

SANDIA CAVE, a National Historic Landmark in central New Mexico, once was hailed as the earliest archaeological site in America. Traces of human occupation in the deepest levels of the cave appeared to be ironclad evidence of a pre-Folsom culture with its roots in the Solutrean culture of the Old World Paleolithic. In the decades since its discovery, however, “Sandia Man” has fallen under a shadow of increasing doubt and suspicion. Recently, researchers from Arizona State University, Harvard University’s Peabody Museum, and the New Mexico Museum of Natural History teamed up to take a new look at the mammal bones from the site in an attempt to sort out the controversy.

Is Sandia Cave a key to unlocking the mysteries of the first Americans? Or are the data hopelessly compromised by incompetence or even fraud?

The controversy

Sandia Cave is a tunnel-like solution cavity in the limestone face of Las Huertas Canyon on the east side of the Sandia Mountains northeast of Albuquerque. Former University of New Mexico archaeologist Frank

Hibben, who directed the early excavations at the site, wrote in 1946 that the “question of the day is, ‘Who were the earliest Americans?’” Based on his work in Sandia Cave, he claimed to have found the answer.

Hibben had uncovered a layer containing classic Folsom points along with the “shattered bones of the horse, the bison, and the camel!” At the time, Folsom represented the earliest known culture in America, so it was gratifying to find such early traces in the cave, but Hibben continued to dig in pursuit of a bigger prize.

Below the Folsom layer, Hibben and his team encountered a layer of yellow ochre, which he claimed was “unbroken, effectively sealing off whatever lay beneath it.”

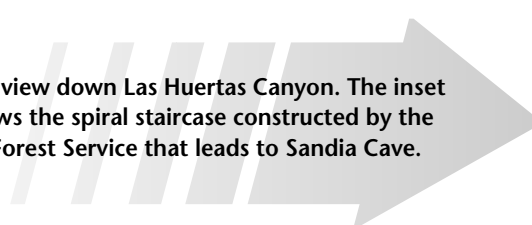
Once they were through the yellow ochre, Hibben hit the archaeological jackpot! He found stone tools, the bones of Ice Age animals, and prepared fire pits—from an unknown culture that appeared to be demonstrably older than Folsom.

Many of the stone tools were similar to those found in the Folsom layer, but instead of the classic Folsom projectile points, Hibben found a distinctly different style of spear point, which he named “Sandia points.” Sandia points are single-shouldered, leaf-shaped flint spear points somewhat like Upper Paleolithic Solut-

rean points from Spain and France [MT 17-1, “Immigrants from the *Other Side*?”]. Hibben claimed that radiocarbon dates indicated that the Sandia people lived in Sandia Cave between 17,000 and 20,000 years ago, making them “almost certainly the first Americans.”

Almost as soon as the claim was announced, however, Hibben’s discovery became mired in controversy. The integrity of the stratigraphy was questioned, the radiocarbon dates

New Study of Animal Bones from Sandia Cave Sheds Light on 70-year-old Controversy



A long view down Las Huertas Canyon. The inset shows the spiral staircase constructed by the U.S. Forest Service that leads to Sandia Cave.

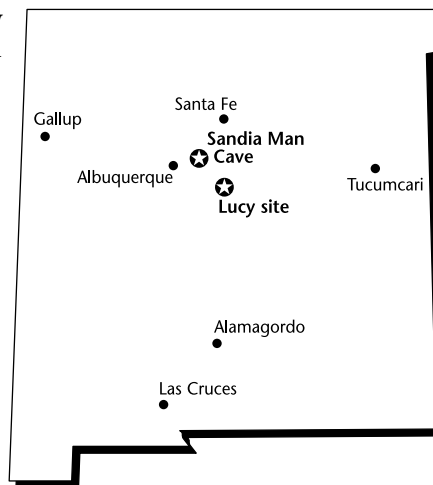
were rejected as problematic, and some even have suggested that Sandia points are forgeries. In a study of the controversy, Eastern New Mexico University archaeologists Dominique Stevens and George Agogino determined that “all conclusive statements” concerning the putative Sandia culture are “based on insufficient and/or uncertain data.” As a result, the site largely has been dismissed and forgotten.

Nevertheless, C. Vance Haynes, Jr., University of Tucson ge archaeologist, and Agogino, in their study of the geochronology of Sandia Cave, acknowledged that it is “one of the most important sites to American archaeology and to Pleistocene geology.”

A new look at an old site

In the April 2008 issue of *American Antiquity*, Jessica C. Thompson, an archaeologist with the School of Human Evolution and Social Change at Arizona State University, Nawa Sugiyama, from Harvard University’s Department of Anthropology, and Gary S. Morgan, of the New Mexico Museum of Natural History, reexamined the Sandia Cave faunal assemblage with three sets of questions in mind.

