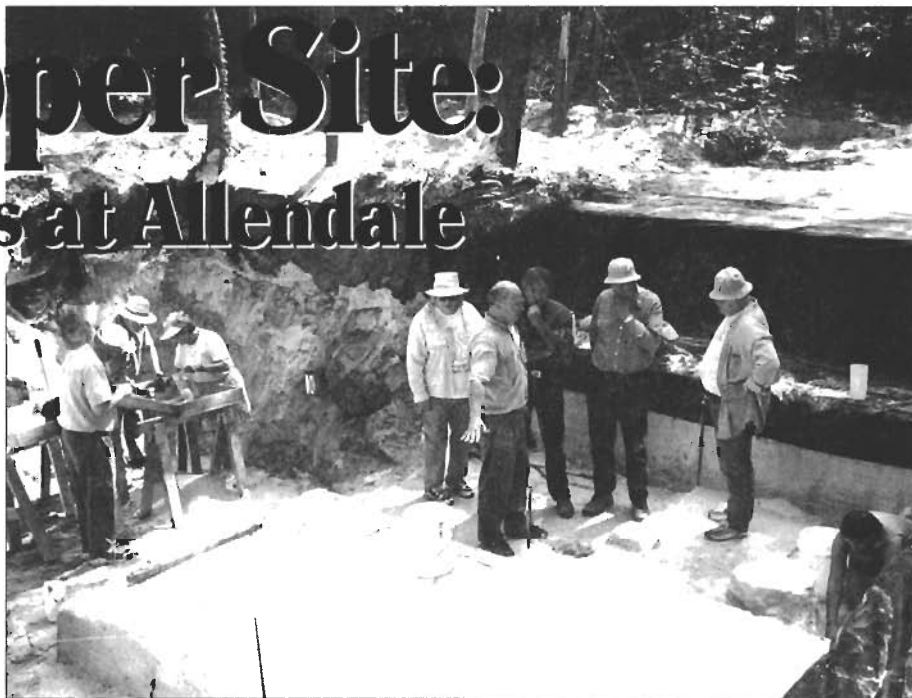


The Topper Site: Beyond Clovis at Allendale

Experts of an interdisciplinary team inspect pre-Clovis evidence at the Topper site in May 2001:



B, Rob Bonnicksen, **CSFA** director;
M, Lucinda McWeeney, Yale University paleobotanist; **G**, Al Goodyear, director of the Allendale Paleoindian Expedition; **S**, Tom Stafford of Stafford Research Laboratories, a radiocarbon-dating facility in Boulder, Colo.; **W**, Mike Waters, Texas A&M University geoarchaeologist; **K**, Marvin Kay, University of Arkansas microwear analyst.



DARYL P. MILLER, SCIAA-USC

For nearly 20 years Al Goodyear has been unearthing Archaic and Clovis-age artifacts along the Savannah River—that's rare enough for the Southeast. Now he's into pre-Clovis levels—and he's excited!

EXACTLY HOW OLD are the soils at the Topper site? Al Goodyear isn't sure yet. Materials recovered from the top of the pre-Clovis level date to 15,000–16,000 calendar years old—and

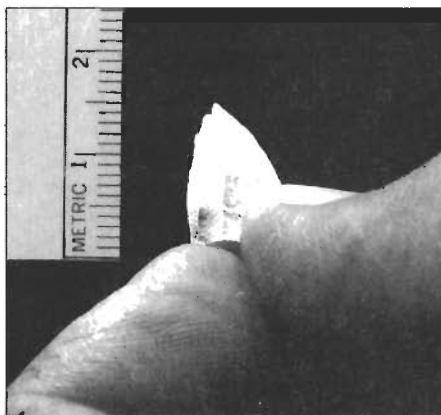
there appear to be artifacts a meter below that! "We may be able to add a few thousand years to that," says Dr. Goodyear with obvious restraint, "since there are artifact-bearing sediments below the 16,000-year-old zone."

