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1

An Introduction to Large-Scale Manipulation of Prey

An Economic and Social Discussion

Leland C. Bement

The various studies assembled in this book investigate the prehistoric development of large-scale prey manipulation and cooperative hunting adaptations. Stemming from two symposia offered at the Society for American Archaeology conferences in 2012 and 2013, the topic of large-scale prey manipulation and cooperative hunting continues as an important research topic through time and across regions. The archaeological signature of large-scale hunting adaptations worldwide shares certain characteristics, yet displays a wide diversity of forms. At their core, these various adaptations require the presence of a large number of animals in a predictable location. After meeting this basic requirement, human groups developed a plethora of cooperative hunting technologies to manipulate, trap, and kill this resource. Once developed, these adaptations often become more than simply means to acquire sustenance. In fact, the large-scale manipulation of game often includes complex social and even political attributes. The how and why large-scale hunting evolved in various settings are the core questions of this book.

A cursory review of the literature on large-scale hunting adaptations worldwide reveals a diversity of hunting scenarios and prey animals sought, and covers quite a time depth. These hunting adaptations share a number of characteristics developed to overcome the challenges of large-scale hunting, which, by definition, requires the production of a surplus of resources to provision a large group of people for a short period

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of time. Key problems addressed include scheduling, ensuring the presence of a sufficiently large animal resource, presence of an adequate trap/kill facility (pound, cliff, arroyo, weir, net), a sufficiently large labor force to carry out the kill and processing, and a location with adequate additional resources to support a large gathering. Often accompanying or incorporated into these hunting adaptations are rituals, feasting, and hierarchal divisions of labor either by age, gender, experience, or proven leadership. Ethnographic accounts indicate large-scale hunting scenarios require the cooperation of all members of an extended group or groups, including women and children in the tasks of moving animals toward a containment/kill facility and in the processing of the considerable surplus of animal resource after the successful kill event (Balme, chapter 3 and Odgaard, chapter 4 in this volume; Satterthwait 1987; Verbicky-Todd 1984).

Projecting the attributes of the ethnographic systems back in time and the identification of archaeological signatures for the various components of large-scale cooperative hunts present significant challenges for archaeologists as illustrated by the hunting structure inundated by Lake Huron (O'Shea et al. 2014) or lack of open-air sites in the case of Australia (Balme, chapter 3). As indicated by the scope of subjects covered by the chapters of this book, researchers rely on studies from both archaeological and nonarchaeological sources to draw insight into the organization of large-scale hunting adaptations. To better understand the role of animal behavior, Maxwell and Driver (chapter 5) study the migration patterns of wildebeest in Africa. Although no known prehistoric large-scale hunting ever targeted wildebeest (Speth 2010; Speth et al. 2013), study of the movement of these large grassland grazers provides analogues for other prehistoric species such as the North American bison and European bison. In particular, the assessment of the conditions that lead to the development of migration within ungulate species as well as the nature of such migrations is key for making migrating animals a predictable and reliable resource susceptible to large-scale manipulation and hunting. The studies of Graves (chapter 6) and Carlson and Bement (chapter 7) show how trace element analysis of bison tooth enamel and stable carbon and nitrogen isotopes of bison bone can indicate the extent and character of *Bison antiquus* migrations during the Folsom period. The identification of the bison migration pattern led to the conclusion that Folsom hunters intercepted bison as they migrated through the Beaver River region of northwestern Oklahoma. The concentration of late summer large-scale arroyo traps along a 700 m stretch of the Beaver River provides convincing evidence that the migrating bison provided a large animal resource in a predictable location that was tapped first

by Clovis and then repeatedly by Folsom hunters. These studies transform the structure of large-scale bison hunting adaptations from one of following herds across the landscape to one of intercepting migrating herds as they move in predictable patterns across the region. The increased logistics associated with the latter scenario gets to the heart of the development of large-scale hunting adaptations (Speth, chapter 8).

