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Lauren W. Ritterbush

Kansas State University, lritterb@ksu.edu

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DRAWN BY THE BISON

LATE PREHISTORIC NATIVE MIGRATION INTO THE CENTRAL PLAINS

LAUREN W. RITTERBUSH

Popular images of the Great Plains frequently portray horse-mounted Indians engaged in dramatic bison hunts. The importance of these hunts is emphasized by the oft-mentioned dependence of the Plains Indians on bison. This animal served as a source of not only food but also materials for shelter, clothing, containers, and many other necessities of life. Pursuit of the vast bison herds (combined with the needs of the Indians' horses for pasturage) affected human patterns of subsistence, mobility, and settlement. The Lakota and Cheyenne,

for instance, are described as relying heavily on bison meat for food and living a nomadic lifestyle in tune with the movements of the bison. More sedentary farming societies, such as the Mandan, Hidatsa, Pawnee, Oto, and Kansa, incorporated seasonal long-distance bison hunts into their annual subsistence, which also included gardening. In each case, multifamily groups formed bands or tribal entities of some size that cooperated with one another during formal bison hunts and other community activities.¹

Given the importance of bison to these people living on the Great Plains, it is often assumed that a similar pattern of utilization existed in prehistory. Indeed, archeological studies have shown that bison hunting was key to the survival of Paleoindian peoples of the Plains as early as 11,000 years ago.² If we combine archeological information about this very early period of prehistoric existence with documentation of the historic era, it seems plausible to interpret that focused bison hunting was the mainstay of Indian societies throughout the millennia of native occupation of the Plains.

KEY WORDS: migration, bison, Central Plains, Oneota, Central Plains tradition

Lauren W. Ritterbush is Assistant Professor of Anthropology at Kansas State University. She is an archeologist with primary research interests in prehistoric hunter-gatherer-gardeners and the processes of human adaptation to the Great Plains.

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Upon close examination of the archeological record, however, we find that bison hunting was not equally important to all past Plains societies. During the Late Prehistoric period (A.D. 1000-1500), for instance, indigenous societies of the Central Plains were *not* heavily reliant on bison hunting.³ These societies organized themselves around individual households and depended on the harvesting of a wide variety of locally available wild and domestic resources. This pattern of subsistence, with limited interest in bison, proved successful given the small-scale social organization of these societies. A change toward more focused bison hunting developed in the Central Plains late in prehistory, not by indigenous Plains populations but by groups that migrated into the region in the thirteenth or fourteenth century.⁴ These immigrants came from the east and were likely Siouan rather than Caddoan speakers. They organized themselves in groups (villages) of linked households. Archeologists refer to this cultural manifestation as the Oneota tradition.⁵ With the entry of Oneota peoples into the Central Plains, indigenous households shifted their settlements, making room for the more cohesive and potentially aggressive population.⁶

The exact reason for westward Oneota migration is difficult to discern. It appears that abundant bison resources played an important role in drawing them into the heart of the Plains.⁷ Preexisting social structures and modes of living allowed large-scale bison hunting to be successfully incorporated into the already mixed subsistence base of Oneota culture. It is this adaptation, developed prior to the introduction of the horse and contact with European peoples, that came to characterize many of the sedentary bison-hunting groups of the eastern Plains during the historic period.

This study of prehistoric human migration into the Central Plains provides insight into this region's past, its people, and the processes of human adaptation and change. It reveals the diversity of adaptations developed by different populations and the factors involved in

decisions to migrate and in adjusting to the Plains. There are no simple explanations of the process of migration; rather, it is a complex interaction of environmental and social factors. The presence of bison does not provide a single explanation for occupation of the Plains. Yet, for certain Oneota peoples this variable interplayed with social structures to influence human movements and adjustments. Through a dynamic perspective of the past we see not only changing populations and adaptations but also the changing role of bison in human societies. This reminds us that the common image of Plains Indians as a monoculture of bison hunters was neither all-encompassing at any one time nor pervasive throughout the long period of human occupation of the Plains region.

