



Archeological Society of Virginia

COL Howard MacCord Chapter

February 2010 No. 255

President:	Chas. N. Manson	804-264-5337	nielmans@comcast.net
Vice President:	Bill Bjork	804-754-0162	wbjork@comcast.net
Secretary:	Joe Corley	804-795-5204	montjoco@aol.com
Treasurer:	Lynn Taylor	804-270-7562	taylor9603@yahoo.com

This month's meeting will be held at the Dept. of Historic Resources, 2801 Kensington Ave, Richmond, VA. Thursday, **February 18, 2009 at 6:30pm**. Our speaker will be world famous Nick Lucchetti, of the James River Institute for Archaeology, Inc., in Williamsburg. He will be speaking on work done recently on Roanoke Island, North Carolina. Please join us.

STABLE CLIMATE AND PLANT DOMESTICATION LINKED

from Springer Science & Business Media

Sustainable farming and the introduction of new crops rely on a relatively stable climate, not dramatic conditions attributable to climate change. Basing their argument on evolutionary, ecological, genetic and agronomic considerations, Dr. Shahal Abbo, from the Levi Eshkol School of Agriculture at the Hebrew University of Jerusalem, Israel, and colleagues, demonstrate why climate change is not the likely cause of plant domestication in the Near East. Rather, the variety of crops in the Near East was chosen to function within the normal east Mediterranean rainfall pattern, in which good rainy years create enough surplus to sustain farming communities during drought years. In the authors' view, climate change is unlikely to induce major cultural changes. Their thesis is published online in Springer's journal *Vegetation History and Archaeobotany*.

Climate-based explanations for the beginning of new agricultural practices give environmental factors a central role, as prime movers for the cultural-economic change known as the Near Eastern Neolithic or Agricultural Revolution (about 8500 B.C., 10500 cal. B.P.*). Dr. Abbo and team studied the traditional farming systems which existed until the early twentieth century in the Near East, looking for insights into the agronomic basis of the early days of Near Eastern farming, and to shed light on the possible role of climatic factors as stimuli for the Agricultural Revolution. Their detailed analysis demonstrates that climate change could not have been the reason for the emergence of grain farming in the Near East. They find that farming requires a relatively stable climate to function as a sustainable economy and therefore is not a sustainable option in times of climatic deterioration. The authors conclude, "We argue against climate change being at the origin of Near Eastern agriculture and believe that a slow but real climatic change is unlikely to induce revolutionary cultural changes."

JOHNSTOWN FLOOD MATCHED VOLUME OF MISSISSIPPI RIVER

Science News By Sid Perkins

The devastating flow released when a dam burst upstream of Johnstown, Pa., in May 1889 transformed a small, normally tranquil river into a raging torrent that briefly rivaled the mighty Mississippi, a new study reveals. Johnstown, which lies about 100 kilometers east of Pittsburgh, was a thriving coal- and iron-producing town in the years following the Civil War, says Carrie Davis Todd, a hydrologist at the University of Pittsburgh at Johnstown. Then, on the rainy afternoon of May 31, 1889, disaster struck: A dam about 23 kilometers upstream of the town burst, sending a wall of debris-filled water down the narrow valley of the Little Conemaugh River to ravage the town. More than 2,200 people died in the disaster — a death toll aggravated by the fact that even before the dam burst, flood waters filling the streets of Johnstown had trapped many residents in their homes, she reported here October 19 at the annual meeting of the Geological Society of America.

Despite the event's massive death toll, few detailed studies of the flood have been done, says Dan Ingram, curator at the Johnstown Area Heritage Association. "There's a ton of anecdotal information, but few people have ever looked at it in a scientific way," he notes. Enter Davis Todd and her colleagues, who recently embarked on a project to analyze the Johnstown Flood. Using modern-day surveys of the area around the dam as well as archival photos, the researchers estimate that the 1.6-square-kilometer reservoir behind the dam held about 15 million cubic meters of water. The pressure of those accumulated waters, as well as erosion that occurred as water spilled over the top of the dam, triggered a sudden and catastrophic failure, says Davis Todd. Peak discharge through the 90-meter-wide, 13-meter-high breach in the dam exceeded 8,500 cubic meters per second — about three times the flow rate across Niagara Falls.