Bryan Hockett and colleagues (2013) studied the manpower required to create the facilities employed in concentrating and trapping animals in the Great Basin (United States). Balme (chapter 3) also provides estimates of the time and effort required to construct nets and fishing embayments. Both of these studies conclude that a communal level of organization was indicated. The construction and maintenance of labor-intensive facilities have profound ramifications in the social development of large-scale hunting adaptations. The social aspects reflected in these facilities can include aspects of ownership, suggest the extent that all members of a group participated in their construction, and provide insight into the amount of manpower required for their construction (Balme, chapter 3; Zedeño, Ballenger, and Murray 2014). Zedeño (chapter 2) argues that group investment in kill facilities eventually led to political agency that identified hunting group territories where core areas and passes were guarded and protected from outside groups. Prehistoric use of structures ranges from the construction of extensive drive lines and pound systems for bison hunting in North America (Carlson and Bement 2013), to construction of winged containment structures or kites in the Near East (Zeder et al. 2013), to manufacture of large game nets in Australia and North America (Balme chapter 3).

The future of large-scale hunting research faces several hurdles, including the development of research tools to aid in the archaeological identification of aggregation sites, social aspects of hunt organization, and the ecological ramifications of these hunts. Graves (chapter 6) and Carlson and Bement (chapter 7) suggest the number of disparate lithic sources represented in the projectile point assemblage indicates the participation of aggregated hunters during Folsom times. Leland C. Bement (2003) suggests the very presence of large-scale kills juxtaposed with small-scale kills is evidence that human aggregations occurred to conduct the large-scale events. It follows that if small kills are the product of dispersed hunters, then large-scale kills are the product of coalesced hunting groups. The proximity of bison jumps, large encampments, and ritual sites during protohistoric times on the northern Plains links various aspects of large-scale bison hunting with group aggregations, ritual behavior, and establishment of territories (Zedeño, chapter 2).

Little archaeological evidence currently exists to identify the hierarchical organization of prehistoric large-scale hunts. Ethnographic studies suggest the presence of spiritual leaders, hunt leaders, and so on, in carrying out the hunt (Verbicky-Todd 1984). As hunt sizes increase, so does the requirement for a larger workforce (Balme, chapter 3). To accommodate the need for more participants, it may be necessary for all members of a group to participate in the hunt. This includes men, women, children, and the aged. How can these various groups be identified archaeologically? If these groups cannot be identified archaeologically, then researchers should err on the side of caution and assume the presence of all able-bodied members of a group rather than just assume the presence of men as some researchers have, including interpretations at the Folsom type-site (Meltzer 2006).

Problems of distributing information and maintaining social order increase as more people are attracted to a large-scale hunting venue, leading to the formation of at least temporary hierarchies as scalar stresses increase (Johnson 1982). Ethnographic accounts describe the formation of such hierarchies to distribute information and maintain control (Kelly 2013; Zedeño, chapter 2). Taboos against individual hunting often accompany large-scale hunting adaptations. Such taboos serve a practical function of not scaring away or dispersing the concentrated animal resource being targeted (Verbicky-Todd 1984).

The ecological ramifications of large-scale hunting adaptations are also hard to detect archaeologically. The effect of large-scale cooperative hunting on prey populations is undoubtedly related to the periodicity of kill events, size of kill events, and the natural carrying capacity of the environment. While repeated large-scale kills have the potential to decimate the prey population in an area, this situation can, in the short term, be averted by staggering the occurrence of such events. In the long term, however, if the intensity of large-scale kills overtakes the ability of the prey species to reproduce and maintain a viable population, then population decline could lead to the extirpation of a species from the region. A case in point is provided by the large-scale hunting of gazelle and possibly onager in the Levant about 6,000 years ago (Zeder et al. 2013). Today in this region all three species of gazelle are endangered and live in small remnant populations. However, 6,000 years ago these animals were the subject of organized, large-scale hunts where migrating herds were diverted to follow stone-lined drive lanes into enclosures today called kites. Melinda Zeder et al. (2013) suggest the 2,000 to 3,000 kites principally employed during the fourth and third millennia BC decimated the steppe animal populations, extirpating them from the Levant. The decline in game animals is accompanied by a decline in kite use. The decline of steppe animals

is recorded in the faunal assemblages from the habitation sites of the time. By the end of this era, gazelle and onager bones represent less than 5 percent of the total faunal assemblage (Zeder et al. 2013:121). The massive slaughter of gazelle as they moved between breeding and calving grounds eventually reduced the population below the level of rebound. Zeder et al. credit the social aspect of these kill events with the destruction of these wild animals. The kills targeted wild populations that were no longer needed to provide the bulk of animal products during this time since domesticates functioned in that role. Because the domestic animals were deemed too important, wild animals were sought to provision social events; hence the development of massive kills using drive lanes and containment structures targeting wild animals.

