

Stone Age Graveyard reveals Lifestyles of a 'Green Sahara': Two Successive Cultures Thrived Lakeside

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Some 4800 years ago, this 11-year-old Tenerian girl was buried wearing an upper-arm bracelet carved from the tusk of a hippo, discovered by National Geographic Explorer-in-Residence Paul Sereno and his team. The Tenerian lived and buried their dead atop dunes near a lake in a region of the Sahara that was once greener than today. Photo: Mike Hettwer, courtesy Project Exploration

(PhysOrg.com) -- The largest Stone Age graveyard found in the Sahara, which provides an unparalleled record of life when the region was green, has been discovered in Niger by National Geographic Explorer-in-Residence and University of Chicago Professor Paul Sereno, whose team first happened on the site during a dinosaur-hunting expedition.

The remarkable archaeological site, dating back 10,000 years and called

Gobero after the Tuareg name for the area, was brimming with skeletons of humans and animals — including large fish and crocodiles. Gobero is hidden away within Niger's forbidding Ténéré Desert, known to Tuareg nomads as a "desert within a desert." The Ténéré is the setting of some of Sereno's key paleontological discoveries, including the 500-toothed, plant-eating dinosaur Nigersaurus that lived 110 million years ago and the enormous extinct crocodylian Sarcosuchus, also known as SuperCroc.

The discovery of the lakeside graveyard — representing two successive human populations divided by more than 1,000 years — is reported in the September 2008 issue of National Geographic magazine and the Aug. 14 issue of the journal PLoS ONE.

As they explored the site, the team tiptoed among dozens of fossilized human skeletons laid bare on the surface of an ancient dune field by the hot Saharan wind. Jawbones still clenched nearly full sets of teeth; a tiny hand reached up through the sand, its finger bones intact. On the surface lay harpoon points, potsherds, beads and stone tools. The site was pristine, apparently never visited.

"Everywhere you turned, there were bones belonging to animals that don't live in the desert," said Sereno. "I realized we were in the green Sahara."

Two seasons of excavation supported by the National Geographic Society eventually revealed some 200 graves clearly belonging to two successive lakeside populations. The older group, determined to be Kiffian, were hunters of wild game who left evidence that they also speared huge perch with harpoons when they colonized the green Sahara during its wettest period between 10,000 and 8,000 years ago. Their tall stature, sometimes reaching well over 6 feet, was not immediately apparent from their tightly bound burial positions.

The more recent population was the Tenerian, a more lightly built people who appeared to have had a diverse economy of hunting, fishing and cattle herding. They lived during the latter part of the green Sahara, about 7,000 to 4,500 years ago. Their one-of-a-kind burials often included jewelry or ritual poses — a girl wearing an upper-arm bracelet carved from a hippo tusk, for example, and a stunning triple burial containing a woman and two children in a poignant embrace.

"At first glance, it's hard to imagine two more biologically distinct groups of people burying their dead in the same place," said team member Chris Stojanowski, a bioarchaeologist from Arizona State University. "The biggest mystery is how they seemed to have done this without disturbing a single grave."

Although the Sahara has long been the world's largest desert, a faint wobble in Earth's orbit and other factors occurring some 12,000 years ago caused Africa's seasonal monsoons to shift slightly north, bringing new rains to the Sahara. From Egypt in the east to Mauritania in the west, lakes with lush margins dotted the formerly parched landscape, drawing animals, fish and eventually people. Separating these two populations was an arid interval perhaps as long as a millennium that began about 8,000 years ago, when the lake disappeared and the site was abandoned.

Dating the sun-bleached bones of fossil humans in the Sahara has proved very difficult. Using a new technique, the team has obtained nearly 80 radiocarbon dates from Gobero bones and teeth, including comprehensive dates based directly on human skeletons.

Archaeologist Elena Garcea of the University of Cassino in Italy helped identify the site's poorly known cultures so well-preserved at the site. Garcea, an expert in ancient pottery who has spent nearly three decades

digging at Stone Age sites in northern Africa, traveled with Sereno in 2005 to the site, where she stood amazed, gazing at far more human skeletons than she had seen in all her previous digs combined.

She quickly homed in on two distinct types of pottery, one that bore a pointillistic pattern linked with the Tenerian and another that had wavy lines and zigzags. "These are Kiffian," a puzzled Garcea told Sereno. "What is so amazing is that the people who made these two types of pots lived in the same place more than a thousand years apart."

Over the next three weeks Sereno, Garcea and their team of five American excavators made a detailed map of the site. They exhumed eight burials and collected scores of artifacts from both cultures. In a dry lake bed nearby, they found dozens of Kiffian fish hooks and harpoons carved from animal bone as well as skeletal remains of massive Nile perch, crocodile and hippo.

A year later, a second round of excavation turned up more riddles: An adult Tenerian male was buried with his skull resting on part of a clay vessel; another adult male was interred seated on the shell of a mud turtle.

One burial, however, brought 2006 activity at the site to a standstill: Lying on her side, the skeleton of a petite Tenerian woman emerged from the sand, facing the skeletons of two young children; their slender arms reached toward her and their hands were clasped in an everlasting embrace. Samples taken from under the skeletons contained pollen clusters — evidence the people had been laid out on a bed of flowers. The team employed a range of new techniques to preserve this remarkable burial exactly as it had been for more than 5,000 years.

Bioarchaeologist Stojanowski analyzed dozens of individuals' bones and teeth for clues to the two populations. "This individual, for example, had

huge leg muscles," he said of ridges on the thigh bone of a Kiffian male, "which suggests he was eating a lot of protein and had an active, strenuous lifestyle. The Kiffian appear to have been fairly healthy — it would be difficult to grow a body that tall and muscular without sufficient nutrition." In contrast, the femur ridge of a Tenerian male was barely perceptible. "This man's life was less rigorous, perhaps taking smaller fish and game with more advanced hunting technologies," Stojanowski said.

Analysis of measurements on Kiffian skulls links them to skulls found across northern Africa, some as old as 16,000 years, Stojanowski said. The Tenerian, however, are not closely linked to these ancient populations.

Ancient bones from many animals common today on the Serengeti were identified at the site by H el ene Jousse, a zooarchaeologist from the Museum of Natural History in Vienna, Austria. The evidence showed that elephants, giraffes, hartebeests, warthogs and pythons all made Gobero their home. Abundant bones of 6-foot-long Nile perch indicate the presence of a deep lake during Kiffian times; remains of small catfish and tilapia make it likely that the waters were shallower during Tenerian times.

The team is continuing to analyze Gobero bones for more clues to the people's health and diet. A large-scale return expedition is planned to the site to further explore the two populations that coped with extreme climate change.

Besides National Geographic, the research at Gobero is funded by the Island Fund of the New York Community Trust, the National Science Foundation and the Wenner-Gren Foundation for Anthropological Research.

To access the scientific paper on Gobero published in the Aug. 14 issue of PLoS ONE, go to [dx.plos.org/10.1371/journal.pone.0002995](https://doi.org/10.1371/journal.pone.0002995) .

Provided by University of Chicago

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