

IMAGINATION AND ANCIENT TECHNIQUES IN SUB-SAHARAN AFRICA

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ABSTRACT

In Africa, technical practices and symbolisms often form an ensemble where rituals, magic, gestures, words and signs combine to ensure a smooth operation and / or a good preservation of the secrets of procedures. Imagination played an important role in all stages of technical practice. Thus, techniques and symbolisms are inseparable and form an often complementary or sometimes ambivalent set, thus conferring an enigmatic character to these technical practices jealously guarded within sub-Saharan African societies. Some aspects of these techniques are impenetrable by the laypersons because most often protected by prohibitions and secret practices. They may play a role in the development of certain techniques or, on the other hand, they may be a brake on important innovations where knowledge is kept by a minority of people or artisans. Indeed, innovation or change is sometimes perceived as an attack on the pre-established order by the gods and ancestors, guarantors of technical traditions. Metallurgy, ceramics, weaving etc. are ancient techniques penetrated by this imaginary. It should be noted that each society has set up an original system, the elements of which often come from a larger cultural ensemble that sometimes goes beyond the world of craftsmen. These technical thoughts and practices sometimes contain important information that can help the technical historian understand societies where writing has been absent to freeze certain facts. Indeed, words, gestures, silence and rituals are often "vehicles" of the history of techniques that help to trace political, cultural and social facts important for the writing and understanding of the human past as well as the evolution of African techniques.

Keywords: Techniques-symbolisms-rites-cultures-traditions.

INTRODUCTION

The approach of the imaginary in the history of techniques is not easy to apprehend by the historian whose sources of the writing of history are known. Indeed, since the concept of the imaginary has a polysemic meaning, we come across definitions that refer most often to ideology, to philosophy, which move away from the scientific reality of the historian. The history of techniques, however, cannot be done outside of society, culture and operative thoughts, which constitute a whole with the technique properly spoken. Indeed, the technique which is the particularity that man has to invent the tools and processes to act on his environment in a sustainable and reproducible way must be apprehended from the historical point of view in the society which puts it in place, for c It is this society which has been born from thought and it is this same society which is affected by the economic, socio-political changes of technical facts. The homo techniques which imagines and creates, the company that incorporates and undergoes modifications and the source environment of the materials used are to be analyzed also at the risk of missing crucial historical information. In sub-Saharan Africa, the history of technology and technical thought is also the history of society, culture and people. The history of techniques in general is perceived at first sight as neglecting man in his cultural and social context. The technical and imaginary relationship in

sub-Saharan Africa is that of cultures, thoughts, and social organization. A study on the history of techniques in Africa is primarily a cultural history of techniques based for the most part on the imaginary. Imagination occupies an important place in all stages of ancient techniques. The symbolism that is translated through rites, cults, magic, silence and gestures is the result of an imaginary ubiquitous in the technical processes. It contains languages, messages, a technical cultural history that enable us to understand, technical processes, transmissions, borrowing, evolutions, changes and obstacles to progress. Oral traditions, gestures and silence are the main vectors of this language.

How to understand operative thoughts transmitted for centuries orally? How are the transmissions of this technical knowledge outside the written word? What are the methods used to memorize information in the oral system?

To understand this universe of imagination in ancient techniques in sub-Saharan Africa we approach our three-point reflection while focusing on the imaginary in the ancient metallurgy of iron. Those are :

- Orality and operational thinking in sub-Saharan Africa: the power of speech in technical processes ;
- The imaginary in technical processes: the importance of gesture and silence in technical know-how and in the didactics of the transmission of knowledge ;
- Imaginary collective in ancient metallurgical techniques and its role in the structuring of society ;