As devastating as that torrent would have been, the flow rate that slammed into Johnstown was even higher, the researchers estimate. Large amounts of rocks, trees and other debris swept along by the initial surge of floodwaters were temporarily trapped against a narrow bridge about four kilometers downstream of the dam. The deluge released by the dam's collapse carried more than 12,000 cubic meters of debris-filled water each second. Flow rates in the Mississippi River typically vary between 7,000 and 20,000 cubic meters per second, says Davis Todd.

Eyewitnesses in Johnstown said the mid-afternoon flood arrived as "a wall of black mist," says Ingram. That initial surge was quickly followed by a 10-meter-deep torrent chock-full of earth, trees, debris from hundreds of buildings and even the locomotives of trains swept off the rails running along the river's banks. The new findings will help Ingram and his colleagues better explain the devastating force of the flood, as well as how the disaster unfolded. "This is one of those events that everyone's heard of but nobody knows the story behind".

RADIOCARBON DATERS TUNE UP THEIR TIME MACHINE

By Michael Balter of ScienceNOW Daily News

It took nearly 30 years and a lot of heated debate, but a team of researchers has finally produced what archaeologists, geologists, and other scientists have long been waiting for: a calibration curve that allows radiocarbon dating to achieve its full potential. The new curve, which now extends back 50,000 years, could help researchers work out key questions in human evolution, such as the effect of climate change on human adaptation and migrations.

The basic principle of radiocarbon dating is fairly simple. Plants and animals absorb trace amounts of radioactive carbon-14 from carbon dioxide (CO₂) in the atmosphere while they are alive but stop doing so when they die. The steady decay of carbon-14 from archaeological and geological samples ticks away like a clock, and the amount of radioactive carbon left in the sample gives a reproducible indication of how old it is. Most experts consider the technical limit of radiocarbon dating to be about 50,000 years, after which there is too little carbon-14 left to measure accurately. There is one major glitch in the approach, however: The amount of carbon-14 in the atmosphere varies with fluctuations in solar activity and Earth's magnetic field, and "raw" radiocarbon dates have to be corrected with a calibration curve that takes these fluctuations into account.

Since the early 1980s, an international working group called INTCAL has been developing and perfecting just such a curve, a process that has unfolded in several stages. To calibrate the period extending from the present to about 12,000 years ago, the team has used thousands of overlapping tree-ring segments from the Northern Hemisphere, which provide a very accurate check of raw radiocarbon dates and how much they must be corrected. But for dates older than the available tree-ring record, the researchers had to turn to several other, less-precise data sets on ancient CO₂ levels, including fossil foraminifers (single-celled organisms that secrete calcium carbonate) and corals.

By 2004, the INTCAL group was able to agree on a curve that stretched to 26,000 years ago, because the foraminifer and coral data were in reasonably close agreement up to that point. That curve, called INTCAL04, was published the same year. But hopes to extend the curve all the way to 50,000 years ago were dashed. The data sets diverged from each other by up to several thousand years after 26,000 years ago, and researchers could not agree on which ones were most accurate and how to combine the several data sets. More recently, however, thanks to new and more accurate data from foraminifers, corals, and other sources--plus some fancy statistical treatments that help predict which way data gaps bend the curve--the INTCAL group has been able to resolve most of the discrepancies. "It took the group quite a while to come together and agree," says INTCAL team leader Paula Reimer, a geochronologist at Queen's University Belfast in Northern Ireland. But the new data, combined with what Reimer calls a "real sense of necessity" among team members to resolve the debates, won the day. The new curve, called INTCAL09 and published this week in the journal *Radiocarbon*, not only extends radiocarbon calibration to 50,000 years ago but also considerably improves the earlier parts of the curve, researchers say.

