A Middle Stone Age / Later Stone Age industry from Buzwagi, Kahama, Shinyanga Region, Tanzania: Results of cultural impact assessment

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Introduction

As part of the baseline study, a component of Environmental Impact Assessment (EIA) and in preparation for open-pit gold mining at Buzwagi near Kahama in northwestern Tanzania, the Barrick Gold Company hired the author (if I may dispassionately refer to myself in the third person) to assess the archaeological heritage of the area to be impacted. In the absence of prior knowledge of the archaeology of this part of Tanzania, the assignment was hailed as a golden opportunity to learn about the past of the region. Consequently, the author conducted four weeks of fieldwork in the area with the view to inventory all archeological sites potentially threatened by the mining project, to describe the archaeological heritage and finally to suggest mitigation measures. What follows is the summary of the finds resulting from the field season.

Geographical considerations

Buzwagi lies 6 km west of Kahama town (Figure 1). Three villages surround the project area; (Mwendakulima, Mwime and Chapulwa) all of which will be impacted by the project development. Other than two relatively low hills, the villages occupy a relatively flat portion, which would be liable to flooding were the soils not generally sandy and thus very porous and well drained. Small paddy fields in localities with clayey soil are seen on the outskirts of the area earmarked for mining, but the majority of the sediments can be described as sandy. Due to the low relief and the sandy nature of the soil, extensive erosion hardly occurs. According to the project geologist, Pat Donavan, Kahama and its vicinity formed part of the Lake Victoria southern margins during the Middle Pleistocene when the lake covered a larger area. Subsequent search of the literature revealed there are two sets of the oldest lacustrine beds with genetic relation to the modern lake in lower valleys of rivers entering the lake along the western shore. These sets of beds are recognized at elevations of 61 to 67 m and 33 to 35m above the modern lake level (Bishop and Posnansky 1960) suggesting that the lake level was higher than today. During this earlier phase of its existence L. Victoria lay further to the west of the present location and that it held water for about 250,000 years. It seems to have been dry at least once during this phase, but the basin eventually filled until it reached its peak about 30m above the present level (Schluter 1997). Since 150,000 years ago the lake has existed episodically in something near its present position and size (Jonson et al. 1996, Peters et al. forthcoming). It is further revealed that the upper and older set of lacustrine beds, the Nsongezi Beds, contains Acheulean and Sangoan lithic industries which would suggest an age of a few hundred years (Peters et al., forthcoming). Kahama being in the southwestern part of the lake would likely have been affected by the high lake waters. However there were no indications of lacustrine sediments in any of the excavations. Perhaps the lake inundated low-lying areas such as river valleys and may not have gotten to the higher plateau ground of the project area. The archaeological assemblages as will subsequently be discussed demonstrate MSA affinities, perhaps related to the Sangoan/Lupemban, but typical Sangoan types are relatively rare. According to Clark (1970) the Sangoan was probably a wood working industry characterized by a number of small scraping and cutting tools, heavy duty crude pick-like tools described as core axes and towards the final stages, so deftly worked lanceolates to have been part of a jobbing carpenters kit, but rather an end product by themselves. This tool type is more associated with the regional MSA, the MSA in the Congo (Clark 1970:114).

A large part of the region is vegetated by either primary or secondary forest dominated by Brachystegia, Jubernalia, Deleniz or miombo woodland and bushes, as is the case with most of the central plateau of Tanzania, but there are also patches, which are currently under cultivation.
Methodologies and Strategies Adopted in Assessing and Retrieving the Archaeological Remains

The archaeology team adopted five strategies to assess and salvage a sample of the archaeological potential threatened by the gold mining project. These were general surface survey, excavation of test pits in different parts of the project area, complete collection of surface finds in two localities of exceptionally high artifact densities, recovering as many artifacts as possible from the two borrow pits previously excavated by road building contractors proximal to the area earmarked for mining, and excavating two archaeological trenches close to one of the borrow pits.

Survey and its Justification

Site surface survey is the simplest way to gain ideas about a site’s extent and layout, studying the distribution of the surviving features and recording.
and collecting the artifacts from the surface. A relevant case study in the literature is the study of Teotihuacan (Mexico) where careful survey was used to produce detailed maps of the city. However site surface survey is only as good as the methods used to record it. Needless to say the reliability of surface finds has always been questionable because of the potential to contain materials from multiple time periods and stone industries. Archaeologists have always used limited surface collection of artifacts as one way of trying to assess the data and the layout of a site prior to excavation. However, now that surface survey has become not merely a preliminary to excavation, but in some instances a substitute for it, for cost and other reasons, a vigorous debate is taking place in archaeology about how well surface traces do in fact represent distribution below ground. Some scholars argue that even isolated finds give us an indication of the past use of the region (Schlanger 1992; Renfrew 1991). Schlanger makes the point that discarded projectile points occurring in high frequencies on the surface can be good evidence for hunting during the post-residential use of the landscape. In the Americas, projectile points are a common element of the surface archaeology of the Anasazi settlement area. Almost one half of the surface assemblages collected from the sites contained projectile points (Schlanger 1992:107). Even without the advantages of cost and time as remarked above, surface finds are useful indicators of the prehistory of an area and as such they should be given as much attention as sealed artifacts. Being more prone to destruction chiefly by the impact related to the development of the mining project and to a lesser extent, cultural practices such as cultivation, herding and the cutting of trees, surface survey is obviously the most expedient approach to collect and salvage as much of the threatened archaeological remains as possible.