ORALITY AND OPERATIONAL THOUGHT IN SUB-SAHARAN AFRICA: THE POWER OF SPEECH IN TECHNICAL PROCESSES

Studies on technical thinking in sub-Saharan Africa raise fundamental questions. Is there a seizable technical thought in these societies where everything seems abstract? In a technical universe where orality is the basis of operative thoughts, how can the historian of techniques apprehend these facts from a historical perspective? The approach of the ancient metallurgy of iron showed the omnipresence of the imaginary in the operative thoughts. Imagination is a human faculty that removes it from animality and makes it suitable for building societies (Boy, 2005: 3; 4). Through the imagination man creates an abstract world, imaginary ideas that he will later attempt to realize in the real world. The imaginary is therefore the domain where all the dreams of man are developed, that is, all that he can invent in the mind, imagine, fantasize. It can be individual or collective. It can thus be asserted without error that the ability to invent technically depends inevitably on the imaginary, without imagination there is no technique. However, the historian of technical thought must also take into account the fact that the imaginary is constructed in an abstract way on a cultural and societal background. The man who imagines to facilitate the creation or the innovation is the fruit of a society, a culture and in this sense, these will have a real impact on the imaginary that it tries to represent in the world reality that surrounds it. And vice versa, technology through innovation will also have a profound effect on the society that welcomes it, even if the autonomy of the technique is proven all the more as it constitutes a structuring element of the societies in which it illustrates and gives meaning.

The reflection on sub-Saharan Africa shows how the imaginary as such is not only omnipresent in all technical stages but is the basis of language, transmission, invention and knowledge of technical processes. The technique has been translated from the imaginary to the real in a language based basically on orality. The words were the support of the imaginary for invention and transmission. A. F. Garçon in his book *L'imaginaire et la pensée*

technique, organizes operational thought in three main regimes: the regime of oral practice, on which all technical cultures depend in sub-Saharan Africa, the regime of technology and the technology regime related both to the written. All are technical and are based mainly on the efficiency and transmission of knowledge. However, each regime has its own procedures for operating and transmitting technical facts (Garçon, 2012: 149). In sub-Saharan Africa, orality constitutes the basis of technical processes, the support of the imaginary to translate the dream into reality. And in this, the technique in this oral society finds ways and means to realize what is abstract and also to transmit it. Thus, the imaginary will rely on oral culture. So how to create and transmit in a society where the word is the vector of the transmission of all knowledge and technical know-how?

In sub-Saharan Africa indeed, society has been for a long time oral. The imaginary that occupies an important place in the procedures of ancient techniques is often transmitted by symbolic oral languages, words through rites, narratives. The absence of writing led the collective imagination to freeze information by these forms of language. In Western societies, where writing most often permits the freezing and transmission of certain technical and social processes, those of sub-Saharan Africa have compensated for this absence by deeper modes of symbolism of the concretization of the imaginary. We know that Europe before the eighteenth century was bathed in this same universe, but the prolonged absence of writing in sub-Saharan African societies accentuated the role of the imaginary in technical knowledge. Thus, symbolism, which is expressed through speech and rituals, allows us to communicate, to invent, to describe and to transmit knowledge. The historian of technical thought in Africa must be able to decipher this imaginary, which also contains some of the technical information. Oral traditions have often been instrumental in understanding these data. At the beginning of research on the history of ancient iron metallurgy in sub-Saharan Africa where archaeological data were the most studied, given the absence of written documents, some researchers have been skeptical about taking oral data in the approach on the history of techniques. The scientific value of research on ancient techniques in Africa, based mainly on oral sources, through descriptions, observation of rituals and praises, was sometimes questioned. The specificity of African society indeed recommended a different approach according to the sources and the culture. Indeed, orality was the basis of transmission, inventions, and technical processes and at the same time constituted one of the fundamental sources of investigation of the historian of technical and technical thought. Thus interdisciplinarity has been the basis of these studies in sub-Saharan Africa over the last thirty years and the ethnological approach through oral traditions has given unexpected results on the operative thoughts. Nowadays, scientific works based on the use of several sources, including oral tradition, have enabled publications that have given important information on certain ancient techniques such as iron metallurgy¹. B. Ravier-Mazzocco in the introduction

¹In recent years, research on ancient iron metallurgy in sub-Saharan Africa has led to important advances in the pre-emergence of iron and steel techniques in Senegal, Mali, Burkina Faso and others. Some PhD theses have been published :

J.B. KIETHEGA J.B. *La métallurgie lourde du fer au Burkina-Faso. Une technologie à l'époque précoloniale*. Ed Karthala, 2009, 500p.

E. COULIBALY, *Savoirs et savoir-faire des anciens métallurgistes d'Afrique occidentale : procédés et techniques de la sidérurgie directe dans le Bwamu (Burkina Faso et Mali)*. Ed Karthala 2006, 422p

to the special issue of *e-Phaestos* on the sources of the history of technology pointed to the fact that it was necessary to add to the methods of study of the history of the techniques, cited by Mauritius Daumas, in his general preface on the *histoire générale des techniques* published in 1962, those of the anthropologist, the ethnologist and even the philosopher. (Rivier-Mazzocco, 2012: 9)

This imagination is much more accentuated in the ancient techniques of the fire arts as the metallurgy of which we will be inspired. From the extraction of iron ore to the production of the finished product, the imaginary intervenes and constitutes the reservoir of the ritual and mythical symbolism of this ancient technique.

