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■ **TANZANIA**

Further Paleoanthropological Research in the Manonga Valley of North-Central Tanzania

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Preliminary investigations by the Wembere-Manonga Paleontological Expedition (WMPE), during the summer of 1990, indicated that the largely unexplored Manonga Valley in north-central Tanzania (see Figs. 1, 2) had tremendous potential for long-term paleontological and archaeological research (Harrison 1991, Harrison et al. in press, Harrison and Verniers in press). Further exploration of the Manonga Valley by WMPE during July and August of 1992 has confirmed this potential, and, in fact, the extensive lake basin, with its fossil-rich sediments, probably dating back to the late Miocene or early Pliocene (c. 5-6 Ma), can now be considered one of the most promising paleontological research areas in eastern Africa. It is of especial importance for investigations into human origins. The possible recovery of fossil hominid remains from sites estimated to be 5-6 million years in age—a time period from which few hominid specimens are currently known, but inferred by many paleoanthropologists

to be that during which the hominid lineage may have differentiated from the basal African hominoid stock—would have a profound impact on interpretations of the phylogeny and paleobiology of the earliest hominids. In addition, the recovery of a sizeable fauna from later Neogene sediments might contribute valuable new clues to help explain the ecological factors underlying the differentiation, habitat preference, and geographic distribution of the earliest hominids.

The specific objectives of the 1992 expedition were: (1) to further assess the nature of the geological context of the major fossil localities, and to continue mapping at both the local and regional levels; (2) to continue to prospect for new paleontological and archaeological localities; and (3) to obtain more secure estimates of the age ranges of the fossil bearing sediments. This paper presents a preliminary account of the major findings of the expedition, with respect to these three areas of research.

The Geological Context

Towards the end of the Miocene, warping of the basement complex, associated with regional rifting, produced a shallow, but extensive lake basin in the Manonga region (Stockley 1929; Williams and Eades 1939). The lake appears to have covered an area in excess of 10,000 km² (which today would rank it as the sixth largest lake in Africa). A number of Precambrian outcrops remained sufficiently elevated to form a complex of low-lying islands. A reconstruction of the possible extent of the lake, and the major exposures of the lacustrine sediments are illustrated in Fig. 3. During the late Miocene and early Pliocene, fine calcareous lake sediments were deposited, and these have yielded abundant fossils (Harrison 1991, Harrison et al. in press, Harrison and Verniers in press). The lacustrine sediments are unconformably overlain by a series of fluvial deposits, presumably laid down by a major river system that cut through the Manonga Valley subsequent to the draining of the depression. It would seem that with the formation of the Eyasi trough, Lake Manonga drained towards the northeast, thereby initiating the development of the

present-day Wembere-Manonga drainage system (Williams and Eades 1939, Williams 1939, Grantham et al. 1945). Like the lake beds, the fluvial deposits have also yielded fossil mammals that are estimated to be late Miocene to early Pliocene in age. Since the mid-Pliocene, erosion of the underlying sediments has been active. A broad, shallow valley, about 10–20 km wide has been cut in an east-west direction through the depression by the action of the Manonga River. The Neogene lacustrine and fluvial sediments are overlain in places by quite extensive layers of undifferentiated alluvial sands and *mbuga* clays that have been accumulated since the Late Pleistocene (Williams and Eades 1939). Unfortunately, tuffs and other volcanogenic materials are absent from the sedimentary sequence, so radiometric age determinations cannot be obtained.

A total area of 75 km² was prospected during the 1992 season, compared with only 15 km² in 1990. However, this still represents less than 5% of the estimated extent of the potentially fossiliferous sediments in the Manonga basin (see Fig. 3). In addition to collecting at ten of the eleven previously recorded localities in the Manonga Valley (the 1992 expedition did not visit Mwambiti 2), further exploration and intensive prospecting resulted in the discovery of 18 new fossil localities (Table 1). The expedition succeeded in recovering over two thousand identifiable fossil mammals, as well as representative collections of fossil reptiles, fish and invertebrates. Major new collections of fossils were obtained at established sites, such as those at Tinde and Kiloleli (Harrison 1991; Harrison et al in press; Harrison and Verniers in press). In addition, significant collections were made at a number of newly discovered sites, including those at Shoshamagai, Inolelo, Mwambiti, Ngofila, Beredi South, Nyawa and Ipembe. These new sites are briefly reviewed below.