Had the objectives of the current investigation been to be able to draw reliable conclusions about the prehistory of a whole site or region from the small area sampled, one should have tried to make use of statistical methods by employing probabilistic theory. The alternative is to adopt a non-statistical approach or non-probabilistic sampling. As Renfrew points out some sites in a given region may be more accessible than others, or more prominent in the landscape, which may prompt a less formally scientific research design (Renfrew 1991:67). However in order to judge in any quantitative manner how representative the sample is of a site or region, some form of probabilistic sampling needs to be used. Probabilistic sampling was not considered an option partly due to some of the area being heavily vegetated and also the need to salvage as much of the material as possible within a limited time period.

Where the ground was not too heavily vegetated to hinder movement, the area was systematically walked over at equal intervals from one person to another ranging from a spacing of 10 to 20 meters depending on vegetation. In this way no part of the area was either under or over represented in the survey. This method also made it easier to plot the location of unusually high concentrations of artifacts. For results obtained from this kind of survey and retrieval approach to be more reliable one ideally would need to cover the area/region repeatedly from season to season for a long time since the visibility of sites and artifacts can vary widely from season to season or

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Table 2. Lists of Test pits with their GPS coordinates.
Table 3. Summary of artifacts retrieved from the area of investigation.

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<th>Artifact type</th>
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<th>Circle 1</th>
<th>Trench 1</th>
<th>Test pits</th>
<th>Testpit/Surroundings</th>
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<td>144</td>
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<td>365</td>
<td>133</td>
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Figure 2. Environmental impact assessment, Bugwazi gold project, Tanzania.
year to year (Renfrew 1991:68). Given the nature of the assignment, it was clear that the fieldwork had to be done once and for all.

The team therefore surveyed as much of the project area as possible, (ca. 75%) in order to get a feel of the archaeological landscape. Overall, archaeological visibility was good despite the secondary Brachystegia species-dominated forest and the grass cover. The latter was observed to be very sparse presumably due to past and present overgrazing and the lingering drought, which had affected the whole of Shinyanga Region. Areas presently under cultivation were included in the survey, but many of the artifacts were collected away from the cultivated areas. Several localities of exceptional high artifact densities were observed and dealt with as explained below. Aside from such areas the team also intensively surveyed areas surrounding test pits so that almost every square meter was covered and all the surface artifacts collected. These are summarized in Table 3 below.

Areas of exceptionally high density of artifact concentration

The survey revealed several patches of exceptional high density of artifacts littering the surface in varying degrees of concentration. This pattern of artifacts distribution reminds one of the phenomenon observed and described by Isaac and Harris as “the scatter between the patches,” with regards to the spatial distribution of the KBS industry and the Developed Oldowan at Koobi Fora Kenya, and other Plio-Pleistocene sites (Isaac and Harris 1983). Ideally as much of the surface finds as possible from such areas should have been retrieved, but time and resources permitted complete collection of only two of these areas. One of these was at UTM 463957 East / 9573032 North where a circle of 5m radius was inscribed and all artifacts inside the circle collected while the other was at UTM 465131 East/9573698 North (Datum: WGS 1984; Projection: UTM zone 365) where a 30x20 m grid was laid and all the artifacts collected. The artifacts retrieved are summarized in Table 5 below.

Excavations

As already remarked, excavations were restricted to test pits distributed randomly over the project area and also in one of the borrow pits. The decision to excavate a proper archeological trench became necessary because it would expose the stratigraphy and artifacts in their primary depositional context and afford suitable comparison with and evaluation of the surface finds and in a way provide a window, though small, to the prehistory of Kahama. Excavations were conducted at the borrow pit No. 3, and in several places in the project area as shown by the GPS coordinates and the map of the project area with locations of the excavations (Figure 2).

