

SOURCE(S) OF IRON AND REFINING IN ANCIENT BENIN AND UNEME TRADITION

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Abstract

The Benin and Uneme blacksmiths once lived together in ancient time in Benin kingdom. They belong to the Igun-ematon guild which was one of the early art guilds in Benin Kingdom. However, with time, they separated and the Uneme group migrated northward to their present location in the Afemai Hills of Akoko Edo area of Edo North in Edo State. These groups produce iron items that serviced the needs of the people of Benin kingdom (in the ancient kingdom and in their separate locations). They produced iron works for religious, social, political and economic purposes. In spite of this high level of dependence on iron works, the source(s) and refining processes of the raw material (Iron Ore) for their production is still a myth. Consequently, the following question arose, what is the source and refining processes of iron before European contact? This paper therefore investigates the source(s) and refining processes of their raw material in Ancient Benin and Uneme kingdoms before contact with European iron product. The paper employed the art history analytical research method in achieving the above. The paper concluded that although the two groups of blacksmiths were once together and eventually separated, their source of raw material (iron ore) and the refining of same was from Edo North where the Uneme people live and that the Uneme blacksmith were also responsible for the refining of the iron ore into iron used for the production of iron works both in Benin and Uneme.

Keywords: Iron, Blacksmithing, Source(s), Refining, Technology.

INTRODUCTION

Iron smelting in ancient Nigeria and indeed West Africa has been a rigorous and strenuous activity. Ancient iron metallurgy has been a primordial exercise in Nigeria. Archeological evidence has it that iron smelting and smithing began about 500BCE in Nok culture, central part of Nigeria (Junius, 2016). This represented the earliest known iron metallurgy in Nigeria. They employed the bloomery furnace method of refining iron ore from the rocky hills around their environment. With this, they were able to sustain the ironworking industry. This same pattern of iron smelting technology also subsisted in north-eastern region of Nigeria around the south-west of Lake Chad basin (Sullivan, 1966). However, recent radio-carbon dating suggests that the blacksmiths of Lajji community in the Nsukka area of the southeastern region of Nigeria started to mine iron ore and smelt iron about 2000 BCE (Eze-Uzomaka, 2009). Evidence of furnace and relics of iron slag and blooms could be seen in and around the village square where

they were used as seats during village meetings. Although iron smelting metallurgy was a common phenomenon within the region and the technology seems to be the same, there were many variations in furnace design and usage (Junius, 2016). They were able to meet up with the demand and supply of the community with regards to iron wares for farm implements, hunting, socio-cultural and religious needs. This led to expansion in agriculture, economic and socio-political powers that gave birth to many great empires like the Benin Empire. Even in contemporary society, iron and steel are pivotal to industrialization and economic growth. Olade (2019) posited that “the iron and steel industry have often been described as the backbone of industrialization and the bedrock of the economy of nations. Such words of encomium can be attributed to the fact that iron and steel products are used in making machinery and other tools needed for manufacturing and infrastructural development”. Although ferruginous rock (Iron ore

deposit) could be found around Okene area of Kogi state, they were found to be of low quality and in small quantity that are not economically viable (ibid).

Consequent upon this wide spread availability and usage of iron in West Africa, the people of ancient Benin empire also engaged in iron working tradition which sustained her growth and development over time. However, there are still controversies surrounding the source(s) of iron and its refining processes in the ancient Benin empire as there are different schools of thought concerning the issues raised above. The sources and processes of extracting iron from its ore by the ancient Benin people before the European contact is still a myth. This has therefore raised the following questions- (1) where did they get their iron? (2) How did they source for iron ore? (3) How were they refined? This paper therefore investigates the source(s) and refining processes of iron in ancient Benin and Uneme blacksmithing tradition. This is with a view to verifying the facts, conceptualizing and ascertaining the source(s), and refining processes of iron in both kingdoms.

