Iron Age archaeology in the southeastern Lake Tanganyika region, Southwestern Tanzania

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Introduction

This paper reports on archaeological investigations conducted in the southeastern Lake Tanganyika region, Nkansi District (Figure 1) between July 1992 and December 1993. The major goals of the research project were to establish the archaeological potential of the area and to reconstruct its socioeconomic adaptations and culture history with an emphasis on ironworking. The field investigations incorporated ethnographic enquiries, archaeological survey, and excavations conducted in four separate field seasons, averaging six weeks each.

The Nkansi District is divided into three physiographic regions: the Lake Tanganyika shore to the west, the Fipa plateau to the east, and the escarpment in between. The archaeological investigation concentrated on four localities representing the three physiographic regions. These included Kirando and Kala along the Lake Tanganyika shore, King'ombe on the Fipa escarpment, and Kalundi on the Fipa plateau (Figure 1). The four research localities yielded 75 sites, ranging in cultural context from microlithic industrial areas (Later Stone Age), to Iron Age settlements, ironworking (smelting and refining) sites, ore sources, cave camps, ritual sites, and historical monuments (Figure 2). The sites were enumerated according to the Standardized Site Enumeration System for the Continent of Africa (SASES) (Nelson 1971) beginning with a code number: HvIk for Kirando, IaII for Kala, IaIm for King'ombe, and HxIo for Kalundi, followed with a serial number assigned in the order in which the sites were found in each SASES block. This paper focuses on ironworking and habitation sites.

Ironworking

The research project revealed three major types of ironworking technologies in Nkansi District each of which differed in technological attributes, spatial distribution, and chronology. These types include the *katukutu*, the *malungu* and the Barongo-type.

Katukutu technology

The technology referred to as *katukutu* by the Fipa was characterized by short (70-120 cm), globular furnaces (Figure 3) and was confined to the area along the shore of Lake Tanganyika and on the Fipa escarpment. Most of these furnaces were plain but a few were decorated with holes punched with a stick or a finger. The decoration was either applied over the entire body or only above the shoulder. A few furnaces had two or three wall layers indicating that they had been reused. The furnace interiors were melted or highly vitrified.

Each furnace had eight openings: seven ordinary tuyere ports, averaging 23 cm in width, and one wider opening, about 40 cm across. The later opening was used as a tuyere port during the smelting process and as rake-hole at the end of the smelting process. Each tuyere port accommodated three tuyeres and the wider opening carried six or seven tuyeres. The tuyeres were narrow and long, varying in external diameter from 3.3 to 6.0 cm and internal diameter from 1.6 to 4.0 cm and in length from 40 to 50 cm. About three quarters of the tuyere lengths projected inside the furnace, thus preheating the in-flowing air before it was released into the furnace chamber.

Each furnace had a ritual pot buried upside-down at its bottom center, covering medicinal materials, called *vizimba* (singular *kizimba*) in Kifipa (the Fipa language). The medicine was believed to have the power to expel evil spirits and to catalyze the smelting process. Charcoal and charred woods, evidence of vegetal *vizimba*, called *nchinji* in Kifipa, were found beneath the pots (Figure 3). A few sites also revealed animal bones including rabbit, tortoise, and caprids, as well as shells (bivalves and land snails). Some of the animals had been used as sacrifice and others as food for the smelters. The shells may have been used as a flux; however this is difficult to confirm