In the pre-Clovis level he has recovered stone flakes and what appear to be

tools. According to one expert in microscopy, they show signs of use wear. And they definitely aren't Clovis. As far as Goodyear and his colleagues can tell, they're pre-Clovis and they're man-made.

These are heady times for Goodyear, founder and director of the Allendale Paleoindian Expedition, a research program of the South Carolina Institute of Archaeology and Anthropology, based at the University of South Carolina. For more than 20 years he has been studying sites in the central Savannah River Valley of Allendale County, S.C., searching for evidence of human inhabitants at the time of the Pleistocene-Holocene transition between 13,000 and 10,000 calendar years ago.

By any standards he has been successful. He has received grants from such varied sources as the National Park Service, the National Geographic Society, the Elizabeth Stringfellow Endowment Fund, Sandoz Chemical Corporation, and Clariant Corporation, the present owner



BOTH: DARYL P. MILLER, SCIAA-USC

Al Goodyear (left) screening, (above) pinching an Ice Age microtool about 15,000 calendar years old.

The stratigraphy story at the Topper site

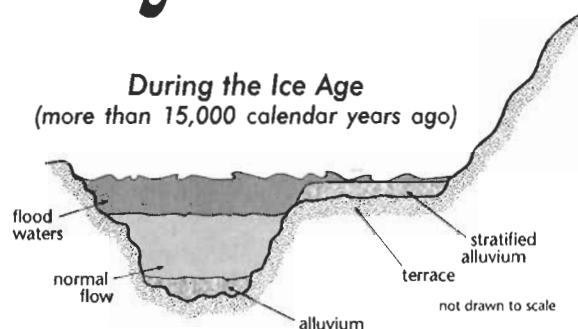
IN 1998 when we first found evidence of possible human activity in the deeper levels at the Topper site, soil morphologist John Foss and I thought the entire 2-meter-deep deposit of sand had probably washed off the hillside and slowly covered the artifacts on the terrace below. Today when it rains you can see sands washing down the hill. The upper 2 m of sediment is virtually all quartz sand (like that found on the hilltop today), with little change in color or texture to allow detection of discrete depositional layers. Furthermore, there was no evidence of pedogenesis, or soil formation, within the sands even though thousands of years were indicated by the archaeology. To complicate things further, in the lowest meter there was no macroscopically visible charcoal or other organic matter to radiocarbon-date. In an effort to find charcoal, I window-screened the sands and recovered tiny pieces of charcoal suitable for AMS C-14 dating. Four samples yielded dates of less than 2900 RCYBP. Given the complete Holocene archaeological sequence lying above them, the dates represented small specks of charcoal that had blown in or fallen in from nearby surface layers. Although disappointing, the dates showed there was essentially no old charcoal in situ available for dating.

In order to document and date the stratigraphy, we turned to outside experts. Rob Bonnicksen urged me to contact Dr. Tom Stafford of Stafford Research Laboratories to come and collect radiocarbon samples. Dr. Mike Waters, geoarchaeologist at Texas A&M, offered his services, as did his colleague Dr. Steve Forman, a geochronologist and OSL-dating specialist at the University of Illinois-Chicago. In June 2000 these scientists, along with Dr. John Foss, project soil morphologist from the University of Tennessee, joined our team for an intensive geological study of the Topper site and nearby floodplains.

With the benefit of several deep backhoe trenches, they found clear evidence of fluvial activity in the lower portion of the sands. Small chute channels with gravels were found paralleling the Savannah River, indicating river activity. These earth scientists learned that the approximate upper meter of sand was formed by slopewash, while the lower meter was formed or modified by river floods. Since the upper sands were colluvial in origin, they realized that OSL dating might work. An OSL date from the base of the colluvium came back 13,000–14,000 calendar years ago, which was in perfect agreement with the presence of Clovis-related bifaces also situated in that zone. (The Clovis culture dates from about 13,000 to 13,500 calendar years ago.) A few centimeters below that date another OSL date on the transition from colluvium to alluvium came back 15,000–16,000 calendar years ago. The majority of the pre-Clovis artifacts lie below that date and thus are older.

