

## THE IRON CRAFTS OF THE SWAHILI FROM THE PERSPECTIVE OF HISTORICAL SEMANTICS

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### 1. Scope of the article

To this day research in pre-colonial Swahili history has only taken casual notice of the role of Swahili crafts. This applies in particular to blacksmithing and iron smelting. As McKay put it:

“In previous discussions of East African trade, the long distance caravan trade, generally in search of ivory, has usually figured prominently. There are several reasons for this, not least being that it was extremely significant. It was, however, significant mainly to the western traders whose records have been used by historians. These records have a built in bias, since they only discuss those goods in which the compilers were interested: ivory, copal, orchella weed, hides, rubber etc., and the same bias holds true for most others who commented on trade” (1975:162).

This is the more regrettable as blacksmithing and probably iron smelting were among the driving factors of cultural contact and of the development of economical structures on the Swahili Coast. Kusimba postulates that metallurgy played an important role for cultural change within Swahili polities. Foreign trade in iron products to other parts of the Indian Ocean fostered local exchange systems that linked the East African settlements on the Coast to each other and the interior (1996:387).

In this article the potential of linguistic research on iron crafts for Swahili historiography will be demonstrated, though it has to be emphasised that linguistic evidence is as of yet too scarce to allow more than preliminary results. Two steps are deemed necessary to achieve this aim. In a first step (chapter 3) the scientific contributions by historical linguistics, history, and archaeology in regard to Swahili iron working will be reviewed. Unfortunately, these contributions are found scattered in various publications and are often nothing but remarks in passing. So far no major publication dealing with the history of iron crafts on the Swahili Coast exists.

In a second step (chapter 4) it will be demonstrated that historical semantics, together with language geography can make a significant contribution to this discussion. More than

anything else, it is the semantic aspect of language that is capable of revealing pre-colonial cultural change in Africa. With comparative phonological and morphological methods historical genetic relationships within a given language family can be discovered. However, two factors limit their usefulness for the analysis of linguistic and cultural change: First, the mutual influence of languages not genetically related to each other remains undetermined. Second, cultural and linguistic change is rarely a matter of a single cultural "wave" from outside inundating a certain recipient language within a narrow period of time. Often cultural innovations reflected in lexical change rather trickle into a recipient language or into a language region. Sometimes change affects a whole part of the culture, for example hunting techniques, but other times only one new technical invention is introduced, for example a new kind of arrow. As will be shown below, the analysis of the semantic properties of language takes these two factors into consideration: it allows investigation into a special part of the culture and it links its results to archaeology which is the corresponding discipline of historical linguistics.

A look at the relevant literature indicates that historical linguistics dealing with Bantu pre-colonial history relied mainly on phonological and morphological properties of words and phrases as an empirical basis<sup>1</sup>. Only a handful of scholars, amongst whom are Frobenius (1921) and Schoenbrun (1998) made use of the meaning of words to reach historical conclusions.

The linguistic findings will be compared with those presented in chapter 3 where appropriate.

From a semantic point of view, language can roughly be categorised in "basic vocabularies" and in vocabularies with more specialised words and less frequent use, labelled "specialised vocabularies" for the purposes of this paper. The latter is much more prolific for our purpose than the former. First, a "specialised" term is more frequently subject to language change than is basic vocabulary, so that it documents linguistic change much better. Second, the meaning of specialised terms is a direct link to the elements of material culture they denote. Changes within the fields of these elements are the most obvious historical processes and thus relatively easy to recognize.

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<sup>1</sup> See for example Möhlig (1981) for the whole Bantu area, and Nurse & Hinnebusch (1993) for Swahili and Sabaki.

Our semantic analysis will be carried out with examples from the special vocabulary of Swahili blacksmiths and iron-smelters. It is well-known that the Swahili language did not develop in isolation, but through mutual influence and contact with other Bantu and non-Bantu languages. Therefore our empirical frame will not be confined to Swahili, but will be extended to Savannah Bantu as well as to Cushitic and Nilotic languages, as it has become certain that languages which influenced Swahili must not necessarily be located in its immediate neighbourhood.

## **2. The utilisation of the semantic qualities of vocabularies**

The method<sup>2</sup> starts out on two premises. First, the technical terms of Bantu blacksmithing and iron smelting are always semantically derived from terms of the basic vocabulary. For example the verb "to forge" is derived from "to beat" and "to knock". Second, Bantu technical terms with identical meaning are in most cases derived from basic words with identical meaning: all terms for "iron" in Bantu have their semantic origin in a verb meaning "to be hard" or "to be strong". These basic words and their specialised derivations must show regular sound correspondence. The basic vocabulary which is needed for deriving technical terms can for the most part still be found in recent Bantu lexicons. This may be due to the fact that basic vocabulary is relatively resistant to language change. However, there are Bantu technical terms which cannot be derived from the Bantu basic vocabulary. These are suspected to be loanwords from other language families.

In order to be able to reconstruct these processes of semantic derivation and to make them visible a method is needed which allows us to identify the basic word, to link it appropriately to the respective specialised (technical) word, and to make the result of this reconstruction visible within a certain geographical frame.

Data was collected in strict adherence to the dialectological principle of "areal coherence" in that material for as many Bantu languages as possible was considered. So far special and basic words in regard to iron crafts have been collected for nearly all Bantu languages of the Savannah and the adjacent rain forest regions. Nevertheless, the present author is fully aware of the fact that this linguistic basis is neither complete nor entirely reliable. As further data is

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<sup>2</sup> This method will be thoroughly discussed in Klein-Arendt (forthcoming).

collected some of the historical results presented in 4. may have to be modified.

The technical as well as the basic vocabularies have been taken from modern linguistic sources since there are no ancient documents available. We refrain from using the term “etymology” in this context to avoid confusion. The process of reconstructing an etymology often involves working with at least two vocabularies on different chronological levels. Thus we will use the more neutral term “semantic derivation” or just “derivation” instead.

Example:

English:	fireplace	--> smelting furnace	--> bloomery iron
Savannah Bantu:	<i>-lungu</i>	--> <i>-lungu</i>	--> <i>-lungu</i>

This does not mean that we will always be dealing with a linear development from basic to specialised and further to even “more specialised” vocabulary:

Example:

English:	to be strong	--> iron	--> knife blade
Savannah Bantu:	<i>-simba</i>	--> <i>insimbi</i>	--> <i>tjepe</i>

This process often has geographical dimensions and can be made visible within a geographical frame.

<u>Region A</u>	--->	<u>Region B</u>	--->	<u>Region C</u>
“fireplace”	--->	“smelting furnace”	--->	“bloomery iron”
<i>-lungu</i>	--->	<i>-lungu</i>	--->	<i>-lungu</i>

This diagram shows that *-lungu* “fireplace” stood at the beginning of the derivational process. Developing semantically to “smelting furnace” *-lungu* appeared in Region B. Thus borrowing from Region A to Region B can be established. The borrowing process continued into Region C, changing the meaning from “furnace” to “bloomery iron”. The essential point of historical

interest is the direction of the borrowing process, which went from A to C, not from C to A<sup>3</sup>. Comparison between the single historical processes as shown on the geographical maps reveals that many of these processes can be categorised: several special terms within Savannah Bantu originated North of the Rainforest, several in the Luba-Lunda region, others on the Swahili Coast.

### **3. History of the iron crafts on the Swahili Coast as reflected in historical, linguistic and historical sources**

#### **3.1 Introduction**

For the purpose of this article I will use the term "Swahili", to speak with the words of Allen, "to cover all Islamised coastal peoples in East Africa whose first language is Swahili and the homogenous culture which has evolved among them" (1974:106). The geographical frame of Swahili culture, however, has varied over the centuries, as Chami points out. Traditionally the Swahili territory has been defined to comprise only the narrow coastal strip and the off-shore islands extending from Southern Somalia to Northern Mozambique and to the Comoros. Between the 11<sup>th</sup> and the 15<sup>th</sup> centuries AD, for example, the territory of the coastal people extended up to 100 kilometres into the hinterland. This applies all the more so to the period from the 17<sup>th</sup> century onwards, when Swahili traders founded trading posts in the immediate hinterland of the Coast and further inland (Chami 1998:200).

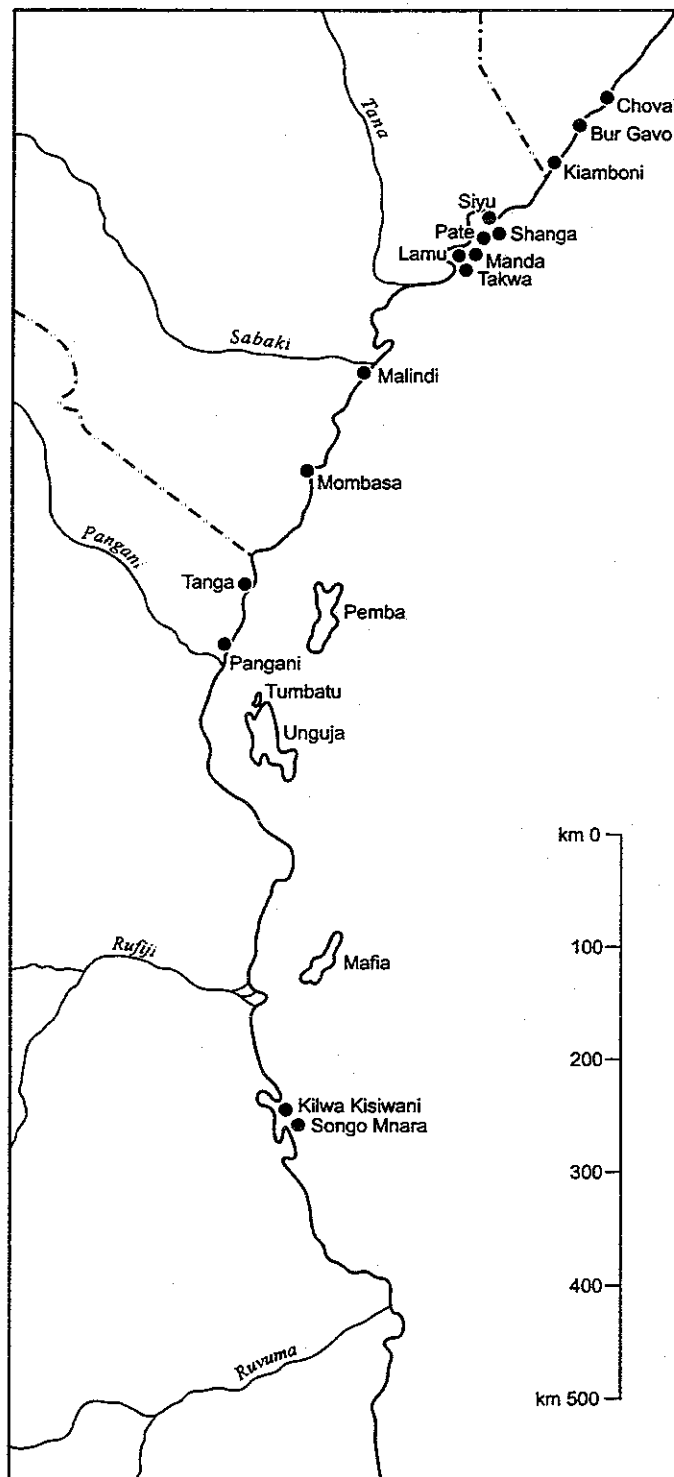
Three categories of sources exist for the history of iron technology on the Swahili Coast, namely written pre-colonial documents of Swahili, Arabic and European origin, archaeological, and, to a lesser extent, linguistic sources.

#### **3.2 The history of Swahili iron working – hypotheses on origin and early development**

Among the oldest written documents about ancient coastal iron working is the "Periplus of the Erythrean Sea" (2<sup>nd</sup> century AD) and several Arabic accounts (9<sup>th</sup> to 15<sup>th</sup> centuries AD). The Periplus is unanimous in its judgement that iron was imported to the African Coast:

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<sup>3</sup> This is the ideal case. Not all technical terms in regard to Bantu iron working can analytically be treated in that way simply because there are words which do not move from one region to another.



“At the distance of a two days’ sail from this island lies the last of the marts of Azania, called Rhapta, a name which it derives from the sewn boats just mentioned (.....), the articles imported into these marts are principally javelins manufactured at Mouza, hatchets, knives, awls, and crown glass of various sorts” (McCrinkle 1973:71, 73).

