Table 1. Asante radiocarbon dates.

Lab No.	Site	Uncalibrated age BP
Gd-6540	Adansemanso	310 ± 70
Gd-5996	Adansemanso	680 ± 50
Gd-6545	Adansemanso	740 ± 70
Gd-6541	Adansemanso	1050 ± 100
Gd-6537	Adansemanso	1110 ± 110
Gd-6546	Anyinam	170 ± 70
Gd-5998	Anyinam	550 ± 50
Gd-5997	Esiease	230 ± 50
Gd-6543	Esiease	190 ± 60
Gd-6542	Esiease	450 ± 80

These dates were supplied by Dr. M. F. Pazdur of the Radiocarbon Laboratory at Gliwice, Poland. The chronology suggested by these dates is congruent with what archaeological evidence had suggested, with occupation at Anyinam and Esiease being comparatively recent whilst Adansemanso has evidence for an earlier occupation with five of the dates suggesting activity considerably before European contact. At this site lack of imports and smoking pipes had already suggested at least partial abandonment before the seventeenth century.

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■ KENYA

Recent Findings of Middle Stone Age Material from East Turkana

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Paleoanthropological fieldwork, under the coordination of Dr. Richard Leakey, began at Koobi Fora, east of Lake Turkana in the late 1960s (Leakey and Leakey 1978). The Koobi Fora region contains rich fossiliferous and artifact bearing deposits which span the time period from the Plio-Pleistocene to the Holocene. Although the Plio-Pleistocene and Holocene archaeological remains have been well documented (Barthelme 1985; Harris and Isaac 1978), very little is known about the Late Pleistocene archaeological record. A detailed study of the Middle Stone Age (hereafter MSA) archaeology of Koobi Fora was therefore undertaken by one of us (Kelly in prep)

Earlier preliminary fieldwork by one of us (J. W. K. H.) yielded one minor scatter of MSA artifacts (FwJi 1—see Fig. 1) associated with the hominid femur KNM-ER 999 (Kelly and Harris in prep). A partial cranium recovered in the 1980s within several kilometers of FwJi 1 has also been identified recently as belonging to *Homo sapiens* (Brauer et al. 1991).

This paper will provide a preliminary description of the location, geological context, and distribution of new artifact finds documented in fieldwork undertaken

by one of us (A. K.) during 1990, 1991 and 1992. A brief characterization of the assemblages follows together with a possible explanation for the low density of the East Turkana MSA in comparison to other MSA assemblages from Kenya.

Site Location and Geological Context

The artifacts were recovered from three separate areas in the East Turkana region (see Fig. 1). Two occurrences are found within a kilometer of one another along an erosional escarpment just to the south of Ileret Police Post. The northern occurrence, designated as FwJi 2, consists of an erosional outcrop which extends for approximately 1 kilometer. Surface collection of two relatively high density 5 x 5 m areas was undertaken in 1991. During the following summer, a 1 x 2 m geological trench was excavated in the proximity of one of the surface samples to determine whether the MSA artifacts occurred in a discrete horizon. A clear artifact horizon could not be distinguished within the predominantly sandy sediments.

The southern occurrence, designated FwJi 3, is also found along an erosional outcrop, although the extent of the MSA deposits is considerably more restricted and the artifact horizon was significantly more distinct. The sediments which make up the artifact horizon consist of sands, pebbles and small gravels and appear to be colluvial in origin. Thirty-four square meters were surface collected and a 1x1m area was excavated to confirm that the artifacts were eroding from the colluvial horizon.