Getting those dates right is critical to understanding such questions as whether humans began painting caves when the climate was colder or warmer, says Clive Gamble, an archaeologist at the University of London, Royal Holloway. For example, the raw radiocarbon dates for the spectacular paintings of horses, lions, bison, and other animals at Chauvet Cave in southern France, the oldest known cave art, come out at 32,000 years ago, right after a major cold spell hit Europe; but the new calibration curve makes the earliest paintings at Chauvet 36,500 years old, a period of relative warmth. And John Hoffecker, an archaeologist at the University of Colorado, Boulder, says that the data sets behind the new curve will allow a more-precise correlation between radiocarbon dates and prehistoric climate reconstructions based on Greenland ice cores and other proxy indicators of ancient weather. Even before the adoption of the new curve, Hoffecker says, those data sets were suggesting that modern humans had moved into Europe about 45,000 calibrated years ago, much earlier than previously thought--and early enough for them to have had substantial contact with Neandertals over thousands of years.

Although the new curve is a major landmark, it is "definitely not the last word" in radiocarbon calibration, Reimer says. Her team is already planning an update for 2011, "as we learn more about the Earth's carbon reservoirs and how they changed over time."

ARCHAEOLOGICAL DIG NETS WELLS, ARTIFACTS FROM 1700S

By Marcia Lane of the St. Augustine Record

Three wells and burned wooden items probably dating back to a British raid in 1702 British are among the latest items to turn up at an archaeological dig on the grounds of the Cathedral Parish School in downtown St. Augustine. "You can see the barrel. The barrel's still there," Melissa Dezendorf, part of the city's archaeology staff, told volunteers who were cleaning off and cataloging items found at the dig site off Bridge Street.

The barrel was part of a third well uncovered by city archaeologist Carl Halbirt. The news was exciting enough to cause volunteers to stop working and head over to the rectangular shaped hole where he was working. A portion of a metal barrel band that once held a wooden barrel together and pieces of burned wood could be seen in the pit. Barrels -- placed one atop another -- were used to form the shaft of the well and hold back the dirt. As quickly as Halbirt dug in the hole on Thursday, water seeped in. The area is below the water level, and that -- combined with recent rains, a full moon and high tides -- prompted the city to bring in a pump to try and keep the area dry while the dig goes on.

The third well caused Halbirt to slightly change his hypothesis about events that took place at the site. He originally thought what turned out to be the well was a "robbers' pit," a sort of dump site. Each of the wells at the site was dug next to each other and each at different times, he believes. The wells range from the mid-1600s to the early 1700s. "It's a fascinating insight into how the Spanish got potable water," Halbirt said. The middle well was about eight feet deep and used hogshead barrels - 48 inches across. Hogshead barrels were the type used to ship in items from Europe. And that middle well was also filled with sand. Halbirt believes the Spanish filled the well with white sand, probably during 1702 when Gen. James Moore of the Carolinas laid siege to St. Augustine in an attempt to take it for the English.

The siege went on for 51 days, but the Spanish did not capitulate. Moore left in defeat. "I think the idea was to go back and clean it out and use it again as a well," Halbirt said. The Spanish were trying to minimize resources that the English could use during the siege. Among other items dug out of the area have been burned wood, including legs from chairs and tables that were probably burned by the English during the siege. After the wells were no longer in use, the Spanish apparently used the area for a hog wallow. Four posts were found that would have served as the sides for the wallow.

"The charred pieces of wood out of the third well suggest there was some type of fire, and then they just dumped that material into that well shaft. It was abandoned and then within a short period of time was reused not for potable water but ... as a muddy environment for pigs right in the back yard," Halbirt said. After digging several buckets of dirt to be cleaned and examined by the volunteers, Halbirt closed the third well hole with clean dirt. The site is part of a planned drainage system for the school. The dig, while more extensive than most, will be over in a couple of weeks. If in future years the site is uncovered by other archaeologists, the sand will let them know this area has been examined. There's another clue as well. As with other digs in St. Augustine, Halbirt planted a coin - in this case a 2009 penny.