THE IMAGINARY IN TECHNICAL PROCESSES: THE IMPORTANCE OF GESTUAL AND SILENCE IN THE TECHNICAL KNOW-HOW AND THE DIDACTICS OF THE TRANSMISSION OF KNOWLEDGE

Our ancient technical cultures in the south of the Sahara depend mainly on the regime of the practice. It is essentially based on technical facts whose observation of the practical technical and symbolic operations makes it possible to define operational thought. The technical gestures transmitted through a desired silence is also one of the pillars of the knowledge of this regime of practice.

In these practices where gestures also constitute a cultural feature of this technical culture, the artisan or the metallurgist has developed a mode of operation through which everything is inscribed: thought, technical facts, descriptions, learning, transmission knowledge, dissemination, technical invention. It will be difficult at this stage to analyze all the supports of technical thought. In this work of reflection, we will discuss the main elements that will allow us to identify the essential.

In this system it is important to analyze the technical processes that contain important information in terms of technical thought that can be grasped and transmitted through technical and ritual gestures. From the extraction of iron ore to the production of the finished product, symbolisms are present in all technical cultures in sub-Saharan Africa and in various forms. The system of orality is translated by the transmission by speech. But it must be noted that smiths and metalworkers also use silence to describe, transmit, innovate, etc. It is not necessary to describe by word all technical processes. Silence and gestures learn more than noise and speech. In the wisdom of master blacksmiths and metallurgists, understanding and learning are acquired in silence and observation. The blacksmith being the guarantor of different knowledge and rites must be trained to speak little and better transmit through different forms of symbols. Thus, only the most knowledgeable and attentive smiths, metalworkers and apprentices will be able to learn and penetrate this universe that is both secret and open. The senses of observation are thus developed in transmission. The silent approach supported by the observation of gestural symbolism makes it possible in this sense to better understand the cognitive activity and to better transmit. The word is taken that if

T.H. KIENON-KABORE. *La métallurgie ancienne du fer au Burkina-Faso : province du Bulkiemdé. Approche ethnologique, historique, archéologique et métallographique. Un apport à l'histoire des techniques métallurgiques en Afrique.* Ed l'Harmattan 2003, 328p.

F.YANDIA, *La métallurgie traditionnelle du fer en Afrique Centrale. Société, économie, culture.* Paris, l'Harmattan, 2001.

need be felt. Symbolism and practice limit the use of speech in the regime of practice. From this moment on, nothing is done at random, rituals, prohibitions, ritual and technical gestures, in the technical processes contain important meanings. Gestural Symbolism becomes the book of ancient technical know-how. We assimilate codes to decipher the message by learning.

It is important to realize that all this symbolism is based on cultural ideas that are embedded in society. Indeed, in the imaginary universe of artisans and metalworkers, everything that is part of the cosmos is alive and possesses a soul and secrets like a human. Thus iron and gold are prodigious metals. They are living beings who must be careful not to offend them in order to be punished or to defeat the technical operation. They have a significant detrimental power that can be exerted on blacksmiths, metalworkers and their families over several generations. Hence the practice of sacrificial rituals at each technical stage of the chain of operation of the direct steel industry. The mythical and secretive character of the raw material of work has two profound meanings: the first is religious because it allows craftsmen to remain in contact with their gods while showing the importance of these in their activity; is mythical allows to put an opacity in these technical facts. Thus the profane are kept away, and the apprentices who wish to understand will seek to unravel the mystery necessary for technical exchange. Thus the artisan emerges from his imagination cultural elements that enable him to protect himself and his profession from the profane and initiated world. The anthropomorphization of the raw material can be explained by the symbolization of the operating chain which gives the magnifying glass whose fundamental principles are not always known to them. For the latter and also for the profane, the metallurgist extracts the metal from simple pebbles that give rare iron, precious and sought after in society. They struggle against the mythical element fire in cosmogony in black Africa. In the collective imagination of blacksmiths and metalworkers, the extraction of the ore which is a living being constitutes the gestation, the reduction in the "belly of the stove" as they designate it in the north of the Ivory Coast in the region of Korhogo, represents the woman in term in labor whose obtaining of the magnifying glass symbolizes the childbirth.

