



## MATERIALS USED FOR MANUFACTURING SOME OBJECTS FROM 1600 BEFORE CHRIST – 500 AFTER CHRIST PERIOD

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### ABSTRACT

*The appearance and the spreading of metallic objects produced a profound social change. The early metallurgy included two ages: The Bronze Age and The Iron Age. The late Bronze Age is considered to be the most important for biblical archeology, because it seems to correspond to the period when Moses lived and when the Hebrew people exited Egypt. According to archaeological testimonies, the first iron period coincides with the entrance in Palestine of two invader peoples. The Bible mentions six metals: gold, silver, copper, iron, steel and tin. Metals served to humans as the most important material for manufacturing weapons, manufacturing application, jewels, cult objects and, most importantly, for manufacturing tools.*

KEYWORDS: metals, archeology, The Bible, history, metallurgy

### 1. Introduction

For more than 2000 years, bronze, a copper alloy, was to humans the most important material for weapons manufacturing for manufacturing application, jewels and, most importantly, for tools. It was widely used in all early cultures and it gave the name to a whole historic age, The Bronze Age.

All early civilizations considered bronze the most important material for a shorter or longer period during their history.

Bronze is an alloy, a mixture of many metals, usually copper and tin. It was used for the first time by the Egyptians, especially for tools and weapons manufacturing. In that time it was not easy to produce bronze. The main problem was obtaining tin. Possible mining regions were Iran and Cyprus. From 1600 B.C., when Egyptians had enough tin for themselves, bronze played an important role for them [ 1-3].

The Hindu manufacturers, on the other hand, had very productive stores and their bronze contained up to 15% tin. Until the middle of the second millennium B.C. the Chinese were masters in bronze molding. Bells and their full sounds were wonderful examples of their skill in metal processing.

The Greeks were masters in weapons and armor manufacturing. For example, their bronze helmets were already used in the Sumerian city of Uruk. In the Middle East it was used between 2200 and 800 BC.

Because gold is relatively soft it was used for precious vessels and jewels, but never for tools and weapons. Gold was coveted by leaders because it

symbolized power and authority. Thus Midas, the legendary Frisian king wished that all he touched become gold.

In Antiquity, gold was found especially in Egypt and Nubia, whose name means “land of gold”. In Greece, gold was found on islands and Thrace, and the Romans had mines in Spain and Dacia, currently Romania.

Gold objects made for burials in Ancient Egypt included coffins, altars and funerary masks. From 1000 B.C., iron helped the greatest empires into the classic Antiquity. The Greeks had been using it for weapons since the 6th century B.C., and in the Danube and The Alps regions, the Celts proved to be ingenious smiths by creating tough steel swords. The Romans produced their first weapons on the Elba Island, were the Etruscan smiths and their anvils.

The power of the Roman Empire relied especially on steel weapons and equipment. The Damask steel, made by mixing various types of iron and steel, was a model for the iron and steel processing art in late Antiquity.

Metals are mentioned in the Bible beginning with “The Book of Genesis 2, 10-14”. In the Bible six metals are mentioned: gold, silver, copper, iron, tin and lead. The Bible is a collection of books written under the influence of the Holy Spirit, over a period of approximately 1500 years: from Moses until The Apocalypse (1400 B.C.- 100 A.D.).

The early metallurgy includes the two ages: The Bronze Age and The Iron Age, and coincides with the events mentioned in the Bible. The Old Testament

shows the history of the Hebrew people and their life style in compliance with the Ten Commandments given by God to Moses. In addition to the dogmatic and moral guidelines, the Old Testament also contains rules of the social, politic and religious life, civil and religious laws.

The late bronze period (1550 – 1200 B.C.) is considered as the most important period for biblical archeology because it seems to coincide with the period of Moses and the exit from Egypt of the Hebrew people. The first period of iron (1200-190 B.C.), according to the archaeological data, coincides with the entrance in Palestine of two invading peoples. Thus, from the South and especially from the East, from Jordan (Joshua, I), the Hebrew entered, and from the North, more precisely, from The Aegean Islands, the Philistines came, who knew well how to process iron (II Samuel 13, 19-21), and they wanted to keep the secret, in order to maintain the technical superiority of their army, who wanted to conquer the same territories as the Hebrews.

## 2. Metallurgist in Antiquity, their conditions and life style

In the early Antiquity, the South – East of Canaan there was a very important center of copper metallurgy, from the Calcholithic until the Iron Age, at Pumon, currently Feyman, the most important center of metallurgy of Arabah. The sons of Cain (the Kenites), a small tribe mentioned in the Bible, were for a long time the copper metallurgists in Canaan. Jeremiah, in his book, confirms the Kenites believed in Yahweh (Jeremiah 35,19); all the data suggests that Yahweh was closely related to the metallurgist, from the discovery of copper and its processing [4 -6]. In the book of Zachariah an essential connection between Yahweh and copper is suggested, where the God of Israel is symbolized by two copper mountains (Zachariah 6, 1-6). Moreover, Ezekiel, in his prophesies describes the divine being as a man whose appearance was the same as copper (Ezekiel 40, 3). In Isaiah 54, 16, Yahweh is mentioned as the creator of both copper mining and of its processing.