CENTRAL PLAINS TRADITION

Identifying and unraveling the factors involved in migration into the Central Plains starts by understanding the indigenous peoples who lived in this region during the early portion of the Late Prehistoric period. Archeologists refer to these people and cultures as the Central Plains tradition (CPT). Numerous sites identified with this archeological tradition have been studied in Nebraska, Kansas, eastern Iowa, and northwestern Missouri and provide us with valuable data for interpreting past lifeways. The majority of CPT sites are relatively small and consist of one to three lodges. House floor plans indicate that these structures were commonly subrectangular with an extended entryway. Four central and a series of smaller wall posts upheld the superstructure of beams, thatch, and earth. A central firepit suggests an opening in the roof for ventilation. These structures were substantial (nonportable) homes that required some investment of labor and resources. Their design was well suited to the climatic extremes of the region. As such, these shelters likely served as year-round home bases for CPT households. New houses were built nearby or in other localities as social situations changed or the

structures deteriorated or were destroyed (for example, by fire).⁸

These habitations are scattered along major and tributary stream valleys throughout much of the Central Plains. On the smallest scale, typical CPt settlements consisted of one or two households, likely composed of close kin. Other households were nearby in similar settlements along the same or neighboring valleys. Individual houses appear to have been occupied for relatively short periods of time (an estimated five to ten years). Larger sites containing as many as two to three dozen lodges have been identified, but rather than villages, these were localities reoccupied by a series of families over an extended period of time.

The location of CPt settlements along the stream valleys of the Plains provided easy access to a wide variety of resources. Rich soils allowed the natural growth of diverse wild plants and the raising of corn, beans, squash, and sunflowers. Hoes made from bison scapulae (shoulder blades) or large mussel shells and picks made from bison leg bones were used to dig roots and tubers and work the soil. After harvest, wild seeds, roots, tubers, and garden produce were processed with various tools. Deer jaws or mussel shells were used to remove corn kernels from the cob, while limestone and sandstone slabs and handstones were employed for grinding seeds and cracking nuts. Scapulae were also shaped into knives for cutting relatively soft materials such as squash, which could then be dried for future use. Dried produce was stored below ground in pits. Much of the cooking was done in ceramic vessels. Clay for the manufacture of these pots was readily available in the stream valleys, as well as in some upland areas of the region where residual rather than alluvial clays were present.

The stream valleys and adjacent uplands were rich in animal resources. A diet of plant foods collected and grown by the CPt people was supplemented with meat obtained through hunting and collecting a variety of fauna. Small side-notched points and woodworking tools, such as shaft abraders and wrenches, indicate

that hunting was done with the bow and arrow. Although tools made of bison bone show that bison were hunted, their remains are not abundant at CPt sites. Various explanations can be hypothesized for this low density. Bison may have been butchered away from living sites so that only meat removed from the bone was returned to the site. The rarity of CPt hunting camps does not lend support to this hypothesis. Environmental conditions may have resulted in low bison populations in the Central Plains at this time, limiting the availability of bison. Cultural patterns may also explain the limited presence of bison remains at CPt sites. Faunal studies indicate that locally available resources were harvested, including a wide variety of large and small animals.⁹ This finding is supported by the diversity of faunal remains at five CPt sites in the northern Flint Hills of Kansas.¹⁰ The occupants of these sites hunted the large game animals bison, elk, deer, and pronghorn. In addition, they hunted or trapped cottontail, raccoon, squirrel, and other mammals and birds of the riparian forests and adjacent grasslands. Aquatic resources were harvested through hunting, trapping, and collecting beaver, waterfowl, turtles, mussels, and possibly frogs and toads. Fish such as catfish, gar, and bullhead were obtained using fishhooks and possibly other means. All these animals were available in habitats located within easy walking distance of the occupation sites and likely in sufficient quantities to support the limited number of individuals occupying each habitation. The faunal assemblage of the Hulme site in south-central Nebraska also reflects a locally focused and diversified subsistence base. The most prevalent animal remains here were those of pronghorn and deer. Nonetheless, numerous other species and types of animal are represented in the assemblage from this upland site, among them the jackrabbit, cottontail, prairie dog, raccoon, fox, grouse or prairie chicken, turkey, beaver, muskrat, turtles, fish, and a variety of waterfowl.¹¹ The more western CPt sites in the Medicine Creek locality of southern Nebraska consistently

contain bison remains as well as a variety of other animals from nearby grassland, woodland, and aquatic habitats.¹² The relative abundance of specific animal remains at each Central Plains tradition site varies according to the primary habitats of the surrounding environment. In nearly all cases, we see the CPt pattern of a diverse (diffuse) subsistence base reliant on readily available resources rather than on large-scale bison hunting.