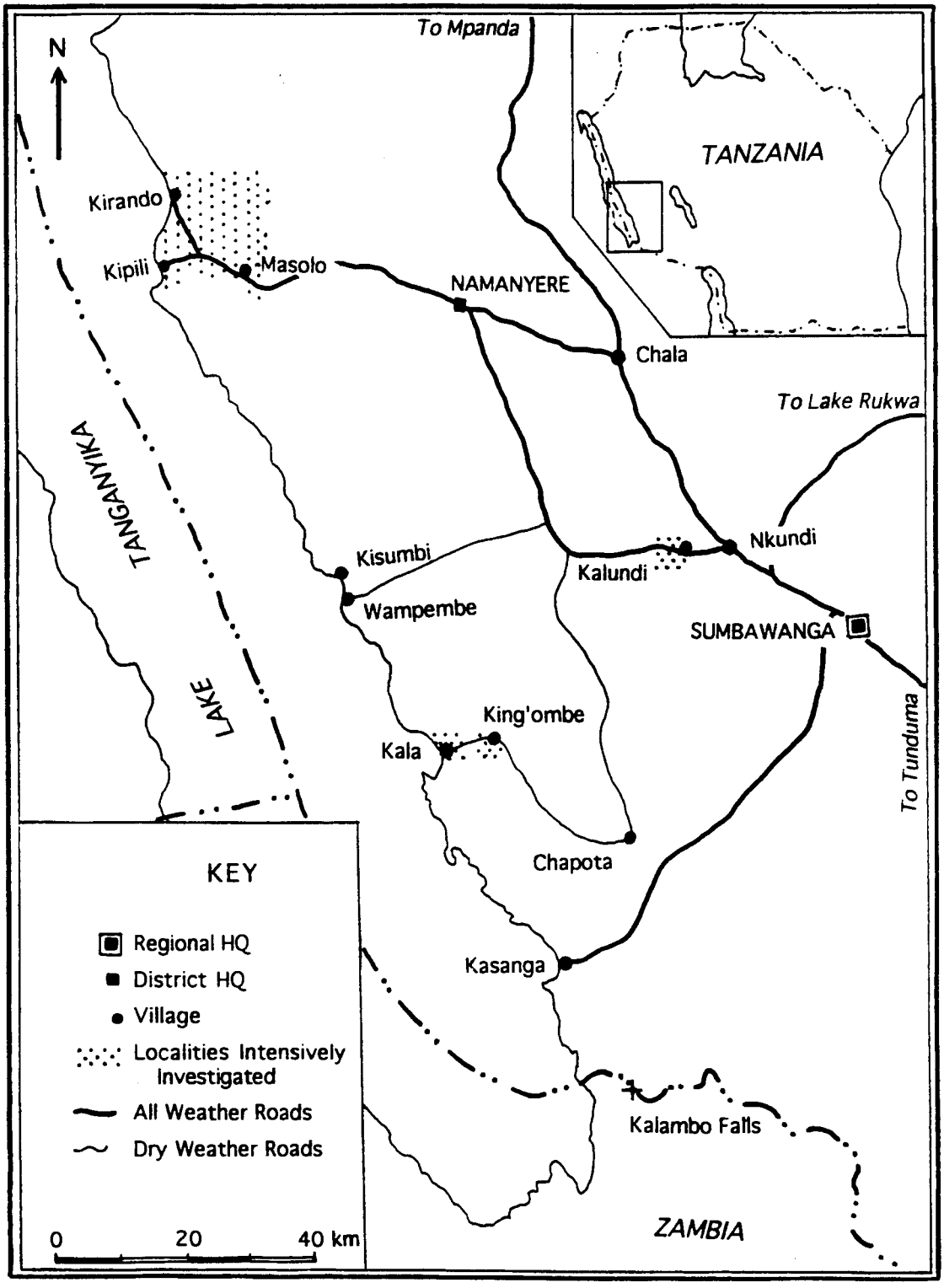

Figure 1: Localities of intensive investigation

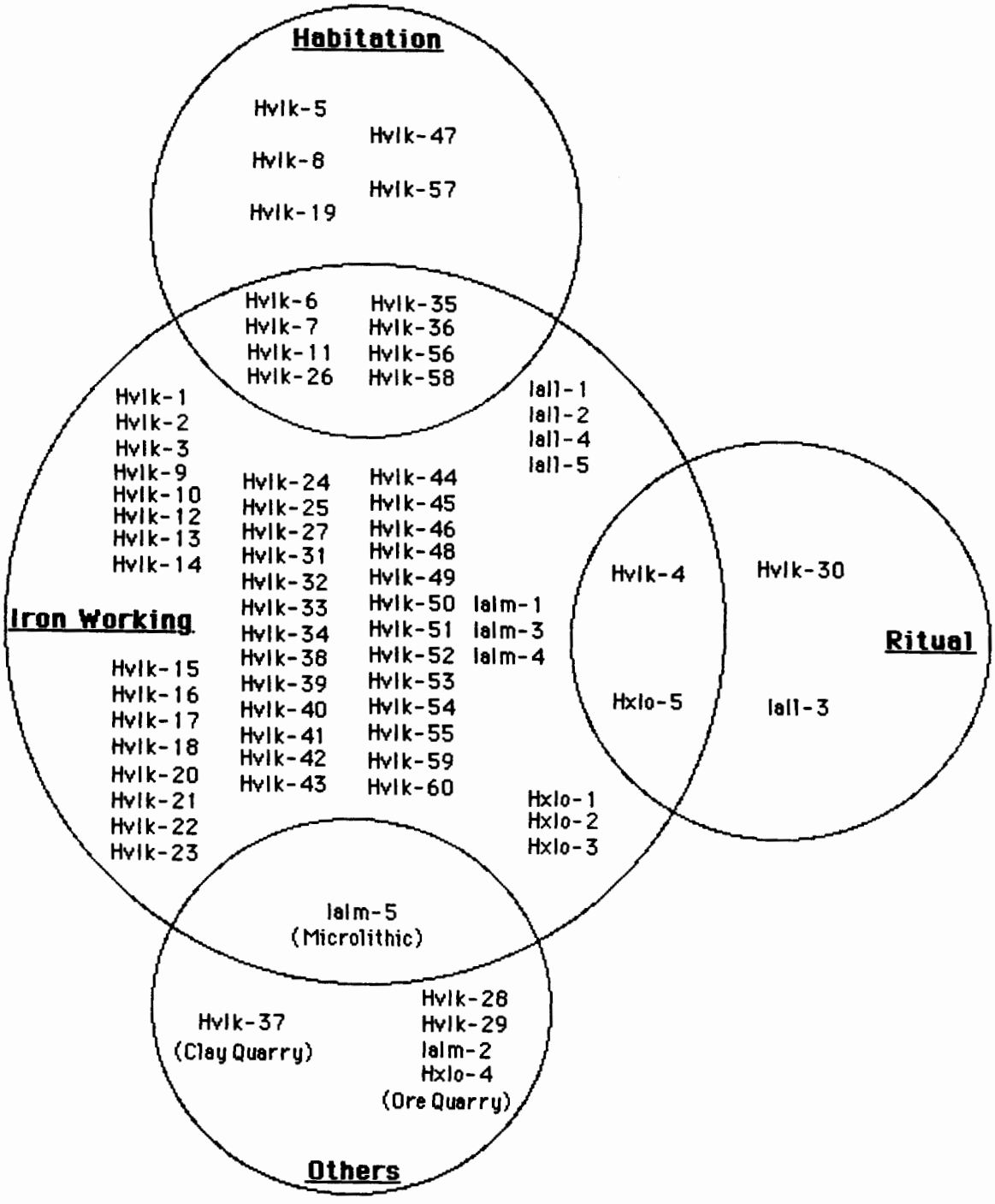

Figure 2: A Venn diagram of site types

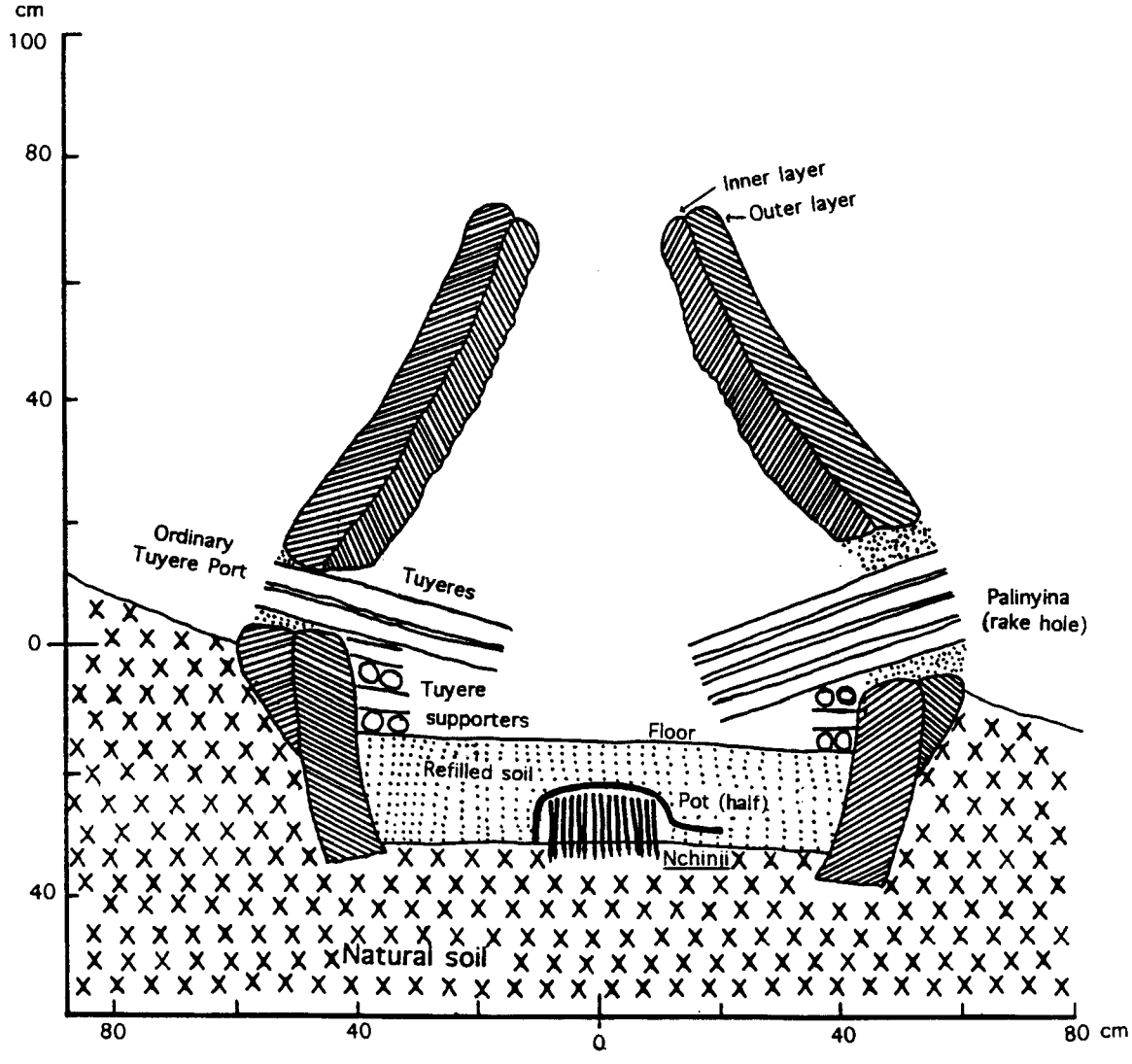

Figure 3: Profile of a *katukutu* furnace

because of the small sample size (only three shells were found in the nine *katukutu* furnaces that were excavated). Although chemical analysis of the slag revealed the presence of calcium, it is possible that this may have come from the termite clay used for furnace and tuyere construction (Killick 1990).

