Copper working in the Messina district

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SYNOPSIS

By reference to the available literature, an account is given of the manufacture of metal ingots by the Messina copper workers. These workers are thought to have been BaLemba tribesmen, of the Musina Clan, who came from across the Lebombo Mountains. A description is given of their methods of mining, smelting, and casting, and of the various types of ingots they produced.

SAMEVATTING

Daar word, met verwysing na die beskikbare literatuur, 'n verslag gegee van die vervaardiging van metaalgietblokke deur die koperwerkers van Messina. Hierdie werkers was vermoedelik lede van die BaLembastam, of die Musinagroep, wat van anderkant die Lebomboberge gekom het. Daar word 'n beskrywing van hul mynbou-, smelt- en gietmetodes gegee, asook van die verskillende soorte gietblokke wat hulle gemaak het.

INTRODUCTION

The intention of this paper is not to present a scientific study of the mining and smelting of copper at Messina, but rather, by reference to the literature on the subject, to give a broader account in which the manufacture of metal ingots by the Messina copper miners will be discussed.

Very little is known archaeologically about the Messina area, and one has to rely a great deal on the findings of ethnologists for the history of the Messina miners and smelters. Since Stayt[1] and Van Warmelo[2] published their works in 1931 and 1940 respectively, relatively few new facts on the pre-European history of the district have come to light.

For comparative purposes and for the sake of completeness, reference will be made to areas outside the Messina district during the course of the paper.

THE HISTORY OF THE MESSINA COPPER WORKERS

According to Stayt[3], the ancient miners and smelters of Messina were BaLemba, who worked under the patronage of the Venda chiefs. The BaVenda later learnt the art of smelting from these BaLemba.

Louis Thompson corroborates this theory, and says:

> According to BaVenda tradition, when the tribe moved across the Limpopo about 200 years ago, to settle in their present territory in the N. Transvaal they found the BaLemba mining the copper lodes near the Limpopo River; the BaLemba taught them how to smelt copper; the BaLemba were a very secretive people, and it was a long time before they parted with the knowledge of copper smelting. The BaLemba say that their ancestors were the first people to mine copper near the Limpopo River and that they taught members of other tribes how to smelt copper.[4]

The closure of the copper workings came about shortly before the death of the Venda chief, Ramabulana, in 1864, when he ordered his headman, Mesina Ba-Leya, to close down production.

However, Van Warmelo has a different story to tell about the origin of the Messina miners. This is based on the information given by a certain M. F. Mamadi, whose genealogy can be traced back to the Messina copper workers. This clan, which had the name of Musina, originally came from across the Lebombo Mountains and settled in the vicinity of what is today Phalaborwa, in the north-eastern Transvaal. At Phalaborwa, the smiths of the Musina clan found iron ore mixed with a little copper ore. The smelted ore was a form of iron contaminated by copper, and this intrusive metal that weakened the iron was given the name of *Musina*, which means something that spoils[5].

Under their chief Dopokabatho, the Musina people left Phalaborwa, and moved north-west towards the Zoutpansberg, which they crossed by following the course of the Sand River. They settled at a hill called Balahe (known today as Groot Bulaai), approximately 16 km west of Messina on the road to Pont Drift[6]. From here, the tribe moved in search of copper ore, which was found at various places around present-day Messina. Mining and smelting began, and the metal, mainly in the form of ingots, was bartered with the neighbouring tribes for food, skins, and household utensils.

The Musina people regarded themselves as the superiors of the neighbouring tribes, and never offered strangers any hospitality. As a result, the copper miners and smelters were not held in high esteem by their customers, and were despised for their pride and arrogance. Numerous skirmishes with their neighbours rapidly reduced their strength, and many people were also killed in frequent rockfalls in the mines[7]. The numerous attacks that were made on them forced the members of the Musina clan to disperse, thus bringing the mining and smelting activities to an end. Today it appears that the remnants of the tribe are to be found among the BaVenda.

