

Technical Developments among Mberi Blacksmiths, the Nya Division, Logone Oriental Region (CHAD)

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Abstract

This article thinks over technical developments made by Mberi blacksmiths in the Nya Division, Logone Oriental Region, in southern Chad. Blacksmith's work needs knowledge and use of techniques that most researchers would like to understand. They adapt their tools to objects they want to make. Right from the beginning of the forge practice in Mberi to nowadays, blacksmiths gradually use new tools in their activities. The article objective is to understand Mberi blacksmiths' technical developments. A 21-day mission in February 2020 in the field enabled us discover their techniques and reasons why they have adapted the new tools. We directly observed blacksmiths' tools and handling and had conversations with them. That mission enabled us collect data. The technical developments aim at providing more working materials to needy people.

Key words: *blacksmith; tools; technical development; Mberi.*

Introduction

The traditional chronology of human technical developments makes the Stone Age, the Bronze Age and the Iron Age succeed one another in an apparently logical way, as if there were a natural transfer from one system to another (Pierre Gouletquer, 1983: 178). This statement shows that technical development is not a new phenomenon in this modern world. The traditional chronology has been used for a long time by craftsmen, particularly blacksmiths.

Blacksmiths' technique is what Pierre de Maret calls "savoir-faire" (Pierre de Maret, 2002: 123). Knowing and "savoir-faire" (knowing how to) are the art of transforming iron, which is a semi-finished product, into a consumable finished product. Finished products are given to people according to their needs which change and make adopt modern working tools. When Elisée Coulibaly writes in his work that the "ka alun-zowa" also had forge techniques (Elisée Coulibaly, 2006: 362), he does not only talk about forge working tools, but he also shows how to use them.

The objective of this study is to know the techniques which have been used by Mberi blacksmiths right from their origins up to now to make various objects needed by their society. This technique combines the intelligence proved through activities of a craftsman with the use of tools. The intelligence and use of tools are better discovered when a busy blacksmith is observed in his workshop. That is why the Mberi say: "Djé gosso shi loo gosso'd lea bbagosso ree dea'd bei"¹ (a craftsman recovers his intelligence and his "savoir-faire" when he is working in his shop). In his forge and facing a need, a Mberi blacksmith looks for an adapted tool to use it and thinks about how to adapt it to his work. Adaptation of new tools and guided activities result from technical development observed for a long period.

1. Methodology

¹ Informer: Daoulongarti Antoine, 43 years old, a blacksmith and son of a blacksmith, interview conducted on February 11, 2020 in Mberi.

To understand Mberi blacksmiths' techniques, we went on mission to their village from 8 to 26 February 2020. During that mission, we had conversations with those craftsmen and visited their workshops. The conversations enabled us to use a questionnaire and take photographs of forging tools. In fact, we precisely had conversations with 18 blacksmiths and visited most of their forges. The issues we discussed with the blacksmiths were about the origin of their "savoir-faire", their natures, use of their tools right from their origins, purchase modalities of the new tools and reasons of adapting them. The objective is to understand forging technical development made by the Mberi.

2. Field data

Field data is about the origin of blacksmiths, forging technical mechanism, working tools, blacksmiths' activities and transformed objects.

2.1. Origin of Mberi blacksmiths

Mberi blacksmiths came from Baguirmi, in Barma community. Oral sources report that the name of the Mberi founder is Dilla, a part of Sig-nan, which is a close village to Massenya, in Baguirmi. Sig-nan is an old name of Massenya. In his peregrination, Dilla is said to have successively stayed in Doroum and Bourédjé, before settling on a site which became Mberi later². The date of this migratory movement is not known up to now, but Dilla was already there eight generations ago, that is to say nearly three centuries.

Other people accompanied Dilla and built several hamlets according to the clans, among which were the four following ones: *Djé g Danga*, *Djé ge Lol*, *Guel bbida* and *Bémangra*. Those hamlets had formed a base of Mberi village, and this village became big later. In 1963, authorities forced the Mberi populations to move closer to the big way leading from Lai to Doba in order to control them better. A new village was, therefore, created and named Mberi II, and the old one Mberi I.