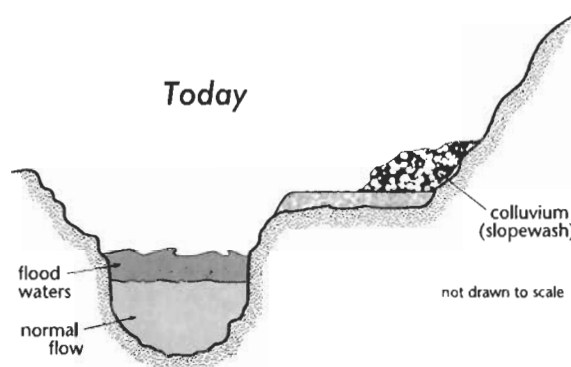
This geochronological finding is in agreement with the paleoclimate and Pleistocene river behavior in the Southeast. Prior to 16,000 calendar years ago, the climate was drier and cooler and rivers flowed at

*During the Ice Age
(more than 15,000 calendar years ago)*




higher elevations owing to sediment-choked floodplains. As the earth warmed at the end of the Last Glacial Maximum around 15,000–16,000 calendar years ago, greatly increased precipitation in the South caused the major rivers to scour and incise their floodplains, lowering them to their present elevations. The Savannah River was thus no longer capable of flooding at the Topper site elevation; only slopewash gradually contributed sands to the terrace below. By the time Clovis people arrived to quarry chert at Topper, only the colluvial system was operative.

Today



Clovis people and all subsequent prehistoric groups at Topper always utilized chert from river-smoothed cobbles available today in the modern Savannah River floodplain. But river-cobble chert and the large quartz-cobble hammerstones present in the river bottom today are absent from the pre-Clovis zone at Topper. These sources of fine-quality chert apparently were not available for human use prior to the great scouring of the Pleistocene.

Thus the plain sands at Topper finally told their story. The upper sands housed the Clovis through Mississippian cultures who lived in the Savannah River valley as we see it today. Underneath them were the stone tools of much earlier peoples who camped in and adjacent to the Ice Age Savannah River floodplain. Their secret remained hidden for over 16,000 years until in 1998, because of finds in Chile and Virginia, archaeologists dug a little deeper. 

—Albert C. Goodyear

of the sites. Over the years his exhaustive explorations of chert quarry sites in the Allendale area have yielded numerous artifacts from the Paleoamerican through the Archaic periods. In 1996 we reported his startling discovery of Clovis-age biface blanks, pre-

forms, and fragments of blades and microblades at the Big Pine Tree site, which lies about a mile upriver from Topper on a lower terrace (**Mammoth Trumpet** 11-1, "Site near Savannah River Yields Clues to Paleoindians").

We first printed this map in January 1996 (**Mammoth Trumpet** 11-1) when we reported on the Big Pine Tree site, an Allendale chert quarry site that was yielding Clovis-age blades, microblades, and cores. (The other two sites shown on the map were unlabeled at the time.) There are seven or eight known chert quarries in the Allendale area; the material from all of them is known as Allendale chert.

Nothing attracts like success. Every spring volunteers eagerly make a donation to the University for the privilege of taking part in the Allendale Paleoindian Expedition. This year's hard-working volunteer force numbered more than 100, its members drawn from as far away as Florida and North Dakota.

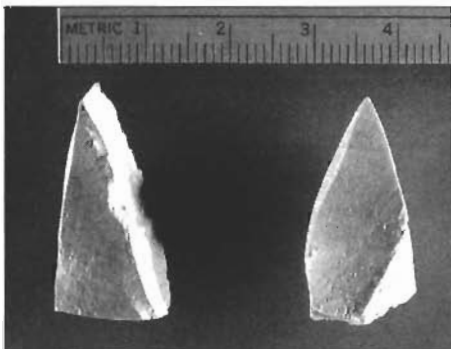
The Topper story:

Confession of a converted nonbeliever

Goodyear is quick to admit that the apparent success of the Topper site is an unexpected boon, like winning a million-dollar lottery.

