Artifacts in the Kirawira stretch and other patches of the Grumeti River in Serengeti National Park: A brief report

F. T. Masao
Open University of Tanzania

R. J. Blumenschine
Department of Anthropology
Rutgers University
New Brunswick, New Jersey
USA, 08901

Charles Peters
Department of Anthropology
University of Georgia
Athens, Georgia
USA, 30602–1619

Jackson Njau
Department of Anthropology
Rutgers University
New Brunswick, New Jersey
USA, 08901

The Serengeti is perhaps the world’s best-studied natural ecosystem (Gereta and Wolanski 1998:1). However, this enviable achievement does not include systematic studies of prehistoric human land use, other than the reports emanating from Bower’s and Mehlman’s works at Loyalangalani and other sites such as Nasera rock shelter (Bower 1973, Bower et al. 1986, Bower and Chadderdon 1986, Mehlman 1989) and Nishida and Mabulla’s ongoing work mainly on the Later Stone Age (LSA) and the Pastoral Neolithic (PN). The vast Serengeti is almost terra incognita, archaeologically speaking. The Serengeti Park, which is a part of the Serengeti Ecosystem covers approximately 15,000 km² and is drained by three main rivers, the Mara, Grumeti and Mbalageti, all of which flow westwards into Lake Victoria (Figure 1). The Grumeti has a total catchment area of ca. 11,600 km², draining most of the central and northern hills (Wolanski et al. 1999:526).

The Grumeti is recorded to have a maximum discharge of 200 m³/s at its exit from the park, but the discharge decreases exponentially to essentially zero within weeks. Hence during much of the year this river consists of a series of ponds (Gereta and Wolanski 1998:6; Wolanski et al. 1999:528). At the time of our two visits in August 2000 and 2001, several of the ponds at Kirawira had dried up forcing the hippo and crocodile to migrate to the largest remaining pool. One of the recently dried-up pools, oval-shaped measuring ca. 6 x 11 m, was the focus of our study. In the course of characterizing the channel sub-facets of ca 100 m adjacent to the dried pool, sub-facets of the dried-up pool and the immediate areas adjacent to it, one of us (FTM) also observed and subsequently studied a scatter of stone artifacts. FTM also noted a scatter of artifacts of MSA and LSA type on the flood plain on the southern side of the river at Pololeti (36M0679795E975 1861 6s). On a more recent visit (30th June 2002) to another area of the same river but more upstream than Kirawira known as Hippo pool (GPS UTM 36M0700804, 9746324), the hippos and crocodiles were found to be enjoying a pool full of water although the river had already dried up at several places.

We present here a brief report of the artifacts, possibly part of a Late Acheulean or Sangoan assemblage, found in the channel of this ca. 100 m stretch of the Grumeti River in the Serengeti at Kirawira, and Middle Stone Age (MSA) and Later Stone Age (LSA) artifacts observed at Pololeti and Hippo pool. In the quest for search of analogs and modern ecosystems to help in the recognition of ancient palaeolandscaes in the Olduvai basin, a study currently being undertaken by the Olduvai Landscape Paleoanthropology Project (OLAPP), four members of the scientific team visited the lower part of the Grumeti river in the Serengeti in August 2000 and September 2001.

Except for a four years’ hiatus (1990-93), OLAPP has, since 1989, been studying the ecological base for hominin behavior during Lowermost Bed II (LBII) at Olduvai Gorge. This basin wide horizon (LMBII), represents an interval of ca. 50,000 years and is bounded by Tuff IF and Tuff IIA at the bottom and top respectively (Blumenschine and Masao 1992).

During the 2000 field season, it became clear that some of the features associated with the ancient wetlands at the HWKE in LMBII at Olduvai, are reminiscent of low sinuosity or meandering river flow systems (Stanistreet and McCarthy 1993; Stanistreet...
Figure 1: Map of study area.
Figure 2: Map of the area of research, not to scale.
Table 1: Artifacts recovered from the four sub facets at Kirawira and at Pololeti and Hippo pool.

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>G</th>
<th>I</th>
<th>J</th>
<th>Pololeti</th>
<th>Hippo pool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flakes, unutilized</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Utilized flakes</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bifaces</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Picks</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unifacial pieces</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Discs</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Scrapers</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Denticulates</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Notched pieces</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Borers/awls</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Core axes</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Choppers</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Cores</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Convex scrapers</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Backed pieces</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>29</td>
<td>19</td>
<td>11</td>
<td>28</td>
<td>29</td>
</tr>
</tbody>
</table>

This tentative attribution is accounted for by a succession of fluvial features as revealed at OLAPP's Trench 104.18. The lower Grumeti River in the south western Serengeti can be considered to vary between a low sinuosity and meandering river as attested by the cut banks, point bars and islands of sands exposed during dry periods as the river dries up. Understanding the palaeo-depositional environments is one of the ways to reconstruct the palaeolandscape within which hominids performed a suite of activities. Although specialists can decipher the ancient geological sediments fairly accurately, the understanding can be enriched by finding and studying appropriate analogs and ecosystems. One such analog is the Grumeti low sinuosity and meandering system at Kirawira. The lower Grumeti River has a slope or gradient of 1/550, which translates to 0.18%. Rivers of such gradient fall between low sinuosity and meandering (Ackers and Charlton 1971; Stanistreet et al. 1993).