Despite the generally sedentary nature of CPt cultures, movements within the region occurred on a regular basis. These movements expanded around the middle of the Late Prehistoric period. At this time many CPt settlements in the heart of the Central Plains were abandoned, as populations shifted to other localities within or adjacent to this region. For instance, CPt sites in the Medicine Creek (southern Nebraska) and Glenwood (western Iowa) localities appear to have been abandoned during the latter portion of the thirteenth century. In other areas, such as extreme northeastern Nebraska, the CPt was present in the fifteenth century.¹³ These data suggest that CPt groups were migrating within the Plains, establishing new homes and social relations. Climatic change (drought) has traditionally been suggested as a prime mover of these population shifts, although resource depletion (swidden model) has also been suggested to be an important factor. The appearance of a potentially aggressive migrant population in the region starting in the late thirteenth or first half of the fourteenth century could have been another major factor leading to the movement of CPt populations in the region.¹⁴

ONEOTA IN THE PLAINS

Evidence for the migration of eastern peoples into the Central Plains during the Late Prehistoric period is found in the form of archaeological remains identified with the Oneota archaeological tradition. The Oneota tradition is best known from sites in the Midwest (Fig. 1). Several well-known but until now little-

studied Late Prehistoric Oneota sites, namely the Leary, Ashland, and White Rock phase sites, are also present in eastern and southern Nebraska and northern Kansas. As is typical of Oneota sites in the Midwest, many of these western sites were villages or large base camps occupied over an extended period of time by a number of households that practiced hunting, gathering, and gardening. This contrasts markedly with the small farmsteads of CPt sites. Evidence for houses is rare, suggesting that light structures of poles, bark, mats, or hides may have been the norm.

Despite some technological similarity between Oneota and CPt assemblages, certain artifacts distinguish them. This is most evident in ceramics. For example, potsherds from the Leary site, a western Oneota site in extreme southeastern Nebraska, are more similar to those at Oneota sites in the Midwest than to CPt ceramics.¹⁵ They are clearly shell-tempered, with a smooth exterior surface. The top or upper interior portion of the lip of these vessels was commonly decorated with notches formed by impressing a tool (or finger) into the damp clay. On some vessels a tool was also trailed through the clay on the interior surface of outflaring or outcurving rims to form a V-shaped design. Trailed lines, as well as punctates, were also used to make geometric forms on the pot shoulder. Paired handles extending between the rim and shoulder were often present and were plain or decorated with trailed lines, punctates, or other tool impressions. Complete jars had a hemispherical to globular shape and occasionally an elliptical cross-section. The combination of these attributes is diagnostic of Oneota ceramics. Although there is much variability in CPt ceramics, most are tempered with sand, grit, or grog and have a roughened or incompletely smoothed-over surface. Rims may be direct or thickened (collared) and are straight or slightly flaring. Decoration is largely confined to the exterior portion of the rim (which is more visible on CPt than on Oneota pots) and may include finger pinching or incised lines. Ceramics from some southern and eastern CPt