His success certainly wasn't altogether unearned. Topper is one of several Allendale chert quarry sites he started investigating in the early 1980s when a local informant named David Topper showed him the site. It fit the search formula that has worked well for other Paleoamerican archaeologists in the East. "Find a good cryptocrystalline chert source," he says, "and you almost always find evidence of Paleoamericans. It works like a charm in the Savannah River area." Goodyear thought the site ought to be worth exploring because it had the earmarks of a good site, a comfortable bench, or terrace, fronting the Savannah River with a chert outcrop on the hillside. After testing it in 1983-84, he nominated the Topper site, along with several other chert quarries, to the National Register of Historic Places. He also had a petrology study done of chert from the site, which was included in his 1984 survey report.

These burin-like tools, found in the Topper pre-Clovis occupation, were made by the bend-break method, a far simpler technology than Clovis fluted-point knapping. Goodyear and his colleagues are studying the bend-break technique.

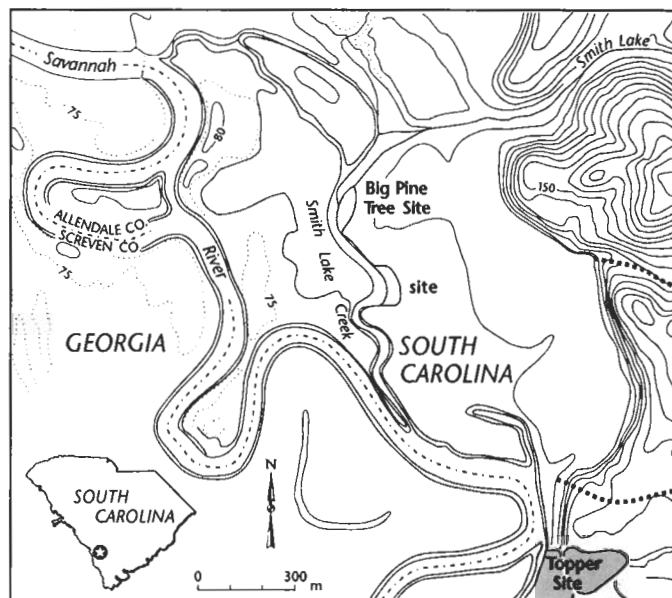


DARYL P. MILLER, SCIAA-USC

In 1986 Goodyear, thinking there was probably about 1 m (about 39 in) of stratigraphy at the site, conducted further excavations in a project funded by the National Geographic Society. It was a worthwhile effort; at 70-80 cm (about 28-32 in) below surface he found early-Archaic side-notched points, dated elsewhere by radiocarbon at 11,000-12,000 calendar years old. Then, he remembers, "after about a meter everything went away." He thought he had plumbed the depths of the Topper site.

