

Dear Earthwatch volunteers of teams Ia and IIIa,

I am sure that your experience at Olduvai was worth your while. May I assume that your expectations were at least half way-realized, an assumption perhaps not farfetched on account of the emails that some of you have been so kind to send. I wish to thank you all very much. Without being complacent, I know that there are so many areas which could and need to be improved, but all we ask of you is to bear with us. Some of you volunteered suggestions on improvement and I wish to assure you we shall work towards that so that future expeditions become better - a lesson from hindsight experience.

My Tanzania colleagues and I, on the other hand, certainly enjoyed getting to know and to work with you. Being such conscientious and energetic workers, we succeeded in rescuing many important fossil bones and artefacts which, without your participation, would have been relegated to oblivion. You were great workers and always cheerful, the hardships of camping at Olduvai notwithstanding. No wonder you were all given field names by the local staff led by none other than the ever joking Good Luck Peter. I know that some of you happily parted with camping gear and gave it to the local staff, while others donated equipment and stuff to the project. I wish to assure you that the project and the different members of staff appreciate this gesture of friendship and generosity a great deal.

Jackson Njau and I are currently analysing the data with the view to writing a paper on the finds for publication. Needless to say, due acknowledgements will be given to you all as generators of the data.

On behalf of all the Tanzania staff and on my own behalf, I wish to thank you for your contribution to science through your work at Olduvai, and also for the assistance you have individually given the supporting staff. The local staff would like to join me in wishing you excellent health and we hope to meet some of you in the UK/US/Australia or back in Tanzania sooner or later.

Kind regards,

Fidelis

EARTHWATCH INSTITUTE FIELD REPORT 2006

Project Title: Early Man at Olduvai.

A project conducted and supervised by:

Prof. Fidelis. T. Masao of the University of Dar es Salaam as the lead Principal Investigator assisted by

Mr. Chediel S. Msuya of the Tanzanian Department of Antiquities, Ministry of Natural Resources and Tourism and

Dr. Jackson Njau, of the Natural History Museum, Arusha, Tanzania, as Co-PIs.

Research site: Olduvai Gorge, Tanzania, 35⁰.25' East, 3⁰.00' South

Local Management: Olduvai Gorge is enclosed in the district managed by the Ngorongoro Conservation Area Authority (NCAA). The NCAA is on UNESCO's World Heritage List. By an act of Parliament, Olduvai Gorge is administered by the Department of Antiquities. Both the NCAA and Dept. of Antiquities report to the same Permanent Secretary in the parent Ministry of Natural Resources and Tourism.

Key Research Objectives

- To increase the sample of artefacts and fossil bones from localities threatened particularly by erosion and trampling by animals and humans by expanding the excavations at the DK site.
- To survey the palaeoanthropological-rich exposures between the DK and JK sites and other exposed patches and record palaeoanthropological remains.
- To survey other exposures, especially FKN, FLKNN, HWK and MCK
To retrieve important fossil bones lying on the surface before they are lost through trampling and/ erosion to the Olduvai River.
- To subject the archaeological and palaeontological finds to preliminary analysis pending more detailed study and curatorial work at the Natural History Museum at Arusha.

Data Collection and Results

The excavations at DK produced a number of artefacts and fossil bones, one of which is a possible hominid tooth. The significance of finding hominin remains cannot be over exaggerated. Hominins are rare and finding them is a combination of chance and luck. For the 75 years research has been conducted at Olduvai, only 75 hominins have been recovered, three or four of which by the Earthwatch teams of volunteers.

The excavations revealed a series of stratigraphic units, which can be summarised as alternating clay and sandy layers with varying amounts of either sand or tuff inclusions, as the case may be. The sediments making up the stratigraphy result from alluvial fan deposits interfingering with lake margin deposits. Basically, the stratigraphy can broadly be lumped into an upper alluvial fan deposit and a lower unit, which is made up mostly of lake deposits. Related to the lake deposits, is the claystone of pale olive colour or various shades of yellow and brown. This wax-like claystone is relatively free of sand and therefore suggests a calm lake environment (Hay 1976, Leakey 1971).