This points to the fact that Indian steel was highly valued in parts of the Coastal region. Thus several scholars have suggested that the inhabitants of Azania (i.e. the East African Coast) did not know how to work iron (Stuhlmann 1910:53ff., Chittick 1971:110). Storbeck challenges Stuhlmann’s hypothesis (1914:165) by postulating that the iron imported into East Africa was in fact steel and that the knives mentioned in the *Periplus* were made of steel. But these imports existed along with inferior African tempered and raw iron, the latter being the raw material for Indian and Arabic steelsmiths. This raw iron was traded for Indian goods like cloth and glass beads as it was still done in Storbeck’s time. This view is supported by Chami (1994:46) who claims that the Azanians exported iron ore and imported finished goods, or rather supplemented their products with better-quality ones.

Were coastal blacksmithing and smelting technologies imported from outside the continent or were they genuine African inventions? And if yes, who were the Africans responsible for their introduction and development? And how to explain the Arabic, Persian, and Indian words in the Swahili vocabulary relating to traditional iron crafts?

The main contribution to the overall history of iron on the Coast was made by archaeologists. The Swahili Coast has been occupied since at least the Upper Paleolithic. The existence of a microlithic industry stratified below the earliest known EIW (“Early Iron Working”<sup>4</sup>) horizons (4<sup>th</sup> century BC to 4<sup>th</sup> century AD) suggests that the iron-using agriculturists succeeded stone-using peoples through peaceful cultural change or replacement as a result of conquering. In the early phase of the so-called TIW (“Triangular Incised Ware”) tradition, which followed the EIW phase, metal smelting was practised on, but with copper, lead, and bronze. Many technological features of the early-phase TIW tradition continued to be used as evidenced by the findings of grooved objects, slag, and metals of different types in later-phase TIW archaeological contexts. This means that an iron working tradition prevailed on the Coast at least until the 11<sup>th</sup> century AD (Chami 1998:207ff.).

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<sup>4</sup> Chami (1994) substitutes the term “Early Iron Working” horizons for “Early Iron Age” horizons.

Wilson and Lali Omar expect that this evidence, if confirmed by further excavations, would underscore the Iron Age, presumably Bantu, origins of the Swahili sites. Moreover it would go some distance in closing the first millennium gap between the Periplus ports and the Swahili on the one hand and the early Iron Age sites around Kwale and elsewhere and the first coastal communities on the other (1997:62f.).

A major issue in the debate is the role of pastoral communities in early Swahili culture.

Early Iron Age sites dating to the 2<sup>nd</sup> and 3<sup>rd</sup> centuries AD exist near the Coast in the vicinity of the current Kenya-Tanzania border (ibid.:62). The relationship between the earliest coastal ceramics, those of the Iron Age in the regions of Pare and Usambara, and pastoral neolithic ceramics from central Kenya and the Rift Valley has already been assumed by Abungu (1989). In light of these archaeological findings he develops a dynamic model of interaction between Iron Age peoples and pastoralists, probably Bantu and Cushitic speakers respectively. This may have been a constitutive factor of early Swahili society.

Allen (1993:29), though it is not clear on which empirical basis, argues that Cushitic and Bantu peoples migrated into the attractive coastal regions to make use of the year-round water supplies, foreign trade goods, and all the other commodities that these settlements offered. The languages of the peoples settling on the Coast were ousted by the language of the blacksmiths. It was the blacksmith's language which, in the course of following centuries, became the most enduring link between communities located, in some cases, thousands of miles apart and which therefore served to unify the coastal communities. According to Allen (1993:128, 195) "Pre-Segeju" and Bantu-speaking iron smiths founded the first settlements in the Lamu Archipelago in the 9<sup>th</sup> century. The "pre-Segeju" group formed the highest social rank, the "patricians", while the blacksmiths constituted the rank of the commoners.

One of these Bantu-speaking groups could have been the ancestors of the modern Pokomo on the Tana. The Pokomo did not traditionally work iron, but they remember a section of their people known as the *waPokomo wa Mgini* who lived at Pokomoni and who worked iron from the ilmenite sand which is plentiful there. This community has now disappeared, perhaps assimilated into the Swahili population. Mgini is a small unexcavated site with iron slag lying about situated near the Pokomoni (Allen 1993:29).



From the historical analysis of lexical material Nurse and Spear (1985:39f.) conclude that the Bantu adopted iron working after they had left their hypothetical homeland and after Proto-Bantu had already splintered into different offspring. By the time the Bantu were expanding in East Africa they had this newly acquired skill with them. The non-Bantu peoples present in East Africa before the Bantu migrations were not familiar with iron and seem to have acquired it at much the same time. A look at the comparative vocabulary in today's languages and at archaeological evidence reveals that the Proto-Sabaki, an offspring of Proto-Bantu, smelted iron, although apart from weapon heads it is not clear what they produced because of inadequate archaeological evidence. The earliest Swahili communities, among other activities, traded locally-produced ironware. Between 800 and 1100 AD trade flourished among the Swahili settlements, in which iron was smelted and ironware like fishhooks, spearheads, and arrowheads was produced (ibid.:47ff.).

### **3.3 The Swahili settlements in detail**

#### **3.3.1 Kilwa**

Our knowledge of pre-colonial iron working in Kilwa comes from the archaeological work of Chittick (1974), who found several vestiges of possible iron working. There is evidence of iron smelting, mainly fragments of tuyères and slag and a few objects of iron for the period between 800 and 1100 AD (1974:28). For the following period - until the late 12<sup>th</sup> century AD - only a complete tuyère could be recovered, which has been fired, but does not appear to have been used in a furnace. The wide mouth was clearly used with bellows; it could equally have been employed for smelting or forging iron (ibid.:52). At Husuni Ndogo, Chittick uncovered a number of crucibles and fragments thereof, apparently unfired, for the period from the late 13<sup>th</sup> century to c. 1400. Additional fragments of crucibles were recorded as having been found in the foundation trench. There is thus substantial evidence of iron smelting or casting in this area. No furnace was, however, found (ibid.:200ff.). The evidence leads Chittick to the conclusion that iron was smelted from the foundation of Kilwa onwards, but not on a substantial scale. The source of the ore is uncertain, but it may have been the ferricrete concretions found on the mainland. In the period of the "Shirazi dynasty" - up until the late 13<sup>th</sup> - century the smelting of iron, as it was known in the earlier period, was still

familiar to the inhabitants. The only iron tools found in considerable number were knives. They occur from the earliest period onwards. Arrowheads were also secured, though not as many as knives. These date from the 10<sup>th</sup> to the 19<sup>th</sup> centuries AD. Only one spearhead was recovered, which Chittick supposes to be a quite recent one, deriving from a near-surface deposit (ibid.:439).

### **3.3.2 Pangani**

Gramly's archaeological research yielded some results relating to iron, though the findings are scarce. Among the recovered metal fragments were three pieces of metal: a droplet of copper slag, a fragment of sheet iron, and an iron knife blade. The findings are from later periods. Gramly sees the scarcity of iron in such a late context partly explained in the poverty of the inhabitants, who used flaked stone tools (1981:19ff).

There is only one more mention of iron for Pangani: the 19<sup>th</sup> century explorer Richard Burton watched as many as 1000 "Wasawahili" setting out for Umasai, Uchagga, and Nguru, laden with iron and brass wires (1967, II:146) of unknown origin.

### **3.3.3 Zanzibar, Pemba, and Mafia**

No archaeological record relating to iron is available for these three islands. In the times of Abdurahman (1939) there were apparently only few indigenous blacksmiths on the island, who made articles like small knives, door fasteners and small hoes. The smith's tools comprised the anvil, hammer, pincers and self-made bellows of goat skin (1939:76).

Ingrams (1967), in his relatively recent description of Zanzibar crafts, stated that blacksmithing is passed on from generation to generation and probably of considerable antiquity. He reports that nobody can remember anything but iron hoes being used or spoken of. Quoting from the *Periplus of the Erythrean Sea* he supposes that iron has been imported into Zanzibar for centuries, since the author of the *Periplus* states that it was imported into several places on the Coast, though Zanzibar is nowhere mentioned. Ingrams still met a few Zanzibar blacksmiths and described their craft in a short note.

Baumann observed imports of ironware to Mafia while on the island in the mid-20<sup>th</sup> century (1957:13).

### 3.3.4 Tanga

Burton is our only source for iron working in the Tanga part of the Mrima Coast. He describes the import of cotton articles, iron wires (*sejenge*), and brass wires (*másángo*) into the city. The citizens of Tanga traded with the "coast-savages", and manufactured billhooks and hard wares for the Wasegeju from imported iron (1967, II:117f.). At the Tanga fair "the Bedawin exchanged their lean sheep and goats, cocoas and bananas, grain and ghee, for white and blue cottons, beads, and rude iron ware - knives, bills, and hatchets, made on the coast of metal brought from Zanzibar" (ibid.:130).

### 3.3.5 Mombasa

Various sources suggest that iron working has a long tradition in the Mombasa Region. At least from the 9<sup>th</sup> century AD onward Mombasa played an important role as a harbour and hub for a lot of trade goods like ivory, amber, skins, and iron (Sheikh-Dilthey 1978:678). Al-Idrisi reports in the 12<sup>th</sup> century that the inhabitants of Mombasa, like those of Malindi, make their living with leopard-hunting and the exploitation of iron mines (Storbeck 1914:131).

Later in history the art of forging iron implements must nearly have become obsolete, as "The sack of Kilwa and Mombasa", a Portuguese account of the conquest of Mombasa in 1505 by the Portuguese, describes the wounding of Dom Fernando de Sa with an arrow "which did not have an iron point". However, some of the arrows of the defenders of Mombasa were made of wood with iron points. These arrows had (poisonous?) herbs at the tip, but weren't dangerous to the Portuguese attackers (Freeman-Grenville 1962:101). "Rezende's Description of Mombasa", dating from 1634, states that iron and rice were imported goods (ibid. 1962:184).

### 3.3.6 Malindi

From al-Idrisi we know that the citizens of Malindi exploited iron mines. They traded this iron, which was the source of their immense wealth (Storbeck 1914:129). Martin comments that no large-scale mining of iron ore in the Malindi area is known of, though he reports deposits of black sands on the beach containing ilmenite and magnetite. Mining of these small quantities of iron ore, however, could not have been profitable. Martin proposes that al-Idrisi confused Malindi with the town of Manda on the island of the same name, two kilometres

from Lamu. The inhabitants of Manda exported large quantities of iron ore (1973:9).

However, peoples from the hinterland of Malindi like the Katwa and the Segeju are said to have received regular supplies of iron spear blades from that area before both groups settled on the Coast. Neither ancestral Katwa nor ancestral Segeju worked iron themselves. The Katwa are said to have tipped their spears with oryx horn until the Queen of the island of Ngumi, located next to Chovai, arranged for a (continuous?) supply of iron spear blades. The "Mossequejos" got their spear blades from Malindi (Allen 1993:111).

### 3.3.7 Siyu (Lamu Archipelago)

Various scholars stress the fact that Siyu must have been one of the main iron-manufacturing centres of the entire Coast. Siyu did not have a deep-water harbour and therefore relied on crafts and agriculture as the main source of income. Siyu blacksmiths were renowned for their daggers and swords. Knives, made of wrought iron, were still being produced in the late 19<sup>th</sup> century. The source of the raw iron may have been at Shanga and Manda, since iron slag has been found at Manda at early levels of settlement. A second supply source may have been the iron sand abundantly found on the south-western shoreline of Pate Island. By the 19<sup>th</sup> century, Swahili blacksmiths were importing much of their iron from India. The smiths of Siyu were mainly descendants from clans of low status, so-called *wazalia*, or "slaves". Some of them were Pokomo slaves called *Wahunzi*. Siyu blacksmiths were so skilled that they even manufactured the *korofingo*, a musket resembling weapons used by the Portuguese and Arabs. The manufacture of gunpowder was carried on in Siyu until very recently (Brown 1988:102).

### 3.3.8 Pate (Lamu Archipelago)

At Pate, Wilson and Lali Omar discovered two pieces of iron slag, the by-products of iron working from early levels at Pate, one from the late 8<sup>th</sup>/early 9<sup>th</sup> centuries, and one from the late 10<sup>th</sup> century. No comparable evidence for local iron smelting or iron working is found thereafter until deposits of the 14<sup>th</sup> and 15<sup>th</sup> centuries with nine specimens. Only few remnants of iron products were found. The most substantial ones were an iron (fish?) hook from the late 8<sup>th</sup> to the 9<sup>th</sup> century, an adze or hoe from pre-14<sup>th</sup>-century levels, possibly used in agricultural pursuits or woodworking, an iron palette with remnants of haematite, perhaps from the late

16<sup>th</sup> or early 17<sup>th</sup> century, and pieces of a slide or bolt-like object and knives (1997:58). From this the authors conclude that the inhabitants of Pate practised iron working and probably smelting from the late 8<sup>th</sup> to the 9<sup>th</sup> century (ibid.:64).