Cactus Hill and Monte Verde change the picture

By his own admission Goodyear is a classically trained

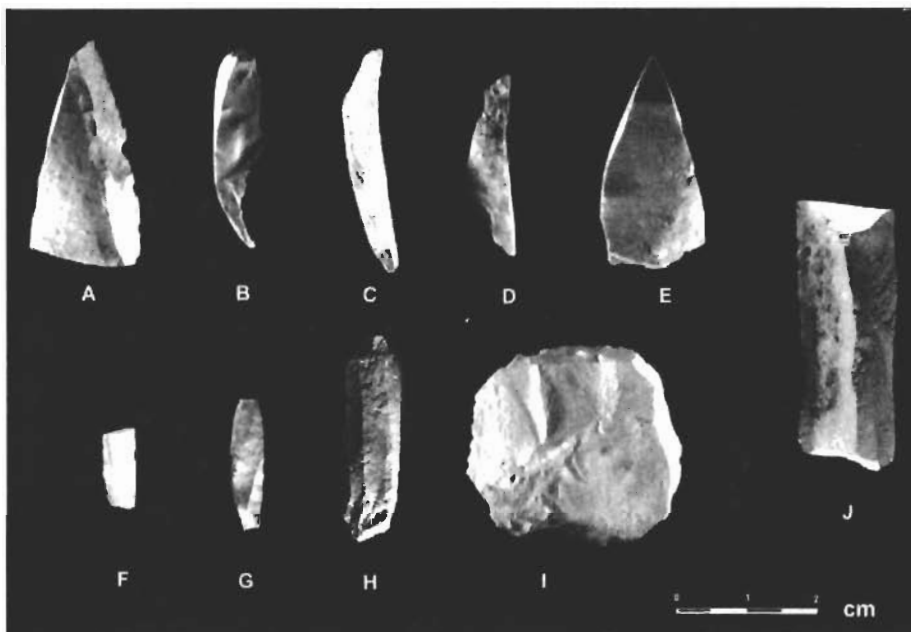


Paleoamerican archaeologist with 25 years' experience. Classical training taught archaeologists that the first humans arrived in the Americas on foot by way of the Bering Land Bridge. However, huge ice sheets covering present-day Canada until about 14,000 years ago probably prevented people from entering the temperate areas now occupied by the United States. The Clovis culture, which began suddenly soon after the ice sheets melted, appeared to be the first prehistoric culture in America. Although he doesn't admit to being a victim of mind set, nonetheless he says frankly, "You don't look for what you don't believe in." To him it was pointless—and irresponsible—to waste time and project money trying to find evidence of pre-Clovis cultures, which he didn't believe was there.

Then in 1996 he read with great interest the article in **Mammoth Trumpet** about the Cactus Hill site in Virginia (MT 11-4, "Simple Tools, Hearth Found beneath Clovis Horizon"), where Joseph McAvoy's Nottoway River Survey found stone tools and evidence of *two* periods of occupation beneath a well-documented Clovis layer. Charcoal dated the find at $15,070 \pm 70$ RCYBP (about 18,000-19,000 calendar years old). Goodyear, after reading McAvoy's detailed report of his findings published in 1997, concluded the Cactus Hill site had anything a skeptical archaeologist could demand: archaeological stratigraphy, undoubted artifacts, change in raw materials (core blades found in the pre-Clovis

levels were made of local quartzite instead of fine-quality chert used by Clovis knappers), and radiocarbon dates that place the find well before Clovis times.

For Goodyear the turning point was 1997, when a number of prominent Paleoamerican authorities published an article in *American Antiquity* about University of Kentucky archaeologist Tom Dillehay's discovery at Monte Verde in Chile. Having inspected the site in person, they stated their belief that the Monte Verde site was a true archaeological site and that it was 14,500 calendar years old—fully 1,000 years older than the Clovis culture in North America. Like many of his peers, Goodyear wondered, If there were people down in South



Microlithic tools from the Topper pre-Clovis occupation include burins and spalls (A-E), microblades (F-G), a possible microcore (H), scraper (I), and blade-like tool (J).

America 14,500 years ago, what was going on up here? If they were down there, he reasoned, mustn't they have been here, too?

Serendipity takes charge

Pasteur said that chance favors the prepared mind. The truth of that was confirmed by Goodyear in spring of 1998.

From 1996 to 1997 the Allendale Paleoindian Expedition had dug on the modern terrace of the Savannah River at the Big Pine Tree site. In May 1998 the volunteer force was ready to resume work there, but the river was so swollen with winter rain it was impossible to dig. Flooded out of the Big Pine Tree site, Goodyear turned his thoughts to higher

ground and the Topper site. Since there was a ready supply of chert and the river nearby, he reasoned, this might be a place where early humans would stop. If pre-Clovis people were in North America and if they stopped here and if they left anything behind, then there might be something down below—where he had traditionally never bothered to look. Now he decided to look.