The tables below summarise the palaeoanthropological trace fossils recovered after the preliminary analysis. Tables I and II are a summary of the lithic and ID data respectively according to trenches and levels. While both trenches produced artefacts and bones, trench 22 yielded a lot more artefacts than trench 21, a disparity accounted for by two reasons. One is obviously the location, and the second has to do with volume of sediments. Trench 21 was located on the western banks of the gully east of the DK hut where the sediments are not only shallow, but there was also a large amount of colluvium, whereas the implementiferous/fossiliferous sediments in trench 22 were almost twice as deep as in trench 21. Another feature worth noting is the different vertical distribution of the artefacts. In both trench 21 and 22 the top levels were found to contain most of the artefacts. Also trench 21 seems to be located away from the lake margin where there was not as much hominid activity on account of having less resources. Analysis for the ID bones from trench 22 is still in progress, but as with the artefacts of trench 22, there are greater numbers of ID bones by taxon.

Although the archaeological industry below Tuff IB at Olduvai is among the earliest Oldowan, the assemblage recovered by the project could not be described as typical Oldowan. Unlike the Oldowan described by M D Leakey from DK, it is dominated by core fragments, while in the Oldowan *fossil directeur* category, the chopper is very rare. This anomaly is probably explained by two reasons; firstly, we are dealing with very different sample sizes, large (Leakey) versus small (this project);

secondly, Leakey may not have considered the core fragments as artefacts. Be as it may, the assemblages appear different.

Table 1. Summary of artefacts recovered in Tr 21& 22.

	Tr. 21	Tr. 22	
Levels	No. of Artefacts	Levels	No. of Artefacts
1	35	1	861
2	13	2	926
3	4	3	272
4	3	4	0
5	0	5	0
6	1	6	47
		7	0
		8	3
		9	0
		10	21
		11	8
Total	56		2163

Table 2: ID Bone Frequency by taxon

<u>Taxa</u>	<u>Tr. 21</u>	<u>Hominid Scrape</u>	<u>Tr. 22</u>
Tortoise	2	5	
Suid	7	3	
Snail	0	2	
Rodant	1	0	
Primate	1	0	
Hyena	1	0	

Hippo	3	1	
Equid	1	0	
Elephant	2	1	
Croco	9	20	
Bovid	18	18	
Bird	4	9	Data not Available

Although a large number of pebbles have not been included in this report, they have, however, been packed and stored properly in case there should be a need to examine them. Unlike the Oldowan assemblage recovered in past seasons, this year's is considered lacking in some of the typical Oldowan artefacts. Not only are there less cores, choppers, polyhedrons, spheroids, scrapers, and a variety of scraper forms, but some tool forms such as sub spheroids and burins are virtually absent. However, as was in other trenches excavated in the past four years, core fragments are the majority of the artefacts, accounting for more than 77% of the assemblage. This is a category which many archaeologists in the past ignored, but its significance has now been appreciated because, *inter alia*, the pieces which make up the category have important information about lithic technology encoded in them.

The preliminary analysis also examined the raw material from which the artefacts are made. Quartzite accounts for close to 70% of the raw material followed by lava, and gneiss. Chert occurs but, rarely while pegmatite, though found does not appear to have been selected for tool manufacture. In addition to the artefacts, we also counted all the pebbles, weighed and recorded them according to the raw material. Pebbles may turn out to be important in trying to understand the mode of deposition of artefact and fossil bone bearing sediments. They also serve as indicators of the source of the raw material.

Table II summarises the number of taxa represented by identifiable (ID) bones recovered from the excavation and analysed in the field lab. As with the artefacts, there were a correspondingly lower number of ID bones this year. The precise number will not be known until all the bones have been analysed. Most ID bones have been analysed to the element, genus and in very rare cases, to the species. A variety of animals are represented by the collection. They include crocodile and tortoise, which are the most dominant genera, but hippo, *bovids*, *suids*, and *equids* are also

common. The commonest bovid remains at DK and also at FLK-NN are of Reduncini, the tribe containing living reedbuck, kob, lechwe and waterbuck. *Alcelaphini* (wildebeest, hartebeest and topi) are represented, but not very common (Gent 1973 quoted by Hay 1976). In addition to the above, remains of a hyena, a primate and possibly a monkey have also been recovered. However, the highlight of the discovery is a hominin tooth which was found on the surface close to trench 21. Aquatic birds such as flamingos, herons, storks and other large birds are likely to be among the remains, although their recognition will have to await a more thorough analysis of the fauna. Such birds are reported to be more common in Beds I and II than is the case under the present semiarid conditions (Brodkorb in Hay 1976: 47).