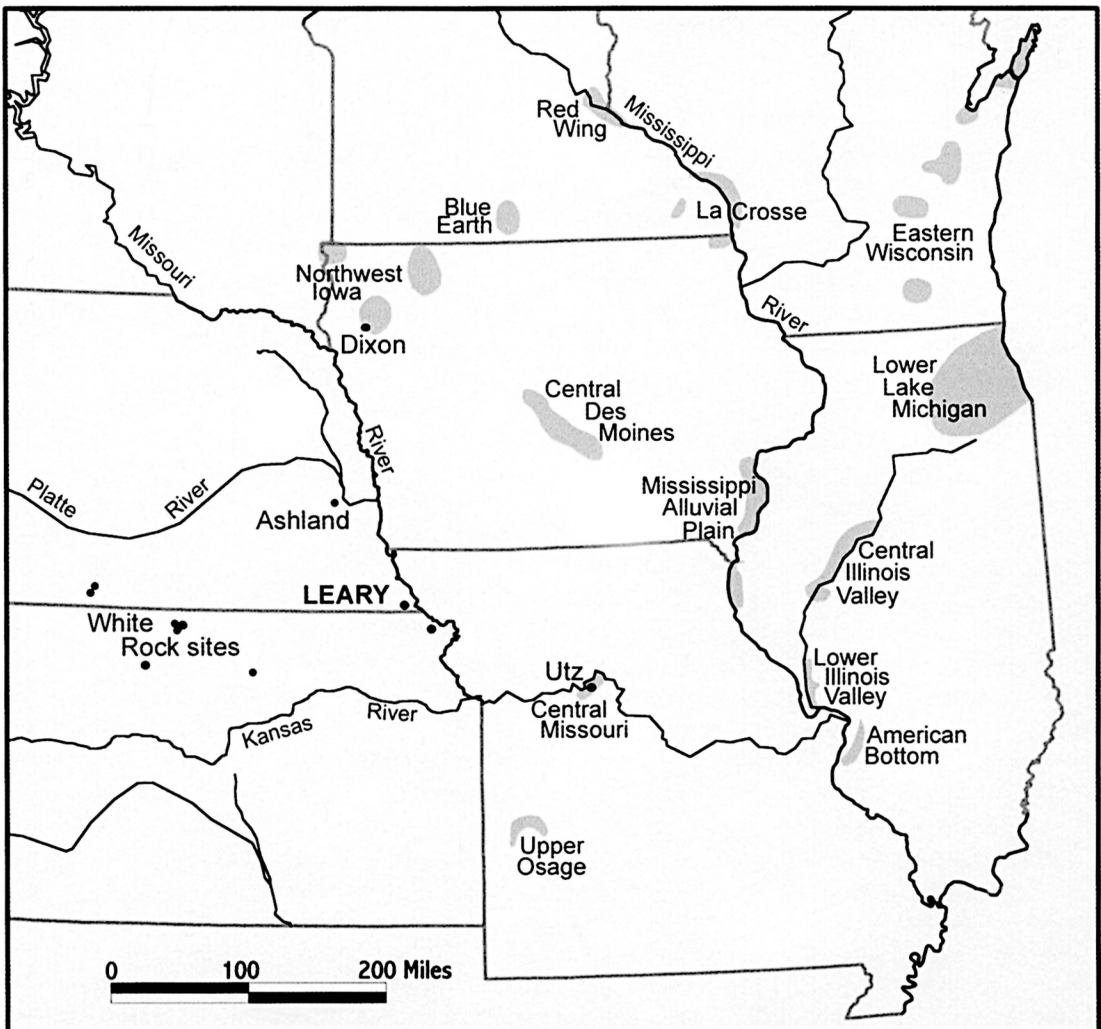


FIG. 1. Localities of Oneota settlements (shaded) in the Midwest and western Oneota sites (dots) in or adjacent to the Central Plains.

sites (Smoky Hill and Steed-Kisker phases) are shell-tempered, smooth surfaced, and decorated with geometric lines on the shoulder. These can be distinguished from Oneota wares on the basis of rim form (low, rolled rim) and lack of lip decoration, as well as other subtle characteristics.¹⁶

Other differences in artifact type, form, and mode of manufacture exist between Oneota and CPt assemblages. For instance, heavy grooved stone mauls, disk pipes, and, occasionally, discoidals are found at Oneota, but

not CPt sites. Stone arrow points made and used by Oneota peoples were commonly small, unnotched, and informally manufactured through limited retouch of small, thin flakes. CPt arrow points were commonly side-notched and formed through more extensive effort.¹⁷

These differences in settlement, housing, and artifact forms as well as manufacturing processes indicate that two general cultural traditions existed in the Central Plains during the Late Prehistoric period. The Leary, Ashland, and White Rock phase sites all share

an affiliation with the Oneota tradition and date to about A.D. 1250-1450. Their similarity to Oneota sites in the Midwest and the lack of earlier such sites in the Central Plains indicate that eastern immigrants entered this region in the thirteenth or fourteenth century.¹⁸

This movement westward coincided with Oneota expansion in various parts of the Midwest.¹⁹ Two approaches to understanding the spread of the Oneota tradition emphasize the competitive edge this society had over indigenous societies. David Benn believes that Oneota economic production involved extensive labor, notably for a variety of simultaneous subsistence tasks (e.g., gardening, gathering, and long-distance hunting). A unified labor force was necessary to maintain this economy. Benn postulates that a tribal form of social organization in which kin groups (such as extended family households or clans) obtained, organized, and controlled labor developed within Oneota society. This social structure not only manipulated labor but also facilitated colonial expansion. As Benn states,

From its "heartland" of permanent village locales, the tribe could range over the former territories of Woodland bands, because the village membership was large enough to undertake extended hunts and protect the base camp.²⁰

Although Benn refers here specifically to Woodland bands, the small, isolated CPt households would have been similarly vulnerable to larger and more cohesive social units, such as Oneota tribal or village groups.

Decorative motifs on Oneota ceramics are believed to reflect the hierarchical ideal of Oneota hegemony and may also reveal the role of warfare in Oneota expansion. Through a broad review of archeological evidence from the Midwest and Plains, R. Eric Hollinger interprets warfare as an important mechanism in Oneota expansion into foreign territories.²¹ Although direct evidence of warfare between Oneota and CPt peoples has not been identi-

fied conclusively, a combination of social dominance and threat of warfare may have led to the intrusion of Oneota peoples into the CPt territory. Here, indigenous (CPt) populations were organized as nuclear families or small, extended families or bands who were likely unable to compete with the more cohesive and aggressive Oneota.