Two more MSA occurrences exist on the backslopes of the Karari Escarpment. These sites have been designated FxJj 61 and FxJj 66. The site of FxJj 66 consisted of a 500 m long strip of eroded outcrop. Six 5 x 5 m surface collections were made in areas of higher artifact density during the summer of 1991. Additional research during the summer of 1992 indicated that excavation in this area would not be feasible because of the topography of the deposits. The site of FxJj 61 is composed of about 1 kilometer of erosional outcrop upon which MSA artifacts were found. During the summer of 1991, six random 5x5m surface samples were taken along the outcrop. To ascertain whether there was a discrete artifact horizon and whether it could be traced along the entire outcrop, seven geological trenches were also excavated during this season. The sediments consist mainly of calcium carbonate rich sands and occasional silts. Excavation was initiated in 1992 at the northern end of the outcrop where the highest surface density of artifacts was located. Artifacts were recovered in relatively low densities from the 12 square meter excavation. To increase the sample size, additional artifacts were surface collected beginning at the excavation and extending approximately 30 m to the south along the outcrop.

The final MSA occurrence, designated GaJj 17, is located approximately 15 kilometers east of the Lake Turkana shoreline. The artifact bearing sediment is composed of an aerially exposed coarse to medium-grained sandstone which overlies fine-grained sands. During the summer of 1991, three 5 x 5 m areas were surface collected and a 3 x 1 m excavation was undertaken. The excavation confirmed that the artifacts were restricted to the overlying indurated sandstone.

Site Distribution

The three areas in which MSA occurrences have been located in the East Turkana region appear to differ ecologically. The Ileret occurrences (FwJi 2 and 3) exist near the present shoreline and near a major river channel. The vegetation along the river, namely large trees and thicker shrub, is scarce within the lake basin. The river may not have been present during the Late Pleistocene, but if it was, it would have provided resources (e.g., plant food, riverine fauna, large cobbles) which were unavailable in other areas of the basin.

The inland sites to the east of the Karari escarpment (i.e., FxJj 61 and 66) lie approximately 23 kilometers from the present lake margin, but are closer to the basin margin than any of the other sites. It is at the basin margin that significant sources of chert and chalcedony outcrop (C. Fiebel and C. Nelson pers comm). The proximity of