Overall the state of preservation is poor, as can be recognised from an average state of weathering of 4, which means badly cracked almost to the stage of pulverisation. Other attributes pertain to modification and involve cut and tooth marks. The tooth marks may have been inflicted by both crocodile as well as carnivores, while the cut and percussion marks were made by hominids in the process of de-fleshing a carcass. The cut marks were made by the stone tools, some of which have been retrieved from the excavations. The abundance of crocodiles, tortoises and hippo suggests that this was a freshwater environment, but the alternating olive waxy claystone and earthy clay sediments suggest alternating saline/brackish to freshwater environment, perhaps related to lake transgression/regression cycles. Possibly the area may also have come under the influence of fluvial activity. This interpretation seems to be supported by sedimentological features such as persisting sand lenses in the section.

Although the DK site is very rich in fossil bone, the state of preservation leaves a lot to be desired. Most of the bones are badly weathered and consequently they break easily (Leakey 1971, Potts 1988:25), and hence the high quantity of NID. These have been counted and bagged separately for more detailed analysis in the future.

Significance/Benefits of the Research

The main goals for this project have been conservation and salvage. There are several sites at Olduvai where the continued preservation of the archaeological and palaeontological remains is continually threatened by erosion. One of these is the DK site. Unfortunately, neither the government nor national parastatal institutions, nor non governmental organisations (NGOs) have had the financial resources to address and arrest the problem. To mitigate the problem, the project has this year successfully salvaged several fossil bones and artefacts that might be lost in

a few years' time. To this end, as much of the threatened material as possible has been salvaged, analysed and finally curated at the Natural History Museum, Arusha.

Despite minor logistical problems, the objectives were met successfully. Indeed, we recovered a satisfactory amount of fossil bones and artefacts, thanks to the highly motivated labour force provided by volunteers and the local workers. Compared with past years, the excavation teams did not recover as many palaeoanthropological remains, nor did they move as much dirt, but that was to be expected because of two reasons. First, unlike in the past when volunteers spent three weeks at the dig, the teams this year worked for only two weeks. Secondly, the emphasis has changed slightly. Instead of spending most of the time excavating, teams are combining excavation and surveying. All in all we recovered, as can be seen from the tables, many artefacts and fossil bones, some of which would definitely have been washed down to the Olduvai River and eventually lost.

A less obvious goal, but nevertheless very important, was to prove to the government and national institutions that this kind of work can be done and produce good results. Contrary to beliefs that employing volunteers cannot yield good results, the data retrieved has just proven such beliefs wrong. This project has shown that salvage work is important and that it can be done. Indeed now that we have four definite hominids from past and this year's work, perhaps the recovery from now onwards should be more intensive, and hence the proposal to have four teams in the area next year. On the basis of this, the government might reconsider its policies regarding threatened archaeological and palaeontological sites. The need to mobilise financial resources to post somebody to monitor the loss of these scientific specimens on a daily basis throughout the year, cannot be overemphasised.

Volunteer Tasks and Accomplishments

The first team this year (12-26 May) was made up of seven volunteers, (Pamela Arsenault, Charlie Bigger, Connie Cross, Greg Dobbin, Richard Kouzes, Martha Mullen and Martin Plummer), while the second had eight (William Cheney, Kyle Corkum, Alexander Corkum, Jim Delahant, Dann Maurno, Glenys McLaren, Laurel Schneider and Eugenia Shuller). In addition to the volunteers there were a number of local employees (Samuel Lawuo, Frank Mataro, John Pelenge, Nicodemus Duma, Augustino Songita, Goodluck Peter, John Gidyeto, Omega Lema, Ahadi Msuya, Elias Burra, Ferdinand Alfonse, Zakaria Kutita, Ndengere Saitoti, Lelekipa Sayore, Richard Bakari and Linius Manda) who assisted in the various aspects involved in running

archaeological field work, including, but not restricted to, setting up camp, cooking, procuring supplies, laying trenches, excavating, screening, analysing data, driving, etc.

