphologies is independent of the variable in question (in this case, the sites) with the null hypothesis that the sites do not have any impact on the proportions. For the purposes of the χ^2 test, the "drills/perforators" category is omitted. The lack of any drills at White Rock would

push the expected values below one, violating best-practices for χ^2 tests (Drennan 2009), and the remaining three categories of stone tool are often linked to gauging the importance of hunting and animal processing (Boszhardt and McCarthy 1999), a direct behavioral implication that makes those types ideal for this test.

Based on tests of the 285 chipped stone tools in this sample, there is a statistically significant connection between sites and the lithic toolkit (χ^2= 23.398, *df*=6, *p*=0.000673). If the proportion of different chipped stone tools serves as a proxy for the proportion of associated activities, this significant result indicates that people were indeed exploiting resources differently across these four sites. It should be noted that though the sample size here slightly exceeds the recommended limit of 250 for a χ^2 test, the *p*-value indicates extremely significant deviation from the expected distribution of stone tools. Indeed, upon calculating a Bonferroni correction to account for the number of individual hypotheses being tested here, the Bonferroni corrected alpha is 0.00426; this indicates that even with a "higher bar" for significance, there is still a significant difference between the lithic toolkits on the basis of sites, so I am comfortable letting this *p*-value stand. Calculating the adjusted standardized residual (ASR) of a χ^2 test is a post-hoc analysis that shows which variables deviate most strongly from the expected values and allows comparison between the residuals. The ASR (Table 4.4) of this test shows which values are most anomalous in this case, with significant deviations bolded. For a two-tailed test, using the Bonferroni corrected *p*-value, the critical score to reach significance is 3.08.

Table 4.4

Adjusted Standardized Residuals for χ^2 Tests on the Basis of Lithic Toolkit

	Shea	Sprunk	White Rock	Dixon
Projectile Points	1.4367	1.3684	-1.0233	-1.357
Knives	**3.2018**	-0.0494	0.833	**-3.1834**
End scrapers	**-3.1408**	-1.3374	0.5751	**3.0515**

Given a critical value 3.08 for a two-tailed test at p=0.00208, there are three cells that deviate very strongly from the expected values; Shea/Knives, Shea/End Scrapers, and Dixon/Knives, while Dixon/End Scrapers is very close to hitting the critical value. Knives at Shea greatly exceed the expected value, while end scrapers fall far below expectations. The reverse is true at Dixon, where knives are underrepresented and there is an abundance of end scrapers. The ASR values for projectile points do not quite rise to the level of significance, but it is still worth noting that projectile point levels are the second-most divergent category, making up an outsize portion of the assemblage at the fortified sites Shea and Sprunk. The relatively low sample size means that the χ^2 tests are operating under less than optimal conditions for comparing projectile point morphology across sites; most notably, more than 20% of the expected values are below five. Nevertheless, conducting a χ^2 test suggests that there is a significant relationship between different sites and the proportion of projectile points (χ^2=20.185, df=6, p=0.0025) even after a Bonferroni correction, while the ASR values (Table 4.5) offer additional opportunities for interpretation.

The adjusted standardized residuals make it clear exactly what is driving the deviation from the expected distribution that shows up in the test- Sprunk's single corner notched point and five side notched points have completely skewed the distribution. This is not surprising;

Sprunk's morphological diversity in projectile points is clear just from looking at the frequencies (Table 3).

Table 4.5

Adjusted Standardized Residuals for X^2 Tests between Sites on the Basis of Projectile Point Morphology

	Shea	Sprunk	White Rock	Dixon
Corner Notched	-0.5734	2.1408	-0.41774	-0.86545
Side Notched	-0.65209	3.7847	-0.03599	-2.3487
Unnotched triangular	0.8215	-4.3356	0.18597	2.5219

The adjusted standardized residuals make it clear exactly what is driving the deviation from the expected distribution that shows up in the test- Sprunk's single corner notched point and five side notched points have completely skewed the distribution. This is not surprising; Sprunk's morphological diversity in projectile points is clear just from looking at the frequencies (Table 3).

As another way of looking at the proportion of chipped stone tools in the studied assemblages, the scraper index can be calculated (Boszhardt and McCarthy 1999) as a proxy measure for the relative importance of hide processing at different Oneota sites. This is done by multiplying the ratio of scrapers to points by 100 (Table 6). One way of interpreting this number is that at sites where secondary processing of game occurs to produce hides, the scraper index should be higher than sites at which the primary focus was initial processing and production of meat, bone, and sinew. Though Ritterbush and Padilla (2005) calculate a higher scraper index

for White Rock, those calculations include private collections of unclear provenience, and for this reason they have not been included in this analysis. The average value for the four sites (Table 4.6) is 85.3 with a standard deviation of 39.3; the only site to fall outside of a single standard deviation from the mean is Dixon, again demonstrating that scrapers seem to make up an outsize portion of the lithic assemblage relative to the other sites.

Table 4.6

Scraper Index (Scrapers/Points x 100) for Shea, Sprunk, White Rock and Dixon

Shea	Sprunk	White Rock	Dixon
53.3	68.1	77.4	142.3

In addition to those properties that can be tested across sites, there are more general conclusions that come from qualitative data or observations made by the authors that do not translate to a statistically testable format. Insights from the lithic assemblage at each site play a role in discussing site function and the range of human activity carried out at the various study locations.

Perhaps most notable are those artifacts that are present at some sites but not at others. The lithic assemblage of Dixon includes a broad array of chipped and ground stone tools. These range from the projectile points (Figure 4.1), knives, scrapers, and drills listed above to abraders, axes, metates, pestles, grinding stones, mauls, and hammerstones (Fishel 1995:258). Projectile points from the 1994 Dixon excavation are exclusively Madison triangular points; the more recent excavations also yielded several Plains side-notched points consistent with other Oneota sites in northwest Iowa, as well as notched points dating to the Middle Woodland, Late Woodland, and Late Archaic periods—it is believed that these older points are the result of

curation by Oneota individuals who brought them to Dixon (Anderson 2019: 181). At Shea and Sprunk, ground stone tools are conspicuously absent, and Logan does not indicate recovering any ground stone tools from White Rock. Assuming that this is not simply an issue of recovery, the lack of ground stone tools at Shea and Sprunk may be an indicator that those tools were not left on-site from year to year, instead being transported to other habitations such as winter villages. It is difficult to imagine that the inhabitants of any of these sites made no use of ground stone, so further investigation is recommended. Pipestone (discussed below) is present at Dixon, Shea, and Sprunk, though not at White Rock.

Numerical data on lithic debitage and cores are not consistently available from the sites, so I turn instead to the conclusions of the original reports to discuss lithic reduction at each site. Michlovic and Schneider (1988:36) report the "lack of hammerstones and…relative scarcity of cores" at the Shea site, while at Sprunk Michlovic and Holley (2009:29) characterize the evidence for lithic reduction as "consistent with a combination of core reduction and tool manufacture." While Logan focuses on formal chipped stone tools in his 1995 analysis of the White Rock site, Ritterbush and Padilla (2005) offer a synthesis of lithic materials from previous excavations at White Rock, reaching the conclusion based on the absence of cores and the small size of the recovered debitage that "primary reduction was not a common activity" (Ritterbush and Padilla 2005:285). While little primary reduction occurred at Shea, Sprunk, and White Rock, Dixon has evidence for all stages of lithic manufacture, from decortication to pressure flaking, although the focus seems to be on finishing and retouching tools (Fishel 1999:54).

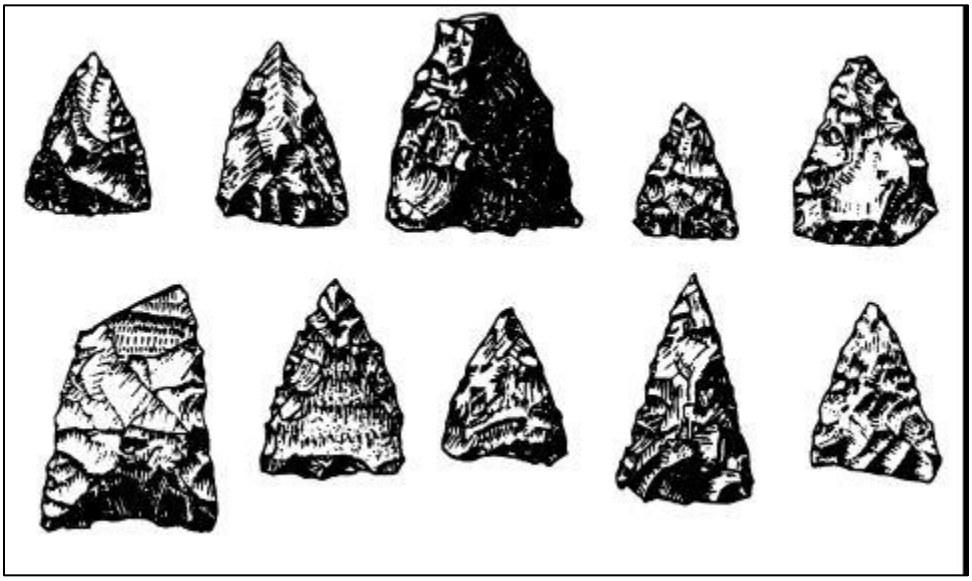

Figure 4.1: Selected arrow points from Dixon (Fishel 1999).

Lithic raw materials sourcing reveals a disparity in how the inhabitants of different sites were procuring their raw materials. Table 4.7 shows the average straight-line distance from each site to the raw material sources used by the inhabitants and associated standard deviation. The averages are taken on the basis of the number of sources utilized, not raw material types; for example, the various cherts falling under the "Florence" designation are treated as deriving from one source (the Florence member of the Barneston Formation) rather than individual sources. From this table, it would appear that all the sites have similar mean distances to raw materials, though the large standard deviations indicate the range of those values. However, factoring in the actual frequencies of the raw material gives a more informed look at use patterns; Shea inhabitants derive a full 66% of their raw materials from local glacial till, while Sprunk inhabitants make heavy use (63% of artifacts) of Knife River flint, whose primary outcropping is 250 miles away from the Sprunk site to the west. Although Shea's proportion of local materials is higher than Sprunk's, the raw materials that make up the remainder of Shea's assemblage are

Knife River flint and Swan River chert, which together comprise 70% of the Sprunk lithic artifact assemblage. Though the amounts may differ, it seems that inhabitants of both Shea phase sites had access to lithic sources further west. White Rock's average is heavily skewed by the presence of Burlington cherts deriving from the Central Mississippi Valley to the east, but over 90% of the lithic raw materials at White Rock are found within a 75-mile radius of the site.

At the Dixon site, 33% of the raw material is Tongue River silica. Tongue River silica occurs in glacial till, and I have personally observed it in cobbles and nodules at the Dixon site. However, the local Tongue River silica is weathered, flawed, and full of inclusions and vugs. The material being used for tools at Dixon is far superior and is likely sourced from the actual outcropping to the northwest.

The number of discrete raw material types at each site merits discussion as well. Dixon, with 46, stands as a clear outlier among the other sites. Minimally this supports the idea that Dixon was part of a much larger social or trade network than the other sites or embedded in that network in a different way. Shea, Sprunk, and White Rock do not seem to be destinations for raw materials or exotic goods, whereas at Dixon these things accumulated. This could be indicative of Shea, Sprunk, and White Rock fulfilling roles as outposts or satellite settlements; the fruits of their labor, whether natural resources or trade goods, were never intended to stay at those places.