Shoshamagai and Inolelo

Several sites in the vicinity of Shoshamagai Hill, about 2 km south of Kiloleli village, have yielded fossils (Fig. 2). At Shoshamagai 2 and Inolelo 1–3 a rich

concentration of well-preserved fossils was found in sediments situated low in the local stratigraphic sequence. The fossils are associated with the thick laterite layer of the Ibole Formation, which forms an extensive and highly visible marker bed throughout the Manonga Valley. This horizon is situated stratigraphically below the series of lake beds that comprise the Wembere-Manonga Formation, which also includes the fossil beds at Tinde and Kiloleli. The discovery of fossils in the Ibole Formation at Shoshamagai and Inolelo is of major significance, because they represent the oldest known specimens from the Manonga Valley. Although the Ibole Formation lies stratigraphically below the Manonga-Wembere Formation, the close correspondence in the mammalian faunas between the two stratigraphic units suggests that the time interval represented is a relatively short one, with no major break in sedimentation between the two units. Based on comparisons with the faunas from other East African sites, the Ibole Formation, like that of the overlying Manonga-Wembere Formation, is estimated to be late Miocene or early Pliocene in age (c. 5–6 Ma).

Mwambiti

The expedition renewed prospecting along a 11 km arc of cliffs, south of the Manonga River, that runs from Tinde to Mwambiti point (Fig. 2). In 1990, two fossil sites, Mwambiti 1 and 2, were discovered on the northwestern and eastern flanks of Mwambiti point respectively. The fauna and the stratigraphic evidence supports the suggestion that the main fossil horizon at these sites is the lateral equivalent of the fossil bed at Tinde. In 1992, a widened search of the general area led to the discovery of two new sites, Mwambiti 3 and 4. They are both located just southwest of Mwambiti point. The fossils from these new sites were found on the surface of the valley floor, having eroded out of the laterite layer that makes up the Ibole Formation. The faunal and lithological evidence indicates that the horizon represents the lateral equivalent of the fossil-rich red bed at Shoshamagai 2 and Inolelo.

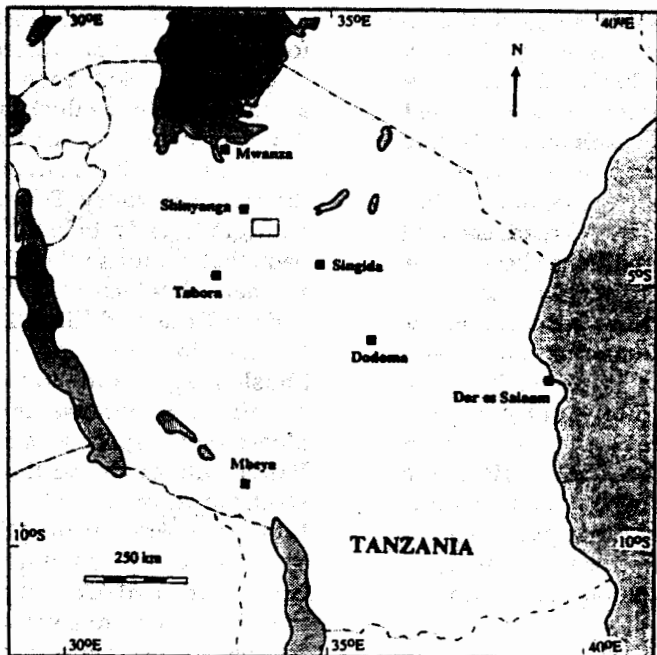


Fig. 1. Map of Tanzania showing the location of the research area (see Fig. 2 for detail of inset).

