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A Historical Review of the Evolution of Metal Technology in Africa -The Igbo Case

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Abstract: One of the challenges of obtaining authentic information on the historical foundation of metal technology in Africa is lack of data. This is also the case in establishing the great role played by the Igbos of Eastern Nigeria in establishing an indigenous metal industry that could have ushered in the much celebrated industrial revolution at least in this part of the planet. This dearth of authentic written information has given to two schools of thoughts,one that claims an independence of origin and the other that proffers the theory of diffusion. This dichotomy necessitates further investigation. This 'work' tries to establish more facts on this by digging some unknown areas in African historical archive. The area of Igboland discovered is Okpogho Community in Igboland of Eastern Nigeria. The available evidence reversed the old conception of the cradle of metal technology in Igboland and by extension, Africa. The result shows an independence of origin in African metallurgical evolution.

Key words: Metal · Technology · Igbo land and Okpogho community

INTRODUCTION

The place of metals in human life cannot be over-emphasized. Metal is an indispensable tool to mankind for without it the clock of progress will rewind and the wheels of development will clog. Hornby [1] defined a metal as a kind of solid mineral substance that is usually hard and shiny and that heat and electricity can travel through for example, tin, iron and gold. Hornby also stated that technology is the scientific knowledge used in practical ways in industry, for example in designing new machines. One can from the above definition express metal technology as the application of scientific knowledge in the usage and production of metals. This paper reviews the history of evolution of metal technology in Africa with particular reference to the Igbo Area of Eastern Nigeria amidst revelation of new facts.

The Igbo people are a black race of Eastern Nigeria extraction. They are industrious and hardworking people and some authors like J.T. Basden link their origin to the Jews because of cultural and biological similarities. They speak "Igbo" which some authors also claim is a corruption of "Hebrew". The Igbo language belongs to the "KWA" group of languages which is a sub-family of the Niger-Congo group [2, 3]. The Igbos nature of hard work and industry stand out in diverse ways in Igbo cultural, social and commercial life. This may be part of the reason the Igbos developed an indigenous metal technology many years before the arrival of the British. But for the industrially produced bars of iron from Europe that found its way in the Igbo territory, the Igbo people through their metallurgy is most likely to have ushered in the much celebrated and "unforgettable" industrial revolution and iron technological advancement at minimum in this part of the world.

Several factors can be pointed out that made the Igbos to miss this historic mark after a very good and marvelous beginning. The first factor was the introduction of the industrially produced iron bars from Europe. These bars were cheaper in comparison to the few products of the oval shaped furnace. This is because these bars were produced in large scale. Naturally, the blacksmiths went for the cheaper iron and that marked the genesis of the erosion of the "great Igbo iron industry". The second factor was the introduction of a new monetary policy that put under the carpet the monetary system developed in Igboland a monetary system that replaced the barter trade.

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Other factors are social, cultural and religious revolutions which served as catalysts to the collapse of the growing iron technology in Igboland. Some of the elements used for rituals, ceremonies and traditional religious worships were products of Igbo iron technology.

A lacuna seems to exist in the history of the evolution of metal technology in the world. The continent of Africa has its fair share of this missing link mainly due to lack of documentation by the early inventors. In Igbo Area of Eastern Nigeria, this history continues to change as new facts emerge. Recent discoveries in the foundation of metal technology seem to tilt the earlier conception of some European writers that metal technology diffused from Europe to Africa just like many other life breakthroughs. This calls for investigation and a revisit of history.

[4], in re-examining the history and economics of metal technology in South Central Nigeria state's that Thurstan Shaw's Igbo-ukwu, 'An account of Archaeological Discoveries in Eastern Nigeria is a very important bench-mark in the historical study of metal technology in South Central Nigeria which houses a huge part of the Igbo nation. It is a bench-mark according to Njoku, because it questions certain long held stereotypes, widens the historical perspectives of the inquiries and commands revalidation or revision of prior assumptions. For instance, it used to be asserted unchallenged as Forde and Jones (1962) did, that metallurgy was a recent intrusion in the Igbo Culture Area and that the Igbos have never been noted for artistic achievement in metal working etc.More recent discoveries of iron production sites in Okpogho, Enugu state of Nigeria, has further sealed the assertions by Forde and Jones and indeed many authors of their like.

