Folsom Bench Mark

The Lindenmeier Site

CHALLENGES EXCITE archaeology professor Jason Labelle of Colorado State University. Armed with a small mountain of data, he has launched a wide-ranging archaeological survey to develop a new "regional Paleoindian understanding of northern Colorado/southern Wyoming." Much of Dr. Labelle's information was gleaned from the famed Lindenmeier site, where, in the summer of 2006, he and a team of graduate students began a walking survey of Lindenmeier and surrounding land. Their mission was to locate other possible Folsom sites in the area along with sources for the raw materials used by ancient inhabitants. “We revisit Lindenmeier and resurvey portions of the site once or twice a year,” Labelle says. “Surface collection is important since artifacts appear regularly due to erosion, and we’ve recently built a ‘Hot Spot’ map to indicate surfaces that are actively eroding.” Since that initial 2006 work, CSU has now recorded nearly 300 newly discovered archaeological sites in the vicinity of Lindenmeier.

Where Folsom studies began
Among archaeologists, Lindenmeier is the standard of reference for studies of the Folsom culture. Today public access is limited to designated areas of the site, but scientists now have embedded in its neural canal, is indisputable proof of the association of Folsom hunters with this giant species. In 1936, exact specimen locations were recorded for the first time. Smithsonian archaeologist Frank H. H. Roberts kept meticulous records even by today’s standards, listing artifacts and associated floral and faunal materials, keeping field notebooks and catalogs, and drawing stratigraphic profiles, distribution plots, and specimens.

The Smithsonian team learned that the Lindenmeier Valley supported a different plant community 11,000 years ago, and that pine and spruce trees grew much closer to the site in the terminal Pleistocene than they do today. Moreover, Roberts’s photographs have proved invaluable in gauging how the topography has changed since the 1930s.

Lindenmeier was a self-sufficient occupation, a unique member of a suite of functionally related, interdependent locations. From Roberts’s documentation of the area in 1935, Labelle knew that other Folsom sites were likely scattered about nearby. Roberts’s records also note a mammoth tusk discovered a mere 1.2 km from Lindenmeier as well as evidence of more-recent occupations above the Folsom level.

CSU Field School at the Lindenmeier site, summer 2011. Folsom paleosols are exposed in the arroyo system in midground, and Folsom Hill is visible in left background.

example opportunity to explore further into the Folsom culture. It was more than 70 years ago that the Smithsonian Institution and the Colorado Museum of Natural History (now Denver Museum of Nature & Science) (MT 21-1, "The Denver Museum of Nature & Science: A History of Early-Paleoindian Research") launched aggressive excavations. Teams of horses pulling slip scoops removed overburden and exposed the Folsom floor, which yielded many distinctive fluted points in association with remains of Bison antiquus, an extinct species of long-horned bison (MT 26-3, “Pre-Clovis Butchers of Bison antiquus”). One exceptional specimen, a bison vertebra with a Folsom point
A large-scale survey

Now a National Historic Landmark, the Lindenmeier Valley lies on land recently protected under the Laramie Foothills Mountains to Plains Project, which encompasses 29 square miles of prairie and foothills in northern Colorado, protecting an area much larger than the original half square mile for investigation by archaeologists. The city of Ft. Collins, Larimer County, and the Nature Conservancy and other groups joined in partnership with private landowners to ensure preservation of this archaeological gold mine, which LaBelle has christened "the New York City of Folsom sites." In 2009, the city of Ft. Collins opened to the public the Soapstone Prairie Natural Area, which contains the Lindenmeier site. "Part of the reason we work at Lindenmeier," LaBelle says, "has to do with the management and education aspects. Although there are no active trails that lead hikers to areas of artifact erosion, I've given many public tours of the site. One of our main purposes there is public education and stewardship."

The Folsom complex spans a period of 800 radiocarbon years, mute testimony to the enduring success of the Folsom culture. Interestingly, Folsom people weren't the only ones who used the site. Nearly every area of excavation yielded evidence of short-term late-Paleoindian occupations. Alberta, Eden, and Scottsbluff points were discovered along with Archaic-era hearths. A Goshen point found at Lindenmeier opens the intriguing possibility of an occupation even earlier than Folsom.

LaBelle used the information from his survey to create 3-dimensional computer-generated maps of the newly discovered sites alongside the original excavations. The rich assemblage of artifacts found in the larger area supports his long-held belief that humans have inhabited the Laramie Foothills for over 13,000 years. Its average date of 10,660±60 RCYBP puts Lindenmeier high on the list of the oldest well-documented sites in the Western Hemisphere.