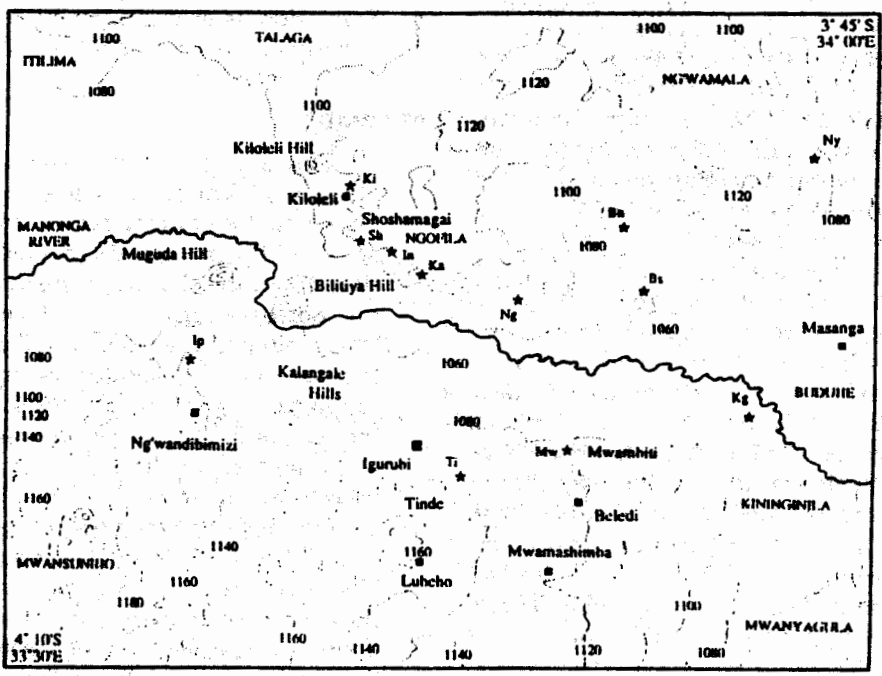


Fig. 2. Topographic map of main research area showing the location of the key groups of fossil localities. Abbreviations are as follows: Bn, Beredi North; Bs, Beredi South; In, Inolelo; Ip, Ipempe; Ka, Kalitu; Ki, Kiloledi; Mw, Mwambiti; Ng, Ngofila; Ny, Nyawa; Sh, Shoshamagai; Ti, Tinde.

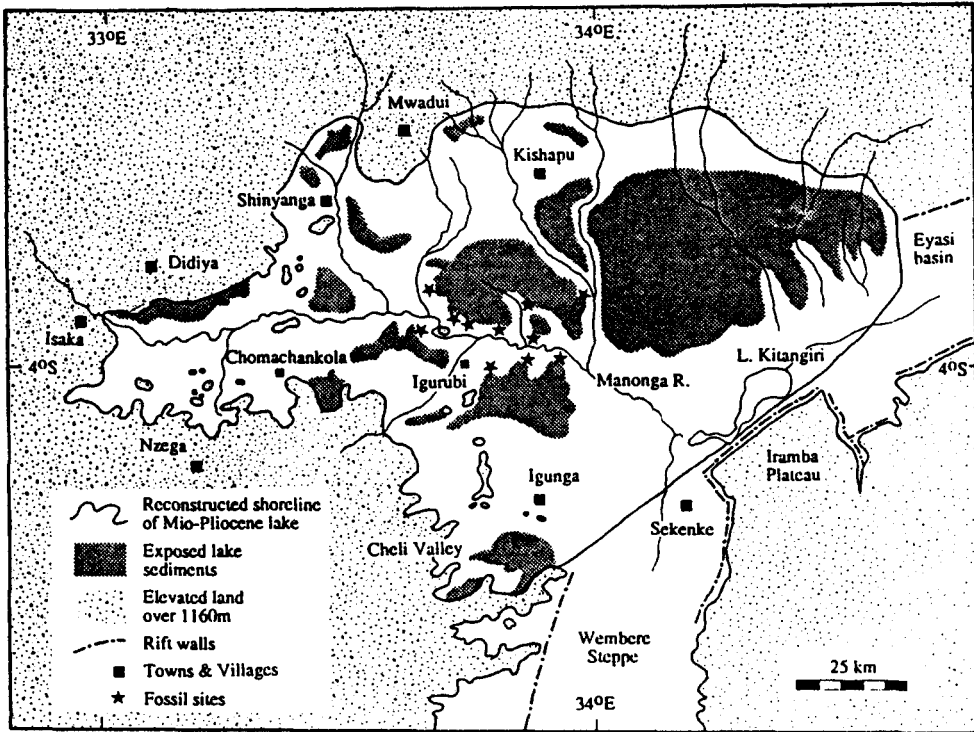


Fig. 3. Reconstruction of the extent of the lake in the Manonga Basin during the late Miocene and early Pliocene.