Katukutu technology was also characterized by large heaps of tuyeres but very little slag. The paucity of slag resulted from a combination of factors including: re-smelting of old slag by both the *katukutu* and Barongo-type smelters; reuse of slag by local healers; and corrosion (the slag had a high iron content and most sites were located in or near wet areas, rivers or marshes).

The sites range in age from 400-200 b.p., calibrated to mid-sixteenth to mid-eighteenth centuries A.D. (Table 1). Little is known of this technology among modern Fipa. They report that it was practiced by the Batwa who, they claim, lived there before the coming of the Fipa, dated genealogically to the early 18th century (Willis 1981). Although this seems to be a reasonable hypothesis, the current research did not yield any convincing evidence to support it. The chronometric dates, beliefs associated with iron smelting, and technological attributes such as convection draft and placement of multiple tuyeres in each port show that *katukutu* technology is closely related to *malungu* technology practiced by the Fipa until the middle of this century. This relationship may mean that *katukutu* technology was practiced by the earlier Fipa rather than Batwa whose knowledge of ironworking is also questionable (Dr. Yusuf Juwayeyi, personal communication).

Malungu technology

The technology called *malungu* in Kifipa was prevalent on the plateau and the Fipa escarpment. It was characterized by tall (200-350 cm), truncated-cone furnaces (Figure 4). None of these furnaces were decorated. Unlike *katukutu* furnaces which had pots at the bottom center, *malungu* revealed a concave formation at the center packed with short (15-20 cm) strips of wood, seemingly *vizimba*, often in four horizontal courses (Figure 4). At the beginning of each smelt every furnace was furnished with a "wick" or *umpakasi* in Kifipa. This was a long stick running through the furnace's central axis and was used as a wick, bringing fire to the furnace base, after being lit at the top of the furnace. Informants also explained that this stick was viewed as a magical conductor, transmitting magical powers from the *vizimba* at the furnace bottom to the top, safeguarding the combustion process during smelting.

Each furnace consisted of 10 openings, nine of which were narrow and one which was wider, called *palinyina* in Kifipa, meaning maternal opening. Three or four tuyeres were placed in each ordinary port. The *palinyina* had double that number. The furnaces were located in the western side of termite mounds with the *palinyina* facing west. The association of termite mounds with ironworking had both technological (source of clay) and religious (home of ancestral spirits) factors (Mapunda 1995). Only one furnace was located per termite mound, contrary to the *katukutu* furnaces: there were up to 14 furnaces around a single termite mound (Mapunda 1995).

On average, 1.5 m^3 of refuse, consisting mainly of slag and tuyeres were found next to each furnace. The tuyeres were wider (2.4-3.5 cm in internal diameter and 4.9-7.6 cm in external diameter) and shorter (22-35 cm) than those used in the *katukutu* furnaces. The slag consisted mainly of dense, rough blocks that had solidified at the bottom of the furnace and flow (tapped) slag that solidified outside the furnace, comprised of dense, smooth sheets or fingery pieces.

The bloom from the smelting furnaces was refined in miniature furnaces called *vintengwe*. These were almost cylindrical in shape, measuring 35-50 cm in height and 30-40 in internal diameter. Each furnace had four openings: three housed a tuyere connected to bellows and the fourth opening was used for slag tapping. Unlike the smelting furnaces which operated by a natural draft, *vintengwe* were operated by forced draft.

Malungu technology observed in this study ranges in age from the late nineteenth century to the mid-twentieth century A.D. (Table 1).

Barongo-Type Technology

Of the 66 ironworking sites (Figure 2), three were representative of Barongo-type technology. All were located at Kirando and included sites HvIk-35, -36 and -60. The technology observed