Orientation: As part of orientation exercise, volunteers and the local workers were given a tour of the camping area and introductory talks in the two field laboratories about the objectives of the project, background information about the Leakeys' pioneer work and subsequent investigation including the current one by OLAPP, the geology of the area, etc. By use of the comparative collection in the two labs, volunteers were shown examples of fossil bone and artefacts they would likely see in the excavation and survey. This was followed by a visit to the Olduvai Museum. Volunteers were encouraged to spend ample time in the museum, as this was the best way to obtain an overview of the cultural richness of Olduvai. The museum tour was concluded by a short lecture by one of the museum guides, followed by a short visit to the Zinj site (location of the discovery of *A boisei* by Mary Leakey on July 17, 1959) and this rounded off the morning session. Lunch was followed by a short break, after which the volunteers were taken to several important palaeontological/archeological sites and geological features in the Olduvai area, and finally shown the locations where the teams would be working. Volunteers excavated, screened dirt, collected artefacts and bone, washed bones and artefacts and assisted in the analysis. Excavations started in the morning of the following day.

In more detail the work in 2006 involved the following steps:

1. Excavating two 1.3m wide trenches down to the basalt, screening and bagging the finds to camp to await preliminary analysis. Excavation involves laying the trench, collecting all artefacts and bone from the gridded area, hard scraping the area (see below), and carefully excavating making sure stratigraphic units are not mixed. In other words, excavations were conducted in natural layers and the finds were bagged according to the stratigraphic layers they come from. Participants were instructed on how to write labels so that each bag had the right label. All steps were documented by notes, sketches and photographs.
2. Surface scrape: The gridded area of the trench was cleared and hard-scraped in order to make sure that loose remains from the colluvium are not mixed with sediments in their primary contexts. The scrape was screened and artefacts and bone picked up and bagged separately. However, these have not been analysed, but they have been properly labelled and stored for teaching or museum use.

3. Equally important is to draw the section after the excavation is over. Both volunteers and the local staff collaborated in drawing the section and describing the lithologies of each layer and what they might mean in terms of past environments.
4. Conducting intensive surface survey in the localities of HWKE, HWKW, FLK, FKLS, FLKN, FLKNN (all of which are considered eastern lake margin).
5. Preparation of artefacts and bone for the preliminary analysis: The excavated data was washed, and dried in preparation for the preliminary analysis. Artefact analysis involved manually sorting the artefacts into broad categories on the basis of OLAPP's coding system and MD Leakey's typology, emphasising weathering stages, maximum dimension, raw material, technical attributes, etc., while the bones were analysed according to identifiable elements (ID), taxa represented, degree of weathering, whether or not they have been modified (animal tooth marks or hominid inflicted modification. e.g. cut marks, and percussion marks). For the non identifiable (NID) only the weight was recorded.

Assisted and led by the local staff, the first team of volunteers successfully excavated trench 21 and scraped the hominid site at DK west, recovering many artefacts and fossil bones as can be seen from table 1. One of the remains is a possible hominid tooth, but this has to be firmly established by experts later on. On the other hand, team IIIa excavated trench 22 at DK east and like the previous one, they also recovered many palaeontological remains, washed the bones and artefacts, assisted in the analysis, consolidated and joined the bones whenever this was practical and packed them for transportation to the Arusha Museum. Team IIIa also conducted surface survey on the exposures close to camp including HWKE, HWKW, FLKN and, FLKNN. Many artefacts and fossil bones were observed, but only the most scientifically significant fossils were collected. To appreciate the palaeogeography of the area, the group spent an afternoon surveying in the western fluvially influenced part of the ancient lake basin. Aside from the excavations, survey and analysis, both teams were involved in collecting raw material from the sources available to hominins two million years ago. They used the rock materials for knapping exercises.

