anthro·notes

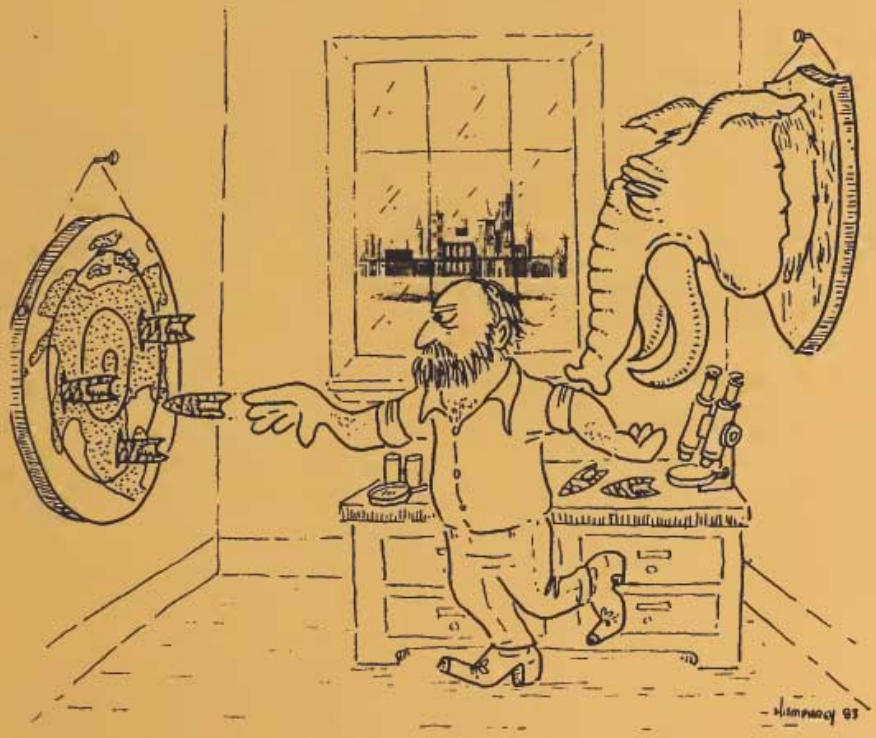
a newsletter for teachers

vol. 5 no. 1 winter 1983

BONES AND STONES - - OR SHEEP?

"If I could find one clearly stratified site with some busted mammoth bones, a couple of crude flake tools, and a single human bone, all in unquestionable association with a charcoal hearth dated 19,500 years ago -- I'd have my dream."

Dennis Stanford, February 1983



What keeps a man looking a lifetime for evidence he knows he may never find? What keeps him excavating sites which turn out to be "dead ends", hiring research associates to disprove his latest theory, or travelling to South America and China to find a single tantalizing clue? A dream, or maybe just a hunch that he might turn out to be right after all. For if Dennis Stanford finds the evidence he has been searching for during the last twelve years he will unravel one of the major unresolved mysteries in North American Archeology: when did the first human beings arrive in the Western Hemisphere?

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No serious archeologist today questions that Native American populations originated from a generalized Mongoloid racial stock that developed in Eastern Asia and Siberia during the late Pleistocene. Sometime after 50,000 years ago, hunting bands entered the New World following the herds of mammoths and mastodons, camels and horses teeming across the 1,000 mile wide grassy plain exposed in the Bering Sea when Ice Age glaciers caused a drastic reduction in sea level. But when did the great crossing first take place?

"Recent" history is clear. As of 11,000 years ago human hunters inhabited virtually all of the Americas. Sophisticated "Clovis" spear points from over 40 sites in North and South America serve as unmistakable evidence that humans were hunting mainly, or exclusively, mammoths and perhaps bison. But the sudden appearance and rapid spread of Clovis culture remains an archeological mystery. 1,000 years after the first appearance of Clovis spear points, the fluted point technology has spread across two continents and most of the huge animals that were once hunted have become extinct. Were the Clovis hunters the first Americans? If they were, why have no Clovis points been found in Eastern Asia or Northern Siberia? If the Clovis technology was invented in America, or as Dr. Robert L. Humphrey has suggested, on route to America where it spread among pre-existing populations, when did these earlier migrants first enter the continent? If humans were here before 11,000 years ago -- and Dennis Stanford firmly believes that they were -- how can archeologists prove it?

The Yukon territory's Old Crow Basin yielded a clue in the late 1960's when a caribou bone that had been worked by human hands into a scraping tool was found to be 27,000 years old. The date led archeologists to propose that pre-Clovis people made use of a bone technology for many tools. Stone was scarce, and bone tools were readily available from butchered carcasses.

In the mid-1970's Dennis Stanford painstakingly excavated large deposits of broken mammoth bone at two Colorado sites called Dutton and Selby. The animals had died before 11,000 years ago, and their disarticulated broken bones seemed to bear evidence of human activity. "At Dutton in the summer of '76, looking down at a pile of busted camel bone in a 12 foot deep excavation, with a stone tool found at a level below 16,000 years old, I thought I had found it." Stanford and his colleagues hypothesized that the bones were broken for marrow by humans smashing heavy stone boulders onto them. Today, the stone tool has been mapped as lying at the bottom of a gopher hole and the busted bones have been more carefully analyzed. Stanford is no longer sure that Dutton is the dream site he had once thought.

Proposing that pre-Clovis people depended on a bone technology was risky, because broken and polished bones, unlike stone Clovis points can be produced by natural forces. Though willing to go out on a limb and willing to risk an innovative hypothesis, Stanford was not willing to close his mind to this possibility -- even if it meant disproving the bone technology theory. For this attitude, and for his painstakingly meticulous excavation and analysis, he is esteemed among his colleagues who watched with interest as Stanford entered a second, highly innovative phase of investigation through experimental archeology.

