

Olduvai: a Window onto Man's Past

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Lago Manyara: l'ambiente, rimasto pressoché immutato da milioni di anni, è simile a quello in cui viveva, 2 milioni di anni fa, l'Homo habilis. Sullo sfondo una moltitudine di fenicotteri e una mandria di gnu.

Lake Manyara: an environment which has remained much the same as it was when Homo habilis inhabited it 2 million years ago. In the background a multitude of flamingoes and a herd of gnu.





*A sinistra, frammento osseo di antilope con evidenti tacche prodotte dall'urto dei choppers utilizzati dall'*Homo habilis* per rompere le ossa e mangiarne il midollo; una delle prime prove dell'utilizzo di uno strumento da parte dell'uomo.*

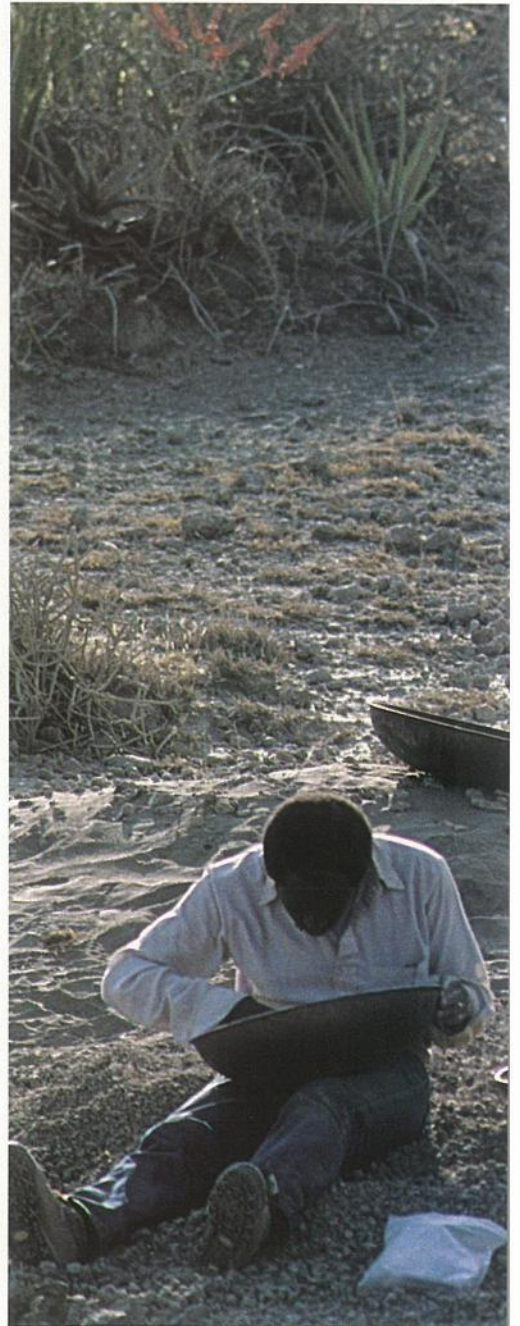
*Left, a fragment of antelope bone with clear hack marks made by *Homo habilis* as he used a stone chopper to smash the bone and get at the marrow; one of the earliest examples of tool use by man.*

Sotto, Donald C. Johanson controlla i reperti già selezionati al campo base di Olduvai, dove si procede alla classificazione delle migliaia di fossili di animali recuperati durante la campagna di scavo 1986/87.

Below, Donald C. Johanson inspecting items selected at Olduvai base camp, where work continues in classifying the thousands of animal fossils found during the 1986/87 campaign.

Sotto, cernita di reperti a Dik Dik, eseguita da alcuni componenti della squadra di ricerca. In questo modo vengono scoperti e selezionati anche i micro fossili degli ominidi.

Below, members of the research team sorting the items excavated at Dik Dik, a careful process through which even micro fossils of hominids are identified and graded.



