Geoarchaeologist Vance T. Holliday of the University of Arizona developed an early fascination with old mummy movies, which branched into a life-long passion for history in all its aspects—from personal family history to human evolution. He didn't find the designation “Texas dirt archaeologist” demeaning when it was applied to him by his first boss, David Dibble, Director of the Texas Archaeological Salvage Project at the University of Texas. Holliday considered it a compliment that confirmed he was a competent field archaeologist. He feels fortunate to have been able to focus much of his research and teaching on the geoarchaeological aspects of his other primary interest, Paleoindian archaeology.

Near the end of junior college and planning to attend the University of Texas, Holliday experienced an epiphany while watching an old television documentary called “The Man Hunters,” an interdisciplinary study of a rockshelter in France. That was what he wanted to do, and he completed a B.A. in Anthropology, with honors, at UT in 1972.

Colleague David Meltzer of SMU says, “There are few geoarchaeologists not named Vance (Holliday or Haynes) who can be said to have worked on or

made as many fundamental contributions to our understanding of Paleoindian sites on the Great Plains. The long list of sites Holliday has investigated includes such iconic localities as the Clovis, Folsom, Midland, and Plainview type sites, as well as Lindenmeier, Miami, Milnesand, San Jon, and especially Lubbock Lake—where, in collaboration with Eileen Johnson, Vance has devoted decades to its chronological and stratigraphic record and made it an exemplary model of a geoarchaeological field investigation [MT 18-4, “Lubbock Lake]. Vance is a wonderfully nice fellow, but make no mistake: He has a strong sense of scientific integrity and ethics, and if he spots someone playing fast and loose with evidence, he will go after them, as evidenced by his unwillingness to let the dubious claims of the Younger Dryas Impact Hypothesis go unchallenged.” [The Clovis Comet is a hotly contested hypothesized event that purportedly accounts for many anomalous features that characterize the Younger Dryas period. We reported extensively on this controversial extra-terrestrial event in Mammoth Trumpet beginning with MT 23-1. –Ed.]

“Vance and I have been on a very long journey together and apart since 1973,” says Eileen Johnson of Texas Tech. “We have been colleagues and research partners, with concurrent and divergent views, occasional disagreements, and compromises. The trek we’ve taken across the Llano Estacado has been amazing, and it’s not over yet. When I think of Vance’s career and my own, I am reminded of my favorite Robert Frost poem and its last three lines:

‘Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.’

Vance has taken the road less traveled by, and by that choice has greatly contributed to the development of geoarchaeology as a recognized and important discipline on a global basis. He is an accomplished Quaternary scholar influencing today’s and the next generation of Quaternary researchers.”

Holliday and John Hoffecker working on a section at Shlyakh, Russia, 2013.
An early career path that “wandered a bit”

An initial experience as an undergraduate at UT working under Dibble soon led Holliday to Texas Tech, where he worked at the Lubbock Lake Site on a research-oriented study of Paleoindians and completed a master’s in Museum Science with a minor in Soil Science. The conferences, field trips, field work, lab work, and report writing involved in his work with Eileen Johnson helped Holliday realize that he was more interested in the sediments surrounding artifacts than in the artifacts themselves.

“When I had the opportunity to work at Lubbock Lake, I jumped at the chance to join research on a well-known Paleoindian site,” Holliday says. “The amazing stratigraphy there almost instantly catalyzed my interest in the geo side of geoarchaeology. That then exposed me to broader issues in archaeology, geoarchaeology, and Quaternary geology, especially soils.”

With this new direction in mind, Holliday pursued a Ph.D. in Geology at the University of Colorado, Boulder, which he completed in 1982.

Holliday joined the University of Wisconsin to teach courses on soils and geomorphology, where his classes included some graduate students in geoarchaeology. He was able to incorporate his Paleoindian geoarchaeology research into geomorphological studies on the Southern High Plains funded by the National Science Foundation.