The Borrow Pits

Borrow pit 1

The first borrow pit to be investigated is referred to as borrow pit 3 in the project’s maps (Figure 2) and lies on the left side of the main road to Kahama after the village of Mwendakulima. Cursory examination of the excavated dirt quickly revealed a number of artifacts including a Lupemban-like lanceolate. It is an area from which gravel has been quarried for road construction as well as providing earth for building huts in the nearby villages. The quarrying activities have left behind a large irregular hole measuring ca. 99,000 sq meters. It is estimated that 80% of the sediments which once formed a low ridge, has been quarried. As already remarked Lake Victoria was larger during the Middle Pleistocene than it is today, and may have extended as far south as Kahama. This being the case, one should expect to find remains of lacustrine life forms, but the lateritic nature of the soils would have militated against preservation of organic material for any length of time. Perhaps this explains why no fossils animal remains were found. However despite the possibility of southwestern expansion of the lake to Kahama, there is no sedimentological evidence for this. Alternatively as has been surmised, the expansion of the lake may have only inundated low lying valleys in the area the investigation of which was outside the scope of the assignment. Being a mixture of clay and gravel the
earth is found suitable for both road as well as house construction and hence the intensive quarrying activities.

**Borrow pit 2**

The second borrow pit surveyed and sampled is not on the project’s map, but it is very close to the airstrip on the northern side of Kimacha forest. We have referred to it as borrow pit 2. The sediments are very much like those in the previous pit though it is not as large a pit as no. 1. Most probably it has similar geomorphologic history to the previous one and may indeed have been part of the same low lying ridge as pit 1 was before it was quarried by the road construction crew. Artifacts and the stratigraphy are also comparable to those of borrow pit no 1 and for this reason they are discussed together below.

**Stratigraphy**

From the embankment of the pits, three different depositional layers numbered 1-3 from the bottom could be recognized; a top layer of clay ranging from 0.5-1.5 meters thick, followed by loose lateritic sediments with gravel inclusions and measuring about 1.0 meters thick and finally a compact layer dominated by a rock formation described by one of the project geologists as Banded Iron Formation (BIF) (Machano, personal communication). All the stratigraphic units seem to have been implementiferous as attested by artifacts seen sticking out from the embankment.

**Test Pits**

Altogether 17 small trenches/test pits measuring 0.75 x 1 m were excavated in different parts of the project area as shown by the GPS coordinates in the table below. The test pits were dug in order to assess both the vertical and spatial distribution of the archaeological material and also to augment the sample retrieved from the borrow pits and the general survey.

**Generalized Stratigraphy of the test pits**

On the average the test pits were dug to a depth of 0.6-1.0 m below the surface, which is only half as much depth as in the borrow pits. This suggests that unlike the borrow pits ridge, area has been subjected to erosion and hence the sediments are not as deep. The stratigraphy was almost similar throughout, being either three- or two-layered. Invariably, the upper unit is humus sandy clay, followed by yellow brown clayey sand overlying a compact gravel layer sometimes with inclusions of small boulders of BIF. With regards to artifacts, layer two and three were the most rich in artifacts. Table 3 summarizes the artifacts retrieved from the test pits. Overall, the test pits yielded relatively small numbers of artifacts compared to the high surface density in some places, again implying that these rich layers may have been eroded.

**Test Pit Surroundings (Surface)**

In order to increase the area of sampling and thus obtain a more complete picture of the archaeological landscape and sample, the team collected all the artifacts seen on the surface in the vicinity of the pits. Needless to say, the pit-surrounding areas sampled, differed from one test pit to another, but as long as the purpose was to increase the sample size and assess density of artifacts per unit of area, the effort was worth it. As can be seen from table 3 several artifacts were retrieved this way.

**The assemblage**

The combination of the above approaches recovered a total of 1881 artifacts mostly belonging to MSA as shown in Table 3 below. Although this total may not be a statistically representative sample, it nevertheless affords strong evidence attesting to the archeological potential of the area. However, since most of the artifacts are surface finds they cannot be considered to represent a true image of the archeological potential of the area. It must also be pointed out that, 928 artifacts or 49.2% of the total fall into the category referred to as non-utilizable (non-functional) artifacts, i.e. core and flake fragments. For comparison, we take recourse to two typical MSA and two LSA/MSA assemblages reported from the Lake Eyasi basin and the Serengeti by Mehlman (1979) Table 4. Despite the different classification systems used, it is clear that the Eyasi and Serengeti samples contain more formal and hence diagnostic forms than the samples forming the corpus of this report. Nevertheless as it is later argued, there are technological and typo-
logical features that strongly suggest belongingness to the MSA/LSA industry. The exceptionally high proportion of the non-utilizable category must be attributed to post depositional sorting by sheet wash wind and human activities. Alternatively, in the case of sealed samples, such a high proportion of debitage would imply proximity to the knapping factory.

