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College of Social Sciences

Department of Archaeology and Heritage Management

Post Graduate Program in Archaeology

An Investigation of Metal Collections from Pre-AksumiteTombs at Yeha: Collections from the 1960/61 Excavations

By: GizachewNigusuLema

Supervisors:

AyeleTarekegn (Ph.D.)

Caroline Rubion Brunner (Ph.D.)

December 2024

Addis Ababa

An Investigation of Metal Collections from Pre-Aksumite Tombs at Yeha: Collections from the 1960/61 Excavations

Thesis submitted to the Department of Archaeology and Heritage Management for partial fulfillment of Master's Degree in Archaeology and Heritage Management

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DECLARATION

I Mr.GizachewNigusuLemadeclare that:thisMaster's thesis entitled, **"An investigation of Metal Collections from Pre-Aksumite Tombs at Yeha: Collections from the 1960/61 Excavations"** is myoriginalworkandhasnotbeenpresented for any degreein anyuniversity. All sources of materials used for this thesis have been duly acknowledged. I haveproducedit independentlyexcept forthe guidanceand supervisionof my supervisors.

College of Social Sciences

Department of Archaeology and Heritage Management

This is to certify that the thesis presented by GizachewNigusuLema, entitled **"An Investigation of Metal Collections from Pre-AksumiteTombs at Yeha: Collections from the 1960/61 Excavations"**submitted in partial fulfillments for the Degree of Masters ofArts in Archaeology and Heritage Management compiles with the regulations of the university and meets the accepted standard with respect to originality and quality.

Approved by the Examining Committee

Supervisor----------Signature----------Date----------

Co-supervisor----------Signature----------Date----------

External examiner----------Signature----------Date----------

Internal examiner----------Signature----------Date----------

Acknowledgments

For Him whose was before the beginnings and everlasting, For Him who is omnipotent and omnipresent, For Him who stretched his throne in the heavens, For Him who is kind and merciful, For Him who created the universe: everything visible and invisible,For Him who owesHail, praises, salute and all worship, For Him who is worshiped day and night with all the holies chanting in front of him with no rest, For Him whose help and condole are with those who are faithful to him:Father of souls, I know I don't deserve it, but your grace gave me the power to call you father through your beloved Son. You gave as the spirit of children for us to be able call you Father. The lord of my soul, I'm not ashamed of your name, to reveal it in front of the world, for that you are not ashamed of me the sinner in front of your father when you called me brother. Your name is the beginning and the end of all gratitude. Thank you for answering all my prayers and call to you. You opened up to me all your doors of grace mercy all the times I need you the most.

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List of Acronyms

AD: anno domini(meaning after the birth of Jesus Christ)

BCE: before Common Era (meaning before the birth of Jesus Christ)

CFEE: Centre Français des étudesEthiopiennes (French center for Ethiopian studies)

EDX: energy dispersive x-ray spectroscopy

EHA: Ethiopian Heritage Authority

FTIR: Fouriertransform infrared spectroscopy

IEA: Institute of Ethiopian Archaeology (the current EHA)

LIA: lid isotope analysis

NME: National Museum of Ethiopia

SEM: scanning electron microscopy

XRF: x-ray fluorescence

Abstract

Burial site of Da'ero Mikael is one of a very significant part in Archaeological site of Yeha along with the great Temple and great palace of Be'alGuebri. It preserved rich intact underground archaeological structures located around these monumental structures dating to the early first millennium BCE. It covers a total area of 250 m² located about 300 m to the south east of the Great Temple near to the Valley of Shillanat. The graves are excavated by Francis Anfray in the 1960s and 1970s. There are a series of seventeen rock-cut graves that most likely belongs to the rulers who lived at the palace of GratBea'lGeubri. The grave contents of these tombs

included abundant pottery, different metal objects including those made out of gold, zoomorphic seals dominantly made up of bronze, other tools such as beads and an alabaster vessel that witness the artistic and techno-cultural advancement of the time. Within holistic archaeological study of Yeha material culture, this study of metal collections tried to address the gap in research concerning nature of the metal collections further in order to better understand t he technology, distinctive metal style of Yeha people specifically, and the function of the metal objects.

Through nondestructive preliminary methods of analyzing such as measuring of morphological attribute, visual observation and comparative analyses, it has been tried to categorize the objects based on their primary functions. The nation of primary function appeared to be important since it is mandatory to feed our reflections in respect to the preliminary objective in which artisans get in mind while fabricating the objects. That is synthesized from the morphological appearance of the specific object. The essence of primary function should also understood from perspectives that materials would be employed for different purposes after fabrication in which that could be termed as secondary and tertiary function. Moreover, the appearance of the objects as grave good has to be mentioned important in this case in line with the idea of mortuary practice that could asserted as one subject in cultural study of Yeha.

The Morpho-typological investigation was conducted on a total of 100intact metal tools in which bronze is the most dominant raw materials they made of: and remains of broken objects o btained from various excavated tombs. These objects have been classified based on their morphological type and function in to eleven groups as; bronze hoes, bronze chisels, bronze

sickles, bronze hooks, bronze cups and cauldrons, bronze seals, Jewelries, Iron weapons, different geometric objects, Aksumie bronze crosses and needles and rivets.Special emphasis has been given to few selected tools in order to assess their cultural meaning in the context. Rather than the simple morphological real, comparative analysis of these objects has been studied to feed our reflections of the basic questioned I designed as guide map in this study.

85 % of the objects are made out of bronze in terms of raw material distribution: where we also have Iron objects and three gold ear rings respectively. It was obstacle for me to expand my thematic scope due to methodological restrictions. I was unable to do radiographic analysis, and elemental composition analysis which would have been helpful in quests such of origin of production. From archaeological perspective however, it was evident that some of the materials are associated with another archaeological remains such as the great structures of Be`alGuibri palace, the Al Moqah temple and the ceramics: not only they just found in the same cultural and archaeological context, but also since there is a clear direct physical relation such as that between the well-dressed block stone shafts used to construct the temple and the bronze chisels most seemingly employed to dress them. Comparative observation of the objects with culturally and chronologically contemporary sites such as Hawelti, Matara and Sobea also shows the probability of trade exchange in addition to artistic homogeneity. Typological and morphological variability's has been interpreted from different perspective of cultural realms and cultural practices that has been deciphered.

Key words:*bronze,Morphology, Primary function, functional analysis, Typology, metal collection, Yeha,Da`eroMika`el*

CHAPTER ONE

INTRODUCTION

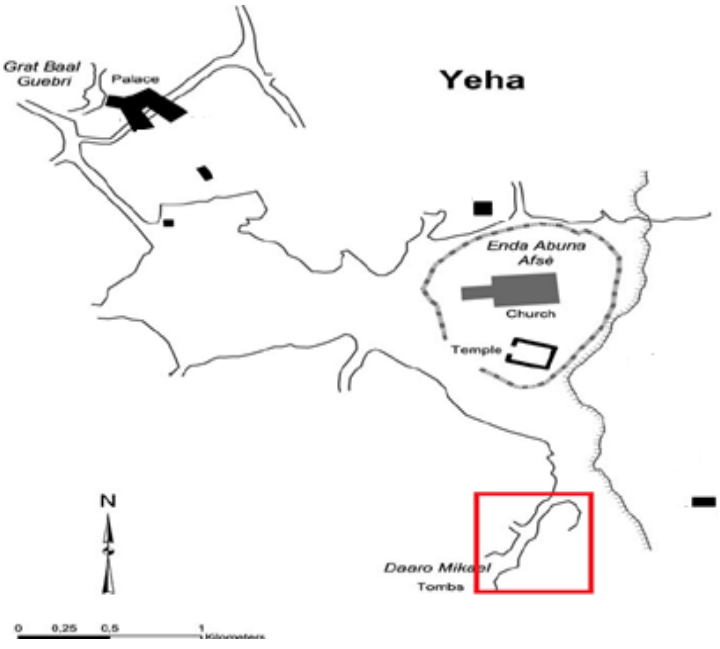
1.1. Back ground of the study area

The Horn is one of the regions in Africa where state formation began (Michels, 2005). Researchers usually relate the state formation in the Horn to South-Arabians migration/economic and political expansion in the early to mid-first Millennium BC (Sergew 1972, Bard et al. 2014, Philipson 2010, Conti Rossini 1984). For millennia the region has been an important crossroads of cultures where peoples of northeast Africa, southern Arabia, the Indian Ocean region, and the Mediterranean basin have interacted culturally and economically (Admasu 1955, Butzer 1981, Mitchell 2006). Its location at the juncture of the Nile Valley, southern Arabian Peninsula, and Indian Ocean has made the Horn important as a region where complex societies developed and later flourished into powerful kingdoms and expansive empires such as Aksumite whose hegemony was extended from the Ethiopian highlands to the western Sudan and across the Red Sea (Chittick 1974, Mitchell 2006). Before this famous Empire in the region so called Aksumite state which supposed to started flourishing from the early first Millennium AD, Archaeological studies of different times revealed there were a long time of occupation (Fattovich, 2009). The development of these polities can be outlined in principle on the basis of the archaeological evidence. The sate formation process in this region consisted of at least two distinct trajectories to social complexity, indirectly related to each other in the Eritrean-Sudanese lowlands and the Eritrean-Ethiopian highlands, respectively (Bard et al., 2014). Though we have a number of archaeological sites, we still need further researches on to know whether they were independent metro polities or a part of certain large state. Archaeologists broadly categorize these sites as Pre Aksumite and Proto Aksumite states (Anfray, 1967, Fattovich, 2010).

The Proto Aksumite period (150-400 BCE) marked a crucial phase in the development of the Aksumite kingdom. It is suggested that local communities began to emerge around the 3rd and 4th centuries BC in the vicinity of Aksum. Recent archaeological evidence indicates that BeteGiorgis served as a significant hub for a political entity. These early Aksumites

differentiated themselves from the preceding Ethio-Sabean population, known as the Pre Aksumites, by focusing on ideological practices involving stelae and pit graves for the burial rites of the elite, rather than constructing grand temple complexes (Phillipson, 1998). The Pre Aksumites are thought to have established dominance in the region from around the 1st millennium BC. Yeha, on the other hand, served as the primary center of the Ethio-Sabean state for a longer period prior to the rise of Aksum.A survey carried out by J.W. Mechels in 1974, spanning from Aksum to Yeha, provided evidence of the existence of sizable nucleated communities featuring elite residences. Yeha served as a prominent center for the Ethio-Sabean kingdom, historically referred to as Dáamat and believed to have thrived between the 10th and 5th centuries BC (Phillipson, 2009).

The archaeological site at Yeha contains two elaborate monumental structures known as the GratBe'alGeubri Palace and the Grand Temple of Yeha, along with two burial areas named the rock cut shaft tombs of Da'ero Mikael and the rock cut tombs situated at the base of the hills of AbiyAddi, dating back to the early and middle periods of the first millennium BC respectively. It also harbors well-preserved subterranean archaeological features surrounding these monumental buildings and the aforementioned tombs, all dating back to the same era.



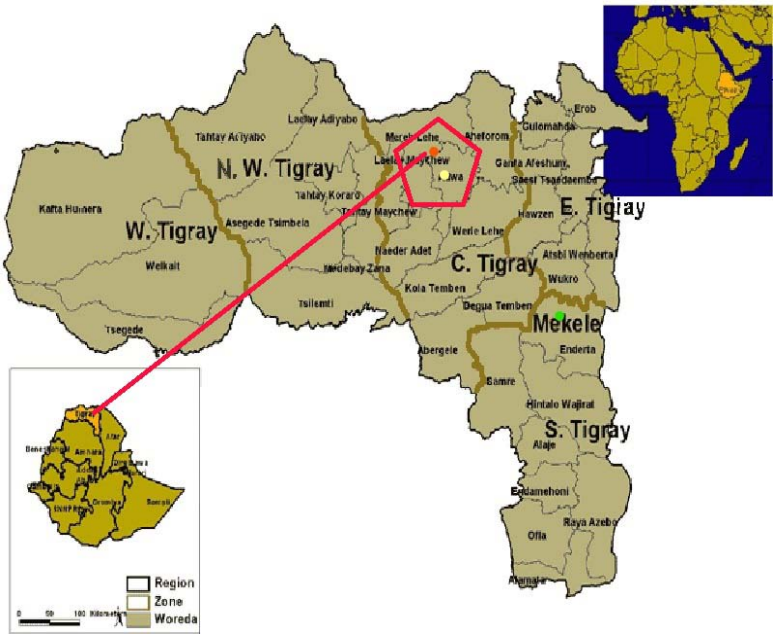
Map 1, Archaeological map of Yeha site, after (Fattovich, 2010)

The rock tombs of Da'ero Mikael, covering an area of 250 square meters, can be found approximately 300 meters to the southeast of the Great Temple near the Valley of Shillanat. They were unearthed by Francis Anfray during the 1960s and 1970s. These tombs, dating back to the first millennium BC, align closely with a set of seventeen rock-cut graves that may have belonged to rulers residing at the palace of GratBea'lGeubri, excavated by Fattovich in 1990. The tombs contained a variety of items such as pottery, copper-alloy sickles, zoomorphic seals primarily crafted from bronze, as well as other tools and an alabaster vessel, showcasing the artistic and technological advancements of the era.

1.1.1. Physical settings of the study Area

1.1.1.1. Location

The Yeha site is situated approximately 25 km to the northwest of the present-day Adwa town, concealed by the Adwa Mountain ranges about 53 km west of the Aksum World Heritage Site in the Central Administrative Zone of Tigray National Regional State (around 205 km northwest of the regional capital town of Mekelle). Positioned within a fertile basin at an altitude of 2150 m above sea level, it is enveloped by impressive volcanic mountain ranges located at the geographic coordinates of 14.2862° N, 39.0164°E.



Map 2, Administrativemap of Tigray (Red dotted Yeha, light yellow dotted Adwa and green dotted Mekelle. after Birke, 2011;24).

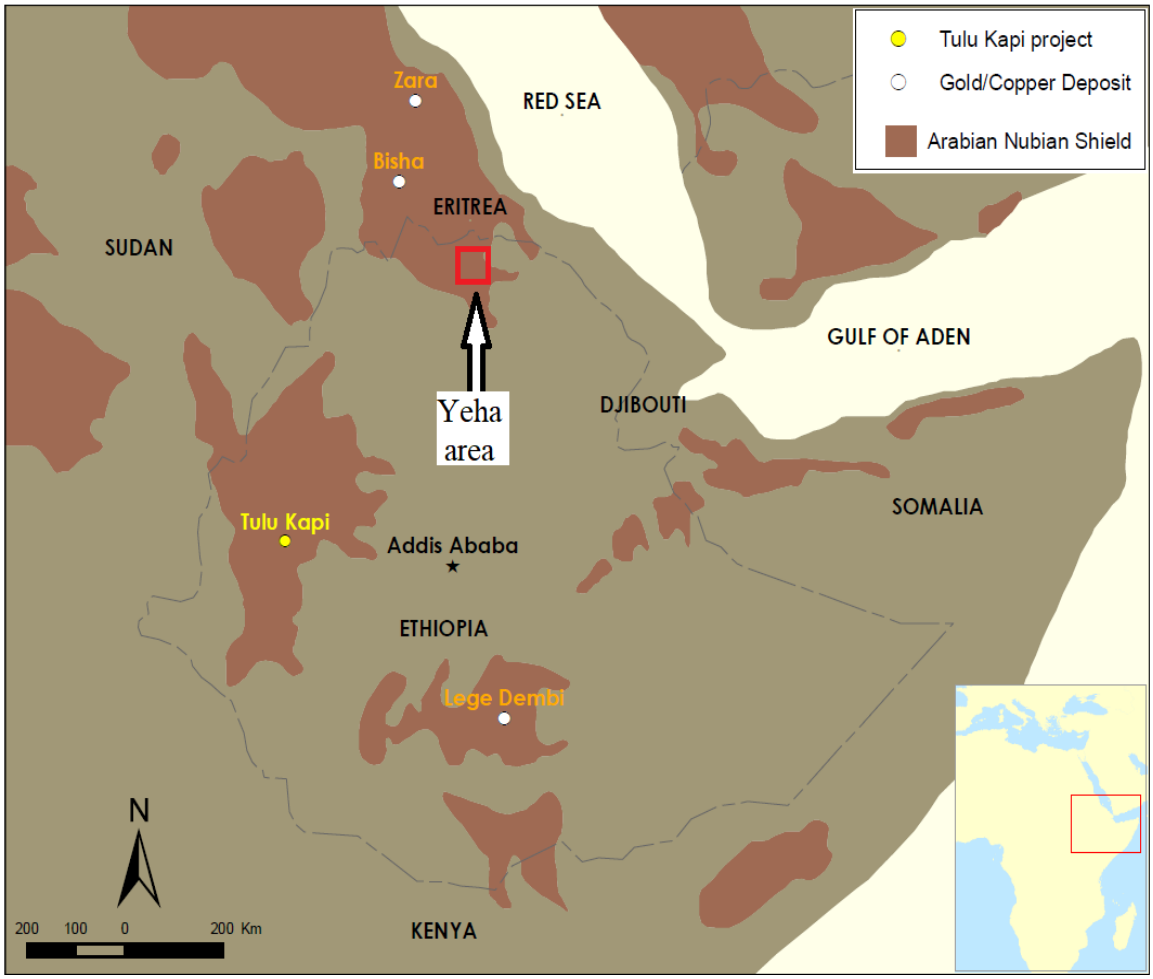
1.1.1.2. Landscape, Geology and Soil type

The geological composition of the area is predominantly characterized by a combination of phonolites, sandstones, siltstones, and clay siltstones (Merla et al. 1979). Discussing the landscape and geological exploration of the Adwa region and Yeha area undertaken by researchers from Aksum University in 2020, the Yeha felsic plugs and domes represent a series of towering inverted cone-shaped isolated plugs and circular domes with broad basal diameters and steep-sided, narrow summits. These features create a distinct topography in contrast to the Trap basalt ridges of the Adwa Axum Tekeze volcanic ridge, situated just to the west of the Northern Afar Depression. The felsic plugs and domes are predominantly found in the Adwa – Yeha vicinity, within a zone approximately 20 km wide and 30 km long, aligning generally in a NNE-SSW direction, parallel to the regional structural orientation of the Precambrian basement and the Miocene - Pliocene rift margin faults. Pietsch&Kühn (2017), conducted studies on soil science, geoarchaeology, and palaeopedology, encompassing sites in both Germany and Yeha, Ethiopia. The objective was to reconstruct the sedimentary deposits and buried paleosols surrounding Yeha, as well as to analyze the Holocene paleoenvironments and establish correlations between soil stratigraphy and the cultural timeline of ancient eras. The Shillanat basin situated amidst the Phonolite Mountains reaches an elevation of 2,150 meters above sea level and is filled with Quaternary sediments. The uppermost part of this sedimentary sequence consists of Holocene Aeolian, fluvial, alluvial, and slope deposits, characterized by various forms of paleosols exhibiting differences in depth, abundance, and weathering intensity.

The Daero Mikael tombs are located in the Yeha basin, positioned 300m southeast of the Great Temple. These tombs are constructed on a foundation of 4 meters of Holocene colluvial and fluvial deposits, situated above a Vertisol soil type. The composition of the sequence includes silty-clay, sand, and gravel, with deposits formed by erosion processes such as sheet wash, anthropogenic-induced erosion, and flash floods happening in both sloped areas and valley floors. The sand and gravel components consist of weathered phonolite, trachyte, rhyolite, basalt, and Permo-Triassic detrital sandstones. From a mineralogical perspective, the lower colluvial sediment unit contains a significant amount of epidote (55%), while the upper sequence units have 15% of this mineral along with higher levels of quartz, feldspars, and augite.

The geological context of a region has major impact on human activities and the development of their craft industries. Depending on the presence and absence of metal bearing ores, we can forward two possible scenarios; the import of finished objects and local production.

Although additional surveys and studies are necessary, the geological map of the Yeha area which has been the Tulu kapi mining and mine exploration project indicates a strong likelihood of local sources for iron and copper. The region is abundant in copper and tin alloys which are essential for bronze production. The brown shaded areas, including Yeha in Eritrea, show the presence of copper and iron alloys as identified by the project research resembling the Arabian shield of mine. However, a more comprehensive investigation is required to determine if there were any quarry or workshop sites in the vicinity for a complete synthesis of the information.



Map 3, geological map of Ethiopia displaying areas rich with copper alloy deposit (from Tulu kapi copper mining project, 2017).

1.1.1.3. Climate and vegetation

Approximately 600 mm of precipitation falls on average each year (Ema, 1988). Although the size of the forests in prehistoric and historic times is uncertain, it has been proposed that large portions of the highlands were covered with forests (Turrietal., 1974). But today's vegetation pattern is mostly composed of montane grasslands, with very few remnant trees (Bard et al. 2000). *Eragrostisteff* is currently the principal crop grown in the region.

1.2. Background of the Study

The metal artifacts that Anfray found in the Da`ero Mikael tombs at Yeha in the late 1960s and early 1970s are the main subject of this investigation. In order to synthesize their cultural meaning within the archaeological context,written history, archaeological discoveries, oral traditions, and epigraphic in formations are the sources of our knowledge.

1.2.1 Oral History

The initial steps in the current study history of Yeha date back to the first half of the 16th century, when Francesco Alvarez visited Yeha, which he named and recorded as Abafazem, along with members of his entourage while serving in the Portuguese embassy (Anfray, 1972). Alvarez discusses Queen Candace, who made Yeha her home, in his book Verdant Knowledge about the Lands of Prieste John of Indias, p. 84:making reference to the various oral legends that propose oneself as Sheba's queen. Additionally, the location was revered because it housed the original Ark of the Covenant, which Menelik I had brought to Ethiopia and later moved to Aksum Tsion Cathedral.