The organization of the iron ore reduction areas in certain metallurgical communities also responded to an imagination in which symbolism and technique combined to give a certain harmony to the operation. The imaginary will play its role in the location of the site and the layout of the furnaces. Georges Celis, in his book on African foundries, cites three types of furnaces, in line (Niger and Côte d'Ivoire), grouped (Côte d'Ivoire) and in circle (Niger). For him, it was a search for saving time and profitability. (Celis, 1991: 102). In the Korhogo region of northern Côte d'Ivoire, these three types of reduction space organization were discovered at various steel sites. The line layout could be up to 30 stoves aligned on the north-south axis. The embrasures and gates situated respectively on the east and west side (Kiénon-Kaboré, 2012: 154). Some blacksmiths from the region who attributed the sites to their ancestors justified the organization of the reduction area by the importance of the four cardinal points in the success of the reduction operation. In their imagination, the East and the West symbolizes the entrance and exit of the world through the sunrise and sunset. The embrasures and doors play an important role in the operation of the furnace for slag evacuation, the recovery of the magnifying glass and should be located east and west to ensure the success of the reduction according to the metallurgists. The reduction of iron ore by natural draft was effected in this part of Africa between the months of December and January, when the winds of the harmattan blow at this period of the year. The direction of the wind plays a great deal in the orientation of the furnaces. When asked about the usefulness of winds in the orientation of stoves, metallurgists confirm their importance in the organization

of the space of reduction. However, this will not be expressly stated. A further example that corroborates the fact that the technique is practiced and transmitted by opaque symbols. It does not reveal itself and is not easily revealed in the regime of practice. Technical facts are often contained in ritual, mythical and gestural narratives. Only the initiates could detect their meanings. A blacksmith from province of Bulkiemde, in Burkina Faso said, when we were astonished at the crucial information hidden by gesture in the making of old iron objects: *"The blacksmith is a man of mysteries, and his technique is able to decipher the language of the wind and the fire is able to understand the mysteries of our profession. With us, speech is silence and silence is speech, and even the approach of a blacksmith master is a source of knowledge."*² Indeed, within the forge, the transformation of the magnifying glass into finished products is also an opportunity for innovation, transmission, learning and understanding of techniques and rituals. The symbolism at the level of the forge is such that it occultes sometimes that of the metallurgists who nevertheless constitute the strong link of the operating chain in terms of the technique and the painfulness of the work. This includes especially the forge is the place where technical and symbolic rituals as well equate to the reduction for the forge when the operating chain is provided by the same people who are both metallurgists and blacksmiths. As the teacher of higher education, who was himself a blacksmith, said of learning and the transmission of knowledge *"if he (the apprentice) has a good belly, he internalises what 'he saw it done and fixed it in his hakili (mind, intelligence, memory). One keeps things in one's belly; we speak in her belly; it is the belly that gives us what to do; it is in the belly that the observations mature before being reused in the practice of the trade; retained in the belly, they will serve later, not to reproduce the model point by point, but to learn how to do what the belly gives us, that is to perform the tasks in the way that is personal to us"* (Kante, 1993: 80). The belly here symbolizes in some African societies, memory, thought, imagination where one keeps its secrets, its information and in which one can dream and invent. We see in this statement that the apprentice uses his imagination in his work and has a technical freedom that allows him to learn, to invent, to innovate. Her visual memory is the most demanded, hence the importance of the use of metaphors to facilitate observation, memorization, transmission, use of technique and observation in the young apprentice. The tools and parts of the forge thus undergo an anthropomorphization. Among the Moose smiths in general, the bellows symbolize the masculine and the feminine hearth. (Calderoni, 2003: 86). This process is all the more important because the word and the technical and ritual gestures in themselves alone translate technique and description. The apprentice must in fact supervise the hearth of the forge, which most often assimilates the woman who gives birth to the objects through the medium of the man symbolized by the nozzles, the bellows. The apprentice must be able to slow down or increase the blower by observing the color of the flames, metal, sparks, and the sound emitted by the hammer blows. Nothing will be explicitly said to the apprentice who develops his sense of observation and analysis that can help him to question and understand. From then on, the master blacksmith has the duty to direct him in his preoccupations. It is thus assured to train another master blacksmith and metallurgist, sharpened in the art of observation, the decoding of symbolism and above all wise, that is to say, poor in speech and rich in didactic silence.