An assortment of typologically diversified artifacts in varying degrees of concentration was observed on the floor of borrow pit 3. The floor seems to be the top of the first layer, a compact gravelly horizon with boulders of material which, as already remarked, was identified by one of the project’s geologist as Banded Iron Formation (BIF). Subsequent to the survey it was recognized that this was one of the raw materials available for the manufacture of artifacts, though it was not as frequently used as quartzite. On account of finding a few of the artifacts in situ sticking out of the walls, it is highly presumable that the majority of the artifacts must have fallen from the overlying layers. It therefore became quite clear that the artifact-bearing levels are 1, 2 and 3 as was further corroborated in borrow pit 4. Core and flake fragments or debitage, were also recovered. This seems to suggest that the knapping factory could not be very far from the spot, but being an already disturbed site, the composition of the artifacts, which would make up the assemblage, could not be more complete. Cursory investigation by the team was sufficient to show that the area was once an important multi-component archeological site. As the team walked over the area, it was observed that the exposed sediments, both the loose soil on the surface and sections on the embankment, were littered with different lithic artifacts which on the basis of overall size and other technical and typological attributes,
can be said to span the Middle Stone Age-Later Stone continuum, but the Iron Age is also represented. Most certainly the MSA artifacts come from the stratigraphic units 1 and 2 while the LSA is stratified in unit 3. The excavation corroborates this observation.

Most of the artifacts from the surface survey were almost in mint condition with very little edge damage as if they had not been exposed for a long time. While it is tempting to entertain the possibility of a recent exposure, perhaps resulting from recent heavy rainfall, the good quality resistant quartzite from which 85% of the artifacts are manufactured, could have played a part too. Curiously, artifacts made from less hard and durable material such as chert and BIF equally displayed relatively fresh edges, a condition which increases the possibility of a recent exposure.

**Artifact Types and Reduction Techniques**

Artifacts recovered from the borrow pits, test pits, and general survey are summarized in Table 3. They include different artifact types, which can only be described as belonging to MSA and LSA. The Middle Stone Age (MSA) as defined by Goodwin (1929) includes flake tool industries, which succeed the Acheulean, but precede blade-based microlithic industries. The absence of handaxes and cleavers, the employment of the Levalloisian and particularly the facetted platform techniques, convergent and parallel flaking on flake and a variety of flake-tool forms, are some of the dominant features of these cultures (Malan 1957; Masao 1992). The MSA is characterized by typological variation among stone artifact assemblages. This variability has been interpreted as a reflection of different economic activities, different materials or different environmental adaptation by MSA populations (Clark 1988). The MSA or Mode 5 Industries are denoted by the presence of flakes.
with features suggestive of the prepared core technique. The prepared core or Levalloisian technique, which was developed during the Acheulean, reached the peak of perfection during the terminal stages of the Acheulean and survived to the MSA. In other words, the MSA is denoted by the presence of flakes and blades with features suggestive of the prepared core technique or Levalloisian. Such flakes/blades will display several negative flake scars on the dorsal side (Figure 3). Being derived from the biface-dominated Acheulean industrial complex, the MSA possesses many of the earlier artifact forms such as different types of bifacial implements, Levalloisian flakes and core artifacts (Figures 3 and 4). Blades are also a feature of the MSA although they also appear in a microlithic form in later industries. Artifacts include a variety of bifacial tools, diminutive handaxes, unifacial points, various scrapers, and many types of cores including discoids, a flaked type, where the flaking is bi-directional, but originating from a single platform. The most frequent artifacts are detached pieces popularly known as flakes.

The nearest area with adequately described MSA in Tanzania is the L. Eyasi Basin and the Serengeti where the MSA is represented by such industries as the Nyarasan, Kisele, Sanzako and Loyalangalani, while MSA/LSA transition industries have been described from Mumba and Nasera (Mehlman 1979; Bower 1984). MSA/LSA industries have also been reported from the Kilwa area in the southeast coast of Tanzania, in Masasi, southeast Tanzania, Southern Highlands at Mgongo in Iringa, and South-west Tanzania both at the Lake Rukwa.
Rift and also many open air sites associated with the terraces of Songwe River which flows to L. Malawi (Masao et al. 1989, Willoughby 2007; Masao in press).

Flakes and Blades. A total of 347 (18.4%) detached pieces were recovered. Of these, 10 area Levalloisian flakes while 13 are blades recognized as such on account of their being at least twice as long as they are broad. There is a wide variety flakes, distinguished on the basis of the type platform, no. of dorsal scars, absence or presence of cortex, and length-width ratios. While the majority of the flakes exhibit faceted platforms there are also some with point and scaled platforms signifying the bipolar core reducing technique. Although there are relatively few classic Levallois flakes, most of them exhibit broad dorsal negative scars again signifying employment of the prepared core technique.