First, what kinds of animals have been identified in the bones from Sandia Cave? In particular, they sought to “provide comprehensive taxonomic and taphonomic data that go beyond the simple taxonomic list” in Hibben’s original publications.



Second, what processes produced these accumulations of bone? Did humans use the site as a base camp, or was it instead a carnivore den?

Finally, is there any evidence in the faunal collection that can contribute to resolving the controversies swirling around the site?

tontail, yellow-bellied marmot, northern pocket gopher, mountain vole, and bushy-tailed woodrat.

This large and diverse assemblage of extinct mammals and species with ranges now limited to colder regions of North America makes Sandia Cave an unquestionably important paleontological locality. But, of course, much of the significance for

American archaeology was the claimed association of these Ice Age critters with the stone tools of ancient humans.

For this reason, a major objective of Thompson and her co-researchers' reanalysis of the Sandia Cave mammals was to "establish if humans were involved with accumulating and modifying" the bones.

Does the collection include bones from other sites?

Thompson and her colleagues examined the mammal bones that Hibben claimed had been excavated from Sandia Cave, checking for evidence that some of the bones might be out of place. There had been accusations that bones from other sites had been added to the Sandia

collection, whether deliberately or through sloppy curation procedures. Fortunately, the majority of the bones were found to be in the "original, unwashed state." This was important because, although fewer than half the bones in the collection still had information indicating the level in which they had been found, sediment adhering to a questionable bone could provide clues about its provenience.

All the bones were covered with the "fine, golden-yellow ochre" that permeated the lower layers of the site. This ochre, not simply covering the bone surfaces, also "filled small cracks and irregularities," indicating the ochre hadn't been brushed

casually onto the bones to make them appear to have been come from Sandia Cave.

Thompson and her team also compared the bones excavated by Hibben's crews with those excavated in 1984 by Smartt and Hafner to determine whether any seemed odd or out of place. They found that "none of the specimens

Sandia points. A is from the Lucy site, B-D are from Sandia Cave.

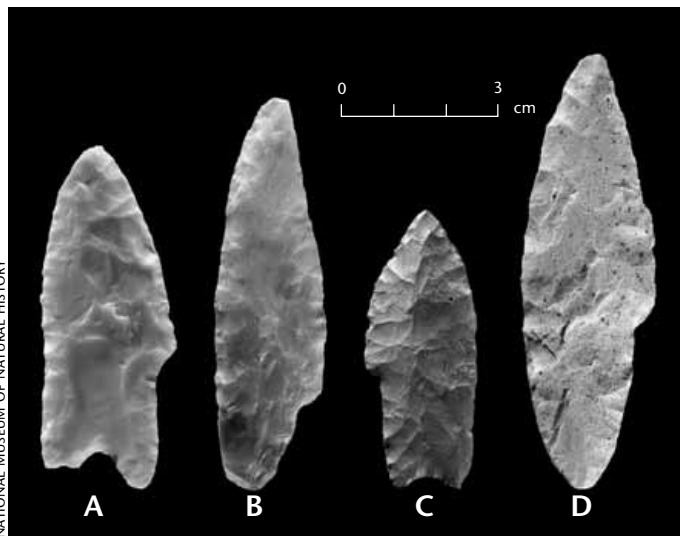


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In addition to the bones collected by Hibben, Thompson and her colleagues had access to an important comparative collection excavated in 1984 by Richard Smartt and David Hafner of the New Mexico Museum of Natural History. This material, collected with modern recovery techniques, adds to Hibben's collection, and, more importantly, it is an independent record untainted by concerns raised over the original investigation.

Sandia Cave bestiary

The original faunal collection reported by Hibben included 16 species of mammals, 7 of which are extinct: mammoth, mastodon, two varieties of horse, camel (giant llama), *Bison antiquus*, and ground sloth. The total number of species was raised to 41 with the addition of species added by Smartt and Hafner's excavations, which include the large-headed llama, flat-headed peccary, dwarf pronghorn, and Stocks pronghorn. In addition, Smartt and Hafner recovered six species of mammals that are "extralimital" (species that, although not extinct, are no longer found in the region around Sandia Cave). These extirpated species include the snowshoe hare, mountain cot-



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were distinctively different in terms of color, fossilization, or matrix from those that were recovered in 1984 under controlled conditions.” In other words, there’s no evidence that bones in the original collection from Sandia Cave were deliberately or inadvertently mixed with bones from other contexts.

Stratigraphy—do the sediment layers have integrity?