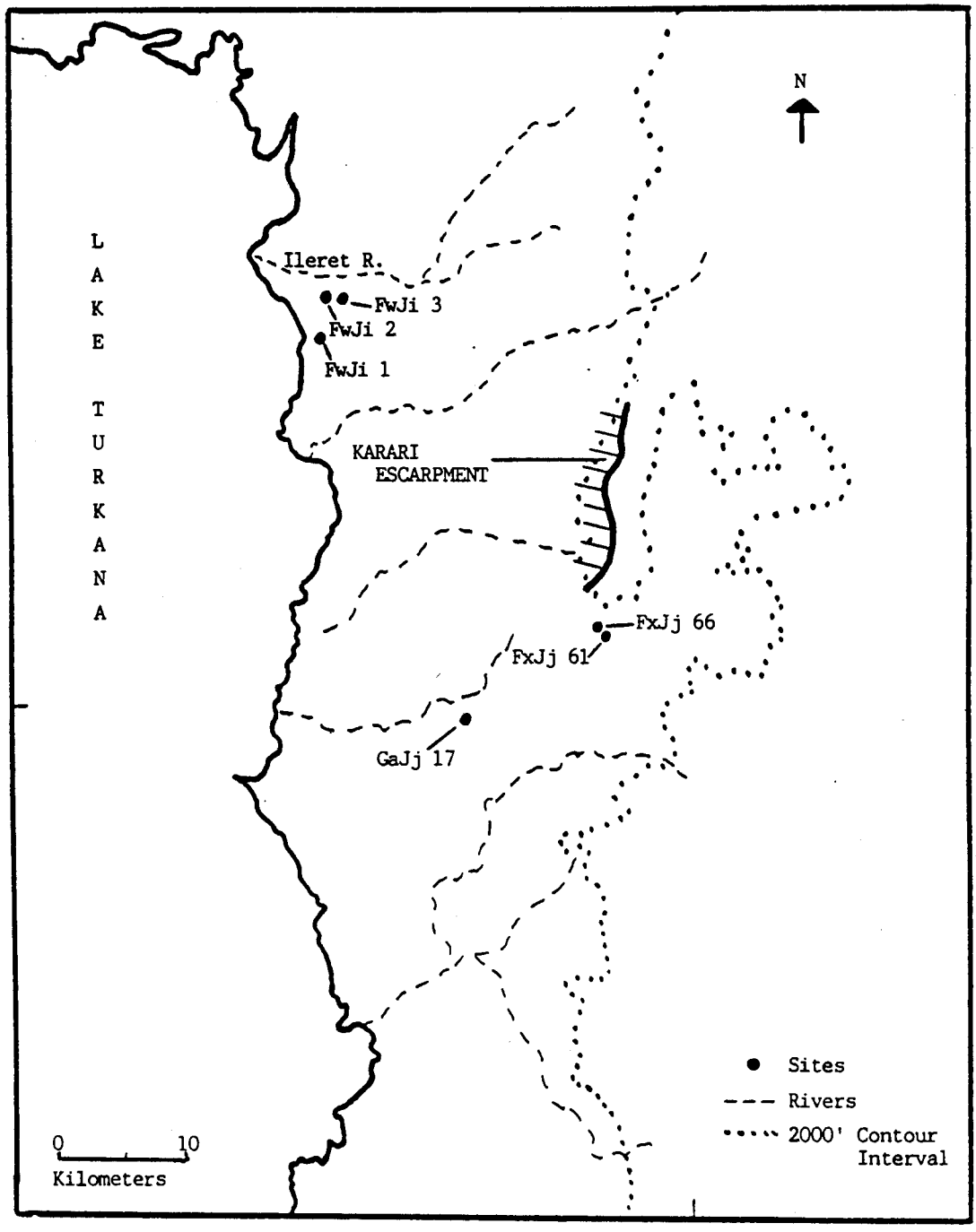

Fig. 1. Physiogeographic Map of East Turkana Region Indicating Location of Middle Stone Age Sites.

these raw material sources may have made this area an attractive place.

Finally, the site of GaJj 17 lies on what appears to be a paleo-beach (Feibel pers comm). Its probable location near the shores of Lake Turkana would have provided easy access to lacustrine resources such as fish and hippo.

Although analysis of the East Turkana MSA assemblages is not complete, preliminary research indicates that the assemblages from these three areas also differ. It may be that part of the intra-regional variation in these assemblages can be related to activity differences among varying habitats.

Lithic and Faunal Assemblages

A total of 121 artifacts along with some fragmentary faunal remains were recovered from the surface samples and geological trench at FwJi 2. The majority of the artifacts consists of flakes and flake fragments manufactured on chert and chalcedony (other raw materials include phonolite/basalt and quartz). Additionally, several Levallois-type cores and one retouched point were recovered. The majority of the faunal remains that could be identified were fish (e.g., Nile perch), turtle, and crocodile, although there were some large bovid (i.e., size 2 and 3) and hippo remains.

The artifacts (n = 232) recovered from FwJi 3 were similar in character to those found at FwJi 2. Again the majority of the assemblage is composed of flakes and flake fragments of micro-crystalline silicates (other raw materials include phonolite/basalt, ignimbrite and quartz), along with several Levallois-type cores and miscellaneous retouched pieces. The fauna is somewhat different from that recovered at FwJi 2. Although there are still some fish remains, there is a greater number of mammalian remains, including the lower right M3 and upper right M2 of *Megalotragus*, the distal end of a femur from a small primate, and several lower limb elements from size 3 bovids.

At FxJj 66 and 61, the MSA lithics appear to be somewhat larger overall than those from FwJi 2 and FwJi 3. Although chert and chalcedony are still the main raw materials at these occurrences, there is a higher percentage of phonolite/basalt artifacts. This increase in volcanic artifacts at FxJj 61 and 66 may contribute to the apparent increase in overall artifact size. The assemblages (n = 194 at FxJj 66; n = 509 at FxJj 61) are mainly composed of flakes and flake fragments, although several points have been recovered from both sites and there are a few examples of Levallois type cores. Faunal preservation at both sites is poor. There was no fauna recovered from the surface at FxJj 66. At FxJj 61 examples of identifiable faunal remains include crocodile teeth, hippo tusk, a lower molar of a size 3 alcelaphine, and fragments of a size 4 tragelaphine horn core.