Utilized Flakes. As already remarked, flakes are perhaps the most utilizable implements for all functions involving cutting. A total of 121 (6.4%) flakes exhibited some edge damage, which, could have resulted from utilization. However since most of the flakes are of quartzite, some of which is coarse grained, it is also quite possible that part of the edge damage seen is natural. Flakes and blades are also known as technical knives, a functional category implying that they were used to perform activities related to cutting on account of their sharp edges. Present day African prehistorians distinguish utilizable from non-utilizable artifacts. Flakes and blades would fall into the utilizable artifacts category while cores and core fragments would have very limited utility or function other than serving as a source of flakes.

Scrapers. Most types of scrapers are represented in this assemblage and form the third most frequent artifact type after flakes and utilized flakes and the largest formal tool category accounting for a total of 97 (5.2%) of the assemblage. End and side scrapers are equally represented but other types such as thumbnail, core and irregular scrapers were present but few in number.

Becs/Burins/Percoirs/Borers. These are implements, which are technically or intentionally spalled or flaked at one end to produce a bit-like point, presumably for boring. They make up a significant proportion of the assemblage and account for 49 or (2.6%)

Unifacial and Bifacial Points. Although there were only 13 such artifacts, they are considered important as being among the fossile directeurs of the MSA. They measured 10 cm on average length and exhibited a pointed end achieved by trimming the implement either from one or both sides. Out of the total, 11 are of quartzite while two are of BIF.

Bifaces. Only two Sangoan-like bifaces were recovered. They are intensely worked from both sides to produce an almond shaped implement measuring 11 and 9 cm in length. They are both made of BIF. They are more of handaxes than picks (Figure 5).

Core Axes and Picks. These are also considered to be the fossile directeurs of the MSA, Seven (0.4%) implements were on account of the bifacial short stepped trimming at one end while leaving the butt crude and unworked, recognized as either picks or core axes. All are made of coarse grained quartzite.

Cores. A total of 196 (10.4%) flaked pieces were recognized as cores, thus making this the second largest category after flakes and blades. On the basis of where the flaking originates and the direction of the flaking, they can be described into four broad categories:

1. Polyhedral cores, sometimes referred to as multiplatform cores are characterized by several striking platforms with multiple flaking directions. This was the second most dominant category after irregular cores accounting for 30% of all the cores.

2. Another category is the bipolar type in which the flaking originates from opposite ends, perhaps by placing the core on an anvil during flaking. Cores of this type will exhibit scaling or crushing on one or both ends.

3. Another very diverse category has preliminarily been described as irregular on account of falling into none of the other classes. While the majority of the cores were made of quartzite, a few were of other types of material.

4. Discoidal cores. There are also 17 (0.7%) discoidal cores in which the flaking originates from one platform, but in opposite directions so that a flaking perimeter or equator is created. This type of flaked piece is also considered as one of the fossile directeurs of the MSA (Mehlmann 1989; Clark 1971).

Notched Pieces. A persistent category in all the samples from the project area is made up of detached pieces that show a deliberate notch on one of the sides. Depth of the notch is variable but it can be
up to 8 mm deep. The notch results from incessant removal of small flakes concentrated on a small portion of the edge of the detached piece resulting in a wide U-shaped notch. Other types of tools such as denticulates, lunates, outils ecaillles, etc., do not appear in very large frequencies and therefore are not individually described here.

The MSA or Mode 3 industries are the Sub-Saharan rough chronostratigraphic equivalent of the Middle Palaeolithic in Europe and North Africa and like the European counterpart industries, they are associated with the emergence and spread of anatomically full modern man, successor of Archaic Homo sapiens (Allsworth-Jones 1993, 1990; Mellars 1992; Clark 1970, 1975, 1981; Singer and Wymer 1982; Bräuer 1984, 1989; Day et al. 1980; Magori and Day 1983) The first anatomically modern humans and Middle Paleolithic or MSA industries may have emerged between 251,000-195,000 BP, but the earliest modern people are almost 200,000 yrs. old. Early moderns are associated with Middle Palaeolithic or
MSA assemblages, while archaic humans are often found with Acheulean artifacts. However, there are transitional forms between archaic and modern which in Africa include among others, specimens from Eliye Springs (Kenya), Florisbad (South Africa), Ngaloba (Tanzania), Omo Kibish (Ethiopia), etc. (Willoughby 2007).

Given the paucity of MSA sites in Tanzania, the importance of the discovery of Mode 3 industries in Kahama cannot be over-exaggerated. The discovery raises more questions than answers this brief encounter could attempt to address. One would like to know how extensive the MSA occurrences discovered in the Project area and the immediate vicinity are, whether or not there are any faunal remains associated with the industry, what the complete toolkit was like and where the raw material especially the good quality quartzite and chert came from, etc. In order to attempt to address any of these questions, one not only needs a larger sample from a larger area, but the sample must come from sealed assemblage in its primary stratigraphic context. Unfortunately the project developers cannot fund a more comprehensive fieldwork.