There is dearth of materials on the evolution of iron technology the world over. The little history of metallurgy that appears in literature is obscure. [5], acknowledges lack of suitable sources as a limitation of Western scholars. The above calls for a revisit of history to establish an authentic chronicle of metallurgical evolution both in Africa and beyond. This is why any new archeological discovery, anytime, anywhere, goes a long way to establish an authentic history. The recent discovery of iron smelting sites at Okpogho in Enugu State of Nigeria is a rich resource. If properly harnessed, it will launch a new era of iron smelting at least in this part of the globe.

The Iron Industry in the Pre-colonial Igbo Nation: It is obvious that many of the discoveries in science and technology stagger the imagination when one thinks of the conception of the ideas. Of course, some are product of chance as experience shows. Some elements are 'reactive' and have certain characteristics in their basic nature. Some of them produce tremendous effects as compounds. Think of magnets and magnetic fields. Think of uranium and radioactivity. Imagine x-rays and ultra-sound. Figure out the invention of carbon dating method and the satellite launch. What of the cell-phone and the internet. Though these are products of man, the invention of some of them is still wrapped in mystery. The same scenario is replicated when one tries to visualize the iron smelting and iron technology in general and in Igbo land in particular.

The discovery of iron smelting in Igboland is buried in a big mound of mystery. This it more pronounced when one thinks of the discovery and smelting of iron from their ores to its final form [6] gives credence to this when he stated that the discovery and working of metals from their ores remain a mystery. Richards asks whether we can imagine a world without metals. No television, no motor cars, no concord, etc. He stated that up to the eighteenth century, copper and gold were the main metals in use. Since then there has been enormous and expanding use of new metals. Light metals such as aluminium and magnesium come into production. Steel (an alloy of iron and carbon) was invented and special steels made by alloying with other metals are now common [7].

[8], said that iron was literally heaven-sent, for iron from meteors was greatly prized for tool making; much more recently, the iron in a meteor that fell in Greenland was utilized by Eskimos for more than a century. The Igbo people of eastern Nigeria value iron like the Eskimos which was why on their own as far as oral account could testify, they discovered iron out of necessity. They started iron smelting centuries or even millennia before their encounter with Europe as carbon dating of certain iron materials found in Igboland showed. Lack of documentation due to illiteracy has hampered the effort to find out exactly when iron smelting 'evolved' in Igboland. For instance, no 'known' literature has been written on Okpogho iron industry and yet recent evidences can lead one to hypothesize that Okpogho was the center of iron production and supply of raw materials to blacksmiths in the pre-colonial Igbo kingdom and beyond. Oral sources revealed that Awka celebrated smiths and those of Agulu Umana got their raw materials from Okpogho.

Iron Production Process: Iron is produced from ore. In Igbo area of Southern Nigeria, one can notice heaps of slags called 'nsiigwe' or 'afulu' scattered all over the places that iron smelting took place in the pre-colonial era.

In analyzing the structure of iron, [9], described iron as a chemical element Fe, with atomic number 26 and atomic weight 55,847.He stated that iron is the fourth most abundant element in the crust of the earth (5%). Iron is a malleable, tough, silver gray, magnetic metal. It melts at 1540c, boils at 2800c and has a density of 7.88/cm3. The four stable naturally occurring isotopes of iron have masses 54,56, 57 and 58. The main ores are hematite Fe2O2 and limonite Fe_2O_3-$3H_2O$. Pyrites Fe52 and chromate Fe(C-O2) are mined as ores of sulphur and chromium respectively. According to Parker, iron is found in many other minerals. It occurs in ground waters and in the red hemoglobin of blood. He asserted that the greatest use of iron is for structural steels, cast iron and wrought iron are made in quantity. The same applies to magnets, dyes (inks, blueprint paper and rouge pigments) and abrasive (rough) which are among the other uses of iron and iron compounds.