Currently, there is little evidence that hunters were concerned about conserving animal resources by restricting the number of animals taken. This situation is seen in the Levantine example and in North American large-scale bison kill sites. Evidence from the bison jumps on the northwestern Plains and from Folsom-age kills on the southern Plains suggests that an excess of animals were killed. At the Beaver River complex Folsom kill sites, the extent of underused resources at these kills is indicated by the butchering pattern that targeted only the hump and rib meat, leaving over 50 percent of each carcass untouched (Bement 2003, 2010; Johnson and Bement 2009).

Even less archaeological evidence exists that prehistoric hunters altered the landscape to enhance ungulate forage quality, thereby luring them to particular pastures. The use of fire to burn off patches to enhance the growth of new grasses and to attract bison has been proposed for the Late Prehistoric hunting complexes of the North American northwestern Plains (Zedeño, Ballenger, and Murray 2014). The difficulty lies in distinguishing between natural fires and deliberately set fires.

Many of the above-mentioned issues or attributes of large-scale cooperative hunting adaptations are designed to ensure the highest-possible success rates: availability of large numbers of animals; knowledge of prey animal behavior (Carlson and Bement 2013); matching that behavior to available traps/kill locations; availability of a large workforce to carry out all aspects of the hunt, including processing the kill; and availability of knowledgeable leaders. In addition to these aspects, many large-scale cooperative hunting adaptations incorporate rituals designed to ensure a successful outcome (Bement 1999; Kehoe 1999; Verbicky-Todd 1984). Ethnographic accounts of hunting rituals associated with large-scale hunts include the use of buffalo calling stones, painted rocks, and painted bison skulls placed at the entrance to pounds (Verbicky-Todd 1984). Archaeological evidence of rituals associated with large-scale bison hunting

includes a painted bison skull in the second kill episode at the Folsom-age Cooper site in Oklahoma (Bement 1999; Bement et al. 1997), a possible bison skull on pedestal at Lake Theo in Texas (Harrison and Killen 1978; Harrison and Smith 1975), a possible shaman pole with offerings at Jones Miller in Colorado (Stanford 1978), and the shaman hut at the Ruby site in Wyoming (Frison 1971). The ritual use of a circular stone structure associated with the Laidlaw antelope trap in southeastern Alberta, Canada, is another example (Brumley 1984:125). Pictographic representations of large-scale bison kills during the Upper Paleolithic in France have been interpreted as ritual representations of several hunts combined into composite scenes, or distilled into basic components such as a massive bison bull charging into a corral (Kehoe 1999). Given what is at stake if the large-scale kill is unsuccessful, it is not surprising that supernatural intervention is sought on behalf of the hunters.

Less tangible aspects of large-scale cooperative hunting ventures occur at the intersection of cooperation and competition. On the one hand, large-scale kills require the cooperation of all participants to follow a set plan (Driver 1990). At the same time, competition exists between participants to advance to filling key roles, including hunt director, spiritual leader, runner (in the case of bison jumps), and net attendants (in the case of net hunters). This competition is present at the highest level. If a cooperative kill is unsuccessful, the leaders risk losing face and the confidence of the followers, who may then seek another venue with other hosts or leaders at a later time (Fawcett 1987).

Discriminating between instances where large-scale hunts move to a new location because of recent failure (host incompetency) and the shift in hunt location because of herd movement or scheduled host reciprocity is currently beyond the capabilities of archaeological techniques. Changes in participant groups may be signaled archaeologically by shifts in the lithic sources represented in the kill assemblages, if each source material is indicative of a separate social unit attending the aggregation (Wilmsen and Roberts 1978).

The spatial requirements of hunting programs have a direct corollary to the number of participants. More animals = more hunters and more organization: not just 1 animal, 1 hunter/killer/butcher, but multiple animals = multiple drivers, spearers (dispatchers), butchers, etc. (Balme, chapter 3). An increase in scale of hunt equates to an increase in participant differentiation and specialization, and the concomitant creation of hierarchies and leadership roles (i.e., scalar stress; Johnson 1982). How these changes in scale manifest archaeologically is one of the major challenges facing future large-scale hunting research. Differentiation and specialization included prekill activities, including scouting, signaling, and directing hunting groups. In addition, studying the tension

between cooperation and competition (the requirement for cooperation between participants and the competition to occupy leadership roles) offers an even greater challenge for large-scale hunting research.