The Later Stone Age. In addition to the MSA industries there is another component and that is the LSA. Unlike the MSA, the LSA has been more extensively studied. We know that the industrial complex represents the cultural expression of *Homo sapiens sapiens* which, *inter alia*, had attained a highly specialized mode of hunting while later and in some areas in northwestern Tanzania, e.g. the Serengeti, and perhaps Mwanza and Shinyanga, there was incipient food production based on pastoralism or Pastoral Neolithic as some people would call it. To perform activities such as advanced hunting and food production, the tool kit had to have improved from that of the MSA. This improvement is referred to in the literature as the microlithic revolution of the LSA or Mode 5 industries (Figure 6).

The LSA is characterized by a preponderance of microlithic implements, which include most of the whole and broken flakes, thumbnail scrapers, a variety of geometrics e.g. lunates, wood working implements such as *outils écailles*, boring implements such as burins, ostrich egg shell beads, etc. While known formal tools, especially diagnostic of the LSA are relatively rare, it is important to point out that sharp edged unmodified flakes were more useful for a suite of purposes than retouched formal tools especially when, cutting or skinning was involved. It is therefore possible that the dominance of unmodified flakes is deliberate and not fortuitous.

On the basis of Olduvai, Lake Eyasi, Serengeti, and central Tanzania, the LSA in Tanzania has been dated to 2,000-20,000 (Leakey et al. 1972; Mehlman 1989; Hay 1976; Bower, et al. 1986, 1985; Masao 1979), while the Iron Age lies between the terminal LSA and historical times. In sub-Saharan Africa, the LSA roughly corresponds with the Upper Paleolithic in Europe. It is distinguished from the preceding MSA from which it derives, by possession of a large proportion of microlithic forms. A fully developed LSA is therefore a dominantly microlithic industry in which most of the artifact forms are equal to or less than five centimeters at their greatest dimension. However, very few typical LSA formal tools were found, an observation which can be explained by: a), the assemblage is not a fully developed LSA but rather part of the MSA or intermediate between the MSA and fully fledged MSA or alternatively, b), the composition is not so unusual given the fact that the assemblage reported here is biased in the sense that it has already been sorted by natural forces such as water, wind and human activities and hence the need to retrieve a sealed sample. The incompleteness may explain why some of the more diagnostic types normally associated with the MSA and LSA industries have not been found. As opposed to the larger cores of the MSA, diminutive multiplatform and bipolar-flaked pieces or cores dominate. The majority of the artifacts recovered mostly from the survey are flakes, scrapers, notches, borers of percoirs, and cores. The conclusion is that the project area is in a once important archaeological locality, which can be expected to extend beyond the confines of the project area. Some Terminal LSA industries are associated with ceramics, but judging by the technical attributes (such as rim shape, decorative motifs, temper, etc., all of which, can be seen in present day pottery), of the few pottery sherds recovered, it is likely that the Buzwagi LSA was aceramic.

The Iron Age

There is no doubt that most of Tanzania was already settled, though not by present day commu-
Archaeological relics depicting early, middle and late Iron Age include pottery, which are recognized on the basis of shape, temper and decorative motifs, iron implements and ruins of iron smelting furnaces and associated paraphernalia, grinding stones, etc. Very early knowledge of metallurgy, indeed perhaps the earliest in East Africa, has been documented in the Buhaya area of Lake Victoria east of the Project Area while several other Iron Age sites, though not as ancient have been described from Shinyanga and Mwanza (Schmidt 1975; Soper and Golden 1969). It was therefore not surprising to find evidences of Iron Age cultures in the project area. Such finds included slag and upper and lower grinding stones.

Discussion

In reporting new discoveries of stone archaeological assemblages, one is always tempted to discuss them under the rubric of the three-age system, the Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) as used in sub Saharan Africa. However there are many problems which can arise from the use of these terms by different investigators at many different levels of abstraction. For example artifacts are often assigned to the MSA on purely typological or technological grounds, but as the name implies the MSA is thought of as a chronostratigraphic unit though very inadequately defined. This might lead to eschewing the crucial first steps of establishing context and defining local sequences. Poorly documented or inadequately described assemblages find their way into the category MSA without adding anything to our understanding. Second, the use of the term Middle Stone Age suggests that the age of the material is known, while in most cases it is not (McBrearty 1988). Aware of these problems, recent investigators have started focusing on detailed studies of regional “MSA”

Table 4. Summary of MSA and MSA/LSA assemblages recovered from Lake Eyasi and the Serengeti (Adapted from Mehlman 1989:544-545).