In the months of August and September 2000 and 2001 respectively, most of the riverbed, save for a few isolated ponds had been recently dried up and

et al. 1993).
therefore ideal for examining the deposits in the channel. In the riverbed could be seen scatters of all sorts of pebbles, dead tree branches, animal bones and artifacts. Indeed any part of the exposed riverbed would have been just as good for the present study. However since as already remarked, the purpose of the visits was to find a fluvial environment which would be a good analog to the HWKE palaeoenvironment, we were restricted to a stretch with a pond which would be occupied by crocodiles and hippos, a breach bank for hippo trails and animal footprints. Faunal remains at the HWKE wetlands include crocodile and hippopotamus teeth, bones modified by crocodile and animal footprints.

A stretch 100 m long (referred to as a landscape facet) of the Grumeti was chosen as the focus of our study. It is located between GPS points 36 626599E 97 60355N and 36 626599E 97 60299N. The facet was subdivided into 9 sub facets on the basis of depositional and physical features. At the study site the channel divides into two branches, a western and eastern branch separated by a low water island ca. 10m wide. The archaeological finds reported here were concentrated in four of the sub-facets referred to as: F=Eastern Channel upper cobble segment; G=Eastern Channel Island Bank Breach Fan 1; I= Eastern Channel Island Bank Breach Fan 2; J= Eastern Channel Lower Cobble Segment. (Figure 2 and Table 1).

The Assemblage

The term assemblage is used here in very restrictive sense. Due to the absence of the original depositional context of the artifacts, the finds can only represent a portion of the complete assemblage. Moreover, the components that usually characterize an assemblage such as a variety of finished tools, utilized forms, unutilized detached pieces, flaked pieces and unmodified blocks which would be available for the manufacturing of artifacts are found in proportions which would be different in the case of undisturbed assemblages.

Mixed with cobbles and non artifactual rocks were several artifacts including 3 bifaces, 1 pick, 3 core axes, 3 choppers, 6 unifacially worked pieces, 15 large scrapers, 6 small convex scrapers, 18 flakes, 4 of which are Levalloisian, 2 Kombewa and the rest simple flakes, 10 flakes exhibiting signs of utilization, 7 borers, 7 backed pieces, 4 notched pieces, 3 discoids, 10 denticulates and 12 cores. Some of the bifaces (hand axes) are diminutive types suggestive of the Sangoan, an Acheulean derived industry, others could belong to a late Acheulean phase. The Acheulean industrial complex is known to include artifacts of both Mode 1 and Mode 2 technologies. Mode 1 consists of relatively simple core types e.g. unifacial and bifacial choppers, discoids, polyhedrons, etc., while Mode 2 technology consists of large, bifacial or sometimes unifacial tools as well as the resulting flaking debris. In later Acheulean times soft hammer flaking techniques were introduced in addition to the pre-existing hard hammer technique. This enabled the striking of large flakes from specially prepared "proto-Levallois" cores. Acheulean typology is defined and discussed in Kleindienst 1962 and in Clark and Kleindienst 1974. Acheulean artifacts of these two modes are sometimes found together on occupation surfaces (Clark and Schick 2000), but on the basis of biface shape here, they are likely to be late Acheulean or Sangoan.

A Middle Stone Age component is also represented as witnesses by the diminutive bifaces and Levalloisian flakes. Perhaps the best documented MSA industry lies south east of the study area at Olduvai Gorge. Here the Ndutu Beds, ca. 50,000 yrs BP, have been reported to have an MSA industry both in the lower and upper units. M.D. Leakey has described the assemblages here as an industry of indeterminate character (Leakey et al. 1972; Hay 1976; Mabulla pers. com).