This study is anchored on the conceptual framework of Indigenous technology and Knowledge as applied by Warren et al (2011 as quoted in Willie O. Siyanbola, Abiodun A. Egbetokun, Isola Oluseyi, Olumuyiwa G. Olamide, Helen O. Aderemi & Mohammed Sanni, 2012). They noted that Indigenous Knowledge is the local knowledge that is unique to a given culture or society. Focusing on the sources of Indigenous Knowledge (IK), they defined IK as a unique, traditional local knowledge existing within and developed around specific condition indigenous to a people of particular geographical area. They examined sources and structures of three major indigenous technology clusters in Nigeria which included Bronze Casting in Benin and the fabrication of aluminum pottery in Saki. This approach was adopted to identify and clarify the source(s) and refining processes of iron in Ancient Benin and Uneme traditional blacksmithing practice.

Source(s) of Iron

There are many schools of thought concerning the source of iron in Benin. In Benin Kingdom, oral tradition holds that “iron ore was found to be common on the ground like sand” They only need to collect it and smelt iron (ematon) from it as stated by Inneh N’ Igun Eronmwon of Benin [the head of the bronze casters guild (Emanemua 2011). The above statement was also corroborated by (Obasogie (2010). Iron was sourced from special sand which was molded and fired to very high temperature before smelting to iron. (Obasogie, 2010: pi) This iron according to him, is called emohanmwem in Benin. This theory of emohanmwem was however refuted by Ine N’Igun Ekhua (2010: pc) when he stated that emohanmwem refers to iron slag. It is a burnt-out iron mixed with sand at the end of the tuyere in the bottom of the open hearth. This spongy mass of slag iron is a common item at the hearth of the blacksmith forge of Lucky Akhagbuzo (1972) in Uneme Erhurun. (Plate1). Iron was sourced from the Etsako Region of Northern Edo State (Ine N’Igun Ekhua 2010 & Obasogie of Igun N’ Ugboha (2011 pc).

After the special sand or laterite soil (ore) have been collected, it is put into the blacksmiths hearth and smelted before “scales of iron

are beaten off the slag by the smith for forging” (Dark, 1973: 65). The above view was corroborated by Obasogie (2010 pc) of Igun N’ Ugboha ward who opined that iron was sourced from a special sand laterite soil. The sand was molded and fired to a very high temperature before it smelts to become iron. This type of iron is called emohanmwem in Benin. This is further forged into different items for specialized utilitarian essence.

Confirming the above opinion, Etuokwu (2010: pc) a ceramist averred that iron metal could be processed from sand after firing to a high temperature. He stated that sand or laterite soil with a high level of iron content could actually become iron when fired and that it could be worked because it is ductile, malleable, and also possesses magnetic properties. He drew his analogy from some experiments he carried out in his studio on sand and clay collected from Okene in Kogi State, Owerri in Imo State, and Benin City in Edo State respectively. Writing in the same vein, www.wikipedia stated, “over much of tropical Africa, the iron ore used was laterite, which is widely available on the old continental cratons in West, Central, and Southern Africa”. It went further to state that laterites is both a soil and a rock type, rich in iron and aluminum, and is commonly considered to have been formed in hot and wet tropical areas (www.en.m.wikipedia.org: 2010).

Inneh of Igun N’ Ekhua (the head of the Benin Blacksmiths Guild) however holds a contrary view to Obasogie Henry’s (b. 1955) opinion above. He stated that Emohanmwem is an ordinary fired laterite soil mixed with iron slag found at the end of the tuyere in the bottom of the open hearth. It is of no significance to the blacksmith because it does not have any element of iron in it. Iron was sourced from the rocks in Etsako region of Northern Edo State. (Ine N’Igun Ekhua & Obasogie 5th of Igun N’ Ugboha, 2010, 2011, 2015 pc).

Oral tradition of origin of iron attest to the fact that the Benin people (including the Uneme people) had been associated with the iron culture in their ancestral homeland in the Nok area of Niger-Benue confluence in the period before their migration to their Guinea-Forest-Zone settlements, in about the period of 600-900AD” (Omoregie, 2005 in Emanemua 2011). There is no geographical evidence of iron-bearing rocks in Benin kingdom. Besides, the Benin red earth (laterite soil) which is used for casting bronze does not possess any iron element in it. Therefore it cannot be fired to transform it into any form of iron-based metal. Whereas in Uneme, a physical examination on a similar iron-sand slag found at the base of the hearth indicates some level of iron element mixed with glass-like content. This could be attributed to the high level of iron element that is available in that environment. This slag is known as Akpakpa (fig 1) in Uneme.