METHODS OF MINING

During the period in which the mines were operating, several thousand tons of copper must have been removed from the numerous stopes and shafts that are to be found in the Messina district, and it appears that a large percentage of this was transported to the coast for export to the north[3]. This is confirmed by Vasco da Gama, who, on the 6th of January, 1498, when he reached the mouth of a certain river north of Delagoa Bay, noted that the 'natives' were in possession of large quantities of copper. This Copper River, as the Portuguese named it, appears to be the Limpopo, although the Sabi River running from the Rhodesian interior is another likely candidate[8, 9]. Most of this copper must have come from the interior of

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Southern Africa, and probably some was of Messina origin.

The amount of copper ore that was removed from the ancient mines is enormous, considering the fairly primitive methods used by the miners and the conditions under which they must have worked.

The shafts were narrow and the underground stopes were generally so small that there has been conjecture about who actually did the mining. In this connection, Schofield[10] said in 1925, 'So small are they [the shafts and underground stopes] that some observers have suggested a race of pygmy miners, but I believe it is more probable that much of the work was done by women and children'. This supposition was based on the finding that five out of seven skeletons recovered from the ancient mines were female. Summers strengthens this theory with further analysis[11] of skeletal material from ancient mines, in which the remains of 17 individuals were examined: 9 proved to be female, 7 were male, and 1 was an infant. It would thus appear that women did more mining than men, but it should be remembered that a mine shaft would also have made a convenient burial ground. Not every skeleton found in an ancient mine can therefore necessarily be associated with mining activities.

The mining operation, irrespective of who the miners were, followed a pattern that appears to have been prevalent in a large part of Southern Africa. The basic tools used for the breaking out of ore were a hammerstone and an iron gad; the latter was apparently hammered into cracks and crevices, and acted as a wedge for prizing the rock apart. A type of 'crowbar' was also used, and consisted of a piece of iron inserted into the end of a heavy stick[6]. Some of these could have been hafted in the manner of a hoe, and used as picks[12].

Firesetting was another method used to crack the rock so that it could be removed from the stope. In Europe, firesetting was the standard practice before the development of explosives. In Rhodesia, considerable quantities of charcoal have been found in many of the ancient mines, and a clay trough containing charcoal was found standing against the face of the reef in an ancient working. Summers considers this to be a hearth used for localizing the heat against the rock face[13]. Rapid cooling of the heated rock is the final part of the procedure in cracking a rock face. A controlled amount of cold water was applied, presumably from a specially shaped clay vessel, to obtain the maximum splitting of the rock[14].

The ore thus obtained was taken to the surface in a reinforced basket or, possibly, a wooden bucket[15]. Van Warmelo[6] mentions that the Messina miners brought the ore up in skins of impala, buffalo, or wildebees, which implies the use of leather bags.

The methods of entering a mine-shaft described by Van Warmelo[6] can be supplemented by a third:

(1) the use of a heavy basket tied to a strong leather rope, by means of which people were lowered into the depths of the mine,
(2) the use of a ladder made from leather thongs and wooden rungs, and
(3) crawling into an oblique shaft.

The first method seems to be the least probable, if one considers the difficulties that would be encountered in lowering and raising people in a narrow mine shaft that was not necessarily vertical.

At Messina the shafts penetrate to a depth of approximately 25 metres below the surface, and why mining was not continued to a greater depth is open to speculation. Calderwood suggests[16] that the ore in the lower levels was not the easily smelted copper carbonate but one of the sulphide ores, which was difficult to smelt. Poor ventilation and water seepage into the mine could also have forced the mines to stop work.

METHODS OF SMELTING

Once the ore had been taken to the smelting site, it was hammered into small pieces. It was then placed into winnowing baskets and winnowed for the removal of dust[6]. The smelting took place in a furnace and was probably much the same as iron smelting. Stayt[3] gives a vague description of the furnace and smelting procedure, as supplied to him by an old Venda man who had learnt the copper-worker's trade from the Lemba.

The most noteworthy difference from iron smelting is that, once the smelting process had been completed, the furnace was broken down. The reason seems to be that the copper tends to form a flat layer on the floor of the furnace and cannot be removed in any other way than by the destruction of the entire furnace. This would explain why there are so few traces of furnaces on sites that bear definite traces of copper smelting in the form of slag and the remnants of tuyères. The furnaces on iron-smelting sites were generally used many times, and such furnaces can still be found intact today.