The tribalization and aggression of Oneota society may explain the process that allowed Oneota peoples to expand into the already occupied Central Plains. This does not, however, describe the motivating factors for westward migration. Although difficult to test, it seems reasonable that a tribal society with a hierarchical organization, as hypothesized by Benn, would be subject to internal, as well as external, competition.²² Internal conflict may serve as a "push" factor resulting in group fissioning. Fissioning may explain part of the decision-making process of migration; however, it does not clarify why Oneota peoples would desire to move westward into the Plains. What "pull" factors drew certain Oneota populations into a region previously unoccupied by Oneota peoples?

DRAWN BY BISON

Dale R. Henning has hypothesized that a combination of environmental and social factors drew certain Oneota peoples westward from their traditional homelands. These include the departure of indigenous peoples from western locales, the occurrence of peaceful social and economic relations between Oneota groups and their western neighbors, favorable environmental conditions, and abundant bison.²³ As noted previously, CPt populations abandoned portions of the Central Plains at about the same time that Oneota peoples arrived. Unfortunately, limitations of radiocarbon and other presently available archeological dating techniques do not allow the development of a finely tuned chronology of events for the period relevant to this issue (ca. A.D. 1250-1450). This is apparent at the Leary site in extreme southeastern Nebraska.

The Leary site contains both CPT and Oneota components that have been radiocarbon-dated to within the Late Prehistoric period. Statistical tests reveal that the radiocarbon determinations for these components are too similar to distinguish one from the other. One explanation for this lack of temporal variation may be that Oneota and CPT peoples were living together at this site. This interpretation suggests support for Henning's hypothesis that Oneota peoples were drawn westward by the development of peaceful relations with western populations. However, archeological deposits at the Leary site likely have been mixed, thus challenging the interpretation of contemporaneous CPT and Oneota occupation. An equally plausible but competing interpretation is that Oneota peoples immigrated to the Leary site soon after it was abandoned by CPT peoples. Their activities (such as digging storage pits) caused the remains of both occupants of the site to be mixed. Additionally, if these two occupations were separated from each other by a relatively short period of time (e.g., several generations), the temporal range determined through radiocarbon assay of materials from those components would overlap. As a result, it is impossible to evaluate the exact timing and form of interaction, if any, between CPT populations and the western Oneota migrants at the Leary site.²⁴ It is hoped that future archeological excavations and analyses will be possible at less-disturbed stratified sites and will be finely tuned to extract detailed stratigraphic and other temporal data.

Changing environmental conditions, especially as they affected bison populations and their distribution in the Plains and Midwest, may also have affected Oneota expansion westward. Archeologists often note the importance of bison in Oneota societies.²⁵ This interpretation comes primarily from the identification of bison bone at many Oneota sites, including those located as far from the Plains as eastern Wisconsin. The presence of substantial numbers of end scrapers and some bison bone at Oneota sites in the LaCrosse locality (south-

western Wisconsin) has been suggested to be indicative of Oneota bison hunting.²⁶ Various researchers have hypothesized that by A.D. 1400 bison were so important to Oneota populations that eastern groups, such as those in Wisconsin, were traveling westward for seasonal bison hunts.²⁷ An alternative hypothesis explaining the presence of bison bone at eastern Oneota sites is that certain bones (as well as hides and horn) arrived at these sites through long-distance exchange. Such activity resulted in a biased subassemblage of faunal elements not representative of assemblages from local or long-distance hunting for food.²⁸ Faunal analyses have shown that skewed frequencies of bison elements are common at Oneota sites. For example, bison scapulae are the most common (and sometimes the only) bison element present at many eastern Oneota sites. Bison scapulae recovered from these sites were often modified to form tools identified through ethnographic analogy and archeological study as hoe blades or other digging implements.²⁹

Hollinger and Falk argue that the most plausible interpretation for bison elements in the assemblages from eastern Oneota sites is that selected bison products, such as bison scapula hoes and hides, were received through exchange with more western populations rather than through local or long-distance hunting.³⁰ Oneota sites in Kansas and Nebraska contain an abundance and variety of bison remains.³¹ This suggests that their occupants were directly and heavily involved in bison hunting. There are few Oneota assemblages from outside the Plains that clearly document such intensive bison hunting. Henning and Fishel believe that other western Oneota peoples living in sites along the Plains-Midwest transition were also extensively involved in bison hunting. Henning interprets increased bison numbers in this region during the Late Prehistoric period as due to cooler and drier climatic conditions. The presence of bison east of the Plains is believed to have encouraged western Oneota migration.³² Fishel suggests that Oneota occupants of the Dixon site in north-

western Iowa traveled long distances into the Plains to hunt bison (and collect useful stone material). This interpretation is based on the types of stone used for tools, the exotic origins of those materials, and the abundance and distribution of bison bone at that site.³³ Further environmental research is necessary to evaluate the interpretation of increased bison numbers east of the Plains during the Late Prehistoric period. Additional carefully documented and thoroughly researched archeological examinations of western Oneota sites, such as Dixon, Blood Run, and others in northwestern Iowa, and possibly those in central Missouri, such as the Utz site, are needed to evaluate the possibility that these Oneota were also directly involved in intensive bison hunting.³⁴