CYCLICAL NUCLEATION AT SURPLUS FOOD SOURCES

A central issue to be considered by the future study of large-scale cooperative hunting is to address the question: Why did large-scale cooperative hunting develop in a particular place at a particular time? I personally believe that the why is found in the human need for social gatherings (see Speth, chapter 8 for further discussion). If there is an innate requirement for social interaction, then large social gatherings (termed *aggregations*, *rendezvous*, or *nucleations*; Schaedel 1995) must be provisioned with an adequate food supply to support a larger-than-normal number of people for a specific period of time. Prior to the development of agriculture, the requisite food supply relied on the natural bounty provided by seasonal surpluses of nuts, wild grains, schooling/migrating fish, migrating birds, and so on. Large social gatherings were scheduled to take advantage of periods of food surplus. Large-scale cooperative hunting was only one of several adaptations that were developed by people following patterns of cyclical nucleation at a surplus food source (Carlson and Bement 2013; Zedeño, chapter 2). In areas where surplus nuts or acorns were seasonally available, social aggregations were linked to those resources. In areas where large game was available, large-scale cooperative hunting programs developed. In both scenarios, the technology to acquire and process the various foodstuffs (acorns, bison, rabbits, wild rice, fish) was already developed at the individual level. All that remained was the exponential amplification of resource use at a higher scale.

At some point, the resource changed from one of immediate consumption to one of delayed consumption. This change follows in step with an increase in scale where stored foods are required to provision groups aggregated into extended-stay situations (Zedeño chapter 2; Zedeño, Ballenger, and Murray 2014).

The answer to why cooperative hunting developed can also vary according to scale. At one end of the continuum are the communal gatherings of short duration that rely on a food surplus to provision those gathered over the course of a short period of time, perhaps a couple of weeks. At the other end are communal gatherings that occurred in areas of high resource density that lasted for several months. An example of the former is the single large-scale bison kill of the Folsom-age Beaver River Complex where it is hypothesized that a

single large kill provisioned several groups for a period of a week or two. An example of the latter is the multimonth aggregation of several groups in bison wintering grounds by the Blackfeet tribes where multiple large-scale kills were sequentially conducted to provision the group over the course of the winter (Zedeño, Ballenger, and Murray 2014). The variation in scale is reflected in the number of animals killed over the course of the period of aggregation (less than 100 for Folsom times to over 1,000 for Protohistoric times), the extent of butchery (gourmet style of only hump and shoulder for Folsom times to the complete butchering and bone grease rendering for pemmican production as seen for Proto-historic times), and number of people in the aggregation (less than 200 for Folsom period to more than 2,000 for Protohistoric times). When viewed from the perspective of scale, the adaptation exemplifies the hierarchal structure and development outlined by Gregory Johnson (1982) as a response to scalar stress. An increase in scale leads to greater development of hierarchies, leading to greater complexity in social structure. Stress is seen in population pressure, resource pressure, and social pressure, which all contain an element of duration. The longer the period of stress, the more structured the societal response.

Perhaps a closer look is in order at what is meant by social gathering provisioned by a resource surplus. Surplus does not mean the windfall discovery of a beached whale, followed by an impromptu hoedown. Nor is it necessarily a state dinner followed by a royal ball. The social gatherings are planned events. The planning in many instances requires months, if not years, of preparation, including building or maintaining nets, drive lanes, or traps. In many cases the surplus foodstuff may be generated by an exponential increase in local resource exploitation as in the case of rabbit and deer netting. Or it could be the targeting of seasonally specific migrant animals, including caribou/reindeer in northern latitudes (Odgaard, chapter 4; O'Shea et al. 2014), waterfowl in Australia (Satterthwait 1987), gazelle in the Levant (Zeder et al. 2013), and bison on the southern Plains of North America as suggested by trace element and stable isotope analyses (Graves 2010, chapter 6; Carlson and Bement 2013, chapter 7),