1.2.2. Epigraphy

Inscriptions of the South Arabian type, in monumental characters, were copied there at the beginning of the nineteenth century by Henry Salt. The Temple, remains of monuments, sculptures, inscriptions bear witness to the importance of the city before Aksumite power was established in the first few centuries of the Christian era (Conti Rossini, 1928, Salt, 1816). We do have other similar epigraphy on Altars of the same type from other sites such as Hawlti and Matara. MonumemntumAdulitanum is another epigraphic source of data (Bernandetal., 2000).

There mostly seen assimilation of Yeha with Ava (Aba) from this inscription of Adulis in the third century BCE (Deutsche Aksum-Expedition).

1.2.3. Written information

The hagiography of Abba Aftse (one of the nine saints) as documented in a manuscript stored in the Church of Yeha recounts the tale of two brothers united by a strong bond of love, who embarked on a journey from Saba and Arabia to Ethiopia. The elder brother bore the name Sob, while the younger was known as Noba. These siblings governed Ethiopia with integrity and fairness, extending their realm to the farthest reaches of the known world. Their lineage traced back to Yoqtan as their father and Balqis as their mother, a devout and virtuous couple who regularly offered sacrifices to the Lord. Soba and Noba took it upon themselves to construct a grand palace in Yeha for their habitation. However, the people of Kusa (Kush), who descended from Kam and formed part of the Ethiopian royal lineage, perpetrated an attack on the palace, reducing it to ruins in an attempt to obliterate the memory of these monarchs from history. Archaeological investigations by a Garman team of scientists later reaffirmed the great palace of Be`alguebri have been deliberately destroyed with fire(Jappetal., 2011).

According to Anfray (1965), there exists a notable discrepancy between the account currently preserved in Yeha and the version observed by Conti Rossini in 1928. Anfray posits that the absence of any reference to the Temple in the text examined by Rossini raises suspicions regarding its authenticity. The architectural remnants visible in Yeha predominantly date back to the pre-Aksumite era, with the Temple and accompanying inscriptions belonging to a period when South Arabian influence still held sway over the region. Rossini's astonishment at the omission of the Temple from the text underscores the divergences between different versions of the hagiography and highlights the complexities involved in interpreting historical narratives. The enduring legacy of Soba and Noba, as well as the enigmatic Temple at Yeha, continue to fascinate scholars and historians alike, prompting further investigations into the rich tapestry of Ethiopia's ancient past. The intricate interplay between archaeological findings and textual sources serves to deepen our understanding of the socio-cultural milieu that shaped the lives of these legendary figures. Research efforts aimed at reconciling conflicting accounts and elucidating historical ambiguities are crucial in unraveling the mysteries of Ethiopia's early kingdoms and shedding light on the enduring legacies of its revered rulers. The enduring enigma

surrounding the Temple at Yeha stands as a testament to the enduring allure of ancient civilizations and the tantalizing prospects of uncovering hidden truths buried beneath the sands of time.

1.2.4. Archaeological data

The first modern systematic exploration into the archaeological landscape of Yeha was commenced in 1906 with the arrival of the German expedition led by EnnoLittmann. This expedition focused on surveying the visible ruins in the area, No actual excavations were carried out during this time. Nearly half a century later, in 1955, Mr. J. Doresse undertook the task of clearing a baptistery located within a corner of the ancient temple, which had been transformed into a monastery dedicated to Aba Aftse in the Christian era. Fast forward to February 1960, when the Ethiopian Institute of Archeology under the leadership of FrancisAnfray, a French archaeologist established a base in Yeha for a comprehensive month-long research expedition from February 22 to March 23,KagnazmatchAmbaèTesfaye, the village chief, had knowledge of an underground structure situated approximately a hundred meters southwest of the temple, concealed beneath a threshing floor spanning an area of around 250 square meters.

Furthermore, additional tombs were investigated in two distinct sectors. The first sector was located at a higher elevation to the west of the primary area, while the second sector was positioned roughly fifty meters southeast of the enclosure containing both the Temple and the contemporary church. These tombs were meticulously carved into the rock at varying depths and exhibited different architectural configurations. Anfray's excavation efforts at the Daero Mikael site unveiled approximately 16 subterranean rock-cut tombs, revealing a plethora of grave goods such as pottery, beads, and metal artifacts predominantly crafted from iron and bronze materials. The pottery discovered bore striking resemblances to those found in Matara, a similarity that was thoroughly examined and discussed by Fattovich in 2009.

1.3. Statement of the problem

Although the archaeological study of the Yeha material culture is studied from the holistic approach of all collections, metal collections in order to better understand the technology and the particular metal artifacts have been studied in depth. Over the past Seven decades researches targeting pre-Aksumie Ethiopia has been neglecting metallurgic part while doing remarkably important works to reconstruct cultural DNA of the Horn. Structures that include small and big obelisks, ceramics, masonry arts, architectural styles and religious aspects have been successfully studied. Researches addressed issues and it continuing.

The amount of metals from this cultural and the range of their variability in terms of functional and morphological type, technological fabrics and state of art are wide enough. A specific look however regarding the metal working development and tradition in the Horn is one of the sub topics remained neglected. That is the point where the problem lays. The metal objects in one and many ways are appeared to show resembling attributes with other kinds of artifacts from Yeha such like with ceramics. These characters have been only provided as a support to feed nalytical reflections during the study and examination of other materials.

Very little is known about the use of metal specifically even though there is a fair enough number of evidences from. Most of the collections currently presented in EHA collection room and so as in Aksum Museum which are still out of reach. These metal objects that were excavated from Yeha includes different types of objects demonstrating a tradition of high-quality metal working ability at the time. The metal objects include different types of geometric and zoomorphic Filigree Bronze seals, sickles, bracelets, cauldrons, cups, agricultural as well as construction tools and so many others which have remained unstudied.

As specific analysis would make it possible to better understand the technology and the particular metal style of the Yeha people, in particular the function of the metal objects. The primary intension of this study though would be to contribute in filling of this research gap by putting some important points and employing methodologies that would help address the quest. I would hence do to characterize the tools and the traditions that could be emanated from them. Side by side to the effort to do these, conservational state of the metal objects has also examined and recommendations have been forwarded.

1.5. Objectives of the Study

1.5.1. General Objective

The general objective of this study is to identify the type and function of metal objects in ancient Yeha culture: from metal collections of 1960/61 excavation.

1.5.2. Specific Objectives

The specific objective of this thesis is to:

- Describe the morphology of metal collections to examine their primary objectives
- Identify the functions of metal objects
- Compare our collections with metal objects from contemporary sites such Hawelti, Matara and Sobea

1.6. Research questions

So as to meet core and specific objectives mentioned, this study would try to address them guided by the following questions.

- ✓ What type of metal objects we have in the collections recovered at the site of Da`eroMika`el at Yeha?
- ✓ What were the primary functions of these objects?
- ✓ What kind of similarity and difference is observed with objects from other sites which are culturally contemporary?

1.7. Significance of the Study

The first target of this work is to do a firstly investigation of collections from Da`ero Mikael which didn't yet have such a touch of identification and had no any systematic classification. This will be the first touch for the collections from the site and primary objective of my study. This is a first step necessary for the development of the following ones; meaning: it paves the way for arranging; classification of the collection in to different group based on their type would help for further researches in the future.This study thesis has also could be cited as a reference for related issues and a frame work for other researchers who are interested to study on the related topics. The re-inventory data would be submitted to NME.

1.8. Scope of the study

As it is mainly a laboratory work, the studyfocuses on investigation of metal objects from the excavation of Da`ero Mikael royal cemetery site of Yehafrom 1960/61 field seasons by the IEA excavation team led by the French archaeologist Francis Anfray. Thisresearch is planned to make a firsthand touch of typo functional investigation of metal tools from the collection available at EHA. In terms of chronology, it covers the period between early8^{th} C BCE to early 1^{st} millennium AD.

1.9. Limitations

This study has appeared to be limited to specific methodologies due to the capacity problems in terms of facilities and necessary trainings. The lack of culture specific characterization of identical objects was one of the main problematic. That is followed by the trouble of standardized method how to group and characterize metal collections. Hence, I had to rely on my selves to set criteria so as to classify my collections according to the morphological and typo-functional basis they have in common.

The relevance of chemical composition analyseshas been noted on most occasions in the sections of topics I should have addressed in this study, and will also be referred throughout the remainder of the thesis. Therefore, a seemingly glaring omission of chemical data within this thesis is the application of nondestructive physical analysis. A destructive method of analysis includes LIA, XRF, FTIR, SEM, EDX or other radiographic mechanisms. One who read the

work may raise the question that: if it is such important, why did not included in this research. Unfortunately, time restrictions, not having access to necessary facilities, and the researcher‘s personal lack of experience in this field, prompted the exclusion of chemical characterizations of our collection. LIA is a chemical analysis of lid isotopes in bronze scientists use the chemical composition in the alloy. The importance of these investigations bolds especially when coming to the questions related togeographic origin of production or origin of raw material and production processes. This has stipulated on the final chapter in a recommendation section since it can form part of future endeavors.

The armed conflict in the study area of the study also had prohibited us from doing the physical re-examination of the context. We were unable to reach the area for ethno archaeological and archaeological surveys which would have been supportive towards our analytical conclusions.On the other occasion; private constraints such as consecutive health issues frequently prevented the researcher finishing the work. These have caused the study to take much longer time than normally assumed.

1.10. Organization of the Thesis

The thesis is organized into five chapters. The First chapter provides the general background of the research, the physical area, and research design including problem statement, objectives and research questions. The archaeological background of the site is also discussed in this section. Chapter two presents a review of the literature on historical back ground of metallurgical practices and different theories related to it: as well as African and Ethiopian metallurgical traditions. The third chapter deals with. Materials and methods used to meet the objective of this study. The fourth chapter deals with the description of our data. From describingthe archaeological context to grouping and presenting our metal furniture supported with photos, illustrations and detailed statistical data, this section of the research occupied the wider part of the thesis organization. The fifth and last chapter hasbeen designated for an interpretations and a discussion our research question synthesized from our material collection. This chapter is also designated to the conclusions and the way forward related to this study.

CHAPTER TWO

REVIEW OF RELATED LITERATURES

2.1.Theoretical frameworks

2.1.1. The Concept of Metalworking and Metal Use

Metalworking and use were pivotal in Humanity's cultural history (Todd et al., 1978; Pearce 2000). It is estimated that humans found copper at approximately 9000 BCE (Shaw et al., 1993). Since then, metal has been an integral part of human life, causing a significant shift in cultural evolution (Harcombe, 2018, Shaw et al., 1993). As our understanding of metallurgy has grown, metals have been crucial to the advancement of agriculture (Salvatori et al., 2008, Shoemaker et al., 2017), weaponry (Arianna, 2012, Al Busaidi, 2015, Al-Zain, 2014, Boman et al., 2009), warfare (Molloy, 2008, Osgood, 2006, Fontijn, 2005, Parker, 2015, Thorpe, 2005, Kenward, 2005), transportation (Shaw, 1993, Anfinset, 2010), and arts and crafts (Terry, 1996, O'Neill, 2010), all of which paved the way for modern society as we know.

As theses stands; beyond being used to make tools, metal was also used as a ceremonial component (Halaandetal., 2000) and as a form and way of marking wealth and dignity (Johnson et al., 2013). Additionally, it led to the formation of social strata in many civilizations (Bahn, 1996a). Todd et al. (1978) explained how there were eventually six different types of metals employed in prehistoric culture for various purposes. This included principally gold, silver, copper, tin, lead, and iron. Gold, silver, and copper can exist in pure form in most places of the world (Tylecote, 1992; James, 1972; Schmidt, 2009).

Around 9000 years BCE, ancient man discovered and began employing native metals, each with their own unique qualities (Pearce, 2000; Shaw et al., 1993). Prehistoric man recognized that some metals were better suited to certain occupations, and they began to designate specific metals for uses (Camizuli et al., 2018). Gold and silver, for example, are extremely soft and were primarily employed for ornamentation, with bullion utilized for trade (Zarins 1989, Horton 1987).

Copper provided Prehistoric man with additional properties and could be toughened by hammering or forging, therefore it was utilized to manufacture tools, although rudimentary ones (Arianna, 2012; Robbiola et al., 2006).

The discovery of bronze (a copper-tin alloy) altered the way humans lived, hunted, battled, and flourished (Fontijn, 2005). It was more durable than copper (Gravette, 2011, Robbiola et al., 2006), could be toughened by forging (Salvatori et al., 2008), and could be cast into a precise form. Lead is soft (Dungworth, n.d.), readily worked (Bocoum, 2004, Gravette, 2011), and prehistoric man understood it was ideal for forming containers to transport liquids (Shoemaker et al., 2017).

Iron was a revolutionary substance that found widespread use, ushering in the 'Iron Age' from the Bronze Age (Trigger, 1969a, van der Merwe, 1980, Alpern, 2022). It was a game changer (Horton, 1987, Pearce, 2000). In the lengthy years that have passed since then, humanity has created a variety of intricate processes for producing iron that are guided by chemical and physical laws (Robion-Brunner, 2018). Blacksmiths constantly strive to address the various environmental, political, economic, and social restrictions and requirements of the society they serve by innovating new technological breakthroughs on the basis of old skills (Pearce, 2000).

The same trends persisted into later times (Pearce, 2000), with additional technological developments that differed depending on the location and culture. These developments left archaeological remnants for us to study, such as metal frgments, blooms, slags, quarry sites, and furnace structures (Todd, 1978, Osgood, 2006).

According to Todd (1979) and Dungworth (n.d.), archaeometallurgy or paleometallurgy is the scientific study of metalworking structures, tools, waste products, and completed metal artefacts from the Bronze Age to the recent past. Mining and metallurgy have played a major role in the world's economy since the dawn of humankind (Camizuli et al., 2018). Bocoum (2004) asserts that this art form is intricately linked to various aspects of society, including the technological, economic, social, and spiritual domains.

In 1836, renowned anthropologist Christian J. Thomsen postulated three significant stages referred to as a "three age system" of human cultural evolution, which he named the Stone Age, Bronze Age, and Iron Age. The three age classification scheme is recognized as such (Schiffer,

1976). According to Shennan (2005) and Schiffer (1976), the Stone Age appears to be the longest period during which people have used tools to make various kinds of implements. The study that has been done thus far indicates that this age ranges from 3 million to 10ka and beyond (Halandetal 2000, Shennan, 2005, Kenward, 2005). The historical era known as the Bronze Age, which spanned from 3300 BCE to 1200 BCE (other literatures, including Osgood, 2006, Pearce, 2000, and Salvatori, 2008, place it at least between 3000 and 1500 BCE), is distinguished by the creation and use of metal artefacts made of bronze (Robbiola, 2006).

Apart from Africa, the rest of the world has used bronze as its first metal (Francois, 1985, Schmidt, 1996, Alpern, 2022). It was either smelted from its own copper and alloyed with tin, arsenic, or other metals, or traded other goods for bronze from regions where it was produced (Bocoum, 2004, Alpern, 2005). The technological advantage for Bronze Age cultural growth came from the metal's superior endurance and hardness compared to other metals available at the time (Fontijn, 2005).

2.2.**Historical background of Metal working in Africa**

2.2.1. **The diffusion vs. indigenous innovation school of views**

Metallurgy is thought to have originated in the Anatolian-Iranian region between 150 and 1000 BCE, under the Hittite Empire (Francoise, 1985). In order to prevent this craft from spreading, its knowledge and methods were kept as secrets (Schorsch, 1988, Childs 2005). Following the fall of the empire, steel production gradually started to disperse over the neighbouring nations, reaching a wide and rapid distribution (Mitchell 2006, Ehret, 2002). It had moved northward to the United Kingdom by 500 BCE via Danube and Roman routes (Molloy, 2008; Todd, 1978). By 500 BCE and 300 BCE, respectively, the technology had travelled eastward along the Silk Road to India and China. Later, in the sixth century, it further dispersed throughout the Korean peninsula and Japan, where the Tatara steelmaking method was established (Tylecote, 1992, Mitchell 2006).

Additionally, the skills and information spread rapidly throughout Africa's southern regions. Miller (2002) and Tylecote (1982, 1992) claim that this technique made its way to Nigeria, where the Iron Age Nok culture (Childs 2005, Horton 2004) was making iron by around 40–300 BCE. Greek or Carian traders also brought it to Egypt, where there is evidence of smelting in the

emporium at Naukratis (Schorsch, 1988, Lucas, 1962, Osgood, 2006, Childs 2005). Iron smelting dates back to before 200 BCE in Sudan (Molloy, 2008). The history of iron working in Meroe dates back to the fourth century BCE, according to some academics like Jane Humphris and ThomsScheibner (Philips 2016 p. 39, Humphris, 2017). (Miller, 2002, Trimingham, 1975).Anfinset (2010) suggests that it may have later spread to Ethiopia's south and southwest.

Around 500 A.D., when the Bantu tribes migrated from Nigeria to Central and East Africa, this technology also made its way there (Philipson 2005, Philips 2016 pp. 127). Around the year 1000 A.D., the dissemination pathway came to an end in South Africa (Mitchell 2006, van der Merwe, 1980).

Conversely, there has long been a discussion among academics over the diffusion and local invention of metalworking in Africa. (Stanley, 2022) contends that, in the case of West and Central Africa in particular, metallurgy is an indigenous innovation since "more and more numerous dating is pushing back the beginning of iron production." According to Stanley,

> *"The Beginning of Iron Metallurgy in Africa to at least the middle of the second millennium BCE, which would make it one of the world's oldest metallurgies. In the present state of knowledge, the debate [over diffusion vs. independent invention] is closed for want of conclusive proof accrediting any of the proposed transmission channels [from the north]."*(Stanley, 2022, pp. 45).

Furthermore, according to American linguist Christopher Ehret

"Africa south of the Sahara, it now seems, was home to a separate and independent invention of iron metallurgy. To sum up the available evidence, iron technology across much of sub-Saharan Africa has an African origin dating to before 1000 BCE" (Ehret 2002 pp 23).

As of 1998, the theory of separate creation is the most likely of the several diffusion hypotheses put out by American archaeologist Peter R. Schmidt.

Iron manufacturing in Egypt has a far longer and distinct history than previously thought, according to study by Johnson et al. (2013). Ancient Egyptian iron may have originated on Earth or in space, according to archaeological evidence from the predynastic burial site at Garzeh, which dates roughly from 3600 to 3350 BCE (Mitchell 2006, Evans 2011). The first known

application of iron in Egypt is symbolized by the iron beads. The iron meteorite they used was cold-worked (Johnson et al., 2013). From these and many more studies it is evident that the idea of independent development of metallurgical tradition in Africa is dominantly supported by different sort of archaeological, epigraphic and ethnographic data.

2.2.2. **Iron before Bronze in Sub-Saharan Africa**

The Bronze Age (Robion-Brunner, 2008, Horton, 1987, Posnansky, 1967), when softer metals like copper were fashioned into artefacts, is absent from Sub-Saharan Africa in contrast to Europe and several other regions of the world. There are two eras in Sub-Saharan Africa: the Stone Age and the Iron Age. The Jos Plateau in Nigeria and the region surrounding Lake Victoria have the oldest records of iron-working in sub-Saharan Africa (Trigger, 1969a). There is minimal indication of local antecedents in early metallurgy in these two regions (Mitchell 2006, Caroline, 2018). Consequently, several archaeologists have proposed that the knowledge of smelting and ironworking spread from the north, maybe via the Nile Valley or the Carthaginian colonies in western Mediterranean Africa (Posnansky 1967, Mitchell 2006). But these long-distance relationships are not well supported by empirical data (Phillipson, 2009).

It also seems that Africans in sub-Saharan Africa independently created iron-making as early as 3600 BCE, based on radiocarbon dates discovered for iron smelting sites in both Niger and central Africa (Rwanda, Burundi, Trigger, 1969a, Horton, 1987 Shennan, 2005).

2.2.3. **Metal Working in the Horn**

Future research endeavors will likely need to clarify the precise timeline around the onset of metallurgical activity in the Horn. The top horizons of the Gobedra, AnqqerBaahti, Lalibela, and Nachabiet caves have all yielded recovered slag fragments that belong to the last millennium BCE (Phillipson 2009, Butzer 1981, Shaw 1993).

A few remarks may be made in light of the larger ethno-historical regional (and local) settings. Ethiopia has a strongsmithing heritage, and the social norms around artisanship do suggest a detachment from society (Haaland 2004, Finneran 2007), furthermore refer to Yamasue et al., n.d.). This is not exclusive to Africa, where blacksmiths are known for their alleged magical abilities and where isolated ironworking locations are found far from important habitation sites, leading to the emergence of metalworking communities (Robion-Brunner, 2008). This might be

one of the reasons why evidence of the smelting process has been found in rock-shelter sites (Haaland, 2004). From a broader geographical standpoint, the larger Ethiopian area is indeed situated at a crossroads of cultures. Some have proposed that a greater focus on trans-Red Sea interaction and technical interchange may be beneficial; theories for the beginnings of ironworking in north-east Africa, for example, tend to be particularly Meroe- or Egypto-centric (Priese 1978, Phillipson 2009, Philips 2016).

The idea that the iron smelting practice spread to the northeast from Meroe is also connected to this (Todd, 1978, Halaand et al., 2007, Finneran 2007 pg 2). By 320 AD, an Aksumeite ruler named Ezana had destroyed the Merotic civilization (Trigger, 1969a). The validity of this conjecture has been called into doubt due to archaeological finds that indicate the use of metal considerably earlier than previously thought (Posnansky, 1967). OnaNegest (Curtis, 2009a&b), Matara (Anfray, 1966, Anfrayetal., 1965, Curtis etal., 2008), Hawelti (Andualem, 2016, Jappetal., 2011), Melazo (Pirenne, 1970, Andualem, 2016), Yeha (Anfray, 1963b, nfray, 1972), and Adulis (Yohannes, 2005) are among the ancient pre Aksumite sites from which metal tools have been recovered. Of course, in AddiGelemo, for example, copper bowls with Meroitic decorative style were discovered at several of these sites (Anfray, 2012).