The Oneota desire for bison scapulae hoes, hides, and other products, despite often very limited access to these animals, created a demand and thus a need for exchange of these items. This appears to have been the case among Oneota populations by at least the early fourteenth century. As noted by Ravenstein, economic motives are among the most important factors to influence migration.³⁵ Although this observation derives from study of industrial societies, there is some reason to believe that the competitive nature of tribal societies, such as that hypothesized for the Oneota by Benn,³⁶ would also drive individuals, kin, or other groups to seek means to obtain desirable goods. If the productivity of a region outside the homeland is perceived as greater than that of the area presently occupied, those seeking improved economic conditions are likely to consider migration.³⁷ My hypothesis is that a demand for bison products and perceived differential productivity between the Midwest and the Plains in terms of bison led certain Oneota populations to migrate into the Plains during the late thirteenth or early fourteenth century. Gaining direct access to bison would have given those people with easier access to the desired products (e.g., bison scapulae, meat, and hides) an economic advantage and would have allowed them to accumulate a sur-

plus that could be used in exchange to build and maintain social and economic ties with others. Continued zooarcheological studies of bison elements and their abundance and distribution in Oneota sites will provide additional data to evaluate this interpretation.

Obstacles or barriers to migration into the Plains do not appear to have existed or been insurmountable. No physical barriers are apparent in the Central Plains. River-based travel would have been suitable on the larger streams in the region, while overland transport could have been eased by the use of dogs as pack animals. The frequency of canid remains at western Oneota sites confirms that these people made use of dogs.³⁸ As noted above, the CPt populations in the Plains at this time lived in small, scattered settlements of few households. The lack of concentrated populations and a broad, cohesive social organization would make these indigenous populations vulnerable to a larger, tribally organized immigrant population. It is unlikely that they formed much of a barrier to Oneota migrants.

Oneota migration westward required some adjustment to the natural and social environment of the Plains. A mixed subsistence base of gardening, hunting, and gathering was still possible and was maintained, but with greater emphasis placed on bison hunting. This is especially evident in the heart of the Central Plains, where Oneota peoples (represented by remains referred to by archeologists as the White Rock phase) focused activities on the hunting of large numbers of bison. The high frequency of bison bone and the limited variety of other faunal remains support this conclusion. Many bison products were processed for local use, as indicated by the presence of butchering tools (e.g., chipped stone knives), the remains of a bone boiling pit filled with crushed and low utility bones (boiled for the extraction of fat), stone hammers or mauls (used for crushing bone for marrow extraction), and numerous hide scraping tools.³⁹ Surplus bison products (meat, "pemmican," scapulae, and hides) could have been transported eastward for exchange with other

Oneota groups. The Leary site, situated along the eastern edge of the Plains and very near the Missouri River, a major transportation artery of the region, may have served as a regional exchange center for these and other products, as hypothesized by Henning.⁴⁰ I have initiated research designed to evaluate this hypothesis through the identification of exotic materials in the Leary site and other Oneota assemblages, the place of origin of those materials, and the distribution of contemporaneous non-Oneota assemblages that contain Oneota traits (indicative of direct or indirect interaction).⁴¹

The migration of Oneota peoples into the Plains during the latter portion of the Late Prehistoric period coincided with the establishment of an economy heavily dependent on bison hunting. However, this also occurred in combination with more "traditional" means of subsistence, including gardening and gathering. This adaptation differed from that of the indigenous populations in the region at that time. The native economy of the Central Plains prior to arrival of Oneota migrants was dependent on a wide variety of locally available resources that could be harvested easily by individuals within self-supporting households. Large-scale bison hunting was not possible without coordinated social effort, a trait not common to their household-based social organization. The more-extended social ties of Oneota groups, on the other hand, were adapted to the completion of multiple labor-intensive tasks, including extensive bison hunting. This, combined with a demand for bison products such as scapulae hoes, hides, and meat, both allowed and encouraged certain Oneota populations to move into the Plains where bison were abundant. These migrations westward likely led to displacement of the indigenous CPT households and the establishment of an economy that included intensive bison hunting. This adaptation came to characterize later native societies of the Plains. Siouan populations of the Central Plains, such as the Oto and Kansa, maintained

a tradition of intensive bison hunting. Reformed Caddoan cultures of the Protohistoric and Historic periods, such as the Pawnee and Wichita, organized into bands and villages that cooperated for long-distance bison hunts.⁴² Although these historic groups are well known for their focus on bison hunting, it was the adjustment of eastern migrants that set the stage for changing adaptations and the well-known tradition of bison hunting in the Plains.