However, the account of Father Monclaro about his journey to Pate in 1569 mentions that the Portuguese exchanged ironware, beads, and cotton cloths, which the people of Pate did not possess, for silks (Freeman-Grenville 1962:142).

### **3.3.9 Shanga and Manda (Lamu Archipelago)**

According to Horton, who carried out major excavations at the ruins of Shanga, this town was occupied between c. 850 and 1440 AD. The earliest archaeological levels, dated by the presence of Sassanian-Islamic, tin-glazed, and early sgraffiato pottery to ca. 850 till 920, contain evidence of iron working. The earliest local pottery at Shanga resembles that of Wenje, a site several hundred kilometres up the Tana River, and that of Kilwa, Manda, and the Comoro Islands, where this pottery style has been found together with iron working at the earliest levels. This links Manda to a wider cultural complex stretching from the coastal islands several hundred kilometres further inland. Combining his findings with medieval written sources, Horton maintains that the early Swahili were iron workers who moved to the Coast and began to trade their products with foreign merchants. Shanga was thus an African town, first settled by local iron workers, fishermen, and farmers (Horton 1984).

Haematite ore, used along with ilmenite sand to produce iron, has been recovered in Shanga at 10<sup>th</sup>-century levels. Allen supposes that this haematite came along the trade routes from the interior, probably from the Mount Kenya region. The ore was traded for iron products made on the Coast (1993:25).

Many iron items must have been used in the coastal settlements themselves, though relatively few have so far been found, mostly knives. Based on local traditions, Allen argues that Shanga iron products were traded to foreign merchants, maybe Indonesians, who also purchased iron on the Sofala Coast. As late as the 19<sup>th</sup> century, Indian and Arab merchants rated iron locally produced near Mombasa more highly than imported iron from Sweden. The main portion of iron products, however, was traded to peoples of the interior. Moreover, by the beginning of the colonial period blacksmiths in and to the west of the Rift Valley used

bowl bellows, while those to the east of it used mainly bag bellows, which must have spread inland from the Coast. This may be an indication for the temporary technical superiority of coastal blacksmiths (ibid.:57).

Chittick found several lumps of iron slag at Manda, which points to the fact that smelting of the metal was done there. The particular form of some of the lumps (one datable to the last quarter of the first millennium AD, and one to roughly 1000 AD) suggests that these are residues from the bottom of furnaces with a cup-shaped base. The surveys did not yield any trace of such a furnace. He concludes from the occurrence of these objects at a considerable distance from where the smelting was carried out, and in view of the very small scale of the excavations, that iron smelting may have been done on a substantial scale. The source of the ore is uncertain: black sands containing iron ore have not been found much further north than Malindi (Chittick 1967:54).

The "History of Pate" mentions, in a chapter concerning a quarrel between Manda and Pate around 1340 AD, the existence of blacksmiths at Manda (Freeman-Grenville 1962:249).

From the proximity of Manda and Shanga and the concentration of later iron working sites around the Mtangawanda in Manda Bay, Pouwels concludes that the Lamu Archipelago might have been at the centre of an early trade network extending to neighbouring (pastoralist) peoples and the Middle East based on superior Bantu iron technology. This hypothesis is supported by Meru oral tradition, in which the Mtangawanda is referred to as an area where "blacksmiths gathered". At Lamu it is said of the autochthonous Wamea "clan" that "les forgerons se recrutent en grande partie parmi eux" (quoted from Pouwels 1987:16).

### **3.3.10 Lamu Town**

For the town of Lamu and its immediate hinterland, data is hardly available. Several iron objects have been found by archaeologists at Lamu, but only in a very corroded condition (Chittick n.d.:30).

In earlier centuries Lamu was renowned in Arabia and the Middle East for its metalwork, but in the last century or two this has more or less died out. Allen reports that he found only one blacksmith in Lamu town, using traditional methods and capable of the finest work, if any iron was offered to him (Allen n.d.:17).

### 3.3.11 Takwa (Lamu Archipelago)

The village of Takwa flourished in the 16<sup>th</sup> and 17<sup>th</sup> centuries. So far archaeologists have excavated one single house. Quantities of iron slag were found at the courtyard group near the mosque and at the south gate. These findings suggest that smelting and blacksmithing were done exactly there (Wilson 1979:14f).

### 3.3.12 Bajun (Tikuu) Region

Our historical knowledge of the history of iron working on the Bajun Coast is mainly based on oral and written documents.

The Chinese historiographer Tuan Ch'eng-shih, writing in c. 850 AD, mentions the fact that the pastoralists who controlled international trade in "Barbara" did not have iron, but tipped their spears with bone, horn, and ivory. Allen suggests that the earliest Bantu settlers on the Coast did have iron and it could well have been that both groups maintained a commercial co-operation (1993:26).

Leaving the period of the 8<sup>th</sup> and 9<sup>th</sup> centuries, we have to make a leap to the times of the Portuguese to find the next reference made to iron. It turns up in connection with the town of Ngumi on the island with the same name, which was destroyed by Portuguese cannons. Some years previous to this event chieftainess Asha Ngumi died. She apparently was not only the head of Ngumi, but possessed general authority over all settlements as far as Port Durnford. She seems to have been the first to supply iron to the Cushitic Garreh, who at that time were settled on the Deshek Wama, and were unacquainted with its use. In this way iron spears soon replaced their older weapons made of oryx horns which had been mounted on wooden shafts (Elliot 1925-1926:254).

Fazil bin Omar Albuhi of Malindi told Elliot, that in about 1600 AD the Kishuru, apparently a Bantu people, were driven from their homelands near the Juba by the Ges Elan, and had to flee South. A medicine man, however, discovering the use of iron, enabled the former to replace their wooden arrow-heads with iron ones, and thus armed they successfully defended their strongholds (ibid.:152).

Grottanelli reports that some "Bagiuni" worked iron in European workshops, though iron

working was not especially wide-spread in the 1950s. The *mfuđi wa tfuma* (blacksmith) and the *mfuđi wa feđa* (translated by Grottanelli as “goldsmith”) were despised craftsmen by that time. At the markets a rich choice of items made of iron could be acquired (1957:188).

#### 4. Precolonial iron working on the Swahili Coast: examples from the semantic evidence

##### 4.1 *-fua tfuma* “to forge”; *mufuatfuma*, *nfuatfuma* “blacksmith”; *fwai*, *fuawe* “anvil” (map 1<sup>5</sup>)

The verb *-fua tfuma* “to forge iron” is derived from the verb *-fua* “to beat”<sup>6</sup>. This fits with the general semantic rule that all words with the meaning “to forge” within Savannah Bantu can be traced back to a basic term “to beat”<sup>7</sup>. *Mufuatfuma* and *nfuatfuma* “blacksmith” are either derived from *-fua* “to beat” or “to forge”. The meaning “anvil” is, at least in Savannah Bantu, often likewise derived from the verb “to beat”, maybe via “to forge”<sup>8</sup>. *Fwai* and *fuawe* are both composite nouns, consisting of the verb *-fua* “to beat” and the noun *iwe* or *jiwe* “stone”.

The verb *-fua* and its nominal derivations make Swahili a member of a large group of Bantu languages stretching from the north-eastern border of the rainforest to the southeastern part of Africa, since *-fula*, *-fua*, *-sula*, *-tula*, and *-tsula* are the most common verbs for “to forge” in the whole Bantu area. In several languages of Savannah Bantu other nominal derivations from *-fula* etc. occur, like for example *mutsula* “the forge” (B.77b<sup>9</sup>), *ntulo* “hammer” (D.53), and *tfifulo* “knife” (M.64). These derivations cover nearly all aspects of blacksmithing. Thus it may be that formerly a whole paradigm was based on this single verb.

There is virtually no evidence for any basic verb *-tula* or *-fula* “to beat” in the vocabulary of any Savannah Bantu language. At the moment Swahili seems to be the only Savannah Bantu language which uses terms like *-fua nazi* “to peel coconuts” and *-fua ŋguo* “to soak clothes”

<sup>5</sup> Maps are provided in the appendix for the more complex cases. For reasons of clarity the basic words are not indicated on the maps.

<sup>6</sup> In most other Bantu languages *-fua* occurs as *-fula*, *-sula*, or *-tula*.

<sup>7</sup> With the exception of *-syana*, *-sana*, and *-fana*, which is derived from Arabic *-san-* “to produce” and *sanaa* “art”.

<sup>8</sup> Sometimes „anvil“ derives from “stone” in Savannah Bantu.

<sup>9</sup> The catalogue numbers of Bantu languages have been taken from Guthrie’s “Key List of the Bantu Languages” (1967-1971, III,:11ff.).



(Sacleux 1939:225). This puts *-fua* into another context, apart from iron crafts. Only Bantu languages of Guthrie's zones A and B use the verb *-tula* and *-tola* "to beat", "to work", and "to pound". In Western Sudanic languages, north of zones A and B, verbs that are phonologically at least similar to *-tua* exist, though no genetic relation should be established at the moment. In Edo we find *rua*, in Efik *tut*, in Kpelle *tua*, each with the meaning "to knock" or "to push". Okpoto uses the verb *pwo*, Gurma *puà*, Takponin *puo*, and Yoruba *fù* "to beat". Thus the possibility of a Western Sudanic source of *-fula* and *-tula* should at least be taken into consideration.

The distribution of the nominalised form "blacksmith" shows the same geographic features as that of "to forge".

The nouns *fuawe* or *fulawe* "anvil" are confined to the coastal strip between the Northern Swahili and Makua regions in central Mozambique, including the immediate coastal hinterland<sup>10</sup>.

#### 4.2.1 *mfua*, *mvua*, *mvuba*, *mvuo* "bellows" (map 2)

The nouns *mfua*, *mvua*, *mvuba*, and *mvuo* denote "bellows" in Swahili. These are probably loanwords from non-Bantu languages north of Swahili. Genuine Bantu words for "bellows" are normally either derived from the verbs "to kindle fire" or "to blow", or from the noun "bag". There is, however, no semantic source for *mfua* in any Bantu language, though it is fairly widespread in the Savannah. There is evidence of its use as far south as Tonga (M.64) and Tswana (S.31).

However, some caution should be exercised when looking for possible semantic sources for "bellows" and "to blow bellows" outside Bantu languages, since no other special word is so often derived from onomatopoeia. For example Arabic uses *fuur* and Shona *-fura* for "to blow" and "to breathe". Thus phonological similarity of forms for "to breathe" and "to blow" in different language families like Bantu and Cushitic do not necessarily indicate a historical link.

<sup>10</sup> Remarkably all those languages with *fuawe* or *fulawe*, except Swahili and Giryama, use *-ponda* or *-syana* for "to forge" nowadays.

In most cases the phonological shape in Savannah Bantu is *muguba*. There is a possible basic verb in Eastern and Southern Cushitic languages:

Orma	<i>guba</i>	to burn (itr.), to fan a fire
Burji	<i>gub-</i>	to burn (tr.)
Gedeo	<i>gub-</i>	to burn (tr.)
Somali	<i>gub-</i>	to burn (itr.)
Rendille	<i>gub-</i>	to burn up?
Boni	<i>kub-</i>	to burn?
Iraqw	<i>guβ-</i>	to burn

A geographical indication for a Cushitic source is that the distribution of the Bantu words *muguba* and *mufuba* has a common border with East Cushitic languages in Kenya. From there it may have spread in southerly direction.

Guthrie reconstructed the noun as C.S. 905 *\*-gubà* and C.S. 907 *\*-gubò* (1967-1971, III:238f.), implicating that it is a genuine Bantu word. It is more likely that the initial consonant *-g-* was reinterpreted by Bantu speakers soon after its introduction into their languages. The first vowel *\*u* caused the sound shift of the first consonant from *\*g > f*, which is a regular phonological process in Bantu.