After two weeks of digging the upper meter at Topper and discussing with his volunteers the possible existence of a pre-Clovis culture in the Western Hemisphere, Goodyear asked his team, "Who wants to go deeper?" They were, he says, "wild-eyed and enthusiastic." He put a test square as close as possible to the

base of the hillside in order to tap into the maximum amount of colluvium (slope-wash that had accumulated at the base). After digging 30–50 cm (about 12–20 in) below the expected Clovis level, they found small flakes and small flaked tools.

Was he surprised?

"I was in shock," he confesses.

After digging down about 1.8 m (about 6 ft), the team found what appeared to be a rock feature, several rocks piled together as though by human hands.

For 48 hours Goodyear was, he says, in a state of mental turmoil. Try as he might, he couldn't explain away evidence he had seen with his own eyes. The Expedition dug two other squares at Topper—and found similar evidence. Excitement ran so high Goodyear claims, perhaps with only slight exaggeration, "we could hardly sleep at night."

What draws volunteers to Goodyear's program year after year is more than the opportunity to witness scientific discovery; it's the chance to work with a leader who they know will keep them informed. For the benefit of all the volunteers who had worked for weeks, many on the upper-Holocene deposits, he wrote his usual letter report bringing everyone up to date. His carefully worded summary told his workers they weren't going to believe it, but the Expedition had dug



◀ Taking a sediment sample from an ancient river bed near the Topper site with the Vibracore. A gasoline engine-powered actuator vibrates a 4-inch-diameter pipe and worries it (instead of pounding it or drilling it) into the soil, cutting a clean core.

Paul Gayes (left, standing) ▶ and Tom Stafford (center, standing) examine a sediment sample taken with the Vibracore. The core has been split open to reveal strata.



deeper than ever before . . . and they seemed to have found artifacts.

It was a secret that couldn't be kept. A volunteer faxed the letter to James Adovasio, director of the Mercyhurst Archaeological Institute at Mercyhurst College in Erie, Pa., and discoverer of the Meadowcroft rockshelter in western Pennsylvania. At the time Dr. Adovasio happened to be working with Tom Pettit, reporter for *U.S. News and World Report*, who quickly picked up on the news from the Topper site. In April 1998 *USNWR* included the brand-new discovery at the Topper site in its lengthy article on the controversial issue of when the Western Hemisphere was first peopled. In October 1998 *Newsweek* followed suit, featuring the Topper site in its treatment. Both articles were cover stories.

Step by careful step

Nobody had to warn Goodyear that every detail of his find at the Topper site was going to be scrutinized in coming months and years by skeptical archaeologists. Later in May 2000, after opening up 80 square meters of the pre-Clovis level, he sought help from key scientists: geoarchaeologist Mike Waters; Steve Forman of the University of Illinois-Chicago, a geologist who specializes in chronology; and radiocarbon-dating expert Tom Stafford. They complemented the talents of John Foss, soil morphologist for the Allendale Paleoindian Expedition, who had been at the Topper site at the initial discovery of pre-Clovis levels in the 1998 season.

The soil conditions at the Topper site make it difficult to date materials in the pre-Clovis levels. Acidic sands have destroyed most organic materials, including charcoal. Fortunately Dr. Forman was able to use a new technique called OSL (optically stimulated luminescence). Many sediments contain small amounts of radioactive elements like uranium, thorium, and potassium, which bombard surrounding sediment with electrons as they decay. Some of these electrons become trapped in quartz crystals; the amount of trapped energy is a measure of how long the material has been buried. The TL (thermoluminescence) technique, which has been in use for some years, measures trapped energy released in the form of luminescence when the material is exposed to heat. In the new OSL technique, exposure to light instead of heat releases the trapped energy. In TL and OSL, the intensity of the luminescence indicates how long the sample has been buried.

For a confidence check of the OSL dating technique, Forman and Waters tested materials from the Archaic level at Topper. The result was right on the button at 7,700 years old. (Unlike radiocarbon dating, whose result must be converted to the corresponding calendar year by applying a correction factor, OSL dating gives the calendar year directly.)