Lastly, at GaJj 17 a total of 378 artifacts was recovered. Again the assemblage is predominantly manufactured on chert and chalcedony, with phonolite/basalt and ignimbrite being less common. As with the other sites, flakes and flake fragments make up the majority of the assemblage and Levallois-type cores and points exist. The chert and chalcedony is very different in color from that found at FwJi 2 and 3, suggesting procurement from different sources. In overall artifact size, the assemblage appears to be similar to those collected from FxJj 61 and 66. The identifiable faunal remains from the site are predominantly of hippo, crocodile, turtle and fish, although a few mammalian remains, including a suid upper tusk, were also found.

Site Density

An interesting aspect of the MSA occurrences in the East Turkana region is that they are all relatively low in artifact density compared with occurrences elsewhere in East Africa. The low density may in part be due to collection of mainly surface artifacts (i.e. the assemblages have been winnowed by water and other post depositional factors). However, excavations at FxJj 61, FwJi 3, and FwJi 2 also suggest diffuse artifact scatters. This pattern is in marked contrast to the pattern found for other Kenyan MSA assemblages where

artifact density is high, such as at Prospect Farm, Prolong's Drift, Muguruk, and Lukenya Hill (Anthony 1978; Merrick 1975; McBrearty 1986). Some of the difference may be due to variation in depositional environment between the East Turkana region and regions further to the south. However, we suggest that the frequency, duration, and number of MSA occupations at Lake Turkana differed from those in the Central Rift Valley and Lake Victoria regions and that this may also explain the variation in artifact density.

The present environment at East Turkana is arid and supports a limited variety and number of plants and animals. Although the lake level has fluctuated periodically in response to climatic changes (Feibel 1988), the surrounding landscape appears to have remained relatively stable. If this reconstruction is correct, then it is reasonable to suggest that the climate near Lake Turkana was arid during the early Later Pleistocene. The region would therefore not have been an area to which MSA hominids were frequently attracted. Furthermore, even if there were populations living permanently in the area, the carrying capacity of the environment must have kept the numbers of MSA hominids low. Such conditions could partially explain the low density of MSA artifacts within the East Turkana region.

The environments surrounding Lake Naivasha/Nakuru, Lake Victoria, and on the Athi Plains, however, were more hospitable. Vegetation and animals were more abundant and variable and rainfall was more frequent. Although climatic shifts during the Late Pleistocene had an effect on the vegetation, fauna, and lake levels of these regions (Messerli et al. 1980; Street and Grove 1976; Washbourn-Kamau 1967), the conditions were almost certainly never as harsh as those at East Turkana. As such, the higher density of artifacts at the sites remote from Lake Turkana is to be expected.

Conclusion

The research on the MSA from East Turkana has not only provided new and unique lithic assemblages with which future comparisons can be made, but also provides new insights into the range and variability of MSA hominid activities within the region. Furthermore, the contrasts between the diffuse MSA occurrences at East Turkana and the high density sites in other regions of Kenya, makes it possible to argue that MSA hominid populations adapted their behaviors to the varying landscapes. Whether the low density sites in East Turkana reflect infrequent use of the area or low population levels remains problematic, but it is clear that MSA hominids were well adapted to exploit a range of habitats in a manner not unlike the Later Stone Age peoples.

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Sangoan Technology and Habitat at Simbi

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It is well known that implements of the Sangoan industry overlie Acheulian artifacts and underlie those of the MSA at a number of equatorial African sites. The Sangoan is significant because the shift from Acheulian to MSA technology seems to indicate a large scale change in hominid behavior, which may coincide with the first appearance of modern humans in Africa (McBrearty 1987).

The precise nature of the Sangoan industry, its environmental circumstances, and its age have been problematic since the first assemblages were described nearly 70 years ago (Wayland & Smith 1923). Primarily our ignorance is due to the dearth of excavated samples from reliable stratigraphic contexts, conditions in the humid tropics that conspire against the preservation of bone or other organic remains, and the lack of reliable dating techniques for this range of time. Application of laser technology, however,