Pretending to Be Obese

That garment high school physics student Cassie Eckerman is wearing is called a weight apron. Big pockets, when stuffed with bags of dried beans or rice, give her a good idea of what it would be like to have to carry extra pounds of fat on her body all day long. It was invented by middle school teachers in Texas, themselves students of Carolyn Marshall at the Department of Medicine at the University of Texas Health Science Center in San Antonio, as a weapon to use in their battle against the epidemic of obesity and attendant diseases, especially diabetes, that is ravaging Cassie's Hispanic and Native American classmates. The causes of the onslaught of obesity in the Southwest? Lifestyle changes and a suspected culprit called the Thrifty Gene. The solution? Encourage children to eat right and exercise regularly. To learn more about Dr. Marshall and the war against obesity and diabetes, read her story on page 13.
A&M professor earns 'Rip Rapp' award

Avid archaeologist and Texas A&M anthropology professor Dr. Michael Waters received a nod from the Geological Society of America. The organization awarded Waters with the "Rip Rapp Archaeological Geology Award" which recognizes Waters' outstanding continued contribution to the interdisciplinary field of archaeological geology.

The award is named for archaeological geology pioneer George "Rip" Rapp. Rapp was the primary individual responsible for bringing the Archaeological Geology Division to the GSA.

Waters is also the associate director for the Center for the Study of the First Americans and author of the avidly used geoaarchaeology text "The Principles of Geoaarchaeology: A North American Perspective," which he wrote in 1992. Waters has traveled across the globe to participate in several archaeological field projects in Yemen, Jamaica, Russia and Mexico.

For the layman, Waters describes the field of geoaarchaeology as the field for applying geosciences and archaeological research questions. Waters' research involves investigating late prehistoric archaeological sites and relating them to the changes in landscape to discover the origins of the first Americans.

After receiving his doctorate in geosciences from the University of Arizona, Waters received several grants from the National Science Foundation and the National Geographic Society to fund his research in geoaarchaeology, the field in which he is known for his expertise.

"Because of the accumulated contributions to the field of geoaarchaeology, I have received this award," Waters said. "I am pleased and honored to receive this award."

David Carlson, associate professor and head of the Anthropology Department, believes that this award is well-deserved. "Mike has been doing exceptional archaeological investigation for 10 to 15 years."

*The award certainly draws attention to his contributions.*
Yana River, Siberia
Implications for the Peopling of the Americas

Part II
The Implications

Although most scientific breakthroughs result from hard, steady work, many disciplines also benefit from serendipity—the dazzling insight, the accidental find, the astounding coincidence. Consider Fleming’s discovery of penicillin, Kuklo’s dream of the benzene ring, or Courteen-Latimer’s good fortune to spot a coelacanth in a pile of dead fish. Archaeology can claim its fair share of serendipitous discoveries. One of these is a recent find that has yielded new information that must be taken into account by specialists seeking to explain the initial peopling of the Americas.

In 1992, while working in the northern reaches of the Yana River in northeastern Siberia, Russian geologist Mikhail Dashzeren happened upon an exquisite artifact, an ivory dart foreshaft with beveled ends, crafted from the horn of an extinct rhinoceros. Radiocarbon dating pinpointed its age at 27,000 BC, placing humans in the Arctic almost twice as early as previously thought. Later, Dashzeren led archaeologist Vladimir Pitulko and a multidisciplinary team of researchers to the location of the find, where they immediately struck archaeological gold: an enormous site, 1.5 km long, littered with animal bones and ancient tools. Among their most significant finds were bone and ivory artifacts that dated as early as 28,300 ± 300 BC, accompanied by unmodified faunal material up to 37,000 years old. Most of the remains were from reindeer, but Pleistocene mammoth, lion, bear, horse, rhino, and birds were also represented. After spending the 2001 and 2002 seasons studying the locality, which they named the Yana Rhino Horn site (Yana RHS), the team published its preliminary findings in the 2 January 2004 issue of Science.

These discoveries, along with the geochronological background of Yana RHS and the conceptual and theoretical framework surrounding the finds, were treated in the first part of this article, last issue’s “The Siberian Connection.” This segment deals with the archaeological, geographical, and social implications of the find, which are legion.

"About as far north as you can get," The Arctic Circle begins at latitude 66°5’ N. Yana RHS lies at 71° N, a good 300 km to the north. In a recent BBC news article, the Smithsonian Institution’s Dennis Stanford characterized the region as "about as far north as you can get." Before Yana RHS, the earliest confirmed evidence of human occupation of the Siberian Arctic came from Bereklekh, a Druskul culture site located at 70° N that dates from just 13,000–14,000 BC. But with the finds at Yana River, quite a bit farther to the north, the time depth of human history in Siberia was effectively doubled in one fell swoop, from 15,000 to 30,000 years.

Some researchers, like Olga Sofer of the University of Illinois, don’t find this particularly compelling: as she puts it, “Yes, they got that far north once or twice, Woolly rhinoceros dart foreshaft recovered by Dashzeren in 1993.
about 27,000 years ago. In Europe they got very far north 30,000–38,000 years ago. So? The fact is, Arctic Siberia—then as now—was one of the coldest places on Earth, far colder than the contemporary European Arctic. According to the University of Colorado’s John Heflecker, who studies human adaptations to cold Quaternary environments, clear that our Pleistocene ancestors could band at dealing with the bugbear of Arctic cold. “Even in the early Upper Paleolithic, the degree of human adaptation to harsh environmental conditions was quite high,” points out Yaroslav Kazmin, of Vladivostok’s Pacific Institute of Geography. “A human presence in high Siberian Arctic circa 27,000 years ago is important for our understanding of that.” Although the precise nature of that adaptation remains uncertain, two things would have been absolutely necessary for human survival at Yana River: fire, and tailored clothing—clothing that was sewn and deliberately fitted to the human body. The role of fire is obvious; it’s been keeping us warm, cooking our food, and scaring off predators since our Homo erectus days. As for tailored clothing, its value is that it traps human body warmth much better than loosely draped furs or textiles. Before people could conquer the Arctic, they had to learn to create relatively snug clothing that covered the entire body. So continued on page 11

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Mammoth Trumpet, Statement of Our Policy
Many years may pass between the time an important discovery is made and the acceptance of research results by the scientific community. To facilitate communication among all parties interested in staying abreast of breaking news in First Amer. studies, the Mammoth Trumpet, a science news magazine, provides a forum for reporting and discussing new and potentially controversial information important to understanding the people of the Americas. We encourage submission of articles to the Managing Editor and letters to the Editor. Views published in the Mammoth Trumpet are the views of contributors, and do not reflect the views of the editor or Center personnel.

Robson Bonnichsen, Director
Mort Turner
1920–2004

Mort and Joanne Turner have been dear friends for many years. I’ve known Mort since an extensive trip through South America examining early sites with Bob, Mort and David Long in 1980 and 1988. Mort was absolutely passionate about the process of scientific discovery. Whether at Mammoth Meadow or in South America, his quiet enthusiasm about a way of looking at an archaeological problem from his considerable knowledge of geology was contagious. The first day we met was in Rio at the beginning of a South American trip. Mort and I went shopping the Basilion government. We were walking along Ipanema Boulevard in the middle of a Saturday afternoon when we were accosted by two fellows with snakes. They grabbed for Mort’s camera. Instead of surrendering his Nikon to the muggers, he fought them off while they stabbed at his arm. After some brights helped him fend them off, he stood there triumphs—wearing his camera and a bleeding arm. Despite his congenital gentleness manner, his determination was surprising in a tough situation. His knowledge was incredibly broad about history, literature, geography, politics—and scores of other subjects. He always would...
for mealtime conversations—often settled arguments and stimulated discussions about the news."