Table 4.7

Descriptive Statistics for Lithic Raw Material Sources for Shea, Sprunk, White Rock and Dixon

	Shea	Sprunk	White Rock	Dixon
Raw Material Types	11	7	4	46
Physiographic Groups	3	5	4	12
Average straight-line distance (miles)	172.66	103.6	158.75	153.64
Standard Deviation	150.38	142.31	169.85	137.84
Most frequent material type/(% of assemblage)	Local glacial till (66.3%)	Knife River Flint (63%)	Niobrarite (70%)	Tongue River Silica (33.4%)
Distance (miles) to most frequent raw material type	0	245	60	300

One final lithic resource, pipestone, makes an appearance at some of these sites. Though red disk pipes have reportedly been recovered from White Rock (Logan 1995) no pipestone artifacts or fragments are reported from Logan's excavation. At Sprunk a single piece of blackened, slightly curved pipestone is reported, possibly a broken pipe bowl (Michlovic and Holley 2009:28). At Shea, pipestone is represented by a single bowl fragment with exterior carvings as well as 7 thin-walled elbow pipe body fragments and 11 pipe body fragments with cut marks or striations, for a total of 19 pipestone artifacts, all of which have been analyzed with x-ray diffraction and sourced to southwestern Minnesota (Michlovic and Schneider 1989). At Dixon, recent excavations yielded 21 distinct red pipestone artifacts, including recognizable pipe bowls, disks, and stems and manufacturing debris (Anderson 2019). There is at least one piece of red pipestone with the overlying red quartzite still attached, which could indicate that Dixon

inhabitants were themselves quarrying pipestone from the southwestern Minnesota deposits (Anderson 2019). Small scraps of red pipestone would also occasionally occur in the fill at Dixon, of such small size that they would simply smear across the shovel blade while digging.

Botanicals

The raw count of botanical evidence from each site results in a number too high for χ^2 testing. Instead, botanical remains have been placed into the categories of starchy seeds, oily seeds, dry/fleshy fruit seeds, plants with known medicinal uses, and a category for unknown uses and incidental inclusions. The botanical assemblage from each site is certainly affected by recovery and reporting processes; the flotation regimens used are not the same, and it is possible that only those seeds thought to be related to the human occupation are reported. In the case of White Rock, botanical analysis is minimal, with the result that only maize has been identified from that site. As a result, it is perhaps best to view the reported botanicals as the bare minimum of those utilized by each site's inhabitants. Because of this uncertainty, no further culling of the botanicals is made for the purposes of this analysis. Appendix A lists the taxa associated with each site and their frequency, while Table 4.8 offers the percentage breakdowns based on subcategories.

Looking at Table 4.8, which lists the botanical evidence recovered from each site, it is quite plain that the most divergent set of values is that for starchy seeds. Excluding White Rock from the analysis, the percentage of the overall botanical assemblage comprised by starchy seeds has a twelve-percentage-point range, from Shea's 94% to Sprunk's 82%. Although starchy seeds were clearly important at each of these sites, this is a substantial variation. The interpretation here is not straightforward, as the two most divergent sites are the two Shea phase sites. Perhaps this is a reflection of differing priorities even between these two sites, just as the percentage of

the faunal assemblage comprised of bison has a 30-percentage point spread between Shea and Sprunk. Fruit seeds and medicinal plants have relatively restricted ranges, suggesting that their usage is not significantly variable between sites.

Examining the botanical assemblages from individual sites more closely reveals additional points of interest. At Dixon, maize comprises a full 5% of the recovered botanicals, compared to 8 and 10% at Shea and Sprunk, respectively. At the Shea phase sites, the bulk of the starchy seeds are Chenopodium. In analyzing the Sprunk botanicals, Parker (2010) notes that the Chenopodium seeds from that site are morphologically consistent with non-domesticated Chenopodium. This may suggest that active farming was not occurring at Shea and Sprunk—instead, the inhabitants were clearing space or tending wild Chenopodium and harvesting those plants during their occupation of the site. At Dixon, on the other hand, given the profusion of maize, it is assumed that crops were being actively cultivated on the floodplain of the Little Sioux River, and at White Rock evidence suggests active cultivation of crops as well (Ritterbush 2002). Feature evidence (see Features, below) may also offer insight into site use patterns relating to the harvesting and storage of botanical resources.

Table 4.8

Botanicals from Shea, Sprunk, White Rock and Dixon Sorted into Subcategories Based on Known Ethnographic Uses, as a Percentage of Total Botanical Samples

	Shea	Sprunk	White Rock	Dixon
Starchy Seeds	94.04761905	82.94	100	86.58
Oily Seeds	0.238095238	0	0	2.74
Medicinal	2.380952381	3.87	0	2.09
Dry or Fleshy Fruit Seeds	2.380952381	3.87	0	3.38
Ritual or Religious Usage	0	5.42	0	0.05
Unknown usage/incidentals	0.952380952	3.87	0	5.13
Total	100	100	100	100

The plant remains recovered also speak to the variety of environments being exploited by the inhabitants of each site. At Shea and Sprunk, there are plants from woodland habitats (trillium, wild cherry, ground cherry) open prairie and prairie/woodland interfaces (rubus, bluestem grasses, nettles), riverine environments (*polygonum* sp) and marshes or standing water (*carex* sp). The Dixon site, in its variety of plant remains, shows a similar range of habitats being exploited. Given the predominance of Chenopodium seeds at Shea and Sprunk, it is also likely that, if not cultivated outright, these plants were being actively encouraged to grow by clearing habitat or removing other plants from growing areas.

Of course, plants provided not only sustenance but were an integral part of ritual and ceremonial life. Tobacco seeds have been recovered from Dixon during both the 1994 excavation and the 2016-2017 excavation (Anderson 2019; Fishel 1999) and coupled with the variety of pipestone on site this suggests that residents were smoking tobacco. Sprunk yielded 6 tobacco seeds and a single morning glory seed (*ipomea sp)*; morning glory is known to have mild hallucinogenic properties. At Shea, no tobacco seeds are recovered from feature matrix or flotation samples, although the number of red pipestone fragments suggests smoking was part of life at Shea. White Rock's botanical evidence provides no information in this regard.

While plants have been categorized according to their known ethnographic use, it is important to consider that plants categorized as "unknown usage" may, in fact, be the results of human practices or uses of plants of which we are simply unaware. The presence of charred grass seeds (*poaceae)*, at Shea and Sprunk may also indicate burning of ground cover, or the use of bison dung as a fuel source. It is established that grass seeds are capable of surviving passage through a bison digestive tract and germinating afterwards, so the burning of seeds contained in dried dung is one possible explanation for the presence of charred grass seeds (Rosas et al. 2008).

Faunal Remains

Across the four sample sites, there is a universal tendency towards large artiodactyls, and bison in particular. Given the general subsistence strategies of Oneota (Alex 2000:157*)* and NEPV (Toom 2004) groups, this reliance on bison is not surprising. Table 4.9 shows the various taxa recovered from each site. Appendix B1 shows the specimens recovered from each site as a percentage of the identified elements from each faunal assemblage. These taxa have been collapsed to the narrowest level of taxonomy that still includes all sites. For example, since the

Dixon report identifies specimens in the family *Anatidae* while Sprunk identifies ducks at the species level, ducks from Sprunk are all classified under *Anatidae*. For the purposes of comparing presence-absence data, the sites are compared with animals represented at the family level. Appendix B2 offers the raw frequencies of faunal elements from each site using the original descriptors.

As table 4.9 clearly shows, Dixon, Sprunk, and Shea inhabitants pursued a wide variety of animals for meat, hides, or other resources, while at White Rock the faunal assemblage is restricted to dogs, turtles, and bison. Bison clearly dominate the assemblages, (see Appendices B1 and B2) although this is doubtless partially the result of preservation and recovery bias. It should be noted that the numbers reported in Appendix B are the percentages of elements, and do not take into account the relative weight of each bone. Thus, a single shrew humerus is counted the same as a bison humerus, despite the obvious difference in caloric value represented by those remains. Even so, bison clearly served as an important source of food and other resources (for example hides or bone tools) at each site.

Table 4.9

Taxa Identified in the Faunal Assemblage from Shea, Sprunk, White Rock, and Dixon (presence/absence)

	Shea	Sprunk	White Rock	Dixon
Bovidae (bison)	X	X	X	X
Cervidae (deer, elk, moose)		X		X
Canidae (dog)	X	X	X	X
Castoridae (beaver)	X			X
Talpidae (moles)				X
Procyonidae (raccoons)				X
Geomyidae (gophers)	X	X		X
Leporidae (rabbits and hares)	X			X
Sciuridae (squirrels)				X
Geoemydidae (box turtles)	X		X	X
Ranidae (frogs)	X			X
Bufonidae (toads)	X			
Ictaluridae (catfish)	X	X		X
Tetraonidae (grouse)				X
Anatidae (ducks, geese, swans)	X	X		X
Icteridae (New World songbirds)		X		X
Mustelidae (weasels, badgers)	X	X		
Cricetidae (voles)	X	X		
Corvidae (crow family)		X		
Colubridae (snakes)		X		
Accipitridae (raptors)	X			
Soricidae (shrews)	X			
Mephitidae (skunks)	X			
Laridae (gulls, terns, skimmers)	X			

In discussing the faunal assemblage at Sprunk, Parker (in Michlovic and Holley 2009:93) makes a distinction between the pattern of exploitation at Sprunk and Shea, arguing that the Sprunk remains are more diverse and show a greater reliance on resources other than bison. In the Shea report (Schneider and Michlovic 1993) it is further argued that the reptile, amphibian, fish, and avian bones at Shea do not represent foods that were an important part of the diet of

Shea inhabitants. In the absence of additional evidence, this distinction seems arbitrary and difficult to justify. Given their close proximity to the Maple River and its associated seasonal wetlands, the gallery woodlands in the lowlands, and the grassland habitat of the bison, there is no compelling reason to reject the majority of the faunal assemblage from Shea as an incidental inclusion while claiming that the faunal assemblage from Sprunk represents a diverse diet.

The faunal assemblages from Shea, Sprunk, and Dixon contain evidence not only of diet but of economic values as well. It is easy to imagine that beaver were valued not only for their meat but for their tail fat and hides, while birds would have served as a source of meat, feathers, and bone for use in manufacture or trade. Recent excavations at Dixon recovered no ducks or geese; instead, the avian assemblage is dominated by small songbirds that would have yielded feathers but little meat, perhaps more useful as a trade good than a source of calories. Likewise, the raptor bones recovered from Shea could be evidence of trapping raptors for their feathers, which were important for their use in prestige goods and ceremonial clothing among historic period Plains people (Warren 2007). Raptor feathers likely also held importance for Oneota groups, if Benn's interpretation of the importance of Hawkman motifs is correct (Benn 1989).

Of the sites examined, White Rock shows the narrowest preference, with bison bone comprising a full 95% of the identified faunal elements by count. At Dixon, bison bones make up 38% of the identified bones, while bison bones at Shea and Sprunk constitute 52% and 83.5% of the respective identified faunal assemblages. One possible explanation for the fact that bison bones constitute an overwhelming majority at White Rock, more so than for any of the other sites, is regional climatic and environmental differences.

It should be noted, however, that contemporaneous CPT sites exhibit high diversity in their faunal assemblages (Bozell 1995:158). This broad-based subsistence strategy contrasts sharply with the bison-focused subsistence pattern seen at White Rock sites (Ritterbush 2002), suggesting that the exploitation of different resources may have a cultural basis independent of any changes in climatic regime. This may apply to Shea and Sprunk as well; bison constitutes a notably larger portion of the Sprunk assemblage as compared to Shea, in spite of the fact that the two sites are located in the same geographic area and are grouped by Michlovic (2008) into the Shea phase.