Figure 1: Iron Slag (Akpakpa) found in Akhagbazo's Forge in Uneme Erhurun. Photo. F. Ophori

Oral tradition amongst the Benin indicates that Benin blacksmiths make annually pilgrimage to Uneme to source for their raw material, iron, and to update their skills (Ine of Igun Ematon, 2010, pc). There is a Benin proverb that says when a Benin blacksmith gets to Uneme, he is at best qualified to work the bellows "*Ogun edo gha se uneme lo gbe egue*" (Obazuaye, 2010: pc).

So Benin largely depended on the loyalty of the Unemes to the Benin monarch for supply of wrought iron. Aisien (2002) posits that the traditional Benin blacksmiths got their iron from the Uneme territories of Edo State. He states thus:

There is evidence that iron as metal and its ore were obtained from the northern territories of the present Edo State principally from the Ineme territories in the Akoko-Edo Local Government Areas. The iron ore concentrate which arrived in old Benin from Ineme was called Akpadan or Akpadan-urigho. This akpadan was smelted to separate the pure iron. (P: 140).

Traditional Iron Smelting Technique

The Uneme who are acclaimed to be the source of iron in pre-colonial Benin kingdom are located in the Akoko-Edo region of Northern Edo State between the rocky hills of igneous and sedimentary rocks of the Afamai hills. They are geographically located between longitudes. 5°55, East to 6°44" East of the Greenwich, and latitudes 6°45 North to North 7°35 of the Equator (Udo, 1971: 24). The hills which are mostly weathered sedimentary and igneous rocks referred to by geologists as ferruginous rocks are iron-bearing rocks (Akpofure, 2017: pc). Therefore the Uneme blacksmiths were able to source and smelt their raw material iron from the rocks in their environment. Although this unique and strenuous iron ore smelting technology was peculiar to the Uneme-Osu and Uneme-Erhurun communities, the blacksmiths of Uneme clan were able to get adequate supply of iron for their forges.

Nevertheless, after contact with the Europeans, the supply of already refined iron metal with the accurate percentage of carbon came in form of wrought iron rods and bars to Benin and Uneme from Europe. This plentiful supply made the blacksmithing work easier and the proliferation of products became evident. In contemporary time, flat iron sheets, rods, and bars could be

purchased from the open market or are obtained from old automobile body parts. They could also be sourced from scrap iron dumps or sites. These are used for the production of different types of blacksmithing products. Benin and Uneme blacksmiths no longer have to refine their raw materials from the rocks because of the manual labour involved. Only very little ore is mined traditionally for smelting today.

The production of iron in Uneme clan is the sole specialization of the people of Uneme-Osu and Uneme-Erhurun. This may probably be because they have a lot of igneous rock surrounding their communities. The other Uneme towns often get their supply of iron from the above communities. Obajeuen (b.1942) a community leader in Ekpedo-Uneme observed that "Uneme-Ekpedo does not have black stone or iron rock in its surroundings. And the production of iron is a very difficult task. Therefore our forefathers used to exchange refined iron from Uneme-Osu and Uneme-Erhurun people who have such rocks in their areas and can also produce iron". The only people still practicing blacksmithing in Uneme clan is Ekpedo.

Iron Refining Processes

Different types of metals can be found in igneous rocks. They include iron, copper, gold, lead, silver, zinc, nickel and many others. Through complex cycles of metamorphosis of climatic and geological conditions, these metals were formed in the belly of the igneous rock. "Igneous rocks are formed directly from the cooling and crystallization of molten magma (materials) while the earth crust solidified or when volcanic streams pierced the crust" (Sullivan, 1966: 23). These ore or iron stone are crushed into tiny particles and dumped inside the furnace along with charcoal ready for smelting. The ore and charcoal are together referred to as charge. The ore is iron combined with stones, while the charcoal is prepared from a special wood known as 'Osaki'. The charcoal that is produced does not deposit ashes when heated and burnt out but adds carbon element to the iron.