Few experiences are as indelibly impressed in my memory as the first view of the majestic Serengeti Plain. Having just crested the foggy rim of the Ngorongoro Crater in northern Tanzania – where slow-moving elephants had reluctantly given way to my Land Cruiser – I was slowly descending the gentle slope. It was a magical moment when I first broke through the fog and saw the soft light giving a velvety appearance to the plain below. The seemingly endless, flat expanse of the Serengeti was an awe-inspiring welcome to one of nature's most remarkable wonders. Looking through the early morning haze, I could just make out the outline of my goal – Olduvai Gorge, a unique window onto Man's past. For decades Olduvai Gorge has yielded

some of the most important archaeological and fossil evidence of early human evolution. The geological strata at Olduvai preserve the most extensive record ever found in Africa, of what I have often called, the Dawn of Culture. Excavations have shown beyond any doubt that close to two million years ago our direct ancestors began utilizing simple stone tools to process food – a step which substantially altered the course of human evolution. Olduvai Gorge first achieved worldwide attention in 1959 when Dr. Mary Leakey and her late husband Dr. Louis Leakey, announced the discovery of the «Zinjanthropus» skull. At last, after searching for close to three decades, the Leakeys confirmed the presence of fossil hominids (humans and their ancestors) in the Gorge.

Louis Leakey first visited Olduvai Gorge in 1931, two decades after its initial discovery by Kattwinkel, a German zoologist. Remarkable vertebrate fossils had already been collected by previous German expeditions, but what impressed Louis were the countless stone tools eroding from the strata and littering the Gorge. Louis believed that humans were distinguished from all other animals by their reliance upon culture (tools) for survival. He asserted that not only did «Man make tools, but tools maketh Man». With this perspective he became convinced that fossil remains of the toolmaker must be present at Olduvai. While «Zinjanthropus» served to bring attention and funding to the Leakey's research at Olduvai, it was not the human ancestor Louis had hoped to find. The skull of «Zinj» exhibited numerous features which confirmed a vegetarian diet. The upper jaw possessed enormous molars for crushing and grinding, the face and skull were massive, preserving crests which had anchored powerful chewing muscles. Furthermore, the brain was only about one-third the size of modern man; too small, Louis thought, for this creature to be the maker of the stone tools. There was no doubt that the specimen was a hominid, but Nutcracker Man, as he came to be known, was not directly ancestral to modern humans, only a lowly cousin who became extinct about one million years ago. Excavations at Olduvai in 1960 provided the valuable, but elusive, piece of the puzzle which Louis had relentlessly pursued. A lower jaw and parts of a skull, belonging to a juvenile, were found in deposits dated to 1.8 million years. Close examination revealed that this hominid was more lightly built, possessed much smaller teeth and had a brain about half the size of modern man. Here, at long last, Louis asserted, was the hominid responsible for the stone tools. Louis placed it in the same genus with modern humans and gave it a unique species name – *Homo habilis*, the handy man. He further suggested that *Homo habilis* made the Olduvai tools to hunt and scavenge meat, a new, highly important addition to the diet of early hominids. Olduvai Gorge has continued to play a critical role in stimulating anthropological research in Eastern Africa and in developing a better understanding of our earliest direct ancestors. Early in 1985, I was asked by a representative of the Tanzanian Department of Antiquities, Prosper



Ndessokia, to develop a strategy for expanded research at Olduvai. As director of the Institute of Human Origins in Berkeley, California, I was able to put together an international team of scientists to undertake research at the Gorge. Dr. Gerald Eck coordinated field operations and the paleontological survey. Dr. Tim White and I led the search for more hominids, and Drs. Robert Walter and Robert Drake undertook the task of expanding our knowledge of the geology of Olduvai. Especially gratifying for all of us involved in the Olduvai Research Project has been the opportunity to work closely with Tanzanian colleagues in the field, as well as training young scholars. Dr. Fidelis Masao, Director of the National Museums of Tanzania, is my co-leader of the project which is

carried out with the co-operation of Centro Studi Ricerche Ligabue of Venice.