The LSA component is by far the most widely represented. It is dominated by microlithic tools such as backed pieces, notched pieces, borers and small convex scrapers. Table 1 shows that LSA artifacts were observed in all three study areas. Most of the artifact types characteristic of the LSA were observed but only a few were collected. These are very much reminiscent of the industry reported by Mary Leakey from the Naisiusiu Beds at Olduvai dated to roughly 17,000 years B.P. although there are older but controversial dates (Leakey et al. 1972, Skinner et al. 2003). On-going work on the dating of the LSA from MDL Hill, the type-site of the Naisiusiu close to the Second Fault by ESR suggests an average date of 60,000 years B.P. (Skinner et al. 2003). This date, early from the LSA, is perhaps not as far-fetched as it may seem, for as Ambrose (1998) has argued the transition from MSA to LSA in eastern Africa took place.
Figure 3: Top left, two flakes. Top right, a biface. Bottom left, a scraper; bottom center, two thumbnail scrapers; the bottom one is made of obsidian; bottom right, an irregular core.
well before 46,000 years B.P. (Ambrose 1998). There is therefore no reason why the LSA in the Serengeti should not be contemporary with the LSA at Olduvai on the southeastern edge of the Serengeti. While not all the artifacts types mentioned above are represented by the small Grumeti sample, several diagnostically significant ones are present. These include backed microliths, thumbnail scrapers, and lunates. Obviously the assemblage has been eroded and sorted by the river and as such some types are missing. Also, had a lot more time been spent, the sample recovered could have been enlarged.

Overall the raw material is dominated by quartzite, but curiously all the bifaces and picks retrieved are manufactured from a granite-like rock, better described as quartzofeldspathic metamorphic rock with large grains. Lava and chert are used but not as commonly. As one would expect, obsidian artifacts were also found mixed in the assemblage but they are mostly microlithic and are considered to be Later Stone Age. The degree and level of rolling is variable, ranging from dulled edges and flake scars to relatively sharp ones. Where the artifacts have been seriously dulled by rolling, the edges cannot inflict a cut. This suggests that some artifacts have been transported by the river for great distances, while those in almost mint condition are from areas within the proximity of the facets yielding them. Perhaps the occurrence of the Late Acheulean/Sangoan in the Serengeti is a lot more widespread than hitherto realized.

The flakes (n=38). Many of the flakes recovered exhibited faceted platforms while a few showed the double bulb of percussion referred to as the Kombewa technique. The average length, width and thickness measurements are 8 x 5 x 3 cm, but given the small sample size, these statistics may be insignificant. Flakes have been divided into unutilized (n=25) where the edge does not show extensive wear pattern and utilized (n=13) where the edges exhibit damage, which may have resulted from use. In the latter the damage may be deep and serrated, in which case the artifacts are classed as denticulate. (Figure 3, top left).

Bifaces (n=4). Altogether four bifaces were recovered. While two of them are quite large and comparable to any Acheulean hand axes, the other two can be described as diminutive. They have an average length/breadth ratio of 85:41. Two of the recovered bifaces are cordiform while of the two remaining one can be described as ovate and the other lanceolate in shape. They are made from quartzite. (Figure 3, top right).

Unifacially worked pieces (n=5). These are basically flakes, which are oblong in overall shape. They display negative flake scars from one side suggesting that they must have been struck from a prepared core. Some of the scars may also be interpreted as a deliberate attempt to reduce the thickness. The working also results in making one of the edges sharper than the other. They can also be considered as side scrapers (Figure 3, bottom left). They have an average length/breadth ratio of 17:10. They are made from quartzite.

Discs (n=6). In overall shape these artifacts are round or semi round with one side fairly flat. Both sides exhibit flake scars but one side is normally more heavily flaked. Edges are fairly sharp suggesting that the artifacts may have been used for cutting purposes and that they could not have been transported by the river for any great distance. All are made from quartzite.

Picks (n=2). The two examples retrieved show that they started as big flakes with very thick butts. A minimum number of flakes, was then removed so that the final product is a very crude bifacial tool. In all cases the butt is left unmodified. The raw material is a metamorphosed granitoquartzofeldspathic material with very large grains.

Scrapers (n=21). These are detached pieces or laterally compressed pieces exhibiting heavy and deliberate retouch on all or part of the edge. Of the total, eight would be considered MSA on account of the size and type of flakes from which they are made. Four of these are side scrapers, two end scrapers and the rest irregular in the sense that the retouch is neither restricted to the side nor the distal or proximal ends. The remaining 13 are LSA on the account of size, shape and raw material. They are mostly microlithic, and can be classified as convex, thumbnail and side scrapers made from quartzite, chert and obsidian. The large MSA ones are exclusively made from quartzite (Figure 3, bottom center).

Denticulates (n=8). These are whole flakes or flake fragments whose edges are serrated so that they attain a saw-like edge. They are different from utilized pieces in that the edge damage is more bold and
continuous. All the four pieces are made from quartzite and are considered to be LSA on the basis of known LSA assemblages from Tanzania.

Notched pieces (n=10). Some flake fragments were observed to exhibit deep and deliberate notches along the edges. Unlike the denticulate the notching is not continuous but rather restricted to part of the edge. Lava, quartzite and siliceous sandstone make up the raw material.