Hibben originally argued that the “well-defined stratigraphy of Sandia Cave is one of its outstanding features.” Yet Haynes and Agogino, in their meticulous reexamination of the cave, found clear evidence of mixing between all the major strata. Even Hibben acknowledged that a ground sloth claw had been found on the modern surface, but he

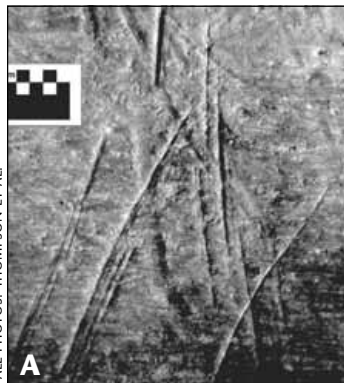
The view from the mouth of Sandia Cave.



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thought that showed that ground sloths had survived into relatively recent times. Subsequent years of discovery and dating, however, have shown that ground sloths died with the other megafauna at the end of the Pleistocene. Likewise, the presence of mammoths—now known to have become extinct prior to Folsom times—in the Folsom layer of Sandia Cave is another indicator of mixing between layers.

Thompson, Sugiyama, and Morgan studied bones to determine whether there were corresponding degrees of bone weathering for each of the three general time periods—recent, Folsom, and Sandia. (Their conclusions are tentative, since they had to rely on a label on each bag of bones that defined the origin of the specimens; the provenience, although probably roughly indicative of the location from where Hibben and his team thought the material derived, isn’t necessarily reliable.) If Hibben was right and the layers were different in age and unmixed, then bones from the deep Sandia level, having lain in the soil for several additional millennia, likely would be more highly fossilized than bones



Large mammal bones from Sandia Cave showing evidence of human activity. **A**, stone tool cutmarks; **B**, percussion mark made by a hammer used to break open the bone for extracting the marrow; **C**, a cut and shaped bone tool fragment.

from either the Folsom or recent layers. The team recorded mineralization as “heavy,” “light,” or “none.”

They found that “there are similar proportions of heavily and lightly fossilized bone in the bottom (Sandia) and top (Recent) layers.” This corroborates the claim that there has been considerable mixing of the bones

between these levels, which undermines Hibben’s claim about the integrity of the levels.

Curiously, the bones from the Folsom layer stand out as “statistically very different” from both the recent and Sandia layers. This may be due simply to sampling error, but it’s also possible that the consolidated nature of the Folsom layer kept it more intact than the more loosely compacted layers

above and below it.

Excavation and curation biases

Thompson, Sugiyama, and Morgan meticulously compared the bones collected by Hibben and his crew with the more recent material excavated by Smartt and Hafner to determine the quality of Hibben’s excavation and curation methods. To Hibben’s credit, they found he was ahead of his time in terms of saving the tiny bones of microvertebrates, which were usually discarded by his contemporaries as uninteresting, and in collecting and saving fragmentary bones. Although the relatively large mesh of the screen Hibben used biased against bones of the smallest microvertebrates, Thompson and her colleagues were nonetheless relieved to find that the original assemblage included bones of rabbits and larger rodents. Their presence verified that the assemblage hadn’t undergone major sorting or analytic bias. They conclude that compared with other archaeologists of his generation, Hibben’s “excavation and recovery methods were excellent.” And the Sandia Cave faunal assemblage “is striking in its completeness and suitability for modern study.”

How did the bones come to be in the cave?

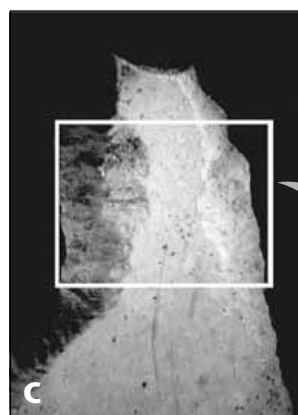
The most important question to be answered, of course, is, What role, if any, did human hunters play in bringing the bones to Sandia Cave? If Hibben is right, many if not most of the bones were brought to the cave by Folsom and

Sandia hunters. The bones represent the animals that were killed, butchered, and cooked at the site. And the bones were broken by people in order to extract the nutrient-rich marrow. Is there evidence in the faunal data to corroborate or refute this scenario?

According to Thompson and her colleagues, there are two main lines of evidence that can shed light on this question: surface modifications, including animal tooth marks and stone tool cutmarks; and skeletal element representation, which refers to the kinds of bones that are preserved at the site.

Surface modifications

To prove or disprove Hibben's claim that Sandia Cave contained evidence for human hunting and butchering of Ice Age megafauna turned out to be a task that eluded a definitive answer.



Large mammal bones from Sandia Cave showing damage from carnivores and rodents. **A**, carnivore tooth marks; **B**, "gastric etching"—damage to the bone from acids in the stomach of a carnivore; **C**, rodent gnawing marks overlie cutmarks, evidence that bones butchered by humans were later gnawed by rodents.