During the dry season the Serengeti lacks the concentration of animals so typical of the rainy season, and, as I drove my dusty vehicle into our camp at Olduvai, I was thrilled to be greeted by some resident giraffes. During breakfast we discussed plans for initiating the search for hominid fossils and decided to concentrate our efforts at the junction of the Main and Side Gorges. Reconstructions of the ancient geography suggest that hominids may have frequented this region because it was situated at the southeastern corner of a highly saline lake where fresh water streams entered. It was here that early hominids came to collect edible vegetation and perhaps

hunt or scavenge animals that had been attracted by fresh drinking water. Modern examples of such a lush ecological zone occur at other African lakes, for example at nearby Lake Manyara.

Searching for hominid fossils which had eroded out of the deposits and now lay on the surface takes great concentration and knowledge which only comes with extensive prior experience. Compared to the large number of herd animals like the gazelles, hominids were probably fairly rare on the paleo-Serengeti and have not left a great number of fossils. Hence, the tedious search for hominids can sometimes go on for years without success and only the dedicated few persist.

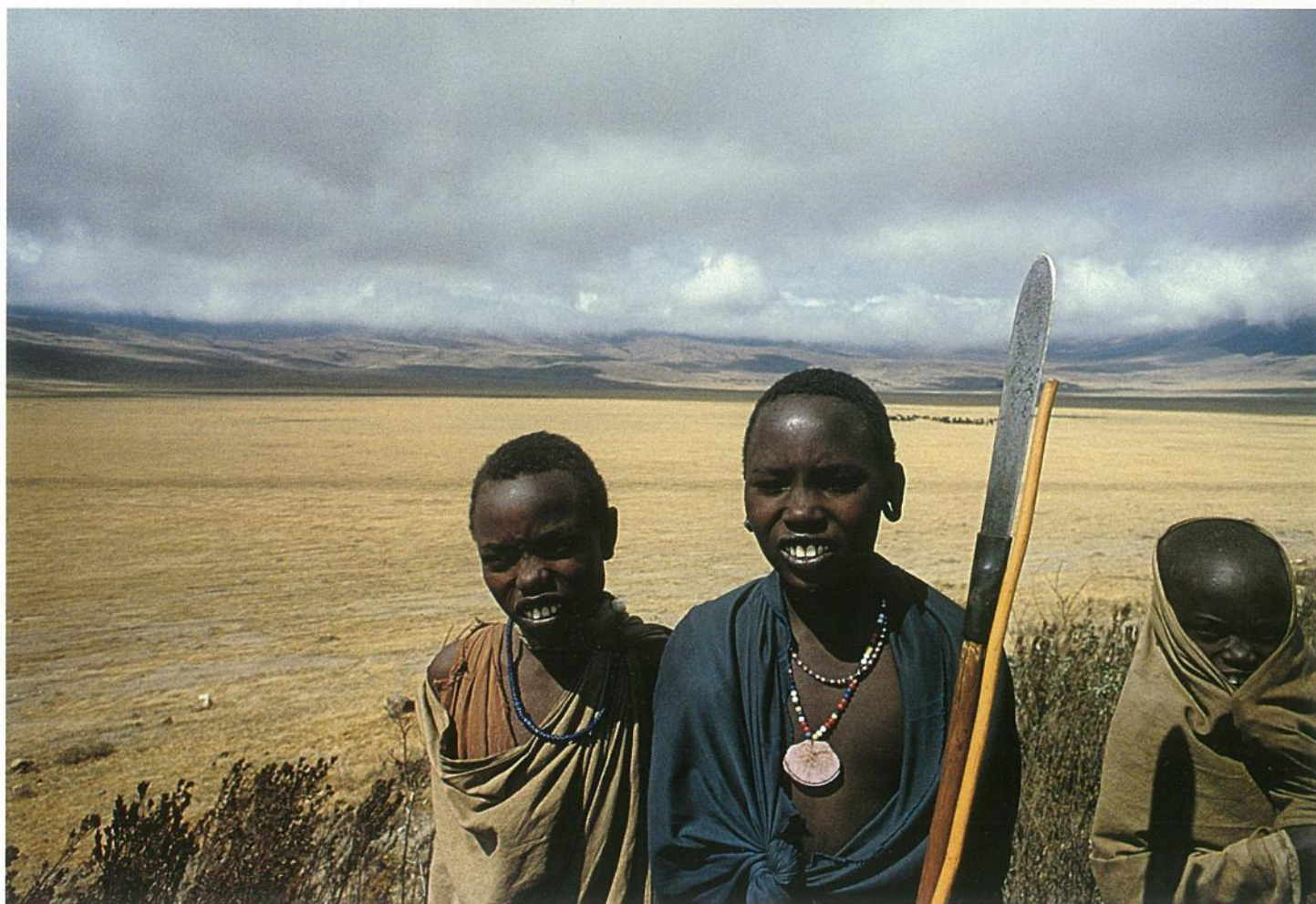
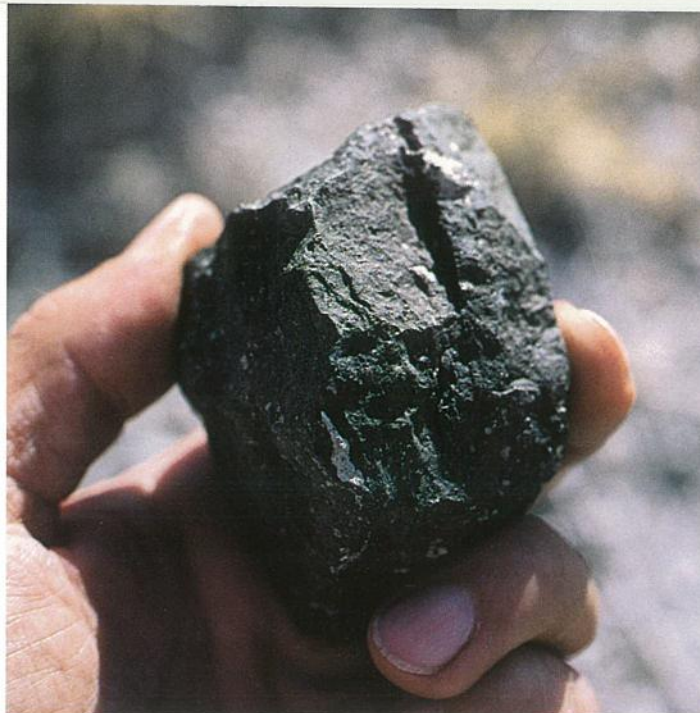
Our team was fortunate, some would



Donald C. Johanson con i trofei di una caccia che risale ad oltre due milioni di anni fa, rappresentati da fossili di antilopi, ippopotami, rinoceronti, e cavalli ora estinti.

Donald C. Johanson with hunting trophies dating back over two million years; fossils of antelopes, hippopotami, rhinoceroses and now extinct horses.

say lucky, for we didn't have to wait decades like our predecessors who worked the Gorge. It was late afternoon on the third day of our survey, as we were walking back to camp, that Tim White spotted the first fragment of a hominid. Bending over to obtain a closer look at the fossil, Tim looked back over his left shoulder at me and exclaimed, «It's a damn hominid!». From my vantage point I could discern that the fragment of arm bone which Tim was holding was definitely hominid. Just a few centimeters away I saw another fragment of an arm. One of our graduate students, Berhane Asfaw, an Ethiopian, excitedly announced the discovery of a fragmentary upper jaw. There was no question, we had parts of an ancient hominid forearm, upper arm, and upper jaw.