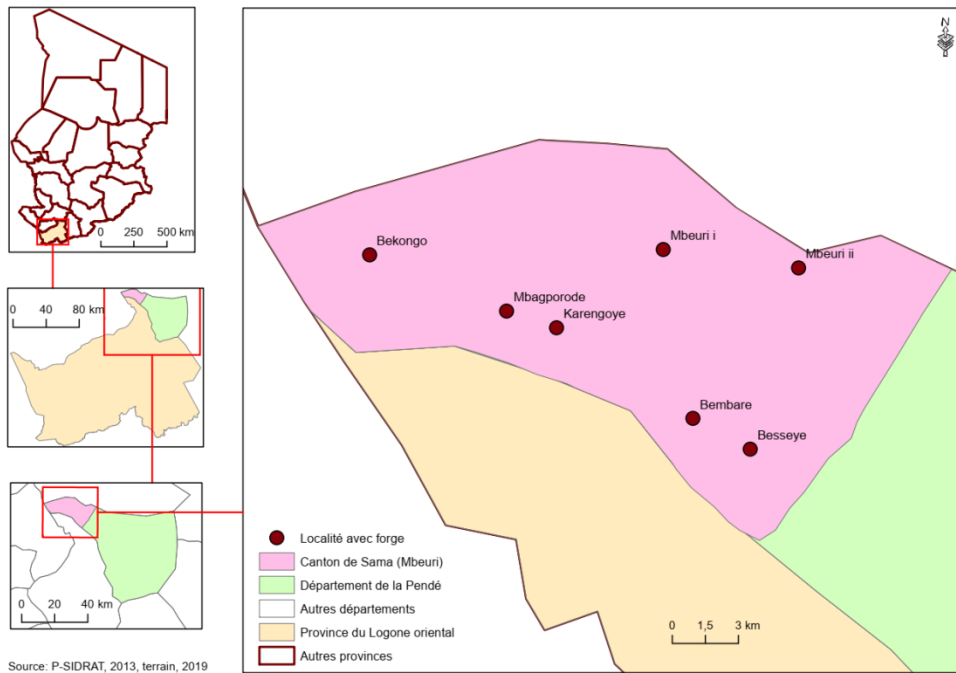
Bolongonne, the ancestor of all the Mouroum blacksmiths, was one of Dilla's companions. Bolongonne had two sons, Ndiba and Baira, and trained them about forge. The two sons also trained their children, and this training is organized from generation to generation till our informants³.

Nowadays, the Mberi, becoming more and more numerous, had created other villages. The more demands are multiplied, the more the leading blacksmith creates a workshop in the neediest village where he placed his son as a blacksmith. A same clan creates forges in Mberi villages. So, the origin of Mberi blacksmiths is located in Massénya, Baguirmi.

Figure 1: localizing map of the forges the Mberi community

² Informer: Godoum Jean, 93 years old, representative of the head of canton, interview conducted on February 11, 2020 in Mberi.

³ Informer: Daoulongarti Antoine, 43 years old, a blacksmith and son of a blacksmith, interview conducted on February 11, 2020 in Mberi.



This map shows seven villages with 18 visited forges. There are two or three forges in a village. The villages belong to Sama Canton, in the Nya Division, Logone Oriental Province.

2.2. Technical system in Mberi forges

Any forge is generally installed outside a village like the Gbaya do in the Central African Republic (Félix Yandía, 2001: 223). In the Bassar community, located in southern Togo, workshops are also installed far from villages (Elisée Coulibaly, 2006: 311). A Mberi forge is called *kei kod*, but it is rather located in this village. It was built under a tree and without a wall, but with a straw roof supported by about ten tall piles of 1 m to 1.50 m.