After the copper 'slab' had been removed from the furnaces and allowed to cool, it was broken up into smaller pieces for re-melting. These smaller pieces of copper were placed either in crucibles[17] or on potsherds[3] and reheated. The obvious reason for this is that the smaller amount of copper is more easily manipulated and could readily be poured into the moulds that had been prepared in the ground for it.

At least three types of moulds were made. Van Warmelo[17] mentions the ingots retrieved from two of these, namely the musuku and a copper headrest made for chiefs. Stayt[18] describes a copper rod cast in a mould made by pushing a stick of approximately 12 cm diameter into the ground. The description of this copper rod bears some resemblance to the lerali, or cast copper rod, from Phalaborwa. In this connection, I. M. Allen has the following to say after the analysis of a copper object from the Limpopo Valley: 'The object may, however, have been connected with an industry of wire drawing, and may be the pouring cup and riser of a lerale [cast copper rod], as it is similar in shape and size to those described by Junod. Such copper rods were drawn into wire by the BaLemba'[19].

THE CASTING OF A MUSUKU

Little is known about the casting of ingots and what they were used for. The description by Louis Thomp-

son[20] of the manufacture and uses of the musuku is unique in this field, and was given to his wife by one of the few remaining copper miners alive at that time [1936]. This man, known locally as Magush, claimed that his mother was the daughter of Mesina BaLeya, and that he had often helped his grandfather on the mines. At the time of his death in 1948, he was reported[20] to be 103.

The name *musuku* is given by the Bavenda to two similar copper ingots of peculiar interest. They are becoming extremely rare among the Venda, and those fortunate enough to possess one guard it jealously.

These ingots were cast in a mould of damp sand, which was shaped by a wooden form, its size depending on the amount of copper available for the casting. Lines were drawn on the inside of the base of the mould so that the holes for the studs could be equally spaced. The studholes were made by pressing a piece of wood shaped like a thin pencil into the damp sand. The ingots were made in several castings, the reason probably being that the amount of copper that could be re-melted on a potsherd or in a crucible was insufficient for one casting. Often the copper would overfill the mould, and would form a mushroomlike head on cooling.

There are two types of musuku: the commercial and the ceremonial.

The commercial ingots are made of solid copper and vary in shape, the small ones usually being cylindrical, while the larger are rectangular. The number of studs on the top of the musuku are supposed to represent the value of the copper in the ingot, but this is rather unlikely because, as shown by a survey of these ingots, the smaller ones often have more studs than their larger counterparts. These ingots were used for trading, and the copper taken from them could be made into ornaments such as beads and bangles.

The ceremonial ingot differs from the commercial ingot in several ways, the main difference being that the body of this ingot is filled with sand; in other words, it is *not* made of solid copper. The head was cast first, and a lump of clay was then placed in the centre of the mould, leaving sufficient space for a thin wall of copper to be cast round it. The mushroomlike base of the musuku, as formed by the overflow of the copper, is considerably larger, and the studs are longer than those on the commercial ingots. Thompson[21] also mentions that the natives refused to divulge the purpose of these ceremonial ingots.

Stayt[22] says that the origin of the unusual form of the musuku had been ascribed to the shape of an extinct cactus that once had been sacred to the Venda, but he was unable to find any evidence to support this theory. As far as the sand-filled musuku is concerned, he says that this can be attributed to the manner in which the object has been cast. During the pouring of the molten metal into the mould, a hollow was formed, and this was filled with sand that fell from the sides of the damp mould. If Stayt's supposition is accepted, one would expect to find sand mixed with the metal, rather than a hollow casing filled with clay.

OTHER TYPES OF INGOTS

The copper ingots manufactured by the Messina miners, although unusual in shape, are by no means unique. Copper currency bars are known from the Katangan and Zambian Copperbelts, and the lerali from the Phalaborwa district is another example.

Ingots cast in other metals such as zinc, tin, and bronze, are also known. Gold and silver, although both mined in Rhodesia, appear to be the exceptions. There is no record of any such ingots having been found, possibly owing to the fact that these are precious metals and people who chanced upon them would sell them, rather than report them as scientific evidence.