At the dig volunteers were assigned to different duties such as excavation, carrying the dirt to the screens, screening and picking up artefacts and bone, bagging the artefacts, etc., though most of them just worked on the screens picking artefacts and fossil bone. Back at camp volunteers would wash bones and artefacts in preparation for the lab analysis. Volunteers with artistic skills or

knowledge of mapping helped in drawing stratigraphical sections, sketching artefacts, photographing artefacts and fossils, while others worked with the computer entering palaeoanthropological data onto spread sheet during and after laboratory analysis etc.

Besides bones and artefacts, volunteers also collected pebbles, which were found in stratigraphic contexts with the palaeoanthropological trace fossils. It has been said that prior to the eruption of Tuff IB, streams from Ngorongoro carried pebbles of lava and welded tuff westward over the mudflats and discharged them in the DK area. Alternatively, some of this class may have been caught up and transported in the hooves of *equids* and larger *bovids* as demonstrated in the Amboseli area of Kenya (Hay 1976). Whatever the mode of conveyance, they may have critical environmental information encoded in them and hence the need to collect them.

Some afternoons were spent, as already remarked, surveying several exposures in the Olduvai area. A group of two or three volunteers in the company of one of the project leaders would survey together, calling everyone together should they see something potentially significant. The group leader would decide whether or not the specimen should be collected or recorded and left in place.

It was not always work. Volunteers in both teams were given time to attend to personal chores, especially at the end of the day. Evening talks and 'show-and-tell' sessions were held in the lab before dinner. These sessions proved very popular as they gave volunteers opportunities to talk about their experiences and to comment and/or ask questions about the field work. The groups spent a day each in the Ngorongoro Crater viewing game, and half a day at the nearby Maasai boma and the kindergarten school. Both of these experiences were enjoyed by everybody.

The main goals for this project have been conservation and salvage. There are several sites at Olduvai where the continued preservation of the archaeological and palaeontological remains is continuously threatened by erosion. One of these is the DK site. To mitigate the problem, the project has this year successfully salvaged several fossil bones and artefacts that might be lost in a few years' time. To this end as much of the threatened material as possible has been salvaged, preliminarily analysed and finally curated at the Natural History Museum, Arusha.

Despite minor logistical problems the objectives were met successfully. Indeed, we recovered a satisfactory amount of fossil bones and artefacts, thanks to the highly motivated labour force provided by volunteers and local workers.

Project Development:

Compared with past years, the excavation teams did not move as much dirt, but this was to be expected because of two reasons. First, unlike in the past when volunteers spent three weeks at the dig, the teams this year worked for only two weeks. Secondly, the emphasis has changed slightly. Instead of spending most of the time excavating, teams are combining excavation and surveying. All in all we recovered, as can be seen from the tables, many artefacts and fossil bones, some of which would definitely have been washed down to the Olduvai River and eventually lost. A less obvious goal, but nevertheless very important, was to prove to the government and national institutions that this kind of work can be done and produce good results. Contrary to beliefs that employing volunteers cannot yield good results, the data retrieved has just proven such beliefs wrong. This project has shown that salvage work is important and that it can be done. Indeed, now that we have four definite hominids from past and this year's work, perhaps the recovery from now onwards should be more intensive and hence the proposal to have four teams in the area next year. On the basis of this the government might reconsider its policies regarding threatened archaeological and palaeontological sites, the need to mobilise financial resources to post somebody to monitor the loss of these scientific specimens on a daily basis throughout the year cannot be overemphasised.

Following the successes recorded since the conception of this project, one would like to repeat the operation next season, though not necessarily at DK. Ideally salvage work should aim at retrieving the total population of the threatened remains, but given constraints of resources, manpower and financial, one has to settle for a representative sample. Nevertheless, we are very close from recovering a representative sample at the DK site. Consequently, we are planning to spend only four more seasons at DK west, while exploring other localities for future work.