Putting the presence-absence data above into a similarity index allows us to more easily see where the exploited taxa overlap between sites and the degree of variation between sites. For the purposes of this calculation, categories were collapsed to compare the fauna at the same taxonomic level (family) across sites. A Dice similarity index displays the calculation of shared attributes between columns (sites, in this case) and weights joint occurrences more heavily than mismatches. A UPGMA Dice clustering diagram (Figure 4.2) shows that Dixon and Shea cluster together most strongly, while Sprunk clusters more loosely with Dixon and Shea, and White Rock is most divergent from the other sites.

It should be noted for interpretive purposes that although Shea and Dixon have the highest Dice coefficient here (0.47) this indicates minimal overlap between the exploited taxa, and this degree of similarity should not be taken to mean that the residents of these sites were exploiting a substantially similar resource base. The occurrence at both Shea and Dixon of turtles, fish, frogs, and other of the animals previously classified as “incidental” at Shea further suggests that these were being actively pursued and exploited at multiple sites, and should be treated as reflecting human activity rather than just taphonomic processes.

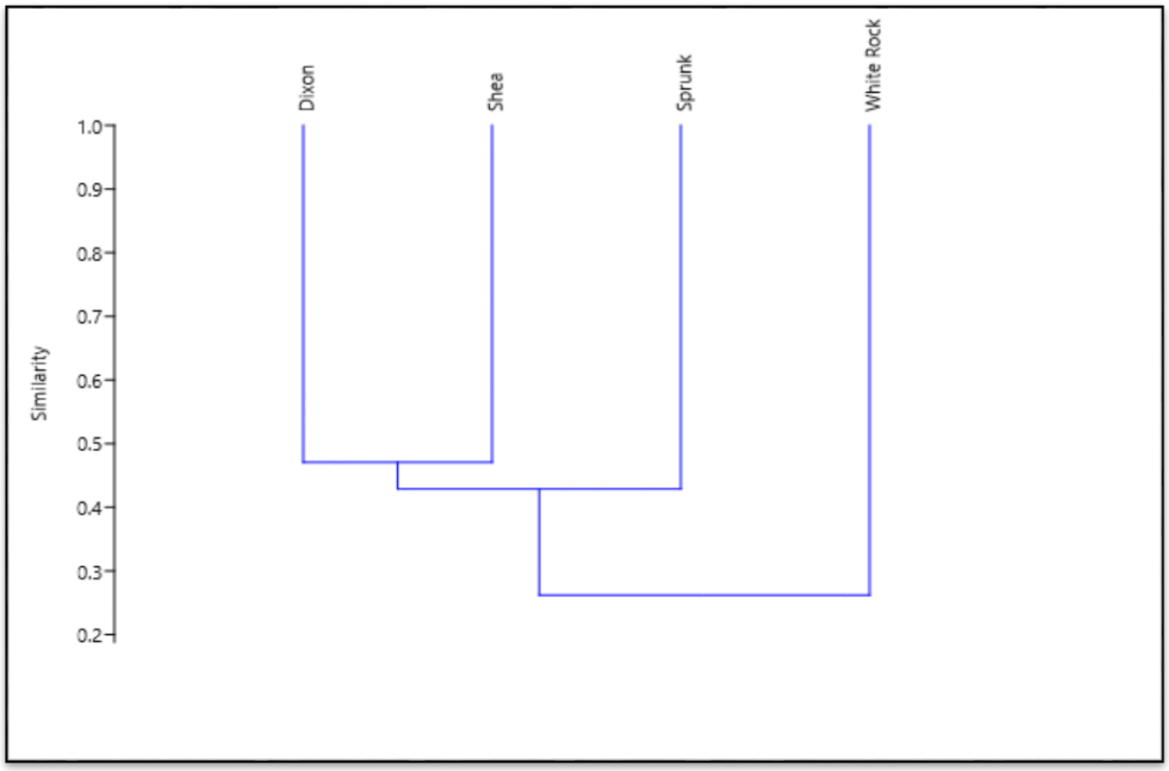

Figure 4.2: UPGMA Dice Hierarchical Clustering based on presence/absence of different faunal taxa

A one-to-one comparison between different sites on the basis of available taxa will, of course, be impacted by regional differences in which animals were available to hunt. Even within the same region, differences in seasonality of occupation could result in different faunal assemblages. To better approach questions of site function and cultural ecology, the bison elements present at each site may be a better indicator than simply the quantity of bison bone. At the Shea, Sprunk, and White Rock sites there is little evidence for discrimination in which elements were transported to the site. Instead, these faunal assemblages show cranial elements, lower limbs, and appendicular segments with a low modified general utility index (MGUI) value (Binford 1978). This is taken as evidence that kill sites were nearby, and little butchering or processing occurred prior to transporting kills to the habitation sites. While the Dixon report

says that low MGUI elements "are poorly represented" (Fishel 1995), more recent excavations suggest that more bison elements are present than previously reported (Anderson 2019), which casts some doubt on the idea that a lack of nearby bison led Dixon inhabitants to engage in long-distance hunting. The recent evidence clearly indicates that bison were available in the area during the Dixon occupation, although there is also ample evidence that the Dixon inhabitants had significant interaction with the Plains region, as discussed in the lithics section (this chapter). Clearly Dixon inhabitants were journeying to acquire resources from the Plains region or its indigenes, but the faunal evidence does not support the idea that these journeys were driven solely by the need for bison-based resources. Shea and Sprunk were warm-season habitations, as evidenced by the fact that 6% of the bison bone at Shea comes from fetal or young bison (Michlovic and Schneider 1993) and Sprunk contains both bison calf bones and migratory waterfowl (Michlovic and Holley 2009). Dixon was likely a year-round habitation, with ample game and resources nearby, and any forays into the Central Plains had a more complex explanation than a lack of suitable food nearby.

The archaeological evidence for exploitation of animal resources is not restricted to the skeletal remains—at Sprunk, Fourier transform infrared spectrometry (FTIR) was used to analyze residue from ceramic vessel walls. In all cases, this revealed bison bone marrow fat had adhered to the vessel walls, mixed with blueberries, acorns and oily nuts, animal blood, and waxy plant remains. This is consistent with the production of pemmican or other products derived from rendered fat, meat, and binders, which could serve as a portable, stable food source for long journeys (Michlovic and Holley 2009: 61). White Rock has evidence for similar intensive extraction of bone marrow (see features, below), and at Dixon and Shea the bison

bones are pulverized, presumably also for marrow extraction (Fishel 1999: 82; Michlovic and Schneider 1993).

In addition to vertebrate remains, Sprunk and Dixon have evidence of substantial usage of freshwater mussels. Not all sites have sufficient data for a quantitative comparison of mussel shells, but at Dixon Fishel reports 639 pieces of freshwater mussel shell (Fishel 1999:92) while at Sprunk, there are "large quantities of mussel shell in some portions of the site...shells and shell fragments [are] present as entire layers of material" (Holley 2009:64). At White Rock, Logan lists three pieces of mussel shell from previous excavations (Logan 1995a:84) while at Shea shell is only listed as an incidental inclusion in some of the features, totaling 190 grams of shell. Soils at Shea are Pachic Udic Haploborolls derived from the Overly series (Peterson 2002) and are neutral to slightly alkaline, which would be conducive to the preservation of shell artifacts. Given the presence of frog, toad, and beaver in the assemblage and the clear exploitation of the nearby river resources, it is puzzling that shellfish are not well represented at the Shea site. However, one possible explanation for the scarcity of mussel shells from Shea is that the mussel shells at Oneota sites reflect not only dietary needs, but the need for raw materials for manufacturing pottery. Of the four sites, the proportion of shell-tempered pottery at Shea is notably lower than that of the other three sites (9.12 percent compared to the next-lowest, White Rock, where shell-tempered sherds comprise 41.81 percent of the ceramic assemblage). Perhaps the lack of mussel shells reflects the fact that harvesting and processing mussels for meat is considered a low reward endeavor when the shells do not also provide a useful byproduct.

Ceramics

The ceramic analysis from each site includes both quantitative data regarding the frequency of surface treatments and tempering agents and qualitative data, focusing primarily on

different motifs and decorative styles applied to the ceramics. It is difficult to quantify the presence of distinct motifs when distinguishing between them is already an interpretive effort on the part of the original researcher, so the quantitative comparison focuses on the prevalence of different surface treatments and tempers at each site, while also considering the intra-site distribution of surface treatments and tempers. Figure 4.3 shows the relative proportion of body sherds with different tempers at each site. Dixon, clearly, uses exclusively shell temper, while tempers at Sprunk and Shea rely more heavily on grit. Although Sprunk has a high proportion of shell temper as well, Shea does not, with shell/grit contributing heavily to the overall makeup. As Figure 4.3 shows, the temper preference is most strongly visible at Dixon, while Shea, Sprunk, and White Rock have a more variable distribution of tempers. Of the quantitative attributes, surface treatment of the upper body and rim may be more culturally distinctive than temper, as the latter may be related to the availability of different tempering agents rather than cultural preference. Surface treatment of rim sherds, however, shows a much stronger pattern as visible in Figure 4.4.

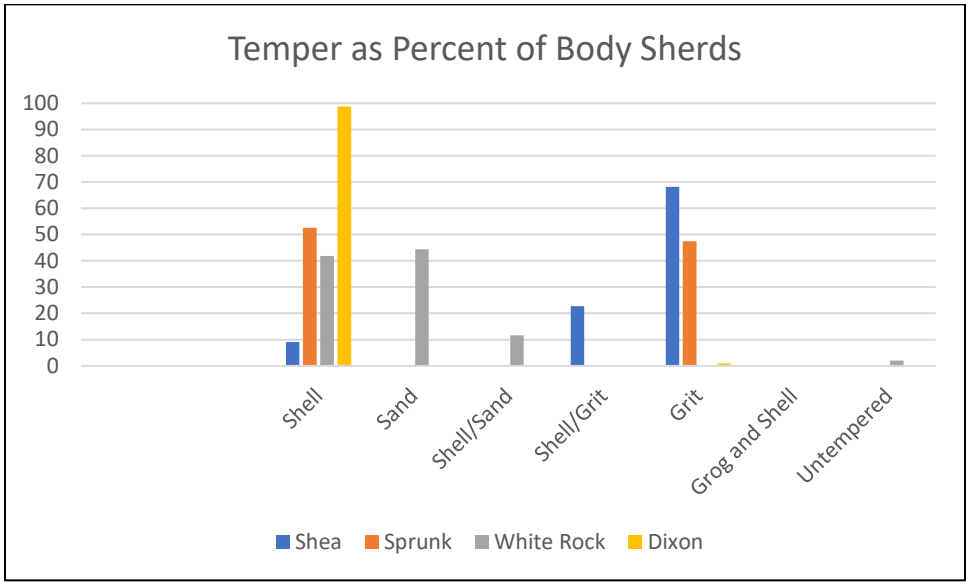

Figure 4.3: Percentage of sherds with various tempers at Shea, Sprunk, White Rock and Dixon.

The hybridized ceramic assemblage of the Shea and Sprunk occupations is clearly contrasted with the single surface treatment seen on Dixon and White Rock rim sherds (Figure 4.4). In fact, at Shea grit-tempered sherds refit to shell-tempered sherds from several vessels, indicating that coils of differently-tempered clay were used in pottery manufacture (Michlovic and Schneider 1993). The distribution of surface treatments across different tempers shows little in the way of recognizable patterns (Appendix C); at Shea and Sprunk, incised or trailed lines do not consistently correlate with shell or grit temper, nor does cordmarking. Calculating a Pearson's *r*, which creates a line of best fit for observed values between different sites, yields a significant and strong correlation only in one case: the relationship between incised body sherds and grit temper. With a *p*-value of 0.0401 and an *r* of 0.96, there is clearly a strong connection between these two attributes, which is in part surprising because grit temper is more readily associated with Plains tradition ceramics, while the incised lines on Shea and Sprunk sites are Oneota motifs. At White Rock, cordmarking is totally absent, a true anomaly for most CPT sites

that further indicates the degree to which White Rock sites are affiliated with the Oneota culture. The total lack of cordmarking at White Rock may also have served to cement Oneota identity in a frontier context.