The second idea is associated with the Ethio-Sabean period's South-Arabic impact. A number of buildings, such as the magnificent temple of Yeha, have the appearance of having been constructed using steal to fasten dressed stone shafts together (Robin etal., 1998, Lindstaedt, 2011). South Arabian sites also had a similar architectural style (Pirenne, 1987, Fattovich, 1996, Krzyzaniak, n.d., Doe, 1971, Robin, 1989). The finely manicured stone blocks themselves provide testament to the extremely advanced metal tools being used and likely functioning as well (Fattovic, 1996, Philips 2016, pg 129).

As it stands, academics who have researched the Horn in-depth for over a century disagree over the degree of South Arabian impact on the region (Andualem, 2016; Mapunda, 1997). The central topic of discussion in this academic debate about "D'MT" is the role played by South Arabs in the creation of this complex society (Fattovich., 1996, 1997, Conti Rossini, 1948, 2010, 2012, Schmidt, 2001, Brandt et., 1987, Curtis, 2008, Phillipson, 2012). Nine sites in central Eritrea and eastern and central Tigray have been identified that show evidence of monumental

buildings and artifacts in the South Arabian style, as well as Sabean inscriptions in Sudarabic script (Fattovich, 2012).

The local innovation hypothesis (Mapunda, 1997) is the third. According to Phillipson (1998), Bard et al. (1997), Fattovich (1997 b), and other sources, this is most likely true when it comes to the Aksumite and proto-Aksumite periods. OnaAddi's proto-Aksumite tombs have also yielded an iron arrowhead and three model axes (Phillipson, 2009), two in bronze and one in iron. Around the middle of the sixth to late fourth centuries BCE, metal representations of axes were found in burial settings at Nuri (Phillipson, 1998). Throughout the late first century BCE to the mid-first millennium AD, iron arrowheads are common in Meroitic and Post-Meroitic royal tombs (Anfiset, 2010).

We also have another metal artifact from this location that is etched with the name of GDR (unvocalized letters), the Aksumi king (Phillipson, 1998 D'Andrea et al., 2008). This is the first written record of an Aksum ruler in Ethiopia (Bard et al., 2014). According to Admassou (1955), the item dates to the early third century AD; also Bernand et al. (1991). Twenty years after the site was discovered, two incense burners with "royal inscriptions" (i.e., mentioning the names of kings) in South Arabian writing were found in the church of AbunaGarima at AddiKaweh (Schneider, 1973, 1976, Bernand et al., 1991). These findings might have essentially resembled the local practice of metal production during the early and middle Aksumite period.

2.2.3.**Bronze Age in the Horn**

As far as considerable Archaeological data suggests, by the early third millennium BC, permanent agricultural settlements had been formed in the highlands of the Horn, even if many elements, including the chronology, remain uncertain (Philips, 1997, Finneran 2007 pg 2, Schmidt etal., 2001, Bard et al., 2000; Machado et al., 1998).

One of the major commercial routes that headed into the interior and finally entered the Nile valley at Meroe began at the port of Adulis, the modern-day Zeila (Butzer 1981, Mitchel, 2005). Situated around 2 miles offshore and 20 miles south of Massawa on the Red Sea, it is currently shown by a series of mounds concealing structures that have been obscured by the sedimentation of the nearby river, which has completely silted up (Littmann, 1913). The few traces of architecture still to be seen point to a late period, probably not more than a century before Christ.

As for the great Adulitan inscription, it has long since disappeared, and probably lies buried in one of the mounds. Luckily for us, it was copied and its authenticity is undoubted, and it forms one of the most valuable aids we have in deciphering the ancient geography of Abyssinia (Butzer 1981, de Maigret 1988).

2.4. **Cemetery sites as an archaeological reference to understand past culture and social organization**

Examination of how the community used to reflects the social structure of the livingand how the community used to describe relationships through funerary activity is one of the initial quests cemeteries are studied for.However, this relationship is not always clear (Stutz 2016, Thorpe 2005). In doing so, Scientists usually apply the study of the spatial distribution of individual graves within the cemetery, the analysis of the associationswithin grave goods, the anthropological analysis associated with grave goods, and the application of ranksize diagrams of the rarity index (Peronietal., 2006).

The due fact that the development of these and other different scientific approaches enables archaeologists implement methods of seek towards understanding ideological realms in past cultures (Murphy, 2008). According to Stutz (2016), funerary practices are one of those important subjects in which archaeologists and anthropologists synthesize socio cultural behavior through. Cemeteries are one of the ideal places which these behaviors are appeared embedded in (Pieter van de Veldeetal., 1979). People manifest individual status and social organization is common in most cultures globally (Harcombe, 2018). These kinds of subjects have been ignored before the introduction of post processualview of the past in archaeological and anthropological sciences (Bahn, 1996a).

The existence of ritual activity has been the first puzzle to solve usually in these cases. Archaeologists seek to understand the meaning and the logic behind these kinds of practices in each culture (Stutz, 2016). The quest for social organization thus depends on two focal themes. The first is the allocation of graves and arrangement of theses graves one to the other; whereas the second one is manifestation from grave goods (Fahlander, etal., 2008). Gender and feminist archaeology has prompted closer attention to family relationships, domestic life and female agency (Radini2019).

For Gardeła (2017), Infants' burials in Archeology wouldembedvaluable data regarding the place and statues as well as bond of the society and individuals with the youth class. These are a dimension archaeologists understand the unique manner in which infant and child graves are treated is frequently viewed as a reflection of parental sorrow (Murphy, 2008). These social issues have been intensified in past decades whereas funerary archaeologywas the funerary sites are ideal target locations for our demand of archaeological data (Giles etal., 2016).

CHAPTER THREE

METHODOLOGICAL APPROACHES

3.1. Explanations

This thesis has seek to identify and analyze the distribution of different types of Metal objects throughout the Archaeological context of the Da`ero Mikael Tombs, their contextual variation as well as artistic and techno cultural realms. I appeared to demonstrate that time is a significant factor alongside the context of these artifacts, hence I have dependently based on the Fattovich`s time classification which is yet the accepted chronological foundation in the study of Yeha so far. The basis of this chronological foundation is independently discussed later in chapter four. I also have emphasized some selected furniture those which are worth further detail investigation in order to understand how people made use of objects, as well as their interpretations as a secondary context which is grave materials.

The basis for the concordance is thus straightforward. Functional tasks depend upon physical characteristics of the artifacts and these can be realized better in some materials than others. In brief, my initial arbitrary classification by distinctive material categories reflects the fact that artisans made artifacts from materials that provide effectively the physical properties necessary for the tasks at hand. The material categories I used for the preliminary sorting of artifacts also happen to be materials that have these physical characteristics. Had the artisans not made distinctions in the production and use of artifacts according to kind of material, then sorting of artifacts in this manner would simply be an imposed or arbitrary order and the distinctions I make would not relate to either decisions they might have made when producing artifacts or their existence as a grave goods (secondary function/context).

A typo-functional study aims first of all to identify, by means of the observation of morphological characteristics of the manufactured object, its primary function. The term manufactured object here refers to any object produced and shaped by Human hands based on the definition forwarded by (Berthon etal.2013). Manufactured objects are made in order to

fulfill a function. Function is the basic factor by the creator which to determines their form. The primary function of an object is defined by its utility: meaning; it is a matter of understanding what it is first made and used for.

The notion of secondary use however is disconnected from the actual use of the object. When the use of the object is different from its primary function, it is referred to as 'secondary, diverted, or special' use. Then, objects sharing the same function, or sharing characteristics that give them close technical features, are organized into types on the basis of their morphological prototypes. I use the definition of "type" given by (Morel, 1981), and for an indeterminate number of formal characteristics or attributes in the inventory (AdroherAuroux, 1991).

The functional approach has given greater emphasis in describing tools for it is more relevant criterion for classifying metal furniture than simple homogeneity of form, as it takes into account the similarity of the physical, technical action of an object. Some objects might have bear similar morphological characteristics but different functions. In this case, the grouping has given first emphasis to morphological designation and the functional issues have been discussed in the description.

I have used it essentially for the vast amount of Metals found at Da`ero Mikael royal Tombs. Functional types of objects are therefore sets of objects that share an indeterminate number of formal characteristics that make them suitable for a function. This approach is analogical in essence. The existence of certain functionally and typologically prototypic objects in Yeha out wider contexts, leads to the importance of comparison between in the Da`eroMika`el Archaeological context and those similar findings from chronologically and culturally contemporary sites.

My reflection then is based upon works of archaeologists who studied similar and geographical areas. Hence my analysis approach comprised and incorporated three different conceptualization s. The first is based on the analysis of the intrinsic characteristics of the Metal corpus, in a typo-functional approach. I then placed this analysis in the secondary use of them as well as context of the materials which is grave. Finally, I opened my reflection to the data known for the whole of Yeha cultural period and for the other archaeological links contemporary to pre Aksumite culture to feed my reflection on pre-existing interpretations by different scholars. All the find

spots, detailed inventory lists, sketches and photos mentioned in the text are distinguished by a given numerical codes in a bracket that corresponds to that assigned object in appendixes section at the end of the thesis.

3.2. Materials and Methods

It has been about more than 60 years since the collections were excavated. The major notion of this study is focusing on post field typo functional and related analysis such as identifying raw material type, taking different measurements and assessing current state of conditions. So as to make that happen, I have been employed the following procedures.

3.2.1 Re-inventory

Re-inventory have been the first step of an archaeological corpus to be studied. The existing documentation has been reconsidered. It allows me to list and describe the objects found on the site and stored NME collections. It also provides data, such as the distribution of raw materials according to contexts, which are essential to my study. This has made the information accessible for future researchers as reference.

3.2.2 Building a database

In my database, I have include detailed information of the archaeological contexts (monument, stratigraphy), classification criteria (functional categories, object designation), and intrinsic characteristics (dimensions, weight, description). My objectives guiding the constitution of these criteria have first to document the collection precisely, and to classify the objects by functional and morphological type.

It is also a question of placing the objects correctly in their archaeological context in order to be able to compare the contexts, both within and between the graves. Finally, I had to be documenting certain morphometric characteristics of the objects, to be able to compare them between types and within the same type. Conservation ethics therefore has been considered as the pre requisite of investigation since in respective of how valuable these artifacts are.

3.2.3 Refitting fragments (reconstruction)

Among the collections in the reserve, there are lots of metal tools (mostly bracelets and ear rings) which are presented fragmented and scattered. In order to have a clear and full image of an

object we needed to find out the missed fragment and stick to its main body so as to reconstruct in to its full image. 18 ear rings presented together given all just one identification number. This requires a re-inventory of the fragmentary finds for a complete record of the number of individual finds.

3.2.4 Visual and microscopic examination

Visual examination and optical microscopy were carried out on each cross in the study. Description, condition information, and notes on fabrication techniques were recorded, including evidence of tool marks, casting traces, joinery, damage, and wear. These features were recorded as photomicrographs and photomicrographs using Stereomicroscope with canon leica IC80HD Camera.

3.2.5 Illustrations

In the same perspective of documentation, I have made a digital edition to the images of selected objects using paint5 photo editing software. The objective is to give visualization of what has been discussed.Emphasized subjects have been zoomed. It has also allowed me to proceed to the detailed observation of the objects, and provided me with a documentation feeding my database and founding my typo-functional reflections.

3.2.6 Photographing

Pohotgraphy was one of the important documentation stages in my laboratory work. The collections have photographed in different photography techniques based on the intended objectives. I used different shots for general image providing, emphasizing selected part andshow its state of conservation. These were helpful to punctually feed my reflection.

3.2.7 Measurement

In the morphologic analysis of the objects I have taken basic measurements according to the shape and size of each object and piece. Tools such as digital caliper, tape measurement and weight balance have been used to take the necessary dimensions.

3.2.8 Grouping the furniture corpus

Finally, the study consists of classifying the objects, making a typology of them, according to their primary function demonstrated by the form, type and morphology of the objects and the

technical as well as dimensional characteristics that it gives to them while doing the laboratory examinations and inventory. Assuming that the grouping is based on the morphological nature and typo functional basis of the objects, it would be systematical to give nomenclatures wherever it was important. This makes it possible to formulate hypotheses on the primary function of the objects, and to compare the assemblages according to the archaeological contexts.

3.2.9 Comparative observation

Considering typological and chronological elements, collected from Yeha have been compared with similar objects from other sites such as Sobea, Matara and Hawelti. These are sites chronologically and culturally contemporary to Da`eroMika`el. This would help to understand the similarities that might have apparently; the range and of technological variety of the archaeological records under consideration.

Fig.1, Sorting, seriation, classification, data basing and photographing of the metal corpus at NME laboratory.Photo by (BurukJifara: 2 March, 2022).

CHAPTER FOUR

DATA PRESENTATION

4.1. Description of the Archaeological context

4.1.1.Typifying the tombs

For our understanding of the geo-cultural context of the archaeological site under discussion, that would be useful to focus on cultural typology of the funerary tradition of Sabean people. The subterranean architecture mainly objected to cemetery purpose is one of the famous Yeha Cultures when it comes to the architectural points of discussion. The tradition is one of the components of cultural typology in Southern Arabia region called a Sudarabic style (Buffaetal., 2001, D'Andreaetal., 2008). The term Sudarabic in fact resembles to any artistic and architectural style ascended to south Arabian origin of culture (Robin etal., 1998). Sudarabic in some features is different from that of Aksumite style.

In Aksumite style, there would be constructed a big and long subterranean tunnel like Chamber constituting several tombs which have a bed like sarcophagi to place the corpse of the diseased (Fattovich, 2005). It is a horizontal Chamber in which the entry would be constructed using dressed stone blocks/bricks with some staircases leading into the innermost parts of the Chamber (Fattovich, 2004). The tomb of the brick arcs could be mentioned here as a good example of such a style. These stone curved sarcophagi have been used instead of caskets or coffins.

Dispite ancient Egypt, Greece and Mesopotamia (Gerlach, 2003), coffins are totally absent in all the ancient Yeha culture and these royal cemetery sites. It seems using coffins is a later introduction (during the mid and late Aksumite time) (Phillipson, 2000), in the Horn region. However, only the noble classes were buried in coffins since they were a sign of high social standing (Shortland, 2000). But in an ancient Jews tradition, it was a reverse. The tradition provides they must be buried without cremated since they believe the dead should be reunited as quickly as possible with their native soil in which it came from (Posnansky, 1967). Coffins are not indications of social status in this case for they believe all Humans are created in the same way and the end also should be exactly so (Simpson, 2000).

In Sudarabic style however, the curvature of the rock gut ground tombs is a revers of the Aksumite one. The vertically excavated hole (section well) in which quadragonal in shape is the dominant one and with the depth varied between the ranges 1m-3ms down from the surface (Jappetal., 2010). At the bottom of the surface, they used to dig horizontal Chambers from either or any direction in which the body of the dead would be rested (Fattovich, 1972a). The Chambers are curved well enough gently to hold the body in all dimensions.

Tombs arranged in this way have been found elsewhere from Middle East as well, sepulchral Chambers where one reaches by a vertical well. It is to recall the tombs of Byblos and the tombs of Canaanites of the Bronze Ages (Smidt, 2001). The Mineans used to dig their tombs in stone (Robin, 2012). Tombs of this type also exist in Nubia (Hatke, 2013, Burstein Ed. 1998). Such tombs are known at Axum from Qohayto (Philipson 2016).

Furthermore, there would be reserved spaces in which the grave goods are sorted (Anfray, 1963a). In some cases (tomb four for instance), there has been witnessed a marker of a certain cult practices. The existence of small extra trenches/dug niche would more explain this idea of ritual activities (Anfray, 1963a). The objects mostly arranged in irregular manner/ unevenly placed (Anfray, 1997).

Every Chamber has a shaft door dressed differently (Phillipson, 2009). These are appeared standing before the Chambers threshold to support (Bent, 1983). Some are poorly curved whereas the others have fine curved grooves in a Sudarabic curving techniques (Littmann, 1913, Schmidt, 2009). The Chamber are designed dominantly in an oblong manner in which each Chamber designed with the capacity of occupying a single body whereas the space size differs depending on the size of the body (Anfray, 1971). Beside it is a royal graveyard, the presence of different kinds of burials chambers belonging to the same cultural phase indicates long occupat ions with varied construction. The practices of dead rituals are synthesized with the presence of materials such as ornamented incense burner; see (Anfray, 1963b).

In order to elucidate the various classifications more distinctly, it has become essential for me to establish a typological framework that has not been previously explored in the extant literature.

Consequently, I have endeavored to propose a nomenclature for these classifications that is predicated upon the quantity of Chambers they encompass.

Category	Description tomb type	Tombs representing
Simple wells	They are a kind of just a round, rectangular or irregularly shaped big holes dug deep down to 1 meters maximum. It is usually an entrance cavity to chambers connected from it at beneath. Most of such structures while solely do not contain any material. They could be considered as unfinished or unused.	Tomb 7, 10 and 16
Single Chambered	These tombs are wells those contain a single vertical burial Chamber on the either side at the bottom of a simple well.	1,2,3,4,8,11, and 15
Double Chambered	Rectangular simple wells those have a couple of burial chambers.	5,6,13,14 and 17
Tri Chambered	Rectangular simple wells those have three burial chambers. Within the cultural schema of Sudarabic traditions, specific sepulchers are marked by the inclusion of four unique chambers; yet, at the designated site of Da`eroMika`el, this form of sepulcher is noticeably absent.	9 and 12

Table 1,tabular summary to type of tombs

4.1.2. Chronology of the Tombs

Chronologically construction of Yeha in general have been set by Fattovich (1990), which is based on the analysis ceramic technology supported by carbon dating. This is still using as the foundational reference for any researches conducted on the area. The cultural layers of Yeha have been arranged in three chronological cultural phases as Yeha I, Yeha II and Yeha II (Fattovich, 2010).

Phase I Includes the earliest and first phase of construction with evidence of settlement underneath material cultures which includes podium of the palace at Beal Guebri. Yeha, I culture dated to be a culture flourished between 8thCBCE- 7th C BCE (Fattovich, 2010). Yeha II culture includes the great temples and most of the shafts of Da'eroMika`el Royal cemetery. Yeha II dated to be a culture of Yeha that extended between 7th C and 5th C BCE. The last phase (Yeha III) culture associated with second phase of construction of the palace of Beal Guebri and the Great temple (Buffa 2001, Jappetal. 2010).

Due to some site disturbances and methodological barriers however, the detailed sequence of the Da'eromikael Royal tombs are not certain (Fattovich, 2010). But the sites clearly have been testified that it used for a longer period as a cemetery site of the nobility (Anfray, 1962a). As per mentioned earlier, the foundation of the chronology is based on the pottery typology that are assigned to each phase via their typological stereotypes from South Arabia, middle east and Mediterranean world (Fattovich, 1997, 2010). In particular, three large jars of this ware were located on the surface close to the opening of the shaft of tomb 12 suggesting special use of this tomb in late Pre-Aksumite times / after Sixth C AD (Anfray, 1963a).

A comparison of these ceramics with those from GratBe'alGebri may tentatively suggest that T5 and T6 were contemporary with the second phase of the GratBe'alGebri palace (Schneider, 2003), as dark red (brick-red) fine ware was found in the Chambers of these tombs. T2, T3, T4, T9 and T11 may be linked with its earlier phase (Phase I), (Anfray, 1963a), as the same wares occur in these tombs and the strata associated with the podium and facade of the palace (Fattovich, 2010). T12 was probably contemporary with the end of the earliest pre palace phase at GratBe'alGebri as red orange coarse ware occurs in all three Chambers of this tomb (Fattovich, 1980).

In some occasions, the tombs have been attested to be frequently re used for longer after their first construction (Gerlach, 2005). As a result of this, some tombs have been appeared to contain Chambers of different periodical phases (Fattovich, 2010). This case is witnessed to be frequent especially in tombs 4, 5, 6, 9, 12 and 16.

Geometric filigree seals and bronze weapons were typical of the phase I, whereas Iron artifacts most likely appeared at the end of it, (Fattovich, 2010), as they were found in Chamber B of tomb 6 and the shaft of tomb 4 (Anfray, 1963b, 1971, 1973a).

As this stands, from other Chambers of the same tombs (tomb 4 and 6), Bronze filigree zoomorphic seals and iron artifacts that belonged to the third phase (Anfray 1963b, Fattovich, 2010), have been uncovered. Tomb 12 in particular dates from the end of phase one to the later phase (Fattovich, 2010).

Tomb no	Cultural phase	Proposed chronology
1	uncertain	uncertain
2	Yeha II	7^{th} -5^{th} CBCE
3	Yeha II	7^{th} -5^{th} CBCE
4	Yeha II	7^{th} -5^{th} CBCE
5	Yeha II	7^{th} -5^{th} CBCE
6	Yeha II	7^{th} -5^{th} CBCE
7 and 8	uncertain	uncertain
9	Yeha II	7^{th} -5^{th} CBCE
10	uncertain	uncertain
11	Yeha II	7^{th} -5^{th} CBCE
12	Yeha I, II&III	Late 9^{th} to 5^{th} mill BCE (shafts covering different age)
13	Late Aksumite	early first mill AD
14, 15 and 16	uncertain	uncertain
17	Late Aksumite	early first mill AD

Table 2,tabular summary:a proposed chronology of tombs

4.1.3. The question of site in-situ

The occurrence of fragments of black polished coarse ware in all shafts may suggest that the tombs were disturbed at the end of the 'Pre Aksumite-Period (Fattovich, 2010), as this ware only occurs in the strata associated with the architectural remains of the second phase of the palace of Great Be'alGebri (Fattovich, 2010). Some tombs (tomb 7, 8, 10, 14 and 15 for a case) have been found totally empty in a manner that can suggest a probably existence of robbery practices (Anfray 1963a&b). Generally, we can trace two kinds of site disturbance took place back in time at this particular site, the re-usage of the chambers of a tomb in different period (tomb 4, 6, 9, 12, 13, 17), and the construction of new kinds of shafts (Tomb 16) at later phase (phase III).