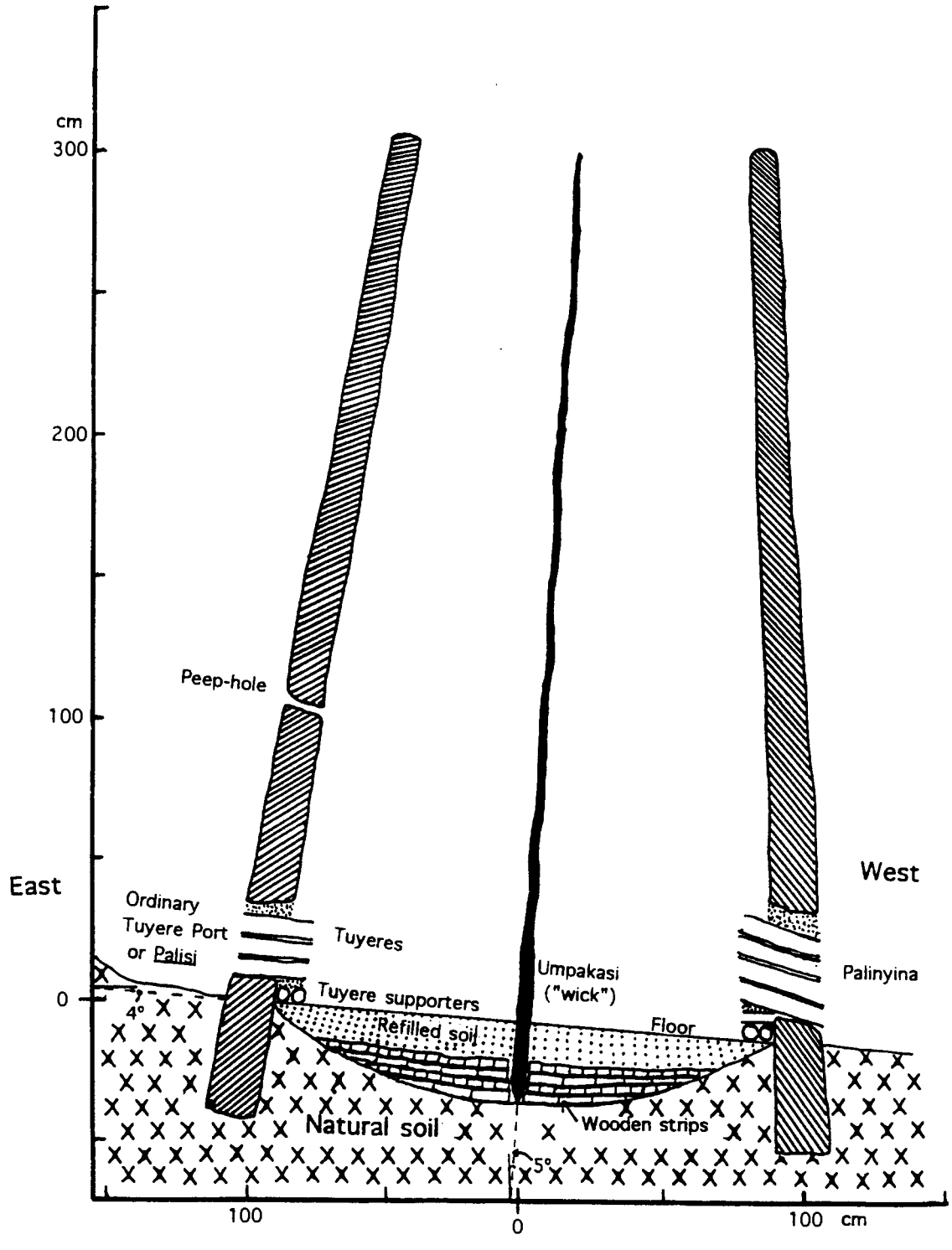

Figure 4: Profile of a *lilungu*

Table 1: C14 Dates from excavated sites, Southeastern Lake Tanganyika

Sample Number	Provenance	Site Type	Uncalibrated Dates (b.p.)	Calibrated dates A.D., 2 sigma, 95% accuracy
Beta-71386	HvIk-1, Unit 2, Block 2, 38 cm	katukutu ironworking	280 ± 60 b.p.	1470-1950
Beta-71387	HvIk-1, Unit 2, Block 2, 53 cm	katukutu ironworking	200 ± 80 b.p.	1530-1950
Beta-63011	HvIk-17, Unit 1, Block 2, 42 cm	katukutu ironworking	430 ± 70 b.p.	1400-1640
Beta-63012	HvIk-17, Unit 1, Block 2, 41 cm	katukutu ironworking	350 ± 70 b.p.	1430-1950
Beta-63014	HvIk-25, Unit 1, Block 1, 35 cm	katukutu ironworking	100 ± 70 b.p.	1660-1950
Beta-63015	HvIk-25, Unit 2, Block 2, 38 cm	katukutu ironworking	310 ± 60 b.p.	1450-1950
Beta-64657	HvIk-32, Unit 1, Block 2, 82 cm	katukutu ironworking	290 ± 80 b.p.	1440-1950
Beta-71392	IaIm-1, Unit 3, Block 2, 55 cm	katukutu ironworking	360 ± 80 b.p.	1430-1950
Beta-71393	IaIm-1, Unit 5, Block 2, 60 cm	katukutu ironworking	230 ± 50 b.p.	1650-1950
Beta-63017	HvIk-35, Unit 2, 24 cm	"Barongo" ironworking	20 ± 50 b.p.	1700-1950
Beta-71389	HvIk-39, Unit 1, Block 2, 75 cm	malungu ironworking	30 ± 50 b.p.	1890-1950
Beta-63018	HxIo-2, Unit 1, 25 cm	malungu ironworking	60 ± 50 b.p.	1680-1950
Beta-63010/ ETH-10614 (AMS)	HvIk-11, Unit 2, 16 cm	habitation	595 ± 55 b.p.	1290-1430
Beta-71388/ CAMS-12707 (AMS)	HvIk-11, Shovel Test #30, 55 cm	habitation	250 ± 60 b.p.	1500-1950
Beta-63013	HvIk-19, 52 cm	habitation	300 ± 70 b.p.	1450-1950
Beta-71390	HvIk-58, Unit 3, 32 cm	habitation	1040 ± 80 b.p.	890-1220

here bears a strong resemblance to that practiced by the Barongo people in the Mwanza Region to the north (de Rosemond 1943; Schmidt in preparation), hence the term "Barongo-type". So far, no site has been reported south of Kirando. We can, therefore, tentatively say that the technology extended from southeastern Lake Tanganyika (in Rukwa Region) in the south as far as southern Lake Victoria (Mwanza Region) in the north.