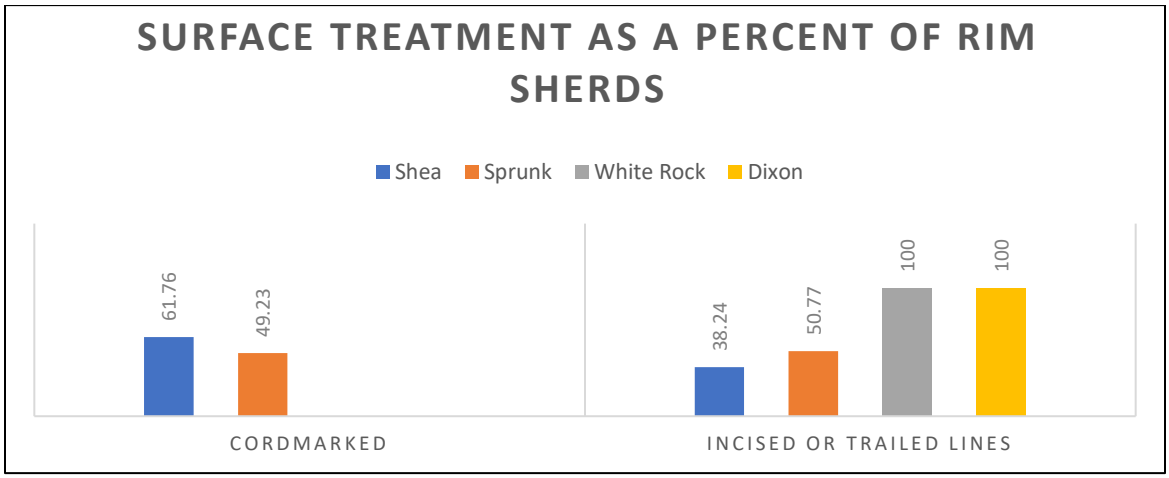

Figure 4.4: Rim sherd Surface Treatment Comparison between Shea, Sprunk, White Rock and Dixon.

The qualitative evidence indicates variable social influence from other cultures across these four different sites. At Dixon, ceramic motifs and styles are congruent with Correctionville-phase ceramics. The vessel forms of Dixon are jars, ranging from an approximate 1-gallon cooking or serving jar to 5-gallon vessels, possibly for water (Figure 4.5). These jars have a globular body, constricted neck with outflaring rim, and a curved base. Decoration is restricted to the upper body, rims, and lips of the vessel. The motifs used for decorations are chevrons across the upper body, nested chevrons bordered by punctates, and wide trailing lines made with a finger or thick implement (Figure 4.6). Due to the degree of fragmentation of decorated sherds, it is not always possible to determine the overall motif, but the individual elements Fishel (1999) describes—rows of punctates, rectilinear trailed lines and chevrons—are certainly consistent with known Oneota designs, and in particular are similar to

the Blue Earth phase ceramics from southern Minnesota. The overwhelming majority of the ceramic assemblage is unmistakably Oneota, with little to suggest influence from other cultures. The recent excavations produced a small number of buff-colored, grit-tempered high-wall pottery, more consistent with Missouri River groups than Oneota, but these are small in number and restricted in distribution within the site itself.

Michlovic and Schneider (1993) divide the ceramic assemblage at Shea into three groups: Sandy Lake ware, Northeastern Plains Village (NEPV) ware, and Oneota pottery. Rather than sherds, Michlovic and Schneider give their breakdown of ceramic wares based on calculated refit vessels. Out of 78 identified vessels, 41 are Sandy Lake ware, 33 NEPV ware, and 4 are ascribed to Oneota. Sandy Lake ware is a ceramic style that is ubiquitous in central and northern Minnesota during the Late Prehistoric period, strongly associated though not coterminous with the Psinomani complex (AD 1100- AD 1750) (Arzigian 2008:127).

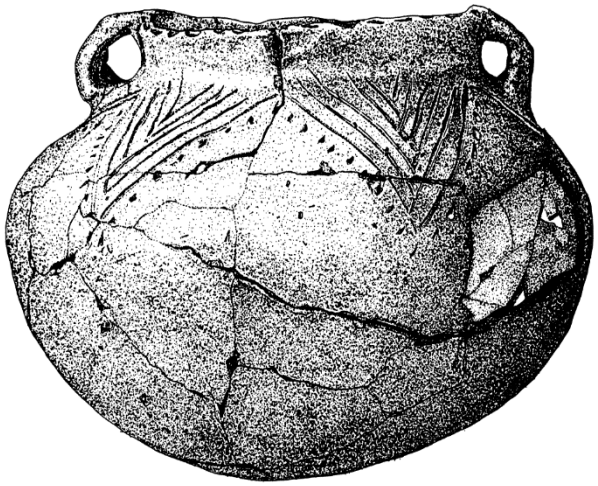

Figure 4.5: Correctionville-phase Oneota vessel from Dixon (Fishel 1999).

Sandy Lake ceramics are squat, globular jars, with mouth openings that are wide in proportion to the body dimensions. Rims are generally straight and may be rounded or flat in profile, and surface treatment generally consists of either vertical cordmarking or smoothed over cordmarking on the surface of the vessel (Arzigian 2008). The Sandy Lake vessels recovered from Shea resemble the standard form in most ways, though they are different from standard Sandy Lake vessels insofar as there is frequent usage of Oneota motifs on their upper bodies and rims. Nested chevrons, chevrons bordered with punctates, and chevrons delineating zones of decoration (Figure 4.7) are all found on body sherds (Michlovic and Schneider 1988). These designs are a departure from the usual surface treatment of Sandy Lake vessels, which are generally restricted to cordmarking and tooled or notched lips (Arzigian 2008:132). Temper of the Sandy Lake vessels at Shea is shell, grit and shell, or simply grit.

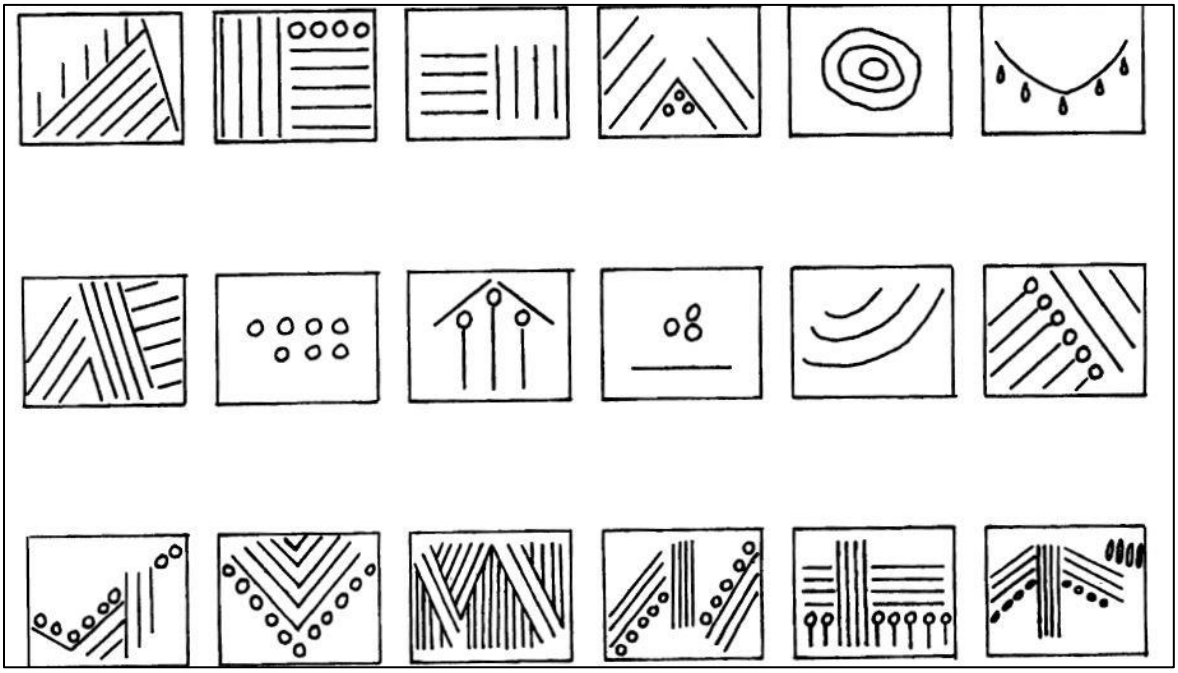

Figure 4.6: Samples of ceramic motifs from Dixon (Fishel 1999).

The other major ceramic group present at Shea is the NEPV ware. This ceramic ware is broadly defined as globular, grit-tempered jars with pronounced shoulders. At the Shea site, the usually smoothed, minimally decorated NEPV ware is instead decorated with a variety of Oneota motifs and cordmarked vertically to match Sandy Lake ceramics. Nested chevrons and decorated zones outlined by chevrons appear on NEPV ware vessels at Shea, suggesting some level of familiarity with these motifs.

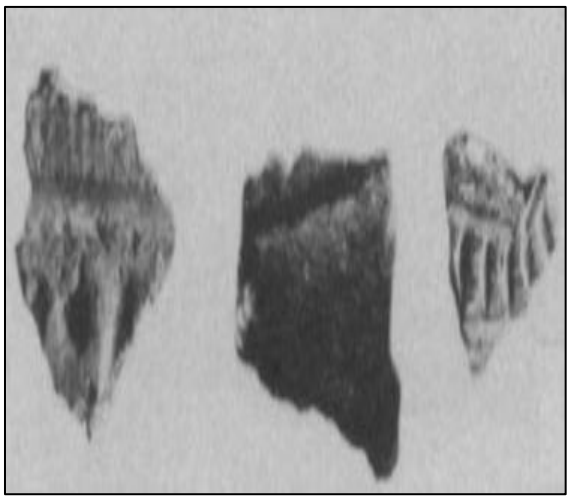

Figure 4.7: Sherds of Sandy Lake vessel from Shea, bearing rectilinear designs and punctates reminiscent of Oneota vessels (Michlovic and Schneider 1993).

The Sprunk ceramic assemblage, like that of Shea, consists of NEPV ware and Sandy Lake. Also like Shea's ceramic assemblage, the artifacts from Sprunk show significant evidence of blending or blurring styles. Oneota-derived motifs dominate, and different attributes seem to cross-cut ceramic traditions, from Sandy Lake vessels with wide flaring rims to grit-tempered Oneota-derived vessels (Figure 4.8). Examining the ceramics gives the impression that "[s]urface finishes and decoration cross-cut tempers…blending or blurring is a diagnostic" (Michlovic and Holley 2009:57). The almost even split of grit and shell temper at Sprunk also

serves to demonstrate the degree of fluidity that seems to have characterized relationships between the different groups present at Sprunk.

At White Rock, both sand and shell temper are in evidence, though the motifs on both sand- and shell-tempered ceramics are the same. Chevrons, trailed lines, and punctate borders congruent with Oneota styles dominate the ceramic assemblage regardless of temper, and much like Dixon there is little evidence for blending of styles or multiple styles coexisting in one vessel.