Also found at the site were: Blue beads, Shell pendant, Big fragments of Native Ameridan pottery, Small brass crucifix in pieces, Copper medallion, Lots of European ceramics, mostly from the First Spanish Period, Piece of decorative wood, apparently from furniture.

ANCIENT DNA POINTS TO ADDITIONAL NEW WORLD MIGRATION

By Bruce Bower of Science News

A nearly complete sequence of nuclear DNA extracted from strands of the long-dead man's hair — the first such sequence obtained from an ancient person — highlights a previously unknown and relatively recent migration of northeastern Asians into the New World about 5,500 years ago, scientists say. An analysis of differences, or mutations, at single base pairs on the ancient Greenlander's nuclear genome indicates that his father's ancestors came from northeastern Siberia, report geneticist Morten Rasmussen of the Natural History Museum of Denmark in Copenhagen and his colleagues in the Feb. 11 *Nature*. Three modern hunter-gatherer groups in that region — the Nganasans, Koryaks and Chukchis — display a closer genetic link to the Greenland individual than do Native American groups living in cold northern areas of North America, Rasmussen says. A largely complete mitochondrial DNA sequence from the ancient man's hair, extracted by the same researchers in 2008, places his maternal ancestry in northeastern Asia as well.

Danish-led excavations more than 20 years ago unearthed four fragmentary bones and several hair tufts belonging to this ancient man, dubbed Inuk. His remains were found at a site from the Saqqaq culture, the earliest known people to have inhabited Greenland. Saqqaq people lived in Greenland from around 4,750 to 2,500 years ago. One popular hypothesis traces Saqqaq ancestry to Native American groups that had settled Arctic parts of Alaska and Canada by 11,000 years ago. Inuk's strong genetic ties to Siberian populations raise a different scenario. "We've shown that this ancient individual was not related to Native Americans but derived from an expansion of northeastern Asians into the New World and across to Greenland," says geneticist and study coauthor Eske Willerslev of the University of Copenhagen.

The team's new comparative analysis of Inuk's previously sequenced mitochondrial DNA indicates that the Saqqaqs diverged from their closest present-day relatives, Siberian Chukchis, an estimated 5,400 years ago. That calculation implies that ancestral Saqqaqs separated from their Asian relatives shortly before departing for the New World and rapidly traversing that continent to reach Greenland. No land bridge connected Asia to North America at that time, so migrants probably crossed the Bering Strait from what's now Russia to Alaska by boat, Willerslev speculates. His group also identified base pair patterns on Inuk's nuclear DNA that are associated in modern populations with type A-positive blood and brown eyes, as well as thick, dark hair and large, flat front teeth typical of Asians and Native Americans. Inuk also possessed DNA signatures for an increased susceptibility to baldness, dry earwax characteristic of Asian populations, and a relatively slow metabolism and broad, short body commonly found in residents of cold climates.

DNA analyses of ancient humans and their ancestors usually face enormous technical challenges. Fossil bones get contaminated with the DNA of those who unearth these finds as well as with fungal and bacterial DNA. Measures to enrich ancient DNA include generating multiple samples of the same genetic sequences and isolating genetic fragments that show no signs of contamination. Because DNA from hair contains little contamination from fungi or bacteria, Rasmussen's team focused on Inuk's locks. Frozen conditions following death also helped to preserve Inuk's DNA and prevent significant contamination. The team generated 20 copies of his genome to confirm that significant contamination had not occurred. About 84 percent of the DNA extracted from Inuk's hair was his. Rasmussen's team then sequenced 79 percent of Inuk's nuclear DNA and identified more than 353,000 base pair mutations.