The corollary question is: Why did large-scale cooperative hunting cease in areas and after times in the areas where it had developed? The answer to this question probably lies in the realm of ecology. The telltale signs that large-scale hunting waxed and waned is found in the shifts in seasonality of kill sites by time period; the shift in projectile point styles; the hiatus in kill site use over time as seen at Head Smashed In and Vore (Brink 2008; Reher and Frison 1980); the shift in stone tool source; and the composition of trash

middens as seen in the Levantine kites (Zeder et al. 2013). It is doubtful that the need to provision a social aggregation ceased to exist, but rather that an alternative surplus foodstuff was required when climatic or ecological conditions removed the existing foodstuff (whether it be plant or animal) from exploitation. It has been argued for large-scale bison hunting on the northwestern Plains of North America that large-scale bison hunting could only occur when bison populations were above a certain threshold and that the threshold was controlled by environmental factors related to bison-carrying capacity (Reher and Frison 1980). When bison numbers were down, large-scale bison hunting ceased. I would offer that research needs to shift to answer the question: What foodstuff surplus replaced bison when bison numbers fell below the threshold required to successfully conduct large-scale cooperative hunts? I doubt that social aggregations ceased. The shift in resource surplus may require altering aggregation schedules to coincide with the seasonal availability of another food source to meet the subsistence requirements for those aggregations.

Is it purely a coincidence that the amount of meat from the Clovis age bison kills at Murray Springs and Blackwater Locality 1, and Jake Bluff are equivalent to or surpass the amount of meat from Clovis-age mammoth kills in these same regions (Bement and Carter 2015:273)? Did Clovis hunters shift to large-scale cooperative bison hunting as a response to fulfill the requirement of a certain level of meat after the extirpation of mammoths? A similar line of inquiry may shed light on the penecontemporaneous occurrence in the Lower Pecos region of Texas (United States) of large-scale resource exploitation of desert succulents (as evidenced by large burned rock middens), communal rabbit hunts and deer netting (as depicted in pictographs), and the bison jump at Bonfire shelter (Turpin 1982, 2004). Did these shifts occur sequentially with the waxing and waning of resources? Or were shifts in the use of these various forms of producing food surpluses predicated on the ecological limitations of each resource to meet the need of provisioning planned social aggregations? And finally, could the recurrence of the use of large-scale cooperative kills belie a shift in the availability of prey densities to the levels required for successful communal kills as in the case of the resurgence of bison kills after hiatuses of over 1,000 years on the North American Plains (Bement and Buehler 1997; Brink 2008; Frison 2004)?

We have come full circle. From the contributions to this volume and other recent publications it is clear that large-scale hunting is as much a social activity as it is a subsistence activity. The social aspect is archaeologically manifest as a line of piled rocks leading to a cliff, or a concentration of bones in arroyo

deposits, or a large net stored in a dry cave, or the constructed rock diversions leading to an enclosure. These mundane features are infused with societal complexity. As such, communal hunting at all scales should be relegated to the realm of social organization and integrated with other social activities, particularly those associated with ritual observances and feasting.

The chapters of this book are highly varied in topics covered, time period contexts, and world regions. The eclectic nature of this volume reflects the highly complex social issues that come into play when large-scale hunting adaptations are viewed through a social lens. The contributions to this book, then, find commonality in the organization of large-scale hunting, ranging from understanding how large-scale hunting defines group identity and territories (Zedeño, chapter 2), the ethnographic definition of large-scale hunting organization in Australia (Balme, chapter 3), ethnographic views of caribou hunting in Greenland (Odgaard, chapter 4), developing models of prehistoric prey populations and behavior from modern wildebeest behavior (Maxwell and Driver, chapter 5), determining bison mobility patterns during the Paleoindian period (Graves, chapter 6), and characterizing mobility structure of bison through stable isotopic analysis (Carlson and Bement, chapter 7). Chapter 8 (Speth) presents a retrospective of the social aspects of large-scale hunting adaptations worldwide and discusses the intriguing prospect that projectile point styles go beyond what is functionally necessary to kill large animals and probably developed as a means of signaling group identity and social connectedness. Not only should earlier concepts of large-scale hunting adaptations be brought under the lens, but also, too, should our basic ideas forming the foundations to our understanding of social identities, hunter-gatherer mobility, and technology (Speth, chapter 8). The eclecticism of this volume ensures that all readers will find something useful to their research into large-scale prey manipulation and hunting adaptations worldwide.