4.2. Associations of other grave goods with Metal objects with in the Archaeological site

The concept of *"instrumentum"* is part of a unified approach to the methodologies for the study of archaeological material, synthesized in the number 131 of Archaeology News, March 2013. This approach emphasizes the study of the object in relation to its archaeological context not detached from it and in in relation to other associated object categories, emphasizing the notion of assemblages (Bahn, 1996a). An assemblage is the presence of several types of objects within the same archaeological structure (Shennan, 2005). The repetition, between different contexts, of one or more assemblages, at the functional categories, if not typologies, is an important indication of the link between these contexts and allows them to be compared (Aston etal., 1974). The notion is concerned with grouping, in the same categories, objects of different categories, objects of different materials, but whose function is identical (Bahn, 1996a). This avoids the artificial division of information on the basis of an a priori that is only adequate when comparing the value (market, symbolic, monetary...) of the objects. These functional categories are defined according to the technical and social activity for which the objects are the objects are intended for (Briand et al. 2013).

The association of Metal tools with other objects in these funerary contexts varies according to time and space, so that it is not possible to identify standard patterns (Olivier, L. 1999). Interestingly, the association between Metal tools with other grave goods is frequent. This

frequency was not attested only in few cases at those tombs with no any material occurrence. Potteries are the dominant number constituting larger amount of total distribution of goods in the context and occurred in association with Metal tools more often than other goods (such as alabasters, jewelries, epigraphy and grinding stone). In the first phase, Metal objects occurred so rare. In contrast, during the second and third phases, assemblages Metal objects deposited in these grave contexts and their associations with other kinds of goods are more complex compared with the previous period. These associations of Metal objects with other kinds of goods in these grave contexts did not necessarily appear to represent a typical pattern, but instead much variability with a few exceptions. In some tombs (tomb 2, 12, 13, and 17 for instance) are attested marking the existence of some kind of ritual rites, not only votive offerings to the deceased (Anfray, 1963a).

4.3. Distribution of Metal Objects in the Archaeological Context

A total number of 221 grave goods have been collected from 12 tombs out of 17. Nothing has been reported to be found in tombs 7, 8, 10, 14 and 15. 100 Metal objects (constituting 45% of the 221 total grave goods assemblage) were collected from 9 different tombs (tomb 3, 4, 6, 9, 11, 12, 13, 16 and 17). 2 out of these 100 Metal tools (Bronze Meat Hooks J.E 2218 and J.E 2395) were added to the collection from uncertain context. One object from tomb 17 registered as J.E 2396 that I failed to find it in the furniture group but included it in the statistics.

Metal objects	100
Other grave goods	121

Table 3, Statistics of grave goods in the Archaeological site, from the report by (Anfray, 1963b)

Tomb	No of Metals found	Total number of Objects found
1	0	1
2	0	2
3	1	14
4	14	53
5	0	2
6	39	60
7	0	0
8	0	0
9	3	20
10	0	0
11	23	5
12	8	52
13	3	4
14	0	0
15	0	0
16	6	6
17	1	2

Table 4, the frequency of Metal objects thought the Archaeological context

While trying to reconstruct the frequency of the Metal objects throughout the tombs, it appeared to show unevenly pattern of deposition. This distribution perhaps may have impacted depending on the basis of roles and ranks of the deceased, Increases in Metallurgical production, as well as the wider distribution of similar Metalwork types (commonly defined as Metallurgical koiné) (Arianna, 2012). Chronologically speaking, the 2nd phase has been appeared not only with larger number of Metal assemblage but also more sophisticated tools in terms of artistic and workmanship. About 16 geometric and zoomorphic (some with alphabets perhaps reading names) filigree seals were found in T3 (one geometric seal J.E 2114), T4 shaft (four geometric seal); T6 Chamber A (two geometric seals J.E 2191, 2193 and one geometric J.E 2192), T6 Chamber B (Three zoomorphic specimens, J.E 2220, 2221 and 2224); T9 Chamber B (one

zoomorphic seal, J.E 2247); T12 shaft (three geometric seals, J.E 2337, 2340 and 2353). The so complex nature of these identity marking objects reflects they used sophisticated methods of hollow casting, welding which was beyond than just forging (Camizulietal. 2018,).

tomb 6 the results the highest distributions of Metal objects from the overall context numbering with 39 different kinds of Metal objects and 99 grave goods in general tomb 11 following it with 23 Metal objects and 28 total number of goods. This tomb (tomb 11) can be defined as a museum of Metal tools since 82% of the grave goods are Metal objects, the highest percentage of all. In the third place there comes tomb 4 with 14 Metal tools out of 53 grave goods found in it.

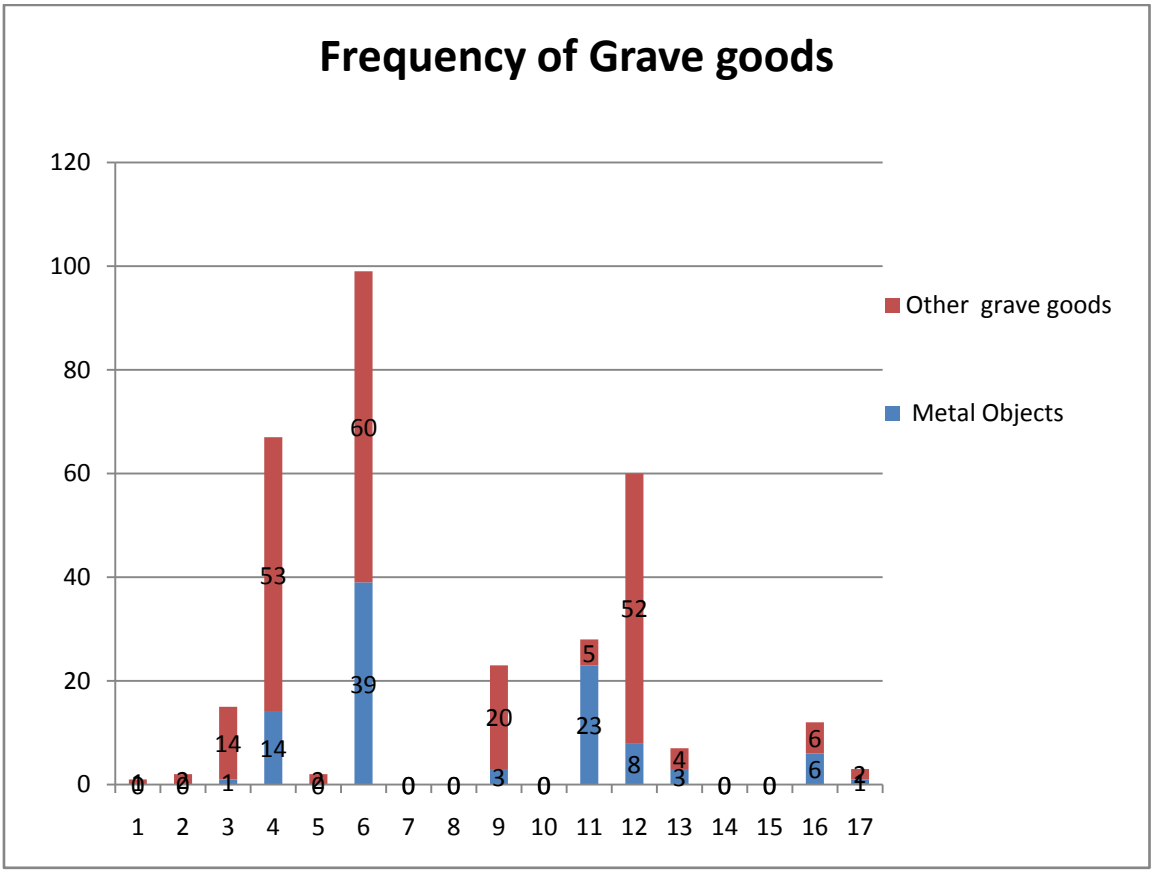


Chart1, a chart displaying frequency of metal vs. other grave goods throughout the archaeological context

4.4. The furniture group: identification, description and classification of metal objects

While engaging in any type of technical or stylistic examination, it is imperative to recognize that the categorization and designation of objects, along with their inherent variability as artifacts, are profoundly influenced by the societal context in which these objects are produced, employed, and consumed. The primary objective of categorizing these artifacts, consequently, is to elucidate the interconnections between the various categories of metallic implements and their respective functionalities within these sociocultural frameworks. A sociocultural fingerprint is not solely identifiable through morphological nature of the object, but also possesses technological attributes, resulting from the intended utilization that was purportedly envisaged for it, along with the ensuing technical determinations that have been executed, in each instance, throughout its manufacturing process. Given that the inherent characteristics differs and chronological contexts of each category of objects is interlinked, the segments allocated for the examination of each will consequently diverge in relation to their specific thematic concentrations.

Based on their primary functional category as previously forwarded, eleven distinct tool types have been proposed. The functional identification is demonstrated by the form and body of the tools that Artisans has made for each purpose, as previously mentioned in section 3.1. The following charts give a basic quantitative approximation of the types of metal implements we have across the archaeological record. These categories are shortlisted in the table below which is followed by the detailed description of each in a separate sections.

Type of Metal object	Quantity
Bronze hoes	2
Bronze Hooks	3
Bronze chisels	4
Bronze sickles	6
Bronze cauldrons and cups	6
Iron weapons	11
Jwelry	33
Bronze seals	16
Bronze Crosses	6
Geometric Objects	4
Needles	7

Table.5, Quantity of Metal objects according to their typology

4.4.1. Type 1, Bronze Hoes

Excavated from chamber A of tomb six tentatively dated 4th-5th C BCE, this type of tools from the site is represented by two elongated Bronze Hoes, (J.E 2197; at the left up side and J.E 2229: at the right above side, both found from the context dating to the third phase of Yeha chronological system). The former one measures a weight of 394 g, 33cm long, 1x0.1 cm thickness and 6.5x1 cm width while its second prototype weights 392g with a length of 32.4 cm, 1.2x0.1 cm thickness and width of 6.4x1. The second one is a bit more convex. They are elongated shape flattening at the distal tip, narrowing and a bit incurved at the proximal side, which are with two striking surfaces and two pegs for attaching a wooden handle. The pointed face tapers slightly towards the distal tip and has a rectangular end. The broad face is again slightly rounded and tapers conically towards the handle, which is rectangular in cross section. There are two pegs on the stem, roughly triangular in cross section and tapering towards the tip. Although there is no trace of a wooden shaft attached to them during the deposition period, it is

more sounding from its fabric that it might have been primarily used for agricultural activity. Signs of usage have been traced from the broad end tip of both. There is a similar object from Yeha museum that is prototypic to this category (Wagner, 2014).

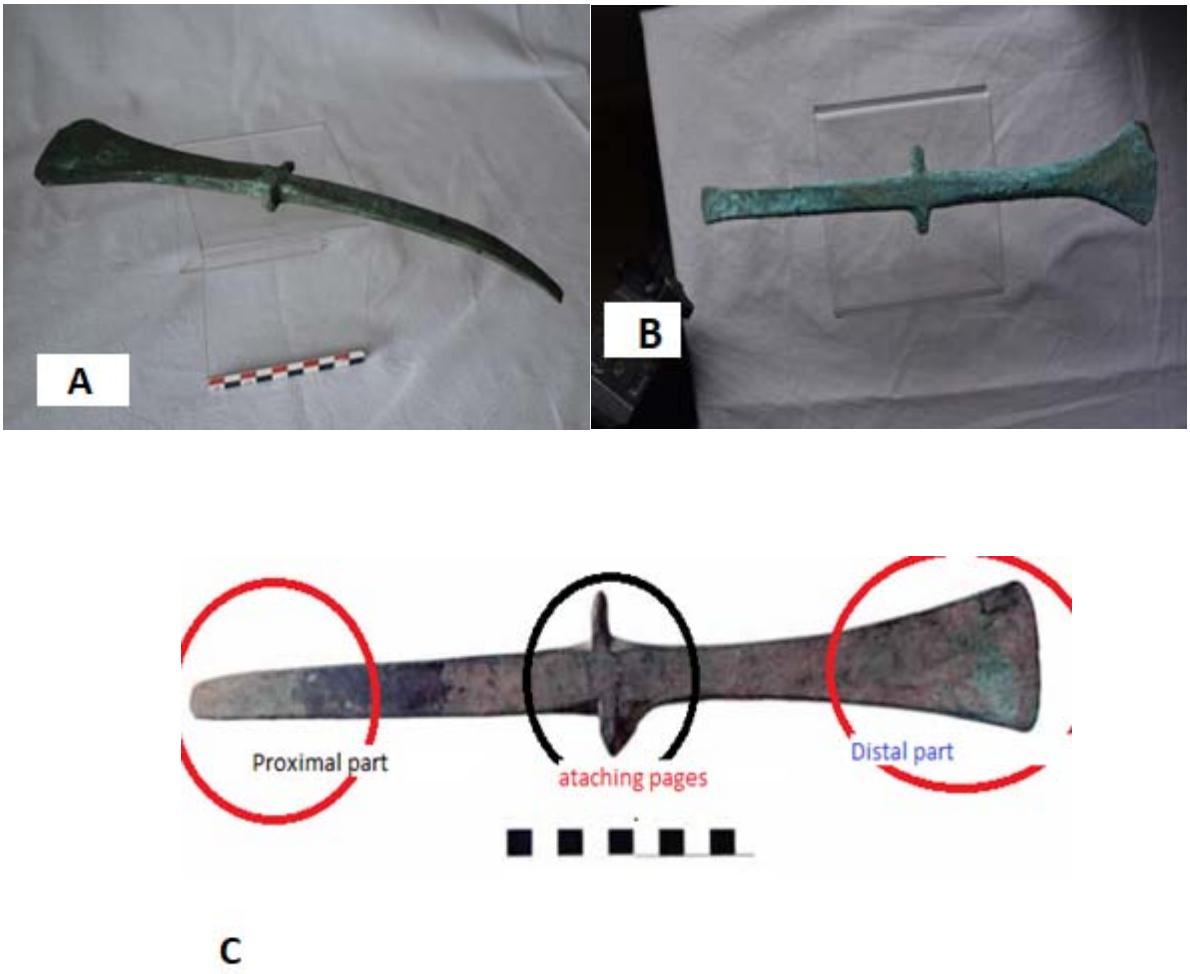


Fig. 2, Bronze Hoes: A: J.E 2197 andB: J.E 2229, Photo by Gizachew N.C, its counterpart tool from Yeha museum: (photo by I. Wagner, 2014, DAI Oriental studies); illustration to show parts: by the Gizachew N., 8 April, 2022.

4.4.2. Type 2, Bronze Meat Hooks

These categories of artifacts within the archaeological framework are denoted by object identifiers J.E 2196: 55cm long, 2218: 50.5 cm long, and 2395: 50.5 cm. The former artifact was excavated from Chamber A of tomb number 6 that belongs to the second phase of Yeha chronological strata, whereas the latter two (J.E 2218 and J.E 2395) were not unearthed within the archaeological context; instead, they were documented by Anfray (1963a) as having been provided by local inhabitants during the field survey, as they had been discovered several years prior in the Mefeleg region, located immediately north of the settlement.

The handles of these materials have an elongated rectangular cross section and tapers towards the top, increasing in thickness. Then a projection (bar) is attached, which also has an elongated rectangular cross section and widens conically from the base. Directly behind the projection, the device becomes oval to round in cross section. This part tapers towards the tip.

Since these objects are unfamiliar to others and cannot be identified by their fabric shape alone, their purpose is rather dubious and challenging to determine. They are typical of the traditional meat hooks that are still in use in the majority of Ethiopia. This seems like the more likely option. The skeptical inscription-looking projection in J.E. 2218 begins 2.3 cm behind the bar and measures 3.8 cm.

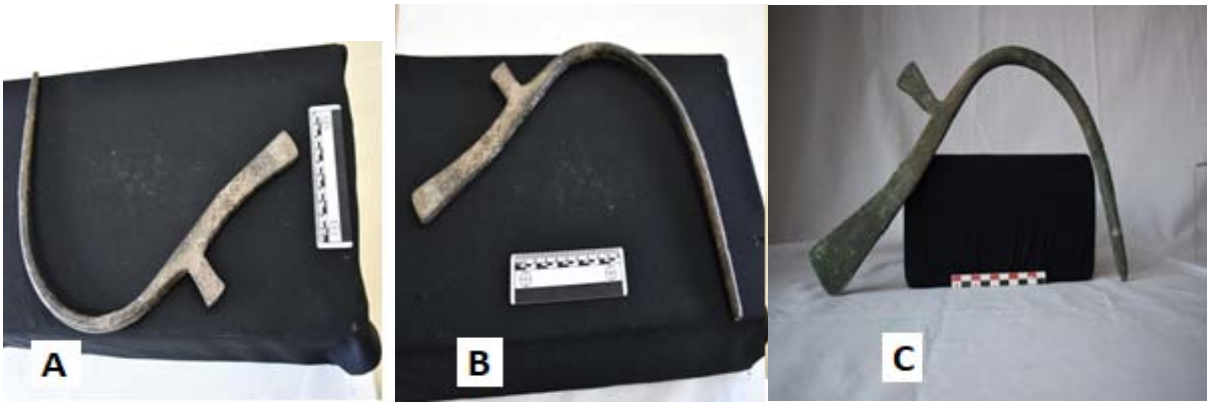


Fig.3, Bronze Hook (A:J.E 2196, B: 2218, C: 2395 respectively), Photo by Gizachew N.26 November, 2022.

4.4.3. Type 3, Bronze chisels

Four chisels used in masonry constructionthose were discovered from chamber A and B of tomb six, two of which date to the second phase (J.E 2217: height of 36.3 cm, J.E 2219: height 35 cm) and the other two to the third phase (J.E 2198: 38.8 cm height, J.E 2213: 33 cm height). The second construction of Great Be'alGuibri and the great temple is dated to the second phase of the Yeha chronological system (Fattovic, 2010). In terms of morphology, these chisels are divided into two types: flat ones and slender ones.

The flat chisels are represented by two individu2als (J.E 2213 and J.E 2217), with a very broad and slightly rounded striking surface, which tapers conically towards the handle and thickens from the striking surface onwards. This is followed by a shaft that is rectangular in cross section, which again widens slightly and then tapers again to a tip that is square in cross section and served as the other striking surface at distal part. A working trace (on J.E 2217) is visible.

Fig.4, Bronze chisels J.E 2213:Photo by Gizachew N.,8April , 2022.

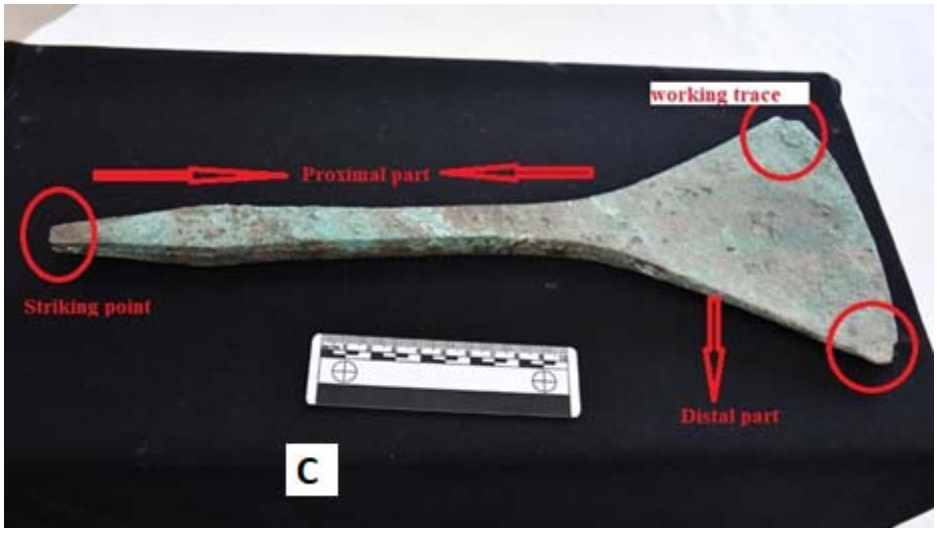


Fig.5, A& B: bronze chisel, J.E 2217: C,illustrationof it displaying parts:byGizachew N.26 November, 2022.

4.4.3.1. Slender Chisels, J.E 2219 and J.E 2198

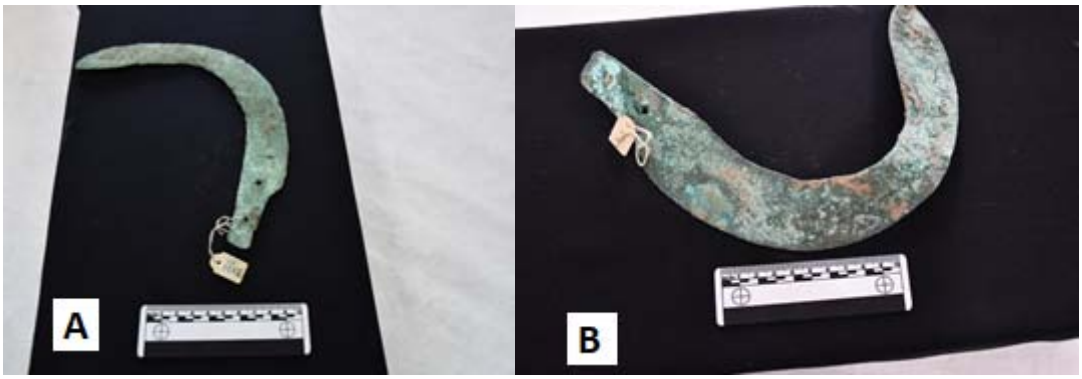
Slender Chisel made of Bronze with a slightly widened striking surface 35 cm height by 1.5x0.1 cm width, a shaft that is square in cross section and tapers towards the striking surface. This is the only representative of slender type in the furniture corpus since its counterpart (J.E 2198) who is reported in the finds is absent. The end is also square in cross section. No visible inscription is observed on the surface of it. It is unique in its physique from the above two and appeared resembling a traditional wood drilling tool which is known in most parts of Ethiopia traditionally called *Mero*.