Many technical processes are used in forging to make and improve the technical performance of objects. However, without observations of gestures and procedures, they go unnoticed. Quenching, iron-steel welding, carburizing, recrystallization, carbonitriding, etc. are all known techniques and transmitted in African forges through the operating procedures. How

² Kiendrébeogo kudu, blacksmith in Tiogo Bukiemdé province, Burkina-Faso, September 1988.

do we transmit these technical methods when we are in an oral society where everything must be memorized and the gift of silence is a symbol of wisdom? Today, with the scientific studies carried out on the physical properties of metals, certain technical acts and their transmissions become more than evident. It is necessary to place oneself in the African historical context where the majority of the techniques were denied to metalworkers and craftsmen, and where according to the ideas received, certain techniques were too perfected for these metallurgists.

In the manufacture of the traditional lighter, for example, the slowness and the speed of the quenching gestures determine particular techniques. The quenching in a rapid gesture makes it possible to have a quenching assembly structure necessary for the hardening of the metal in order to support the friction of the stone on the metal. The second, slightly slower quenching, obtained after a carbonitriding surface treatment using white sorted faeces of the color white and the salt, makes it possible to obtain a superficial hardening of the steel. Thus the part most often in contact with the stone to produce sparks will be more resistant to wear.

The production of the ordinary blade to cut objects and the one used to cut the skin differ only in technical gestures. Since physical forms are identical, only observation can make it possible to assimilate, learn and transmit even more so because craftsmen mastered techniques but most often ignored the principles of transformation to allow a rational explanation of the results. The ordinary ferrite-based blade is hammered to obtain the desired shape. The technique used to cut the skin undergoes a recrystallization of the grains which changes the structure of the metallic material in order to give it the flexibility, homogeneity and purity necessary to protect the fragility of the skin and to avoid the transmission of certain germs (Kiénon- Kaboré, 2003: 138; 139).

The technical gestures conceived and realized from the imaginary, thus make it possible to detect the technical fact, observation, questioning, innovation and transmission of technical know-how in the regime of practice through memorization based most often on anthropomorphization and metaphor of tools, gestures and words.

The imagination, which allows material to act on it in order to create the technical object, can only be approached from a technical perspective. A technical history of techniques would not suffice to understand the dynamics of technical facts and societies. The object is apprehended in the societal universe that made it. This is why we propose to take an approach to technical thinking through its social expression. The technical function creates a collective imagination which will constitute one of the bases of structuring of certain societies.

COLLECTIVE IMAGINARY IN THE ANCIENT METALLURGICAL TECHNIQUES AND ITS ROLE IN THE STRUCTURATION OF THE COMPANY

In Africa, techniques and societies are indissociable given the interactions of one with the other. The autonomy of the technique was accepted by several researchers of the last century, however, they recommended the analysis of the relations of the companies with the technique. Indeed, in this autonomy, which is reflected in structuring modalities specific to it, as A.F. Garçon points out in his work on the *Imaginaire et la pensée technique*, technology can not grasp outside society what it structures, amended. For Sub-Saharan Africa, technology is the basic element of social, political and cultural organization in many societies. The technique acts on society from a collective imagination that permeates the lives of people on several levels.

The introduction of iron metallurgy has had a significant impact on African societies at the technical, economic, political, cultural and social levels. Iron has upset habits, structured societies and altered the social way of life that existed before. Agriculture is intensifying because of new and more powerful tools, conquests are multiplying and empires are in place because the tools of warfare have become sophisticated. The common denominator of all these upheavals is metal. The unavoidable and indispensable character of this metal has fueled a collective imagination that will play a decisive role in various areas of the life of the populations.

The collective imagination through the metal produced by the metallurgist and the blacksmith has attributed a certain power to the latter, which becomes equally inescapable as the metal they produce and transform. For the collective imagination, transforming simple stones into metal and fighting with fire could only be done through supernatural beings with the blessing of the gods they feared and to whom they vowed a flawless respect. Everything is organized around the production of metal as if to introduce utopian facts, embellish and make mythical the craft of the blacksmith so that the technical changes are well integrated and accepted in these societies where the supernatural, the spiritual and the religion occupy a special place. Indeed, the collective imagination has put much emphasis on the religious role of the metallurgist and the blacksmith. Given the deep attachment of African societies to the supernatural, religion was the preferred way to facilitate the introduction and acceptance of a major invention such as iron metallurgy.