If Mort harbored ambitions about a career in archaeology, a few head-on collisions with reality jarred them loose. When he was 16, Joanne tells us, his mother took him to the famous Lindenmeier Folsom site near Fort Collins, Colo. She asked the head of the excavation his recommendation (meaning Mort) going into archaeology. "Only if you are independently wealthy," he replied. Says Joanne, "That ended that."

When Mort entered the University of California at Berkeley, the Archaeology Department was preoccupied with Middle East archaeology—which required learning Hebrew. That finally decided it: Mort went into geology.

World War II understandably diverted his attention. Mort earned his bachelor's in geological engineering while serving as an ordnance technician. After the war he worked with the California Bureau of Mines and Geology. He left in 1964, with his master's in his pocket, to set up the first State Geological Survey in Puerto Rico.

In 1959 the National Science Foundation recruited Mort to help manage the U.S. Antarctic Research Program, a project still in its infancy. "He was the ace

back up his statements with a printed reference if challenged. In fact, we used to kid him about being 'a voice activated computer.'" If asked a question, Mort invariably had an answer. He was a kind and gentle man. I am among those who will never forget him.

Anne Stanley
former chairman, IGPA advisory board

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We kids called Mort by his first name from the time we could talk. As you can imagine, he never fit the stereotype of the duds on TV shows. But no matter what we were doing and no matter how unconventional our life together seemed, we always had a sense of him as a kind and accepting father. He wanted to encourage any interests we had, anything that fostered enthusiasm and learning. He often typed letters at our dining room table and was always willing to interrupt his work to type out a story I wanted to dictate. He took each of us out in the field with him so we could have some one on one time and learn a little about our environment. He was the one who would come in the middle of the night if I felt sick or saw a bug in my room and needed him to save me from it. He never tried to tell us what we should think, only that it was important we learn how to think and how to question. He never dictated our choices of areas to study. He always encouraged us to find the things that made us excited and then helped us find ways to pursue those.

One thing we never doubted was the importance to Mort of being a person of principle. He drew me through the roughest storms in Puerto Rico to deliver clothes our family felt outgrown. He wanted to make sure we understood, even though we lived comfortably in the middle class, that most of the world does not and that we have a responsibility to never lose sight of that. He modeled compassion with principle. He would not band out cash to street people but would buy them sandwiches and then sit down to eat with them. I truly never heard him speak ill of anyone we knew. He lived by the idea of only talking about someone if he had something good to say.

Most considered him an atheist but we always had a shelf of religious books at home. There was a Bible, the Torah, even a book of Mormon. He was told as it was fine to decide not to believe in something but we had to understand the ideas before we could decide not to believe in it. He didn't even talk when I decided to start going to church with my friends. Later he said he figured I'd get over that phase.

He also taught us about not holding on too long when it comes along. When he fell in love with Joanne, I think the only thing that might have made him like being married to her even more is if she had been able to go to the office with him every single day! After he retired from the National Science Foundation, they worked side by side on every project.

Most loved working in the field. We kids figured he only took the job at the National Science Foundation so he could get us all through college. He told me I could pick any college I wanted and he would pay for it. I knew how important this was to him—not that I go to college, but that money would not be an issue when it came time to decide. I understood the sacrifice he was making, and I always had the feeling it was agitating for him when he had to make the decisions about allocating that NSF research money, having to decide whose project to fund, whose to review and whose to discontinue.

Mort could always surprise me, no matter how well I thought I knew him. Once he came for a visit when my daughter was two
forms. With his support, the Antarctic ice sheet was first drilled to its base in 1968, and sediments in the Dry Valley of Antarctica were penetrated in the early 1970s. Numerous subsequent drilling programs of this kind form the data base upon which much of our knowledge of climate change is based."

"He worked hard—given the budget and the operational resources available—to field as many investigators as possible from universities around the country," Guthrie explains. "For a sense of the scale of Mort's program at NSF, the 1984 review issue of the Antarctic Journal contains 43 papers by scientists he selected and funded in terrestrial geology and geophysics, marine geology and geophysics, meteorite studies, and mapping... By contrast, when Mort started in 1959 I count four Antarctic field projects in geology and geophysics."

In 1965 Mort's wife of 20 years, Laura Perez Mendez, was killed in an auto accident. He married Joanne Church the same year and became stepfather to Chris Dort, her son from a previous marriage; she became stepmother to his daughters, Satiss and Yla, and to his son, Robert.

For a rough idea of the vastness of Mort's achievements during his 22 years as program manager of Polar Earth Sciences, consider his publications—more than 70 scientific papers—and discoveries that bear his name:

- Mortimerciceps, the fossil of a new type of Cretaceous pinniped found during research on Seymour Island, Antarctica;
- Turner Hills 828° 58′ S, 156° 18′ E, a group of hills in the northwest part of the Miller Range;
- Chlamys inexpecta Turner, a fossil bivalve found in the area of the Vestfold Hills, East Antarctica;
- Caribourenor turner, the fossil of an Oligocene sirenian (manatee-like) skull. (Joanne recounts that Mort, so finding the fossil, sent word to UC-Berkeley that he had discovered evidence of an animal he couldn't identify. Would they pay to ship the fossil back to the States? When they refused, Mort carried it home with his baggage.)

In 1984 Mort retired from NSF, but not from research. Long skeptical of the Clavis-First theory that dominated First Ameri-
can studies, he visited such controversial locals as Texas Street site in San Diego, Calico site in the Mojave Desert, Meadowcroft Rockshelter in Pennsylvania, and Cactus Hill site in Virginia. In 1987 Mort and Joanne joined the staff of INSTAAR. Mort also taught courses in geology at University of Colorado in Denver.

The Center's membership and organizing conferences that would be of interest to botanists and specialists alike. Mort and Joanne were the initial charter members of the Center's Advisory Board. Joanne was a significant contributor to the ideas that shaped the development of the Mammoth Trumpet. It was Mort, however, who chaired our Scientific Council and helped guide and expand the Center's scientific directions and influence.

Mort was a big-picture visionary with an encyclopedic knowledge of many scientific fields and knew what it takes to move scientific fronts forward. Mort urged me to establish what became the CSFA's Peopling of the Americas program of publication. Mort knew how important it was to establish scientific monographs and journals to document discoveries and advances made in the field. He also appreciated the importance of having a first-hand knowledge of scientific evidence. Following his retirement from the National Science Foundation in 1986, he joined the CSFA's Advisory Board. We traveled together to China and then to South America, along with two other Advisory Board members, to develop a first-hand knowledge of the people doing the work and places where significant research was occurring. Mort was among the key planners who helped develop the conference concept and international slate of speakers from Russia, Canada, Mexico, and South America for our First World Summit Conference on the Peopling of the Americas in 1989.

Mort and Joanne did more for the Center than serve as knowledgeable advisors. They also wrote scientific contributors to this field. Along with the late Ed Zeller and Geza Bartha, they published a ground-breaking paper, "Impact of ice-rafted Plant Nutrients on Glacial Margin Environments" in our book Age of Humans of North America. In this paper, they established the peleolichenic foundation for why ice marginal environments were evolutionary centers in the American and Eurasian. It is my opinion that this is the most significant paper ever published by the Center. They also were full partners and co-authorial investigators on our Meadowcroft project located near Clifton, Montana. As the director of the first and only international center dedicated to the peopling of the Americas, I can say there are enormous challenges that face the future of our field. As I think of the issues the CSFA faced during recent years including changes in how some Departments of Anthropology view the scientific approach, shifts taking place in Federal public policy regarding the use of America's cultural and biological resources, and the ongoing attack against science by some sectors of society, I always think of Mort. His strong basic belief system has steered me and the Center well: always be kind to others; use logic and reason to guide your actions; and stay focused on the most important scientific issues.