NOTES

I wish to acknowledge the contributions of Dale Henning and R. Eric Hollinger to the development of this paper. They willingly shared their ideas and data through published and unpublished manuscripts and stimulating conversation. I have had further conversations on the many issues and analyses related to my ongoing research into Plains Oneota and migration with Brad Logan, who has directly and indirectly encouraged me in my research and provided a sounding board for my thoughts and interpretations. Ideas of these individuals are evident in this thesis, as is true of all research that builds on existing ideas and data to derive a more thorough understanding of our human past.

I thank the organizers of the Great Plains Migration Symposium for pulling together a successful meeting that provided an interesting and enjoyable outlet for interdisciplinary exchange. Two anonymous reviewers and the editor of the *Great Plains Quarterly* provided useful insight into better means for presenting this archeologically based research to the audience of the GPQ.

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5. Dale R. Henning, "The Oneota Tradition," in *Archaeology on the Great Plains*, ed. W. Raymond Wood (Lawrence: University Press of Kansas, 1998), pp. 345-414.

6. A traditional archeological interpretation has been that the indigenous Central Plains tradition (CPT) populations abandoned the Central Plains, moving northeastward to become involved in cultural changes associated with the Coalescent tradition. Although the latter is apparent, not all CPT populations may have been involved in this process, and the Central Plains were likely not truly abandoned. We await further data and analysis to reach a more finely tuned interpretation of CPT movement within and out of the Central Plains.

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14. Reid A. Bryson and David A. Baerreis, "Introduction and Project Summary," in *Climatic Change and the Mill Creek Culture of Iowa*, ed. Dale R. Henning, *Journal of the Iowa Archeological Society* 15 (1968): 1-34; Blakeslee, "Modeling the Abandonment" (note 13 above); Logan, "Oneota Far West" (note 4 above).

15. A. T. Hill and Waldo R. Wedel, "Excavations at the Leary Indian Village and Burial Site, Richardson County, Nebraska," *Nebraska History Magazine* 17, no. 1 (1936): 1-73; Charles R. Keyes, Review of *Excavations at the Leary Indian Village and Burial Site, Richardson County, Nebraska*, by A. T. Hill and W. R. Wedel (1936), *American Antiquity* 3

(1938): 290-93. More extensive and detailed analysis of the Leary site ceramics is underway by the author (manuscript in preparation).

16. Published and unpublished reports too numerous to cite here provide descriptions of ceramics from many different Oneota sites. A recent overview, including a summary of ceramic traits of the Oneota tradition, is presented in Henning, "Oneota Tradition" (note 5 above). Likewise, a summary of CPt ceramic traits is presented by Steinacher and Carlson, "Central Plains Tradition" (note 8 above). A brief comparison of ceramic and other traits of the CPt and the White Rock phase of the Oneota tradition is given by Ritterbush and Logan, "Late Prehistoric Oneota Population Movement" (note 4 above), pp. 259-62.

17. Ritterbush and Logan, *ibid.*; Isaku Owada and Lauren W. Ritterbush, "Changes in Late Prehistoric Arrowpoint Technology in North-Central Kansas" (paper presented at the 21st Annual Flint Hills Archaeological Conference, Lawrence, Kans., 1999).

18. Ritterbush and Logan, *ibid.*; Lauren W. Ritterbush, "Leary Site Revisited: Oneota and Central Plains Tradition Occupation along the Lower Missouri," *Plains Anthropologist* 47, no. 182 (2002): 249-62; Robert E. Pepperl, "Ashland Archeological District, Cass and Saunders Counties, Nebraska, National Register Nomination" (on file with the Nebraska State Historical Society, Lincoln, 2000); Robert E. Pepperl, "Reassessment of the Ashland Site (25CC1) Complex, Cass and Saunders Counties, Nebraska," in *Survey and Testing Investigations for a National Register District Nomination*, vol. 1, ed. J. Blackmar and J. Swigart (Lincoln: Nebraska State Historical Society Archeological Survey Report, 2000); Logan, "Oneota Far West" (note 4 above), pp. 249-51.