None of the Barongo-type sites at Kirando revealed a standing furnace; only chunks of burnt clay from broken furnace walls were found. Neither height nor diameter of the furnaces could be estimated because the furnace slabs were too fragmentary. But de Rosemond (1943) and Schmidt (forthcoming) observe that south of Lake Victoria the Barongo furnaces measured 60-90 cm high and each consisted of five tuyere ports. Rake-holes were not used in this technology because blooms were picked after dismantling the furnaces at the end of each smelt.

There were fewer tuyere remnants at the Barongo-type sites than at those of the *katukutu* or *malungu* technologies. No complete tuyere was found, thus their maximum length is not known. Tuyeres varied in external diameter from 4.1-5.4 cm and in internal diameter from 3.0-3.5 cm. Some end pieces were flared, indicating that bellows were probably used. The sites had abundant slag, most of which displayed either charcoal impressions or charcoal entrapments. Unlike the other two technological types which were located adjacent to termite mounds, sites of this type were located in varied topographic environments with no relationship with termite mounds. This suggests that this technology was practiced by people with different beliefs from those who uitilized *katukutu* or *malungu* technologies.

One charcoal sample (Beta 63017) has been dated to 20 ± 50 B.P., calibrated to A.D. 1702-1955 (Table 1). However, the elderly informants at Masolo, a village close to two of the sites, denied seeing any people practicing this type of iron-working in their lifetime. This suggests that the Barongo-type iron workers stopped making iron or abandoned the area before the contemporary inhabitants of Masolo arrived from the plateau and other places around the end of the last century.

Habitation sites

Thirteen sites found during this research project yielded evidence for habitation (Figure 2). Four of the sites, HvIk-11, -26, -57 and -58, were unique in terms of quantity, variability, and age of materials and were therefore chosen for excavation. The evidence for habitation included features such as architectural structures and rockshelters, artifacts such as daub, pottery, beads, tobacco pipes and gourd sherds, and faunal remains.

Concentrations and scatters of burnt daub on the ground were located at two sites, HvIk-11 and HvIk-58. Low density scatters of faunal remains were found at most habitation sites, whereas high density scatters and concentrations of faunal remains were limited to three sites: HvIk-5, -11 and -58. The remains from site HvIk-5 were principally of domestic cattle (zebu); site HvIk-11 consisted of zebu as well as buffalo and hippo remains; and site HvIk-58 consisted mainly of zebu and buffalo remains.

Potsherds were the most ubiquitous materials at the habitation sites. Five different traditions have been recognized based on attribute comparison within the research area and between the research area and other sites in East and Central Africa, superimposition of the pottery and C14 dates. The traditions include Kalambo, Triangular Incised ware (TIW), Ivuna, Katukutu, and recent (Kirando and Tabwa) pottery.

Kalambo Tradition

The name is derived from the type site, Kalambo Falls, located 70 km south of Kala, along the Tanzania-Zambia border (Figure 1). This site was excavated by J. D. Clark in the early 1960s (Clark 1974). Kalambo tradition ceramics found in Kirando are characterized by open bowls and globular pots, most of which are undecorated (Figures 5a and b). Decorated pots are dominated by simple techniques such as grooving and channelling, hatching, and stamping. Additionally, there are false relief chevron designs and bevelled rims that are often externally thickened (Figure 5b). The pottery has a medium paste and tempered with quartz. Most Kalambo pots are rough inside and smooth outside; the remaining are either roughly finished on both interior and exterior sur-