Fig.6, Bronze chisel: J.E 2219 in both cross sections:Photo by Gizachew N.8 April, 2022.

4.4.4. Type 4, Bronze Sickles

Six sickles made of Bronze are appeared to be demonstrated to this category one discovered from a section well of tomb 12, dating to the end of first phase to second phase (J.E 2344), three marking a date to the second phase of Yeha chronological system (J.E 2142 from section well of tomb 4, 2168 from section well of tomb 6, and 2228 chamber B of tomb 6) and remaining two (J.E 2194 and 2195 from chamber A of tomb 6) to the end phase of chronological strataof Yeha culture. Morphologically they are Crescent shaped sickle with varied size ranging between the length of minimum 36.2 cm (J.E 2142 and maximum 43.5cm (J.E 2194). A few working traces has been identified on the working sides. No inscription is visible on the surface of any side. The tip of the sickles is drop-like (pointing to outwards). The sickles end in a rectangular-shaped shaft tapering to the end of the shaft and some of them with two rivets (lower 2.1 cm high; upper 2.35 cm high) to fix the wooden grip whereas others are with rivet holes while the rivets actually are absent (2228, 2344 for instance). The Hole for the rivet for J.E 2194 for instance is 1.6 cm and 5.1 cm from end of the shaft; diameter of holes 0.4.

Fig.7, Bronze sickle: J.E 2194:Photo by Gizachew N.8 April, 2022.



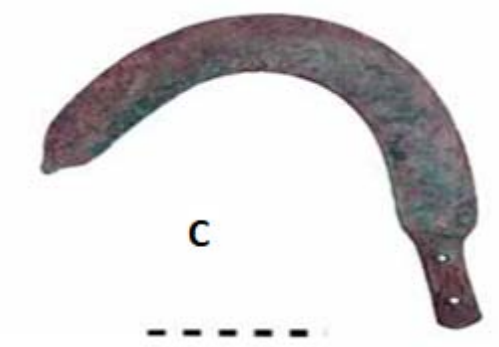


Fig.8, bronze sickles: A, J.E 2228:B, J.E 2344:Photo by AndualemGirma: 23 February, 2023. C, Similar Bronze sickle from Yeha museum: After Wagner, 2014; DAI Oriental studies

4.4.5. Type 5, Bronze Cups, Bell and Cauldrons

4.4.5.1. Pair of bronze CupJ.E 2187 and J.E 2188

A pair of an open bronze bowl with rounded base and rounded lip J.E 2187 and J.E 2288 from chamber A of tomb 6 that dated back to late second and third cultural phase has been excavated. Below the rims of the first one, there are less preserved narrow holes. In the interior some remains of iron, perhaps once connected to its pair (J.E 2188) via a chain through the holes. A Bronze cone (J.E 2198) which is an element of this weight measuring system has been discovered alongside these cups. Most likely it has been employed for measuring some specific stuff which is more valuable such as gold. Fattovich (2010) suggested that, there is a probability these pair of weight measuring scale might have been dedicated to Aksumite period since they are excavated from Chamber A of tomb 6. However, only chamber B of this tomb is undoubtedly so far re used during Aksumite time.

Fig.9,A: bronze weight balance J.E 2187,B:J.E 2187 and 2288 as pair, D: J.E 2188. Photo by Gizachew N.፤8 April፤ ፤2022.

4.4.5.2. Bronze Bell, J.E 2190

Excavated from similar context to the cups, this is oval shaped bronze bell, tapering towards the top. There is the hole for the clapper. The rim is slightly stepped. There is the hole for the clapper but a bell clapper is absent. It is the only object to this kind of tool and it would have been affiliated a certain kind of ritual activity or votive offerings. But there is no strong argument to back these interpretations.

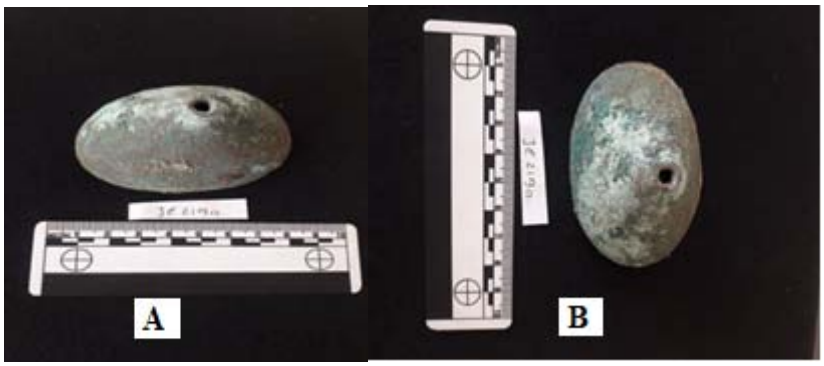


Fig.10, Bronze bell: J.E 2190. Photo credit toAndualemGirma: ፤23 February፤ ፤2023.

4.4.5.3. Two Bronze cauldrons (J.E 2216 and J.E 2212)

These are bronze cauldrons equipped with two attachments for the suspension. They are from tomb six which marked by chambers that cover a chronology from second to third cultural phases. J.E 2212from chamber A: end of second phase and J.E 2156 is from chamber being that is designated to the third phase. They appeared in rounded base and globular body, while the upper body part is slightly incurving. The rim is not distinguished. The lip is flattened diagonally inwards, so it is protruding to the exterior. On two opposite sides are two attachments for the

suspension. These consist of a rectangular bronze sheet with partially rounded corners. A round rivet head is visible at each end, and the counterpart is then visible on the inside of the vessel. In the central area the sheet is compressed and protrudes outwards, showing a central piercing. On one side the wire is formed as a ring (round to rectangular in cross section), one end looped several times around the other. Attachment complete: 6.1 cm wide, 2.3 cm high, 0.1 cm thick, rivet head diameter 0.7-0.9 cm; hole diameter 0.5 cm; ring exterior diameter 5.8, diameter 0.4 cm; protruding 3.3 cm Attachment out of shape: 6.3 cm wide, 2.3 cm high, 0.1 cm thick, rivet head diameter 0.7-0.9 cm; hole diameter 0.5 cm. Another well preserved finest cauldron that has been found by a certain peasant in Guldam locality in Yeha vicinity is also appeared to be identical in fabric and size.

There was no damage to this kettle during the times it was discovered. The discoverer also used to rent it out for different purposes (Nebes, 2011). After the extensive use however, it finally perforated at the basement. During their struggle against the DERG administration, Tigrayan rebels reportedly used this cauldron for cooking as well. Another unique feature of this cauldron is that it bears a Sabean inscription as well as a monogram on both its handles. The bull figurine depicted on it right beneath the handles (Gerlach, 2013), is a typical of south Arabian bull head culture.

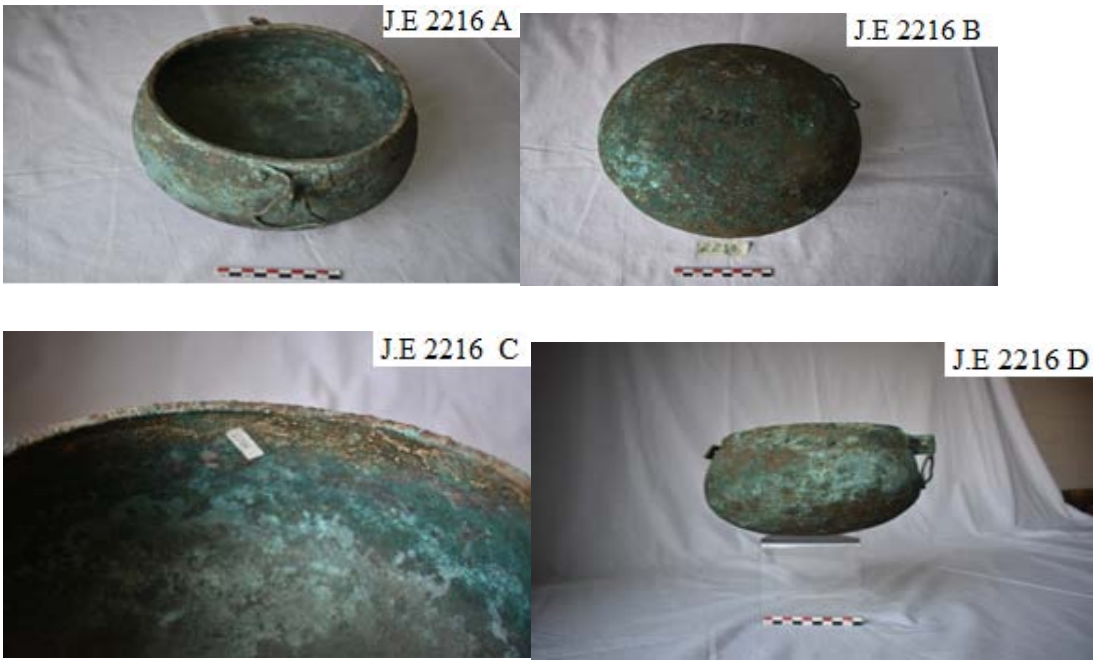


Fig.11, different sidesof bronze cauldron J.E 2216:Photo by Gizachew N.8 April, 2022.

Fig.12, A, B, and C: bronze cauldron J.E 2212, Photo by Gizachew N.: 23 February, 2023.below: bronze cauldron from Guldam area, photo credit: (DAI/ Wagner, 2013)

4.4.6. Type 6, Iron weapons

The Iron fragments of handy weapons dominantly in this context are of variable in their sizes ranging between 3.5 and 24.5 centimeters. They all are made up of Iron which could have been utilized as daggers, knifes and small cutting blades as it can be synthesized from their morphology and sizes. Majority of these diverse objects in size and fabric has been discovered from Chamber A and B of tomb six. They hence are chronologically dedicated to second and third cultural phases. Some of them however are from a context which was not clearly mentioned. Most of these carefully undocumented objects are small fragments of broken daggers and knifes.

Despite from the assumption of probably robbery marked from tombs, we do not have bronze weapons from this site so far. Bronze daggers which are typologically identical to these iron daggers however has been discovered from different sites of contemporary cultural contexts such as the Mai Temenai site in northern Asmara that has been dated to approximately 400 BC (Schmidt, 2001). Another counter part of this dagger is also excavated from Awām sanctuary

cemetery in the Mārib Oasis Yemen dating back to mid first millennium BC (Gerlach 2003, Japp 2005, Breton 2002, Nebes 2002 and O'Neill n.d).

A deep discussion of these objects has been given in the next chapter. One of these tools (J.E 2205) typologically could be compared to the Arabian dagger (referred to interchangeably as a Jambiya or Khanjar) (Elgood, 1994, Heinze, 2015). Unfortunately, not much is known about these kinds of dagger, apart from it being Arabian origin (Harcombe, 2018). The word "Sanja" in its Ethiopian meaning to mean sword, might have been derived or adopted from the name Khanjar. The main distinctive characteristic of such a type of daggers is the handles curved backwards sometimes up to 90 degree and above (Heinze, 2015). A good example of such a type from the Da`eroMika`el is represented by a dagger fragment referred as J.E 2205.

Fig.13, part of an iron dagger handle: J.E 2205. Photo by Gizachew N.: 23 May, 2023.

Since the weapons in fact are made of Iron, an environmentally sensitive element, are in a bad conservational condition. Corroded, broken down in to pieces and the parts missed out. On the surface of the weapons, there seen a scabbard sign which is diagnostically recognized marking that the weapons have been sheathed in leather during scabbard the deposition time.

Fig.14, A: fragment of handle, B: part of an iron dagger J.E 2231. Photo by Gizachew N.: 2 an 9 April, 2022.

There is a bronze rivet on the knobs to weld the wooden shafts, however we are unable to see any wooden knob since it has been totally decayed away.

Fig.15, a bronze rivet; Photo by Gizachew N.: 2 April, 2022.

Several fragments of iron (J.E 2211), three objects probably one iron dagger or lance head: length 10.65 cm, width 1.6-2.9 cm, and thickness 0.2 cm. The beginning of the shaft is preserved but broken. Two matching fragments of a dagger: length 12.8 cm; width 2.9-3.3 cm; thickness 0.4 cm. Upper and lower end broken. Three fragments, two matching of a hilt of a dagger or sword: length 27 cm; width max. 2.5 cm; thickness 1.3 cm. Ends are broken and heavily corroded.

Fig.16, Iron Dagger, J.E 2211; Photo by Gizachew N.: ‎2 April‏, ‎2022.

J.E 2231 is relatively better preserved Iron Dagger with iron shaft and a bronze rivet used for the covering of the handle. The dagger is tapered regularly towards the tip. Shaft end; length 4.6 cm; width 2.1-2.9 cm; thickness 0.3 cm bronze rivet 1.1 cm high and 0.3 cm diameter - is placed 0.6 cm above the end of the shaft Condition Broken into several parts. Its two pieces are joining whereas three pieces are not matching, but seem to be similar. It is on heavily rusted conservational condition.

Fig.17, Iron Dagger: J.E 2231and small Iron blade :J.E 2206. Photo by GizachewN.: ‎9 April‏, ‎2022.

4.6.7. Type 7, Jewelry

These are 33 individually registered round jewelries of different size (dominantly of bronze, one Iron and three Gold made ear rings and rings). They are a group that are characterized by largest in quantity, divers in chronology, variable in size and less variable in type. They are from tomb 4, 6, 9, 11, 12 and 16 covering all cultural phases. They are normal rings that has no decorative patterns, but there are also very few twisted and springing ones. Among bronze rings, one (J.E 2262) is beautifully twisted mall with opening.

Fig.18, A: Twisted small bronze ring J.E 2262, an spring ring J.E 2128. Photo by Gizachew N.: 26 November, 2022.

18 rings from a section well of tomb 11 registered as (J.E 2261) of different size 8 are probably bracelets, perhaps for children, they have round cross section, open, the ends are flat to slightly rounded: outer diameter 3.6-4.9 cm, diameter ring 0.2-0.5 cm. 2 probably are earrings, round cross section, open, the ends are flat: outer diameter 3.0/2.9 cm; diameter ring 0.25/0.3 cm 8 are probably finger rings, round cross section, open, the ends are flat: outer diameter 2.0-2.6 cm; diameter ring 0.1-0.4 cm.

Fig.19, left, sample photos from J.E 2261, right: gold ear ring J.E 2150. Photo by Gizachew N.an Andualem G.: 26 November, 2022 and 23 February, 2023.

4.4.8. Type 8, Bronze Seals

Sixteen seals entirely made of bronze have been appeared covering a chronology that ranges from end of first phase to the last chronological and cultural strata. Majority of them are excavated from section well of tomb 4 and chamber A and B of tomb 6. Tomb 3, 9 and 12 has also appeared to be in the list. They are the most variable group in discussion of physical size, fabric, type/style and technology. These are in addition the most significant findings not only in from the context of the archaeological site under discussion but also in the whole study of Yeha. (Anfray, 1963a) call these findings Identity marks. Their real function however was uncertain until one of the names they were given, was resolved recently by the discovery in South Arabia of sealing bearing impression of such object (Manzo 2002, Costa 1991).Deeper emphasis of them has been provided in the next chapter.

These seals are sub categorized in the study based on their fabric as simple geometric seals, geometric seals with Sabean alphabets, zoomorphic filigree sealss and zoomorphic filigree seals with Sabean alphabets. The table below summarizes the designation of all 16 of such items and the suggested classification which is based their physical fabric as illustrated above. The time and physical context of them also emphasized for us to look in to it in order to have an image in to technological development of it with time.

J.E	Type of seal	Tomb no	Date
2114	Geometric filigree seal	3	5th-7th C BCE
2144/45	Geometric filigree seal	4	5th-7th C BCE
2147	Geometric filigree seal	4	5th-7th C BCE
2148	Zoomorphic filigree seal	4	5th-7th C BCE
2151	Geometric filigree seal	4	5th-7th C BCE
2152	Geometric filigree Stamps with Sabean alphabets	4	4th-5th C BCE
2191	Zoomorphic filigree Seal with sabean alphabetes	6	4th -5th C BCE
2192	Zoomorphic filigree Seal with sabean alphabetes	6	4th -5th C BCE
2193	Zoomorphic filigree Seal with sabean alphabetes	6	5th-7th C BCE
2220	Zoomorphic filigree Seal with sabean alphabetes	6	5th-7th C BCE
2221	Zoomorphic filigree Seal	6	5th-7th C BCE
2247	Zoomorphic filigree Seal with sabean alphabetes	9	8th -9th C BCE
2337	Geometric filigree seal	12	8th -9th C BCE
2340	Geometric filigree seal	12	8th -9th C BCE
2353	Geometric filigree seal	12	Early 1st Mill AD
G-001	Geometric filigree seal	uncertain	uncertain

Table 6, typological distribution of bronze seals throughout physical and chronological context: designation of color is according to their type

4.4.8.1. Geometric filigree seals

4.4.8.1.1. Geometric filigree seal, J.E. 2114

This is stamp excavated from a section well of tomb 3 which is dated back to the second phase of the cultural period. It is a seal with geometric decoration. The piece consists of a long rectangular frame with short V-shaped extensions on the long sides, which are vertical at the corners. It is in a broken state and a part is missed. Inside the rectangle, there are opposing bent elements (consisting of vertical, horizontal and vertical bars), three of which have been preserved. The one on the narrow side is connected to the rim with a horizontal bar. The handle consists of a band which has been placed semi circularly. It is oval in cross section.

Fig.20, Geometric filigree seal: J.E. 2114. Photo by Gizachew N.: 2 March, 2022.

4.4.8.1.2. Geometric filigree seal, J.E 2193

Excavated from chamber A of tomb 6 that is designated to the second phase, a body of this miniature stamp has appeared to consists of circular bar divided by a horizontal bar in the middle, which projects beyond it on both sides. From the point of attachment to the circle, two more bars extend diagonally outwards. The handle is round in cross section and is semi circularly attached.

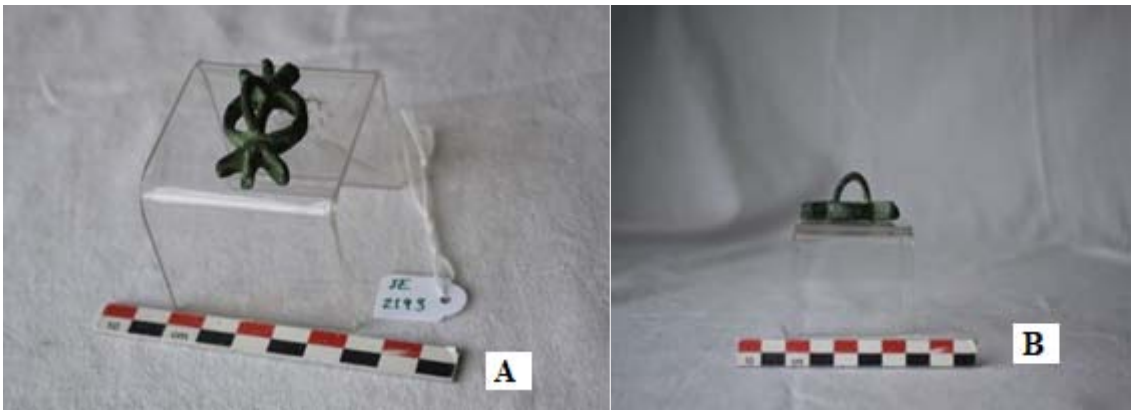


Fig.21, Geometric filigree seal: J.E 2193:Photo by Gizachew N.: 8 April, 2022.

4.4.8.1.3. Geometric filigree seal, J.E. 2337

This seal is from section well of tomb 12. This tomb is one of those who bear the sign of disturbance and reuse. The materials excavated out of chambers of this tomb range from late first to the third phase of chronological strata. The stamp and other materials especially ceramics

excavated from the section well are affiliated to the end of first phase. Technological attributes of the seal in comparison to the later ones to it also witness a less advancement of it. The stamp face is consists of two triangles that meet at a summit. From the tip, a bar divides the triangle. Above and below at the meeting point is a semi curved bar, which is also divided centrally with a bar. The handle is round in cross section and set on as round.

Fig.22, Geometric filigree seal: J.E 2337:Photo by Gizachew N.: 23 February, 2023.

4.4.8.1.4. Geometric filigree seal, J.E 2340

The stamp body is composed of four compartments, two of which are opposite each other and have the same shape: crescent-shaped and semicircular with a point. Two extensions are attached to the crescent shaped compartment. The handle has a round cross section and is placed on top of the stamp body in a circle. It is from exactly similar context to the previous one: J.E. 2337.

Fig.23, Geometric filigree seal: J.E 2340: Photo by Gizachew N.: 23 February, 2023.

4.4.8.1.5. Geometric filigree seal, J.E 2353

From Chamber B of tomb 12 chronologically affiliated to the end of phase one and early phase two this eas has been appeared to be the only seal object in the chamber. The pointed oval stamp body shows a bar in the center and two diagonally running bars starting from it. The handle is round in cross section and shaped as a semicircle.

Fig.24, Geometric filigree seal: J.E 2353: Photo by Gizachew N.: 8 April, 2022.

4.4.8.2. Zoomorphic filigree Seals

4.4.8.2.1. Zoomorphic filigree Seal J.E. 2148

The stamp body shows a stylized animal: likely elephant. The body is formed in a semicircle of bars. Inside, there are two straight bars framed by two wavy bars on the sides. The legs are formed as triangles. The feet are a small extension. The head shows a large eye and a wide open snout. The tail is broken off. The handle, which is round in cross section, is semicircular in shape. It has been from a section well of tomb 4 that is chronologically belonged to second cultural phase.