The Center is now located in a strong and healthy research environment in the Department of Anthropology at Texas A&M University. We at the CSFA continue to believe that science provides the most satisfactory approach for learning about the past. I believe that Mort's strong role model helped shape the Center and its direction. Thank you, Mort.
When the Camel Died
Did Anyone Hear It?

Archaeological Research at the Sunshine Locality, Nevada

In the summer of 1993, fresh from my first year in graduate school, I drove out into the remote Nevada desert to get my first taste of Great Basin Paleoindian archaeology. With Easterner’s eyes I studied the alien landscape as I barreled down Route 50, across mountain ranges studded with junipers and flat basin floors under cloudless blue skies. Turning north onto a dirt road at the head of Jake’s Valley, I nosed my Ford Escort wagon along rutted roads and over dry creek beds into the field camp at Indian Springs.

Once there, I was warmly greeted by Hamilton College researchers Charlotte Beck and Tom Jones. Dr. Beck is a petite energetic woman keenly interested in changes in Paleoindian projectile points over time, with particular emphasis on the methods and theories used to convert artifact styles into chronology. Dr. Jones, her husband, is a soft-spoken man interested in patterns of Paleoindian lithic raw material use, mobility, and the paleoenvironments through which people once moved. Both researchers have been at the forefront of developing theoretical approaches to chronology based on evolutionary biology, a collaboration that began during their graduate studies at the University of Washington. Over the campfire that night, we discussed their ongoing research into eastern Nevada Paleoindian prehistory.

Early the next morning, we drove across the dusty flats of Long Valley to the Sunshine locality. Standing amid the sagebrush, saltbush and winterfat, it was hard to appreciate the significance of the lithic debitage scattered around my feet. But looking at a map of the debitage, along with the location of more than 850 Paleoindian projectile points recovered from the site, it was obvious even to me that this locality had a lot to tell us about the earliest occupation of the central Great Basin and the North American continent.

Camel bones and artifacts recovered together: Evidence of camel hunting?
The land and vegetation around the Sunshine locality is rimmed with the dust, white silt of ancient lakebeds. For more than ten millennia, wind and water have reworked these lakebed sediments, lowering the surrounding hills while filling in ancient river channels and washes. The pancake-flat valley floor is a modern pasture; meters below lies the sedimentary record of ancient marshes and streams, once home to ducks, fish, horses, camels and people, a lush landscape impoverished by the warm, dry climates of the Holocene. With such an abundant surface record, did Sunshine harbor deeply buried, in situ archaeologically diagnostically as well?

This was the question that animated initial subsurface testing at the locality in 1987-1990 by a team from the Desert Research Institute (DRI), the Nevada State Museum, and the Bureau of Land Management (BLM) led by Cynthia Irwin-Williams. What they found in their backhoe trenches electrified the Great Basin archaeological community. In a series of papers at the 1991 Great Basin Anthropological Conference, the team

Charlotte Beck (left) at the Sunshine locality excavations, 1993.

Tom Jones and Charlotte Beck in their lab at Hamilton College.
announced that camel teeth and bones, along with a single piece of stone tool debitage, had been recovered from a deposit several meters below the surface. The association wasn’t secure—the researchers didn’t know if the bones, teeth, and debitage were the result of a single activity or had accumulated in the deposit over time. But the possibility of an association was tantalizing; if true, this would be the first direct evidence of humans hunting camels during the Pleistocene in the Great Basin. To prove it would require detailed excavation of the site. Plants were cut short, however, by the deaths in 1990 of both Irwin-Williams and project geologist Jonathan Davis.

The following year, BYU archaeologist Pat Bucker asked Beck and Jones to take over research at Sunshine. The BYU-led research had ultimately been inconclusive. Had the camel bones, teeth, and debitage really come from the same stratum? If so, were they really associated, or had they accumulated together by other means? What did any of this tell us about life at the end of the Pleistocene in this corner of the Great Basin? Beck and Jones, who had spent several years conducting archaeological surveys in nearby Butte Valley, were determined to find out.

The geology tells a different story
As with all archaeological enterprises, it is the details of the stratigraphy that matter most, for it is the details that establish context and association, and that constrain what we can say with certainty about a site. So it was with the geology that the two archaeologists began their research. Following a short field season in 1982, during which Jones and BYU geologist Fred Nialls cored at the site, Beck and Jones began four summers of excavation and geoarchaeological research at the site in collaboration with Washington State University geoarchaeologist Gary Huckleberry.

The first year’s excavations, which I participated in as a field school student, produced no camel bones but showed that Beck and Jones were on the right track. As expected, an alluvial deposit was visible in the lower part of the 5-by-6-m excavation block. Debitage occurred throughout this deposit, along with the bones of small mammals, birds, and fishes. Clearly this was the right deposit, but it would be two more summers before they found camel bones, and these of a camel different from that located by the BYU team.

The camel bones—a scapula, phalanx, unicondylar, and other
Significant Great Basin sites: 5 Sunshine; 1 Bonnville Estates Rockshelter; 2 Danger Cave; 3 Hogup Cave; 4 Deer Creek Cave; 6 Smith Creek Cave; 7 Tule Springs; 8 Calico; 9 Haywood, Roger's Ridge, and Awel; 10 China Lake; 11 Tonopash; 12 Spirit Cave; 13 Last Supper Cave; 14 Dietz and Tucker; 15 Nial; 16 Buffalo Flat; 17 Conshay Caves; 18 Fort Rock Cave; and 19 Newberry Crater.

The Beck and Jones model of the peopling of the Great Basin.

The Beck and Jones model of the peopling of the Great Basin was in situ, Jones and Beck were hopeful that they would find cut marks on the camel bones resulting from butchering the carcass. Cut marks would at least unambiguously tie the camel’s death to human causes and strengthen the case for association between the bones and immediately adjacent artifacts. The bones, however, were devoid of cut marks.

The Sunshine locality raises more questions than it answers

Although disappointed that they weren’t able to prove the association between the camel bones and human occupation in the excavated portions of the Sunshine site, Beck and Jones still think the site is significant. For one thing, says Beck, the radiocarbon date of 11,830 ± 60 14C yr BP (Beta 50662), about 11,487-11,207 cal yr BP, on the camel phalanx is the youngest date for camels in the Great Basin. The samestratum produced the bones of horse (Equus sp.), along with 1,256 bones of other mammals, birds, and fishes, making the deposit a significant source of information on late-Pleistocene biota in eastern Nevada. California State University—Long Beach archaeologist Mike Canzhoo, a 1987 University of Washington graduate and collaborator on the Sunshine research, has been studying the Sunshine faunal remains and is considering additional fieldwork at the locality.

Another product of Sunshine research that Beck thinks is significant is the collection of fluted points recovered from the surface and from dated subsurface deposits. Although smaller and thinner than the well-known Clovis points, like Clovis points they are fluted on both sides and made from high-quality toolstone, usually chert. Beck and Jones believe Sunshine points are later in time than Clovis, perhaps contemporary with Folsom/Midland points on the Plains. A limiting date of 10,230 ± 50 14C yr BP (Beta 89300), about 10,388-9663 cal yr BP, was obtained at Sunshine on charcoal located 13 cm above a buried Sunshajiet point.

lenses while large debitage had been recovered from more gravelly lenses. No artifacts could be unambiguously tied to pure sand lenses. Second, the number of artifacts decreased in the excavation units towards the center of the stream channel and in a downstream direction, just as we’d expect if they had been washed into the site from somewhere nearby.

Another way the archaeologists examined transport was to look at damage on the edges of artifacts. A sample of 31 artifacts analyzed by one of their students showed that 100 percent of the artifacts exhibited edge abrasion typical of stream transport. However, when subjected to microscopic examination, about a third of the edge-damaged artifacts had damage that resulted from processes other than stream transport.