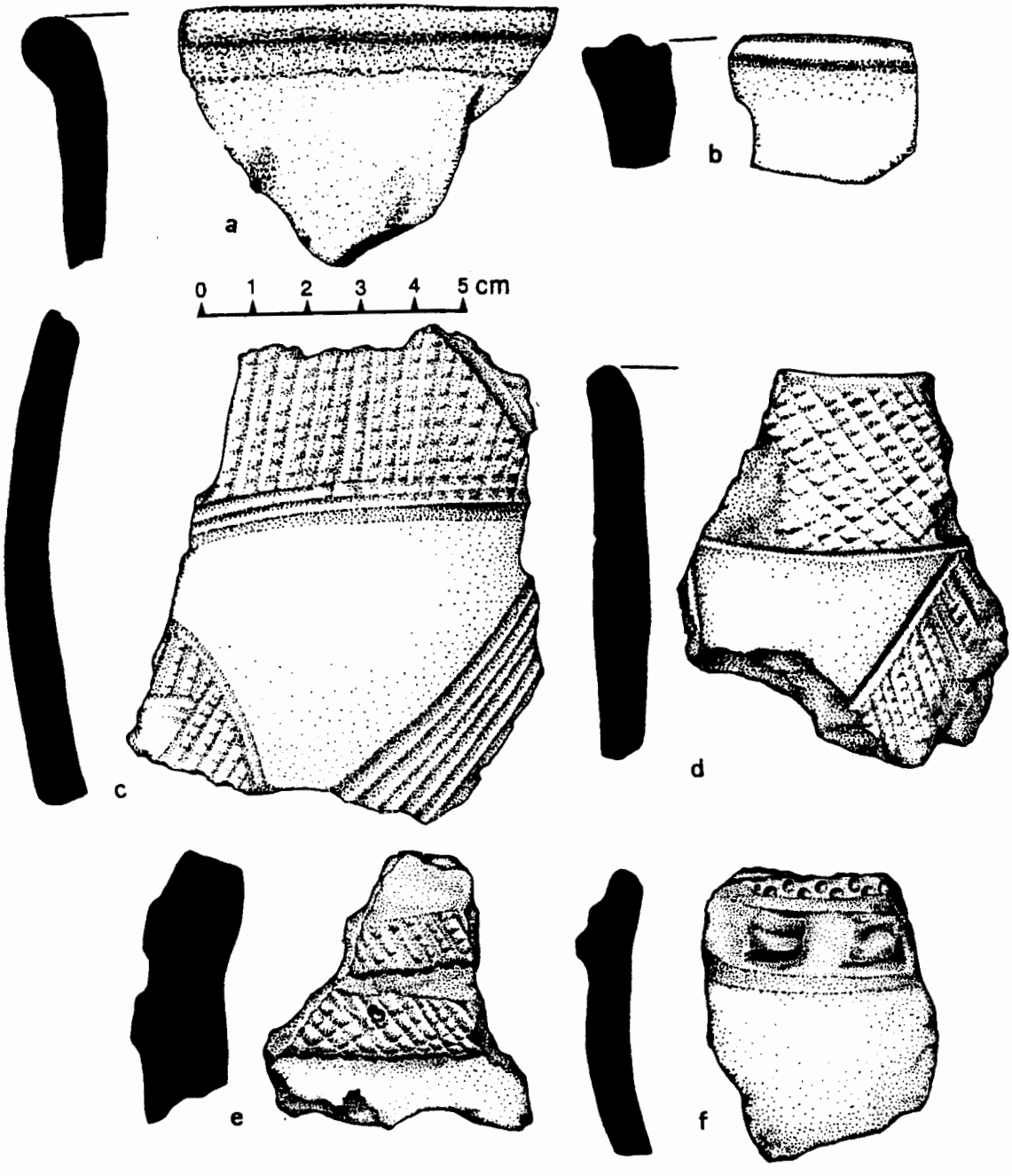

Figure 5: Some Early and Middle Iron Age pottery from the Southeastern Lake Tanganyika region

faces or are smooth inside and out. They appear in buff or brown color.

Clark's excavations at Kalambo showed that the Kalambo pottery dates between the fourth and the eleventh centuries A.D. (Clark 1974). Current research has yielded one C-14 date (Beta 71390) on charcoal taken from the context of both Kalambo and TIW pottery at Kirando, it dates to the tenth century A.D. (Table 1).

Triangular Incised ware

This type of pottery is commonly reported from the East African coast and is known by various names (e.g., Tana, Wenje, Type C, TIW, etc). It dates between the seventh and thirteenth centuries A.D. (Chami 1994).

The pottery included in this category consists of medium to small pots and bowls and a few large globular pots. They are made of fine to medium clay and tempered with quartz and calcitic grits or gravels. Most of the medium and small vessels are burnished outside and/or inside, but large vessels are plain. Over 80% of the rim- and neck-sherds are decorated, and among these about 70% of them are decorated on the rim tops. The dominant decorative techniques include cross-hatching, incising, grooving, and punctating. These were applied in different combinations to form various motifs, most commonly bands of triangular incisions or cross-hatches (diagonal or vertical) bordered with horizontal grooves or bands of diagonal incisions bordered with curvilinear grooves, horizontal lines or punctates (Figures 5c and d).

Ivuna Tradition

Pottery of this category has a great affinity to the pottery found by Fagan and Yellen (1968) during their excavation at Ivuna in the 1960s. The assemblage consists of medium to large hemispherical and open bowls as well as globular pots. Most pots are crosshatched or comb-stamped around the shoulder and the neck, and few also on the lip. The unique feature of this pottery tradition, however, is the presence of bumps or longish wavy or horizontal applications (ridges) around the shoulder (Figure 5e and f). Some of the ridges are decorated with chevron, deep crescent-shaped punctates, or pronounced roulette applications. The paste is fine, compact, and tempered with quartz. The exterior side is smoothed while the interior is generally rough. No date has been obtained from the Lake Tanganyika shore, but the Ivuna pottery from Lake Rukwa (type-site) dates to between 1200 and 1400 A.D. (Fagan and Yellen 1968).

Katukutu Tradition

Almost all potsherds excavated at the *katukutu* sites belong to this tradition, hence its name. It is dominated by large-to-medium jars, hemispherical bowls, and globular pots with vertical or out-turned rims. The medium-size jars and hemispherical bowls were used mainly for ritual purposes inside the furnaces, whereas the other types were found outside the furnace, probably used for non-ritualistic purposes. Most of these vessels are undecorated. The motif of those that are decorated consists of bands of parallel groves around the neck and cross-hatches on the lips. A few pots have red pigment on the outside and are burnished inside, while the rest are smoothed on both sides. The pots have a fine paste and are tempered with quartz. Katukutu pottery ranges in age from the mid-sixteenth century to the end of the eighteenth century A.D.

