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► To cite this version:

Caroline Robion-Brunner, Alebachew Belay, Friyat Angesom. Metals and metallurgists in Wollo and North Shewa Area (Amhara Regional State, Ethiopia). Preliminary results of the survey conducted in Spring 2021. Nyame Akuma, 2022. hal-03428102v1

HAL Id: hal-03428102

<https://univ-tlse2.hal.science/hal-03428102v1>

Submitted on 15 Nov 2021 (v1), last revised 31 Aug 2022 (v2)

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Title: Metals and metallurgists in Wollo and North Shewa Area (Amhara Regional State, Ethiopia), Preliminary results of the survey conducted in Spring 2021

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Résumé :

Notre connaissance de l'histoire de la métallurgie et des métaux en Éthiopie et dans la Corne de l'Afrique est encore très parcellaire par rapport au reste de l'Afrique. L'utilisation de métaux non ferreux et ferreux y est attestée au cours du premier millénaire avant Jésus-Christ et la découverte de quelques vestiges sidérurgiques, plutôt dans la partie nord du pays, montre que du fer y fut produit et transformé en objet de la période antique jusqu'à très récemment, en passant par la période médiévale. Afin de contribuer à l'histoire des métaux en Éthiopie, un premier travail de terrain a été mené dans la région du Wollo et du Nord Shewa. Son objectif principal était de localiser les sites archéologiques présentant des traces d'anciennes activités métallurgiques. Pour ce faire, des entretiens avec les populations locales ont été réalisés afin d'obtenir des informations sur ce sujet. Cette phase a permis également de comprendre la relation entre les habitants actuels et la production des métaux. Onze quartiers de forgerons/bijoutiers situés dans la partie orientale de la région d'Amhara ont été visités. Plusieurs ateliers métallurgiques ont été mentionnés lors des entretiens et un a fait l'objet d'une visite témoignant de la production du fer dans cette région où cette activité était pour l'instant inconnue des archéologues.

Introduction

Our knowledge of the history of metallurgy and metals in Ethiopia and the Horn of Africa is quite limited compared to the rest of Africa. The use of non-ferrous and ferrous metals is attested there during the first millennium BC. These artifacts from Egypt, Nubia, and Arabia bear witness to the important traffic of goods at that time both within Northeast Africa and between it and the Near East. For example, the discovery of four bronze vessels of Meroitic origin in an Aksumite cache at Addi Galamo in Tigray, Ethiopia, attests to the relationship between ancient Ethiopia and the Nile Valley (De Contenson, 1963). Already a few centuries earlier, the openwork metal plates of South Arabian tradition discovered in the tombs of the Necropolis of Yeha offered an eloquent testimony of trade with the Arabian Peninsula (Anfray, 1963; Drewes and Schneider, 1967). It seems that independent metal production started in Ethiopia in the first half of the first millennium of our era. A recent analysis of metallurgical remains (ore, furnace wall, and slag) from a site near Aksum dated to the 3rd-4th century AD shows that iron was produced there (Severin et al., 2011). The material evidence of this activity is still very tenuous, whereas the Aksumite civilization, from its coinage (gold, silver, and bronze) to its architecture (metallic toads to bind the blocks), presupposes a significant presence of metal. The writings of Cosmas Indicopleustes, a Greek-Speaking Egyptian merchant of the 6th century AD, suggest that the gold and silver used by the Aksumite kingdom came from distant regions, located possibly about 500 km south. However, ethnological surveys reveal that peasants collect gold nuggets in the rivers of Tigray (Smidt and Grebremichael, 2012). This current exploitation of gold-bearing alluvium bodes well for the existence of primary deposits in the surrounding mountains that may have been the subject of ancient mining works. It opens up the possibility of multiple Aksumite gold and silver sources. On the Tigray Plateau, some coins and slag were discovered during the excavations of the site of Wakarida but metallurgical and metallic remains are rare (Dugast and Gajda, 2011). Not far from Wakarida, two large iron