LaBelle's work pinpointed many other nearby areas with multi component lithic scatters, some of them located far enough from the main site to put them outside the typical daily foraging range of inhabitants. Other large Folsom sites in Larimer County make it likely that Lindenmeier was repeatedly used as a base camp. The layout of other camps and kill sites shows what archaeologists might expect to find if Folsom groups used Lindenmeier as a central base camp from which task groups spread across the area.

Reassessing Folsom mobility

LaBelle's analysis on a macro-regional scale of data collected from 619 Folsom sites suggests that Folsom groups weren't constantly moving across vast territories as previously thought. Instead, LaBelle believes groups either occupied or frequently revisited locations—he calls them "hubs"—selected for ready access to such resources as lithic raw materials, water, small game, and edible plants. Small task groups likely forayed some distance to hunt bison, camping at the kill site and returning to the hub when butchering was completed.

LaBelle wants to see archaeology break free of the earlier assumption that Folsom groups were highly mobile by using all available data to construct models of subsistence and land
use during the late Pleistocene. In earlier studies, almost half the diagnostic artifacts analyzed came from only 3% of Folsom sites—all of them large, well-excavated and -reported sites. Often ignored were artifacts from the other 97% of Folsom occupations, thereby giving an incomplete and possibly misleading picture of Folsom behavior. In place of this limited approach, LaBelle and his team use an analytical method with three different scales, or fields of view:

- Site  Detailed analysis of assemblages from 27 well-published Folsom sites.
- Foraging radius  Surveying the resources within the area surrounding Folsom sites exploited by hunter-gatherers.
- Macro-regional  Studying 619 sites in 5 states to investigate large-scale Folsom land use.

This incremental method has the virtue of being sensitive to differing spatial components in the archaeological record. Artifacts within a site are related, sites are related to each other within a landscape, and landscapes are related to each other within regions. Patterns found in the data for each of these three scales help LaBelle draw inferences about Folsom mobility.

**Hunter-gatherer adaptations**

At the end of the Younger Dryas, a late-Pleistocene cooling event, LaBelle believes conditions in northern Colorado changed quickly. Temperatures rose, tree lines moved uphill, and modern climatic conditions took hold. Human groups adapted by subtly changing their subsistence and settlement patterns, and the populations of Paleolithic communities increased in size. "Daughter" groups split off and expanded into new areas, perhaps forming new cultural identities over time.

The earliest cultural groups of northern Colorado left distinctive footprints, which help archaeologists determine the effects of climate change. Although little evidence has been found to chronicle the lives of pre-Clovis people, we know that Clovis sites consistently reflect a pattern of short-term, low-intensity habitation and minimal investment in modifying the site. The Folsom record, illustrated by the long-term, high-intensity occupation of Lindenmeier, is quite different.

An interesting land-use practice common to the largest Folsom occupations and exemplified by Lindenmeier was situating camps with "viewsheds." This served two purposes: Inhabitants could spy game at great distances; and foraging groups returning from the hunt could see their destination from far away. Smoke trailing into the sky from its elevated location advertised the presence of Lindenmeier. "It is no coincidence that Lindenmeier is located halfway between the northern and southern limits of Folsom habitation as well as halfway between the eastern and western boundaries," LaBelle says. "Being the center of the Folsom world, sites like Lindenmeier could have served as lighthouses, places to facilitate interaction and communications over vast empty territories."

**Abundant evidence of change**

The archaeology of the Central Plains and Rocky Mountains is replete with evidence of changes in Paleolithic subsistence and behavior during the late Pleistocene made necessary by dramatic climate change. During the Younger Dryas, Folsom groups appear to have settled in. They engaged in mapping the natural and cultural landscape and gradually acquired a sense of place. It was a period of increasing cultural complexity. Some groups even seem to have used seasonal residences.


A few of the Folsom sites in Colorado and Wyoming contain traces of Folsom houses, the beginnings of formal physical
Students surveying buried paleosols downstream from the Lindenmeier site, 2009.

architecture (MT 21-3, "Folsom on a Mountain Top"). Concentrations of burnt daub show the impressions of poles used to support a roof, which may indicate an adaptation to the colder climate of the Younger Dryas. Although Lindenmeier has yet to yield evidence of Paleoindian structures, the presence of decorative bone and beads in various states of manufacture suggests these nonessential activities most likely occurred during winter, when Folsom inhabitants sought shelter from the cold and had time to engage in activities other than food gathering. "The sheer magnitude of the site and the amount of debris there suggest a cold-weather site," LaBelle says, "and an accumulation of hundreds upon hundreds of endscrapers points to major clothing manufacturing, normally a cold season occupation."