When in 2002 the eminent Paleoindian scholar and geoarchaeologist C. Vance Haynes retired from the University of Arizona, Holliday filled his senior-level position in both Anthropology and Geosciences. The leadership change was seamless, thanks to the long tradition of ties between the two disciplines at UA. With the position came his appointment as Executive Director of the Argonaut Archaeological Research Fund, a privately endowed research fund at UA (MT 18-1, “A campaign to find the First Americans”). Argonaut has been a key funding source for his work on Paleoindian geoarchaeology across the great Southwest.

Clovis in the shadow of the A-Bomb

In the late 1950s geologist Robert Weber discovered Mockingbird Gap, a Clovis site located near the place where the first atomic bomb was tested in 1945. Weber worked for the New Mexico Bureau of Geology, but had life-long interest in Paleoindian archaeology. His extensive geologic mapping gave him the opportunity to look for artifacts. Weber mapped the site; serious investigation began after University of New Mexico archaeologist Bruce Huckell and Holliday visited the site with Weber in 2004. On a low ridge they discovered at least a dozen separate clusters of Clovis artifacts scattered on the surface, which suggested either discrete campsites of small Clovis groups or repeated occupations over time by a single group (MT 23-4, “Mockingbird Gap: A mid-century discovery gets another spin”).

A swale at the north end of the site had escaped extreme erosion. A thin layer of sand in the swale covered much of the site, and this is the area Huckell excavated. Holliday chose to core the adjacent Chupadera Wash, which during Clovis time was a stream and wetland system lying more than 10 m below the ridge and swale.

Huckell’s excavations produced many endscrapers but few blades, which indicates the site may have been used for working hides. During the 2007 season a large percentage (49.2%) of artifacts at Mockingbird Gap were found to be made of obsidian acquired from an unknown source that must have been nearby.

Holliday as a workmate earns high praise from Huckell. “Working with Vance for nearly 20 years has been a real pleasure from both a scientific and personal perspective. We first met during Dave Meltzer’s work at the Folsom type site, and af-
After he moved from Wisconsin to Arizona in 2002 we began collaborating on archaeological and geoarchaeological research at the Boca Negra Wash and Deann’s, both small bison-kill/short-term Folsom camp sites (the latter discovered in 2001, named for survey-crew member Deann Muller) separated from one another by about 2 km. That led to joint investigations at the Mockingbird Gap Clovis site in the years 2005–2007 and at White Sands National Monument, work that continues to this day. His generous support of this work using Argonaut Archaeological Research Fund resources is a testimony to his collaborative and inclusive research perspective. Vance’s skills in deciphering Quaternary sedimentary deposits and soils, as well as his superior knowledge of military armored vehicles, have provided a lot of memorable discussions.”

A chronicle of the changing land inhabited by Clovis

The Clovis occupation of the Americas is the most geographically extensive of any time period, testifying to the remarkable mobility and adaptability of the Clovis people. A chapter written by Vance Holliday and Shane Miller in the CSFA book Paleoamerican Odyssey addresses Clovis adaptability and explores the environmental conditions and the rate and direction of environmental change along with differences in land use. Their approach—a synthesis of Clovis-age landscapes and climates—helped develop a “snapshot” or “slice” of the landscape occupied by Clovis foragers during the final millennia of the Pleistocene and the beginning of the Younger Dryas chro-

The climate and landscape encountered by Paleoindians at the end of the Pleistocene was unlike anything experienced by later occupants. Sea level was lower than now but rising, and glaciers were widespread; the continent was undergoing rapid environmental changes from the late Last Glacial Maximum (LGM) to the Holocene, a time slice not often studied.

Although their focus was not on flora and fauna, they found that the distribution of past plant communities indicates rapid transition during most of the North American Paleoindian occupation. Some plant associations then existing have no counterpart today. The wide excursions in North American climate during this time underscore the importance of pursuing a balanced study of global climate change and changes at the local scale, which were clearly both significant and widespread.