The collective imagination, which did not have a rational explanation for the process of producing iron metallurgy, finally introduced into the collective memory, and in an unconscious way, the fact that the blacksmith and the metallurgist were the spiritual representatives of the populations to the gods that give them the power to extract iron. Thus, artisans become persons through which social organization is structured within certain societies.

From a major technical invention, the collective imagination of blacksmiths and metalworkers succeeded in establishing a social system in which the blacksmith became the pillar of social cohesion. In his trade, the blacksmith integrates a code of life based on religion. Prohibitions related to the extraction of ore and metal are merely a means of making production profitable, establishing peace and social harmony between the blacksmiths in order to avoid any social tornings which could be fatal to the functions which are assigned. Throughout the direct technical chain of the direct steel industry in sub-Saharan Africa, the extraction and reduction of iron are in the majority of cases preceded by sexual prohibitions at the risk of being punished by the gods of the forge. They become the central characters in non-blacksmith societies and also assume the role of unifying and consolidating social harmony. Indeed, the collective imaginary sees them as intermediaries with the gods. No member of society dares to contradict or defy the gods. Thus, in case of conflict, the symbolic element of the forge constituted by the anvil is used to separate the belligerents. This is the case in all blacksmith companies in Burkina Faso. Here the anvil is the symbol of all the spiritual powers of the blacksmith and contains in itself all the technical and ritual aspects of the craft of the blacksmith.

The blacksmith is also at the beginning and end of the life of the members of society. Indeed, in some societies, the blacksmith gives birth to dystocique women, heals the sick, makes amulets and bracelets for the protection of men and bury the dead. Thus, as gods, he cares for the body and the spirit and thus finds himself in the symbolism of life and death. Because

without it there is no social or spiritual peace. Given his spiritual place and the social symbolism born of his craft as a blacksmith who makes the tools used to nourish, protect and bury, as well as those used for the cultural rites of other members of society, the latter becomes the sole interlocutor technical and ritual plan with the supernatural world.

The blacksmith by the social position he occupies is also the one who educates and trains children from a young age to face technical and spiritual life. In societies where the caste division does not exist, the blacksmith ensures, through training, the transmission and diffusion of technical and ritual know-how in all blacksmith and secular societies. By matrimonial relations it happens to penetrate the societies where the craft of blacksmith is unknown. Women thus become a vehicle for spreading their know-how.

Thus, technique develops by practice a symbolism whose identifiable elements are rites, gestures, technical processes all this is integrated into the cosmogony of the social group. The society in which the metallurgist and the blacksmith are practiced find themselves impregnated and modified at the technical, political and socio-cultural level. Therefore the imaginary begets the technique and plays an important role in the structuring of society. In the system of practice, the imaginary begets the technique in the mind, invents it in the real and structures society through technology and the spiritual.

CONCLUSION: BALANCE SHEET AND PROSPECTS

The history of technical thought which approaches the imaginary can only be done in a historical approach to techniques. It is through the history of the techniques that must be apprehended the operating thoughts that are often specific to each society. Research on ancient techniques in Africa over the last thirty years has been approached by many researchers, mostly art historians and archaeologists. In most cases, these approaches emphasized descriptions of technical processes, process steps, aesthetics. Indeed, the research subjects dealt in the majority of the cases, the old iron metallurgical techniques, the ceramics, the architecture, the weaving. The scientific preoccupations of many of these research programs were, first of all, the collection of different old techniques with complete and detailed descriptions of the operating chains. This research has revealed the rich technical heritage of sub-Saharan Africa in terms of history, technical processes and social and economic aspects.

However, in spite of the diversity of themes on ancient techniques, it must be noted that the majority of these approaches were carried out in historical perspectives in general and not with the aim of establishing a history of techniques. Research on the history of technology has its own methods and sources. Since the epistemology and methodology of the history of technology is not taught in most African universities south of the Sahara, this results in a huge gap and gap between European and African researchers. Indeed, in Europe, research on the history of technology is advanced, more and more specialized, multidisciplinary and mostly often carried out in collaboration with certain modern industries. These approaches offer enormous documentation that allows researchers to set up problems and research on subjects such as the imaginary in the technique that addresses operative thinking. A real collaboration with research laboratories on the history of techniques in Europe could be beneficial and complementary for researchers on both continents.