ore reduction sites were identified at Myriam Takot and Myriam Kadith. The metallurgical wastes are mainly tapped slag and tuyeres. No chronological attribution has been established for the moment but the sites appear to have been in operation during the medieval period (Humphris, 2017). Also in the Tigray area, an important ironworking site has just been discovered north of the town of Wuqro (Hiluf et al. 2020). Gud Bahri site contains all the steps of the iron metallurgy in a 9-hectare area: mining of hematite-rich veins on a hillside, iron smelting and smithing workshops and a habitat site. Thanks to the pottery identification and the radiocarbon dating, the occupation of the site took place between the 7th-8th and the 11th century. The iron production could be, on some level, associated with the carving of the rock churches found in the Abyi Addi-Asbi Wombäarta belt where close to 150 rock-hewn churches are located. In the south-west Ethiopia, smelting of iron is a craft which is still practised at least the beginning of the 21st century (Haaland 2004). In this isolated area, the metallurgists use a shaft furnace made of clay with a slag pit and pot bellows to produce regularly iron. They transform it into agricultural tools sold and used in the neighbouring villages. The rapid presentation of the available data on the history of metals in Ethiopia reveals the lack of data to get to know the interactions between societies and their environment; the processes of the invention, innovation (borrowing/non-borrowing), and diffusion of techniques; the social, ritual and symbolic dimensions of craftsmanship; the relationship between power and wealth production; the networks and circuits of economic exchange; etc.

To contribute on the history of metals in Ethiopia, one of us (CRB) was posted by the CNRS at the French Center for Ethiopian Studies on September 1st, 2020 to conduct paleometallurgical research and to train Ethiopian students and colleagues in this subject. Our first fieldwork was designed to allow for a cultural overview of the Wollo and North Shewa Area. Its main objective was to locate archaeological sites which have evidences of ancient metallurgical activities. To do so, we conducted interviews with local populations to identify metallurgical workshops. This

phase also helps to understand the relationship between the current inhabitants and the metal production. It is why, the main attention is done on the blacksmiths and jewellers. Thus, an in-depth interview was conducted within the above-mentioned societies of the region. It covered eleven blacksmith/jewellery quarters found in the eastern part of the Amhara region (Figure 1). Where ancient workshops were mentioned, we validated the information through site visits, taking GPS readings, describing the site, and establishing photographic documentation.

Figure 1: Map showing the localities alluded in the text

Archaeological Background

Compared to the other regions in Northern Ethiopia known for their rich archaeological resources, the central highlands were long forgotten. There is no archaeological research reported on the periods before the Middle Ages, except some paleontological and geological campaigns along the Mush basin (Feseha 2015). There were some travelers, i.e. missionaries and explorers traversed the region in the 19th century and provided passing remarks in their accounts on some of the prominent churches and political garrisons. By the mid-twentieth century, an American Sociologist Donald Levine conducted an ethnographic study on the culture and history of Menz (1964). In all these cases, however, there is no elaborated information provided on the archaeological sites of the region. Archaeological campaigns in the central highlands began in 1990s. Since then archaeological researches in this area focus on three major themes, viz. megalithic (“pagan”) archaeology, church archaeology and archaeology of Islam.

In 1983 Francis Anfray notified the existence of various megalithic and other historical structures in the region for the first time (1983). Following Anfray’s report, from 1997 onwards studies were conducted on historical and archaeological sites by an Ethio-French team that led to the operation of organized archaeological surveys which were followed by several publications on a range of archaeological issues (Fauvelle-Aymar and Hirsch 2011; Derat and

Jouquand 2012; Fauvelle-Aymar and Poissonnier 2016). For instance, the test excavations conducted on five megalithic sites in South Wollo and North Shewa and subsequent studies on collected artifacts and ecofacts throw light on the temporal dimension of the culture, which is among the most important contributions in the archaeology of the region (Fauvelle and Poissonnier 2016).

Meanwhile, there were historical explorations of medieval royal camp sites conducted in the region for the fulfillment of doctoral and masters studies (Deresse 2009; Mengesha 2011). Recent explorations by archaeologists and historians based at the department of history and heritage management of Debre Berhan University also tried to document archaeological and other heritage sites particularly those located in the present North Shewa Zone of the Amhara Regional States (Alebachew and Chalachew 2016). Moreover, a PhD thesis by Alebachew Belay (one of the authors of this article), provides a comprehensive archaeological research focusing on the megalithic sites in the Central Highlands with comparative overview on the other two themes i.e. Church archaeology and archaeology of Islam (2020). Nevertheless, no attempt has been made to understand the technological advancement of the society in the region that lies behind their architectural excellence attributed to all the local religious practices, Christianity and Islam. Thus, this metal history report will reveal much more about the architectural achievements of medieval society in the region.