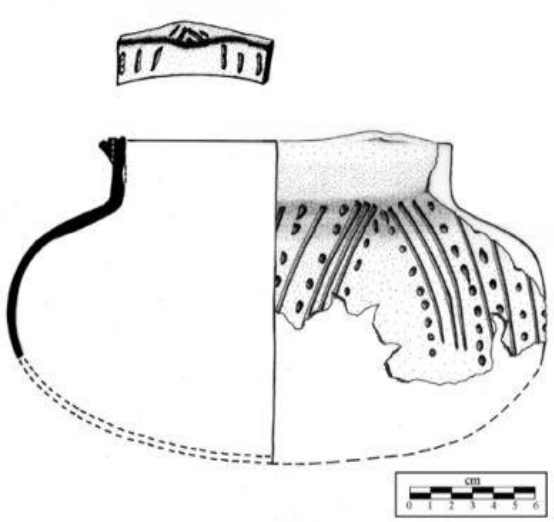

Figure 4.8: Oneota-like vessel from Sprunk (Michlovic and Holley 2009).

The rim forms are consistently of the Walnut Decorated Lip style (Wedel 1986), high and straight to slightly outflaring with tool impressions on the top and interior of the rim. Again like Dixon there is little evidence for crosscutting of styles across multiple vessel forms or blending of disparate vessel elements. Interestingly, the motifs on Oneota pottery recovered from White Rock (Figure 4.9) are consistent with Correctionville-phase Oneota decoration, suggesting possible interchange between those areas (Logan 2010b).

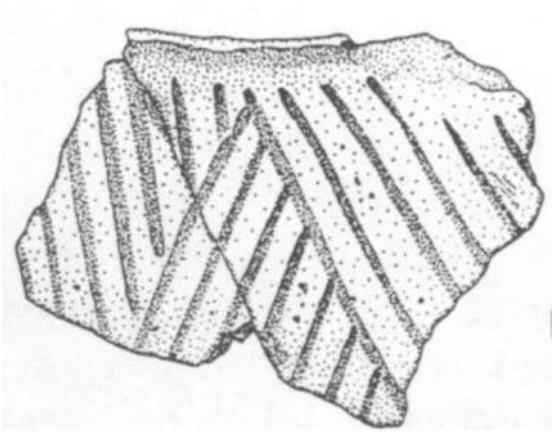

Figure 4.9: Walnut decorated lip sherd from White Rock (Ritterbush 2002).

Features

The types of features identified at sites can, of course, illuminate much about the activities in which the inhabitants were engaged. There is little need to resort to statistical analyses to pick through the numbers in this case; there are clear distinctions between the sites with regard to the features recorded. Table 4.10 shows the features recorded at each site as both a raw frequency and a percentage of all the features on site. Storage pits and discard/refuse pits show a clear inverse correlation—where storage pits make up 33.7 percent of the features at Dixon, the next highest site is White Rock, where they comprise only 5.5 percent of the features. Conversely, discard/refuse pits comprise 27.7, 31.25, and 42.1 percent of the features at White Rock, Sprunk, and Shea, respectively, while at Dixon only 4.5 percent of features are refuse pits. This sharp contrast speaks to a fundamentally different presence on the landscape, with different rules for how the surrounding area should be maintained, and likely is related to how the seasonally occupied sites were abandoned after their use. The other value that triggers interest is the relative number of hearths or food processing features at each site; at Dixon, only 4.94 percent of features are hearths, notably lower than White Rock, Shea, and Sprunk. This is due

not to an absence of cooking or food preparation at Dixon, but to the other feature types represented at Dixon- a wider variety of human activity means a wider variety of evidence from that activity, including features. Finally, Shea and Sprunk are noteworthy for having fortification ditches, whereas White Rock and Dixon lack any defensive architecture

Dixon's profusion of storage pits makes sense for a large village with a strong focus on growing, processing, and storing maize, especially if the village is occupied year-round and requires storage for winter foods. By contrast, the relatively low proportion of features given over to storage at Shea, Sprunk, and White Rock suggest that there is less need for accumulated provisions at these sites—this could reflect a year-round availability of resources at White Rock, but at Shea and Sprunk given their location in the Northeastern Plains this explanation is not satisfying. Either they are not producing a surplus of food for storage, or that food is being transported elsewhere. We know that the faunal evidence, as well as ceramic residue at Sprunk, suggests intensive processing of bison bone to extract grease and marrow, and at Sprunk a reasonable case can be made for production of pemmican. This suggests that the inhabitants were less concerned with storing provisions on site and more preoccupied with food that could be transported elsewhere-potentially back to a winter village.

Table 4.10

Features by count/percentage of total features at Shea, Sprunk, White Rock, and Dixon

Features: Number by Type	Shea	Sprunk	White Rock	Dixon
Storage Pit	2.00	0.00	2.00	30.00
Discard/Refuse	16.00	5.00	10.00	4.00
Hearth	9.00	3.00	5.00	4.00
Structure	0.00	0.00	2.00	3.00
Post	7.00	6.00	17.00	47.00
Unclassified	3.00	1.00	0.00	1.00
Fortifications	1.00	1.00	0.00	0.00
Total	38.00	16.00	36.00	89.00
Features: % by Type	Shea	Sprunk	White Rock	Dixon
Storage Pit	5.26	0.00	5.56	33.71
Discard/Refuse	42.11	31.25	27.78	4.49
Hearth	23.68	18.75	13.89	4.49
Structure	0.00	0.00	5.56	3.37
Post	18.42	37.50	47.22	52.81
Unclassified	7.89	6.25	0.00	1.12
Fortifications	2.63	6.25	0.00	0.00
Total	100.00	100.00	100.00	100.00

White Rock has a unique feature type; two bone boiling pits that may have been used for bone grease production. Logan (1995) indicates that Feature 10 at White Rock is a bone grease pit with all of the pulverized bone left *in situ*, while Feature 4 at White Rock is a boiling pit that has been cleaned out. Shea and Sprunk do not have evidence of bone boiling pits, but evidence from ceramic residues indicates pots may have been used to boil bones for grease extraction (see Faunal, above). The archaeological footprint of grain processing, such as may have occurred at Dixon, may be more likely to appear in the form of grinding stones or other tools used to mechanically process starchy seeds- these are notably absent from Shea and Sprunk, indicating

that grains may have been minimally processed or boiled whole rather than ground. This is consistent with the botanical analysis—the predominant starchy grains at Shea and Sprunk are charred seeds of Chenopodium and amaranth, which may be ground into a flour but may just as easily be boiled (Babot 2009).

Shea and Sprunk are both notable for the presence of a fortification ditch. These ditches encircle the entire site; in the case of Shea, the fortification ditch also seems to have been enlarged to cover a greater area of the site at one point (Michlovic and Schneider 1988) suggesting that between seasonal occupations there was a need for more space. White Rock and Dixon lack fortifications, as do most western Oneota and CPT sites (Henning 2001). Fortifications are generally interpreted as evidence of chronic conflict in an area. Although the Dixon site has been intensively excavated, efforts have focused on mitigation of particular areas potentially impacted by undertakings or erosion (Anderson 2019; Fishel 1999). As such, the outer boundaries of the site have only been delineated by noting where surface artifacts end; it is possible that subsurface testing would reveal fortification of Dixon. It should be noted, however, that fortification is a rare phenomenon at Oneota sites (Henning 2007), and based on current knowledge neither Dixon nor White Rock is fortified. Further investigation may necessitate revisiting the question of fortification at Dixon and White Rock.

Human Remains

As a means of claiming ownership of a place, and as a symbol of connection to that place, the interment of the dead is a strong symbol throughout human history. At 13WD8, human remains representing a minimum of six individuals were recovered during 1994. At White Rock, one cranial fragment was recovered during excavations, and no human remains were recovered from Shea or Sprunk. While these results focus on the human remains recovered from

documented excavations, it is worth noting that the Dixon human remains are in addition to those known to have been disturbed or looted by pot hunters, school field trips, and others over the years (Fishel 1999:6).

The six individuals recovered from Dixon during the 1994 excavation range from a subadult of one to three years to a middle-aged female with developing osteoarthritis. There is little sign of nutritional stress or skeletal pathologies beyond mild arthritis in one individual. Among the human remains from the Dixon site are three isolated cranial fragments, one recovered during highway maintenance in 1989, one during the 1994 excavations and the other during the more recent 2016-2017 mitigation. The 1989 cranial fragment bears incised lines, interpreted as a partial thunderbird motif (Lillie and Schermer 2015). The 1994 cranium was mostly intact, except that the right lateral and parietal frontal bone had been cut off and the resulting marks had been smoothed over. Cut marks are also visible on the zygoma and maxilla (Fishel 1999:114). The 2017 cranial fragment, which "consists of the right eye orbit, both maxillae, and most of the sphenoid" (Noldner 2018) is not etched or modified, although the lack of any other elements in the same context suggests intentional removal from the rest of the cranium, and the loss of the maxillary left third molar suggests that the remains decayed elsewhere before the facial skeleton was deposited at the base of a pit.

During the 2017 excavations, one largely intact skeleton was recovered, belonging to an 11.5-13.5 year old of indeterminate sex in the base of a pit feature (Noldner 2018). Skeletal pathologies suggest malnutrition or disease impacted this individual from an early age and would have required significant care from other members of the community until the time of death (Noldner 2018). Excavation of the cranium from the surrounding matrix in the lab revealed that a turtle shell had been laid underneath the skull, likely as a grave offering. Owing to the

abundance of food available at the Dixon site, it is more likely that disease was responsible for skeletal pathologies than malnutrition (Noldner 2018).

While there is a clear pattern of burials at the Dixon Site, including incised human cranial fragments that doubtless held great significance and power, the single cranial fragment from White Rock is more difficult to tie to a larger pattern of human interment at the site. This piece was recovered from Feature 10 of White Rock, suggested to have been a bone boiling pit for the extraction of bone grease (Logan 1995). Although the cranial fragment from White Rock does not seem to be part of a formal interment or burial (Logan 1995), there is precedent for isolated cranial fragments at Oneota sites, particularly western Oneota sites (see Discussion).

The absence of human remains from Shea and Sprunk may indicate that these were not sites at which the dead were regularly interred. Instead, it is possible that burials occurred away from warm season habitations or in areas in which reinforcement of ownership was more critical. It is also possible that further excavation may reveal the presence of human remains at Shea and Sprunk. It should be noted that, based on currently available data, human remains and fortification do not co-occur at any of the sites.

Chapter 5: Discussion

In making the comparisons discussed above, one thing becomes quickly clear; there is no obvious answer, no glaring difference in how people lived their lives that can instantly explain the variable evidence for social interaction between groups across the western Oneota frontier. However, the archaeological data do allow us to narrow the scope of inquiry somewhat by discarding answers that do not match the observed cases and focusing on areas of inquiry that have the potential to further unravel the dense skein of social, political, and economic activity that connected people on the Late Prehistoric Plains. I begin by briefly summarizing findings for each site, and gradually tie in the existing literature to provide an interpretive framework.

Dixon, by virtue of its role as a year-round permanent habitation site, is both the most complex site and the easiest to discuss, in many ways. In Dixon we have an example of a western Oneota village and all the myriad activities associated with such a site. The lithic artifacts run the gamut from unnotched triangular projectile points to ground stone metates, with a heavy emphasis on end scrapers relative to the other sites in our sample. Ground stone chopping, abrading, and grinding tools are all in evidence. Residents exploited a wide array of faunal and botanical resources from the surrounding environment, including bison, though bison only make up 38% of the faunal assemblage. Animals targeted for hunting include not only ungulates with a large amount of meat, but also songbirds and animals whose primary value may have resided in their feathers, bones or skin rather than their flesh.

The features recorded at Dixon also indicate that this site was inhabited for extended periods of time, with multiple storage features indicating that the inhabitants were stockpiling food, likely for the winter months. The human remains at Dixon also suggest that this site was a place of significant importance and that its inhabitants had a longstanding and enduring

connection to the location; the interment of the dead imbues a place with an importance that is difficult to overstate.