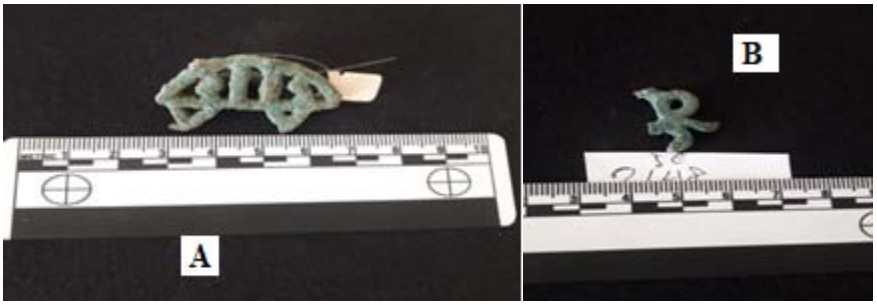


Fig.25, Zoomorphic filigree (elephant figurine) stamp:J.E. 2148, main body and broken away part. Photo by Gizachew N.: 23 February, 2023.

4.6.8.2.2. Zoomorphic filigree Seal J.E. 2247

It has been excavated from chamber B of tomb 9 that is date back to second phase. Stamp seal is in the shape of a stylized roaring lion made of Bronze. The feet are shaped as round extensions, the legs are open worked like the body and enclosed by bars. The whole body is surrounded by a bar and shows several letters of a monogram inside. The tail hangs down vertically and is fully sculpted. The head with the wide-open mouth has plastically executed spherical eyes and a spherical nose. Two canine teeth are visible in the mouth as well as the plastically executed tongue resting on the lower jaw. Possibly the mane was indicated by small furrows on the upper bar, but due to the corrosion it is not possible to say for sure. The handle consists of a rectangular sheet (width 2.4 cm, thickness ~0.6 cm) and is semicircular formed (width 3.35 cm). The top of the sheet is divided into two friezes, each framed by a rounded bar (thus three bars). The friezes were plastically decorated, but the motifs are no longer visible due to corrosion.

Fig.26, Zoomorphic filigree seal: J.E. 2247: Photo by Gizachew N.: 8 April, 2022.

4.4.8.3. Zoomorphic stamps with names inscribed in Sabean alphabets

4.4.8.3.1. Zoomorphic stamp with Sabean alphabets:J.E. 2192

The stamp dates back to the third cultural phase since it has been excavated from chamber A of tomb 6. Other materials from this context are chronologically affiliated between end of second and third chronological strata.This zoomorphic seal stamp hashandled and name inscription. The stamp body shows a stylized lion consisting of Metal bars. The body has a curved back with a semi-circular tail curving downwards, decorated with horizontal incised lines and hanging down to the legs. The chest area is similarly semi-circular; another bar sits on top of the bar, which has seven notches indicating the chest fur. The head begins above this; the muzzle and the originally

open mouth are recognizable. It would be clear for one to tell it has made in hollow casting technique. The ears are indicated as semicircular small ridges. Eyes are no longer visible. Behind the ears, four semicircular ribs open at the bottom are indicated, representing the mane. The lower part of the body is slightly curved. In the middle are the male genitalia. The legs are curved backwards. The feet bend horizontally to the front. The handle is a cross sectional rectangular bar that is rounded at the edges and rests on the letters. Possibly two elongated incised lines divide the upper side near the edge but the oxidation blocked clear views.

Fig.27, J.E. 2192**,** a lion figurine Zoomorphic stamp inscribed in Sabean script; from both sides: A: outer side, B: inner side.Photo by Gizachew N.: 8 April, 2022.

4.4.8.3.2. Zoomorphic stamp with Sabean alphabets: J.E. 2220

From similar context to previous one: J.E. 2192, this is another classic zoomorphic stamp with zoomorphic handle and name inscription in it. The stamp body is formed as a long rectangle. This represents the body of an ibex, whose head is set at one corner with two semi circularly curved horns. The muzzle is a tapering bar. At the opposite upper corner, the tail is attached, which is bent back as a semicircle on the back. One leg is attached to each of the two lower corners and the other two legs are 1 cm apart. They consist of parallel bars; the feet are bent horizontally towards the head. In the middle of the lower bar of the body there is a triangular bar which represents sexual characteristics or teats in a stylized form. Four letters are indicated inside. The handle probably represents a bull, which is executed in round sculpture. The leg ends on the bars of two letters. The body is oval in cross section and elongated, the head has a pointed muzzle, the horns are battered, the tail is also round sculptured, hanging down at an angle.

Fig.28, Zoomorphic stamp with zoomorphic handle and inscription J.E. 2220; A and B, the whole stamp from both sides: C and D zoomorphic handle of cattle figurine.Photo by Gizachew.N.:8 April, 2022.

4.4.8.3.3. . Zoomorphic stamp with Sabean alphabets:J.E. 2221

This stamp has a handle and name inscription. It is also also found from the similar context alongside the previous two. The stamp body is formed as a circle that tapers towards the bottom and then ends in a trapezoid. Inside, the letters are arranged around a central circle. A lion's head is attached to the upper part of the stamp body, as well as the two front paws to the left and right of it, directly on the bar. Everything is executed in round sculpture. The lion's head shows a wide-open mouth with four canine teeth and a hanging tongue with a round cross section. The ears stand straight up; in front of them are the eyes as spherical applications and the nose as a long-rounded bar that reaches to the mane. From the ears onwards it is decorated with transversal grooves and is probably meant to represent the mane. The paws are formed as flat, rectangular bars, single claws are still visible at the left end of the paw, the right paw is battered. The semi-circular handle is a sheet of Metal, the sides of which are raised at right angles. It ends on the letters. The interior of the handle is decorated with five rows of raised dots running lengthwise.

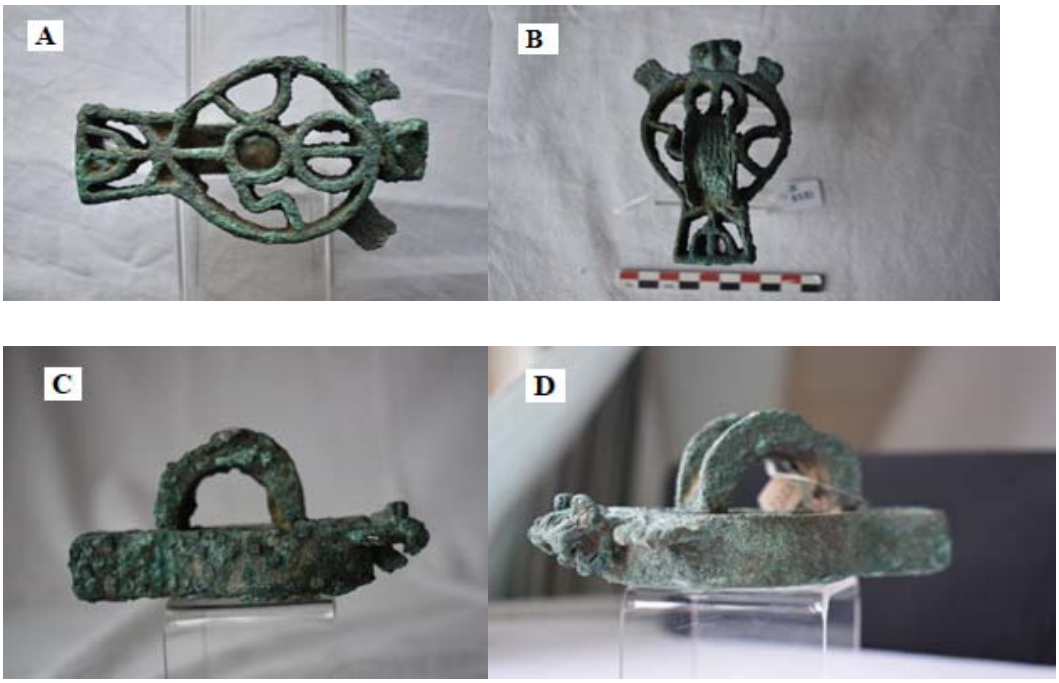


Fig.29, Zoomorphic filigree stamp with name inscription J.E. 2221: Photo by Gizachew. N.: 8 April, 2022.

4.4.8.3.4. . Zoomorphic stamp with Sabean alphabets:J.E. 2191

It is from chamber A of tomb six that date from end of second phase to third as previously discussed. The stamp body is long and rectangular, filled with four letters, and has hook-shaped extensions at the corners, which are curved towards the long sides. On the narrow sides there are two diagonally opening extensions in the middle, perhaps stylized horns. The handle is shaped like a crescent and attached to the letters in a semicircle.

Fig.30, J.E. 2191, Geometric filigree Stamps stamp with handles and name inscription: Photo by Gizachew. N.: 8 April, 2022.

Above in the description an attempt has been made to make a strategically formalization of typology for these seals base on simple observation of morphological characteristics and addition of extra elements such as Sabean alphabets, typological frequency of these bronze seals and their distribution throughout the tombs are shown in the table and chart below though. It helps clearly to understand typological changes through different phase of chronological time. Some of them (J.E. 2144/45) however are in a very fragile state of conservation which is so difficult to reconstruct the original appearance of the object.

The bronze seals are the only type of objects that in which their distribution is extensively appeared from early of the first phase to the end of the third phase. These seals however give us a very little Chrono-typological information due to the irregular distributions their types throughout tombs marking to different chronological periods.

Geometric filigree types are the dominant one in this group constituting half of the total number of seals discovered so far from the site. They are less advanced in their fabrics and much of them are distributed all throughout contexts dating to the earlier middle and last phase of Yeha.

The most advanced ones from this type of furniture are Zoomorphic filigree Stamps with Sabean alphabets, the second largest group from fourth to seventh century BCE suggesting the most strong and centralized governance section of Ethio-Sabean cultural period so far. The advancement of the fabric of the stamps from geometric filigree type to inclusion of letters (most probably reading the names of the owner) could be synthesized as a marker for transition/development to more stratified and a formation of polycentric polity in Yeha.

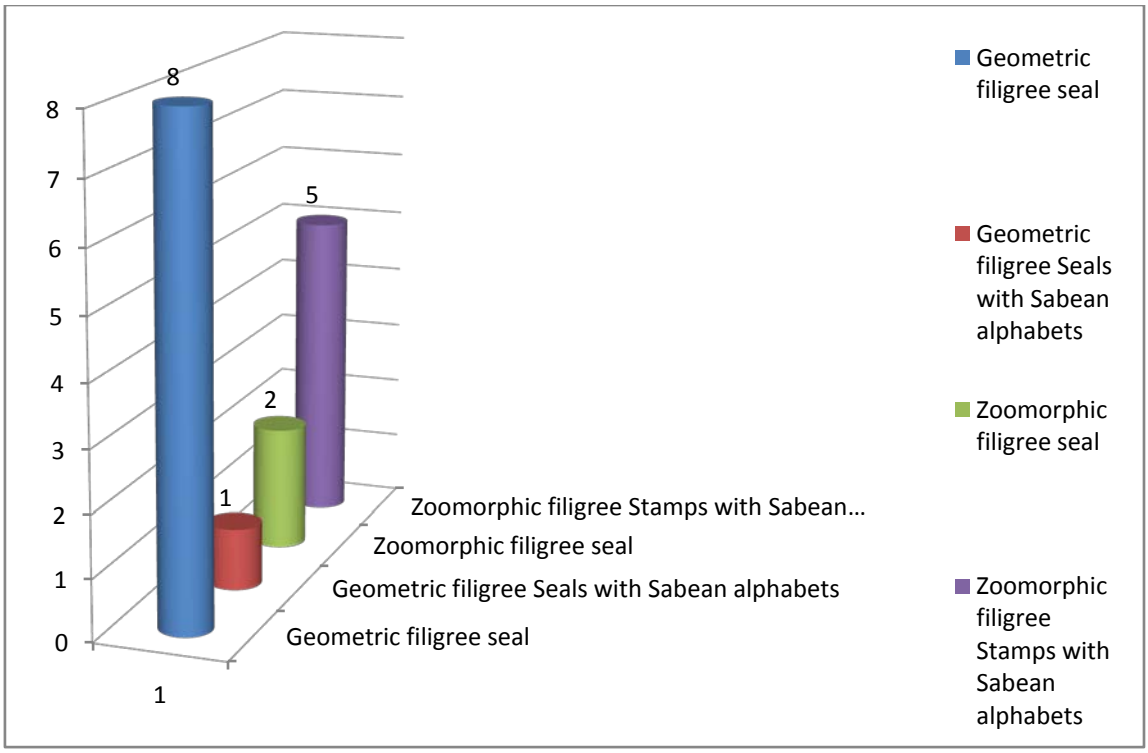


Chart 2, typological frequency of bronze seals in the furniture group

4.4.9. Type 9, Early Aksumite Bronze Crosses

Sixbronze crosses marking early Aksumitestyle with some other ecclesiastical objects has been excavated from T16 in which one of them J.E 2382 has been excavated from chamber B of tomb 13. While tomb 13 could be provide an example for re-using of some tombs/ or chambers during early Aksumite Christian times, tomb 16 must have been totally designated to this time. It is totally different from tombs that describe the Sudarabic tradition that discussed at the beginning of this chapter. They are appeared to be clearly Christian tombs. Tomb 16 is not a single one but a package of numerous independent oblong shaped individual tombs scattered on the surface.The shafts are not much Deeper from the surface.These small crosses hence obviously indicate the Christian period.

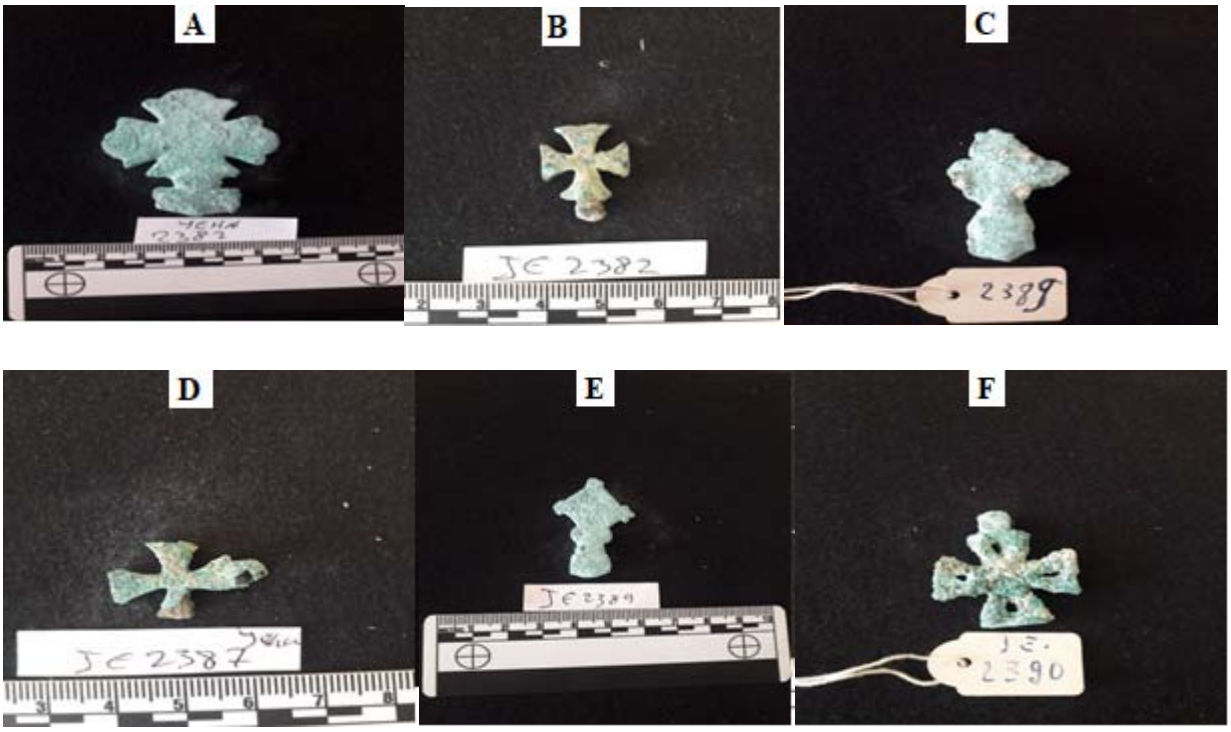


Fig.31, Early Aksumite crosses from T 13 and 16, A: J.E 2382a, B: J.E 2382b, C: J.E 2389a, D: J.E 2387, E: J.E 2389b, F: J.E 2390. Photo by Gizachew. N.: 23 February, 2023.

4.4.10. Type 10 Geometric Objects

These are 4 individual objects of different geometric shape objects those which has designed for particular purposes.

4.4.10.1. Weight scale, J.E 2189

As a device in composite system of weight measuring, it has excavated alongside the cups from chamber B of tomb 6 that date back to second chronological and cultural strata. Among different kinds weight measuring devices, such a system is belonged to a type which called the equal arm scale, in which two pans/cups of equal space and mass that suspended opposing sides of a leveler stick. A separate device of a certain weight will put on either of the pan/cup with the object to be measured on the other one. This is the oldest type of any kinds of weight measuring systems which its origin it traced from ancient Egypt dating back to 19th C BCE (Gravatte, 2011, James, 1972, Lucas, 1962). This the only of its kind discovered from a site contemporary to the period.

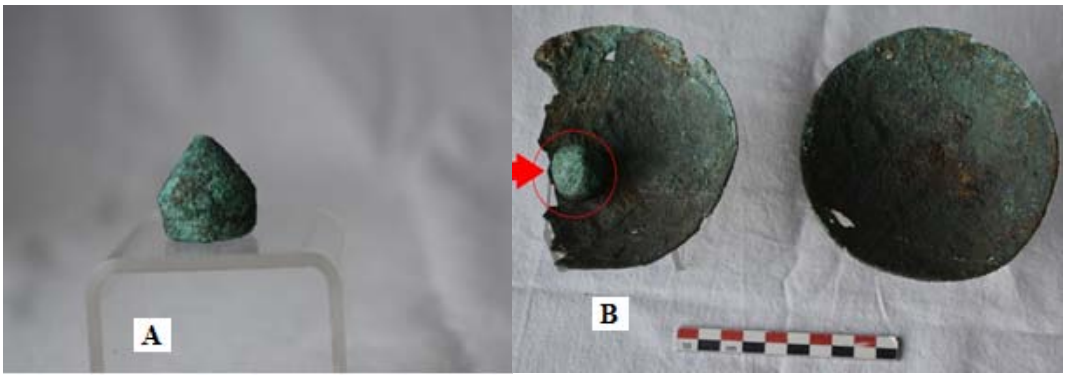


Fig.32, A: a cone shaped device of measurement weight scale; J.E 2189, B: the system complex. Photo by Gizachew. N.: 8 April, 2022.

4.4.10.2. Sandal cone

It is a cone shaped small objected widening from the top to narrow from the tip with hole in order to place sandalwood. This is one of the objects to be provided evidences for the existence of ritual activity to the dead. The hole is clogged by an oxidation. The chronology could be somehow difficult to be certain since it has discovered from chamber B of tomb 12 which has been opened and re-used during later times. This chamber originally is dated back to the third cultural phase.

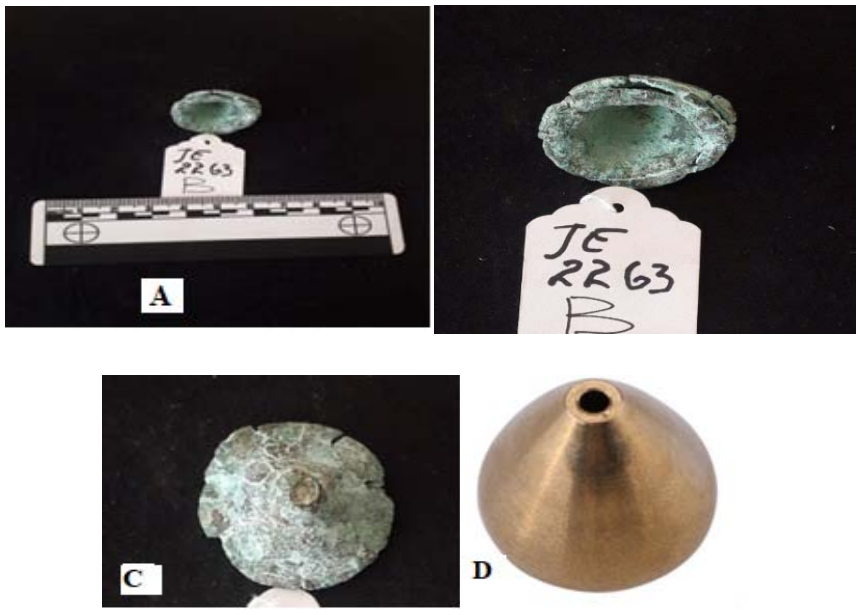


Fig.33: A, B and C; Sandal cone, J.E 2363B:D;its modern prototypic object for a comparison. byGizachew. N.: 7 June, 2023.

4.4.10.3. Censer bell, J.E 2363-A

Chamber B of tomb 12 as per discussed above is one of the contexts that has been disturbed and re-used during different lateral times including a Christian era alongside chamber B of tomb 6. These are marked by the existence of Christian ecclesiastical objects such as Crosses, probably bell and surely this censer bell. A censer bell is one of the prominent Christian ecclesiastical objects especially in Orthodox Christianity. These objects have their own theological symbolizations as well and that is agreed in Byzantine traditions though (Wendowski, 2005).

The openings of the censer bell are partially clogged with the oxidation but it can easily identifiable. The inside part is empty and filled with soil particles rolling in it. There is no known reason why one bell is found. There are normally 12 censer bells on a single censer.

Fig.34, Side-by-side comparison of the censer bell from left (J.E 2363-A) with a modern one from the right side.byGizachew. N.:7 June, 2023.