19. Dale R. Henning, "The Western Oneota: Evolution and Interrelationships" (paper presented at the 57th Annual Plains Anthropological Conference, Sioux Falls, S.Dak., 1999); R. Eric Hollinger, "Oneota Population Movements: Aggressive Territorial Expansions and Contractions" (paper presented at the 66th Annual Meeting of the Society for American Archaeology, New Orleans, 2001); Richard L. Fishel, ed., "Bison Hunters of the Western Prairies: Archaeological Investigations at the Dixon Site (13WD8), Woodbury County, Iowa," (University of Iowa, Office of the State Archaeologist Report 21, 1999), pp. 117-18.

20. David W. Benn, "Hawks, Serpents, and Bird-Men: Emergence of the Oneota Mode of Production," *Plains Anthropologist* 34, no. 125 (1989): 233-60, quote from p. 254, emphasis in original.

21. Hollinger, "Oneota Population Movements" (note 19 above).

22. Benn, "Hawks, Serpents, and Bird-Men" (note 20 above).

23. Henning, "Oneota: Western Manifestations" (note 7 above), p. 239.

24. Ritterbush, "Leary Site Revisited" (note 18 above).

25. Henning, "Oneota Tradition" (note 5 above); Henning, "Western Oneota" (note 19 above).

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27. Constance M. Arzigian et al., "Summary of the Pammel Creek Site Analysis and a Proposed Oneota Seasonal Round," *The Wisconsin Archeologist* 70, no. 1-2 (1989): 278; Boszhardt and McCarthy, *ibid.*; Overstreet, *ibid.*; Robert F. Sasso, "La Crosse Region Oneota Adaptations: Changing Late Prehistoric Subsistence and Settlement Patterns in the Upper Mississippi Valley," *The Wisconsin Archeologist* 74, no. 1 (1993): 324-69.

28. R. Eric Hollinger and Carl Falk, "Reassessing Late Prehistoric Patterns of Bison Exploitation in the Midwest" (paper presented at the 54th Annual Plains Conference, Iowa City, 1996); Peske, "Winnebago Cultural Adaptation" (note 26 above), pp. 66-67.

29. Jodie A. O'Gorman, "The Tremaine Site Complex: Oneota Occupation in the La Crosse Locality, Wisconsin," vol. 1: "The OT Site (47 Lc-262)," Archaeology Research Series no. 1, Museum Archaeology Program, State Historical Society of Wisconsin, 1993; Overstreet, "Oneota Prehistory and History" (note 26 above); Peske, "Winnebago Cultural Adaptation" (note 26 above), pp. 66-67; James L. Theler, "The Pammel Creek Site Faunal Remains," *The Wisconsin Archeologist* 70, no. 1-2 (1989): 157-242; James L. Theler, "Oneota Faunal Remains from Seven Sites in the La Crosse, Wisconsin, Area," *The Wisconsin Archeologist* 75, no. 3-4 (1994): 343-92; James L. Theler, "An Analysis of Selected Animal Remains from the Gundersen Site (47Lc394), LaCrosse County, Wisconsin," in *The Gundersen Site: An Oneota Village and Cemetery in LaCrosse, Wisconsin*, by Constance M. Arzigian,

Robert F. Boszhardt, Holly P. Halverson, and James L. Theler, *Journal of the Iowa Archeological Society* 41 (1994): 38-52; and others.

30. Hollinger and Falk, "Reassessing Late Pre-historic Patterns" (note 28 above).

31. Logan, "Oneota Far West" and "Fat of the Land" (both note 4 above); Hill and Wedel, "Excavations at the Leary Indian Village" (note 15 above).

32. Henning, "Oneota: Western Manifestations" (note 7 above); Bryson and Baerreis, "Introduction and Project Summary" (note 14 above); David S. Baerreis and Reid A. Bryson, "Climatic Episodes and the Dating of Mississippian Cultures," *The Wisconsin Archeologist* 46 (1965): 203-20; Reid A. Bryson, David A. Baerreis, and Wayne M. Wendland, "The Character of Late-Glacial and Post-Glacial Climatic Change," in *Pleistocene and Recent Environments of the Central Great Plains*, ed. W. Dort Jr. and J. K. Jones Jr. (Lawrence: University of Kansas Press, 1970); Wayne M. Wendland, "Holocene Man in North America: The Ecological Setting and Climatic Background," *Plains Anthropologist* 23, no. 82 (1978): 273-87.

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39. Logan, "Phasing in White Rock," "Oneota Far West," and "Fat of the Land" (all note 4 above).

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