Although the majority of artifacts were likely transported to the area excavated by Beck and Jones, there were three reasons that the researchers couldn’t rule out the possibility that the deposit contained a mix of transported and in situ materials. Most of the artifacts appeared to come from near the top of the gravel beds rather than being distributed throughout, which suggested an occupied surface. Artifact damage was not uniform, indicating that while some artifacts had been transported a long distance, others had not. It was no water wear at all on the artifacts directly associated with the camel bones. Finally, in several produced tight clusters of debitage made of the same raw material.

Such clustering is unlikely by chance. It indicates that the flakes were likely deposited together at that location, as we’d expect if the flakes were the waste from a single flknapping episode.

Presented with the possibility that some of the artifacts were in situ, Jones and Beck were hopeful that they would find cut marks on the camel bones resulting from butchering the carcass. Cut marks would at least unambiguously tie the camel’s death to human causes and strengthen the case for association between the bones and immediately adjacent artifacts. The bones, however, were devoid of cut marks.
Although many researchers call all dated points in the Great Basin "Clovis," Beck and Jones are reluctant to do so because of the paucity of dates on these points. Instead, they follow Donald Griffin in using the term "Great Basin Fluted" (GBF) to refer to all fluted points in the Great Basin, including the Sunshine types. Beck and Jones have recently argued that GBF points may not represent the earliest human arrival in the Far West. Instead, this arrival may be represented by the ubiquitous Great Basin Stemmed Series (GBSS) points, which, at sites like Coopers Ferry, Idaho, have been shown to date back to 11,400-11,300 RCYBP. What is the relationship between these two point traditions? Does their presence in the Great Basin by 11,000 RCYBP point to two different founding populations, the fluted points coming with settlers from the South and Southeast (Texas, New Mexico, Arizona, Mexico), the GBSS originating with immigrants from the Pacific Northwest? In an effort to answer these questions, Beck and Jones are continuing a Great Basin fluted-point survey begun by their student, Amanda Taylor. For now, research at the Sunshine locality raises more questions than it answers. But the answers are out there somewhere, perhaps on the buried remnants of a Feathercone stream terrace hidden under meters of windblown silt. The answers may also lie in existing collections, where detailed scientific analysis may allow us to assemble this part of the puzzle that is the history of the peopling of the New World. —Ariane Heston
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Suggested Readings

Ted Goebel of the University of Nevada, Reno, who specializes in both Siberian archaeology and the peopling of the Americas, believes that Yana River might signify a brief "pulse" of human occupation immediately preceding the Last Glacial Maximum (LGM), after which people abandoned the coldest parts of northern Eurasia for thousands of years, a hypothesis that John Hodder also finds plausible. And it appears that no one was especially eager to occupy the area once it was available again; although sites dating to about 17,200-18,000 years ago are known for southern Siberia, there's no evidence of significant occupation in northeastern Siberia until the Dvyrakh culture took possession 14,000-15,000 RCYBP.
Kuzmin believes that other Yana-age sites, and possibly sites needed to fill the temporal gap between Berezdelikh and Yana RHS, may still be found; "These possible new sites may be found, first of all, near the main rivers like Lena, Indigirka, Yana, Kolyma, and Anadyr," he suggests. He cites two problems that have delayed their potential discovery: the fact that the sites are probably located on lowlands near the coast of the Arctic Ocean, where they’re buried by up to 10 m of loess, and organizational issues that have thwarted his research in Siberia. "Unfortunately, since the fall of the Iron Curtain, no foreign scholars have even tried to make a hill-scale expedition along with Russians to northeastern Siberia to find new Paleolithic sites," he says ruefully.

Trek to a New World?
Yana RHS is unusually far north for the time period in which it occurs, though it’s not unique in that respect; witness Mamontovo- Kurya, which is a bit older if not quite so far north. Unlike Mamontovo-Kurya, Yana RHS lies within the nearly uninhabitable Siberian-Arctic on the fringes of Beringia—the region that
sometimes connected Asia and North America during the Qua-
terrary ice ages. This was corridor, which spanned the area be-
tween the Lena River in Siberia and the Mackenzie River in the
Yukon, has long been considered the most likely route of human
migration from the Old World to the New. Since Beringia is
partly underwater these days, it’s only on the icy rims at the
northern edges of the continents that archaeologists can effec-
tively look for clues to the origins of the First Americans.

An Overview . . .

Our article “Mamuta de México” in the June 2004 Mammoth
Trumpet, which described the research on early humans at
Vallequillo and the investigation of mammoth remains and
primate human association at Toculca currently pursued by
Sefor Scientist joacinto Arroyo-Cabrales and his colleagues,
failed to mention the contribution of archaeozoologist Oscar J.
Polaco of the Instituto Nacional de Antropología e Historia
(INAH) in Mexico City. In addition to serving as a principal
member of the Toculca research team, Professor Polaco also
planned the exhibit of materials at the in situ museum.

Might the Yana River people have advanced east to colonize
the new continent waiting on the other side of Beringia? Pos-
ibly; it depends on how early they were there, and at what time of
year they undertook the journey. As Yana RIS and other sites
have proven, game was plentiful in Beringia. If the Yana River
hunters followed migrating game herds east across the
Beringian steppes, they would have had no clue that they were
passing from one continent to the next—only that they were
entering a place where game was plentiful and competition
scarcely. As highly mobile hunter-gatherers, they could have
made the trip in a few months. However, weather would have
allowed only a narrow window of time in the year for travel, and
they could only have advanced into North America if the ice-free
corridor by the Cordillera and Laurentide Ice sheets was
still open. When the ice sheets coalesced no later than 19,000–
20,000 years ago, the way slammed shut and wouldn’t open
again for many thousands of years.

Despite the difficulties, they could have made the trek, and it is
this possibility that has excited many researchers. “For me,
the significant thing is that the site dates before the Last Glacial
Maximum—before the time the ice-free corridor in northwest-
ern North America closed,” says Goebel. But colleague Hof-
fonner, among others, doesn’t share Goebel’s optimism about a
potential Yana River colonization of the New World. He empha-
sizes a crucial point that’s easily overlooked: that sites like Yana
RIS and Mamontovaya Kurya were probably warm-weather
seasonal encampments only, occupied by groups that lived
hundreds of miles further south during the winter. If groups
weren’t living at Yana RIS on a year-round basis, he reasons,
then they would have found it difficult to permanently colonize
Beringia (all of which is above 60° N) and thus move into the
New World. He also cites recent studies suggesting that the ice-
free corridor into North America may have been sealed as early
as 35,000 years ago.

So where does this leave us? As always, the issue of “who’s on
first” remains cloudy. It’s clear that humans were in northeast-
erern Siberia very early on, and certainly they could have contin-
ued east into the Americas. However, it now seems that they
would have had to do so before about 30,000 years ago, and even
then they could have accomplished it only if they started early
enough in the year and were able to get far enough south to be
safe when winter came.

Much has been made of the possibility that the Yana River
hunters were the ancestors of the Clovis culture, particularly by
the general media. Their arguments are bolstered by the fact
that some of the organic tools at Yana River, particularly the
ivory and rhinoceros horn dart foreshafts, are very similar to
artifacts used by the Clovis culture. Furthermore, both cultures
had distinctive (if dissimilar) bifacial stone tool industries.
Pitulko and his colleagues cautiously implied a potential connec-
tion between Yana River and Clovis in their recent article in
Science, and it didn’t take more than a few hours after the
article’s publication for news outlets from the BBC to the Associ-
ated Press to latch onto this intriguing prospect.

Though most researchers downplay this possibility, it has
nonetheless generated a spirited debate about Yana River’s
relevance to the peopling of the Americas. This debate and
related arguments will be the subject of the final article, “The
Controversy,” in this series.

—Floyd D. Largent, Jr.

‘Rip Rapp’ Award

continued from page 1

tion to the department and the caliber of faculty that work
here,” Carlson said. Although Waters is still relatively young,
Carlson said there was still much to be done within his
extensive research.