"It is amazing how well-preserved this ancient genetic sample is, presumably due to its rather young age and the permafrost in which it was found," remarks geneticist Svante Pääbo of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. In contrast, 40,000- to 70,000-year-old Neandertal bones studied by Pääbo's team have yielded genetic sequences that, because of substantial contamination, generally include no more than 4 percent Neandertal DNA. Pääbo and his colleagues recently extracted and sequenced 63 percent of the total Neandertal genome from a bone (SN: 3/14/09, p. 5). "I am envious," Pääbo says, referring to the completeness and quality of Inuk's recovered DNA. Rasmussen and Pääbo agree that a major challenge will be to sequence ancient human genomes from places where remains have not been permanently frozen and most preserved genetic material consists of microbial, rather than human, DNA. Another challenge is to gain a firmer grasp of genetic variation in modern Arctic populations, so that scientists can more precisely trace Inuk's geographic roots. "It will become easier to make sense of the genetic data from Greenland as more and more present-day humans become sequenced over the next few years," Pääbo says.

NATIVE AMERICANS FIRST TAMED TURKEYS 2,000 YEARS AGO

By Jennifer Viegas - Discovery News

More than 1,500 years before Christopher Columbus and his crew sailed to the New World, Native Americans had already domesticated turkeys twice: first in south-central Mexico at around 800 B.C. and again in what is now the southwestern U.S. at about 200 B.C., according to a new study. The two instances of domestication appear to have been separate, based on DNA analysis of ancient turkey remains. However, the different Native American groups could have been in contact with each other, sharing turkey-raising tips.

"Interestingly, the domestic turkeys were initially raised for their feathers, which were used in rituals and ceremonies, as well as to make feather robes or blankets," lead author Camilla Speller told Discovery News. "Only later, around 1100 A.D., did the domestic turkeys become an important food source for the Ancestral Puebloans." Speller's colleague, Dongya Yang, said the new study came together when two groups joined forces. Their group was busy studying ancient turkey bones, while another research team from Washington State University was analyzing early turkey coprolites, i.e. fossilized dung from the birds. The scientists combined their efforts for the study, which involved DNA analysis of 149 turkey bones and 29 coprolites from 38 different archaeological sites. Speller said their investigations revealed that pre-Aztec people around south-central Mexico first domesticated turkeys. The birds appear to either have either been penned or "allowed to roam around the village," according to Speller.

The southwestern turkeys, on the other hand, "were raised by the Ancestral Puebloans who lived on the Colorado plateau, around the Four Corners region of the southwest United States," Speller said. These Puebloans, also known as the Anasazi, appear to have not only raised domestic turkeys, but also incorporated local wild turkeys into their domestic stocks, according to Yang. DNA tests determined that the southwestern domestic turkey breed probably is most closely related to the eastern and Rio Grande wild turkeys that are still found in the U.S. today. It is possible, however, that the original southwestern domestic breed has since become extinct.

"It seems that only the Aztec turkey breed survived into the present day," Speller said. "It's fascinating to think that the turkeys that we eat today were ultimately descended from the turkey breeds raised by the Aztecs." The researchers weren't able to precisely identify these Aztec turkey breeds, but they ruled out at least one early progenitor: the South Mexican domestic turkey, which previously was thought to be a mother of all modern domestic turkeys.

"Over the following two centuries, several varieties of turkey were developed in Europe. And then in the 18th century, these European turkey breeds were imported back to the United States, where they eventually became the forerunners to the turkeys we eat today," Speller explained.

EXTINCT BISON BODY COULD REWRITE CANADIAN ARCHAEOLOGICAL RECORD

By Randy Boswell, Canwest News Service

A steppe bison cranium specimen. A carcass of the now-extinct animal, discovered two years ago melting out of a cliff in the Northwest Territories, is shedding new light on the Ice Age species, and could rewrite the history of human migration in Canada. The carcass of an extinct steppe bison, discovered two years ago melting out of a cliff in a remote village in the Northwest Territories, is shedding new light on the Ice Age species — and could rewrite the history of human migration in Canada as glaciers began retreating in the region nearly 14,000 years ago.