In alto, il chopper, tipico arnese litico di Olduvai datato a 1,8 milioni di anni. Questi strumenti si trovano sempre associati a ossa fossili di animali nei così detti «campi di macellazione», luoghi dove gli ominidi spartivano il frutto delle battute di caccia.

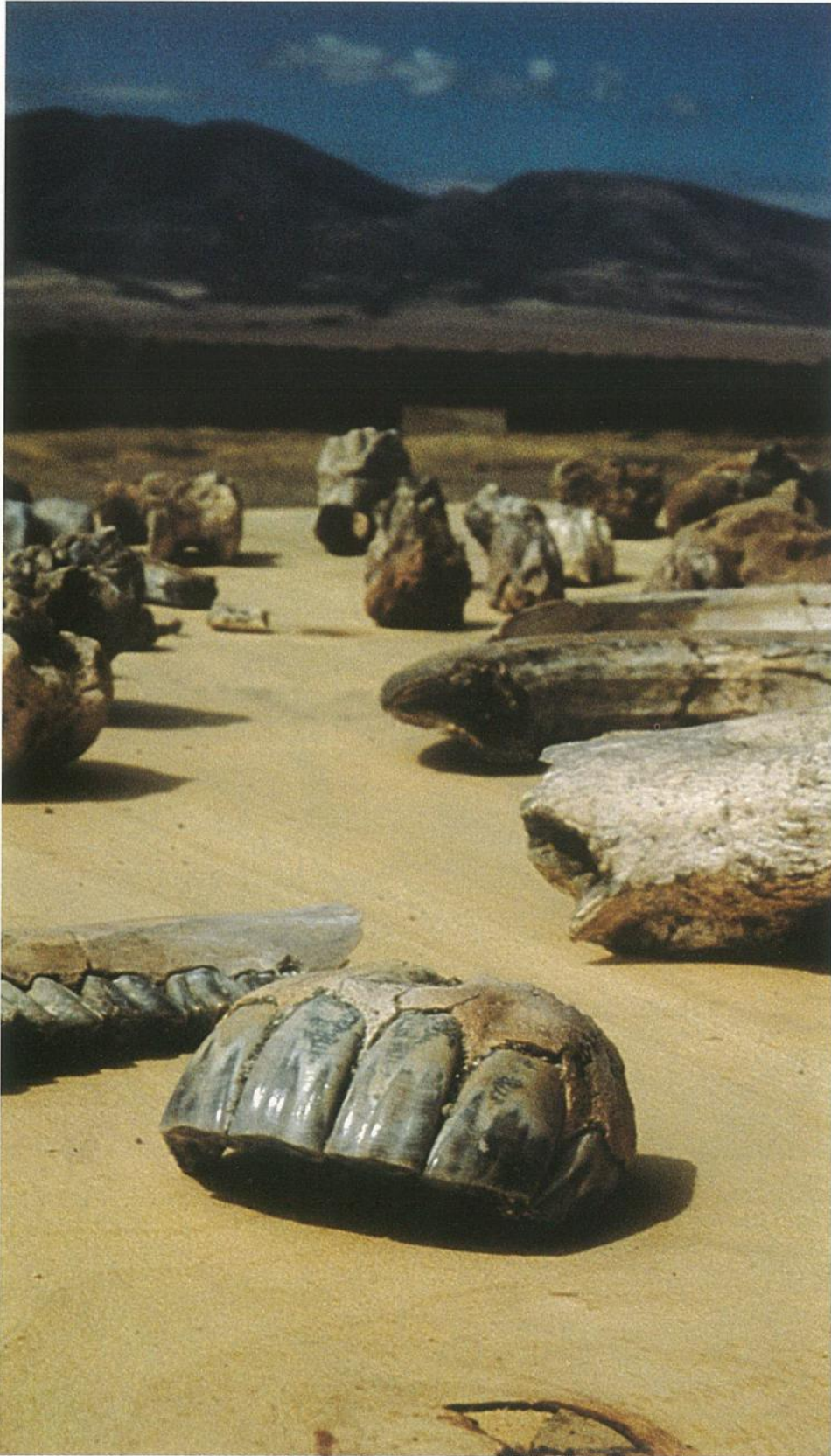
Above, a chopper, a typical Olduvai stone tool of 1.8 million years ago. Choppers are always found with fossilized animal bones in so-called «butchering-grounds» set up after a hominid hunting expedition.