Historical Background

A study on the pre-history and early history of the Central Highlands of Ethiopia is almost none. This is partly because of the general infancy of archaeological research in the region and the absence of sufficient historical data in the later case. Despite the relative abundance of historical (mainly hagiographies and chronicles) and archaeological evidences, the medieval past is also far from complete reconstruction save the on-going and up-coming works of Ethio-French teams on selected sites. Hence, it is still difficult to present ancient historical bases as a prelude

in dealing with the medieval past of the area. Based on existing historical references, the history of the area is mostly traced from the late 13th century A.D., which is traditionally taken as a dividing line between the little unknown early medieval and the late medieval periods of Ethiopian history. However, there is no doubt that the aforementioned cultural and geographic dynamics did have their roots back in ancient times.

As discussed in the section above the medieval past of the region was characterized by cultural dynamism. From archaeological campaigns so far it became clear that there existed a well-established pagan civilization exemplified mainly by gigantic tumuli located on the plateau to the west and a few but adorable stelae found in the escarpment eastward (Fauvelle and Poissonnier 2016; Alebachew 2020). Although sample C-14 dates indicate that the culture prevails between 10th and 14th centuries, it still requires taking more samples from different sites. Recovered artifacts also attested that the megalithic society of the area had both local and international trading networks.

Nevertheless, due to limited archaeological and historical research, it is hard to establish the period before the dawn of the so-called Solomonic Dynasty in the late 13th century. For instance, the early history of Menz is little known. Archaeological evidence suggests that the area was populated in the 1st millennium AD. Tradition claims that the legendary last Aksumite king 'Anəbasā Wudəm fled to Menz from Aksum when it was sacked by ʿĪsāto (Yodit or Gudit) in the tenth century (Derat 2020). Meanwhile, there are other hagiographic and oral sources stating the settlement of 'Anbasā Wudəm around Dabra Hāik Estifānos as discussed below (Alebachew 2020).

However, Menz and adjacent areas on the plateau, which was the core zone of the megalithic culture, appear in ancient literature in the 14th century, when it was conquered by the Christian power and Christianity was underway. The first mention of Menz in the texts produced in the

Christian kingdom was in the history of the wars of Amda Seyon, which recounts the victorious campaigns of this sovereign against Muslim sultanates in 1332 (Derat and Jouquand 2012).

The western part of the present research area, which comprises most of the South Wollo formerly called Beta-Amhara (lit. the house of Amhara) was a political and religious center of the Ethiopian medieval Christian civilization from late 13th to early 16th centuries (Mengesha 2011). Beta-Amhara, which includes Dabra Hāik ṾEstifānos was a famous center of Christian scholarship. According to hagiographical sources, the last king of Aksum Dəl Nā`od with the guidance of the then Bishop Abba Salāmā the 2nd came from Aksum and camped at a hilltop northern side of Lake Hāik called Dabra Egziabher ṾAb. It was here that the renowned medieval church scholars including Abba Giorgis attended their schooling. It is also stated that the people of the area were worshippers of python (Alebachew 2020).

While the internal upheavals in the heart of Ethiopia were at their height (towards the close of the 1st millennium AD), Islamic encroachment at the fringes of the kingdom became bolder and more dangerous. The troubles were eventually checked, and ground lost, both territorially and propagation of Christianity, was regained, but the effects of the disturbances in the periphery could not be mitigated in the same manner. Here the losses of the coastal plains proved irremediable; the Islamization of the lowlands continued at accelerated pace and Muslim powers succeeded one another establishing their sovereignty, with varying degrees of effectiveness, over African Red Sea littoral. But Islam threatened not only the coastal areas which the Abyssinian kingdom had been cut off; it spread its militant among the nomadic groups who lived and moved between the sea and eastern slopes of the escarpment until, finally, it began to encroach even eastern Shoa and the Sidama country (Taddesse 2008).

In the meantime, Arabic sources trace the earlier arrival (between late 9th and early 10th centuries) of Christian kings further south to the Central Highlands which probably includes

the Shewan Plateau. However, due to their preoccupation in battles with the emerging Muslim forces to the east the expansion was not intense and continuous (Taddesse 2008).