An analysis of the super-sized beast, larger than both the plains and wood bison which inhabited North America following the demise of its steppe-cousin, showed the specimen was one of the last of its kind in ancient Beringia — the ice-free, northwest corner of the continent that was once linked to eastern Siberia. But the rare find, documented by a team of Canadian, British and American scientists in the latest edition of the journal *Quaternary Science Reviews*, has wider implications for dating the retreat of the glaciers in northern Canada and the possible entry of human hunters from Asia — the ancestors of today's aboriginal Canadians — into the continental interior.

The "partially mummified" steppe bison was found two years ago in Tsiigehtchic, N.W.T., by local resident Shane Van Loon. The animal's distinctive skull and wide horns were largely intact, but more tantalizing were portions of preserved limbs, hide and intestines — soft tissue that permitted detailed genetic analysis allowing scientists to accurately situate the specimen in the evolutionary history of North America's bison populations. "Based on the genetics, this animal was one of the last of the remaining steppe bison in Beringia," Yukon government paleontologist Grant Zazula told Canwest News Service. "Shortly after this, populations in the North are completely replaced by bison that evolved in the mid-continent."

What the find also shows is that the post-glacial ecosystem inhabited by the steppe bison, which was found a short distance east of the Yukon-N.W.T. border near the Mackenzie River Delta, must have supported large mammals earlier than previously known. That, say the scientists, suggests human hunters may well have entered the area around this time and — potentially — left traces of their own activities at sites still waiting to be found by archeologists. "Given that steppe bison inhabited the northern portal to the 'ice-free corridor,' data from the Tsiigehtchic bison raises the potential for discovery of . . . archaeological sites in the lower Mackenzie River Valley," the study states.

The bison find follows a Yukon museum's unveiling earlier this year of the partial remains of an extinct Ice Age horse, a discovery hailed as a national treasure because of the animal's exquisite state of preservation. Zazula and other Canadian scientists also published a study this year detailing the scientific riches yielded over the years by Klondike-area

gold mines, where mining excavations have unearthed a motherlode of Ice Age "megafaunal" fossils, including the well-preserved horse, as well numerous mammoths and other extinct species.

FORT UNCOVERED ON TRAIL OF TEARS

Associated Press

The U.S. Forest Service has begun to uncover the remains of a fort used to temporarily house migrating Cherokee Indians along the Trail of Tears more than 170 years ago. The land in Monroe County where Fort Armistead once stood has never been plowed or developed, so walking along the trails there and passing the numerous springs used by the Cherokee is like traveling back in time. Forest Service archaeologist Quentin Bass told the Knoxville News Sentinel that work has revealed the locations of block houses, a parade ground, a powder magazine, barracks and storage pits. Archaeologists and volunteers also have discovered many articles discarded by soldiers and Cherokees.

The Forest Service purchased the 26-acre site in 2005 from the Dalton family. Kathleen Dalton said she had heard about rumors of a fort on the property, but after artifacts were found at the site, the family knew the land should belong to the public. "No one outside of this area knew about the location, but it was carried down through oral tradition," Bass said. Bass said representatives of three Cherokee tribes met at the fort's remains about a year ago and were amazed by the beauty of the site that held the memory of such tragedy for their people. Rare species of mushrooms, herbs and medicinal plants used centuries ago by American Indians are still growing there. "This is a sacred place," Bass said. "It certainly represents a crucial, and tragic, part of the history of not only the Cherokee people, but also the entire nation."

The trail leading through Fort Armistead had been used by American Indians for centuries and may have been used by the Spanish explorer Hernando de Soto in 1540. It was the lowest gap through the Appalachians. Fort Armistead was built in 1832 to protect the Cherokees and keep white settlers out of the area after gold was found along Coker Creek. But in 1836 the function of the fort changed and it became a stop on the Trail of Tears, the campaign of forced removal of the Cherokees from their lands in Tennessee, Georgia and the Carolinas.

Future plans for the site are still being developed, but many Cherokees are advocating keeping it as a walk-in-only site to maintain its solitude and the atmosphere of reverence.