#### 4.2.2 *mvukuto* “bellows”; *-vukutfa*, *-fuguta*, *-vukuta* “to blow bellows”

A second word for “bellows” in Swahili, though less common, is *mvukuto*. The three related verbs *-vukutfa*, *-fuguta*, and *-vukuta* are, however, the only forms for “to blow bellows” in Swahili. Like in the case of *mfuba* no plausible basic word for *mvukuto* and *-vukuta* could be found in the Bantu vocabularies. Verbs like *-fukusa* “to shake” in Mongo (C.61), *-buka* “to push” in Mpongwe (B.11a), and *-fuka* “to blow from nose” in Nyoro (E.11) are phonologically similar at best, semantically not convincing, and are scattered and isolated. Thus non-Bantu languages have again to be taken into account, though research hardly yields satisfactory results yet. Vague possibilities are e.g. *-tukut* “to make blow” in Karimojong (Eastern Nilotic), *-pukuket* “to fan” in Turkana (Eastern Nilotic), or *fug-* “to blow with the mouth” in Dullay (Eastern Cushitic).

### 4.3 *tupa*, t<sup>h</sup>*upa* "file"

The file is a technological concept which must have been developed outside of Bantu Africa. Bantu blacksmiths traditionally use whetstones to sharpen tools. The noun *tupa* is the only word for "file" that is of some importance in Savannah Bantu, and it is not a loanword. The fact that no other word besides *tupa* exists for the meaning "file" in the Savannah makes semantic derivation very difficult, since its semantic history cannot be compared with that of other words for "file".

A possible basic verb *-tuβa* "to rasp", "to rub" can be found exclusively in Tikuu, the corresponding form in the Southern Swahili dialects is *-t/ua*. No form *\*-tupa* seems to exist. Outside Swahili the verb is not known.

The distribution of *tupa* "file" extends south to the Sotho-Tswana group (S.30), and west as far as Luba (L.30). In large parts of the distribution area the word can be identified as a loan by the non-regular sound correspondence of the second consonant. The fact that most of the languages using the form *tupa* did not shift it to their own sound pattern suggests that this is a relatively recent loan. This applies to zones D, E (except Kamba, E.55), F, G (excepting the groups G.40, G.50, and G.60), L.30 and S (excepting the groups S.10 and S.20). The second consonant *-p-* of *tupa* is regular only in the languages of zones M, N, and P. However, they cannot be taken into account since words denoting iron working never reached the Swahili Coast and zone E from M, N, and P.

The hypothesis that the Swahili Coast was the place of origin for *tupa* is corroborated by two non-linguistic arguments. First, the noun *tupa* dispersed radially into nearly all regions of the Bantu Savannah, including the fringes of the rainforest. This is the same distribution pattern as that of the nouns *jundo* and *tfuma*, both of which originated at the Swahili Coast<sup>11</sup>. Second, many language informants of zones G, M, and N confirm that the technology of the file came along with the form *tupa* from "the Swahili".

One objection, however, arises from the Bantu lexical evidence: The lexicon of the Yao (P.21) in Northern Mozambique includes a noun *tuupá* with the meaning "little bone", which is the diminutive form of *liupa* "bone". From there it is possible to conclude that at least the

<sup>11</sup> See 4.5.1 and 4.6.

form *tuupá*, not the technology, was imported to the Coast, since the Yao maintained close commercial contacts with the Swahili. Thus the Yao supplied a term for the file technology, which apparently was not known before. From the semantic point of view, a derivation from "little bone" to "file" is also possible, since the file resembles a little bone.

#### 4.4 *kibanda*, *kiband'a* "the forge"

Bantu languages derive "the forge" either from "to beat", "fireplace", or "hut". The Swahili form *kibanda* "the forge" is a semantic derivation from *kibanda* meaning "hut" and "shelter". Its distribution is confined to the Northeast of the Savannah, with a linguistic island in Taabwa (M.41).

The geographical origin of *kibanda* denoting "the forge" is the Swahili Coast. The other languages using it (E.51, E.72a, F.21, G.31, and M.41) cannot be considered as sources for several reasons. First, in most of these languages the forms are marked by their first root consonant as loanwords: *kibanda* and *kuwanda* instead of *kianda* and *kuanda* in Kikuyu (E.51), *nhanda* instead of *-banda* in Sukuma (F.21), *kiwanda* instead of *kianda* in Zigula (G.31), and *tfibanda* instead of *tfiβanda* in Taabwa (M.41). Only *kibanda* and *kiwanda* in Swahili and *kuwanda* in Giryama show a regular sound pattern. However, the Giryama lexicon apparently includes only the basic words *lwanda* and *mwana*, meaning "surrounding" and "space". Thus the Giryama form *kuwanda* may have originated from somewhere in the Swahili area since no semantic source exists in the basic vocabulary. The lexical sources of Kikuyu (Benson 1964:23) state that the word was borrowed from Swahili. Whether it was inherited directly from Swahili or as a third loan from Giryama remains an open question. The Zigula word *kiwanda* "the forge" must also have been borrowed from Swahili since the latter is, according to Guthrie, the only language of Northeastern Bantu which uses -w- as a regular sound correspondence of \*b. The Taabwa do not have any basic term for *tfibanda* "the forge", which must have originated in the East of the Savannah, presumably in the Swahili-Zigula region.

#### 4.5.1 *nund<sup>1</sup>o, pundo* “hammer” (map 3)

In Savannah Bantu, “hammer” is in most cases derived from the verbal form “to beat”, less frequently from “stone”.

The form *pundo* “hammer” has been derived from the basic verb *-unda* “to construct”. With this phonological shape it is rare in the languages of Savannah Bantu. So far it can be traced only in Swahili and in Nyanja (N.31). In the former *-unda* means “to construct”, “to build”, and “to mend”, mainly in connection with traditional Swahili ship building. In the latter the form *-uunda* means “to weld” and “to hammer iron into a lump”. Thus we have two possible geographical sources in Swahili and Nyanja. Since the semantic analysis produced no clear result, non-semantic evidence has to be taken into account.

First, there is not a single piece of evidence that any iron technological innovation spread from the Nyanja territory into Savannah Bantu with such an impact. The main areas of distribution lie near Lake Victoria, the East African Coast as far North as the Eastern Cushitic region<sup>12</sup> and around Lake Malawi/Nyasa. Nearly every Bantu language in the northern half of the Savannah uses this word. These distribution features fit neatly into those of other semantic imports from the Swahili Coast into the interior. Second, there is another word for “smith’s hammer” in Nyanja, namely *nkama*. Third, *pundo* denotes in most cases the hammer of European shape, i.e. with a wooden handle and an iron head, and not the traditional stone hammer of the Bantu blacksmiths. Fourth, the Swahili origin of *pundo* is attested by all informants of languages such as Mambwe (M.15) and Iwa (M.26) in Zambia, and Tumbuka (N.21) in Malawi. These four facts point to an import of *pundo* from the East African Coast through the traditional trade routes into the interior and not vice versa.

Ehret (1973:58), however, claims that at least the word *inonde* for “anvil” (a secondary meaning of *pundo* in the Savannah) may have been derived from *òndóó* “blacksmith” in Lugbara, a central Sudanic language. This seems rather unlikely, since *inondo* (not *\*inonde*, which does not exist in Bantu), and *pundo* are phonologically clearly connected with *pundo* “hammer” by regular sound correspondence.

<sup>12</sup> In Burji for example the meaning “hammer” is denoted by *pundo* (Sasse 1982:210).

Interestingly, there exist forms *ntulo*, *thulo*, and *tfitulo* (from *-tula* “to beat”) for “hammer” in the Savannah. In most of the cases it appears at the fringes of the distribution area of *pundo* “hammer” (for example in the groups D.50, D.60, M.50, and in Kalanga, S.16), hardly complementary to *pundo* in one and the same language. Thus, *pundo* seems to have superseded the older form *ntulo*.

#### 4.5.2 *komango*, *k<sup>h</sup>omango* “hammer”

This noun has been derived from the verb *-koma* “to hammer” which is widespread in the northern part of the Bantu Savannah. The nominal derivation denoting “hammer” appears in various morphological forms in Bantu, like *eenkomero*, *lukumo*, *kikomeko*, and *komango*, to name just a few. The forms *komango* and *inkomango* are particular to only three Savannah languages, Sukuma (F.21), Nyiha (M.23), and Swahili. Swahili is the only language of the three which possesses a possible basic verb *-komanga* (Jomvu, Amu *-kumanga*) “battre pour oter la poussière” (Sacleux 1939:433) with a morphological form corresponding to the noun. This points to Swahili as the source language of this item, though the database for the verb and its nominal derivations has to be extended to be able to draw final conclusions. Moreover it is not yet clear which kind of hammer the word *komango* denotes, and whether there is a difference between the underlying technical concept of the forms *pundo* and *komango*. According to Sacleux (ibid.:433), the word *komango* is as widely distributed in Swahili as *pundo*.

#### 4.6 *tfuma* “iron” (map 4)

The noun *tfuma* “iron” developed on the Swahili Coast and migrated along the traditional trade routes into the hinterland of the Coast and further into the Great Lakes Region. This assessment stands in direct contrast to that of Wainright (1954) who postulated an origin of *tfuma* in the region of Lake Victoria.

There is, however, sufficient evidence to identify Swahili as the source language. All forms denoting “iron” with a wider distribution in Savannah Bantu are derived from a Bantu verb

with the meaning "to be hard" and "to be durable", or from a noun meaning "hardness"<sup>13</sup>. An identification of the semantic basis of *tfuma* "iron" (appearing also as *tfoma*, *ekyoma* etc. in Savannah Bantu) alone does not help to identify its geographical origin, since most of the Savannah languages using the word *tfuma*, *tfoma*, *ekyoma* etc. for "iron" are also using verbs like *-uma* or *-oma* meaning "to be hard" and/or "to be dry".

Two criteria on the semantic and phonological level help to narrow down the group of possible source languages. The basic verb must have had the meaning "to be hard" and the phonological shape *\*-uma*. Thus languages in which forms like *-guma*, *-uma*, or *-oma* exclusively mean "to be dry" can be excluded as possible candidates.

The number of possible languages of origin can further be reduced by taking a look at the phonological properties of the source verb and derived noun. First, since the basic word must have had the phonological shape *\*-uma* or *\*-oma*, languages with forms like *-goma* or *-guma* can be deleted from the list of candidates; there is no noun such as *\*kiguma* or *\*kigoma* for "iron". Second, there is reason to assume that the phonological shape of both basic verb and derived noun must be the same. Otherwise the latter may be classified as a loanword. In Nyoro (E.11), for instance, the verb meaning "to be hard" is *-guma*, but "iron" is denoted by the forms *ekyoma* and *fuma*. Third, as can be seen in the Nyoro case, two phonological variants that far apart from each other usually means that one or both forms were borrowed.

The two criteria mentioned above are met by Kikuyu (E.51), Kamba (E.55), Sukuma (E.21), and Swahili (G.40). However, with the exception of Swahili, these languages use a second word for iron, namely *tfela* (by Kikuyu), *kia* (by Kamba), and *sinza* (by Sukuma).

The linguistic evidence is supported by the geographical pattern of the distribution of *tfuma*. The form is exhaustively represented in Northeastern Bantu. The distribution includes a "core", which is constituted by languages using *tfuma*, *ekyoma* etc. only with the meaning "iron", and a periphery, in which *tfuma* for "iron" is used as well as semantic derivations from "iron", like *nfuma* "iron hoe" (Haya, E.22), or *tfuma* "iron bead" (Shona group, S.10). According to informants in Northern Zambia, Northern Malawi, and Southern Tanzania *tfuma* entered their country from the Coast. The Luba (L.33) say that *kyuma* with the meaning

<sup>13</sup> With the exception of *tfela*, which is a loanword from Cushitic languages.

“wire” was imported by the Swahili. The fact that *tfuma* means “property” and “wealth” in several languages at the Western and Southern periphery of the distribution area indicates that the iron represented by the noun *tfuma* was a mode of payment and may have had a finer quality than the iron from the interior.

Thus it can be established that Swahili was the source of the word *tfuma* “iron”. Forms like *ekyoma*, *ikyuma*, *suma*, or *ilitfuma*, so prominent elsewhere in the Savannah, point to the fact that either the loanword *tfuma* has been adapted to the phonological rules of the target language, or that it was not directly borrowed from Swahili.

#### 4.7 *puva*, *pua*, *tfuma tja pua* “steel”

To date, no Bantu word with the meaning “steel” has been identified in the Savannah. Rather, there exist words for “hardened iron” or “tempered iron”, like *ikyuma ekyakkalwe* in Ganda (E.15). Swahili and its immediate neighbours Giryama (E.72a), Dabida and Sagala (E.74), Kaguru (G.12), and Kamba (E.55) are the only Savannah Bantu languages which have a genuine word for “steel”. *Pua* or *puva* “steel” is a loan from Persian/Arabic *pulad* and *fulad* “steel” (Sacleux 1939:761, Knappert 1983:133). Knappert supposes that the form *pua* is relatively ancient, which is indicated by the deletion of two consonants. There is no question that this word entered the Savannah via the Swahili Coast.