4.4.10.4. Iron awl J. E 2384

This awl which is the only representative of its kind has excavated from chamber B of tomb 13 that is affiliated to third phase and which is re-opened of re-used during Christian period as discussed above. Awls are objects of multiple functions. They are also appeared to be one of the controversial objects when it comes to their origin. First bone owls invented in Africa by ancient hunters to of colder climate to facilitate cloth production (Philipson, 2005). There are an

archaeological evidence suggesting this technology has been started with awls those are produced from a bone of consumed animals (Abell, 2000, Kenwardetal., 2005).

On the other side, when it comes to the bronze age, the earliest evidence for a copper awl was discovered at the archaeological site Tel Tsaf in the Jordan Valley of Israel, dating to 5100 B.C. to 4600 B.C (Salvatori, 2008, Zutterman, 2003). Hence it is one of a multi-functional device that could have been used for weaving, leathering and wood work. Apart from the physical presence of such an object from the site we do have some substantial evidences from the site marking the use of this tool while making impressions on different kinds of tools.

Fig.35, Above, Iron awl J.E 2384, below impression of such an object on bracelet and a pot from the same site.byGizachew. N.:26 November, 2022.

4.4.11. Type 11, Bronze Noodles and Rivets

These are seven bronze needles and a rivet those are small in size. The needles are with round cross section, the lower end is flattened, the needle tapered towards the tip. They are found alongside fragile pendants and marks of decayed garment, clearly indicating the practice of weaving. Some of the needles are irregular round cross-section and does not taper.

The tip is rounded. The head is a flat sheet with two piercings and underneath a cross shaped decoration by two incised lines. The upper end is almost trefoil-shaped. They are excavated from chambers tomb 4 and six that cover a chronological strata of second and third phase.

CHAPTER FIVE

DISCUSSIONS

5.1. Raw Material Preference and Utilization

Regarding the distribution of objects in terms of raw material preference, bronze corpuses predominantly constituted the majority share of the metal furniture (83 %) followed by Iron (15 %) and gold (3 %). The fact that they are not so found often together, leads us to raise some important questions. Why Bronze is the dominant one? Was that due to preference of Bronze over other metals in the historical context or, due to absence of the other ones?

So as to answer these questions, we have to understand the link between Historical contextualization in terms of resource acquisition, and period specific previous data of technological developments in metal use throughout cultural History of the region. We will in detail discuss in sub topics later in this chapter.

Metal tools by their raw materials type	Quantity
Bronze tools	83
Iron tools	14
Golden tools	3

Table 7, Frequency of Metal corpus within the archaeological context under discussion according to the raw material distribution

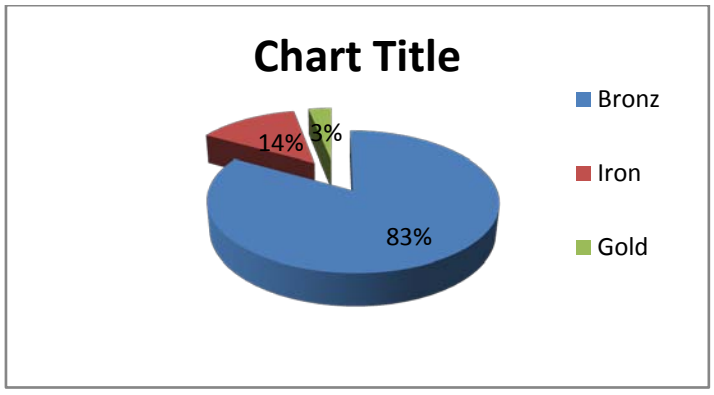


Chart 3, percentage of objects in terms of raw materials distribution

5.1.1. Raw Material utilization according to tool types

The DMT period in facts known to be the bronze age of the horn in particular as we have been discussed in chapter two before. Bronze materials have been in use almost for any kind of metal tool demand as we can simply synthesize it from our furniture variability from the Archaeological context. Bronze tools are all available throughout three phases of our cultural strata regardless of the variation in workmanship and stylistic alterations. The only tool type we do not have made out Bronze is weapons. In most of cultures in remote and recent past, Bronze appeared to be widely utilized in production of weaponry especially spearheads and daggers (Postma, 2010, Parker, 2005, Thorpe, 2005, Fontijn, 2005). The total absence of the bronze weapons hence would be an equivocal event considering there were disturbances happened to the tombs. The chemical behavior of bronze coating itself to suit with the context enables it to survive under different kinds of contexts (Robbiolaetal., 1998, 2006). So that, it would be reasonable to put reflection if these kinds of tools have been there and they might have been favorite target by the robbers (Anfray, 1963, 1972). Bronze spear head and dagger from the Sabean cemetery of Marib (O'Neill, 2010) could suggest the probability of having such an object so as in D`M`T` as well. Another contemporary evidence to strengthen this argument is the occurrence of similar bronze daggers at the site of Mai Temenai northern Asmara dating 400 BC (Schmidt, 2001).

Iron weapons presented in cemeteries that belonged to the middle and last phase of Yeha Chronological strata (Fattovich 2009), whereas gold ear rings during the second phase solely. It however does not necessarily mean this resembles sequential order of introduction of these kinds of metals since it appeared in a funerary context where selection of materials is strongly marked. On other side of the story, the presence of precious metals and precious stones may reflect the level the metro polity in terms of wealth, prosperity and strength (Cerulli 1960, Conti Rossini 1928, 36 Fattovich 1977). Here we can support our reflection by asking why Gold is there during the second phase but not during the next one at all. All the find spots from these context and other sites those are contemporary to the Yeha cultural period shows this polity were stronger particularly during the second phase of its cultural strata (Fattovich 2009, Jappetal., 2011).

5.2. Use of metal in a pre-Aksumite art and architecture of D`M`T polity

For Matthews (2005), Artifacts are not produced in isolation but are produced in a cultural and social context of interacting individuals.Constructing a typology a structured system of artifact types involves more than just the application of analytical methods (Berthon etal.2013). As M. (Curtis, 2008) noted, pre-Aksumite metal works, along with inscriptions and monumental buildings, occur in elite and ceremonial contexts where people likely met regularly. These contexts are traditionally very suitable for the expression of state ideology, and the target of this transmission can tentatively be identified with both members of local elites and the rest of the population. As is clear from the inscriptions, the activities that characterize these sites were carried out by the community's elite, whose name at least from a certain point onwards was D`M`T (Anfray, 1991). It should be emphasized that the metal works and the inscriptions are closely linked (Anfray, 1991): often the works of art bear inscriptions, and moreover, works of art and inscriptions are located in the same places that can clearly be assumed to be ritualistic activities were dedicated. The inscriptions and works of art, together with monumental structures such as the temples whose remains have been documented at Yeha and perhaps at Keskese, form a coherent and unified system of propriety. Fattovich (1990), Finneran (2001) Curtis (2008) and Philpson (2009); all agreed on the supposition that metal chisels form Da`eroMik`el funerary are a manifestations of Sabean architectural art and masonry practices.

Fig.36, A; insence burner with Sabaic inscription from Yeha (photo by Gerlach, 2011), left Sabean inscription of Yeha from the monastery of Abba Aftse; (Photo uploaded on Alamy.com).

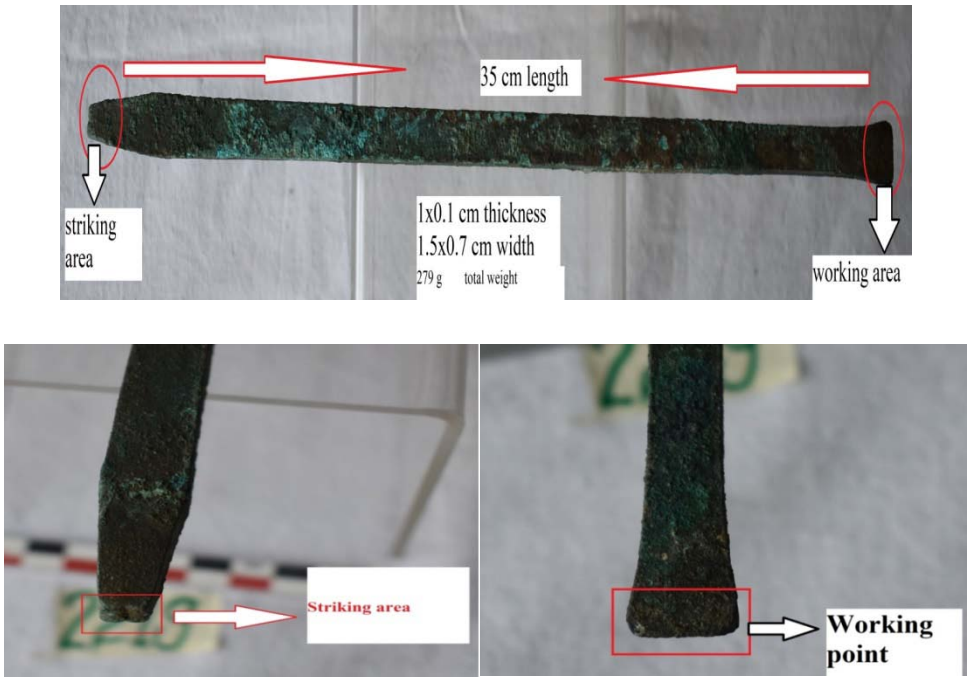


Fig.37, Unique metal chisel (J.E 2219); employed while curving an inscriptions.

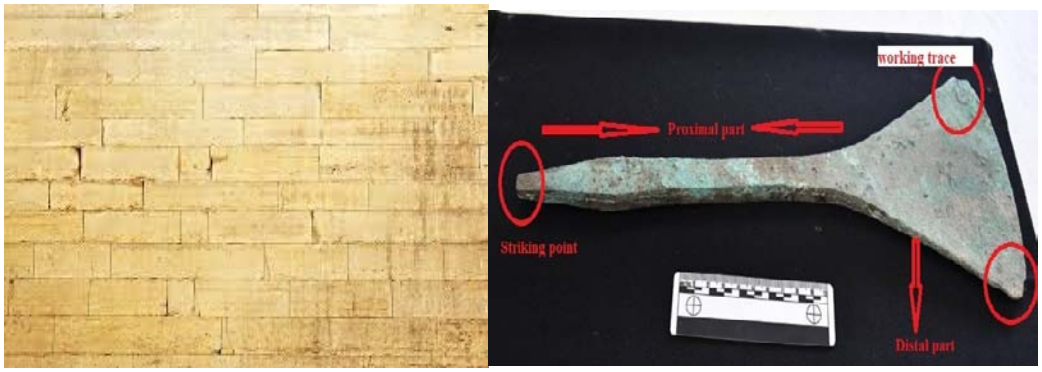


Fig. 38, precisely curved and polished surface of Yeha temple and example of bronze chisel they used for curving stone slabs.

5.3. Local innovation vs. foreign introduction

Due to the cultural similarities of Sudarabic tradition and the Horn Anfray (1963, 1972), Manzo (2005, 2009), Fattovich (1977, 2001), area of origin for the metal objects from the study site as well as their mother materials requires a careful investigation. Analization of chemical characteristics of the material and geo chemical contemporary analysis needed for accurate reflection on the issue of place of original production. Bronze is spurred as one of the locally availability natural resources in the area (Solomon etal., 2003). Central Tigray which

incorporates the study area is one of the regions which is rich with metallic minerals mainly copper alloy (Jelenc, 1966, Solomon etal., 2003). A Precambrian basement rock exposed to the low lands of western Tigray (Greigetal., 2020), noting that the elemental composition of bronzes was significantly variable during ancient times (Goffer, 1980), north western and central Tigray (Kaleb, 2021, Solomon etal., 2003, Smidt, 2019) is appeared to be rich in metallic alloys such as Gold, copper and silver (see geological map on chapter one). A few previous studies like (Finneranetal. 2005, Hailemariametal. 2017, Smidt, 2019) revealed that there is a long-lived tradition of artisanal mining at the region. Therefore, we can put our preliminary suggestion to the principle of localized resource availability and artisan traditions (Postmaetal. 2010); which explicitly means the objects might have been a development of an independent local production. This framework however must be conceived with future archaeological discoveries of mining and workshop sites like that of al-mahdara quarry site in south Arabia.

On the second scenario, there is undeniable cultural contact between southern Arabia and the Horn. Throughout historical and archaeological literatures so far, there seen continuous ununiformed synthesis between scholars describing this contact as trade, migration, movement and colonization. Scholars who are authorities on the historical and archaeological study of the region (Conti Rossini, 1928, Anfray 1953, Fattovich, 2007, finneran, 2001) asserts, not all clans of south Arabia migrated to the horn of Africa crossing the red sea. They could have been few clans who were specialized in masonry and related craft production. Whatever the case is, there is a clear cultural influence between the regions even if the direction of the influence is also another point of difference. The chronology for the beginning of this contact roughly goes back between the end of 2^{nd} and early 1^{st} millennium BCE. This is not only defined by material cultural similarities, but also the exchange of raw materials and finished products that has been lasted roughly for about a millennium (Gerlach, 2003). This vast time would be appeared to be fair enough not only for importing and exporting of raw materials and finished goods, but also for the assumption towards the introduction of immigrant craftsmen who could have brought a rapid evolutionary development of metal craftsman to the Horn.

5.4. State of the art

Study of metallurgical state of art demands our generalized understanding of how the social and cultural context of artifact production frames and shapes the patterning arising when raw material is transformed into material objects by artisans (Renfrew etal., 2004 pp. 4), who are part of a cultural and social system. That in the other expression meant, the understanding of cultural techniques and Chaîneopératoire helps us infer the identical state of art bearing on a material by examining the physical features. Before we start to identify and delineate cultural techniques and kinds, we must have information about the archaeological cultures (Artioli, 2010). The manufacturing of an object is the outcome of a complicated technological grammar, which eventually transforms the raw material into a culturally understood shape (Artioli 2010, Ciliberto, 2000).

Despite other kinds of material production, Metallurgical Chaîneopératoireare often conventional throughout most cultures; most likely as a result of defused knowledge of practicing procedure. The production techniques which employed to manufacture that material will not just appear on the physic of the object. But also this association production techniques and their physical distinction often help infer a period specific origin of objects within more accurate culture-chronological frameworks based on the principles of relative dating. Even though the type and range of data we collect doesn't allow us to reconstruct the full Chaîneopératoire of production of each type for our metal objects in Yeha, common production techniques have been physically analyzed. These techniques are more witnessed in some objects than the other. Whereas some objects has been given a shape using mixed techniques, but it's clearly obvious and evident that the application of a production technique is determined by the type of intended object to make. Techniques such as riveting, forging, casting and welding has been identified and analyzed from our metal furniture group.

5.4.1. Forging

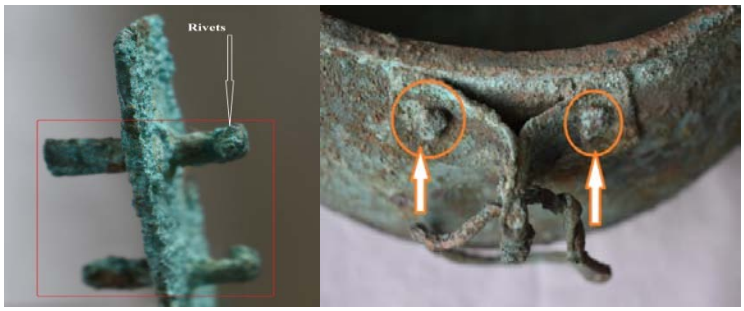
Forgingdependends primarily on the nature of the metal. Iron was only forged in ancient times.The use of forging can be observed when tiny striking traces of hammering remained on the body of the finished object. Group one, two, three, for and six are mainly produced by this artisan technique as synthesized from macroscopic examination. This hot working practice often applied simultaneously in the smithing process alongside with other techniques such as casting.

Reshaping and refining the cutting edge side would primarily executed by hammering during the production.

Fig.39, bronze chisels resembling forging practice of production

5.4.2. Riveting

Bronze rivets have appeared to be operational in three kinds of objects groups (sickles, cauldrons and weapons). Except from the case of cauldrons, this technique has used to attach the tools with the wooden shaft. No physical trace for existence of wooden shaft has been examined in the sickles however. With the bronze kettles from this particular site and the homogeneous one from Guldam as stated in the description chapter, it has been witnessed that they used also this technique to attach metal with the other metal. Neither socketing technique nor non bronze rivet has been discovered so far in Yeha culture as a hole. The rivets still had seen in place and as the original production in most cases. Some particular broken bronze rives (J.E 2332) has been documented most likely as part of broken daggers or sickle found in the same context with it. In the case of one particular sickle (J.E 2344) there has been seen two rivet holes in the physical absence of the rivet itself; while with the others it is existed.



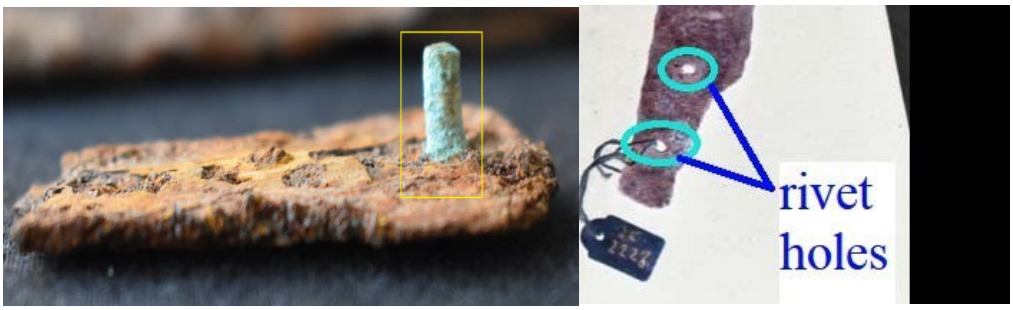


Fig.40, use of riveting technique in different object groups

5.4.3. Casting

The ancient history of casting and manufacturing was marked by trial and error (Ogden, 2000: 152). Ancient smiths recognized that pure copper did not cast effectively because it tended to form bubbles, resulting in porous, less lasting products (Ogden, 2000: 153). Hammering made copper brittle, whereas annealing produced a softer, more workable metal. The process of alloying substantially enhanced both casting and reworking, especially when tin and lead were added on purpose.

Adding lead to tin bronze would lower the alloy's melting temperature, improving pourability, casting ease, and bulk (Scott, 2002:5). By lowering the melting point, the solidifying alloy would become less susceptible to bubble formation, reducing overall porosity (Ogden, 2000: 154). The inclusion of lead enhances the alloy's fusibility. The latter is a necessary prerequisite for multi-component bronze sculpting, as independently cast portions were skillfully bonded together using reheating contact surfaces (Savage, 1968). In addition, as bronze solidifies, it expands, forcing the alloy into every sculptured crevice of the mould.

During cooling, the alloy then contracts, freeing the sculpted bronze from its clay mould (Savage, 1968). Considering all these material properties, leaded bronze was far superior to other alloys in terms of casting.

Assuming Da`eroMika`el as a sample site it show that the majority of ancient Sabean copper alloy objects were cast into their final form rather than pounding the malleable bronze into shape. While casting is not a chronological marker, the various casting methods examined are appeared to bear hollow, solid, and lost wax casting techniques. In terms of period-specific technology at this site, solid casting may be seen in pieces ranging from the 7th century BCE to metal crosses

symbolizing Aksumite culture. We can hence conclude that it is a well-known technique for producing bronze objects. The hollow casted objects appeared during mid-first millennium BCE (7^{th} to 5^{th} C). Lost wax method is represented by bronze rings and Gold ear rings, 7^{th} to 4^{th} C BCE.

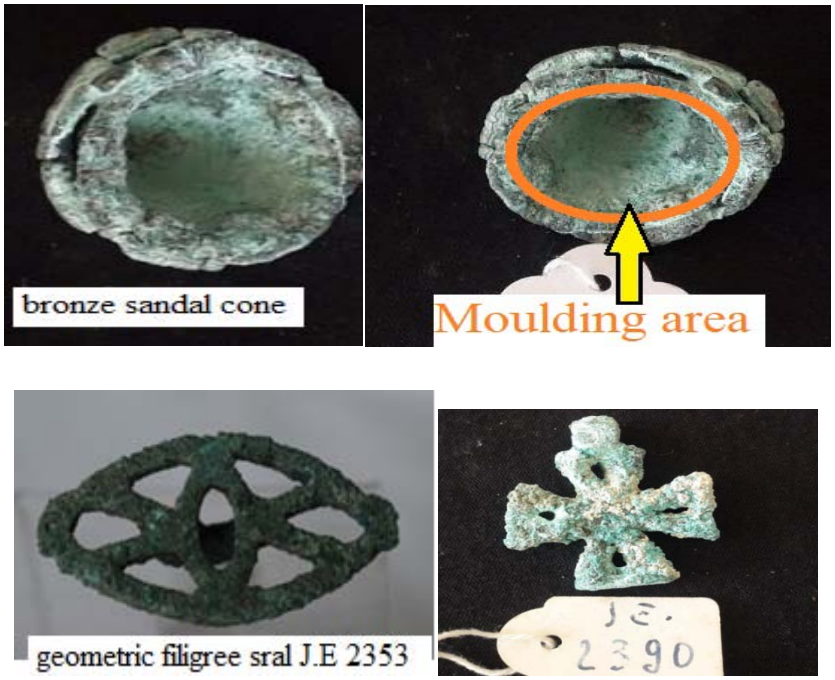


Fig.41, different kinds of materials in mark of moulding technique of production: i.e: a bronze sandal cone with a cavity which is a mark of clay other kind of mould (7^{th} – 5^{th} C BCE), right below: a geometric, filigree seal (8^{th} 7^{th} C BCE), and an Aksumite miniature cross.