On the other hand, the hagiographical evidences (particularly Gadla Takla Haymanot), on the history of the kingdom of Damot, one of the most powerful pagan kingdom, attests its control over Ifat. It was stated that the kingdom was positioned to the west of Ifat kingdom and south of Abbay. But, the gold resource which was being extracted from the heartland of this kingdom and places mentioned as part of this kingdom such as Enarya and Gimma will take us to conclude that it was somewhere in Wellega (Ayda Bouanga 2014). Based on the former premises, i.e. the position of Damot west of Ifat and the pagan nature of the kingdom led Fauvelle to propose the possible location of Damot within the Central Highlands, where the megalithic culture flourished (2020).

The war of attrition between the central Christian highlands and the Muslim sultanates, entrenched all along the eastern and southern fringes of the Abyssinian plateau was the principal feature of Ethiopian history during the period from the 14th to the 16th centuries. From the 16th century onwards, Ifat became the center of ethnic and religious dynamism among the Argobba, Amhara, Oromo, and even Afar to some extent (Alebachew 2020).

Ethnographic Survey

This part of the fieldwork aimed at getting a broad picture of regional variations in metal activities. At the beginning of the mission, we had no idea how the metal economy was organised in the eastern part of the Amhara region. We therefore carried out research around three cities: Bati, Ataye and Ankober. We always started our study by going to the weekly market to interview people who sell jewellery and farming tools. Most of the time, these people are the craftsmen who made them. These interviews allow us to meet the craftsmen and/or buyers, to identify the type of metal goods sold, to obtain information on the transactions and buyers and finally to obtain appointments with some jewellers/blacksmiths in their workshops.

The surveys in the craftsmen's villages were generally conducted in their workshops and sometimes also in their home. More in-depth, they allow us to look at the family history, the training framework, the techniques mastered and the past and present origin of the raw materials. They also offer the possibility of directly observing the craftsman at work, the organisation of his workshop, the tools used and the other people involved (the person who operates the bellows, the clients and wives).

The only jewellers met who still practise their craft live in the village of Kejumo or Qgibo (Bati District). All the inhabitants of this village are involved in jewellery making. When the fathers are making the links of a necklace or a bangle, their sons help in some easy activities like fixing the different parts of a piece of jewellery and preparing the tools. Their wives, on the other hand, are involved in making pottery. They work with silver and nickel. The metals come from jewellery bought from local women. This transaction is mostly done on market day. The jewellers recycle it to make new types of jewellery. They also transform old coins like the Maria Theresa thaler (MTT). They have no memory of a time when they extracted or used local silver. If they know how to recycle MTT, we assume that it dates back to the arrival of this coin in Ethiopia, i.e. in the mid-18th century. The other raw materials are clay, charcoal and a liquid to facilitate the welder little pieces of silver. The clay comes from sources in the vicinity. Craftsmen made crucibles with it. These little pots can only be used six times and then changed. Jewellers produce charcoal from Acacia because this species does not produce much ash. The charcoal is prepared in an open space, piling the wood and setting fire on it. It is then collected by pouring water over it. Jewellers master the brazing technique with a mouth torch to melt and to weld the metal (Figure 2). They sell their production directly in their village or at the market of Bati. Some have relatives in Ankober, but today they are producing less and less jewellery. They sell industrially produced necklaces, pendants and rings.

Figure 2: The brazing technique with a mouth torch

Blacksmiths are more common than jewellers. Even if the blacksmith's trade no longer attracts the younger generation because it requires hard working and income is low, the region under study is not devoid of this craft. Generally, technical skills are acquired within the family, from a father, uncle or grandfather. However, in the villages around Ankober - Bergibi, Gadilober and Goshber - the blacksmiths interviewed learned their trade from another blacksmith to whom they had no family ties. Blacksmithing is a skill learnt during the life. Currently, they don't live in a special or separated place. They live with the non-blacksmith community in the same village. They aren't marginalized. They don't even have a problem in the intermarriage processes, the blacksmith can marry from the non-blacksmith woman. Their wives are preferentially involved in pottery.