<table>
<thead>
<tr>
<th>Artifact Type</th>
<th>MSA Sanzako/Mumba N</th>
<th>MSA Sanzako/Mumba %</th>
<th>MSA Kisele/Nasera N</th>
<th>MSA Kisele/Nasera %</th>
<th>MSA/LSA Mumba/Nasera N</th>
<th>MSA/LSA Mumba/Nasera %</th>
<th>MSA/LSA Mumba/Mumba N</th>
<th>MSA/LSA Mumba/Mumba %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small convex scraper</td>
<td>3</td>
<td>1.2</td>
<td>3</td>
<td>6.5</td>
<td>2</td>
<td>0.5</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Other Scrapers</td>
<td>47</td>
<td>38.2</td>
<td>88</td>
<td>35.3</td>
<td>10</td>
<td>21.7</td>
<td>185</td>
<td>48.8</td>
</tr>
<tr>
<td>Geometric backed</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>1.3</td>
</tr>
<tr>
<td>Other backed</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>0.8</td>
<td>3</td>
<td>6.5</td>
<td>28</td>
<td>7.4</td>
</tr>
<tr>
<td>Total points</td>
<td>4</td>
<td>3.3</td>
<td>36</td>
<td>14.5</td>
<td>2</td>
<td>4.3</td>
<td>18</td>
<td>4.7</td>
</tr>
<tr>
<td>Burins</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Bifacially modified pc</td>
<td>24</td>
<td>19.5</td>
<td>23</td>
<td>9.2</td>
<td>2</td>
<td>4.3</td>
<td>24</td>
<td>6.3</td>
</tr>
<tr>
<td>Becs</td>
<td>6</td>
<td>4.9</td>
<td>7</td>
<td>2.8</td>
<td>4</td>
<td>8.7</td>
<td>27</td>
<td>7.1</td>
</tr>
<tr>
<td>Composite tools</td>
<td>9</td>
<td>7.5</td>
<td>15</td>
<td>6.0</td>
<td>2</td>
<td>4.3</td>
<td>12</td>
<td>3.2</td>
</tr>
<tr>
<td>Outils écaillés</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Heavy duty tools</td>
<td>13</td>
<td>10.6</td>
<td>3</td>
<td>1.2</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Sundry modified</td>
<td>20</td>
<td>16.3</td>
<td>70</td>
<td>28.1</td>
<td>20</td>
<td>43.5</td>
<td>75</td>
<td>19.8</td>
</tr>
<tr>
<td>Flake &amp; fragments</td>
<td>425</td>
<td>51.5</td>
<td>996</td>
<td>24.5</td>
<td>78</td>
<td>20.2</td>
<td>2865</td>
<td>60.0</td>
</tr>
<tr>
<td>Blade &amp; fragments</td>
<td>1</td>
<td>0.1</td>
<td>9</td>
<td>0.2</td>
<td>1</td>
<td>0.3</td>
<td>156</td>
<td>3.3</td>
</tr>
<tr>
<td>Levallois &amp; fragments</td>
<td>12</td>
<td>1.5</td>
<td>8</td>
<td>0.2</td>
<td>0</td>
<td>0.0</td>
<td>29</td>
<td>0.6</td>
</tr>
</tbody>
</table>
assemblages especially in Southern Africa, Tanzania and Kenya. To this end, they have proposed local names describing the industries (Mehlman 1977, 1979, 1989; McBrearty 1988, 1992). With this in mind, the discussions that follow and the conclusions arrived at must be understood as tentative pending further investigation in the area.

The Assemblages. Two technologically and chronologically differentiated assemblages are represented; the MSA and LSA. There are also IA pottery and other artifacts, but they are negligible. The MSA in the study area is denoted specifically by the presence of diminutive bifaces, bifacial and unifacial points, Levallois flakes and blades, scrapers, *outils ecaillés*, and discoidal cores. As remarked above, the best hitherto dated MSA assemblages in Tanzania come from the Serengeti and the Lake Eyasi basin where dates of 130,000 yrs BP, as subsequently discussed, have been obtained.

Compared to the earlier and later industries the MSA is still relatively unknown in Tanzania. Barely over two decades ago, it was only in South Africa that the MSA was on the basis of the sequence from the type section at Klasies River and other sites well known. Four MSA stages; MSA I to MSA IV with a distinct macrolithic Mode 5, industry sandwiched in the middle have been recognized (Willoughby 2007). In Kenya the MSA became a focus only in the 1990s when MSA/LSA sites in Koobi Fora, Karari escarpment, Kaphurian Formation, Makodo Hill in the Laikipia Plateau in north Kenya, Tol and Kipsing River valley were excavated and studied. However the most intensive studies have been directed at both MSA and LSA sites in the Rift Valley and the Lake Victoria Basin. Sites such as Engapune ya Moto, Prospect Farm, Prolonged Drift, Lukenya Hill, Songhor, Simbi and Muguruk are now well known to African Prehistorians. In many of these sites, the MSA/LSA transition may have occurred before 46,000 years ago (McBrearty 1991, 1992, 1993; Kusimba 2003; Willoughby 2007).