Director of the CSRA Roben Bonnichsen said that Waters
receiving the award reflects recognition by his colleagues of
the high-quality effort that goes into his work.

“It’s a terrific achievement that he’s been recognized by

his peers in geology as the excellent scholar that he is,”
Bonnichsen said.

Waters is constantly on the move between archaeological
sites. He has recently returned from a site in Mexico only to be
leaving soon for Mud Lake in Wisconsin.

Waters is also the recipient of the 2003 Kirk Bryan Award
from the GSA for his research with C. Vance Haynes that was
published in a geological journal entitled “Late Quaternary
array formation and climate change in the American South-
west.”

—Jonee M. Jensen

THE BATTALION, 19 July 2004
Reprinted with permission
The Curse of

A friendly gene turned hostile
may be threatening a generation
of Hispanics and Native Americans

powerful, despite prominent ribs and joints. What impressed Fleming was their running. Zunis ran for the pure joy of running. "It is a common sight," he reports, "to see one or more of these Indians, while going from one pueblo to another, a distance of fifteen or more miles, run the entire distance without stopping." A favorite game was the race of the kicked stick, run over a course of 15 to 20 miles. His account of these extraordinary athletes is astounding: Examinations of eight Zunis immediately after the finish of a stick race, at which time they were bathed in profuse perspiration, revealed comparatively no evidence of fatigue, no evidence of respiratory distress, and no heart rate above 160 beats per minute. What's more, their superb physical condition carried into old age. Fleming was astonished to find 70-year-old men, who were engaged in activities requiring great effort and endurance, registering diastolic blood pressure of 60-75 and systolic pressure of 110-125. Hypertension simply didn't exist among the Zuni.

Today the Zuni are suffering an epidemic of obesity and diabetes and its host of associated illnesses—coronary heart disease, hypertension, and complications of diabetes that include diabetic retinopathy (damage to the blood vessels in the retina caused by high glucose levels in the bloodstream), neuropathy (damage to the nervous system), end-stage renal disease (ESRD), kidney failure caused primarily by simultaneous diabetes and hypertension), and amputation of the feet and legs. In just 80 years the health of the population has plummeted.

The Pima and Tohono O'odham Indians of southern Arizona also look back with sadness at days of former greatness. CBS News correspondent Vicki Maheuy visited their reservation and spoke with tribal elder Robert Porter, who remembers when his people were physically strong. "Our Pima-Maricopa people were runners," he recalls, "strong runners, silent runners." Porter himself was once a marathon runner. Age 59 at the time Maheuy spoke with him, he was in a wheelchair, "alternating between the reservation dialysis center, and the reservation hospital, where doctor Wes Yanada [was] trying to save his legs."

Today the Pima hold the tragic distinction of suffering the highest incidence of obesity and diabetes in the world. This epidemic of obesity isn't confined to our shores. The second-highest incidence is found in native Hawaiians. "Hawaiians were never fat, apart from the royalty," remarks Terry Shintani, director of preventive medicine for the Wai'ākea Coast Comprehensive Health Center on the island of Oahu; "now I have 300-pound patients by the dozen."
Diabetes, the silent killer

Obesity itself doesn't kill. It is unhealthy because it stresses the body's structure and organs and, more important, makes the body vulnerable to opportunistic diseases. The worst of these is adult diabetes, a disease caused when the body either doesn't produce insulin or can't utilize it. Insulin, a hormone secreted by the pancreas, "locks" the cells of the body and enables them to convert food into energy.

Despite the fact that diabetes has afflicted mankind since earliest recorded history—the symptoms are described in the writings of ancient Egypt, China, and India—it defies our efforts to predict its occurrence with absolute accuracy. We only know for certain that two conditions must exist in order for diabetes to occur: the individual must be genetically predisposed; and a trigger of some kind must be activated. Once contracted, diabetes is incurable. In most cases, however, proper care can control its symptoms and reduce its effect on the body.

There are two principal kinds of diabe tes, type 1 and type 2. In type 1, also called insulin-dependent diabetes mellitus (IDDM), the pancreas produces little or no insulin. Victims of type 1 diabetes probably inherit risk factors from both parents. Frequently the disease develops over many years. Scientists suspect possible triggers are cold weather (the incidence is higher in winter than summer and in cold climates), viruses, and early diet (it occurs less commonly in people who were breast-fed and didn't eat solid food as infants). About 5-10 percent of American diabetics have type 1.

Type 2 diabetes, non-insulin-dependent diabetes mellitus (NIDDM), is the disease that is growing at an alarming rate, especially among minority populations. It used to be called adult-onset diabetes; sadly, that name no longer applies. "Today," Marshall notes, "children as young as six years old are developing it." The body of a person suffering from NIDDM produces insulin, at least in early stages of the disease; however, because of a condition known as insulin resistance, the cells of the body are unable to utilize insulin and therefore cannot metabolize glucose—burn it and convert it into energy. In early stages of NIDDM, victims typically have elevated levels of glucose in the blood (hyperglycemia) and in the urine (glucosuria); they also have excessive amounts of insoluble (hyperinsulinemia), since the pancreas continues to do its job of producing insulin.

The glucose-insulin interaction is one of the metabolic processes that break down compound into usable components. In a healthy person, it is an exquisitely fine tuned feedback system, like a thermosstatically controlled furnace or a governed engine. But if the governor fails, an engine can rev up faster and faster until it destroys itself. In like fashion, physiologists theorize that if NIDDM is left untreated, the pancreas eventually becomes exhausted and stops producing insulin altogether. Blood sugar can then rise to dangerously high levels, ravaging body organs and eventually resulting in diabetic coma and death.

Nutritional and health care providers keep telling us—even if we're tired of hearing them—that skinny is healthy, and research has borne out the truth of their preaching. Experiments with mice demonstrate that subjects fed a severely restric ted diet live significantly longer than subjects that are allowed to eat their fill. In studies on people, J. M. Molina and fellow researchers found that insulin activates glucose metabolism much more slowly in obese subjects than in those of normal weight; moreover, they determined that insulin resistance, a major risk factor for NIDDM, is a characteristic feature of obesity. Gerald Reaven, a world-renowned authority on metabolic disorders, pursued the link between obesity and attendant diseases one step further. He found a direct relationship between the level of insulin in the blood and blood pressure; in other words, the higher the insulin level, the higher the blood pressure. There is evidence, he concluded, of a possible association between insulin resistance and hyperinsulinemia as causes, and NIDDM, hypertension, and coronary artery disease as effects. That's quite a witch's brew of illnesses, and obesity is the cauldron.

Just being obese doesn't mean diabetes is inevitable, since the genetic factor must also be present. However, obesity markedly increases the risk of developing diabetes, as well as many other diseases that can devastate the quality of life and cut life short.

A population at risk

Marshall and her colleagues at UTSCC are sounding the alarm because Hispanics and Native Americans run a far greater risk than the general population in the U.S. of developing diabetes. The American Diabetes Association reports that 6.3 percent of the U.S. population have diabetes—and a third of those aren't aware of it. This is unsettling news. But the picture for Hispanics and Native Americans is truly distressing:

- almost 50 percent of Pimas age 35 and older are diabetic;
- NIDDM is 1 1/2 times higher in Latinos than non-Latino whites;
- 32 to 40 percent of Mexican Americans suffer from diabetic retinopathy;
- 14.5 percent of Native Americans and Alaska Natives receiving care from Indian Health Services have diabetes;
Mexican American diabetics are 4.5 to 6.6 times more likely to develop type 2 diabetes than are non-Latino white diabetics. Native American diabetics are 6 times more likely.