None of the small-mammal bones bore unquestionable evidence of human modification. Only 2 percent of the bones from larger mammals had surface modifications that could be attributed to human activity—possible cutmarks on a few bones, percussion marks possibly made by stone hammers used to break open bones, and a few examples of tools made



from the animal bones. Unfortunately, definite human modification was only identified on bone fragments and long bone shafts that couldn't be traced to a skeletal element or species.

Many of the bones with evidence of human modification are the most heavily fossilized specimens, which suggests that at least some of the human-modified bones "may have considerable antiquity." Nevertheless Thompson and colleagues found no evidence of any kind of human modifications on any bone from an animal "positively identified as [an] extinct Pleistocene species." Absent human-modified bones of an extinct or extralimital species, it is impossible to confirm Hibben's interpretation of Sandia Cave as an Ice Age hunting station or even as a shelter occasionally visited by terminal-Pleistocene Early Americans.

Skeletal element representation

Thompson, Sugiyama, and Morgan report that the bulk of the large-mammal bones from Hibben's excavations consists of "high-density elements such as teeth and long bone shafts," a composition consistent with carnivore action. Moreover, evidence of gnawing is found throughout the assemblage and several bones appear to have passed through the digestive tract of carnivores. Comparing the incidence of tooth marks with that of modern experimental bone assemblages that have been butchered by humans, then fed to carnivores, Thompson and her coauthors conclude that large carnivores "were the primary agent for accumulating most of the fauna including extinct Pleistocene species."

It's worth noting that the inventory of skeletal elements confirms that Hibben, contrary to the traditional practice of discarding long bone shafts that cannot be identified to skeletal

element, seems to have kept everything. His compulsion to retain even apparently useless materials made it possible for Thompson and her colleagues to identify the few human modifications present in the assemblage. Although there is no evidence of human interaction with Pleistocene mammals at Sandia Cave, we at least know that humans occasionally butchered some large mammals and left bone tools at the site at some point in its history.

"Sandia Man"—fraud or First American?

Hibben's research has been controversial for decades. Although Thompson, Sugiyama, and Morgan have shown that the collection of animal bones from Hibben's excavations at Sandia Cave still has great value for answering questions of paleontological and archaeological interest, their faunal analyses make a strong case for rejecting many of his most important claims.

The animal-bone data show clearly that humans occupied Sandia Cave only infrequently and then only for brief periods.

Most of the animal bones in the cave represent the meals of large carnivores that used the site as a den. Of paramount importance is the fact that contrary to Hibben's appraisal, the "Sandia" layer was not sealed off from the upper layers by a continuous pavement of yellow ochre; extensive burrowing by rodents throughout the history of the site has jumbled materials from recent cave deposits with those from the deepest levels. But do these findings indicate that Hibben's "Sandia Man" was a fraud?

After examining the animal bones in Hibben's collection, Thompson and her co-authors are grateful that Hibben curated the entire fossil assemblage. It's likely he

Principal investigators (left-right) Thompson, Sugiyama, and Morgan.



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understood that parts of the assemblage considered unimportant at the time might in the future become significant when new analytical methods appeared. Whatever his motives, the fact remains that he left a valuable faunal collection from Sandia Cave that's usable by modern researchers. But what about "Sandia Man"?

Except to show that humans had little to do with bringing the animal bones to the site, the faunal data don't contribute to proving or disproving the authenticity of "Sandia points," the single-shouldered echo of the Old World Paleolithic that was exactly the sort of "missing link" sought by archaeologists in the 1930s. It's worth noting that Sandia points have been found principally at only two sites, Sandia Cave and the Lucy site, a site in the Estancia Valley about 30 miles southeast of Sandia Cave, where Frank Hibben, and his student William Roosa found Sandia points and bones of mammoth and bison, along with other artifacts. One of the Sandia points from Lucy was

fluted like a Clovis point, which suggested it was a technological bridge between Sandia points and the presumably later Clovis style of point. Hibben worked at both sites. But were Sandia points intentional frauds, or were they simply Folsom or Clovis knives that rodents dragged down into the deepest layers of the cave and that Hibben misinterpreted as the remains of a separate and distinctive culture?

Six decades after Frank Hibben wrote that "the question of the day" was "Who were the earliest Americans?" that question still begs an unequivocal answer. Granted, "Sandia Man" might not have been an intentional fraud, but

Thompson, Sugiyama, and Morgan found no evidence to support the claim that he was the First American. 

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Suggested Readings

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- Hibben, Frank C. 1946 *The Lost Americans*. Thomas Y. Crowell, New York.
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