Tools are arranged in a way that blacksmith can use them easily. Stone anvil is placed between blacksmith and hearth (firebox) in the center. On blacksmith's right side, opposite hearth and blower, there is a wooden stone anvil, which is usually about one meter long. Nozzle is placed between hearth and blower. Blower, sitting on a small bench, faces hearth and has blown on his legs. Nozzle is found between firebox and bellows. On blacksmith's left, there is a coal bin next to which chisels can be identified. Blacksmith is between coal bin and pliers. On his right, there are hammers, file and tools to shape hoes and spears. On this same side and a little bit behind, there is a water tank behind which iron pieces are piled up for eventual use. At the entrance to forge, only whetstone for shaping transformed objects can be found. Opposite blacksmith and around forge is dumping area where stag and wooden charcoal debris are scattered. These arrangements are the same in all the forges visited by the Mberi.

2.3. Mberi blacksmith's tools and "savoir-faire"

The first tools of Mberi forges are rudimentary. They comprise two anvils, pliers, hammers, chisels and buckle bellows. Old stone anvil, *mbal*, is a main bellow. Old anvil, *mbal*, is a main tool which marks the existence of a village forge⁴. The nature of this tool was mentioned by other researchers. Anvil was formerly made of stone (Danielle Jonckers, 1979:

⁴ Informer: Daoulongarti Antoine, 43 years old, a blacksmith and a blacksmith's son, conversation taking place in Mberi on February 11, 2020.

111) and has particular characteristics. On one of the surfaces, the nature has projecting, which is almost a smooth head on which iron can be beaten (Félix Yandia, 2001: 223). It is fixed in a hole, leaving its upper part visible and on which hot iron can be placed for hammering. Its fixing immobilizes an object during forging. Blacksmith hammers iron to roughen, thin, lengthen, cut, weld or give it a certain shape. Sara blacksmith anvils (which the Mberi are a sub-ethnic group of) come from the Niellim community (Félix Yandia, 2001: 223).

The second anvil comes from the wood of *Prosopis africana* or *Vitallaria parkii* because of blacksmiths' hardness and suitability for forging activities. If a blacksmith wants to give any shape to hot iron without widening or thinning it like the case of a hoe or spear socket to which handle or shaft can be adapted, as well as the curved shape of a throwing knife or sickle, that blacksmith places the hot iron on wooden anvil and hammers it. He does the same as many times as possible if he wants to pierce an iron blade. The kinds of anvils, made of stone and wood, were the only ones before the arrival of colonizers.

At that colonial period where recovering irons were available, blacksmiths chose parts of vehicles that could be transformed into anvils. Those parts still exist in almost all the Mberi forges (see figure 2). By the end of the colonial period, modern anvils designed for this activity, despite the fact that they were scarce, were sold on the markets. We found some in one of the Mberi II forges (see figure 2). That scarcity was due to economic problems: recovering irons were free and well used by blacksmiths who did not want to use money to buy them, because that could give the same result.

Figure 2: anvils (made of stones, recovering iron and a modern anvil)



In the figure 2 above, the first two photos are, from the left to the right, a stone anvil and recovering iron anvil fixed on a wooden log. Next to the latter are two stone sharpeners (two old anvils). The two other photos below are recovering iron anvil and another modern one designed for forging.

In the pre-colonial and colonial times, explorers who observed bellows described them as “openers with sticks” (Josette Rivallain, 1991: 236). That description was about the oldest bellows used by Mberi blacksmiths. The bellows were made from the skin of *Gazella rufifron* (Gazelle à front roux), *Hippotragus equinus* (hippotrague), *Kobus Kob* (Kob de Buffon) or *Kobus Defassa* (Kob Defassa) (Clison Nankara, 1986: 79). The progressive disappearance

of the habitat of those animal species due to demographic pressure justifies the replacement of their skins with those of goats from small-scale domestic breeding.

To make bellows work, a worker sits on the floor or a very low bench, grasps with each hand skin cones through their tops which he alternately raises and lowers while closing, during movement from up to down and from down to up, slots that thus serve as valves (Elisée Coulibaly, 2006: 313). Flexible and well handled, the slots maintain a forge hearth well (Moheb Chanesaz, Ella Dardaillon and Jean-Claude Daniel (dir.), 2018: 77). The disadvantage of these bellows is that they do not resist bad weather and are easily destroyed by dogs, particularly if they are left within reach. Those made of goatskins wear out within less than a year if they are constantly used. They, therefore, require much care, forcing blacksmiths to look for other solutions.