The major process of production of iron is the blast iron furnace. [10], states that since 1970, the growth of alternative direct reduction processes has been very significant. He made a difference between the blast furnace process and the direct reduction processes. The principal difference between the two processes, according to Parker is temperature of operation. In the blast furnace, high operating temperatures enable the production of melting iron. At the lower operating temperature of the direct reduction processes, solid or sponge iron is produced. [11], observed that if a metallic oxide is heated with carbon, the reaction between them results in carbon dioxide, being formed and the metal being released. In electrical method of extraction, an electrical current is passed through molten material or through a solution of a metallic compound mixed with water. The process is called electrolyses. As it is usually carried out on a large scale, this industrial process is dependent on huge supplies of electricity [12].

The above description is different from the iron production processes at its inception in Africa and particularly in Eastern Nigeria. At the beginning it was the pit and oval shaped furnace that were prevalent. Probably in other parts of the world it might have been the same at the genesis of iron production. Lack of written literature has cost an authentic claim to the specific way iron smelting started. It could be a product of many years of trial and error.

However, the modern processes of mass iron production especially using the blast furnace and electrical method will enable one wonder and appreciate the ingenuity and doggedness of these "iron founders" and the mystery of their arrival to this extent. Though iron production processes might have started in the same crude form at different places in the world, it is possible some parts of the world might have overtaken the others due to some ancillary factors. It is well known civilization started in Africa and later Africa was overtaken. The same could have been the case in iron production. Iron production started in Igboland and indeed Africa many millinia before the discovery of Africa by the voyagers. Some iron smelting communities in Igboland still have their myths of the beginning of iron production. Though some of the claims are not verifiable due to scientific limitations, it goes to prove that within their context, iron production did not come to them from "outside". The 'Okpogho' Community which is taken to be the cradle of iron production in Igboland of Nigeria attests to the originality of its iron smelting. In Okpogho, a boy of 15years can give you a historical background of iron smelting in their locale unlike some other communities in Igboland that have lost their iron smelting history. It seems Okpogho was the last to stop iron smelting in Igbo Area of Nigeria lasting up to 18th century and early 19th century. Some of the products of Okpogho iron smelting industry can still be seen. The present generation of the Okpogho indigenes can still narrate the pre-colonial iron production processes of their fathers and great grandfathers.

Okpogho Iron Production Industry: An interview conducted by the researcher with selected Okpogho citizens revealed that their iron technology was indigenous. They said that theirs' is an ancient kingdom of the Eastern Part of the world. According to their assertions, history has it that civilization started from the east and being part of the east, they are highly skilled technologically. Their technical knowledge merited for them the use of local materials to produce scientific objects not known to any other part of the world. They listed the following as materials used for their iron industry.

- Life stone (made of five particles)
- Iron Trees (dead or alive.)

The Iron Trees Include: Inyi (iron tree), akpaka (oil bean tree), ugopi (ichekwu), charcoal (from iron or iron bean tree), natural palm oil, avuvuakwu (slides of palm fronds) etc. The above are combined in various degrees in the iron smelting process. Though an indepth analysis of the pre-colonial iron production mechanism may not be

adequately be accommodated in the domain of this paper, the much we have said goto buttress the claim of a local Igbo Community of originatingiron smelting in Igboland. Their story tends to negate the earlier hypotheses of some authors that iron production diffused from Europe to Africa. It also put to question the claim by some authors that Awka is the cradle of Igbo iron technology [13], gave credence to this when he said that predominant attention has been on Awka, a town many scholars describe as the cradle of Igbo iron technology. According [14-16], recent micro studies such as done by A.E Afigbo, J.N. Ezike, Anthony Udueze, Onwuka Njoku, V.E. Chikwendu, Alozie Osuagwu, etc. indicate that there are other centers that occupy not insignificant niches in the landscape. Okpogho is one of such centers.

CONCLUSION

The foundation of the iron production technology remains a mystery. The history of the foundation of metal technology in the world is obscure. Historical accounts continue to improve as new facts emerge. Igboland and indeed Africa lays serious claim to the originality of its ancient iron production industry. It is obviously unacceptable to embrace the 'diffusion theory' of some writers to explain the foundation of Africa metal technology. Scientific and oral evidences have negated it. More studies on African indigenous metal technology will help to reshape the history of the world metal technology evolution and putOkpogho, Igboland and indeed Africa in the proper perspective.

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