ESSAI

Volume 7 Article 11

4-1-2010

The People of the Green Sahara

Ellen Briggs
College of DuPage

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by Ellen Briggs

(Honors Biology 1152)

ABSTRACT

Around 10,000 BC, the region that is presently the Sahara Desert was once a green and flourishing habitation. Two cultures of people, Kiffian and Tenerian, dwelled in this land, separated by a drought that lasted one millenniun. Present day Gobero, Nigeria, located within the Sahara Desert in Africa, is the site of an ancient cemetery containing at least 200 burials. Recently, a human skeleton in pristine structural condition and two artifacts were discovered in this region. The objective of the study was to identify the remains and determine the archeological age, age at death, possible cause of death, and gender of the skeleton. From carbon-14 dating used to measure the age of the remains, it was determined that the skeleton and fishing hook are 9,000 years old, and the bone needle is 6,500 years old. The human skeleton was identified to be a Kiffian adult male. The bone fishing hook belongs to the same time of the human remains but the bone needle belongs to the Tenerian people.

INTRODUCTION

The Southern Sahara Desert was at one time a lush wetland that supported numerous species. A change in climate about 12,000 years ago caused significant rainfall in the region (Gwin 2008). In the location of present day Gobero, Nigeria, there is evidence for a culture of people who dwelled in the fertile lands for a period of time spanning approximately 12,000 to 8,000 years ago. This group of people, known as Kiffian, was a hunting and fishing society that stood as tall as two meters (Gwin 2008). Their diet was rich in protein which supported and allowed for their large, muscular stature (Gwin 2008).

Approximately 6200 BC, drastic changes in the climate caused an extensive drought enduring an estimated one thousand years (Sereno et al. 2008). There is evidence that the water resources dried up during this interval and the region was abandoned by humans (Sereno et al. 2008). About 6,600 years ago, the Sahara once again turned green and a distinctly different people emerged (Sereno et al. 2008). This new group of inhabitants is known as Tenerian and they had a smaller build than the Kiffians (Sereno et al. 2008). The availability of food during the time of the Tenerian was less than that of the Kiffian, which is supported by animal remains which date to this period (Sereno et al. 2008).

The culture of these two peoples paralleled in several ways and gives rise to consideration whether these two groups, separated by one thousand years, have some possible relationship (Sereno et al. 2008). Both the Kiffian and Tenerian had unique funerary practices and buried their dead in the same cemetery (Gwin 2008). It is thought that the graves of the Kiffian people were marked in this cemetery because the Tenerians buried their dead without ever disturbing the Kiffian graves (Gwin 2008). The differences between a Kiffian and Tenerian grave are subtle but the Tenerians were often buried with several artifacts including jewelry and tools (Sereno et al. 2008). It also is not uncommon to find multiple skeletons in one grave (Gwin 2008). In a Kiffian grave, only one skeleton was found and they were tightly bound by presumably animal skin or some other sort of material that has since decomposed.

An archeological find was recently uncovered in this region of present day Gobero, Nigeria. A human skeleton and two artifacts, a bone fishing hook and bone needle, were discovered in proximal location. The objective of this study was to date and identify the skeletal remains, determine the age at death and possible causes of death, and determine the gender of the individual. In addition to the analysis of the skeletal remains, the possible relationship between the artifacts discovered near to the individual was to be investigated.

METHODS

The height of the skeleton was measured and structure analyzed for indications of age, gender, and possible cause of death. The shape and certain attributes of the pelvis can give insight to the gender, and it is the most useful source for sex determination of a skeleton (Shipman 1985). The pelvic ratio was calculated by measuring the distance between the tips of the ischial spines divided by the distance between the inner surface of the pubic symphysis and the upper, inner surface of the sacrum.

The age of the skeleton was estimated based on its dentition and the appearance of fused sutures of the skull as explained by Ortner (1985). The degree of fusion of skull sutures has commonly been used to determine the age of a skull that is older than 18, however, there is only weak correlation between age and suture closure (Ortner 1985). The skeleton was examined for signs of trauma or deformities to determine the cause of death.

Carbon-14 dating was used to measure the age of the skeleton and artifacts. The archeological age measurements of the human skeleton and associated artifacts were log10 transformed to meet conditions of normality. Differences in age to the skeletal remains were then done using t-tests. Significance was determined at $P \leq 0.05$.

RESULTS AND DISCUSSION

The age of the human skeleton was determined to be 9000 ± 12.5 years old (Table 1). The bone fishing hook and bone needle were determined to be 9000 ± 9.6 and 6500 ± 5.2 years old respectively (Table 1). It was concluded that the fishing hook was the same age as the human skeleton. There is significant difference in the age of the bone needle and the age of skeleton. The pelvic ratio was determined to be 0.84 (Table 2) and the skeleton was identified as a Kiffian male adult. The cause of death was inconclusive based on the skeletal remains.