Ngofila

Ngofila is the easternmost continuation of the line of cliffs on the northern side of the Manonga Valley, that extends from Shoshamagai in the west to the Nhuliku Valley in the east (Fig. 2). Of the five localities known in the area, Ngofila 2 is the most productive. Fossils were recovered from several different layers. A number of darkly stained and heavily mineralized fossils were collected at the base of the series of clays that are lithologically and stratigraphically equivalent to those at Tinde and Kiloleli. Directly above this layer is an orange-brown pebbly mudstone densely packed with large gastropods. These sediments, and the overlying series of alternating mudstones and calcareous clays,

represent an important transition in the depositional environment in the Manonga Valley from a lacustrine setting to a fluvial one. It probably documents the draining of Lake Manonga into the Eyasi trough, and the initiation of the modern-day Manonga River drainage system. This series of fluvial beds will eventually be designated as a new stratigraphic unit within the Wembere-Manonga Formation (see Table 2). The fossil vertebrates recovered from the fluvial series suggests that the community is basically the same as that from the underlying lacustrine series, indicating that the time period covered is a relatively narrow one.

On a narrow ledge close to the top of the cliff at Ngofila 2 the expedition recovered a large number of poorly mineralized bones

Table 1. List of fossil localities in the Manonga Valley.

Name of Locality	SASES No.	Coordinates	Year of Discovery
Tinde West	Hi Ix/1	4°02'S 33°46'E	1929
Tinde East	Hi Ix/2	4°02'S 33°46'E	1929
Mwambiti 1	Hi Ix/3	4°01'S 33°50'E	1990
Mwambiti 2	Hi Ix/4	4°01'S 33°50'E	1990
Mwambiti 3	Hi Ix/5	4°02'S 33°47'E	1992
Mwambiti 4	Hi Ix/6	4°02'S 33°47'E	1992
Kiloleli 1	Hh Iw/1	3°51'S 33°42'E	1990
Kiloleli 2	Hh Iw/2	3°52'S 33°43'E	1930s
Kiloleli 3	Hh Iw/3	3°52'S 33°42'E	1990
Kiloleli 4	Hh Iw/4	3°52'S 33°42'E	1990
Shoshamagai 1	Hh Iw/5	3°53'S 33°42'E	1990
Shoshamagai 2	Hh Iw/6	3°53'S 33°42'E	1990
Ipembe	Hh Iw/7	3°56'S 33°37'E	1992
Inolelo 1	Hh Iw/8	3°53'S 33°43'E	1992
Inolelo 2	Hh Iw/9	3°54'S 33°44'E	1992
Inolelo 3	Hh Iw/10	3°54'S 33°44'E	1992
Kalitu	Hh Iw/11	3°54'S 33°45'E	1992
Ngofila 1	Hh Ix/1	3°55'S 33°47'E	1992
Ngofila 2	Hh Ix/2	3°55'S 33°49'E	1992
Ngofila 3	Hh Ix/3	3°55'S 33°49'E	1992
Ngofila 4	Hh Ix/4	3°54'S 33°49'E	1992
Ngofila 5	Hh Ix/5	3°53'S 33°49'E	1992
Beredi North	Hh Ix/6	3°53'S 33°51'E	1992
Beredi South 1	Hh Ix/7	3°55'S 33°52'E	1992
Beredi South 2	Hh Ix/8	3°55'S 33°52'E	1992
Beredi South 3	Hh Ix/9	3°56'S 33°52'E	1992
Beredi South 4	Hh Ix/10	3°55'S 33°53'E	1992
Nyawa	Hh Ix/11	3°50'S 33°58'E	1959
Kininginila	Hh Ix/12	3°59'S 33°56'E	1992

and teeth, creamy white in colour, with a yellowish adhering matrix. These bones are almost certainly late Pleistocene or Holocene in age. All of the bones were surface finds, and their source of origin could not be located. Some of the bones exhibit clear signs of human activity in the form of butchering marks, but unfortunately no stone tools were found in association.