Borers/Awls (n=5). The two specimens recovered are both made from flakes. They are characterized by the possession of a sharp point, which is made by means of trimmed notches on either side. In both examples the points are at the distal ends. They are made from quartzite.

Core axes (n=3). These are crude pick like artifacts with a roughly worked end. They have been flaked so that the side edges converge to a point at the distal end while in some cases the opposite end remains un-worked. In one of the examples, the unworked end displays cortex as most of them are made from pebbles. Of the three pieces, two are made from quartzite and the other from lava.

Cores (n=5). Of the five cores recovered, one is radial or discoid; two with multi-platforms and the rest are irregular (Figure 3, bottom right). Two are made from quartzite, two from lava and one from the siliceous sandstone-like material.

Raw Material

The range of raw material from which the artifacts are made is rather restricted. While there are several types of lava used in other places such as the southwestern margins of the Serengeti, it seems that only one type, the trachyandesitic basalt was used in the Grumeti. However the dominant raw material is quartzite which appears in two forms, a fine grained cloudy, white variety and a coarse grained one whose colour can be described as weak red or 10R 4/2 on the Munsell soil color chart. Other raw materials are obsidian and chert, but these are restricted to the LSA.

Discussion

Admittedly, some readers might justifiably query the purpose of reporting an assemblage deprived of its primary depositional contexts. They would argue that since a site is considered as a unit of association, the artifacts that are deprived of this association, such as the artifacts discussed here are, could not be linked to an archaeological event and thus their contemporaneity is questionable (Dunnell 1992:35). While this may well be the case, it is also true that local relative chronology based on technical attributes can be developed and applied to assemblages deprived of their primary contexts. This possibility coupled with the recent debates about siteless archaeology and the questionable role played by the site as an archaeological concept, justify this study (Dunnell 1992). In fact the uses of the site "are not warranted by its proportions. It obscures crucial theoretical and methodological deficiencies and it imparts a serious and irredeemable systematic error in recovery and management programs. In spite of the technical problems its abandonment will cause, the concept of archaeological site should be discarded" (Dunnell 1992:36-37).

Aside from that, in a place like the Grumeti river, for which the archaeology has not been reported before, a study such as this will not only contribute to the widening of knowledge regarding the distribution of Late Acheulean/Sangoan (Njarasan) assemblages in Tanzania, but might generate interest for a more systematic investigation on early human land use and thus provide the Serengeti Park authorities with opportunities to design proper cultural conservation and management programs.

There are very few well-documented late Acheulean/Sangoan occurrences in Tanzania especially in the Serengeti. The closest is perhaps the Njarasan described by Mehlman (1979) from the Lake Eyasi basin, especially from Mumba. The discovery of a comparable industry elsewhere will therefore enrich our understanding of the distribution, typology and technological attributes associated with this industry. The discovery of this assemblage in the Grumeti river might lead the way to locating undisturbed Late Acheulean/Sangoan assemblages. Judging by the relatively sharp edges of most of the artifacts, they could not have been transported great distances. It is therefore proposed that the area should be revisited with the view to locate the sediments from which the artifacts are eroding. The discovery of a well sealed site with artifacts and associated bones in primary contexts would, in addition to expanding our understanding of the Acheulean/Sangoan, make it possible to research and document
the transition from MSA to LSA, hitherto little understood. It should also be mentioned that a few rolled fossil bones were also observed in the river bed, but there is no way of inferring spatial association with the artifacts before appropriate field work is undertaken. One of us (Jackson Njau) is currently studying bone assemblages modified by modern crocodiles in the Grumeti and other places in order to better evaluate fossil comparable taphonomic agency at Olduvai. Unfortunately, the bones in the riverbed were too rolled to bear marks of crocodile teeth. Artifacts and bones probably eroded from the riverbanks during the 1997-98 El Nino high water flow.

Acknowledgements

This draft has benefited from constant discussions and comments on sinuosity and river meandering offered by Prof. Ian Stanistreet of Liverpool University. His enthusiasm and encouragement are greatly appreciated.

Bibliography

Ackers, P. and F. G. Charlton

Ambrose, S. H.

Blumenschine, R. J. and F. T. Masao

Bower, J. R. F.

Bower, J. R. F. and T. J. Chadderdon

Bower, J. R. F., D. P. Gifford and D. Livingstone

Clark, J. D. and M. R. Kleindienst

Clark, J. D. and K. D. Schick

Dunnell, Robert C.

Gereta, E and E. Wolanski

Hay, R. L


Kleindienst, M. R.


Marean, C. W.


Mehlmann, M. J.


Rossignol, J. and L. Wandsnider, editors


Stanistreet, I. G. and T. S. McCarthy


Stanistreet, I. G., B. Caincross, and T. S. McCarthy


Wolanski, E., E. Gereta, M. Borner and S. Mduma.