Despite the lack of studies by methods and sources specific to the history of techniques, African scholars have been able to put in place interesting data on the history of techniques

and operating thoughts. The subjects do not specifically address these aspects, but they do provide the basis for a first approach to the history of technical thought in sub-Saharan Africa.

The richness and diversity of the African technical heritage south of the Sahara are such that there should be specialized research laboratories on this subject. The research carried out over the last thirty years has made it possible to put in place an important documentation on certain ancient techniques and to show at the same time the urgency of an inventory and a study on the history of techniques in Africa, because the latter disappear as time passes. In Africa south of the Sahara, there is still no break in some traditional technical production. In the present-day villages, ancient techniques are still used in architecture, ceramics, metals and garments, thus providing an environment conducive to an approach to the history of ancient techniques. This would take into account historical, technical, cultural and ethnological aspects. These latter aspects provide vital information on technical thinking in sub-Saharan Africa. The study of technical thought contains important historical information which informs us about technical processes and social life and deserves to be studied more thoroughly because this theme is still new. This research can be accentuated only from a general perspective of the history of techniques, even less treated in our research units.

Many laboratories and research groups are being set up in universities all over the world to understand not only the history of technological advances and their impact on societies, but also to grasp the technical world that is constantly evolving at high speed. States realize that techniques govern the world and that it is urgent to understand their evolutions, their advances and their impact on societies in order to better understand the technological future. In Africa south of the Sahara, societies are rather consumer reservoirs. Most industries are in the west. The study of their evolution, innovations and advances seem not to concern Africans who do not have most of these industries installed on their space. This fact leads researchers in sub-Saharan Africa to turn to the study of traditional techniques, which for the majority of our leaders are not useful to today's societies. Hence the marginalization of studies on the history of techniques in general and the history of ancient techniques in particular.

The study of the history of ancient or modern techniques in sub-Saharan Africa, however, is crucial for the understanding of our present societies. Indeed it would make it possible to know the impact of this profound break with the old techniques and the consequences of the introduction of modern products and techniques on the African society in general. The introduction of mobile phones, NICTs, in sub-Saharan Africa are examples of studies that would provide insights into profound social, economic and political upheavals.

1- ORAL SOURCES

LAST NAME FIRST NAME	OCCUPATION / STATUS	AGE	LOCATION OF ORAL INVESTIGATION	DATE OF INVESTIGATION
BAGRE Kudugu	Black-smith	55 years	Kindi	25.08.1994
KABORE Mathias	Farmer	40 years	Wologteng - Goden	11.11.1994
KIENDREBEOGO Kudu	Former blacksmith Farmer	108 years old	Tiogo	27.09.1988 09/28/1988 23.12.1988

	traditional healer	+ 1996		25/12/1988 01/26/1991 22/12/95
KIENDREBEOGONOaga and his son	Former blacksmith	70 years	Doulou	Sept. 1994
KIENDEBEOGOREGMA	Former blacksmith	60 years + 1994	Tiogo	Sept.1988
KIENON Yembi	Mask carrier Farmer	53 years old 1994	Tiogo	22.12.1988 03.01.1990
KINDA Olivier	Former blacksmith	105 years + 1995	Reo	23.12.1988 August 1993 01/11/94
KOALA Yamba	Black-smith	62 years	Koudougou	Sept 1988
NIKIEMAKomênêmmoogo	Black-smith	65 years old	Ralo	22.12.1988 09.11.1989 29.11.1989
Nikiéma Gangr	Black-smith	75 years old	Ralo	24.12.1988
NIKIEMA Wogo	Black-smith	85 years old	Poa (Loaga)	25.01.1990
OUEDRAOGO Awa	Wife of former chief smith	90 years	Ralo	29.12.1989
Zongo Bangba	Black-smith	60 years	Nandjèla	25.08.1994 20.09.1994 30.08.1993
Zongo konyib	Black-smith	72 years	Nandjèla	06/01/1990
Zongo REGMA	Former blacksmith	100 years	Ralo	11.11.1989 29.11.1989 22.12.1988 08/29/1993
Zongo Yamba	Black-smith	60 years	Siguogin	09/28/1988 11.01.1991 09/22/94
Zongo Yamba	Traditional Leader	80 years old	Ralo	03.01.1990
Zongo Kuka	Traditional Leader	80 years old	Ralo	03.01.1990

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