At the base of the colluvium (accumulated slopewash), which Goodyear believes is Clovis age, the sands dated to 13,000–14,000 calendar years old. That's in perfect agreement with other Clovis site dates. Goodyear isn't the least perturbed that he isn't finding Clovis points. "Even though we don't have Clovis points," he notes puckishly, "we have Clovis-age dirt."

OSL tests of materials taken a few centimeters below the Clovis level, at the transition from colluvial to alluvial deposits, give dates of 15,000–16,000 years old. These dates correspond

to 12,700–13,300 RCYBP. That's older than Monte Verde. And this is just the *top* of the pre-Clovis level at Topper.

The pre-Clovis materials lie in sands on top of a Pleistocene terrace 2 m thick. Naturally Goodyear and his colleagues wanted to know what lies *under* the terrace. In 1999 Stafford radiocarbon dated humic acids in two sediment samples taken

The Allendale–Topper Site Conference

An Archaeological Conference for the Public

January 25–26, 2002

The Capstone Conference Center
University of South Carolina
Columbia, South Carolina

Program

Friday, Jan. 25 1:00–5:00 P.M.

Open house with Allendale artifact display at the S.C. Institute of Archaeology and Anthropology, University of South Carolina. Friday evening reception to meet the scientists.

Saturday, Jan. 26 8:30 A.M.–5:00 P.M.

Presentations by Topper site scientists, including:

- Dr. Steve Forman, OSL Dating
- Dr. John Foss, Soils
- Dr. Albert C. Goodyear, Topper Artifacts
- Dr. Marvin Kay, Stone Tool Microscopy
- Dr. Lucinda McWeeney, Paleobotany
- Dr. Thomas Stafford, C-14 and Chronostratigraphy
- Dr. Dennis Stanford, the Eastern Seaboard and Europe
- Dr. Michael Waters, Geoarchaeology of Topper.

Saturday evening 5:30–9:00 Cash bar reception, banquet, and presentation.

Registration

Contact Dr. Al Goodyear, SC Institute of Archaeology and Anthropology, University of South Carolina, 1321 Pendleton St., Columbia, SC 29208; (803) 777-8170; e-mail goodyear@sc.edu. Registration fee of \$125 includes banquet (\$100 is tax deductible). Make checks payable to USC Ed. Foundation, Allendale.

Hotel Reservations

Rooms are reserved at the Clarion Townhouse Hotel, 1615 Gervais St., Columbia, SC 29201. Call (800) 277-8711 and ask for reservations for Allendale Archaeology.

from under the terrace and got results of 19,000–20,000 RCYBP, or about 23,000 calendar years old. These dates are being cross-checked by radiocarbon dating more reliable materials.

Enter more experts

Finding possible evidence of the earliest human activity yet found in North America isn't like finding a vein of gold. Far from secretly hiding it from prying eyes, Goodyear welcomes examination. The more scientists that see his discovery and evaluate his findings, the better. That's why in May 2001 he invited a high-powered team of experts to visit the Topper site (see photo at start of article). Each brought special expertise to bear. Drs. Waters and Stafford's contributions in geoarchaeology and radiocarbon dating have already been mentioned. Dr. Rob Bonnicksen shed valuable insight into pre-Clovis flake-tool

technology. Paleobotanist Dr. Lucinda McWeeney analyzed sediment samples from Topper for phytoliths and took sediment samples from a nearby Pleistocene river bed. The microwear analysis of microscopy specialist Dr. Marvin Kay was critical to the archaeological assessment of the Topper lithic assemblage; the results of his analysis determined how the artifacts were interpreted. It was Kay who analyzed materials from the Monte Verde site and pronounced them artifacts, based on evidence of microwear. His diagnosis of Topper artifacts? Three flaked stone objects recovered from pre-Clovis levels show definite signs of use wear. In other words, in his opinion Goodyear has found tools in the pre-Clovis zone.