The ceramic record at Dixon shows little evidence of influence from other cultures—Oneota vessels with typical Correctionville-phase motifs are far and away the dominant specimens, with a thin scattering of grit-tempered Missouri River wares recovered from limited contexts in the 2016-2017 excavations (Anderson 2019). Although it is clear that the Dixon inhabitants had contacts within a wide geographic area based on the lithic raw materials recovered, there is little evidence that directly supports the presence at Dixon of non-Oneota individuals.

White Rock is interpreted by Logan and Ritterbush (Logan and Ritterbush 2000; Logan 1995; Logan 2010b) as a year-round habitation site with a focus almost exclusively on procuring bison. Although there is evidence of corn present at the site, a mere 11 kernels are not sufficient to assert that these people were engaged in horticulture to supplement their hunting-based diet. Exploitation of non-bison animals is limited, and no ground stone tools for processing grain were recovered. The lithic raw materials recovered from White Rock suggest limited ties with Oneota groups to the east, instead being more oriented towards lithic sources in the Central Plains and points west. Bone boiling pits provide evidence of processing crushed or fragmented bison bone to extract grease and marrow fat, while the ceramic assemblage is exclusively of vessels constructed in the Oneota fashion with Oneota motifs, though sand is used as a temper as well as shell. A connection to Dixon and other Correctionville-phase sites is suggested on the basis of western lithic materials recovered from Dixon, as well as the Correctionville-like motifs on the White Rock ceramics.

This putative connection is based on more than the exchange of goods, however, an insight that comes from the human remains at White Rock. Although the only human skeletal element at White Rock was a piece of cranium recovered from a boiling pit, this provides a link to a practice recorded at several Iowa Oneota sites (Lillie and Schermer 2015). Throughout Iowa and the Midwest, multiple Oneota sites have yielded carved pieces of human crania, with incised lines depicting anthropomorphic birdmen and other motifs common to Oneota iconography (Boszhardt 2018, personal comm; Lillie and Schermer 2015). These pieces are found universally in cache pits or middens, with little to suggest grave offerings or much ceremony at all in their positioning. Evidence from Nodaway suggests that a single skull might be separated into multiple incised pieces that could be distributed to multiple households or communities (Lillie and Schermer 2015). The purpose of these modified cranial fragments is unknown, but the similarities are striking; in all the sites, modified portions of human crania are found in a context identified as a storage or trash pit. The known specimens all exhibit rounding and wear at the edges, as if handled frequently by their users. Lillie and Schermer (2015) interpret the deposition of the bones as evidence that their usefulness is finite, and once they have served their purpose they can be discarded. Another interpretation is that the burial of these items was integral to their function—if they served as a talisman of some variety, burying them in the ground might yield positive results for all those associated with a household or community nearby. It is further striking that many of the engravings depict birdmen or birds, generally representative of an Upper World in Siouan cosmology. The placement of an Upper World symbol into the earth evokes the same imagery of balance that typifies mound symbolism among Oneota groups (Betts 2010).

Shea is a fortified village along the Maple River, with a ditch and possible palisade encircling a hilltop overlooking the river. Faunal evidence suggests heavy exploitation of bison, but not to the exclusion of the many other species that would have been available from the river, plains, and gallery woodlands nearby. The Shea inhabitants produced great quantities of refuse, with middens and discard pits pockmarking the site and comprising a full 42% of the recorded features. Bison elements indicate that Shea residents were taking locally available animals and processing their bones for marrow or grease on-site. There is limited evidence for use of freshwater mussels, though inhabitants were exploiting other aquatic resources such as beaver, turtle, and frog. Unlike the ceramic assemblages of Dixon or White Rock, there is strong evidence for hybridization and intergroup contact contained in the ceramics from Shea; Oneota motifs occur on NEPV sherds, Sandy Lake vessels are found in the same context as NEPV vessels, and vessel forms, temper, and motifs are combined in many permutations that would normally exclude the vessels from characterization as NEPV or Sandy Lake. There is some red pipestone recovered from the site—though its provenience has not been analyzed it is assumed to derive from the quarries of southwestern Minnesota.

Botanical evidence from Shea suggests that maize was present, though perhaps not actively cultivated and may have been imported from elsewhere. Whether or not it was cultivated on site, it is clearly not a dominant part of their diet. Instead, Chenopodium supplies the majority of the starchy seed remnants, though analysis suggests that the inhabitants were using undomesticated Chenopodium rather than seeds from plants that had been selected for their higher yield. Projectile points heavily outnumber end scrapers, and all thirty of the points recovered are unnotched triangular points with the exception of a single side notched point. No ground stone tools have been recovered; no chopping tools, grinding tools, abraders, or any other

form. This suggests that Shea inhabitants were either not using these tools or removed them from the site when they returned to their off-season habitations. There is no feature evidence of house floors or dwelling spaces congruent with construction of permanent homes. Instead, residences may have been hide or bark over wooden frames that could be transported between sites. Schneider and Michlovic (1993) report that the Shea site kills do not represent a full cross-section of a bison herd in terms of age and gender. This in turn suggests that bison were not being taken in large, one-time kill events but were taken periodically over the course of a long occupation in many small-scale kills. Overall, Shea presents as a warm-season hunting village, at which inhabitants procured food for their immediate needs as well as processing food for later transportation.

Sprunk mirrors Shea in many respects as a fortified warm-season hunting village, though the discrepancies are numerous and important. Just as at Shea, maize seems of little importance to the inhabitants, with the botanical record dominated by Chenopodium seeds, as well as a variety of fruits and greens that were locally available. A wide variety of animals are exploited, though at Sprunk a pattern of bison hunting shows much more clearly than at Shea, with bison elements comprising 83.5% of the total faunal assemblage. Ceramic residues indicate that bison bones were being processed for marrow and bone grease, likely in the production of pemmican based on the mingled residues of blueberries and other plant matter. Just as at Shea there are no ground stone tools that would have been suitable for processing seeds, constructing or shaping wood, or pulverizing bison bone for marrow extraction, though at least some of these activities likely occurred. Unlike Shea, the lithic raw materials at Sprunk are primarily derived from sources farther west in North Dakota, with 63% of the lithic assemblage manufactured from Knife River flint.

Sprunk's projectile point morphologies present as significant in X^2 tests due to the higher proportion of side-notched points relative to other sites. Where Shea's ceramics largely use grit temper, Sprunk has a more even balance of grit and shell tempered ceramics. If the choice of temper and variations in point morphology are linked to members of different cultures, the more differential distribution of tempering agents and point morphologies at Shea and Sprunk may reflect a greater or lesser influence from particular cultures at these sites. The ceramic assemblage contains additional evidence of hybridization, with Oneota motifs occurring on both Sandy Lake and NEPV vessels. It is intriguing that though Shea and Sprunk are putatively connected as part of the "Shea phase," there is substantial variation in the degree of representation of either NEPV or Psinomani material culture, suggesting that these sites were not occupied by a uniform cultural group but that the number of inhabitants from different cultures may have fluctuated over time and between sites, potentially between occupation episodes. It should also be made clear that the Shea phase does not represent an intrusive Oneota occupation; instead, one of the defining characteristics of the Shea phase is the evidence for interaction between different cultures, primarily NEPV and Psinomani.

In interpreting Oneota expansion into Woodland territory—and later into the Central Plains—a concept of Oneota as aggressive has been promulgated (Benn 1989; Hollinger 2005, 2018; Ritterbush 2007). As discussed in the literature review, this is based on two primary elements—actual and circumstantial evidence of violence (skeletal trauma, depopulation, fortification) during the time of Oneota entrance into new areas, and an iconography that includes vivid depictions of warriors, Hawkmen, victims, and trophies removed from victims (Benn 1989; Hollinger 2018). In Benn's interpretation, violence was integral to the development

of Oneota society and was both a means of coercing resident populations and elevating personal and kin-group status.

The lack of evidence of intercultural contact at White Rock and Dixon seems to support the concept of Oneota as buttressed by an aggressive ideology that permits movement into new areas, subjugation or displacement of an existing populace and establishment of control using war-like iconography that is linked to powerful clan groups within the larger society. Circumstantial evidence in the Central Plains and northwest Iowa support these ideas; the abandCentral PlainsCentral Plains and the sudden exodus of Mill Creek peoples from Iowa are offered as proof that the Oneota swept in, displaced the resident population, and established dominance over the region (Alex 2000; Henning 2007). There is a growing body of eCentral Plainsting that the Central Plains from AD 1200-1300 was rife with violence, specifically violence against communities and structures (Hollinger 2018; Roper 2001). Earthlodges were burnt, entire families killed, and soon after CPT groups Central Plains the material record in the Central Plains, their descendants appear in Initial Coalescent sites further north. Circumstantially, the Oneota are the logical choice as the aggressors; few other groups were present in the area and the Oneota seemingly possessed the numbers to engage in this level of sustained violence. The few sites with co-located CPT and Oneota artifacts exhibit little mixing of those components (Ritterbush 2007), suggesting that despite their contemporaneity and proximity there was little interaction occurring.

Shea and Sprunk complicate this narrative of hegemony supported by physical violence and promulgation of iconography. The ceramic evidence clearly suggests that Oneota groups engaged in positive relations that left their mark on the material record of the Northeastern Plains. The cultural ecology of the sites does not immediately seem to be a factor—Dixon is a

large village with a wide array of resources exploited, White Rock is perhaps more properly a hunting camp or extraction site—and yet both of these sites have very little evidence for intergroup contact, while the warm-season habitations of Shea and Sprunk, which also reflect a pattern of resource extraction similar to White Rock, show signs of friendly interaction—though of course the fortifications suggest that friendly interaction occurred within a nuanced social milieu.. The varying evidence of social relationships in sites geared towards resource acquisition suggests that the factors governing whether Oneota interacted positively with other groups were not simply related to site function. Instead, Shea and Sprunk offer clues based on the specific nature of the evidence of positive relationships

The two wares prevalent at both Shea and Sprunk are NEPV and Sandy Lake. Hybridization is apparent in both the NEPV and Sandy Lake wares, with Oneota motifs appearing on both, although the actual ratio of Sandy Lake to NEPV is different between Shea and Sprunk. The fact that Sprunk has evidence of projectile point morphology differences, and a more even split of grit and shell tempered pottery may offer some clues as to what is happening here—rather than consider these site deposits as the result of a single group of people, it seems more likely that NEPV and Psinomani groups were coming together for warm-season hunting camps to procure provisions, trade with one another, and prepare for winter.

In addition to the ceramic evidence for social interaction, the presence of pipestone at Shea and Sprunk, as well as tobacco seeds at Sprunk, raise the possibility that social relations were being created and maintained partly through the ritual use of tobacco. Though Dixon does not share the same evidence for interaction in the ceramic record, the presence of pipestone and tobacco on-site as well as the wide geographic area suggested by Dixon's lithic raw materials raise the possibility of pipe ceremonialism at Dixon as well. In fact, there is a strong argument to

be made that northwest Iowa Oneota were early proponents of pipestone usage. As the role of pipestone in tobacco ceremonialism became more pronounced, Oneota groups could position themselves as suppliers of a resource that was critical to the social and ceremonial lives of people in the Midwest and Plains.

If the interpretation that Psinomani groups were utilizing Shea and Sprunk is true, then this changes our understanding of how the Oneota influence arrived at those sites. Rather than direct Oneota contact in the Northeastern Plains—a scenario with little evidence to support it—these motifs and ceramic styles may have arrived by way of Psinomani groups travelling westward to procure bison meat and hides. The different proportions of grit and shell temper pottery between Shea and the differential proportion of projectile point morphologies both may indicate that the ethnic makeup of these sites differed from one another or fluctuated over time, perhaps both. This is not to say that no Oneota individuals were ever present at Shea or Sprunk, but instead I suggest that any individuals at those sites may not have been present in an "Oneota capacity" and instead were there due to kin ties established with Psinomani people.