Beredi South

Beredi South is a low plateau, located 6 km southeast of the village of Beredi and 11 km east of Ngofila (Fig. 2). The southern and western margins of the plateau end at steep cliffs, which delimit the northern and eastern flanks of the Manonga Valley and Nhuliku Valley respectively. The cliffs have been subdivided geographically into four separate fossil localities, Beredi South 1-4. At both Beredi South 1 and 3, rich concentrations of fossils were discovered washing out of a thick series of clays and mudstones. These fluvial beds occur high up in the stratigraphic sequence, and appear to be the lateral equivalent of the fossil-bearing beds at Ngofila.

Nyawa

The locality of Nyawa was first recorded by Kleindienst and Haldemann in 1959. WMPE made a brief visit to the area in 1992, and collected further fossils. The site, located close to Nyawa Village, 12 km northeast of Beredi, is the most easterly of the localities so far recorded in the Manonga basin (Fig. 2). The main exposures at Nyawa are found along a line of low cliffs that border the western flanks of the Tungu Valley, close to the confluence of the Tungu and Mangu rivers. The fossils appear to be eroding out of a single horizon, a hard band of white powdery calcareous clay intercalated within a swelling clay layer. On lithological grounds it would seem to be equivalent to the Mwambiti Member of the Wembere-Manonga Formation, which is also exposed at Beredi South 4 and at Mwambiti 1. Just to the north of the main exposures at Nyawa, a dense scatter of mammal bones was discovered in association with small quartzite artifacts. The bones and stone tools

are in the process of being washed out of a thin layer of *mbuga* clay which covers much of the surrounding area. The animal remains consist primarily of isolated teeth and bones of a large species of bovid and an equid. This site represents the richest archaeological concentration so far located in the Manonga Valley.

Ipembe

The site of Ipembe, located 2 km southwest of the village of Ipembe and 13 km northwest of Igurubi, consists of a low plateau, about 10 m high (Fig. 2). The fossils, which were found scattered along the entire length of the eastern flank of the Ipembe plateau, are derived from sediments stratigraphically equivalent to the swelling clay series at Kiloleli and Tinde. Some lightly mineralized bones, white in colour with a chalky texture, were found washing down the northern promontory at Ipembe. These included a parietal fragment of a modern human skull, found in association with a thin scatter of microlithic quartzite tools. These were presumably derived from the superficial sediments and soils on top of the cliff, and are much younger than the heavily mineralized bones derived from the underlying lake sediments.

Biostratigraphy and Biochronology

By integrating the preliminary results from investigations of the geology and faunas, it is possible to draw some tentative conclusions about the biostratigraphy and the biochronology of the sediments in the Manonga basin. Based on stratigraphic evidence alone, it is possible to group all of the fossil localities in the Manonga Valley into four main units. Although the faunas obtained from each of these units were not necessarily collected from precisely the same horizon, they are undoubtedly stratigraphically closely associated, and can therefore be considered to be contemporaneous. The oldest fossil-bearing stratigraphic unit in the Manonga Valley is the Ibole Formation, which is succeeded in turn by the Mwambiti Member, the Tinde/Kiloleli Members, and an unnamed

A preliminary comparison of the faunas from the four stratigraphic units suggests that there is no major difference between them in terms of their overall taxonomic composition, and that all of the fossil sites can be considered to be broadly contemporaneous. Significant differences can be identified in the actual structure of the vertebrate communities at different localities, even within a single stratigraphic unit (cf. the faunas at Tinde and Kiloleli), however, these almost certainly reflect facies or palaeoecological differences, rather than major temporal differences.

Unfortunately, because of the lack of volcanic rocks in the Manonga Valley, it is not possible to correlate the stratigraphic units to an absolute time scale. At present, the only means of estimating the age of the sediments is through faunal correlation, by which comparison is made with other sites in East Africa that have been dated by radiometric methods. Preliminary work on the faunas suggests that the age of the localities is not younger than Pliocene in age, and comparisons of the mammals with

those from specific East African sites shows that the fauna bears a close resemblance to that from Lothagam in northern Kenya (Patterson et al. 1970, Smart 1976, Behrensmeyer 1976). This would indicate that the sediments in the Manonga Valley are late Miocene to earliest Pliocene in age (c. 5–6 Ma).