Mberi blacksmiths, having discovered some parts used to recycle machines, adapted bicycle wheels to the forge's wind tunnel, which has been used since 2001. This mechanical bellow is easy to be handled, since even a child can make it turn to help blacksmiths work. Blacksmiths must control activities of their assistants, while managing their charcoal according to objects to be made⁵. Blacksmiths say that bellows produces more fire than skin bellows. In case an apprentice is absent, a blacksmith can play two roles on his own: operating mechanical bellows and blacksmithing. Only a blacksmith can make some objects but cannot make welds because this technique does not succeed if there is a period of time without bellows. The iron cools down. Moreover, if the pieces to be welded are not large, they liquefy under the file of embers in the hearth without a distracted blacksmith knowing. That was one of the reasons why Antoine Daoulongarti, our main informer, chose to use vehicle inner tubes to make bellows. The new bellows help succeed in all forging activities (striking, folding, cutting, welding, thinning, twisting, etc.) and can bear bad weather as long as no hot iron or embers are used.

Figure 3: bellows (skin, mechanics and plastics)



In this figure, we successively see, from the left to the right: skin bellows, mechanical bellows, and blower operating mechanical and plastic bellows.

Mberi blacksmiths formerly used two kinds of hammer skins: stone and iron hammers without handles. The stone hammer was called *mbal*. The action of hammering in a forge with a stone was called *kila mbal*. The stone hammer is the oldest one because it has been

⁵ Informer: Daoulongarti Antoine, 43 years old, a blacksmith and son of a blacksmith, interview conducted on February 11, 2020 in Mberi.

used since the foundation of the first Mberi village eight generations⁶ ago, meaning almost three centuries. The blacksmithing learner, in charge of hitting, in a crouching position, grasps it with both hands to strike the hot iron in order to roughen it while the blacksmith himself grasps it strongly with his left hand with pliers, and hammers it with light blows with his right hand and shapeless iron hammer, the *mon*⁷.

Figure 4: hammers (one stone hammer, five local iron hammers without handles and two modern hammers with wooden handles)



(Photos C. Nangkara, 2005 and 2020)

At the colonial period, modern iron hammer with wooden handle was added to the first two ones. This modern hammer is an imported product and it is sold on the markets. It comes in various sizes and weights that blacksmiths choose according to the objects to be made. In Mberi forges, such hammers can be seen in the figure above: a hammer made of whitish stone that is more or less oval, five elongated hammers without a handle locally made from reducing iron and two modern hammers bought in the markets.

Several pliers can be found in a forge. Blacksmith is the one who has personally made them. The pliers are called *köglö*. Their main role is to take the hot iron out of the furnace, place it on an anvil, beat and bring it back to fire. The blacksmith repeats this process till the finished product is obtained. He also uses the hot iron to grasp the small cold one he wants to cut. He does that to avoid crushing his fingers or simply injuring himself.

Mberi forges also have other tools that are as important as drill, file, poker, chisel and whetstone. In the past, blacksmiths used to sharpen their instruments such as knives, razors, axes and adzes on a stone (Daniel Arnoldussen, 2015: 28). However, stone has been currently replaced with the Western-made pile. A blacksmith or his assistant must file his burin on this tool for the following operations (François Muramira, 2006: 82). Punches are used to pierce metal when hot. This operation is often applied to lance sockets through which a point is passed to fix it properly.

Poker enables blacksmith make technical operations. When coal burns in the furnace, slag accumulates all the nozzles to form that slag. If the slag is not removed, it obstructs the air flow and starts sticking to the metal as it heats up. The blacksmith extracts it with the poker.

Blacksmiths can succeed in their techniques only when they manage coal well. Their techniques are to first control fire (Yves Monino, 1983: 302). They must control temperature and make sure that coal is enough, and not according to the iron to be forged and the kind of the actions to be undertaken: cutting, flatter, thinning, bending or welding. Blacksmiths

6 Informer: Diandingarti Mongbé, 120 years old, former head of village, interview conducted on February 16, 2020 in Mberi.