About 24 percent of Mexican Americans in the U.S. between the ages of 45 and 74 have diabetes; for Puerto Ricans in the U.S. in the same age group, the incidence is about 26 percent; for Cuban Americans, about 16 percent.

Why are Hispanics and Native Americans paying such a terrible price? Why are they so much more vulnerable to obesity and its cruel effects than the general American population? And what caused their health to decline so drastically in just a couple of generations—practically overnight? The answers lie in their genes and in their lifestyles past and present. “Here we are dealing with practical applications of physical anthropology and cultural anthropology,” says Marshall—with additional complications thrown in by the U.S. government. This is a problem whose origins go back many thousands of years and whose terrible consequences are staring us in the face today.

Enter the hypothesis of the Thirsty Gene

Several researchers have independently noted that populations suffering the highest incidence of SIDS trace their roots to migration from Asia, either over the Bering ice bridge to the Western Hemisphere (Native Americans) or over water (Australians, Hawaiians, and Nauruans). In 1962 James V. Neel proposed the theory of the thirsty genotype. Suppose, he suggested, the founding stock of these migrations, Asian hunter-gatherers, developed over time an enhanced ability to store calories in times of plenty so fat that would carry them through periods of famine. Such a genetic development would give them a distinct competitive advantage. This is Darwin’s classic struggle for survival played according to the rules of natural selection, where the winner’s genes are passed on to posterity and the loser’s are condemned to oblivion—an unyielding principle that can be paraphrased as “Last one in the breeding pool is a rotten egg.”

The mechanism that enabled their bodies to increase the storage of fat, Neel proposed, may have been increased production of insulin in response to food.

Later, Neel and others realized that his Thirsty Gene theory was too simple. What was lacking was the environmental factor, namely physical activity. Frank W. Booth proposed that the genetic makeup of those Asian forebears evolved over many generations to support a lifestyle that would have included strenuous activity associated with hunting, gathering, and relocating campsites.

In 1978 Lawrence J. Mandarino found that Pima had an increased ability to synthesize fatty acids from glucose and store them in adipose tissues, consistent with the Thirsty Gene theory. The Pima are Amerindian stock. According to the landmark report by Greenberg, Turner, and Zegura in 1986, the Amerind, Na-Dene, and Alcat-Eskimo were the principal migrations from Asia across the Bering Strait; since linguistic evidence puts the center of the Amerindian population farthest south and finds the greatest internal differences, the authors concluded that the Amerind migration was the earliest.

Evidence is mounting that Amerindians carried the hypothesized Thirsty Gene to the New World, where over thousands of years Pimas and other descendants intermixed with Hispanics and Mexican Americans, thus distributing their genetic constituents, including the Thirsty Gene. Marshall writes that “preliminary results from researchers in diabetes mellitus at UTISCMAA indicated a much greater risk for Mexican Americans with Pima admixture than for Anglos.” S. H. Raboud and fellow researchers in 1989 found that resistance to insulin varied within mixed populations along apparent ethnic lines and was most pronounced in Mexican Americans, who are primarily admixed with the Pima. In their genetic examinations of A, B, and C alleles conducted in the San Antonio Heart Study among Mexican Americans and non-Hispanic whites, the C allele was only found in Mexican Americans. “The C allele has thus far been detected only in Pima Indians and Mexican Americans,” Marshall writes, “two high-risk populations for diabetes that share Native American ancestry.” Furthermore, the C allele, which is found in 34 percent of Pimas, appears in 17.7 percent of Mexican Americans; this frequency is compatible with the Native American admixture of 15-45 percent reported for the Mexican American population.

Victims of the New World Syndrome

For thousands of years the descendants of Amerind immigrants adjusted to a new landscape that was changing with the end of the Ice Age. With the disappearance of megamammals, hunters took smaller animals; gatherers continued to supplement their diet with available plant species. As the climate in the Southwest became increasingly hot and arid, the people of agriculture-based prehistoric cultures, whose domain extended over most of Arizona, New Mexico, and Utah, and parts of Colorado, California, Nevada, and Sonora and Chihuahua in Mexico, continued to benefit from their genetically endowed ability to store excess calories as fat to see them through periods of drought and famine.
The long road back to health

There are Pima and Zuni living today who can remember when their people enjoyed good health and lived long lives, and some members have taken the first steps toward emulating the lifestyle of their ancestors. Marshall recounts success stories told by John Willoughby in 1991.

of Pima diabetics who have switched to a traditional diet including sepyar beans, mesquite, cholla buds, prickly pear, and chaparral tea, and who have increased their levels of physical activity. Earl Ray is a case in point: at 5 feet 11 inches, 239 pounds, and being on a fast food diet, he suffered from severe diabetes. When he switched to the traditional diet mentioned above, his weight gradually dropped to 150 pounds and his diabetes is under control. Pima activist Adrian Hendricks . . . lives on the old, traditional low-fat, high-carbohydrate Pima diet that includes squashes, sepyar beans, corn, melons, and sunflower seeds. He weighs 130 pounds and is also a long-distance desert runner, an activity in keeping with his cultural heritage.

Success is also reported in Hawaii. Dr. Shigeki describes the Waianae Diet Program, which includes only traditional foods:

Native Hawaiians may eat as much taro, poi, sweet potato, greens, seaweed, breadfruit, and other fruit as they desire and up to 198 grams of fish or chicken a day. The food is eaten raw or steamed, as was done in the 1700s before Hawaiians had any contact with the West. This traditional diet is extremely low in fat, rich in fiber and complex carbohydrates, and moderate in protein.

CBS News Correspondent Markby tells of the St. Peter Indian Mission School and its principal, Sister Martha Mary Carpenter, who has initiated a program of exercise and diet to protect her 200 students, many of whom are overweight and at risk. As soon as kids get off the bus in the morning, they run. "We just kick that metabolism in," says Sister Martha. She also got permission to alter the federal school lunch guidelines, which require a specified portion of carbohydrates that would make her students "bumper out." A typical lunch at St. Peter includes ham, potatoes, green beans, watermelon, and fat-free milk. Sugar is totally absent. The result? "None of our children are diabetic," she boasts. "None."

The Zuni Diabetes Project, initiated in 1983, achieved encouraging reductions in blood sugar level and body weight among sufferers of NIDDM. Marshall believes it was successful because organizers sponsored community-based exercise programs and weight-loss competitions and thus made it possible for the Zuni to reclaim their ancestry. An attempt to impose dietary and exercise programs from outside would probably have failed.

Marshall (standing) confers with Jackie Mace, a member of the staff of Texas State Representative Frank Cortez, one of a group of legislative visitors observed and listened to the teachers as they reported on their 6-week training. To a person, the teachers reported that their experiences at UTHSCSA had changed their lives and that they had been given the knowledge and tools to do the same for their students. The UTHSCSA programs have been funded entirely by the federal government, and now Marshall and her colleagues are campaigning for state funds. They are also offering their services as consultants to the Texas Education Association to educate teachers about the epidemic of obesity and diabetes among schoolchildren.

The incidence of diabetes was fairly equal worldwide, Marshall tells us, until the end of the 1930s. That was when minorities in the Southwest abandoned their physically active lifestyles and became sedentary. And they also abandoned their traditional diets. The Tlhono Goddam, for example, were once known as the Papago (literally, "bean eaters") because the staple of their cultural diet was the tepary bean, a plant native to Arizona and Mexico; they changed the name of their tribe because they thought the name was belittling. "Little did they know that the beans were actually essential to their survival," Marshall remarks. We started to see the rise of diabetes in the U.S. at the beginning of World War II, when the food industry started producing processed foods on a gargantuan scale. At the same time the government initiated food subsidies. Where did they go? Says Marshall, "Mostly to drugstores and Indian reservations. What were those foods? Tins of lard. I mean buckets of lard," she emphasizes, "meat packed in lard, cheese, and starches. We were sending them everything they didn't need." She adds bitterly, "And we still do. That same kind of food goes to senior centers, to WICs [Women with Infant Children programs], you name it. That is what our federal government is doing to us."