#### 4.8 *kinoo* “whetstone”; *-noa* “to sharpen iron tools”

There are two ways to sharpen an iron tool, either by grinding or by hammering. In most cases the Bantu derived their verbs denoting “to sharpen iron tools” from verbs with the meaning “to beat” or “to stamp”, less frequently from those meaning “to grind”.

Like many verbs within Savannah Bantu denoting “to sharpen iron tools”, *-noa* cannot be derived from any Bantu basic word. Thus, there is the possibility that *-noa* is a loanword, presumably from the languages north of Swahili. Admittedly this hypothesis is only supported by the geographical pattern of the distribution: in the North the distribution area of *-noa*<sup>14</sup> has a common border with non-Bantu languages. The same applies to the nominal derivation

<sup>14</sup> The equivalents of *-noa* and *kinoo* outside Swahili are *-nola* and *-nolo*.



*kinoo* “whetstone”. The distributions of *-noa* and *kinoo* (*-nola* and *kinolo* respectively) stretch as far as into the territories of the Fipa (M.13) and Tonga (M.64), where it appears as *-nyola*.

Thus it remains unclear from which source *-noa* and *kinoo* dispersed, but there is reason to suspect that it may have emerged Northeast of the Bantu Savannah.

Remarkably, many Swahili words belonging to the semantic field of “sharp”, “to sharpen”, and “knife” seem to have counterparts with similar or identical forms and meanings in non-Bantu languages, like for example Swahili *-kali* “sharp” in Oromo *-qara* “sharp” (Bitima 2000), and Swahili *-tema* “to cut” in Dinka *tem* “to cut” (Mitterrutzner 1866). However, to assume intensive borrowing here between Bantu and non-Bantu languages is premature at this stage of investigation. As long as there are no phonological and semantic rules to describe borrowing between Bantu and non-Bantu languages, we are dealing here with accidental similarity. However, this coincidence is too striking to be ignored.

#### 4.9 Iron smelting

While there still exists an intact vocabulary for traditional blacksmithing in Swahili, technical terms for traditional iron smelting are hard to find in Swahili dictionaries.

The Swahili iron smelting vocabulary can roughly be divided into two chronological groups: a modern one, published in Ohly (1987), and remnants of an apparently older vocabulary, scattered in various sources.

The modern vocabulary comprises a plethora of terms which are peculiar to Swahili. Two terms for “iron smelting furnace” exist in Swahili, *tanuru* and *joko la kuyeyufia*. The former is derived from *tanuru* “native lime-kiln” (Johnson 1974:453), which is in turn borrowed from Arabic *tannur* “kiln” (Sacleux 1939:869, Johnson 1974:453). It seems that this borrowing process from Arabic into Swahili has a relatively early origin, since there also exist forms like *tanu* or *tano* (Sacleux 1939:869), where several sounds have been elided. However, none of the older dictionaries list the meaning “furnace” for *tanuru*, which suggests a recent semantic development from “kiln” to “furnace”.

The nominal compound *joko la kuyeyufia* has to be translated literally as “kiln to smelt with”. The fact that it is a nominal compound specifying the function of *joko* “kiln” indicates that

there is no special term for this technology in Swahili. Bantu languages with a genuine word for a smelting furnace never use compounds, but rather single nouns which are solely reserved for the meaning "iron smelting furnace".

The same as has been stated for *joko la kuyeyufia* applies to *tfuma yafi* and *mgando wa tfuma* "bloomery iron", which are translations of an apparently alien technical concept into Swahili using vocabulary already available.

Swahili furthermore possesses two terms for "iron ore" (only mentioned in Ohly 1987), *mawe ya tfuma* and *madini ya tfuma*, the second not only being a nominal compound, but also incorporating the loanword *madini* or *maadini*, translated by Sacleux as "minerai" (1939:482). Thus the meaning of *madini ya tfuma* is "ore of iron", and that of *mawe ya tfuma* "stone of iron". As in the case of "iron smelting furnace" most Bantu languages have a single noun for "iron ore", mostly derived from "stone" and reserved for the meaning "iron ore".

All the items discussed so far are particular to Swahili and do not appear elsewhere in the Savannah.

There are also modern Swahili terms relating to iron smelting which are reflected in other Bantu languages. The nominal compound *mavi ya tfuma* "iron slag" (literally "excrements of iron") belongs into this category just like *mtapo* "iron ore", which has been imported relatively recently from Southern Bantu into Swahili. *Mtapo* as "iron ore" is also known in the Bantu languages around Lake Malawi, and in Bembe (D.54). Its semantic source is not "stone", but *-tapa* "to fetch water", "to collect", and *mutapo* "source of supply for honey, clay", which are used exclusively in Southern Bantu. Judging from the lexical material, the special meanings "to collect ore", "source of supply for ore", and "mine" developed there. These terms dispersed in a north-western direction into Lozi (K.21) and Kaonde (L.41), and north-east into Nyanja (N.31). In these regions the semantic change from "mine" to "iron ore" took place. Starting from there, *mtapo* "iron ore" entered the Swahili vocabulary. *Mgodi* "mine" has likewise been imported from Southern Bantu languages.

The only forms which point to an ancient tradition of iron smelting on the Coast are *kewa* (in Mvita), and *kelwa* (in the dialects of G.43) meaning "tuyère". In several Bantu languages it means "nozzle of bellows". As a general rule for Savannah Bantu the basic word for "nozzle

of bellows" and "tuyère" denotes, in most cases, something like "opening" or "channel". *Kelwa* developed from nouns like *kikelwa* "hole", *nkelwa* "brook", and *γikeero* "filter", which again were derived from the verb *-kela* "to flow". This verb can be found in the Tetela group (C.70). In the Teke and Kikuyu-Kamba groups (B.70 and E.50 respectively), as well as in Kikongo (H.16), it means "to filter", in Chokwe (K.11) "to ferment beverages". The nominal derivation with the meaning "brook" and "hole" can be found in Luba (L.30) only. Thus Luba, Kongo, and Tetela near or within the rainforest area, and the languages of the Kikuyu-Kamba group in the north-eastern Savannah are possible sources. A closer look at the forms in Kikuyu (E.51), Embu (E.52), and Kamba (E.55) excludes the latter possibility. These languages of zone E use the voiced variants in consonant-initial position *gera* or *ngerwa* for "nozzle" and "tuyère". Chokwe (K.11) may also be excluded, as it uses *-kela* exclusively for "to ferment beverages", not for "to flow" and for "to filter"; Kongo does not even have a nominalised form derived from *-kela*.

But the Luba use the basic terms *nkelwa* "brook" and *kikelwa* "hole", and the special iron terms *nkelwa* and *kikelwa*. Therefore it is justified to regard the wider Luba region as the source for this semantic innovation, which spread into the Savannah and reached the East African Coast.

## 5. Historical conclusions

### 5.1 Blacksmithing

The analysis of examples from the Swahili iron vocabulary yielded results that allow some provisional conclusions.

From a synchronic perspective the Swahili vocabulary of blacksmithing has a relatively close lexical affinity to Mijikenda and to the languages in the immediate hinterland of the Coast, like Bondei (G.24), and Zigua (G.31). A tendency to a closer affinity with Dabida (E.74a) and Sagala (E.74b) is also visible. Moreover, the Swahili iron vocabulary bears a striking resemblance in parts to the languages located in the corridor between the Lakes Tanganyika and Malawi/Nyasa, like Lungu (M.14), and Mambwe (M.15).

From a diachronic perspective, one part of the Swahili vocabulary relating to iron are the result of intensive influence from other Bantu and non-Bantu languages. Another part had an equally important influence on other Bantu languages. This mutual influence occurred in various phases of ancient and modern history and often involved languages in great geographical distance to Swahili. This means that for a comprehensive description of the semantic history of Swahili iron vocabulary all Bantu and Sudanic languages have to be considered as possible donors and recipients of lexical borrowing. From a chronological perspective, it became clear that mutual influence on a large geographical scale and thus the large geographical distribution of single lexical items is not peculiar to ancient history, but also possible in modern times.

The oldest influence on Swahili is reflected by terms like *-fua* "to forge" or *fuawe* "anvil". Swahili shares these words with most of the other Bantu languages of the Savannah, and with Bantu languages of the Northern Rainforest.

Several words are suspected to have been borrowed from non-Bantu languages north of Swahili, namely from Cushitic and Nilotic. Whether this influence coincides with the Cushitic influence on Swahili postulated by Allen (1993) is not yet clear.

By trying to link the Bantu iron lexicon to non-Bantu lexical sources two problems arise. First, to be able to describe these historical links comprehensively, much more lexical data is needed, especially from languages of the Sudanic belt. Second, we do not possess any comprehensive methodology for describing mutual borrowing processes between non-Bantu and Bantu languages. Phonological and morphological rules of borrowing processes are needed, so that we do not run the risk of comparing words which may only be accidentally similar. The greater the geographical distance, for example, between a possible non-Bantu source and a possible Bantu recipient, the more questionable is a comparison on the basis of such a phonological, morphological, and semantic similarity. Thus, only a few cases of this kind have been exemplified here.

Whether a single extensive borrowing process occurred from Cushitic and Nilotic languages into Swahili or vice versa, or whether it was a continuous flow of isolated technologies and their lexical terms cannot be established with certainty at the moment.

The most obvious historical process visible in today's Bantu iron vocabularies is that of borrowing from Swahili into other languages. These loanwords are more recent than most of those imported into Swahili and can be seen in the context of the penetration of the Savannah by coastal caravans. This process is represented in words like *tfuma* "iron" and words for new tools like *pundo* "hammer". Terms not dealt with in chapter 4 took the same routes into the interior, but they did not have an influence equalling that of *pundo* and *tupa*. Among the former are *tfembeu* "chisel" in Ganda (E.15) and Giryama (E.72a), and *mukasi* "chisel" in languages of the groups D.50, D.60, and E.20. Various iron tools for farming have a similar distribution as *pundo* "hammer": the distribution of *upanga* "bushknife" reaches as far as into the Bantu zones B and C and was also introduced into the Southern Bantu hemisphere. Whether this influence coincides with the "superiority" of Swahili blacksmithing in the East African context (Allen 1993) has yet to be confirmed.

The dispersal of all these words was surely driven by technical innovations on the Swahili Coast. A particular factor of innovation may have been shipbuilding, which required a sophisticated arsenal of tools for the wooden and metal parts of a ship. Moreover, new technologies were imported from overseas and distributed via the traditional trade routes to the interior.

In the above discussion it may seem that the processes represented by words like *-fua*, *-noa*, and *tfuma* can easily be arranged in chronological order. This is true in respect to the oldest chronological level, represented by *-fua* "to forge", and to the youngest, represented by *pundo* "hammer". What happened in the periods between these two chronological cornerstones is not clear. The problem is evident with the words of Arabic, Persian, and Cushitic origin. Some of these may belong to an ancient stratum, like *pua* "steel". *Tanuru* "kiln" may likewise fit into this category, but *tanuru* with the meaning "iron smelting furnace" is a recent one.

It is realistic to argue that what constitutes the modern vocabulary of the traditional Swahili blacksmiths is the result of a multitude of historical processes of mutual borrowing from various sources at different times, out of which those identified so far are just a part. These processes of borrowing may not have occurred in the form of one massive wave at a certain time. Rather a single term was borrowed on occasion, when a new technical invention found its way into the recipient language.

The fact that in certain parts of the Swahili Coast blacksmithing may have been of varying importance, as some of the sources presented in chapter 3 suggest, further contributes to the complexity of the chronological problem.

## 5.2 Iron smelting

In regard to iron smelting the empirical basis is even more scant than in the case of blacksmithing. As far as the existing lexical material is concerned, roughly two phases of mutual influence can be established: an ancient one (represented by words like *kelwa*), during which iron smelting was done on the Coast, either by Swahili or at least Bantu-speaking populations, and a very recent one, during which iron smelting terminology was borrowed, for example, from South African Bantu languages or compiled from the already existing Swahili basic vocabulary to meet the demands of a growing western-style iron manufacturing industry.

## 6. Perspectives

The semantic analysis presented in this paper yielded several preliminary historical results. To obtain a comprehensive picture of traditional Swahili iron crafts at least three further steps are necessary.