7 Informer: Madjiadngr Jacob, 29 years old, a blacksmith, interview conducted on February 11, 2020 in Mberi

must be able to identify right temperature before they work metals. This is one of the most important qualifications of blacksmiths. An insufficient quantity of coal cannot enable a blacksmith to reach the right temperature. If coal is very thick and the iron in the firebox is very small, this blacksmith does not only lack coal but the iron can liquefy at the slightest distraction as it is mentioned above.

A working blacksmith, in his workshop, handles tools, monitors combustion and does not make random gestures. He chooses the tools to be used with technical gestures. When he considers the iron to be hot enough, he takes it out of the hearth, places it on the anvil and beats it with light or strong blows depending on the case, before bringing it back to the fire. This process means “savoir-faire”, a technique which needs several tools: anvil, hammer, pliers and the old or new bellows depending on the cases and periods.

These techniques consisting in using forging tools by adding “savoir-faire”, in particular gestures, must be controlled before making the objects that result from them.

2.4. Results from forging techniques and their development

The main needs of the Mberi, who are mostly farmers, are farming tools that were not numerous in the past: three kinds of hoes⁸ and one axe. The hoes are used for sowing, ploughing and weeding, whereas the axe is used for clearing new fields or bulking dead woods from fields. It is also used in the form of bundles or firewoods.

Security issues always preoccupy the Mberi. Before colonization, villages were often attacked by their neighboring ones and ambushes were also frequent. Therefore, to defend themselves, men moved around with defensive weapons such as jet knives, spears. They also carried them against eventual attacks from ferocious animals and snakes. Apart from these weapons, knife was very useful for collective hunting. Made by blacksmiths, these tools were weapons for both war and hunting.

Fishermen from neighboring villages, such as Boumou, Taré, Masde, Naman, Pourou, Löroum, Lögö, Mbaou-Goré, need hooks and harpoons. These fishing instruments, without which the neighboring fishermen cannot carry out their activities, are provided by Mberi blacksmiths.

Ornamental objects (bracelets, ankle rings, earrings, nostril rings) are needed by women and girls. It is the same case of ritual objects for bush school students (bracelets and bells) and traditional rulers (religious shafts). Shackles (*dâ*) to manage the movement of mental patients who threaten the populations are often part of the requests registered by Mberi blacksmiths. Riders, for their part, wish to have harnesses for their limes.

A few decades ago, housewives started asking for new cooking materials such as buckets, pans and ladles. Shovels and pickaxes were also needed by quarry workers specialized in fired brick sale. Since the advent of harnessed cultivation in the 1950s in southern Chad, farmers using modern tools have been on the list of demand for ploughs, carts and spare parts for working materials.

⁸ The three kinds of hoes are: *kos ge tar* (standing position) for women and young people who are still able-bodied, *manderaye* and *ngonn dubu* (squatting position) for men, particularly when they are already old.

Ritual and ornamental objects and working former or modern tools, that were the real needs of the Mberi populations and those from their neighboring villages, were provided by local blacksmiths. These products resulted from forge technical development

3. Discussion

Technique gets developed over the time according to professions. The current techniques used by Mberi blacksmiths are different from those their ancestors left to them. Before the colonial period, Mberi blacksmiths used stone anvils and hammers. Bari blacksmiths in eastern Africa, in the 18th century (around 1875), used stone anvils and pebbles as hammers (CHANESAZ, M. DARDAILLON, E. and Daniel, J.-C., 2018: 77). Stone anvils were, therefore, used in old Africa forges.

In their past organization, Mberi blacksmiths worked in groups of three people per forge: blacksmith (*djéndubu*), blower (*kod*) and hitter (*djékila mbal*). Members of that organization also met their counterparts in western Africa where they formerly worked in a team of three people (Danielle Jonkers, 1979: 111). Ancestors were the ones who left the organization to their children. However, it does not remain the same for the next generations.