Even if the Shea phase sites do represent Oneota-influenced Psinomani people interacting with NEPV groups, this merely moves the original Oneota interaction further down the line, and we are still left with the evidence of intergroup violence and depopulation that accompanies the Oneota expansion into the Plains. An examination of the factors driving conflict in the Upper Midwest and Plains regions may help to clarify why it is that Oneota seem to interact with their neighbors in such different ways under different circumstances.

Bamforth (1994) asserts that in the precontact Plains the primary driver of intergroup violence was the need to secure arable land for farming. Though his cases largely revolve around the Middle Missouri region, the results are applicable to Oneota westward movement as

well. Whether Mill Creek or CPT, the groups who seemingly found themselves displaced or driven out by Oneota intrusion were reliant on maize agriculture, and Oneota movement west inevitably sees the Oneota situating themselves on prime arable land (Hollinger 2018; Pugh 2010).

In the case of White Rock, though it is still not clear whether it was occupied year-round or seasonally, I believe the argument can be made that it was territory claimed by Oneota groups. The presence of human cranial fragments in a bone boiling pit, mirroring those bones found at Oneota sites throughout Iowa, may be a way of establishing ownership on a symbolic level, even if the Oneota inhabitants were not in residence for the entire year.

By contrast, the Psinomani occupied areas of Minnesota beyond the northern limits of corn horticulture (Schneider 2002; Woodie and Kaye 1969). Oneota relations with these people could have been established as part of the Oneota movement west from Red Wing towards the Blue Earth River valley. The archaeological record provides a surfeit of evidence to support the idea of a close relationship between Oneota and Psinomani people, with ceramics resembling a blend of Oneota and Sandy Lake recovered from contexts as early as 1100 AD in the Red Wing area locality (Arzigian 2008: 127). Oneota-Sandy Lake hybrid ceramics are common enough to have garnered the portmanteau "Sandyota" and are reported from central and eastern Minnesota, ranging up north into the Chippewa National Forest (Arzigian 2008:132). Ogechie ceramics, defined as a blend of Oneota and Sandy Lake, occur throughout central Minnesota and up into the Red River valley (Arzigian 2008:133). Though parsing the exact nature of this relationship is not the intent of this thesis, there is a strong argument to be made that "On the basis of shared ceramic traits, use of a common environment, chronological overlap, and a likely relationship to

historically known Siouan speakers, a close link between Sandy Lake and at least one variant of Oneota may be postulated" (Michlovic 1983:25).

The fact that the primary evidence for positive Oneota non-conflict driven interactions with another group is with a culture whose land use patterns differed substantially from those of the Oneota is intriguing. If the primary motivator for conflict was in fact arable land, the Oneota would have one less reason to antagonize the Psinomani, whose territory and lifeways did not encroach on available land for cultivating maize. Even in the Shea and Sprunk sites, we see that maize is present as a small addition to a diet focused on bison, locally available fauna, and wild plant resources—and perhaps maize is one of the resources that made a cordial relationship with the Oneota a possibility for Psinomani peoples, with Oneota groups exchanging corn for hides or other goods.

Though a divergent resource base (wild rice as opposed to maize) could explain why the Oneota were able to maintain friendly relationships with the Psinomani, this does not explain why the Shea phase sites are fortified. If we take fortifications as evidence of violence— or at least the recognition that violence was a possibility—then this seems to run directly counter to the narrative of Shea phase sites as representing a peaceful coming-together of peoples. Perhaps the most important conclusion here is that social relationships of the Great Plains and Upper Midwest during the Late Prehistoric period defy such easy categorization as "friendly" or "unfriendly". Any ties between Psinomani and NEPV people were not established on a single occasion, after which they remained fixed. Instead, social bonds would need to be created and actively sustained through exchange, exogamy, pipe ceremonialism, or other means. It follows then that those ties could also be severed at times and then restored when there was a need and desire to do so. It is also worth considering that neither Psinomani, nor Oneota, nor Northeastern

Plains Villagers are a monolithic cultural group making decisions as a single entity. It could very well be the case that Psinomani groups on the Northeastern Plains forged connections with particular families, clans, or other social units, while others resisted their overtures or made none of their own. The archaeological record is a palimpsest and should be regarded as such. Where we see hybridized ceramics and fortifications and perceive a contradiction, the processes that left behind those remnants would have unfolded over years and decades.

The historic record also tells us that initiation and then cessation of hostilities was not an unknown phenomenon. For example, in 1699 a group of Mendeouacantons Dakota attacked and plundered a shipment of goods belonging to Le Sueur, then offered a gift of beaver pelts the next summer in an attempt to assuage any remaining hostilities and facilitate relations--apparently the cause of their ire was the failure to secure their permission to travel segments of the Minnesota River (Westerman and White 2012:55). Such incidents would certainly make a compelling case for fortifying one's position against attacks, especially if the political situation was subject to rapid change. Of course, given the degree to which European contact disrupted indigenous lifeways in the North American midcontinent, it may well be that such historical connections are unwarranted and at this time we simply lack the information necessary to correctly explain the fortification of the Shea phase sites. It is intriguing, however, that fortification and human remains do not co-occur at any of the sites. The interment of a group's dead could be seen as both a way of establishing a link to that place and as evidence that the inhabitants have little fear that they will be separated from that place.

Taken together, the picture that unfolds is one in which the Oneota do seem to have a vested interest in staking their claim to sites such as villages or locales where resource extraction occurs. When there is arable land to be had or a valuable resource to exploit, it does seem that

Oneota groups quickly supplant existing groups and leave behind only their own distinctive material culture. This should be considered with the caveat, of course, that ceramic artifacts are given a great deal of weight in determining whether a site is affiliated with Oneota. Shea, White Rock, and Sprunk all show evidence of being sites with a seasonal occupation, although the presence of human remains at White Rock does suggest a sense of ownership or enduring connection to a place. The total absence of Central Plains Tradition traits at White Rock could even be a deliberate gesture to assert an Oneota identity. By contrast, I interpret Shea and Sprunk as shared spaces between multiple groups and identities. We cannot know exactly how much significance people ascribed to these ceramic artifacts, or indeed whether the hybridized ceramics were deliberately representative of a close relationship between different groups or were simply regarded as an aesthetic choice. That said, the obvious familiarity with a variety of ceramic motifs and designs clearly speaks to prolonged interaction between Psinomani and Oneota as well as Psinomani and NEPV.

In Chapter II, I discussed the three approaches envisioned by Guy Gibbon for better understanding Oneota. These three overlapping paths of inquiry include Oneota trade, political power and networking activity, and the development of permeable ethnic and social boundaries. The archaeological evidence for these different approaches all generally centers on interpreting the movement of material and ideas between Oneota and other groups. Though all are worth pursuing, based on the analyses above, an inquiry focusing on the permeable ethnic and social boundaries of Oneota and other groups in the Upper Midwest at this time period will have both the greatest array of evidence and will inevitably shed light on social networking and trade. This thesis has largely focused on the results of intergroup contact that may have originated far from Shea and Sprunk; the Northeastern Plains offer evidence for how Oneota and other identities

were expressed and maintained, but a broader geographic and temporal net must be cast to fully grasp these social processes.

Chapter 6: Conclusions

As ever in archaeology, the data do not gift us with clear conclusions, and frequently simply lead to more questions. However, comparing the cultural ecology and subsistence strategies of Shea, Sprunk, White Rock, and Dixon to test if those factors offer explanatory power for the differences in intergroup interaction yields some tantalizing glimmers of insight into the shifting social dynamics of Plains and Oneota groups.

Perhaps the most obvious conclusion that can be reached is that no single model can completely encompass the range of Oneota intergroup dynamics and the processes that led to signs of Oneota contact from Central Kansas up to eastern North Dakota. Instead, a consideration of the particular context in which evidence of Oneota interaction is recovered allows a more nuanced view of not only Oneota movement but the connection between a culture's relationship to the environment and how they related to other nearby groups. In the case of Dixon and White Rock, a substantially different way of life and strategy for procuring resources belies the underlying cultural connections. Comparing Shea, Sprunk, and White Rock, by contrast, shows how even sites in which the range of activities and resources exploited is comparable can have significant differences in how relationships to other cultures are incorporated into the material culture and site organization; perhaps the most obvious example in this case is the presence of fortifications at Shea and Sprunk and their absence at Dixon and White Rock.

Although the model that calls for Oneota to be rapidly expanding and aggressive has its roots in solid archaeological evidence for inter-group conflict in the Midwest and American Bottom (Hollinger 2005; Benn 1989), clearly this approach is but one of many that were available to those who participated in an Oneota lifeway. This is not to suggest that Oneota were

never violent or aggressive--where it was necessary to secure access to resources and territory, Oneota were able to leverage their large population and strong social organization to displace indigenous populations, and in my interpretation, this is the process that best fits the archaeological evidence from the Central Plains.

That said, within Oneota ideology there was clearly a degree of flexibility in group membership and identity. Oneota people were able to forge lasting relationships with Psinomani groups and individuals, as evidenced by the hybridizing of these ceramic traditions. Indeed, these bonds were strong enough that Oneota motifs and ceramic designs are found co-located with Sandy Lake ceramics not only in Minnesota, where those meetings may have first occurred, but also in North Dakota. At this time, it is not clear whether those "Oneota-like" sherds at Shea or Sprunk derive from individuals incorporated into Psinomani groups through marriage or adoptive kinship, or whether those ceramic forms became so thoroughly embedded in Psinomani ceramics that they were reproduced elsewhere in the absence of their progenitors. Rather than view the imposition of Oneota symbolism as an act of hegemonic control (Benn 1989), it may instead be more profitable to focus on the existing similarities between thunderbird motifs and raptorial symbols of the Plains and Midwest regions (Warren 2007), as any overlap in belief systems may have afforded an opportunity for shared symbols to take on greater importance. This is particularly important if Benn's analysis of the role these raptorial motifs played is correct; any symbol of control or unifying motif will be more effective if it already has a place in a group's cosmology.

Economic differences between settlements are not the sole factor that led people to pursue different strategies for interacting with their neighbors. However, examining the role that these differences may have played in the past allows us to sharpen our focus and identify areas in

which additional information would prove useful. An archaeology of the Oneota, or any tradition for that matter, is above all an archaeology of human communities. The more we are able to reveal about how Oneota people interacted with their neighbors, whether that was peaceful, hostile, or both by turns, the more we begin to understand the tight webs of community that connected people, directly and indirectly, across the landscape.

The human cranial fragments and the movement of lithic raw materials suggests that for White Rock, community was something shared between other Oneota groups, an identity that aligned White Rock's inhabitants with the Oneota people of Iowa and shows great cultural continuity with sites further east. Although the subsistence practices of White Rock may have been considerably different from those of Dixon, when examining issues of community and group identity it is important not to let subsistence strategy become a defining characteristic (O'Gorman 2010); instead, looking at White Rock as but one part of a larger economic system may help to more properly situate it in relation to other western Oneota sites such as Dixon or Leary.

As is often the case, we are left with more questions than answers in many respects, but this analysis has not left us bereft of guidance; like any hypothesis, the conclusions reached in this thesis have testable implications for the archaeological record. A better understanding of how and why Oneota ceramic motifs and styles manifest on the Northeastern Plains may not begin at Shea and Sprunk at all; instead, our grasp of the burgeoning relationship between Oneota and Psinomani groups will likely be improved most by explorations in the central Minnesota Psinomani heartland. If the Oneota-Psinomani relationship is structured by differences in subsistence strategy and the lack of competition over the same resources, this should be apparent in the faunal remains and botanicals from sites in that region, as well as in the

appearance of Oneota influence on Psinomani pottery prior to the habitation of the Shea and Sprunk sites. This latter piece of evidence is arguably already present in the form of so-called Sandyota pottery. There will almost certainly be some overlap between the resources exploited by both cultures but if my inferences are correct then there will also be clear differences in subsistence strategies. The presence of lithic raw materials or ceramics derived from sources in the Oneota heartland at Psinomani sites would also help to substantiate this theory by offering evidence of early Oneota-Psinomani contact.