First, lexical data relating to iron crafts for every Swahili dialect should be collected as comprehensively and as soon as possible, since the knowledge about traditional blacksmithing in the Savannah will disappear sooner or later. Iron smelting already died out in the entire Bantu area during the first half of the 20<sup>th</sup> century. Nevertheless, the collection should include the technical vocabulary of blacksmiths and iron smelters in a form as complete as possible, as well as the words for iron products like "hoe", "axe", and "iron wire", which played an important role in East African history, as can be seen from the evidence presented in chapter 3. Data collection should furthermore comprise the iron vocabulary of the other Bantu and relevant non-Bantu languages, since the history of Swahili iron working can only be seen in a wider geographical context. Finally the appropriate words from the basic vocabulary should be included. Starting from such a database it will be possible to reconstruct the semantic development of most of the special words in regard to the Swahili iron crafts.

Second, rules should be formulated to plausibly identify and describe genuine borrowing processes between Bantu and non-Bantu languages. These rules should include the phonological, morphological, and semantic levels.

Third, a methodology for an interdisciplinary co-operation between historical linguistics and archaeology should be developed. One discipline alone will not be capable of producing a comprehensive description of the history of iron crafts in the region, which is so important for other aspects of pre-colonial history. Both archaeology and historical linguistics can make significant contributions: archaeology in terms of chronology, and historical linguistics in terms of the cultural context in which archaeologically-recovered items functioned. Yet we are far from having established such a method.

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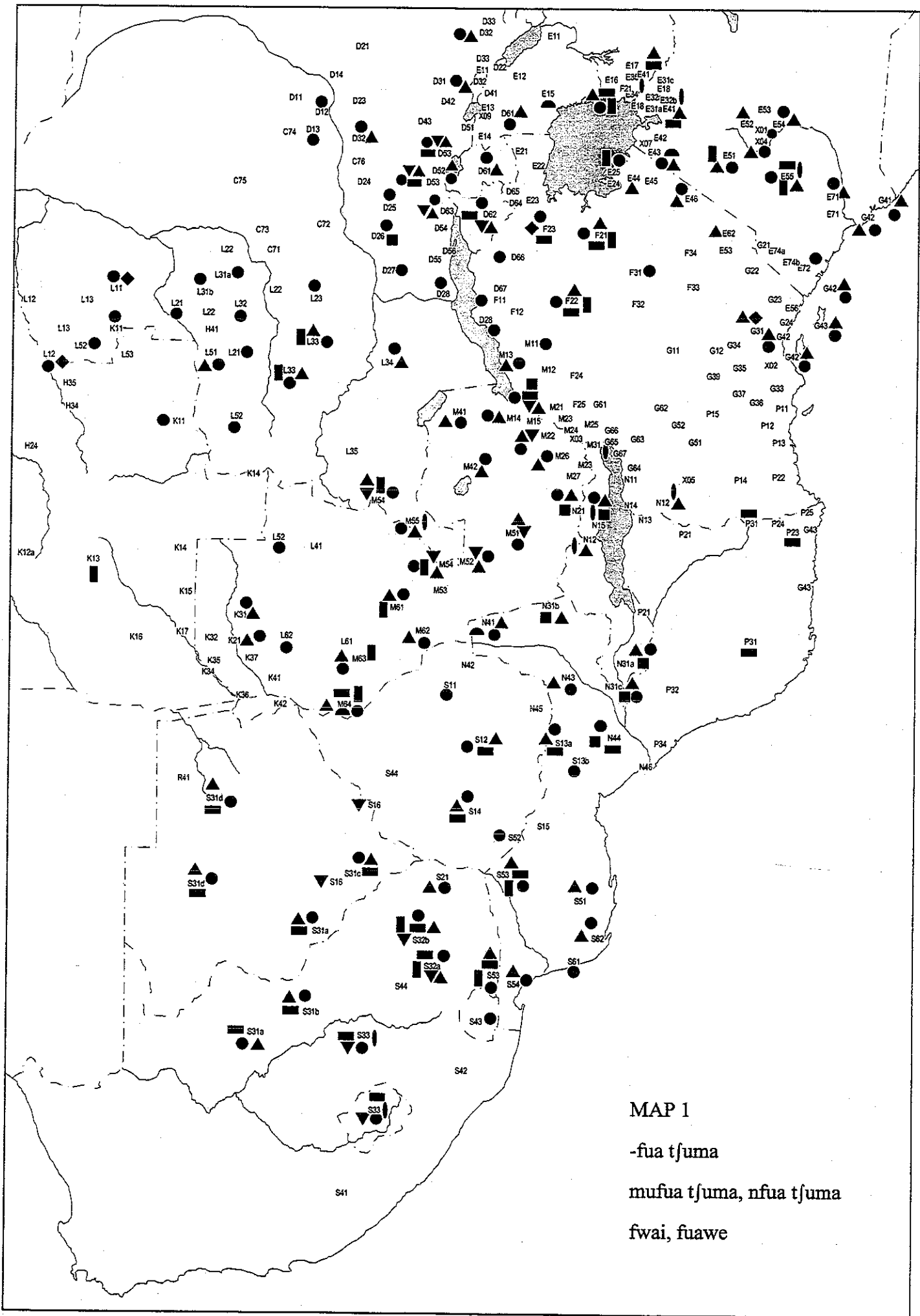
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MAP 1  
 -fua t'fuma  
 mufua t'fuma, nfua t'fuma  
 fwai, fuawe

## Map 1

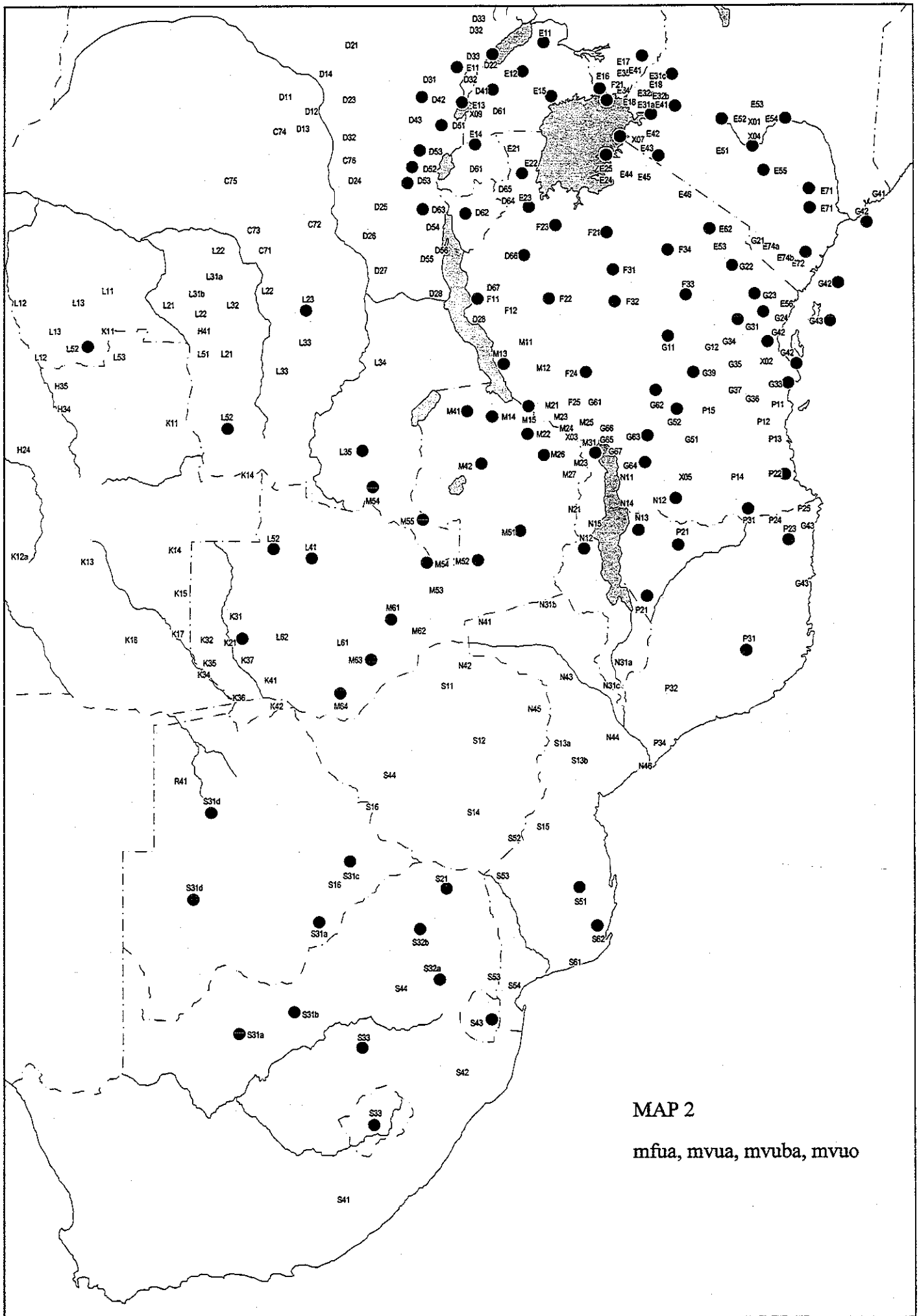
●		
A24	to forge	-lule
A72a	to forge	-lui
A75	to forge	-lui
B43	to forge	-tula
B63	to forge	-tfula, -sula
B77b	to forge	-tsula, -tfula
B86	to forge	-tsul, -tsyl, -tsöl
C32	to forge	-tula
C61	to forge	-tula
C83	to forge	-tula
D12	to forge	-tula
D13	to forge	-tua
D25	to forge	-fula
D26	to forge	-tula
D27	to forge	-fula
D28	to forge	-sila
D32	to forge	-tula
D35	to forge	-tuo
D52	to forge	-tfula
D53	to forge	-tula
D61	to forge	-tfula, -tfura
D62	to forge	-tfura, -tfyura
D63	to forge	-tula
D66	to forge	-tfura
E25	to forge	-tula
E43	to forge	-tura
E46	to forge	-tura
E51	to forge	-tura, -tura
E54	to forge	-tura
E55	to forge	-tua
E71	to forge	-fuya
E72	to forge	-fula, -fura
F11	to forge	-sola
F21	to forge	-fula, -sula
F22	to forge	-fula, -hula, -sula
F23	to forge	-fula, -hula
F31	to forge	-thula
G41	to forge (Tikuu)	-fua
G42	to forge (Amu, Mvita)	-fua
G42	to forge (Mrima, Unguja)	-fua
G43	to forge (Pemba)	-fua
H16	to forge	-fula
H21a	to forge	-sula
K11	to forge	-fula
K21	to forge	-tula
K31	to forge	-fula
L11	to forge	-fula
L12	to forge	-fu(u)la
L21	to forge	-ful

L23	to forge	-fula
L31a	to forge	-fula, -tula
L31b	to forge	-fula, -tula
L32	to forge	-fula
L33	to forge	-fuka, -fuka
L34	to forge	-fula
L51	to forge	-pfula
L52	to forge	-fula
L62	to forge	-fula
M11	to forge	-sula
M13	to forge	-sula
M14	to forge	-sula
M15	to forge	-sula
M22	to forge	-sula
M26	to forge	-sula
M41	to forge	-fula
M42	to forge	-fula
M51	to forge	-fula
M52	to forge	-sula
M54	to forge	-sula
M55	to forge	-fula
M61	to forge	-fula
M62	to forge	-fula
M63	to forge	-fula
M64	to forge	-fula
N15	to forge	-fura, -sula, -sura
N21	to forge	-fula, -fura, -sula, -sura
N31a	to forge	-sula, -sura
N31c	to forge	-sula, -sura
N41	to forge	-fula
N43	to forge	-sula
N44	to forge	-fula
S11	to forge	-fura
S12	to forge	-fura, -pfura
S13a	to forge	-pfura, -fura
S14	to forge	-bfura, -pfura
S21	to forge	-fula, -fura
S31a	to forge	-thula
S31b	to forge	-thula
S31c	to forge	-thula
S31d	to forge	-thula
S32a	to reforge	-rulolla
S32b	to reforge	-rulolla
S33	to forge	-rula, -thula
S43	to forge	-fula
S51	to forge	-fula
S53	to forge	-fula
S54	to forge	-fula
S61	to forge	-tjula
S62	to forge	-pfhula, -fula
X01	to forge	-tura
X04	to forge	-tura