The identity of the human skeleton discovered in Gobero, Nigeria was determined to be Kiffian based on the age of the remains. The skeleton was dated to be 9,000 years old which was the heart of the Kiffian era (Gwin 2008). Based on the positioning of the buried skeleton, it had been bundled tightly with a material that had long since decomposed. The tight wrapping of the dead in animal skins or some other material was a common funerary practice of the Kiffian (Sereno et al. 2008). Because the Kiffian relied on fishing as a staple source of food, it is logical that the bone fishing hook is the same age as the Kiffian skeleton (Sereno et al. 2008). The date of the bone needle suggests it belonged to the Tenerian. The numerous artifacts found in the graves of Tenerian people give evidence that they were skilled craftsman and would have had great use for the bone needle (Sereno et al. 2008). The Tenerian raised cattle and relied on agriculture for their food source which is supported by remains of domesticated cattle and grains dated back to this period (Sereno et al. 2008). Their lifestyle allowed for the development of new skills such as making jewelry and other artifacts that adorned their graves (Sereno et al. 2008).

The gender of the skeleton is not definite because it can occasionally be difficult to determine the sex of a human based on skeletal form (Pearson 1999). It is important to note that there is a general bias towards classifying remains as male so possible analysis of the DNA would confirm

gender. Height can be used as a guideline for determination of gender because females are generally shorter and of smaller stature than males. However, there is evidence that some of the Kiffian females also measured up to 1.8 meters tall (Sereno et al. 2008). The skeleton in question has a pubic arch with an angle of less than 90 degrees which is more typical of a male (Tortora 1987). The pubic arch of a female's pelvis generally will have a more obvious obtuse angle in order to provide an area large enough for a baby's skull to pass through during child birth (Tortora 1987). The ratio of the pelvis was measured to be 0.84. A typical female pelvis has a ratio greater than 1.0 and a male typically has a ratio of less than 0.80 (Gunstream 2008). The pelvic inlet of the skeleton is heart-shaped which is characteristic of a male (Tortora 1987). Because there is greater evidence, the skeleton was determined to be male even though it is relatively short compared to the average height of a Kiffian adult male.

The skeleton had 31 teeth suggesting that the last wisdom tooth had not yet come in at time of death or some natural cause due to the age of the remains (Shipman 1985). An adult has 32 teeth including the wisdom teeth, or third molars, that usually grow in at age 18-21 or older (Shipman 1985). The skeleton showed no sign of aging such as osteoporosis and the teeth did not show excessive wear so this individual's age can be estimated as early twenties at time of death (Shipman 1985).

No markings or visible evidence were found on the skeleton that would indicate injury as the cause of death. A small portion of the ischial tuberosity was chipped away but damage due to the archeological age of the remains is the most likely cause for this one flaw. Because the skeleton was preserved in such immaculate condition, it can be speculated that the death was quick and caused no harm to the skeletal structure. Drowning, bleeding to death, or some diseases are feasible causes of death because it is possible for no evidence to be maintained in the skeleton. Some diseases known to exist in ancient times such as syphilis would cause scarring especially on the skull of an infected individual (Ortner 1985). The individual was quite short so malnutrition is a valid explanation for lack of growth. Malnutrition so severe to cause death however, can usually be detected by the curving, spongy appearance, or thinning of the boney structures. There were no lesions or other characteristics of identifiable diseases apparent on the skeletal remains (Ortner 1985).

A discovery of skeletal remains in such impeccable condition is exciting because there is great potential to learn about human ancestral past. This specimen would be an excellent candidate for DNA extraction to determine with confidence the gender of the skeleton and infectious agents that could have caused its death (Dancourt et al. 1998). Evidence of septicemic diseases such as the bubonic plague could be recovered from the extraction of DNA from dental pulp and demonstrate the etiology of such diseases (Dancourt et al. 1998). Analysis would also be useful to trace migratory patterns in Africa including if the Kiffian are ancestors of the Tenerian (Pearson 1999).

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Table 1: Summary (mean ± standard deviation, all n = 10) of the archeological age of the discovered specimens. Student t comparisons test for differences in mean ages between the human skeleton and the bone artifact.

Specimen	Archeological age	t	P
Skeleton	9000 ± 12.5		
Bone fishing hook	9000 ± 9.6	0.758	0.458
Bone needle	6500 ± 5.2	642.3	<0.001

Table 2: Measurements of the pelvic ratio of the skeleton were used to determine gender. Distance 1 is the distance between the ischial spines while distance 2 is the distance between the pubic symphysis and upper-inner sacrum.

Measurement	
Distance 1	8.0 cm
Distance 2	9.5 cm
Pelvic Ratio	0.84