Blacksmiths mainly produce agricultural tools: plough, axe, scythe and knife blades. Agriculture plays an important role, both in the landscape and in people's lives. It is carried out on terraces where farmers use their "maresha", a wooden-iron plough, to dig the land (Lefebvre 1845). The "maresha" is the main animal drawn cultivation implement currently used in Ethiopia. This plough consists of a sharply pointed metal shear and metal hook "wogel" made by local blacksmiths. The rest of the components of the plough are a wooden yoke, a long beam and two flat wooden parts (diggers) made by the farmers themselves. Currently, blacksmiths produce around ten plough blades per day between January to April. Their productivity depends of course on demand. A plough blade has a life span of three years. That depends on the nature of the soil. The hook that holds the blade on the wooden parts was made in the past with two pieces of iron. Now, blacksmiths just split a thick iron plate into two pieces to make the hook (Figure 3). The plough blades worn are reused as digging sticks.

Figure 3: The different steps to produce a hook

The question of the age of the use of the plough has been raised by several authors. Marks left by the plough on blocks in cultivated terraces have been dated by archaeological material

(Ciampalini *et al.* 2012) and they allow the idea of structures already in place 2500 years ago to be put forward. These techniques have been maintained until the present day. Farming techniques and equipment have certainly changed very little. The quantity of iron used to make the plough blade may have increased over the centuries, but most definitely not from the 19th to the 21st century.

In the village of Rungudi, near Bati, the blacksmith Seïd Yimam also produces aluminium cooking utensils and impressive dagger “Gile” (Figure 4). This dagger is associated with pastoralist activities. It is used for the process of slaughtering, but most of the time, it is worn during annual celebrations. Blacksmiths make the dagger scabbard; they buy the skin, the copper and the horn. Not everyone can make a dagger, because the work of the scabbard and the handle takes time.

Figure 4: Gile, the ceremonial dagger

Since the end of the 19th century, the raw material used to produce the aforementioned iron tools is “balestra”, spring plate truck or car. Craftsmen buy it in the big towns, like Bati, Kombolcha, Debre Berhan and Addis Ababa. They continue to recycle it and to weld it because iron is rare and expensive. They sell their produce at the market or farmers come to their village forge to buy tools. The buyer looks with care at the weight of the plough blade. He checks if it isn't cracked, if there isn't mark, if there isn't rework. The quality of the workmanship will determine how long it lasts.

Most of the interviewed persons doesn't know how iron was obtained in the past. However, some of them told us that iron ore was mined in Borena, a place near Mekane Selam. The father and the grandfather of the actual blacksmith of Hayk used to go there to smelt iron ore. Outside our research permit, we have not yet surveyed this area which is 180km from the northwesternmost village visited. At Bergibi village, Shefa Wosine, a 73-year-old blacksmith, told us that he knows two places where the ore was smelted in the past: Astaberete and Goshber.

The furnace had four bellows. It took a day to smelt the ore. The raw iron was a ball that the blacksmiths separated in several pieces to make objects. The ore came from the soil. This work was only carried by the blacksmiths. The description of the artefacts found in Goshber can be found in the next section.

Charcoal is still being produced in this region for blacksmithing. Craftsmen choose different species of tree to make it: Acacia, Myrtaceae, Pinaceae, Juniper, etc. The technique for making charcoal seems broadly the same in the study area. The differences are in the position of the wheel in relation to the ground. In Kereye Ager, the blacksmith put down the branches and pieces of trunk on a flat space. In Goshber and Eyarico, they dig a hole, put down the pieces of trees, then they set the fire and after that they cover the wheel with leaves (Figure 5). After two or three days they can recover the charcoal. There is a serious shortage of charcoal today. Sometimes farmers go to the forge with the charcoal needed to repair the required iron tool.

Figure 5: The hole where the blacksmiths make the charcoal for the forge

At least two people per forge are necessary, one for the bellows and one to hold and strike the iron (Figure 6). Sometimes, farmers help the blacksmith to strike the iron. The smith is sitting in front of the hearth in a slightly staggered position. In his left hand, he holds a pair of tongs that allow him to manipulate the piece of iron to be worked between the hearth and the anvil. He hammers it with his right hand using a sledgehammer or a hammer. In front of him is a first anvil, often made of metal; to his right is a second, larger one made of stone. The stone anvil is used for actions needed power. It is changed every two months. Sometimes, it has a concave shape that makes it possible to form the plough blade socket. The iron anvil is for finishing touches. We assume that it was recently introduced into the forge because it contains a very large volume of metal. At the bellows stands his helper. He is preferably seated on a sort of platform placed at the back and overhanging the hearth. Putting the bellows up high gives power, they send air faster and more powerfully. Made of goat skin, they last between one and

two years. The tuyères which transport the air between the bellows and the hearth are made stone of and they are changed in every six months.