The genetic predisposition of American Indian descendants to store calories as fat is no longer a competitive advantage. It has become a curse.

Weiss, Farrell, and Hanis in 1984 called this proliferation of metabolic diseases among susceptible American Indian geneticists the New World Syndrome. It is distinct from the unhealthy phenotype known as Westernization, the tendency of most newcomers to our land of junk food and giant portions to add weight. Marshall notes that Japanese, who typically eat quite sensibly, put on weight when they immigrate even to Hawaii. The reason Europeans aren't experiencing metabolic disorders on the scale seen in the U.S. is because they didn't stop eating grains and herbs and start wallowing cheeseburgers. "That's what's happening now," she says, "and that's why these changes are occurring over just a few years instead of over thousands of years."
Most school districts in the Southwest have become alert to the threat posed to their students by obesity and metabolic diseases. Until just a few years ago, Marshall notes, NIDDM was considered an adult affliction and pediatricians often check for symptoms in children. Unfortunately, since obesity is one of the first consequences of NIDDM, many children suffered permanent eye damage. "Now," she says, "we're playing catch up and trying to educate pediatricians to look for signs of type 2 diabetes." Physicians now also have a more reliable test for diabetes than the traditional fasting glucose test: called the AIC test, it reveals the average glucose level over the previous several weeks, rather than the previous 24 hours. Teachers and school nurses are also trained to look for AN (Acanthosis Nigricans), a skin condition associated with hyperinsulinemia and insulin resistance and therefore a risk factor for NIDDM. It appears as a dark, scaly ring around the necks of children, especially boys. (Before today's heightened awareness of diabetes, says Marshall, the condition probably would have elicited a scolding from a child's mother or teacher—Why didn't you wash your neck before you came?)

The program at UTSCICA

Marshall and her colleagues at Positively Aging® likewise are carrying the fight to the classroom. Their target is middle school students. Marshall admits realistically that "in middle school (grades 6-8) in this part of the country, that's just about the last time you really have the attention of the students before all the hormones kick in."

Teachers from middle schools and high schools are brought onto the UTSCICA campus every summer. This summer 10 teachers from 14 minority schools in 6 districts were selected to work and learn with research faculty, then to write curricular units in their fields—science, math, and language arts. Teachers are divided into six groups, each dealing with a particular subset of health issues. One group concentrates on the cardiovascular system, including blood and the blood supply; another on sleep and sleep disorders (obesity and other conditions can interfere with sleep, thereby inviting other health problems); diabetes, including heart disease and stroke; aging and mobility, including disease states that impair mobility; mobility and obesity emphasize concepts of forces and motion, since the body systems—lungs, kidneys, and heart—are closed systems that operate according to well-defined principles of physics; the pulmonary system, including issues of nutrition in addition to lung function.

UTSCICA is one of few organizations in the country that train teachers to protect students' health, and the only one funded by scientific education partnership groups that educates teachers under the tutelage of researchers. Its Web site http://teachhealth-12.utscica.edu/pa/postageabout-overview-htm.htm posts sample copyrighted curricular units, complete with handouts and worksheets, that are available for downloading. The 12 units cover a full range of health issues from aging and nutrition to diabetes and oral health, and they all meet national, state, and district standards. "There are thousands of pieces of curriculum sitting on shelves that were put together with federal funding," Marshall laments. She and her colleagues want theirs put to use.

A results-oriented teacher

Dr. Marshall is a remarkable educator with both feet planted firmly on the ground. Equally remarkable is the story of how she got caught up in the war against obesity and diabetes. In 1986 she accompanied her husband, Dr. Tom Marshall, a professor of Restorative Dentistry at the UTSCICA Dental School who is also trained in forensic science, on an archaeological dig at Ru Amul in Guatemala. Prehistoric human remains were shipped to TAMU for evaluation by Dr. Gentry Steele, professor (now emeritus) of Anthropology, Marshall, who at the time held a master's in Public Health, confides that "after being in Guatemala and then meeting Gentry, by the next year I was in a doctoral program."

Her dissertation wasn't the typical bound sheet of papers. Instead, it was a series of seven video novels, each 15 minutes long, that discussed risk factors and demonstrated self care associated with diabetes. Narrated in English and Spanish, the series was targeted to the population of south Texas, many of whom can't read. An integral part of her dissertation investigated how the series was used and its practical effects. "One of the things we found," she reflects, "was that you aren't going to change the habits of abuelos or grandparents for their own cooking; what they are interested in is what their children can do to improve the life and health of the children and grandchildren. They showed great interest in the content of the series."

A measure of the practical value of her series is that it is still used all over the United States. Recently the Massachusetts Department of Public Health found it useful for educating Puerto Ricans and Cubans because it communicates in very simple, easy-to-understand Spanish. Marshall gives credit to Dr. Steele for the success of the series; as a member of her doctoral committee, Steele, as she puts it, "really went out on a limb."

The practical side of education, the application of principles—that's what matters to Carolyn Marshall. What could be more practical than saving the health—and lives—of a generation of human beings? /MCC

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Suggested Readings


Diving into
Florida Prehistory
The Paleoindian Record at Sloth Hole

At 33 ft deep, Sloth Hole is more than just a deep hollow in the middle of the Auxilla River. Since its discovery in the 1960s, Sloth Hole has been a rich data mine for paleoanthropologists and archaeologists, far surpassing similar sites that dot the course of this unusual river. Running from northeast to southwest in central Florida, at the join between the peninsula and panhandle portions of the state, the Auxilla is partially landlocked, in its southern half, the river sometimes disappears underground, flowing through a network of sinkholes, springs, and other karst topography features before reappearing at the surface and continuing on its meandering way to the Gulf of Mexico.

A submarine mother lode

Today, Sloth Hole, completely inundated, is one of the deeper sinkholes in the Auxilla River system. Several springs feed in from the bottom of the sinkhole, an area bracketed by shallow limestone shales on both the upstream and downstream ends of the sinkhole proper. But Sloth Hole wasn't always in the middle of a river. There's compelling evidence that the site originated as a spring-fed pond at the bottom of one of the many karst holes potholing the area and has undergone repeated inundation over the past several thousand millennia. "We have wonderful evidence it was dry land once," says C. Andrew Hemmings, who has been studying the site for 10 years. "In 18 feet of water, we have an in situ paleo stump."

The paleo stump has twice been dated to approximately 35,000 years BP. Additional evidence points toward surface exposure of this portion of the site at about 20,000 years BP and 12,000-14,000 years BP as well. During those periods, its depth would have been much reduced, to about 10 ft deep; it would have been a half-filled hole in the ground. But after about 12,300 years ago, modern conditions prevailed. "Nowadays you can take a boat from Sloth Hole to Tampa," says Dr. Hemmings. "It goes straight out to the Gulf. In Clevel West, the shoreline was 150 kilometers away, maybe more."

The first investigations

Sloth Hole first came to scientific notice through the efforts of Stanley Olson, the prominent zoologist, and Dr. Richard Olmes, a student of Clevel. Over several decades, Olson and Olmes collected a large amount of faunal material from the Auxilla and a neighboring river, the Wacissa. Although he was most interested in adding ivory artifacts to his collection, Olmes also attempted to take soil cores from the hard-packed sediments at the bottom of the sinkhole. Unfortunately, he found that his cores, obtained after a great deal of difficulty, were, as he expected, useless.