The hearth which serves as the furnace (Fig. 1) is dug into the ground about sixty (60) centimeters deep; one hundred and twenty centimeters (120cm) in diameter and built up about one hundred and twenty centimeters (120cm) and above in height. The wall is lined with bricks and stones which most likely is a type of sedimentary rock that is also abundantly available in the area. This furnace has an opening on the upper side which serves dual purpose of a charge point where the charcoal and ore are deposited into the middle of the furnace for smelting. It also serves as a vent or chimney for the escape of hot gases and inlet for air. At the bottom to the side of the furnace is attached a hollow bamboo pipe which is connected to two other hollow bamboo pipes forming a 'y' shape. These bamboo pipes are laid in the ground and linked to the bellows. This connection serves as the tuyere and a blast pipe that conducts air to the furnace from the bellows. The bellows are made of two drum-like shape built with clay on the ground. They are about 45cm high by 35cm in diameter. The upper parts of the bellows are covered with leather with two sticks attached at the middle. The leather is made with antelope's skin.

The blast is provided by two men at a time pumping the bellows with the sticks by pushing the sticks up and down. The Uneme blast furnace is reminiscent of the traditional blast furnace used by Africans in the South-Western part of Lake Chad region during the pre-colonial era (Fig. 2). The significant difference in the Lake Chad shaft furnace is that a man stands astride on top the bellows pumping with the up and down movement of the feet.



Figure 2: Local Shaft Furnace at South-Western Lake Chad. 1917. Courtesy Prof. W.J. McCaughey of Ohio State University in Sullivan, 1966

Akhademe Emmanuel (b. 1942) explains that this exercise is continued for several days with the men attending to the bellows in shift or rotational order until the required temperature is attained. At the completion of the processes, the molten metal is allowed to cool and solidify for some days. The furnace is then broken open to reveal the solid lump of iron at the bottom of it. This spongy mass of iron known as bloom, is later split into smaller pieces and distributed to the smiths who participated in the refining processes for further smelting and smithing processes in the open hearth in their different forges. It is further hammered on the anvil to remove slag and other impurities such as sand and stones. However, the furnace used in Uneme-Osu is slightly different. Damisa Adeyemi (2015 pc) states that their furnace usually have a tiny hole plugged with bricks or clay at the bottom. When smelting is completed, the plug is removed to allow the molten iron to run out into a dug channel in the ground. This type of furnace is peculiar to the Uneme-Osu community.

Damisa's description above seems to fit into the National draft furnaces which were peculiar to "Africa Savanna woodland from Senegal in West to Sudan in the East ... The National draft furnace which is designed to reach the temperatures necessary to form and drain slag by using a chimney effect –hot air leaving the top of the furnace draws in more air through openings at the base" (www.en.m.wikipedia.org).

The ore for the charge can be gotten from a few selected igneous rocks, with high density of iron content. Describing the rock, Momoh James (b. 1912) opines that "the rock containing iron is usually dark or black in colour known as iron stone". It could be found among the rocks in the surrounding hills of Erhurun-Uneme but one is at the heart of the village: The researcher's visit to one of the sites of the rocks situated within the town shows that the rock is now located within the premises of a white garment church. According to google geographical map reading, the rock is located within 7°17'04.3"N; 6°15'06.1"E (7.284535; 6.251689) [Google Earth map]. The religious worshippers have turned the rock into St. Michael rock where they perform spiritual and religious rites and sacrifices. Never-the-less, two different samples of the rock were collected (Figures 3 and 4) and sent for geological analysis. This was to ascertain (1) the rock type (2) if there was any iron mineral in them and (3) amount of iron content in it.