Giovani pastori Masai con la corta lancia, l'attuale arma di difesa degli indigeni della Tanzania.

Young Masai herdsmen with their short spears, the defensive weapon still used by the natives of Tanzania.

Corna, ossa e denti fossili di animali ritrovati ad Olduvai; in primo piano, denti di Hipparium, un antico cavallo ora estinto.

Fossilized animal horns, bones and teeth found at Olduvai: in the foreground, the teeth of the Hipparium, an early, now extinct species of horse.



The specimens were small, but the anatomy told us that it was an adult. But there was not enough of the skeleton at this time to be certain of its identification as *Homo habilis* or another «Zinjanthropus».

After five weeks of exhaustive work at the site we recovered over 18,000 bone and tooth fragments, including remnants of extinct birds, antelopes, giraffes, hippos, porcupines, crocodiles and snakes. It was tedious searching through these bones but, after many hours in the Olduvai laboratory, we identified 302 fragments belonging to the hominid. A picture was beginning to emerge of a small hominid which resembled other specimens of *Homo habilis* and not «Zinjanthropus».

Detailed analysis of the hominid, now officially catalogued as Olduvai Hominid 62 (OH 62), produced some surprises about the anatomy of *Homo habilis*. The facial and cranial anatomy attested to a typical *Homo habilis* pattern. Although the skull is very fragmentary, other finds of this species had brains close to half the size of modern humans. Surprisingly, however, the post cranial anatomy (below the neck) is unexpectedly primitive in several respects. Most striking are its very long arms – much longer in relation to its body size than the arms of modern humans or even the much more ancient fossil known as «Lucy» (belonging to the primitive species *Australopithecus afarensis*).

Reconstruction of the length of the upper arm (humerus) and thigh (femur) permitted us to establish limb proportions. In modern humans the humerus is approximately 75% as long as the femur. In African apes the humerus is longer than the femur. The new Olduvai hominid had a humerus 95% the length of the femur – a primitive condition reminiscent of the apes. The overall size of OH 62 is very small suggesting a stature of only about one meter. Other discoveries already established that substantial differences existed between the stature of male and female early hominids, OH 62 is interpreted as a female.

Le savane d' Africa: il suggestivo teatro dell' alba dell' uomo.

The African savannah, the fascinating stage which saw the dawn of man.



As is so often the case in science, with new discoveries come new questions, new problems to solve. OH 62 does not fit into our earlier views of *Homo habilis* as being modern in its body proportions and possessing a stature like its direct descendent, *Homo erectus*. *Homo erectus* first makes its appearance in the fossil record at about 1.6 million years ago, only 200,000 years after the estimated geological age for OH 62.

This being the case, the transition from a body build seen in OH 62 must have been very rapid and directed by strong natural selection.

It is highly provocative to ponder why such primitive limb proportions were retained from the distant time when Lucy lived, 3.0 million years ago, up to the time of *Homo habilis*. Perhaps it was still advantageous to spend some time in the trees collecting fruit, sleeping

at night or maybe escaping charging carnivores.

Homo habilis was primarily adapted to two-legged walking, but final refinement of a modern body form did not appear until *Homo erectus*. Just what aspects of the environment and the behavior of our earliest ancestors prompted these anatomical changes still elude us and await further research and field exploration.