With new tools nowadays, the post of mass user, who is a hitter, has been removed. Two people work in a forge: blacksmith and his assistant (or apprentice)⁹ in charge of activating bellows (Félix Yandia, 2001: 224). Moreover, only one person can work in a forge if he uses mechanical bellows. The arrival of colonizers to Africa brought innovations in terms of working materials and thinking about how to solve problems. This technique is used in several communities. In Chad, it is used by Toupouri blacksmiths (Tchago Bouimon, 1991: 274).

Mberi blacksmiths use recovering irons that they adapt to their different needs. Without completely abandoning their traditional stone anvils, Mberi blacksmiths use some vehicle parts or machines transformed into anvils. Then, a few decades later, they buy in the markets, industrial anvils designed for their profession. However, they must not forget that ritual practices cannot be separated from forging techniques. Their ancestors do not accept sacrifices to make any sacred anvil, except stone ones and those designed for only forges, because the “anvils” were consecrated, blessed and protected by the ancestors. The others did not undergo this process. Mberi blacksmiths know and use them because they say that these stone anvils are useful. Concerning ritual practices, they make sacrifices with consecrated anvils¹⁰.

Hardening is a technique commonly used by blacksmiths. At an indicated time, after thinning the sharp end of a tool, a blacksmith takes it out of the hearth, immerses it very quickly in the water tank, while giving repeated and light blows on the iron anvil with the sacred hammer (*mon*) until it cools down. Quenching is a brutal cooling of a heated piece. According to Mberi blacksmiths, the objective of this is to harden the sharp end of the tool (axe, hoe and adze). Nowadays, blacksmiths no longer use this technique. They heat tinsplate, place it on anvil and strike the part to be thinned for a long time to make it sharp. Bows on

⁹ Informer: Daoulongarti Antoine, 43 years old, a blacksmith and son of a blacksmith, interview conducted on February 11, 2020 in Mberi..

¹⁰ Informer: Madjiadingar Jacob, 29 years old, interview conducted on February 11, 2020 in Mberi.

anvil at the moment of hardening are not all important to them¹¹. Yet, this is their ancestors' technique.

Unfired clay nozzles used in pre-colonial times with outreaches were about 80 cm long. The current ones, working with mechanical bellows, are very short of nearly 30 cm. Although the nozzles always keep the same raw material, the clay, accompanied by a tool (bellow), is not the same. The raw material was transformed: the first bellow was made of skin, the second one of recovered iron (bicycle wheel) and the third one of plastics (vehicle inter tube). This transformation is an adaptation to growing demands from clients.

Conclusion

Mberi blacksmiths are said to make technical development. There are old and new working tools in each of their forges. While complying with economic contexts (Bruno Martinelli, 1992: 25-41), we can admit that the surest possibility is that of an adaptation which is different from techniques with economic, social and cultural constraints (Yves Monino, 1983: 298).

The Mberi populations keep expressing their needs for modern farming tools and current commonly used objects to blacksmiths. That is why blacksmiths adapt the objects to the situation, their working tools and have creating minds. The aim is to meet growing needs of their clients. By adapting the new working tools, blacksmiths do not abandon the old tools because they are sometimes useful to them. There is complementarity between the old and new tools.

If Mberi blacksmiths develop their techniques, it is possible that the religious dimension of their activities will be gradually abandoned because of their conversion to the revealed religions and the greater consideration given to the economy. Thanks to the increase in imported semi-finished products, this development does not cause drop in blacksmithing activities. Making modalities, materials and made objects have a little bit changed, but blacksmiths' life remains the same (Daniel Coulaud, 1973: 235). Mberi blacksmiths' technical development is advantageous for craftsmen and clients who try to increase their wealth and keep pace with the development in their surroundings. This technical development separates Mberi blacksmiths from their tradition. It is important to carry out other works to understand whether they can keep their tradition while getting developed.

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¹¹ Informer: Daoulongarti Antoine, 43 years old, a blacksmith and son of a blacksmith, interview conducted on February 11, 2020 in Mberi.

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