The Uneme blacksmithing culture is historically linked to the Edoid-speaking group that migrated from the Nok culture and civilization to Benin as a special group of blacksmith caste. They eventually migrated from Benin to their present location in the rocky area of Edo North where there was availability of iron ore which could support their metallurgical industry. According to Aashikpelokhai (2012) and Harunah (2003) they "moved to virgin lands where they could find what they called 'Rocks–Meltable-To-Iron'". In contemporary times with the availability of imported metal, the traditional blacksmiths of both Benin and Uneme have fully depended on these cheap metals. "Today (in Africa), very little ore is mined from the ground for smelting, as the smiths acquire their raw material from many more easily available sources, including large numbers of junked automobiles" (Spring, 2008:17) The Benin and Uneme smiths no longer have to refine their raw material from the rocks. "The main reason for this is the increasing availability of iron imported from Europe. Blacksmiths still work in rural areas of Africa to make and repair agricultural tools, but the iron they use is imported or recycled from old motor vehicles (www.wikipedia.org).

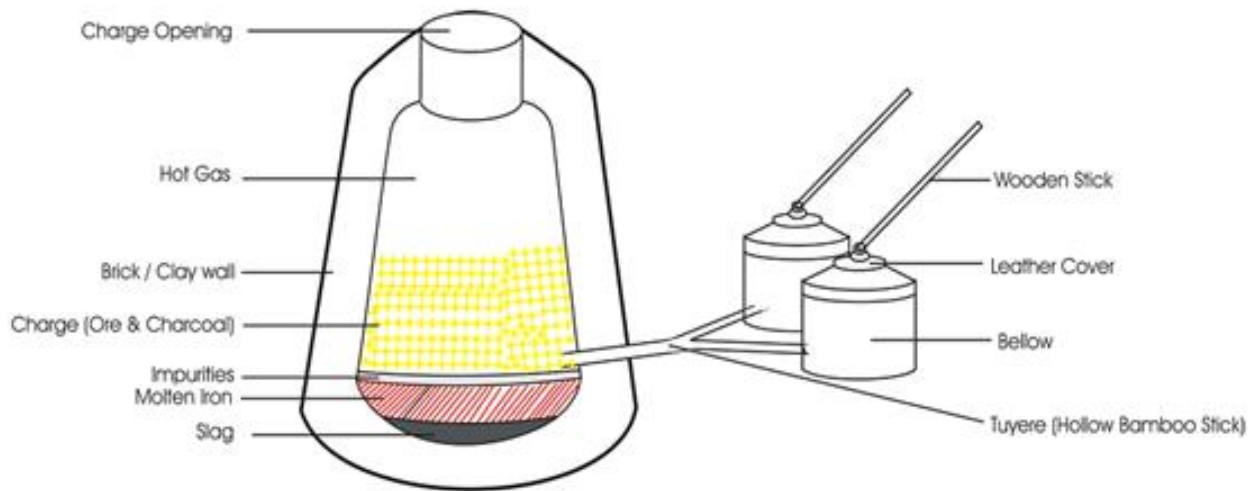


Figure 5: Artistic Impression of a Cross Section of Uneme Furnace by Ophori Felix



Figure 6: Rock Sample A of Iron Bearing Rock in Ekpedo Uneme. Photo by F. Ophori



Figure 7: Rock Sample B of Iron Bearing Rock in Ekpedo Uneme. Photo by F. Ophori

Physical geological examination of the samples A and B above conducted by Akpofure (2017) of the Department of Geology, Niger Delta University, Wilberforce Island reveals that the rock type is a sedimentary rock whose upper surface layer has undergone weathering known as ferruginous rock. Therefore the

iron content may not be very high. Sample 'A' has crystal line structure and greyish in color which places it as pure sedimentary rock. While sample 'B' is dark in color without visible crystalline structure. The black or dark color classifies it as 'Black Stone'. And this indicates that it has a high iron content and the non-visible crystalline structure suggests that although it is a sedimentary rock, it belongs to the upper surface layer that has undergone many years of climatic weathering. This makes it a ferruginous rock which is not an igneous rock (Akpofure, 2017: pc).