Figure 6: The forge at Kereye Ager

The smith slags are put in the agricultural fields to fertilize the soil or given to animals to force them to spit the swallowed clothes.

Archaeological Survey

Archaeological survey methods were adapted to the specificities of the study area. Since the existence of paleometallurgical sites in the region was not already known, our aim was to discovery if there are or not ancient workshops for the iron production. We therefore chose to follow the information given by the interviewed people. The latter cited only two places where their ancestors were smelting iron ore before the use of modern metal. The first is Borena that is outside our present study area. The second was reported by several blacksmiths in the villages of Goshber and Bergibi.

This site is located in a hamlet called Abo/gur. In the fields and the western side of an old church, we found a scattering of slag covering several hectares (Figure 7). The slag is very fragmented, only a few centimeters long. Despite this fragmentation, two kinds have been observed: tapped slag and pit slag. The majority belongs to the tapped slag. This waste belongs to the smelting phase during which the ore is transformed into metal in a furnace. Tapped slag has a characteristic shape, resembling a flow of lava, with rivulets of slag on the upper surface and a rough under surface which has adhering sand and clay. Here, most of them has individual runs. They flowed outside the furnace through an opening at the bottom of the shaft. There are also several small pieces of pit slag. No slag block has been identified. Their outer surfaces of the pit slag are irregular and have a jagged appearance. Their density and weight are lower than tapped slag, but they have more pores. Rust-colored, they are magnetic because they still contain metallic iron in their matrix. They formed and solidified at the base of the furnace and

in contact with the bloom. No slag concentrations, no tuyeres, no furnace bases were observed in the fields. However, the characterization of the slag confirms the presence of an ancient iron smelting site at this location.

Figure 7: Slag scattered in a field near Abo/gur

Future Research Directions

The pilot survey carried out in early 2021 and described here has proved that paleometallurgical resource potential is very encouraging. The current political crisis in northern Ethiopia does not allow us to continue our investigations for the time being. However, here are some thoughts on future research to be conducted:

- Interviews with craft practitioners, extending geographically, will have to continue. The knowledge of jewelers is disappearing. New types of jewellery from industry are appearing on the market and displacing traditional jewellery. It is therefore necessary to undertake in-depth ethnographic research on this technical knowledge before it get completely lost or changed.
- Blacksmith Hussen Seid met at Aliyu Amba is a very active craftsman. He produces agricultural tools and sharpen ancient tools on market day. With his team, they make four or five new plough blades a day. They also recycle a lot. Before he has settled at Aliyu Amba 20 years ago, he lived in Shonke. He told us that there are a lot of blacksmiths in Shonke, an Argoba inhabited are in Eastern Wollo. There are quarters for blacksmiths and potters. The farmers give cereals to the blacksmiths once a year in return to their services. We think it would be interesting to conduct oral surveys in this village which has a certain originality in its social organization.
- Oral investigations will have to carry out on the settlement of the current and past populations. Currently, it seems that the separation between artisans and farmers is

blurring, but what about earlier periods? Did the artisans constitute endogamous specialist groups? Did they have specific ethnic origins?

- Geological investigations have to be conducted with an aim to identify the place of possible metal deposits.
- Archaeological prospections have to be undertaken in Borena with a view to determining if there are traces of paleometallurgical practices in the area.
- Archaeological prospections have to be continued around Goshber to identify iron smelting sites more precisely. We have to start excavations at Abo/gur site to build up a chronological, cultural and technical sequence.

Together these various elements will, we hope, help to reconstruct a part of the metal history in Ethiopia.

Figure legend

Figure 1: Map showing the localities alluded in the text

Figure 2: The brazing technique with a mouth torch

Figure 3: The different steps to produce a hook

Figure 4: Gile, the ceremonial dagger

Figure 5: The hole where the blacksmiths make the charcoal for the forge

Figure 6: The forge at Kereye Ager

Figure 7: Slag scattered in a field near Abo/Gur

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