REFERENCES CITED

Bement, Leland C. 1999. *Bison Hunting at Cooper Site: Where Lightning Bolts Drew Thundering Herds*. Norman: University of Oklahoma Press.

Bement, Leland C. 2003. "Constructing the Cooper Model of Folsom Bison Kills on the Southern Plains." *Great Plains Research* 13(1):27–41.

Bement, Leland C. 2010. "Replicating Bone Tools and Other Fauno Technologies." In *Designing Experimental Research in Archaeology, Examining Technology through Production and Use*, ed. Jeffrey R. Ferguson, 225–40. Boulder: University Press of Colorado.

Bement, Leland C., and Kent J. Buehler, eds. 1997. "Southern Plains Bison Procurement and Utilization from Paleoindian to Historic." Plains Anthropologist Memoir 29.

Bement, Leland C., and Brian J. Carter. 2015. "From Mammoth to Bison: Changing Clovis Prey Availability at the End of the Pleistocene." In *Clovis: On the Edge of a New Understanding*, ed. Ashley Smallwood and Thomas Jennings, 263–75. College Station: Texas A&M Press.

Bement, Leland C., Marian Hyman, Michael E. Zolensky, and Brian J. Carter. 1997. "A Painted Skull from the Cooper Site: A Folsom Bison Kill in NW Oklahoma." *Current Research in the Pleistocene* 14:6–8.

Brink, Jack. 2008. *Imagining Head Smashed In*. Edmonton, AB: Alberta University Press.

Brumley, John H. 1984. "The Laidlaw Site: An Aboriginal Antelope Trap from Southeastern Alberta." In *Archaeology in Alberta 1983*, ed. David Burley, 96–127. Occasional Paper No. 23. Edmonton, AB: Archaeological Survey of Alberta.

Carlson, Kristen, and Leland Bement. 2013. "Organization of Bison Hunting at the Pleistocene/Holocene Transition on the Plains of North America." *Quaternary International* 297:93–99. https://doi.org/10.1016/j.quaint.2012.12.026.

Driver, Jonathan C. 1990. "Meat in Due Season: The Timing of Communal Hunts." In *Hunters of the Recent Past*, ed. Leslie B. Davis and Brian O. K. Reeves, 11–33. London: Unwin Hyman.

Fawcett, William B. 1987. "Communal Hunts, Human Aggregations, Social Variation, and Climatic Change: Bison Utilization by Prehistoric Inhabitants of the Great Plains." PhD dissertation, Department of Anthropology, University of Massachusetts, Amherst.

Frison, George. 1971. "The Buffalo Pound in North-Western Plains Prehistory: Site 48 CA 302." *American Antiquity* 36 (1): 77–91. https://doi.org/10.2307/278024.

Frison, George. 2004. *Survival by Hunting: Prehistoric Human Predators and Animals Prey*. Berkeley: University of California Press. https://doi.org/10.1525/california/9780520231900.001.0001.

Graves, Adam C. 2010. "Investigating Resource Structure and Human Mobility: An Example from Folsom-age Bison Kill Sites on the U.S. Southern Great Plains." PhD diss., Department of Anthropology, University of Oklahoma, Norman.

Harrison, Billy R., and Kay L. Killen. 1978. *Lake Theo: A Stratified, Early Man Bison Butchering and Camp Site, Briscoe County, Texas*. Special Archeological Report 1. Canyon, TX: Panhandle-Plains Historical Museum.

Harrison, Billy R., and H. C. Smith. 1975. "Excavations at the Lake Theo Site, PPHM-A917." *Panhandle-Plains Historical Review* (Briscoe County, TX) 48:70–106.

Hockett, Bryan, Cliff Creger, Beth Smith, Craig Young, James Carter, Eric Dillingham, Rachel Crews, and Evan Pellegrini. 2013. "Large-Scale Trapping Features from the Great Basin, USA: The Significance of Leadership and Communal Gatherings in Ancient Foraging Societies." *Quaternary International* 297:64–78. https://doi.org/10.1016/j.quaint.2012.12.027.

Johnson, Eileen, and Leland C. Bement. 2009. "Bison Butchery at Cooper: A Folsom Site on the Southern Plains." *Journal of Archaeological Science* 36 (7): 1430–46. https://doi.org/10.1016/j.jas.2009.02.007.