The location of glacial ice and the Clovis-age coastline helps define areas where the First Americans came from and what landscapes were available for occupation. Glaciers still covered large parts of Canada and the higher Cascade and Sierra Nevada...
Adventures in Soil Coring

A Giddings soil-coring rig is hydraulically driven and uses brute force to push a barrel into the ground to recover a core the length of the barrel (ours are 120 cm long and 5 cm in diameter). Depth is dependent entirely on what we are coring. If we hit a rock or a resistant layer such as dense calcium carbonate (“caliche”) we come to a dead stop (the core “refuses”). Otherwise, we can go quite deep. My record is 15 m. Typically our cores are in the range of 2–6 m long.

I first got interested in this technology as I worked on the geoarchaeology of the Southern High Plains. The famous Paleoindian sites such as Clovis, Plainview, and Lubbock Lake are buried deep in the draws (dry valleys). Other buried sites such as San Jon and Miami are in playas (generally dry lake basins). To reconstruct regional site contexts, paleoenvironments, and landscape evolution, the Giddings rig was just what we needed. With support from NSF, I carried out a systematic study of draws and playas in the region based largely on cores. In the draws we recorded almost 400 cores (plus natural and artificial exposures) from about 100 localities (only a few of which were archaeological sites). We also cored about 30 playas. Scores of radiocarbon samples from the cores helped to build chronologies of deposition in both settings, which aided in reconstructing environmental changes. A book on the draw research won the 1998 Kirk Bryan Award of the Geological Society of America.

We continued the coring work when I joined the University of Arizona. We cored draws and playas across southern New Mexico and Arizona, and added paleo-lakes and alluvial fans to our repertoire. We had several unusual discoveries. At Mockingbird Gap we were trying to understand why there was such a high concentration of Clovis stone artifacts along Chupadera Wash. The floor of the draw today is not much lower than the level of the site. What we discovered by coring is that during Clovis and Folsom time the floor of the Wash was over 10 m deeper than it is now. The Clovis people were living along a small canyon that dropped off over 30 ft to a mixed stream and wetland setting. That was an obvious attraction. In one of our cores, at over 9-m depth we found a Folsom-age bead made of calcium carbonate (published in 2013 in Current Anthropology). In my experience and that of my geoarchaeological colleagues who use coring devices, discovery of stone tools or bone is exceedingly rare.

Our stratigraphic studies suggested that the Mockingbird Gap campsites, like those at Lubbock Lake and Blackwater Draw, were located near a wetland environment. Radiocarbon-dated core samples established an age of 9000–11,000 RCYBP and confirmed that what is now desert grassland was then a much wetter environment.

The coring also was instrumental in our work at the Water Canyon site in New Mexico. During testing along an arroyo, working with Robert Dello-Russo (Office of Contract Archaeology, University of New Mexico) we realized we had a buried Paleoindian site. Such sites in buried contexts are quite rare in the Southwest. Water Canyon was the first one discovered in New Mexico west of the Pecos River in several decades. To understand the distribution of Paleoindian-age strata and the paleo-topography and to guide excavations we undertook a program of subsurface investigation that recovered 75 cores. In one area of the site in an area of less than 10 m² we hit bone at ~3.5-m depth in 5 cores. That got our attention. Robert subsequently opened the area and exposed a bison bone bed with an Eden point.

— Vance Holliday

Suggested Readings


ranges, but most continental glaciers were retreating long before the arrival of Clovis people, leaving behind vast till plains. As the glaciers melted and ice fronts receded, the rising sea level covered coastal areas that had once been occupied. Holliday tells us that “across the continent the hydrology, and all geomorphic and depositional processes underwent massive changes.”

The picture of North America during the spread of the Clovis culture shows a remarkably dynamic environment with
broad trends and detailed changes at different rates and in different directions.