Though this thesis and the associated research questions have focused on the role of Oneota in influencing and interacting with other groups, it is also important to recognize that these interactions were entered into by multiple parties, and the Psinomani groups involved would have had their own reasons for engaging in, or refraining from, relations with Oneota. Historically, many researchers have ascribed a great deal of agency to Oneota groups when discussing inter-group interaction (Ritterbush 2007; Pugh 2010; Bettinger 2018); I believe this is due to two primary factors. First, Oneota sites often show little evidence of interaction with non-Oneota groups (Henning 2007), which compounds with the notion of Oneota as inherently expansionist (Benn 1989;1995) to produce the appearance of a culture that is more interested in spreading its own lifeways and beliefs than incorporating those of others. Second, the simple nature of archaeological sites as palimpsests means that the archaeological footprint of a group undergoing "Oneotification" (Gibbon 1995) may resemble that of a strictly Oneota site. Conversely, sites created by members of the same community before and after adopting an Oneota lifeway may be interpreted as the product of distinct groups rather than the same community with different material culture.

On the Central Plains, the theory that White Rock represents an Oneota adaptation whose intensive maize agriculture required consistent control over territory can be tested by further analysis of White Rock botanical remains and soil samples. If the use of maize relative to other botanicals is consistent with that of Oneota sites such as Dixon or Leary, this may suggest that White Rock inhabitants were actively cultivating maize and sought to establish a permanent or semi-permanent habitation in the region, which would have involved control over arable land and other geographically-fixed resources. Climatic data would also play a role in this analysis, clarifying the role that climate change and associated resource scarcity played in shaping Central Plains social relations. A shortage of arable land—particularly if aggravated by the Pacific Climatic Episode during this time period—could increase tensions and the possibility of conflict over key resources.

Ultimately, what we are able to glean from this analysis is not a complete answer to the question of why Oneota social strategies and intergroup relations seem to differ markedly across the western periphery of that tradition—or, at the very least, leave behind highly variable archaeological evidence. However, the results do suggest that a differential approach to land use and sense of "ownership" over land may have been at work under different circumstances. The presence of cranial fragments at White Rock, in particular, echoes the similar cranial pieces found throughout Oneota sites in Iowa and may point towards a fully-fledged connection to that landscape and place for which there is little counterpart at the Shea phase sites. Facing different resource constraints and having already forged a relationship with Psinomani peoples of eastern and central Minnesota, members of Oneota groups in the northern Plains may have been more fully enmeshed in the kinship system of that region, strengthening important ties to NEPV and Psinomani groups that permitted seasonal, temporary access to rich hunting grounds that could

be exploited as part of the seasonal round. It is not clear what Psinomani participants would have gained from this relationship. Grain is one possibility and would align well with historic period practices of hunting tribes trading with farmers. Additionally, one should not discount the advantages of having strong social ties to a large, well-organized group with extensive resources, especially in times of conflict.

As ever, dealing with Oneota in the archaeological record prompts the question of what it meant to *be* Oneota--questions of identity and group membership that the archaeological record can only address obliquely. However, the evidence from the Shea phase sites, White Rock, and the Dixon Oneota site all suggests that to participate in this broad, multi-regional tradition was to be part of a vast web of different communities and to partake of multiple identities, with group membership and kin ties fluctuating depending on the circumstances and the needs of particular individuals, kin groups, and larger social groups.

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Appendix A: Botanical Data

Botanicals by Frequency		Shea	Sprunk	White Rock	Dixon
Amaranthus/Chenopodium (pigweed or goosefoot)		362	94		537
Echinochloa sp. (barnyard grass, etc.)					57
Elymus sp. (wild rye grasses)					4
Helianthus annuus (sunflower)					6
Hordeum pusillum (little barley)					11
Iva annua (marsh elder)					5
Iva xanthifolia (burweed marsh elder)		1			36
Nelumbo lutea (American lotus)					5
Panicum sp. (panic grasses)					20
Phaseolus vulgaris (common garden bean)		1			4
Prunus sp		9	3		6
Poaceae (grass family)			5		55
Polygonum pensylvanicum/P. persicaria (smartweeds)			1		12
Portulaca sp. (purslane)					8
Rhus sp. (sumac)					13
Rosaceae (rose family: hawthorn and wild rose)					14
Rubus sp. (blackberry, raspberry, dewberry, etc.)			2		1
Scirpus validus (bulrush)					1
Setaria sp. (foxtail grasses)					4
Solanum americanum (black nightshade)		4			10
Verbena sp. (vervain)					1
Vitis sp. (grape)					37
Xanthium sp. (cocklebur)					1
Unknown type					
Unidentifiable					
Andropogon sp			1		
carex sp			2		
ipomea sp			1		
nicotiana sp			6		
rumex sp		2	1		
Maize		32	13	11	867
Trillium sp (trillium)		1			
Potentilla sp (cinquefoil)		2			
Oxalis sp (Wood Sorrel)		2			
Papaver Rhoeas (Corn Poppy)		2			
polygonum hydropiper (water pepper)		1			
Prunus pumila (sand cherry)		1			
Urtica sp (Nettle)					
Total		420	129	11	1715

Botanical Taxa and raw frequencies from Shea, Sprunk, White Rock, Dixon. (Fishel 1999; Logan 1995; Michlovic and Holley 2009; Michlovic and Schneider 1989*).*

Appendix B: Faunal Data

B1: Faunal Taxa as Reported. Percentage of total identified elements, by count (Fishel 1999; Logan 1995; Michlovic and Holley 2009; Michlovic and Schneider 1989)

	Shea	Sprunk	White Rock	Dixon
Bison bison	52.05	83.55	95.65	38.66
odocoileus sp (deer)	0	0.89	0	20.95
canis sp	4.11	6.67	3.91	13.82
cervus canadensis (elk)	0	0	0	2.16
castor canadensis (beaver)	3.08	0	0	1.08
scalopus aquaticus (mole)	0	0	0	0.65
rattus sp (rat)	0	0	0	0.43
procyon lotor (raccoon)	0	0	0	0.43
sus scrofa (pig)	0	0	0	1.73
geomyds (gophers)	3.42	0.45	0	0.43
Lagomorphs (rabbits)	1.71	0	0	0.22
sciuridae	0	0	0	2.80
testudinae (turtles)	5.14	0	0.43	0.65
ranids (frogs)	8.22	0	0	0.65
bufonids (toads)	2.40	0	0	0
fish	4.10	0.44	0	13.82
passeriformes	0	0	0	0.43

tetraonidae (grouse)	0	0	0	0.43
anatidae	6.84	4.89	0	0.43
passerines	0	0.45	0	0.22
lutra sp (otters)	0	0.45	0	0
microtines (voles, lemmings, muskrats	5.48	0.45	0	0
cricetines (hamster)	1.03	0	0	0
corvidae	0	0.45	0	0
snake	0	0.45	0	0
taxidea taxus (badger)	0	0.89	0	0
mephitis (skunks)	0.34	0	0	0
mustelids (weasels)	0.34	0	0	0
raptors	1.37	0	0	0
laridae (gulls and waders)	0.34	0	0	0
TOTAL	100	100	100	100

B2: Faunal Element Frequencies, unculled (Fishel 1999; Logan 1995; Michlovic and Holley 2009; Michlovic and Schneider 1989)

Taxa by Elements (Raw Count)	Shea	Sprunk	White Rock	Dixon
Bison bison	152	188	220	179
Odocoileus virginianus	0	2	0	1
Odocoileus sp	0	0	0	96
canis sp	12	15	9	64
cervus canadensis	0	0	0	10
castor canadensis	9	0	0	5
scalopus aquaticus	0	0	0	3
Rattus sp	0	0	0	2
procyon lotor	0	0	0	2
sus scrofa	0	0	0	8
geomys bursarius	10	1	0	2
lagomorphs	5	0	0	1
sciurid (squirrels)	0	0	0	13
testudinae	15	0	1	3
ranidae	24	0	0	3
bufonidae	7	0	0	0
tetraonidae	0	0	0	2
Anatidae	20	0	0	1
passerines	0	1	0	1
anatidae	0	11	0	1
lutra canadensis	0	1	0	0
microtines	16	1	0	0
corvus corax	0	1	0	0
serpentes	0	1	0	0
taxidea taxus	0	2	0	0
accipitridae	4	0	0	0
soricidae	2	0	0	0
Ictaluridae	12	1	0	0
Mephitis sp	1	0	0	0
Mustelidae	1	0	0	0
Cricetines	3	0	0	0
laridae (gull/wader)	1	0	0	0

Appendix C: Ceramics

C.1 Intersite comparisons

Temper (sherds, %)	Shea	Sprunk	White Rock	Dixon
Shell	9.13	52.55	41.81	98.8
Sand	0	0	44.48	0
Shell/Sand	0	0	11.7	0
Shell/Grit	22.73	0	0	0
Grit	68.14	47.45	0	0.9
Grog and Shell	0	0	0	0.3
Untempered	0	0	2	0
Surface Treatment (% rims)	Shea	Sprunk	White Rock	Dixon
Smooth	0	0	0	0
Cordmarked	61.76	49.23	0	0
Incised or trailed lines	38.24	50.77	100	100

C.2: Intrasite Ceramics descriptive statistics (percent of total ceramic assemblage at each site)

Dixon	Plain	Cordmarked	Incised/Trailed Lines
Shell	80.71	0	13.78
Grit	2.66	0.53	2.32
Shell/Grit	0	0	0
Sand	0	0	0
Shell/Sand	0	0	0
Grog	0	0	0
Shell/Grog	0	0	0
Untempered	0	0	0
Sprunk	Plain	Cordmarked	Incised/Trailed Lines
Shell	11.11	41.75	6.06
Grit	13.8	2.36	24.91
Shell/Grit	0	0	0
Sand	0	0	0
Shell/Sand	0	0	0
Grog	0	0	0
Shell/Grog	0	0	0
Untempered	0	0	0

Shea	Plain	Cordmarked	Incised/Trailed Lines
Shell	1.36	4.5	3.27
Grit	15.04	19.65	33.45
Shell/Grit	4.56	11.33	6.87
Sand	0	0	0
Shell/Sand	0	0	0
Grog	0	0	0
Shell/Grog	0	0	0
Untempered	0	0	0
White Rock	Plain	Cordmarked	Incised/Trailed Lines
Shell	31.35	0	10.45
Grit	32.47	0	12.01
Shell/Grit	0	0	0
Sand	0	0	0
Shell/Sand	7.61	0	4.09
Grog	0	0	0
Shell/Grog	0	0	0
Untempered	2	0	0

Appendix D: Features

Features: Number by Type	Shea	Sprunk	White Rock	Dixon
Storage Pit	2	0	2	30
Discard/Refuse	16	5	10	4
Hearth	9	3	3	4
Structure	0	0	2	3
Post	7	6	17	47
Food Processing	0	0	2	0
Unclassified	3	1	0	1
Fortifications	1	1	0	0
Total	38	16	36	89
Features: % by Type	Shea	Sprunk	White Rock	Dixon
Storage Pit	5.26	0	5.55	33.70
Discard/Refuse	42.11	31.25	27.77	4.49
Hearth	23.68	18.75	8.33	4.49
Structure	0	0	5.55	3.37
Post	18.42	37.5	47.22	52.81
Food Processing	0	0	5.55	0
Unclassified	7.89	6.25	0	1.12
Fortifications	2.63	6.25	0	0
Total	100	100	0	100