The successes recorded by the project show that this kind of work can be done and that it is important. However, it is one thing salvaging threatened heritage, but a different matter making sure that the collection is well taken care of for posterity. Ideally the government and national stake-holding institutions should take up the responsibility to provide not only the space for the repository of the collection, but also qualified manpower. On the contrary, the government

represented in this project by Mr. Msuya, the Co-PI requires the PI to think about the eventual repository of the collection ensuing curatorial requirements. To this end the PI has started making shelves for the storage of the collection at the Natural History Museum, Arusha. The government should conceive of a programme to monitor the exposures at DK and other sites, on a regular basis, especially during the rainy seasons and immediately after. Such work could be done by two of the local workers who can easily recognise and identify fossil bones and artefacts.

Educational Opportunities

The on-the-job training initiated by OLAPP since its inception in 1989, was continued. In this regard, local young men and women were hired as part of the excavation crew and in this process they are trained in excavation, recognition of different stone materials, sorting artefacts and analysing the data. Some of these have become very good excavators, while two of them have gained knowledge to recognise different skeletal parts. The conservation efforts developed by the project will increase the salvaging of important heritage and to that end convince UNESCO that enough conservation work is in place to guarantee Olduvai a place on UNESCO's World Heritage List.

Until the inception of this project the local community, the Maasai and Iraqw had not been integrated with the ongoing research at Olduvai Gorge on a regular basis. This might sound ironic when it is realised that Olduvai Gorge is in the heart of Maasai country. Indeed, the word Olduvai comes from the Maasai word *Oldupai*, the wild sisal, which abounds in the Olduvai area. Both Maasai men and women were hired to help in the excavations. In Maasai culture, it is a taboo for men to work alongside women, but since the project employs women, the Maasai men are gradually accepting that women are not inferior to men.

Finally, some of the collection will find its way into museums as exhibits and scientific collections and thus provide pleasure and research opportunities to the public and scholars. As part of education, papers have been presented at international symposia while others are in preparation for publication. A paper co authored by J.K. Njau is being prepared for publication in *Journal of Field Archaeology*. Anticipated publication dates are March 2007. Another one is in the pipeline for publication in *Nyame Akuma Newsletter*.

A paper on "The Oldowan Revisited: Results of a Conservation Project at the DK site Olduvai Gorge" was presented at an International Symposium, University of Ludz, Poland 15-19 Sept 2006. The same paper will be published in the proceedings of the symposium.

Partnerships

As in the past, the project has enjoyed close collaboration with the Olduvai Landscape Palaeoanthropological Project (OLAPP) and the Natural History Museum at Arusha. The former has continued to put field equipment and camping gear at our disposal and this has been of great assistance in solving some of the logistics. One of the field vehicles used by the lead PI is owned by OLAPP. Without the use of the vehicle, camping at Olduvai would have been more difficult. On the other hand, the project has also shared some of its equipment with OLAPP. We have, for instance, let OLAPP make use of the kitchen and camp gear and whatever water and foodstuffs are left after the fieldwork. The latter, on the other hand, has always been willing to provide space for the storage of the artefacts resulting from the fieldwork.

Acknowledgements

Without the cooperation of the Government of Tanzania, the Tanzania Commission for Science and Technology and the National Museums of Tanzania, the fieldwork could not have run so smoothly. Through the Department of Antiquities the Government waived the fees for the collectors' licence, while the Tanzania Commission for Science and Technology allowed the research without the requirements for a research clearance and the fees thereof. On its part, the National Museums of Tanzania provided temporary working space at the Museum in Arusha, while the Ngorongoro Conservation Area Authority provided free entry to the Ngorongoro area.

The head of station at the Olduvai camp, Mr. Ozias Kileo and his staff, extended the generosity of the campsite to all the volunteers and went out of their way to make the volunteers feel welcome. I must also acknowledge the constant assistance I received from Alana Jones and her supporting staff at Earthwatch, for not only making sure that money was received on time, but for being always courteous and ready to answer questions on safety and administration. Last but not least, a vote of thanks must go to the Earthwatch volunteers, the local excavation crew and the drivers who individually and collectively made the project a success. I wish to congratulate all of these for the excellent work done and I hope they enjoyed the experience and that I shall have the pleasure to work with some of them again.

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