“The data we have now suggest there were few people in the Americas prior to the Clovis occupation,” Holliday says. “But based on numbers of sites and artifacts, there was a population explosion of sorts in Clovis time with people living in North America from coast to coast. To me that is still a great mystery. Was there a large pre-Clovis population we just aren’t seeing or finding? Where did Clovis artifact assemblages evolve? We don’t see colonization (which I take to mean people settling much or most of each continent) until Clovis assemblages appear in North America. A lot of my work focuses on building chronologies both in terms of stratigraphy and numerical dating. I worked on this extensively on the Great Plains because we have so many stratified Paleoindian sites.”

A one-of-a-kind Clovis kill site in Mexico

The site El Fin del Mundo (Spanish for The End of the World) was discovered by a rancher in Sonora, Mexico, who noticed large bones and artifacts eroding out of an arroyo wall. In 1999 Vance Haynes and University of Arizona graduate student Guadalupe Sánchez, when investigating the area, were told of the find. “But it wasn’t until we had the Argonaut funding in place,” Holliday explains, “that we could support Guadalupe’s visit to the site as part of her broader research into Clovis archaeology in the state of Sonora just south of Arizona.” The large bones belonged to gomphotheres, megamammals from the proboscidean family previously thought to have disappeared earlier in the Pleistocene. Remarkably, the bones were found in association with Clovis artifacts, indicating that the animals were part of the Clovis diet. El Fin del Mundo is currently the oldest Clovis kill site yet discovered (MT 30-3, “El Fin del Mundo: News from the end of the world . . . as we know it?”) It’s only the second Clovis site yet discovered in Mexico, and the only gomphothere kill site in North America.

Holliday, one of the primary researchers of the site, and Sánchez could only reach the isolated site in the Sonoran Desert after a rough three-hour journey over volcanic hills far from the nearest paved road. Excavated between 2007 and 2012, the site revealed a Clovis camp and butchering area, heavily eroded. Flowing water had carved islands in the sediments and destroyed evidence of the stratigraphic relationship between the islands and surrounding deposits.

Two bone piles with disarticulated skeletons of two proboscideans—at first thought to be mammoths or mastodonts—were later identified by their unique molars as gomphotheres. Examining the teeth also helped determine the age of the two gomphotheres, animals long thought to have disappeared from North America before the arrival of humans. Four Clovis points, fluted lanceolate bifaces that demonstrate skilled pressure flaking, were found near the bones, one within 60 cm of the mandible. Bits of broken teeth and bone appeared beside, above, and below the points. A nearby broken artifact, the distal end of a Clovis point, exhibited a snap break usually associated with an impact fracture. (Clovis points were multipurpose: They served as projectile points for hunting and as knives for butchering and for preparing vegetal material.) Disarticulated bones gathered into two piles led researchers to believe the animals were butchered by humans and later disturbed by scavengers. Holliday admits, though, the severely weathered bones make it impossible to know for sure. The most reliable date for the site, taken from a piece of charcoal, is 13,325–13,440 yr B.P., which extends the previous ancient limit.

Guadalupe Sánchez’s work at El Fin del Mundo became part of her dissertation titled Los Primeros Mexicanos, which she later published as a book. She is now a professional archaeologist in Hermosillo, Sonora.

Recalling his experience at the El Fin del Mundo site, Holliday tells us, “One of the great opportunities provided by the Argonaut funding is working in northern Mexico alongside Mexican archaeologists.” “A lot of my work focuses on building chronologies both in terms of stratigraphy and numerical dating,” Holliday explains. “I worked on this extensively on the Great Plains because we have so many stratified Paleoindian sites. Working in the Southwest has been a very different experience, however, because buried, datable stratified sites are very rare west of the Pecos River valley. I’ve been fortunate to work on several of the rare buried sites in the Southwest (El Fin del Mundo and Water Canyon) and contribute to the archaeological chronologies.”