A diverse fauna has also been recovered from the *mbuga* clays, which often form a fairly thick layer of superficial deposits covering the Neogene sediments. The mammals all belong to extant species, clearly pointing to a late Pleistocene or Holocene age. Most importantly, the fauna contains a single fragment of a human skull, and bones of mammals that show evidence of human activity in association with stone tools. It is hoped that with further prospecting in the Manonga Valley, additional archaeological occurrences will be discovered. A preliminary correlation of the major stratigraphic units and their relationship to the individual fossil localities is presented in Table 2.

Table 2. Preliminary correlation of the major stratigraphic units and fossil localities in the Manonga Valley.

Estimated Age	Stratigraphic Unit		Key Fossil Localities
Late Pleistocene-Holocene	Mbuga Clay		Ngofila 2, Nyawa, Ipembe
Late Miocene- Early Pliocene	Wembere- Manonga Formation	Unnamed Member	Ngofila 2-4, Beredi South 1
		Tinde/Kiloleli Member	Tinde East and West, Kiloleli 1-4, Shoshamagai 1-2, Mwambiti 1-2, Ngofila 1-5, Ipembe
		Mwambiti Member	Beredi South 4, Mwambiti 1, Nyawa
	Ibole Formation		Shoshamagai 2, Inolelo 1-3, Mwambiti 3-4

Conclusions

Two seasons of exploration have shown that the Manonga Valley is now one of the most promising new paleoanthropological research areas in East Africa, with tremendous potential for future long-term paleontological and archaeological research. The late Miocene to early Pliocene age of the sediments, in conjunction with their paleontological productivity, makes the sites in the Manonga Valley of especial importance for investigations into human origins. However, the extensive lake basin is still largely unexplored, and a long-term program of systematic prospecting, surveying and mapping is needed. Plans are already underway to organize a third field season during the summer of 1994.

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■ UGANDA

Masaka Hill Revisited

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neighboring kingdoms of Bunyoro and Nkore throughout the precolonial era. No archaeological excavations have ever been conducted at the site, which lies on the flat top of the hill. Lanning (1954) produced a sketch map of the site showing an earthen rampart about six feet across enclosing a circular area about 180 feet in diameter. A second concentric rampart branched off from the main enclosure on the west. There were six named openings ("gates") in the ramparts. Local residents were able to tell Lanning about the ceremonies that occurred at the site and about some of the artifacts stored and used there, including a royal drum (*Rusama*) stolen from the shrine during the religious strife of the late nineteenth century. Various artifacts given to Lanning or collected by him at the site are stored in the Uganda Museum in Kampala.

Renewed interest in Masaka Hill has been provoked by Peter Schmidt (1990) who challenged the widely accepted notion that the Bigo site was the capital of a Cwezi kingdom. He has drawn attention to those few sites, including Masaka Hill, where a link to the Bacwezi seems indisputable. Inspired by research further south in Buhaya (Schmidt 1978), he has also argued for a connection between power and ironworking at Masaka Hill (Schmidt pers. comm.). Thus, archaeological investigation of Masaka Hill merits high priority. However, no archaeologist or historian, to the best of our knowledge, has visited the site in the last thirty years. Kamuhangire's new observations are, therefore, of particular interest.

Introduction (Peter Robertshaw)

Masaka Hill is located on the north bank of the Katonga River in western Uganda, about 15 miles northwest of the site of Ntusi and 11 miles upstream from the Bigo earthworks. An ancient center of worship described by Eric Lanning (1954), Masaka Hill figures prominently in oral traditions, being linked with the Cwezi hero Wamala and subsequently serving as the spiritual center of the Bwera region which was able to assert its autonomy from the larger

**Masaka Hill—1991
 (Ephraim Kamuhangire)**

Since E. C. Lanning visited and made a survey of Masaka Hill in 1952, a lot of changes have taken place there. The site is no longer an active centre of worship of the Bacwezi cult. The traces of the enclosure with specific gates are marked by a few old fig trees which are arranged in a semi-circle; and accessibility to the site became impossible for a number of reasons. In the first place, the whole region surrounding the site was infested with tsetse flies which forced the pastoralist communities to