Upon close examination, some artifacts discovered at Lindenmeier show traces of red ochre, a hematite pigment that lodged in the crevices of chipped-stone tools. Endscrapers and other scrapers used to prepare hides show the highest incidence of imbedded ochre, suggesting an association between the pigment and hide preservation. "It's possible that the ochre was sprinkled on the hides to stain them and worked in with tools, but it may also have been used as a preservative," LaBelle explains.

The Center for Mountain and Plains Archaeology
As the director of Colorado State's new Center for Mountain and

The Lindenmeier site in a nutshell! This superb rendering was created from a database compiled by CSU graduate student Jason Chambers, using distribution maps generated from the 1934-40 Smithsonian Institution excavations by Frank H. H. Roberts, Jr. To construct this database, Chambers scanned 17 different individual artifact distribution maps, geo-referenced them into common coordinate space, and digitized the results. The derived dataset, which embraces all 413 squares excavated by Roberts, includes 5,480 individual items representing 22 distinct artifact types. Both piece-plotted and general excavation-square counts are included, resulting in a robust geo-relational database that documents the spatial relationships of archaeological materials recovered during the Smithsonian Institution excavations. As part of his thesis project, Chambers also analyzed spatial patterning to determine the overall distribution of bone and lithic items at the site and reveal spatial relationships among several functionally related artifact types. "This project," says Chambers, "represents a collections-based approach that incorporates existing data and modern mapping software unavailable to previous generations of researchers to maximize the information available for this important Paleoindian site, and demonstrates the commitment of the Center for Mountain and Plains Archaeology (CMPA) to advancing regional Paleoindian research."

Plains Archaeology, Dr. LaBelle oversees a $1 million endowment to the Department of Anthropology, which has enabled him to move research facilities and thousands of artifacts from off-
campus areas to the Clark Building on the Main Campus, making them more accessible to students and faculty. The gift, which establishes the James and Audrey Benedict Mountain Archaeology Fund, is the largest ever received by the department. The Center will expand the university’s collaborations with other universities and with federal, state, and local resource agencies. It is home to the Archaeological Repository, which retains more than 18,000 catalog items consisting of prehistoric and historic artifacts from the cultures of peoples living in the Northern Colorado region over the past 12,000 years or more.

Jim Benedict, an internationally known geoarchaeologist who died in 2011, developed a rotary model that has enlarged our understanding of Paleoindian land use and how it changed across space and altitude. Deeply committed to research, stewardship, and public education, Dr. Benedict conducted extensive research on the natural history of the alpine coun-

These conservative estimates of discoveries at Lindenmeier during the 1930s reveal the vast quantities of specimens at the site.

try. The Benedicts have been long-time friends and supporters of the Department of Anthropology at CSU, and their generous gift will advance geological and archaeological research in the Rocky Mountains. The Center for Mountain and Plains Archaeology is pledged to carry on his legacy, and the fund will help train a new generation of Colorado State anthropology students.

“In the summer of 2013, I plan to return to Lindenmeier with students to excavate an unexplored area on the east side of the site near the bison pit,” LaBelle says. Meanwhile he continues to expand his database of evidence of human presence in northern Colorado and southern Wyoming in the Pleistocene. These activities could easily consume a lifetime, but Jason LaBelle isn’t one to retreat from a challenge.

—Martha Deeringer

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Students surveying the vicinity of the bison pit, eastern side of Lindenmeier site, 2009.

Suggested Readings


ARCHAEOLOGY
...Latin American style

"Harsh but fruitful" is how Laura Miotti, professor of Anthropology at the University of La Plata, describes Patagonia, for its barren windswept plains obscure the fact that hunter-gatherers had already colonized this region—indeed, many parts of Central and South America—when the Clovis culture was flourishing in North America.

You'll find compelling testimony to the long-standing presence of humans in the southern continent in the new CSFA publication Southbound: The Late Pleistocene Peopling of Latin America. In its 218 pages Dr. Miotti and 97 other scientists and scholars document evidence of occupations from Mexico to Argentina dating to the early-Paleoindian age with radiocarbon dates to support their claims. Discussing the unifacial lithics industry of the Itaparica tradition, for example, anthropologist Antoine Lourdeau states his case eloquently: "The existence of such a techno-cultural complex in Brazil, conceptually so different from the North American Clovis culture and yet contemporaneous with it, throws into question the basic premises underlying American prehistory."

To order your copy of Southbound, see the inside rear cover of this issue.