Recent pottery

This category includes pottery dating from the nineteenth century to the present, and is divided into two sub-traditions: Kirando and Tabwa.

Kirando pottery is locally made and shows some derivative relationship with the Katukutu tradition. It is dominated by globular pots and open bowls with out-turned rims. Decorative motifs include diagonal incisions bordered by curvilinear bands of incisions and inclined incisions (left to right) below the neck without bordering. Common tempering is grog and quartz gravel.

Tabwa pottery is either imported or made by Tabwa immigrants (from Zaire) along the shore. It consists of small carinated pots, and open bowls with vertical rims. All rims are rounded and upturned with a slight flaring towards the exterior. About 30% of the vessels have a red slip on the outside. Almost all vessels are decorated, some around the shoulder and others on the rim, but not

on the lips. The decorations include cross-hatches, bordered on both top and bottom with single horizontal channels or curvilinear incisions. The paste is fine and compact, some consisting of mica, and is tempered with quartz. Almost all pots are burnished both inside and out.

Conclusions

The results of this investigation demonstrate that the archaeology of southeastern Lake Tanganyika region (Nkansi District) is biased towards the Later Iron Age (post-1500 A.D.). Although relatively large amounts of Early Iron Age pottery (Kalambo tradition) are found along the shore, the virtual absence of evidence for ironworking contemporary to the Kalambo pottery is surprising. As most of the early ironworking sites found in East and Central Africa are located either along perennial rivers or lake shores (Clark 1974; Schmidt 1978; Mapunda and Burg 1991; Haaland 1993), the southeastern Lake Tanganyika shore would be expected to have been an attractive ecozone for early ironworking communities.

The paucity of early ironworking materials along the shore is perhaps due to both natural and cultural factors of site formation processes. The principal natural factors are the landscape and the periodic fluctuation of the lake. The lake is bounded mainly by precipitous uninhabitable escarpments and a few narrow habitable plains, most of which are less than a kilometer wide (except Kirando). Because the lake level fluctuated (Livingstone 1965; Haberyan and Hecky 1987), the plains were inhabited only at low levels. During the period of high level people migrated to the highlands, the escarpment terraces or the plateau proper (Mapunda 1995). The limited amount of habitable land also lessened the visibility of archaeological remains: it constrained people to repeatedly return to these narrow plains whenever the lake receded. Thus, older cultural materials were subjected to continuous disturbance through cultivation, construction, and ditch and channel digging for field-fencing. Furthermore, during high lake level periods cultural remains which otherwise would have remained in situ were eroded and washed to other locales.

The fact that the plateau and the escarpments lacked wide, arable river plains and fishable rivers may also explain the paucity of Early Iron Age materials there. However, given that the investigations on the high altitude region (the Fipa escarpment and the plateau) was limited in aerial coverage, this explanation should be regarded as hypothetical. The terraces on the escarpment and perhaps the plateau seem to have been preferred by Stone Age communities. One Later Stone Age site was found at King'ombe on the escarpment where a 4 km^2 area was surveyed. This leads to the speculation that additional Stone Age sites might be found on the plateau and the escarpments if a more extensive survey was conducted.

The occurrence of TIW pottery at Kirando, about 900 km from the Indian Ocean coast, is both interesting and challenging. Since the TIW pottery is traditionally known to be a coastal (Indian Ocean) material culture, its location in the interior prompts some questions especially in regards to the link between the coast and the interior. Although Kirando is the farthest reported TIW site from the Indian Ocean coast, it is not the only one in the interior. Other sites include Dakawa (Haaland 1993), Usambara Mountains (Soper 1971), Ruhuhu River Basin (Mapunda 1991), and Kilosa and Dodoma (Chami 1994). The occurrence of TIW sites in the interior indicates that there was much more social and commercial interaction in East and Central Africa during the late first millennium A.D. than what is currently appreciated. I hope that, as more pottery with TIW affinities continues to be found in the interior, we will soon begin to understand the culture processes that took place in East and Central Africa during the late first millennium A.D.

The period between A.D. 1550-1750 witnessed significant social-cultural changes in the region southeast of Lake Tanganyika. The changes are associated with the introduction of *katukutu* ironworking technology and the related pottery. The abrupt appearance of full fledged iron technology and a new pottery type suggest that a large-scale population influx took place during this time and that these newcomers brought with them *katukutu* iron and pottery skills. The archaeological evidence also indicates that *malungu* technology bears some derivative link with *katukutu* technology (see Mapunda 1995 for details), suggesting that the two may also be related socio-culturally. The ubiquity of ironworking sites in this area indicates a substantial dependence on iron for hunting, farming, fishing, and trade during the last five centuries.

Finally, ethnographic data gathered during this research project has yielded a substantive amount of information pertaining to political organization, socio-cultural units, trade, subsistence, beliefs, and customs during the last two centuries (Mapunda 1995). When this is combined with archaeological data, we get a more richly developed history of the area for the last two millennia.

Acknowledgements

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