A middle-Paleolithic blade industry in southern Russia

Holliday and colleague John Hoffecker of UC Boulder in 2013 visited Shlyakh, an open-air site located near Volgograd in southern Russia, to collect new archaeological data and to perform new dating of the area. The site presents a challenge, since materials deposited 50,000–40,000 years ago lie at the limit of radiocarbon dating. Ancient human DNA extracted from skeletal remains indicates that the local Neanderthal population was being replaced by an incoming population of modern humans and that local Middle Paleolithic industries were being transformed.

More than 5,700 artifacts were recovered at Shlyakh between 1990 and 2000. New stratigraphic profiles, along with soil micromorphology, gave a more detailed picture of the context of the site. New dating research confirmed earlier results, based mainly on paleomagnetic stratigraphy. When Shlyakh was occupied, roughly 40,000 yr B.P., both Neanderthals and modern humans appear to have been present in Europe.

Holliday remembers the experience of working on site as “a fun project with great Russian colleagues.” Satisfaction was assured from the start: The region is the Russian equivalent of our Great Plains, and Holliday found the stratigraphy interesting. For him, “It was like being home.”

“Vance and I first worked together in the summer of 1974, when he was a first-year grad student and I was still an undergrad,” says Hoffecker. “Vance was the Clovis area crew chief at Lubbock Lake and I was on the crew. In 2001 we worked together once again, this time in Russia at the Kostenki sites with a group of Russian colleagues and students (technically, I was the PI and Vance was the project geoarchaeologist) and we have continued to collaborate on the field and lab study of Paleolithic sites in Russia and Ukraine ever since, including Mira and Shlyakh.”
“Vance has made a major contribution to Paleoindian archaeology in North America and Paleolithic archaeology in Eastern Europe. And we’ve had a lot of fun doing this work together all these years.”

Honors and awards galore

Holliday was recognized as a “Titan of Texas Archaeology” by the Texas Archaeological Society. The list of his honors, awards, and grants and his many publications would fill an entire issue of *Mammoth Trumpet*. Holliday’s 1997 book *Paleoindian Geoarchaeology of the Southern High Plains* yields important information about cultural chronology and paleoenvironments across the region.

In 2018 Holliday received the Roald Fryxell Award for Interdisciplinary Research by the Society for American Archaeology. He acknowledges that he owes a large measure of thanks to some of the scientists we mention in this article. It’s a most prestigious award, especially considering that Vance Haynes was the first to receive the award exactly 40 years before. Holliday, who was in the audience at the 1978 SAA Conference when the award was announced, remembers thinking, “That is so cool!”

About the future

“There is so much to do!” Holliday tells us. “Access to the White Sands area in southern New Mexico opened up so many research opportunities. Most of the Tularosa Basin is owned by the military or the National Park Service, and the military holdings extend north into the Jornada del Muerto Basin (almost to the Mockingbird Gap Clovis site). That means that most of the Paleoindian sites over a huge area (measuring about 140 by 50 miles) were never collected and we can visit most of them (with the generous and enthusiastic help of the personnel out there). So, we can document literally hundreds of sites from all Paleoindian time periods in a variety of landscape settings. Paleo-lakes and playas have fascinated me since I started graduate school and began working on the High Plains. As a result, I developed an interest in investigating the relationship between the First Americans and the evolving lakes scattered across the Great Plains and the intermountain West. We have Paleoindian sites scattered across much of southern and central New Mexico, thus a great opportunity to pursue that research.

“I also plan to continue work with the National Park Service and other agencies on the remarkable record of mega-fauna tracks and human tracks at White Sands National Park. This is also a remarkable and unique research opportunity (and linked back to a paleo-lake record) (MT 34–4, “Ghost fossils: A Pleistocene trackway and possible kill site at White Sands, New Mexico”). Because of the international reputation of archaeology and paleoenvironmental sciences here at the UA, we attract a wide array of first-rate graduate students from around the world.”

– Martha Deeringer

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Suggested Readings


Holliday, V. T. 1997 *Paleoindian Geoarchaeology of the Southern High Plains*, University of Texas Press.