Different technology and raw materials from Clovis

In sands at the base of the upper meter—at the transition from alluvium to colluvium, believed to be the Clovis level—Goodyear found broken fluted preforms, which experts have judged diagnostic of Clovis bifaces. Artifacts found below that, however, don't look at all like Clovis. There is no evidence of bifaces. Most objects are microlithic artifacts, predominately burin-like tools made by a technique called bend-break, a simpler technology than the sophisticated method used by Clovis knappers.

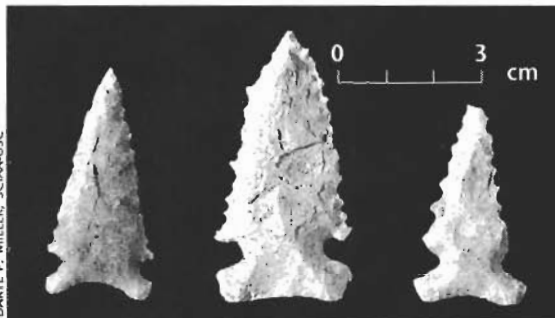
The pre-Clovis knappers used different raw materials, too. Denied the high-quality material in river-bed cherts and quartz cobbles that were available to Clovis knappers, pre-Clovis tool-makers apparently gathered weathered cobbles from the hillside and worked them on site; Goodyear has found numerous chunks and pieces of the local cobbles that were apparently smashed to get at the chert inside. Even the hammerstones they

used weren't of the large size you find today in the Savannah River; they used whatever they found on the hillside.

The elusive Clovis connection


Today Goodyear is starting to feel comfortable. He has stratigraphy, he has dating, and it appears he has artifacts.

The transition to Clovis is a mystery, though. Unlike lithic artifacts from the Cactus Hill site and Meadowcroft rockshelter,



These beautiful Taylor side-notched points found at the Topper site date to the early-Archaic period, about 11,000–12,000 calendar years ago.

which show obvious biface technology, pre-Clovis artifacts found at Topper show

no evidence of bifaces. "It's easy to see Clovis evolve from Cactus Hill and Meadowcroft," he notes, "but not from Topper." That's the beauty of archaeology, of course, and the aggravation: an answer opens up a whole new set of questions. 

—JMC

How to contact the principal in this article:

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Kennewick Man

continued from page 2

case that did not involve a "final judgement." Apparently, like Humpty Dumpty in Wonderland, when the DOI uses a word, "it means what they choose it to mean."

Although Jelderks indicated he would take several weeks to make his decision, the scientists and their attorneys have every reason to be optimistic about the outcome. Jelderks stated at the June hearing that he had "very serious concerns" about Secretary Babbitt's decision to give the 9,000-year-old skeleton to the coalition of Indian tribes. But if Jelderks rules in favor of the scientists, it may be only a temporary reprieve for American archaeology. Alan Schneider, one of the attorneys for the scientists, said that whoever loses will likely appeal the decision. The case may eventually end up before the Supreme Court.

On June 18, the day before the federal court proceedings, the scientists met with their attorneys and a few supporters to discuss what to expect in court. The meeting was upbeat. The attorneys were well prepared and cautiously enthusiastic. The

scientists were hopeful that finally, after five years of litigation, a reasonably definitive conclusion would be reached. However, Douglas Owsely, a physical anthropologist with the Smithsonian Institution, offered a sobering thought. He pondered that if the judge found for the scientists and if his decision were based on one or more of the big issues, such as the definition of "Native American," and not just on a legal technicality, supporters of wholesale repatriation would almost certainly attempt to amend NAGPRA so that it would allow truly ancient human remains be given to Native Americans for reburial. Owsely fears that even if scientists win this battle, they could lose the war.

Owsely's fear is well founded, but this bitter controversy has raised the consciousness of all concerned. And scientists as well as members of the general public are becoming more aware of just what is at stake in this debate. Antone Minthorn, the Chairman of the Board of Trustees of the Confederated Tribes of the Umatilla Indian Reservation, claims that the Kennewick Man case "is not science versus religion, . . . it is science versus the law." Minthorn is wrong. It is about U.S. government administrators overinterpreting the law to advance a social and religious agenda. Ancient human remains have much to teach us.