Meanwhile, other scientists, including vertebrate paleontologist Bruce Means and paleoanthropologist David Gillette, were examining the Sloth Hole faunal material from a paleoanthropological perspective. It was through their efforts that the site first came into prominence—as the type-site for Polu amatioi, a long-extinct species of wild cat once endemic to Texas, Florida, Georgia, and Mississippi. Indeed, specimens of 27 extinct Pleistocene species are known from Sloth Hole, including horse, camels, mastodons, mammoths, and not surprisingly sloths, along with the remains of extinct species like whitetail deer, lynx, and turtle. Some of these bones had been worked into tools, and a few bear unmistakable evidence of butchering. One find, a lynx mandible dating from the Archaic period, has three spiral moils carved on each side. A fragment of turtle carapace bears a similar design.

Several years ago, just prior to his death, Olmes donated his collections to the Florida Museum of Natural History in Gainesville. Among the dozens of mammoth teeth, mandibles, and similar pieces were numerous worked ivory artifacts, including a complete ivory spear shaft with an incised zigzag pattern on both sides. This piece, which was clearly made while the
ivy was fresh, has been called "the oldest artwork in North America." It may have served as a lunar calendar. Interestingly, it was found in two pieces—five years apart.

The Auclla River Prehistory Project

Others and the other early investigators stuck to mining the fine-grained organic-rich sediments at the bottom of the site, and for this reason it's unclear today exactly where their finds came from. They seldom dug into intact sediments; real excavations didn't occur until Sloth Hole came to the attention of the Auclla River Prehistory Project (ARPP).

The ARPP began in 1983 as a joint project of the Florida of Natural History, the University of Florida, and the Florida Bureau of Archeological Research. The project, which has assayed astonishing amounts of data on the past 12,000 or so years of occupation on the Auclla, has attracted dozens of researchers and volunteers, most of whom are professional-grade divers. One of them was Andy Hemmings. Hemmings first began working at Sloth Hole as a graduate student in 1994, when he surveyed the site to see if anything was left intact. Fortunately, aside from surface disturbances, the site seemed mostly unharmed. Formal excavations began shortly thereafter under theegis of the ARPP, and continued until 1999.

The sediments at Sloth Hole turned out to be substantial. Several meters of modern fluvial material (Stratum D) make up the topmost sediments; beneath this are 10 layers of semi-compact peat, leaves, and cross-bedded sands that overlie a red organic clay dating to more than 41,980 RCYBP. Additional radiocarbon dates reveal that the deposits below Stratum I ran a period from at least 45,000 RCYBP to 1200 RCYBP. The cultural material in the deeper parts of the site is suspended in fine-grained sand layers younger than 12,300 years old.

Hemmings and his associates have recovered thousands of artifacts from Sloth Hole, most made of perishable materials and many demonstrably Paleo-

indian in age. The assemblage is enough to make any First Americans researcher drool; in fact, Sloth Hole may well boast the largest assemblage of Paleoindian bone and ivory tools in North America. Among other objects, the researchers have identified more than 900 bone pins, which may have served as awls or projectile points, and at least 33 complete beveled ivory points, all at least a foot long. In addition to these are numerous other ivory pieces, including 70 non-joining point fragments, two drilled bead preforms, a smaller point, the tip of a needle, and a fragment of a socketed handle. The only unsteamed ivory tool fragment found in situ has been directly dated to 11,050 ± 50 RCYBP; currently, Hemmings was surprised at the number and diversity of ivory tools found at the site, and he believes every single one is Clovis in origin. They were probably collecting the ivory fresh, possibly from their kills, not mining fossil material," he points out. Furthermore, he believes that "the guillotine came down pretty hard at 11,000 RCYBP for the proboscideans in Florida. I don't think any of the later cultures, like Suwannee, Simpson, and Bolen, ever saw any proboscideans." If his theory is correct, the ivory craftsmen were almost certainly Clovis or pre-Clovis.

Other remains include mastodon and mammoth skeletal material, uncountable slivers of shattered ivory, and the butchered limb of a Pleistocene camelid, Pseudolama— a meta- tarsal that appears to have been chopped apart when a prehistoric butcher was separating bones in the animal's lower limbs. Two Pseudolama teeth were also recovered. Pseudolama remains, although rare in archaeological contexts, have been associated with Paleoindian sites elsewhere, including Blackwater Draw in New Mexico.

The organic remains are strong evidence of human presence, but it's the stone tools that clinch the deal. Thus far, two early cultures are represented: Clovis (11,000–12,000 RCYBP), Hemmings (right) with Michael Faught in 1997 at the open house of the Auclla River Prehistory Project. Dr. Faught (MT 18–4, "Rethinking Clovis Origins") is being awarded the prototype of his invention, the Faught-o-lator, which he intended to fit on the end of a 6-inch induction dredge horse and assist a diver in cutting through hard sediments underwater. Unfortunately, the invention never quite lived up to his expectations.

and the Bolen culture (about 10,000 RCYBP), which straddles the late-Paleoindian/early-Archaic divide. Professional archaeologists have recovered 17 Bolen points and 6 Clovis points, and collectors are known to have been taken.
of Clovis points. Also recovered were bifacial cores, a few preforms, portions of late-stage bifaces, and various overshoot flakes and utilized blade flakes. Much of the material was quarried at nearby Fossil Hole (8E1497), a massive inundated lithic site at the southern tip of Ward Island less than a mile away. According to Hemmings, most of the Sloth Hole lithics, especially the projectile points, are "best to death—exhausted."

Stones and bones
These observations have led Hemmings to an intriguing conclusion: that the Clovis occupants at least, and likely the Folsom occupants as well, were pursuing a vigorous bone tool industry at Sloth Hole. In fact, he's confident that he and his colleagues have found an ivory workset. It's hard to argue with the facts: in an area roughly 3 m square, 9 splinters or fragments of finished tools and 4,000 shivers of chopped-up ivory were found in association with 2 Clovis points, 2 heavily battered bifaces that may be unrecognizable Clovis points, and some 20 overshoot flakes removed from bifacial cores and used as utilitarian tools. Some of the ivory pieces retain what appear to be "chatter marks," created when ivory is deliberately split apart. Hemmings agrees that the Clovis points probably started life as projectile points; he theorizes, however, that the Sloth Hole people, while creating new stone and ivory tools, were also using up worn-out stone tools.

Artifacts recovered from Sloth Hole: A, flaked proboscidean long bone fragment; B, revised *Lynx rufus* mandible, probably Archaic in age; C, ivory haft dated 11,050 ± 50 BP; D, ivory needle tip; E, Clovis points.

Some of the bone points collected from the site are almost certainly Clovis in age. "My take on the bone points is this," Hemmings explains. "We have 37 bone points and 9 clear Clovis points. If we took that ratio, that would mean that 300 of the bone points are Clovis. I don't think it's that high, but I think that at least 10 percent of the tools are Clovis. And even if it's only 5 percent, that's 45 bone tools—more Clovis bone tools than are known for the entire rest of the continent." What's more, Hemmings has so far identified 10 to 12 deer bone tools that are made in the same way as the ivory tools, and are almost certainly Clovis in origin.

Hemmings is quick to point out that Sloth Hole is not an atypical Clovis site; the only reason so many ivory and bone tools have been found here, he argues, is because of the excellent preservation. He believes this level of ivory and bone use was not at all unusual for Clovis peoples. "I want to hammer this point home," he declares. "We fundamentally misunderstand sites that don't have good organic preservation. We shouldn't get too wrapped up in the individual trees and fail to see the forest here."

Despite the impressive amount of material Hemmings and the ARPP have recovered, Sloth Hole still has a great deal to teach us. Only a relatively small portion of the site has been formally excavated, and untold amounts of faunal material remain at the bottom of the Aucilla. Hemmings, for one, expects his attention to remain focused on Sloth Hole for some time to come. "I owe the world a site report, and I think I need to do some more work there before I move on," he says. "There's plenty still to be learned. There's no 'use-by date' on good data—like the preservation at the bottom of the Aucilla, it remains good forever."  

—Floyd B. Langgut, Jr.

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