Tanzania on the other hand has lagged behind as Willoughby (2007:260) puts it, “While there have been many Middle and Later Stone Age sites excavated in Kenya, Tanzania is a different story. Most of the research that has been done has been carried out in the north while the rest of the country has hardly been studied at all”.

The chronology of the MSA in Tanzania is not yet well resolved. Thanks to the work of Mehlman in the Lake Eyasi Basin and southern Serengeti in Tanzania, particularly at the Skull site, Mumba Hole and Nasera, which has recognized and adequately described a long cultural sequence which includes three typical MSA, one MSA/LSA and four fully developed LSA industries; Njarasan, Sanzako, Kisele (MSA), Mumba, Naseran (MSA/LSA), and Lemuta, Silale (LSA), and provided some chronometric dating (Mehlman 1979). In the Lake Eyasi Basin, uranium-series dating technique has produced dates of 131,000 years ago for the Sanzako while Kisele industry is estimated to be 90,000 BP (Mabulla 1996). The only other well-documented MSA/LSA industries reported in the literature come from the Serengeti open air site of Loyalangalani, the Ndutu and Nasilusiu Beds at Olduvai and Kisele rock shelter in central Tanzania (Bower 1981: 54; Bower, et al. 1985; Leakey et al. 1972; Mabulla 1996; Skinner et al. 2003; Masao 2006). The Loyalangalani has produced both MSA and LSA whereby the MSA includes many scrapers, borers, few points or bifaces along with disc and levallois cores (Bower 1981:54), and in this case could easily be considered comparable to the industry discovered at Buzwagi. In addition to the typical MSA tool kit, artifacts, which are related to the emergence of hominin symbolic behaviour, have also been found at the Loyalangalani site. These are in the form of ostrich egg shell beads, which have been dated to 70,000 BP (Curtis 2004). More concrete evidences of the association of the MSA with the anatomically full modern man and archaic *H. sapiens* are the discoveries of the Laetoli Hominid 18 and Ndutu skull from Laetoli and Ndutu respectively in southern Serengeti. (Rightmire 1983; Mturi, 1976; Day et al. 1980). Both were found associated with an industry, which can be described as Terminal Acheulean or Early MSA. Comparing the Mode 3 industries of Tanzania with those recovered from better dated sites in southern Africa, it can be argued that the hunting and gathering communities who made and used Mode 3 industries date to between 200,000-20,000 years ago. The assemblage from Buzwagi has all the typological and technical attributes that would qualify it as MSA/LSA. Typological attributes include the implements which are normally associated with the MSA such as diminutive bifaces, bifacial points, large *Levalloisian* points, *Levalloisian* flakes and blades, discoidal cores, core axes and picks (see illustration). On the
other hand technological attributes include the prepared core technique or Levalloisian, discoidal flaking whereby the core is worked around the perimeter and a relative increase in the production of blades compared to the succeeding LSA industries. As already remarked, the MSA in Tanzania is yet to be well documented and hence any little additional information about the MSA, such as this, should be appreciated (Masao 2006).

The cultural meaning of the term MSA can be defined as connoting a group of cultures, differing from one region to another and with different names, but all having a great deal in common with regard to lithic techniques and typology. As already remarked, the absence of hand axes and cleavers, and employment of the Levalloisian technique together with the production of convergent and parallel flaking and a variety of flake-tool forms are some of the dominant features of the MSA industries (Malan 1957). The chronological meaning of the MSA period is, however, not yet established and does not always denote the same interval of time when it is used. Overall a time range roughly between 200,000 and 40,000 is conceivable (Clark 1988:236). Characteristic tool types of the MSA include lanceolates, bifacial points, core axes, a variety of scrapers, picks, diminutive hand axes, retouched Levallois flakes, disc core, blades, etc. (Figures 1 and 2).

As for chronological resolution, one is always aware of the difficulties inherent in surface survey, which basically retrieves discarded artifacts few of which may be chronologically diagnostic. Although it is argued that many surface scatters have to be treated as a single chronologically insensitive assemblage reflecting a repeated use of an area over a long period of time (Zvelebil et al.1992), it can also be counter-argued that in the case of the surface finds in the Buzwagi area, one sees definite chronologically diagnostic pieces which can be used to assign the assemblage into the broad MSA and LSA industries. Such pieces are discussed elsewhere in this report. On the other hand it is also possible that what one sees on the surface are palimpsests of several phases of occupation. Obviously, the continued exposure of an archaeological landscape to human occupation such as the Buzwagi landscape has been for years will result in the blurring of spatial patterns and mixing of unrelated remains. Biases are also in-

introduced through taphonomic processes, which result from cultural and natural agencies that distort the surface distribution patterns (Zvelebil et al. 1992:196-197). Devoid of provenience the surface finds have limited scientific use. They should however be saved for museum and teaching purposes. They are also useful for typological and lithic technology studies.

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