5.4.4. Welding

Welding in traditional smithing is a technique that requires a skill of heat controlling and execution accuracy (Zang, 2009). It requires physical and chemical characteristics of different metal such as melting point. Archaeo-metallurgists mention different kinds of ancient welding techniques (such as fusion, pressure, sintering, colloid and soldering) which are identified in a separate scientific examination. This is the common technique that is examined in our bronze collections specifically to attach different metals or metal parts together as a single object. Welded parts could be of a similar kind of metal or not. The need and application of heating is also depends on the nature of the metal type. Ancient artisans often use this technique to braze metal parts of different origins as well (Schorsch, 2007).

This art has been used widely used in our metal furniture in different manner within geometric filigree seals and zoomorphic seals. Round shaped handles, semi-circle handles, and zoomorphic handles of these seals are jointed with the main part by welding. The technique also used on other groups of metals such like chisels and hooks in different physical contexts. The patterns of welding are not visible sometimes due to the accuracy and in other objects as a result of corrosion.

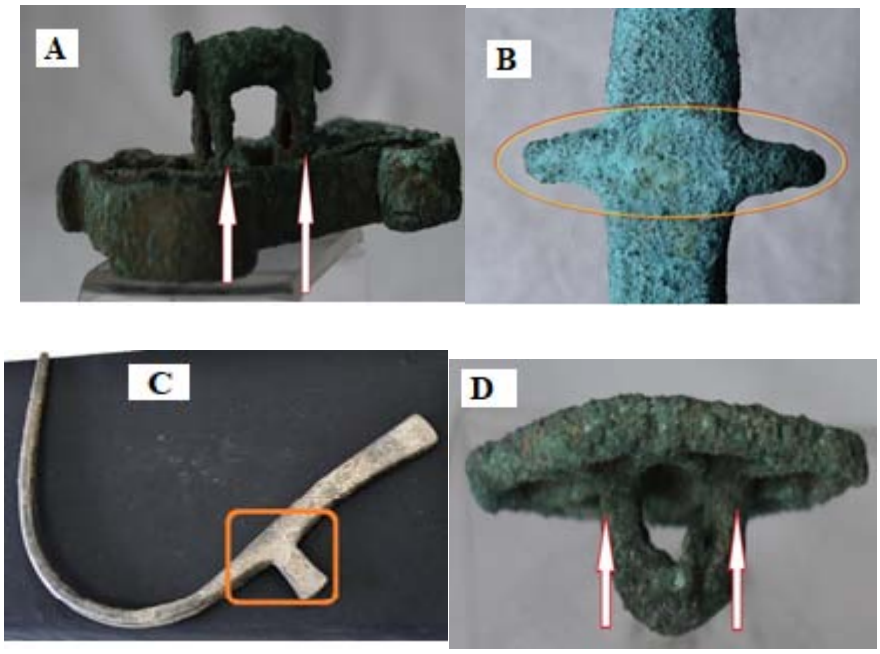


Fig.42, use of welding technique of different kinds of object groups: A, welding a cattle figurine handle on a mother object in zoomorphic seal with Sabean alphabet J.E 2220: B, shaft holder in bronze hoe J.E 2229: C, meat hook J.E 2196: D, attachment of elliptical handles on geometric filigree seal J.E 2353

5.5. Seals: Royalty and Identity Marking

Bronze filigree seals are one of the widely distributed groups of objects in a sense of time range they cover and morphological typology. They appeared to demand more attention in our group since they bear wide range of cultural aspects. This distribution seals through all cultural phases also marked by technological advancements. They gradually upgraded from simple geometric filigree to complex zoomorphic and then again to inclusion of Sabaitic alphabets arguably reading the name of significant individuals.

These different small sized geometric and zoomorphic seals which Anfray identified them as identity markers have a cluster of historical information about religion, socio-cultural aspects, epigraphy and cultural wider connection of the Yeha cultural group with regional cultural atmospheres.

5.5.1. Religion and art

One of the most frequent subjects in South Arabian and Pre-Aksumite art on the northern Horn of Africa plateau is the ibex, known by the Linnean term Capra *nubiana* (Antonini, 1997). The animal has frequently emphasized subject in art and religious symbol of Ethio-semetic cultures (Manzo, 2009). This mountain goat, known as Walia in Ethiopia, is one of the indigenous species and roaring the hills of the Horn for million years. In the ruins of a frieze reused from the Great Temple at Yeha or in the decorating of the 'throne' unearthed at Hawlti, portrayed on pottery surfaces of Yeha and south Arabia, as well as on stamps, which are under discussion.

The ibex, along with the bull species Bos*indicus* (bull head culture) and the lion, is considered a sacred animal. According to Finneran (2001), bulls and ibex were once used as sacrifices offered for the South Arabian moon god Al-moqah (Wolf etal., 2010).

Fig.43, A, Walia ibex figurine on zoomorphic seal (J.E 2220) B, its bull figurine handle

Majority of our seal collection as stated are geometric and zoomorphic with the exception of one particularly unique filigree seal (J.E 2353). It appeared to bear the symbol of an eye. The word AYIN in almost all ancient semitic (Aramaic, Phoenician and Hebrew), central Semitic and south Semitic group that includes geez, Tigre and Amharic languages, commonly translated as Eye.

On the other side of the story this symbol of eye in ancient Greece mythology used to represent Omicron. In Greece mythology, omicron is a god of conflict and resurrection. The symbol also is used to represent the 70th letter in Greek alphabets; small letter “o”. Thus it would be reasonable to arguably synthesize the connection of these cultures or the conventional understanding and use of symbols.

Fig.44, seal in the Eye symbol (J.E 2353)

5.4.2. Socio-cultural meanings

The primary functional interpretation forwarded to the seals by the scholars who study the cultural region (Anfay 1963b, Fttovich, 2010, Oneil 2010, Gerlach, 3003), in common is as an identity marking tools and administrative devices. It is a common understood that these bear a letters of monogram letters read a name of authorized individuals or appeared as a symbolic logo. This functional interpretation is despite of their morphological and technological variability. The archaeological existence of these artifacts as royal objects would also strongly support the idea that they were belonged to the important and dignified class of the society. Hence; it is necessary to look in to what kind of specific task they bear, we can assume based on morphological types.

From researches of a similar topic in particular cases of ancient Egypt (Robbiola, 2006), ancient Greece and Rome (Bernabò, 2010) as well as India and Levantine kingdom (Cameron 1936, Jeluff, 2007) somehow similar attribute had designated to the seal as a branding objects. From the ancient cultural point of view, branding could be interpreted as signature of authority and also a symbol of ownership towards something valuable. This mark of ownership could have been displayed on non-material things including animals and slaves. While it is common in many still existing cultures to brand cattle and other livestock with a burning iron, slaves in ancient

Egypt also used to suffer the same fate (Robbiola, 2006). They would have been forcibly branded to show they were the property of their masters.

From wide range size variability of seal discoveries as well as epigraphic and iconographic inferences, researchers concluded that the big sized seals used to brand cattle and horses while the small sized one to brand slaves in ancient Pharonic Egypt. Compared to homogeneous seals from contemporary sites such as Matara, Hawelti and Sobea, Da`eroMika`el seals appeared to comprehend morphologically variable collections. Other sites bear miniature seals which are less advanced and no monogram letters on them.

Fig.45, sample comparison variability size of in bronze seals

5.4.3. Sabean alphabets depicted on the seals

The South Arabian shadows in the art, together with the language and script, are the most impressive elements resembling the existence ofa strong connection between the two sides of the Red Sea from early to mid1st millennium BCE (Conti Rossini 1928, Anfray, 1990). This undoubtedly presence of South Arabians in the horn is the realm which separated scholars between at least two paradigms, the colonialist, and integrationist schools of thoughts. (Glaser 1895), (Conti Rossini, 1928), (Ricci 1985) and (Anfray 1990), all stated thatduring the mid-first

millennium BCE, the southern of Red sea is conquered by Sabean by a kind of economic and political expansion or migration. One evidence for this supposition is the existence of dedicatory south Sabean alphabets on filigree seals most likely reading the names of the individuals. Six of our seal corpus appeared to bear letters.

In contrast of this cultural homogeneity is somehow questionable. A research byOneil,(2010) and Gerlach, (2005), would dare to put hypothesis that previously suggested are somehow questionable and the South Arabian elements were not exclusively Sabean in their origins. The absence of bronze seal before mid-first millennium BCE in south Arabian side is one scenario. The existence of Yeha seals in large quantity and more sophisticated could lead us to conclusion; Yeha is more likely to be the major political and economic power center.

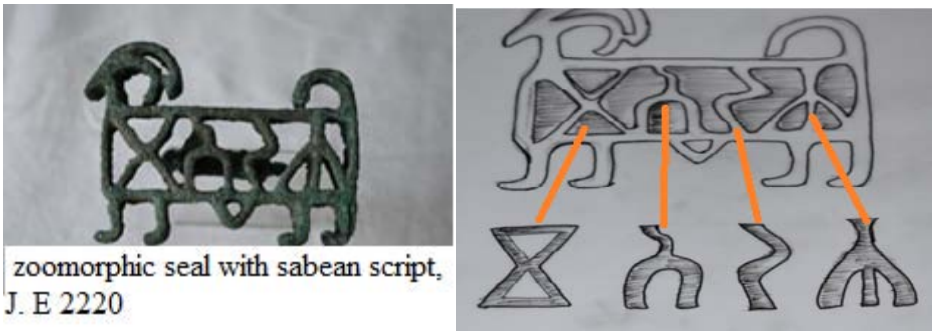


Fig.46, Dedicatory inscription in Middle Sabean alphabet (Portray credit to AmesiasAlemu)

5.5. Weapons from the perspectives of Grave goods: personal defense or object of honor?

Synthesized from the armament collections derived from archaeological sites, one may posit the notion of martial accoutrements that have frequently been associated with the constructs of warrior identity, as well as masculine identity and hegemony in numerous ancient cultures. Given that the characteristics and historical contexts of each category of objects vary, the segments allocated to the exploration of each will consequently diverge in their respective focal emphases. (Kopytoff 1986, Chapman 1999, Appadurai 1986).

Although difficult to ascertain, it seems possible that, besides the general rarity of daggers in Da`ero Mikael graves, there was also a reluctance to associate the synthesis with swords in these contexts. I have made it clear in this chapter why we do lack bronze weapons in our context

associating it with frequent previous robbery incidents of the site before the undertaking of archaeological examination. The existence of such weapons in contemporary sites such like Mai temani and Awam as stated may strengthen our supposition. As part of warior identity designated to masculinity in community, ideological bond between the dagger and an individual set should not be dismissed from this perspective.

Despite the absence of evidence for gender based, age structure or special arrangements based on status, we can suggest (with reservations) that the introduction of swords in tombs had a symbolic and ideological dimension. I believe that it may express a concept of martiality that went beyond the physical ability of individual to fight, but was rather a symbolic tool (an object of honor) through which senior individuals symbolized and maintained their dominant role within the society. Swords of honor are commonly bear as a symbolic meaning of authority and leadership as scepter (Bridgeford, 2000).

Fig.47, Iron weapons from the site

5.6. Continuity and rupture

D`M`T` metro polity raptured somehow after 4th C BCE; that has been followed by the raise of small polities at the foothill of BeteGiorgis gradually to give rise for the Aksumite Empire in early 1st C AD. The rapture of D`M`T state can also be described in terms of the rapture their cultures identical to pre Aksumite society. Though Aksumites were managed to retain a number of D`M`T cultures that could be testified in their calligraphy and architectural elements.

Iron working expanded during post D`M`T periods while copper became utilized widely in the production of Christian ecclesiastical objects such as censer, cup, crosses, flanges, sistrums, pitchers, plates and chairs (Butzer 1981, Phillipson 1998;2009, Fattovich 2009, Finneran

2007).Gold and silver used to as a raw material for the newly introduced culture of coin mintage in the region (Munro Hay 1993a).

Ideologically also, some elements have seen continued such in lion figurine of Geta lion near Kombolcha. Aksumite seals eventually have made to be different in style (cylindrically small in anthropomorphic manner). Aksume miniature seals have been made out of clay and curved wood also. They also appeared to use imported seals of Mediterranean and far east/Indian types.

Fig.48, Yeha lion figurine seal vs. lion statue atGeta site, Kombolcha

Fig.49, Yeha bronze chiselJ.E 2213 vs. an Iron chisel from Aksumite period

5.7. Yeha metal in regional and out wider culture-geographical context

Culturally contemporary sites of the Horn designated to the Pre Aksumite sites that yielded a large amount and variety of archaeological data are Hawelt, Melzo, Metera and Sobea alongside Yeha. One of material types this striking homogeneity is expressed in is metal artifacts with the special emphasis to bronze stamps as they appear in large quantity next to pottery (Fattovic, 2010). These resident sites including cemetery sites of Abiyaddi and site under discussion are dedicated to elite' class since the bear with some local made and imported luxury items (Gerlach, 2005). The homogeneity of the objects apart from morphological differences shows a certain cultural similarity and interconnection. Although the elites were supposed to be the main economic partners within short and long distance trade networks (Sherif 1981, Phillips 1995, Philipson 2009), the rationale behind the deposition of such exotic artifacts could have been their essence in creating conducive life after death as it has been believed in ancient cultures conventionally. Graves in the study of social stratification also play a significant role indeed. Seals as an administrate objects appear here to support this assumption. However, trade plays an important role of satisfying demands in the case local made materials got to be insufficient. Increases in metallurgical production as well as the wider distribution of similar metalwork types is (commonly defined as metallurgical koiné) created an intertwined network of contacts. Imported objects would have been also transferred from one community to another through the system of exchange.

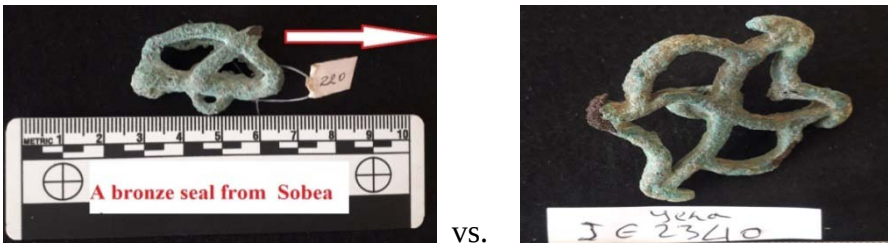


Fig.50, A comparison between D 220 of Sobea site and J.E 2340

Fig.51, A comparison between J.E 1837 and 1833 of Hawelti site and J.E 2191

Vs.

Fig.52, A comparison between D 221 fromSobea site and J.E 2353

Vs.

Fig.53, A comparison between J.E 1838 fromHawelti and a half broken seal J.E.G 01

Vs.

Fig.54, Zoomorphic figurine sea handle of J.E 2220 and animal figurine from Matara

Fig.55, A: fish figurine seal from Sobea and B: broken elephant figurine miniature seal J.E 2148

Fig.56, Human hand figurine from Matara, a unique object with no prototype in terms of function and fabric

Not Walia Ibex (Cabra*nubiana*) is a sacred animal in South Arabia, Semetic culture of the Horn and Nubian region. But it appeared to resemble a striking correspondence in type and style with Far East as well: i.e ancient Persia. These ideological contemporaries are stressed by artifacts and artistic works of the cultures under discussion. The Persian arts often ascribed to be more often fine accurate related to Sabean in the same chronological context.Besides the conventional understanding of religious ideology about this animal commonly expressed as sacred, that would be followed by a questions about the origin and distribution of the culture.

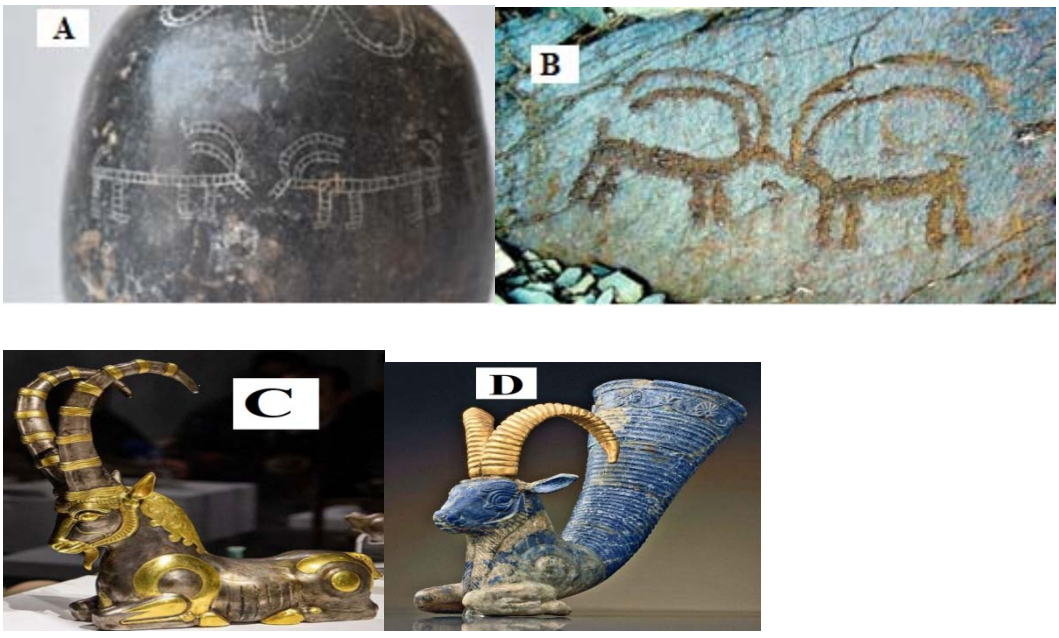


Fig.57, A and B, cross comparison in image of confronting Walias, A; a pot from Da`eroMika`el, B; a portray from Tiemreh rock site, Iran: C and D artworks from ancient Persia in theme of crouching goats

5.8. Conservation matters

Conservation essences differ throughout raw materials and individually from object to another. The chemical behavior of materials and the nature of context they live in determine the kind and rate of deterioration often happened to them as a post depositional adherent event. Artifacts containing hygroscopic materials such as wood, bone, adhesives, varnish and lacquer changes in humidity and temperature may lead to dimensional changes (Tornari et al. 2008, 84). Materials made out of iron are also sensitive to environment and these are amongst extremely decayed in the case of our material group. These are weapons and iron miniature rings. Corrosion on the bronze materials has also seen altering the dimensional change of the objects. These dimensional changes create strains that adversely affected mechanical integrities, such as the adhesion strength. Hence, corrosion, decay, fragmenting, crack and physical alteration of shape has been examined. The conservation issues hence demand a fast adequate conservational intervention to minimize the rate. Management issue is another important thing to assert. The way materials stored has to be given attention since it has been paving the way for physical decay of the metal collection.

5.9. Conclusion

The necropolis of Yëhâ provides a number of data concerning the burial mode and funerary practices used by the ancient Ethiopians. The presence of such rich furnishings in the tombs and the creation of a system of cavities and gutters on the surface suggest that this was not a simple gesture of affection on the part of the living for their dead, but rather a way of ensuring the well-being of the latter in their life beyond the grave. The utensils, metal tools that analyzed in this thesis and various objects discovered in these tombs bear witness to the degree of development reached at the time by the social stratification established at Yëhâ. They are like a reflection of its tastes and prosperity. Concerning this material, some points require attention in fact.

It can be stated that the sites with which Yeha currently offers the most comparisons are Sobea, Matar and Hawelti. It should be noted, however, that the material unearthed at Sobea and Hawelti shows variations. A comparison can only be made for a few objects. However, the abundance and quality of execution of the material from Yeha, with regard to objects of which there are a few examples elsewhere, leads one to believe that this city was important center. The iron objects (swords, daggers, and scissors) found in the tombs raise the problem of the origin of the raw material and also the question of its use. Like the numerous bronze objects, they are the manifestation of metallurgy in full possession of its means. On this basis, we can imagine a flourishing craft industry at Yeha; even though it has to be supported in concurrent findings in future. The small tools: chisels, palettes, punches, scales and weights, testify to the existence of workshops where precision work was carried out. Small bronze objects representing animals: lion, bull, ibex, or simply geometrical motifs, particularly attest to the value and artisan skill of craftsmen at the time.

On the other hand, Sudarabic letters are inscribed in the body of these objects. These letters, sometimes combined, make up names; one can therefore think that they are administrative devices and an identity mark of assumed precise task. The first observation is that these objects refer to a time when the South Arabian influence continued to be exerted, and I made a certain assertion from our data that this influence must have been re-examined. I omitted Photographic shows of every conservational matter here for the sake of avoiding repetitions.

5.10. Recommendation

This work should not been constituted more than an initial look and preliminary assessment of metallurgical aspect of Yeha archaeology. Even in an out special framework of the physical context under study, hopefully it will make it possible to distinguish in The geographical framework of the Yeha necropolis and, I hope, pave the way for future studies Comparing with greater precision the furniture of these spaces exceeding the above mentioned and others currently existing limitations. I have made it clear this should be taken as a very preliminary touch of a subject matter. This kind of studies should be advanced and exceed the current methodological limitations. Hence, to fill the currently existed information gap about the subject and acquire as much as possible knowledge about the subject, the researcher would like to forward the following recommendations.

To verify the extent to which edge-wear studies can critically challenge traditional models and interpretations, providing more intimate observations on the relationships between objects and individuals, as well as life history of an individual object. The existence of these artifacts potentially as a secondary context strongly justifies the importance of this analysis.

Arguably, these themes are beyond the scope of typological methods but edge-wear studies offer an instrument of investigation for these themes with much greater potential. (2) To this end, in order to understand how the use of wear studies can be advantageous in detecting the “social life of things” (Appadurai, 1986), it is important to compare it against the limitations of other methodologies which are normally applied to the study of objects. Again, typological approaches aim to compose a diachronic sequence of types, classifying objects according to a fixed status (that of the objects before they entered the archaeological record) with the end result that the object is depersonalized and its unique history lost. Thus, from a typological point of view two specimens can be very similar, but their context of find and treatment before deposition may vary greatly and this may prove to be the most significant aspect which distinguishes them.

The need for Archaeological, chemical and radiographic investigation that I have been mentioned as my drawbacks (under 1.9) so as to answer the demanded questions should also stressed here.

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