A24	blacksmith	mot' a boluli
B63	blacksmith	otfulu
B77b	blacksmith	mutuli
C32	blacksmith	motuli
C61	blacksmith	botuli
C83	blacksmith	ntudi
D32	blacksmith	mtutuli?
D32	blacksmith	tutuli?
D52	blacksmith	obutfuzi
D53	blacksmith	mutuzi
D61	blacksmith	umutfuzi
D62	blacksmith	umutfuzi, umusuzi
D63	blacksmith	mutuzi
E41	blacksmith	umuturi
E43	blacksmith	omuturi
E44	blacksmith	muturi
E46	blacksmith	moturi
E51	blacksmith	muturi
E52	blacksmith	muturi
E54	blacksmith	muturi
E55	blacksmith	mdui, mutui, mutwii
E61	blacksmith	mfuru
E71	blacksmith	m(u)fuya
F21	blacksmith	nfuji, nsuji
F22	blacksmith	musuzi
G31	blacksmith	mfusi
G41	blacksmith (Tikuu)	mufua, nfua
G42	blacksmith (Amu, Mvita)	mfua
G42	blacksmith (Mrima, Unguja)	mfua
G43	blacksmith (Pemba)	mfua
K21	blacksmith	bufuzi, sifula, mutuli, situli
K31	blacksmith	(o)mufuli, sifula
L33	blacksmith	mufudi, mufuli
L34	blacksmith	mufuli
L51	blacksmith	mupfuli
M13	blacksmith	kasula
M14	blacksmith	(a)kasula
M15	blacksmith	kasula, musuzi
M22	blacksmith	(e)kasula
M26	blacksmith	wakasula
M41	blacksmith	fikafula, mufuzi
M42	blacksmith	kafula
M42	blacksmith	mufuji, fikafula
M51	blacksmith	fikafula, umfusi, umufuzi
M52	blacksmith	fikafula, umfusi, umufuzi
M54	blacksmith	fikafula, umfusi, umufuzi
M55	blacksmith	fikafula, umufuji
M61	blacksmith	mufuji
M62	blacksmith	mufuji
M63	blacksmith	mufuzhi
M64	blacksmith	mufuzi, uufula
N12	blacksmith	mufuzi

	●		
C83	iron-smelter		ntudi
E32a	iron-smelter		omuhuli
E32b	iron-smelter		omuhuli
E55	iron-smelter		mutui
G65	miner		avatoli
M55	miner		abafuji, bakafula
N12	miner		bafuzi
N15	iron-smelter		msuli
S33	iron-smelter		setfolli
	●		
A75	to cut		-sule
E15	to become sharp		-tula
E43	to castrate		-tura
M64	to whet		-fula
N41	to whet		-tuula
	◆		
F23	arrow		fitulo
G31	arrow		mfulo
G31	arrow-shaft		ntulu
L11	arrow		mufula
L12	arrow-point		mufuula





N15	blacksmith	mfuzi, msuli, m(u)suzi,
N15	blacksmith	wakusula
N21	blacksmith	m(u)fuzi, msuli
N31a	blacksmith	msuzi, wosula
N31a	blacksmith	muombawoosura
N31b	blacksmith	wosura
N31c	blacksmith	msuzi, wosula
N31c	blacksmith	muombawoosura
N41	blacksmith	mfuzi, mufuli
N43	blacksmith	nyakusura
S12	blacksmith	mupfuri
S13a	blacksmith	mupfuri
S14	blacksmith	mupfuri
S21	blacksmith	mufuli
S31a	blacksmith	mothudi
S31b	blacksmith	mothudi
S31c	blacksmith	mothudi
S31d	blacksmith	mothudi
S32a	blacksmith	mothudi
S32b	blacksmith	moruli
S51	blacksmith	moruli
S53	blacksmith	mufuli
S54	blacksmith	xifuri
S62	blacksmith	mufuli
X04	blacksmith	fifuri, mufuri
		muturi

## ■

B63	the forge	njo-otfulu
B77b	the forge	mutsula
B86	the forge	tsul, iluun la tsul
C32	the forge	lituli
C61	the forge	etuli
E25	the forge	mwituliro
E51	the forge	ituriro
E55	the forge	kituio
F21	the forge	isulilo
F22	the forge	isulilo
K13	the forge	tjilulo
L33	the forge	kifudilo
M54	the forge	itjifulilo
M61	the forge	tjifulilo
M63	the forge	tjifudilo
M64	the forge	imfulilo
S32a	the forge	morulo
S32b	the forge	morulo
S53	the forge	fulo

## ▼

D53	hammer	ntulo
D62	hammer	umuduro, isure

D63	hammer	ntuulo
M15	hammer	tj̄isulilo
M22	hammer	umusulilo
M51	hammer, weapon	tj̄ifulilo, tj̄ifulo
M52	hammer	tj̄isulilo, tj̄isulo
M54	hammer	tj̄isulilo, tj̄isulo
S16	hammer	tj̄ifulo
S32a	hammer	thulo
S32b	hammer	thulo
S33	hammer	tj̄etlo

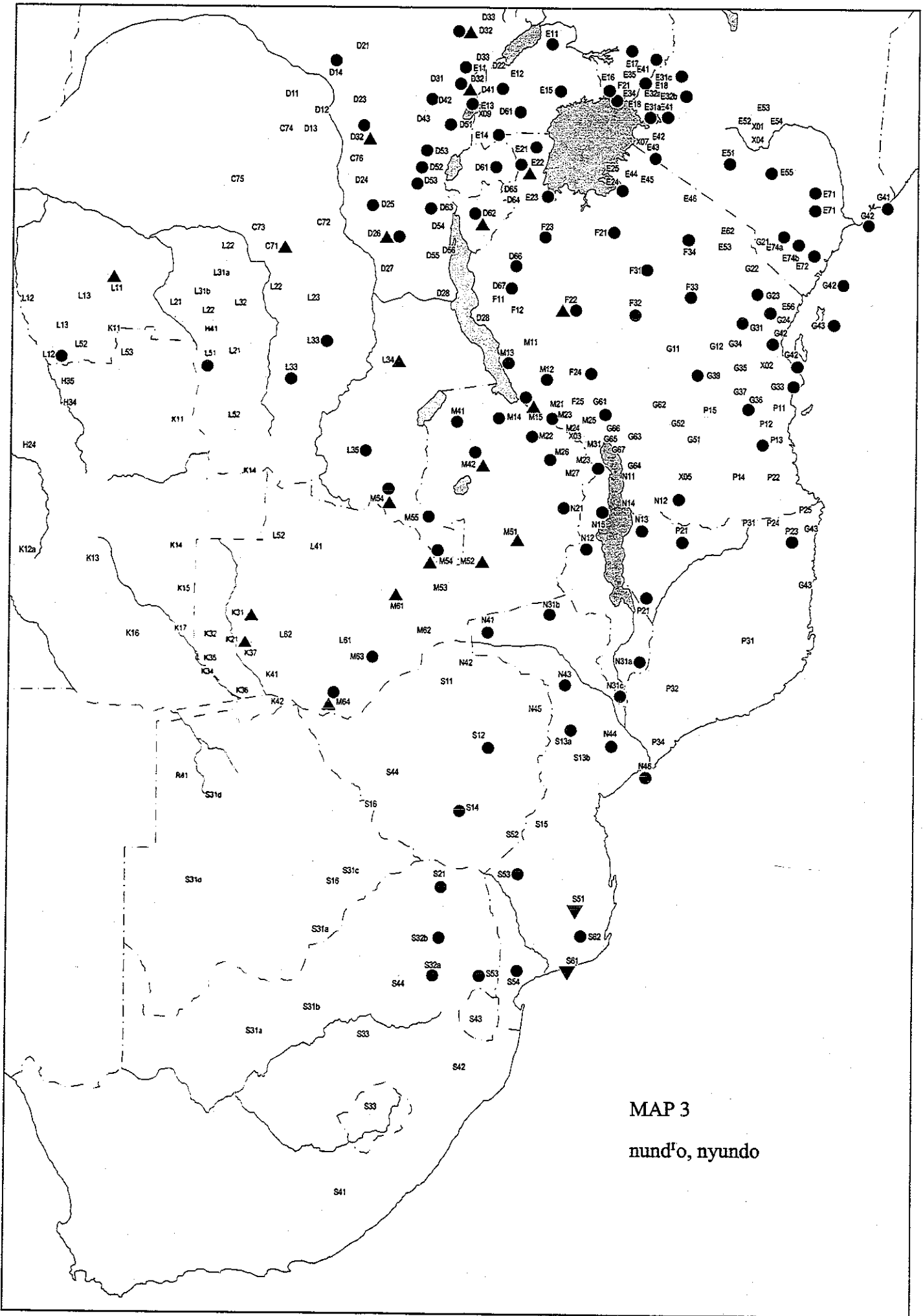
D53	anvil	ituliro
D62	anvil	it̄juriro
E41	anvil	eituliru
E55	anvil	kitui
F21	anvil	isulilo
F22	anvil	isulilo
F23	anvil	ifulilo
M15	anvil	tj̄isulilo
M64	anvil	tj̄ifulilo
N44	anvil	safula
P23	anvil	lyulagwe
P31	anvil	nihulave
S12	anvil	tj̄ip̄furiro
S13a	anvil	tj̄ip̄furiro
S14	anvil	tj̄ip̄furiro
S31a	anvil	sethulelo
S31b	anvil	sethulelo
S31c	anvil	sethulelo
S31d	anvil	sethulelo
S32a	anvil	patolo
S32a	anvil	serulelo
S33	anvil	tsetlo, serulelo
S53	anvil	xifulo

D26	iron	itule
M15	iron	tj̄isule
N15	iron	tj̄isulo
N21	iron	tj̄isulo
N31a	iron	tj̄it̄fulo, tj̄itsulo
N31a	metal	tj̄itsulo
N31b	iron	tj̄itsuro
N31c	iron	tj̄it̄fulo, tj̄itsulo
N31c	metal	tj̄itsulo
N44	iron	tj̄itsulo

## Map 2

●		
D22	bellows	muguba
D41	bellows	omuyyuba, moguba
D42	bellows	omuyufa, omugoba
D51	bellows	mupfuba
D52	bellows	omuvubo
D53	bellows	mufuba, muvubo
D62	bellows	umuvuba, umuvuŷa
D63	bellows	oomuvuba, oomuvubo
D66	bellows	umuvuŷa
E11	bellows	mujuba, omjuŷa
E12	bellows	omujuba
E13	bellows	omujuba
E14	bellows	omujuba
E15	bellows	omuvubo, mifubo, mvuba
E22	bellows	omujuba, myuba
E23	bellows	muhuhi, kujuba
E25	bellows	omuguŷa
E31a	bellows	kumukuba
E31c	bellows	kumukuba
E34	bellows	omukuba
E41	bellows	omuguŷa, umuguvu
E43	bellows	umugup <sup>h</sup> u
E52	bellows	migua
E54	bellows	muba, migua
E55	bellows	mua
E61	bellows	mfuwa, mfuva, mfua
E71	bellows	mifua
E72	bellows	mifuo, mivuo, mivuwa, muvuwo
F11	bellows	mufuba
F21	bellows	mujkuba, -guŷa, nguba, mguva
F22	bellows	muguŷa
F23	bellows	muvuŷa
F24	bellows	umuguwa
F31	bellows	ngua
F32	bellows	mewa, meua
F33	bellows	muuva
F34	bellows	muvo
G11	bellows	mfua, mjua, mvuo
G22	bellows	mfuŷa, mvuo
G23	bellows	muvuwo, mvuo
G24	bellows	mivua
G31	bellows	muvuwo, mvuo
G33	bellows	mivuo
G39	bellows	mivua, mvuo
G42	bellows (Mvita)	mifuo
G42	bellows (Mrima)	mvuba, mfua
G42	bellows (Unguja)	mvuo, mifuo
G43	bellows (Pemba)	mvuo, mifuo
G52	bellows	mfua

G62	bellows	mufuva, mufuwa
G63	bellows	mfua, mvua, umufuva
G64	bellows	umfuvu, mvua
K21	bellows	mabuba
L23	bellows	muwa
L35	bellows	muba
L41	bellows	myuba, miuwa
L52	bellows	muuba
M13	bellows	umuwa
M14	bellows	umuwa
M15	bellows	imyua
M22	bellows	imwua, umuša, umuwa
M26	bellows	umuwa
M31	bellows	mfubo
M41	bellows	umuša
M42	bellows	-fuba, imwuba, muba, umuša
M51	bellows	umuwa, -fuwa
M52	bellows	umuwa
M54	bellows	umuwa
M55	bellows	myuba, umuba
M61	bellows	miuwa, miuwa, myuuba
M63	bellows	mavhuba
M64	bellows	mavwuba, ivuba
N12	bellows	mvua
N13	bellows	muhuwa
P21	bellows	miuwa, miyuwa, mubua, muhwa
P22	bellows	miuwa
P22	bellows	mivua
P23	bellows	mmuwa, muuša, muva
P31	bellows	nihuva
S21	bellows	muvuvha
S31a	bellows	mouba, mouša
S31b	bellows	mouba, mouša
S31c	bellows	mouba, mouša
S31d	bellows	mouba, mouša
S32a	bellows	meuba, mfua, mouva
S32b	bellows	meuba, mfua, mouva
S33	bellows	mouba
S43	bellows	mfua
S51	bellows	mivubo, mivušo
S62	bellows	mišušo
X04	bellows	mugwa
X07	bellows	mfuwa, mguva