Johnson, Gregory A. 1982. "Organizational Structure and Scalar Stress." In *Theory and Explanation in Archaeology*, ed. C. Renfrew, M. Rowlands, and B. A. Segravees-Whallon, 389–421. New York: Academic Press.

Kehoe, Thomas F. 1999. "Subsistence and Beyond in Upper Paleolithic Bison Economy." In *Le Bison: Gibier et moyen de subsistance des homes du Paléolithique aux Paléoindiens des Grandes Plaines*, ed. J.-Ph. Brugal, F. David, J. G. Enloe, and J. Jaubert, 249–60. Antibes, France: Association Pour La Promotion et la Diffusion des Connaissances Archéologiques.

Kelly, Robert L. 2013. *The Lifeways of Hunter-Gatherers: The Foraging Spectrum*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139176132.

Meltzer, David J. 2006. *Folsom: New Archaeological Investigations of a Classic Paleoindian Bison Kill*. Berkeley: University of California Press.

O'Shea, John M., Ashley K. Lemke, Elizabeth P. Sonnenburg, Robert G. Reynolds, and Brian D. Abbott. 2014. "A 9,000-y-Old Caribou Hunting Structure Beneath Lake Huron." *Proceedings of the National Academy of Sciences*. Early Edition. https://doi.org/10.1073/pnas.1404404111.

Reher, Charles A., and George C. Frison. 1980. "The Vore Site, 48CK302: A Stratified Buffalo Jump in the Wyoming Black Hills." Plains Anthropologist Memoir 16.

Satterthwait, Leonn. 1987. "Socioeconomic Implications of Australian Aboriginal Net Hunting." *Man* 22 (4): 613–36. https://doi.org/10.2307/2803355.

Schaedel, Richard P. 1995. "The Temporal Variants of Proto-State Societies." In *Alternative Pathways to Early States*, ed. Nikolay N. Kradin and Valeri A. Lynsha, 47–53. Vladivostok: Dal'nauka.

Speth, John D. 2010. *The Paleoanthropology and Archaeology of Big-Game Hunting*. New York: Springer. https://doi.org/10.1007/978-1-4419-6733-6.

Speth, John D., Khori Newlander, Andrew A. White, Ashley K. Lemke, and Lars E. Anderson. 2013. "Early Paleoindian Big-Game Hunting in North America: Provisioning or Politics?" *Quaternary International*. https://doi.org/10.1016/j.quaint.2010.10.027.

Stanford, Dennis J. 1978. "The Jones-Miller site: An Example of Hell Gap Bison Procurement Strategy." In *Bison Procurement and Utilization: A Symposium*, ed. L. B. Davis and M. Wilson, 90–97. Plains Anthropologist Memoir 14.

Turpin, Solveig A. 1982. "Seminole Canyon: The Art and the Archeology, Val Verde County, Texas." *Texas Archeological Survey Research Report No. 83*. Austin: University of Texas.

Turpin, Solveig A. 2004. "Cyclical Nucleation and Sacred Space: Rock Art at the Center." In *New Perspectives on Prehistoric Art*, ed. Gunter Berghaus, 51–64. Westport, CT: Praeger.

Wilmsen, Edwin N., and Frank H. H. Roberts, Jr. 1978. *Lindenmeier, 1934–1974: Concluding Report on Investigations*. Contributions to Anthropology 24. Washington, DC: Smithsonian Institution. https://doi.org/10.5479/si.00810223.24.1.

Verbicky-Todd, Eleanor. 1984. "Communal Buffalo Hunting among the Plains Indians." Occasional Paper No. 24. Edmonton, AB: Archaeological Survey of Alberta.

Zedeño, Maria Nieves, Jesse A. M. Ballenger, and John R. Murray. 2014. "Landscape Engineering and Organizational Complexity among Late Prehistoric Bison Hunters of the Northwestern Plains." *Current Anthropology* 55 (1): 23–58. https://doi.org/10.1086/674535.

Zeder, Melinda A., Guy Bar-Oz, Scott J. Rufolo, and Frank Hole. 2013. "New Perspectives on the Use of Kites in Mass-kills of Lavantine Gazelle: A View from Northeastern Syria." *Quaternary International* 297:110–25. https://doi.org/10.1016/j.quaint.2012.12.045.