The copper currency bars from Katanga and Zambia were cast in clay or sand moulds, the shape varying from a St. Andrew's cross and a large capital I to other, more complicated forms. Moulds that could have been used for such ingots have been found at Zimbabwe and other ruins in Rhodesia[23]. David Livingstone mentions that these copper ingots were common in Central Africa, the I-shaped castings being the largest and often weighing 60 to 70 lb apiece[4].

The other fairly well-known 'ancient' copper ingot comes from the Lowveld around Phalaborwa and is known as a lerali. This ingot resembles a miniature golf club, consisting of a long metal rod of some 50 cm in length, with a bent-over conical knob at one end. The method used to cast these objects is uncertain, but it seems likely that there were two possible ways in which the moulds were made: in damp sand as for the musuku, and by use of the waste wax process. Thompson[24, 25] associates the Pedi with the manufacture of the lerali. This is based on a description by Thomas Baines of a prospecting trip from Lydenburg in the eastern Transvaal northwards to the Limpopo, where the prospectors came across natives still mining and working copper.

Bronze ingots were found on the farm Blaauwbank, which is approximately 5 km to the east of the Rooiberg Tin Mine. Within a 16 km radius of the tin mine, with its ancient tin workings, are numerous old copper mines, and it seems fairly certain that some of the ingredients used in the making of the bronze were of local origin. There are indications, however, that copper was imported into this area from the Messina district. A musuku of the commercial type has been found in the vicinity of Rooiberg. It is at present in the collection of the Archaeological Department of the University of the Witwatersrand.

The bronze ingots were bun-shaped, and the melting was done in small clay pots. A complete pot containing a bronze ingot was found at Rooiberg, but unfortunately no mention is made of where it is now. An analysis of one of the bronze ingots found at Blaauwbank is as follows[26]:

Copper	80%
Tin	7%
Nickel	3%
Iron	5%
Arsenic	2%
Gangue	3%

CONCLUSION

The origin and nationality of the copper miners of Messina still remain a mystery. From the ethnological evidence it would appear that two tribes can lay claim to having been the copper miners, namely the BaLemba on the one hand, and the Musina Clan, whose ethnological background is unknown, on the other. There is proof, however, that ancient miners were busy sinking shafts at Phalaborwa before the Pedi began with their open-stope mining[25]. These ancient miners left no record of their origin, nor of the place to which they moved, and therefore it seems probable that they can be related to Van Warmelo's Messina copper miners, who claimed to have come from east of the Lebombo Mountains.

The origin of the BaLemba also remains uncertain in ethnological circles, as does the time when they first settled in the Messina and Zoutpansberg districts. Their claim to having been the original miners can therefore not easily be ratified.

Considering the numerous ancient mine workings that can be found at Messina, in the Messina district, and in the Zoutpansberg, it can be postulated that two different groups of miners and smelters may have been responsible for them. Should definite proof be found of the existence of two such mining groups, systematic archaeological investigation would be required to show whether they worked contemporaneously or one after the other. The fact that the Musina Clan no longer exists as a group, while the BaLemba are still to be found among the Venda, suggests that the former are an older group that has been absorbed by the new and larger groups of migrants who crossed into the Transvaal from the north.

Not much can be said about the methods used in mining, except that Rhodesia is far ahead of South Africa in the field of ancient-mine surveying. It can be assumed that the same techniques were used by most of the ancient miners, but there is no proof to validate this postulate.

As far as copper-melting is concerned, experiments should be carried out along similar lines to those at present being conducted on the process of ancient iron-smelting. It would be of interest to test the manner in which ingots were cast; that is, to determine whether the descriptions in the literature are accurate or not.

Worthy of further consideration is the analysis of the metals in various types of ingots and a comparison between them and similar metals that have been extracted from the ores of various known mines. In other words, it should be possible to analyse the copper used in the manufacture of a lerali, and by comparison determine whether the metal was locally mined and smelted, or whether it was imported from another area such as Messina. The same procedure could be applied to ores. In this manner, more light could be thrown on the trade routes that were then in existence.

Finally, in fairness to archaeologists, it must be said that it is not their lack of interest that inhibits the exploitation of this extensive field of surveying, excavation, experimentation, and analysis, but rather a lack of financial support.

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