However, geo-chemical analysis conducted by Ganiyu Rafiu, a Chief Laboratory Scientist at Kaduna Research Centre, Kaduna revealed that Rock Sample A contains 3.24% and Sample B consist 4.83% of iron respectively (See Table 1 for geo-chemical analysis result.). Analyzing the result, Edward Emenemiaye, (b.1960) a Chief Laboratory Scientist in the Department of Geology, University of Benin, Benin City stated that the result implies that Sample B has some level of iron that could be mined but not for commercial purpose (Emenemiaye, 2017: pc). This was corroborated by Akpofure (2017: pc) after also studying the report. This result further confirms that there were actually iron mining activities in pre-colonial Uneme Kingdom.

Date: Nov. 9th, 2017

RESULTS OF ANALYSIS ATTENTION:

Please, find below the results of the analysis:

ANALYSIS REQUESTED: % ELEMENTALS COMPOSITION

S/N	NAME OF ELEMENTS	ELEMENT AL OXIDES	% COMPOSITION	
			A	B
1	Silicon dioxide	SiO ₂	35.22	65.51

2	Aluminium oxide	Al ₂ O ₃	22.51	27.27
3	Thallium (i) oxide	Tl ₂ O	ND	0.20
4	Iron (iii)oxide	Fe ₂ O ₃	3.24	4.83
5	Potassium oxide	K ₂ O	0.21	1.12
6	Magnesium oxide	MgO	ND	0.60
7	Sodium oxide	Na ₂ O	0.01	0.11
8	Manganese (ii) oxide	MnO	21.31	0,07
9	Calcium oxide	CaO	0.24	0.32
10	Copper (ii) oxide	CuO	0.03	ND
11	Nickel (ii) oxide	NiO	0.01	0.01
12	Zinc (ii) oxide	ZnO	0.01	ND
13	Chromium (iii) oxide	Cr ₂ O ₃	ND	0.02
14	Sulphur	S	0.03	0.01
15	Phosphorus	P ₂ O ₅	0.17	ND
16	Barium oxide	BaO	15.35	ND
17	Molybdenum (v) oxide	MoO ₂	ND	0.02
18	Zirconium (iv) oxide	Zr ₂ O	0.01	ND
19	Vanadium (v) oxide	V ₂ O ₅	0.27	ND
20	Strontium peroxide	SrO ₂	0.12	0.01
21	Cadmium oxide	CdO	ND	0.03
22	Silver (i) oxide	Ag ₂ O	ND	0.01

Figure 8 Courtesy: Kaduna Research Centre, Kaduna.(2017)

Conclusion

The analyses above have indicated that there was no iron-bearing rock within the geographical area occupied by the Benin-speaking people. While it is on record (both oral and scientific) that iron-bearing rocks are available in the Uneme geographical territory. Therefore the Benin blacksmiths sourced their raw materials iron from the rocks in Uneme territories. Consequent upon the above, the Benin blacksmiths had to depend on the Uneme smiths for their supplies. It was erroneous to claim that iron was sourced from the ground like sand in Benin. The Uneme refined and smelted the raw material iron from the rocks themselves. However, with the introduction and proliferation of cheap imported iron from European forges, the Benin and Uneme blacksmiths now get their supplies of iron from scrap iron dealers in major cities around. The body parts of automobile vehicles are also source of quality iron for the blacksmiths. Modern blacksmiths also adapted the casting of aluminum to their production techniques.

It is evident that the Uneme blacksmiths sourced and refined their raw material from the iron-bearing rocks available within the Uneme community. However, there might have been other rocks within the vast Uneme rocky forest land rich in iron content that were available to the pre-colonial blacksmiths of Uneme. Notwithstanding the stress involved in the mining processes because of the percentage level of iron content in those rocks, the Uneme blacksmith were still able to meet the supplies necessary to sustain agricultural, socio-political, defense, hunting, and religious needs of the community and their Benin neighbour

The blacksmithing genre witnessed high level of activities in both pre-colonial Benin and Uneme communities in spite of the above challenges. The study has shown that Benin land does not process iron-bearing rocks and as such, the blacksmiths of Benin could only have gotten their iron metal supplied from the Uneme territory.

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