MAP 3  
nund'õ, nyundo

## Map 3

●		
A43	hammer	njon
A72a	hammer	ngondo
A75	hammer	nnon y'edu
B63	hammer	njunu
B77b	hammer	njunu
C36a	hammer	elondo
C41	hammer	eyondo, yondo
C61	hammer	njondo
D14	hammer	nondo
D25	hammer	nondo
D26	hammer	nyondo
D32	hammer	mondo, mundo
D41	hammer	enyoondo
D42	hammer	enyondo
D51	hammer	enyundo
D52	hammer	enyundo
D53	hammer	nyundo
D61	hammer	inyuundo
D62	hammer	inyuundo
D63	hammer	inyuundo
D66	hammer	inyundo
D67	hammer	nyondo
E11	hammer	enyondo
E13	hammer	enyondo, enyundo
E14	hammer	enyondo, enyundo
E15	hammer	ennyondo
E17	hammer	enyuundo
E21	hammer	enyundo
E22	hammer	enyondo
E23	hammer	enyondo
E24	hammer	enondo
E31a	hammer	inyondo
E31c	hammer	inyondo
E32a	hammer	inuundo
E32b	hammer	inuundo
E34	hammer	enyundo
E41	hammer	itsinyundo
E43	hammer	inuundo
E51	hammer	nyondo
E55	hammer	nyundo
E71	hammer	nyundo
E72	hammer	nyundo
E74a	hammer	nyondo
E74b	hammer	nyondo
F21	hammer	nundo
F22	hammer	nundo
F23	hammer	nundo
F24	hammer	inyondo
F31	hammer	nondo

F32	hammer	nyondo
F33	hammer	nyondo
F34	hammer	nyondo
G23	hammer	nyundo
G24	hammer	nyundo
G31	hammer	nyundo
G33	hammer	nyundo
G36	hammer	nyundo
G39	hammer	nyundo
G41	hammer (Tikuu)	nund'o
G42	hammer (Amu)	nund'o
G42	hammer (Mvita)	nyundo
G42	hammer (Mrima, Unguja)	nyundo
G43	hammer (Pemba)	nyundo
H16e	hammer	nyundu
L12	hammer	nzuundu
L33	hammer	nyundo
L35	hammer	nnyundo, nyundo
L51	hammer	nzundu
M12	hammer	nyondo
M13	hammer	inoondo
M14	hammer	inondo
M15	hammer	nondo
M22	hammer	itfinyondo, inyondo
M23	hammer	inondo, nyondo
M25	hammer	inyondo
M26	hammer	inyondo
M41	hammer	inondo, nondo, nzondo
M42	hammer	inondo
M54	hammer	inondo
M55	hammer	inondo
M63	hammer	inyundo
M64	hammer	inyundo
N12	hammer	inyondo
N13	hammer	nyondo
N15	hammer	tfinyundu, nyondo, nyundo
N21	hammer	nyondo
N31a	hammer	nyundo
N31b	hammer	nyundo
N31c	hammer	nyundo
N41	hammer	nundo
N43	hammer	nyundo
N44	hammer	nyundo
N46	hammer	nyundo
P13	hammer	nyundo
P21	hammer	nyuundo
P23	hammer	nyundo, nyundu
R21	hammer	inyundo
R41	hammer	onyudo
S12	hammer	inyundu
S13a	hammer	nyundo
S14	hammer	nyundo
S21	hammer	nyundo
S32a	hammer	nundu
		nyundo

S32b	hammer	nyundo
S53	hammer	nyundzu
S54	hammer	nyundju, nyundu
S62	hammer	nyundju

## ▲

B43	anvil	nyundu
C32	anvil-stand	elondo
C32	anvil	nzondo
C41	anvil	yondo e fina
C61	anvil	njondo
C71	anvil	nyondo
D26	anvil	nyondo
D32	anvil	mondo
D62	anvil, "leg of the king"	inyundo
E22	anvil	nyondo
F22	anvil	inundo
K31	anvil	(e)nyundo
L11	anvil	nzundo
L34	anvil	nyundo
M15	anvil	nondo
M42	anvil	nondo
M51	anvil	inondo
M52	anvil	inondo
M54	anvil	inondo
M61	anvil	nyundo
M64	anvil	nyundo

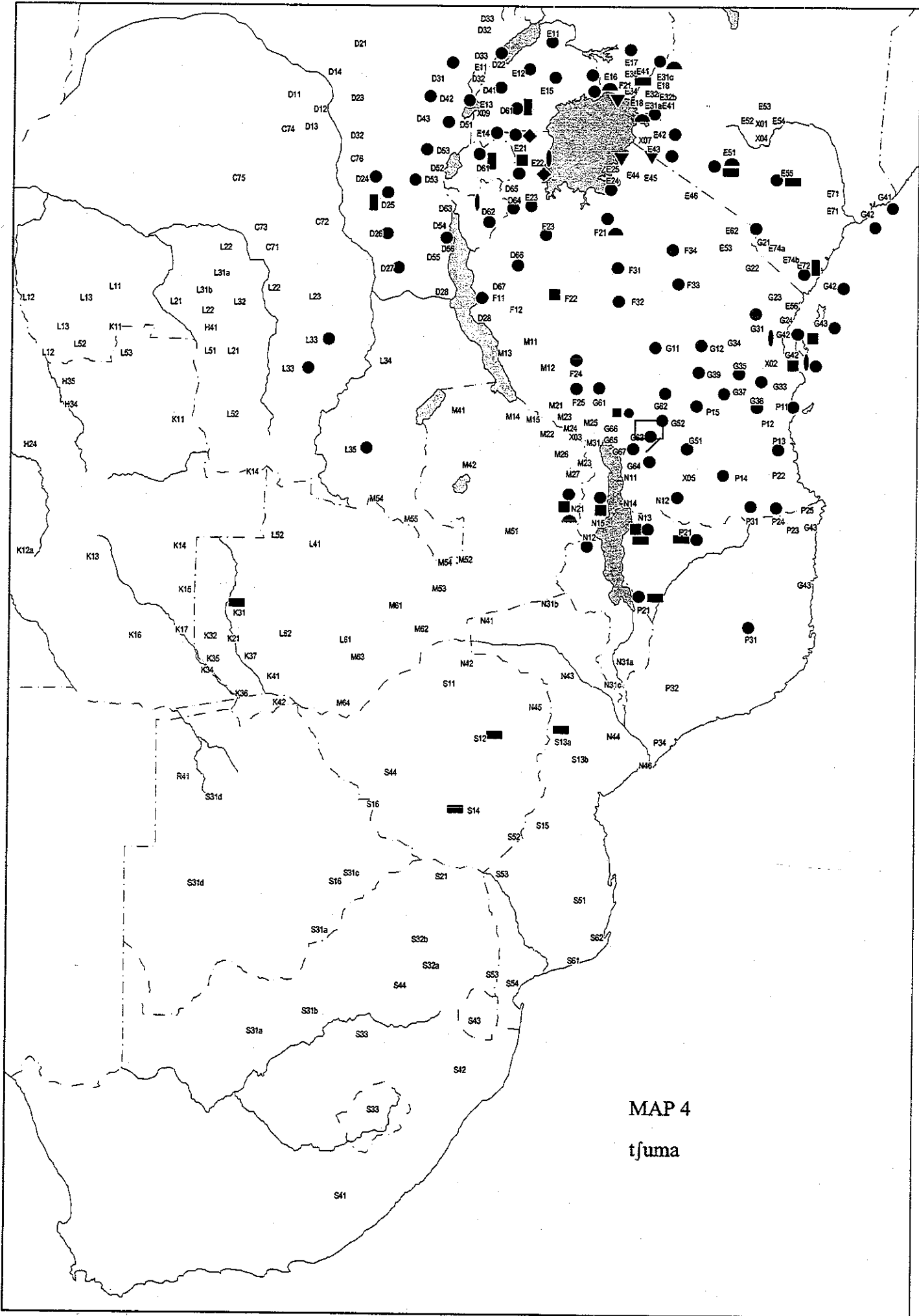
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A26	axe	eondo
B22b	axe	yondo

## ▼

S51	the forge	nyunzo
S61	the forge	nyundo





MAP 4  
tfuma

## Map 4



D22	iron	kjoma
D24	iron	kiuma
D25	iron	kiuma
D26	metal	kioma
D27	iron	kyuma
D41	iron	ekoma, ekyoma
D42	iron	ekihoma, ekyoma
D51	iron	kyuma
D53	iron	tjuma
D53	metal	tjuma
D56	iron	kyuma
D61	iron	itjuma, ikyuma
D62	iron	itfyuma
D62	metal	itfyuma
D64	iron	vioma
D66	iron	itjuma, idzuma
D67	iron	fiuma
E11	iron	fuma, ekyoma
E12	iron	ekioma
E13	iron	etfoma, ekyoma
E13	metal	ekyoma
E14	iron	ekyoma
E14	metal	ekyoma
E15	iron	tjuma, ekyuma
E16	iron	ekiuma
E17	iron	ekyoma
E21	iron	edzioma, edzoma
E21	metal	evioma
E22	iron	kioma
E23	iron	ekyoma
E24	iron	ekyoma
E31a	iron, metal-point, piece of iron	etjuma, ikiuma
E31c	iron	etjuma, ikiuma
E42	iron	ekiuma
E43	iron	ekioma, ikyuma
E51	iron	tjuma
E55	iron	kyuma
E72	iron	tjuma
E72	iron	juma?
F21	iron	tjuma
F21	metal	tjuuma
F23	iron	syoma
F24	iron	itjuma
F25	iron	ilitjuma
F31	iron	kyuma
F32	iron	tjuma
F33	iron	tjuma
F34	iron	tjuma
G11	iron	tjuma

G12	iron	tfuma
G21	iron	tfuma
G31	iron	tfuma
G33	iron	tfuma
G35	iron	tfuma
G36	iron	tfuma
G37	iron	tfuma
G39	iron	tfuma
G41	iron	tfuma
G42	iron	tfuma
G42	iron	tfuma
G43	iron	tfuma
G51	iron	tfuma
G52	iron	tfuma
G61	iron	kiuma
G62	iron	tfuma
G62	metal	tfuma, kyuma
G63	iron	tfuma
G64	iron	tfuma, ikyuma
G65	iron	ifyuma
G67	iron	ekyuma, ikhuma
L33	metal	kiuma
L35	metal	kyuma
N12	iron	kyuma
N13	iron	tfuma, kyuma
N15	iron	tfuma, suma
N21	iron	tfuma
P11	iron	tfuma
P13	iron	kijuma
P14	iron	kyuma
P15	iron	tfuma
P21	iron	tfuma
P24	iron	juma
P31	iron	tfuma
		iyuma



A72a	iron-slag	esom
A75	iron-slag	esom



D25	knife	kyuma
D61	knife	ikyuma
E72	knife-blade	tfuma



E25	anvil	eryuuma
E34	anvil	sitfuma
E43	anvil	ikyoma



E32a	iron bead	etfuma
E51	iron bead	keoma
E55	iron bead	kyoma
K31	iron bead	isiuma
N13	iron bead	suma
P21	iron bead	tfuma
S12	iron bead	tfuma
S13a	iron bead	tfuma
S14	iron bead	tfuma



E22	bloomery iron	kyoma kibisi
F22	bloomery iron	tfuma tfafika
G42	bloomery iron	tfuma yafi
G65	bloomery iron	ikyuma
N13	bloomery iron	dsuma
N15	bloomery iron	tfuma
N21	bloomery iron	tfuma



D62	arrowhead	itfyuma
E22	arrowhead	eitfumu?
G42	arrowhead	tfuma



E31a	steel	khikhyuma
E31c	steel	khikhyuma
E51	steel	tfuma
F21	steel	tfuma
N21	steel	tfuma



E21	iron-ore	edzoma
E22	iron-ore	orwooma