In order to eliminate non-human explanatory factors, Stanford and his associates sought to find out what other natural agencies could produce similar results on bone. At the same time, in order to see if humans could indeed produce and use bone tools he began to butcher dead elephants, and make tools from the bones -- of Ginsberg, Maggie, and Tulsa.

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These large elephants were dead when Dennis arrived on the scene ready to simulate Pleistocene mammoth butchering. The early, carefully documented results were encouraging: bones broken over stone anvils resembled broken bones at Dutton and Selby; the resulting bone tools worked extremely well in carving up skin and meat; and the wear, polish, and striations matched those on ancient bones. In fact, Stanford remembers, "one flaked bone from Ginsberg looked identical to the 27,000 year old bone tool from Old Crow."

But many archeologists remained skeptical, and Stanford was eager to face the skeptics head on. In the mid-1970's a graduate student at Catholic University, Gary Haynes, saw Stanford's evidence for pre-Clovis bone technology, and expressed serious skepticism. Stanford encouraged Haynes to try disproving the bone technology theory, and supported his plan to feed fresh bones to the Kodiak bears and African lions at the National Zoo. This research, along with studies of captive wolf colonies that were fed whole carcasses of deer and moose, produced for Haynes his first clear evidence that the Ice-Age "tools" might instead be the results of gnawing by carnivores which polished and broke the bones.

From those first Zoo experiments evolved a remarkable professional relationship: Dr. Stanford developed hypotheses and Dr. Haynes searched to disprove them. Both of them published papers advancing the science of archeology and of taphonomy -- the study of what happens to bones after an animal dies in the wild, a subject of increasing importance to archeologists. For several years, in summer and in the "dead" of winter, Haynes travelled to the Canadian Northwest Territories to watch bison herds preyed on by wolves in order to document what happens to carcasses in the wild. More recently Haynes has been dispatched to Africa to record the behavior of elephant herds and to describe modern elephant bone accumulations.

What Haynes discovered was exactly what Stanford thought he might find: evidence that natural agencies could produce the spiral fractures, the polish, the wear patterns, and the striations on bone archeologists once thought reflected human activity. Wolves chewing on big-game carcasses produce polish as well as tooth marks; bison wallowing in the dust actually fragment and polish previously deposited bone; carnivores break bones to get at marrow just as humans do; and gravel produces the scratches once thought to be clear-cut evidence of human tool use. Broken mammoth bones, previously thought too massive to be broken by natural causes, are explained by Haynes' research documenting that elephants walk over and break the bones of dead elephants. The resulting broken bones look very much like broken bones in Dennis Stanford's office taken from the Dutton and Selby sites. Even the flaked tusk "tools" have been found in the wild, the result of elephants knocking into one another as they struggle to get to water in the dry season.

At times, Stanford says, he feels "like just walking out, leaving the bones and stones behind, and going to herd sheep." He and Haynes agree that humans and carnivores can produce closely similar evidence for future archeologists to excavate, and it may be impossible in many cases to differentiate the exact circumstances of bone breakage in the past. But by 1982 Stanford had pretty much concluded that the bones at Dutton and Selby did not "show unmistakable evidence of human activity." Herding sheep, however, wasn't going to solve the problems.

Instead, Stanford decided to embark on a Chinese-American joint effort which would include research in the High Plains of North America

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and Northeast Asia, the hypothesized homeland of the Paleo-Indian precursors. With funding provided through the National Geographic Society and Wenner-Gren Foundation, Chinese and American archeologists worked together during the summer of 1981 at the Lamb Spring site in Colorado excavating a large pile of mammoth bones, many of which had been broken before burial over 11,000 years ago. Lying in the same deposit was a 33 pound boulder that could have been used by pre-Clovis people to break the long bones. Once again Stanford feels he may be on the trail of pre-Clovis hunters, for why would 90% of the large long bones be broken while the majority of fragile bones (ribs, etc.) remain intact.

Haynes' research results on wallowing African elephants cannot neatly explain the modified bones at Lamb Spring. So, in the summer of 1983 Haynes will excavate modern "elephant graveyards" in Africa: these are the waterhole sites where elephant skeletons have accumulated for many decades. Perhaps he will find there some explanation for the broken long bones and the intact rib bones.

Stanford, meanwhile, is off to another well-stratified site, Blackwater Draw, New Mexico. This site was excavated originally between 1932 and 1937. "Then no one thought there was even a Clovis people, and so no one dug below the Clovis level. Local legend has it that pre-Clovis material has been found there and this summer we hope to find it."

After Blackwater Draw, Stanford will return to China where he spent the fall of 1982. In China, he did not find any evidence of Clovis technology or even tools that look like Clovis' antecedents. But he was able to examine all the Pleistocene collections in the museums, and travelled to most of the Paleolithic archeological sites. What he discovered was broken bones, flaked bone, and crude stone artifacts, all very similar to what is found at the sites in North America such as Lamb Spring. Evidence for a highly evolved lithic technology does not appear in China until perhaps as late as ± 14,000 years ago when a microlithic (small tool) technology developed which bears close resemblance to that of the early Eskimo peoples, who are later arrivals on the North American continent.

So, if the earliest American cultures did not originate in Eastern China, where is their source? A new idea tantalizes Stanford. Perhaps the roots of Paleo-Indian culture developed in North Central China. No archeologist since before World War II has examined the sites west of Manchuria, the first stop on Stanford's planned trip to China in 1984.

For now, he will continue his search in America, tracking down the bones and the stones which might give him that unmistakable clear association, of human tools with extinct animal remains, that he is sure exists somewhere, if only he knew exactly where to look.

Ruth Osterweis Selig

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