## 3. Myths and legends of the people

The myths and legends of many ancient peoples expressed in various forms the faith in a savior. All peoples felt the need to be saved from evil. Mircea Eliade [7], in his comparative study, observed a close similarity in the faiths and the life style of metallurgist from all over the Antiquity world.

This uniqueness influenced their organization as a group that traveled long distances for material changes, for copper extraction and mining.

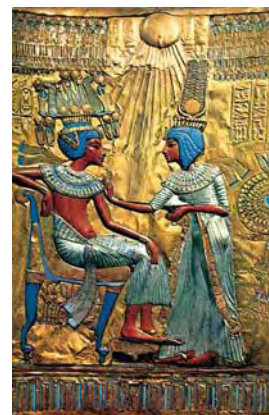
The Egyptian God of metallurgy, Petah, was considered to be the source of Ka. In Mesopotamia, the god of metallurgy was Enki, considered to be one of the main gods in the Akkadian pantheon [1]. As Ptah [8] in Egypt, he was celebrated in Sumerian hymns as being the most intelligent and also the loneliest god. In the tradition of metallurgy fighting against gods is common [7].

In Greece, the Cyclops, creatures symbolizing former metallurgists [9], were mentioned as the first beings who fought against Uranus, the main god of the Ancient Pantheon, and against all gods [5].

## 4. Metal objects from the Antique world

Metallurgy first developed in Anatolia, in today's Turkey. The mountains in the high regions of Anatolia were rich in copper and tin deposits. Copper was also extracted in Cyprus, Egypt, The Negev Desert, Iran and around the Persian Gulf. Copper was usually mixed with arsenic, but the constantly growing demand led to long distance commercial routes being established to and from Anatolia. Copper was transported by sea to the great kingdoms of Ancient Egypt and Mesopotamia.

In that period, it seemed that iron was used for ceremonial purposes only, as it was an extremely expensive metal, more expensive than gold. A systematic metallurgy of iron appeared for the first time in the Hittite Empire, in the 14th century B.C., and in India, starting in 1800 B.C. Between 1600 and 1200 B.C. iron was obtained by primitive casting, in the Hittite Empire (Anatolia and Caucasian Mountains). The disappearance of that empire allowed the information on iron metallurgy to circulate in the entire region, facilitating the evolution from The Bronze Age to The Iron Age [10 -15].



**Fig. 1.** The throne of Tutankhamen pharaoh (XIV<sup>th</sup> century b. Cr., the Museum of Cairo, Egypt).

The gold funerary objects in Ancient Egypt included coffins, altars and funerary masks. One example of gold used in burials is the treasure of the Egyptian Tutankhamen pharaoh, who reigned between 1333 and 1326 B.C.. Tutankhamen's chair, with its golden back, decorated with filigree can be observed in picture 1 and the pharaoh's funerary mask is presented in picture 2.



**Fig. 2.** *The Tutankhamen mask.*



**Fig. 3.** *Guns from Bronze Age, Romania.*

The European territory, rich in natural resources, is characterized by the presence of many treasures made of precious metals and stones [11-15].



**Fig. 4.** *The funerary diadem Kept in the Louver Museum.*

During the Hellenistic period (313 – 30 B.C.) the glitter and richness reached the highest levels. After

Alexander the Great defeated Darius the 3<sup>rd</sup> and conquered Babylon, Sosa and Panopolis, the great treasure of Persia was robbed and the riches were carried on 2000 mules and 3000 camels. The metals from this treasure were transformed by the Hellenic Kings into coins (the unique coin of Alexander the Great, made of gold – the stater). The only symbol of royal authority worn by all Hellenistic Kings was the diadem (Fig.4 – *the funerary diadem on display in the Louvre Museum*) adopted by Alexander from the Persian kings.



**Fig.5.** *Gold necklace.*

The Etruscans, the first inhabitants of Italic peninsula, were also interested in jewels. The Kings appeared in the ceremonies as supreme priests, wearing gold crowns, precious footwear, mantles richly embroidered and decorated with human faces, and they sat on a sumptuous thrones during trials and gatherings. During ceremonies dedicated to military victories, the King wore a scarlet toga, embroidered in gold, a golden crown, a sphere and a golden chain, and in the hand an ivory scepter with an eagle at its top.



**Fig. 6.** *Gold bracelets.*

In the 7th and 6th centuries B.C. jewels were formed by hammer, with filigree and granulations with abundant decorations. The decorative motives were applied on fibulas, earrings and necklaces, on bracelets and rings. Up to 20 miniatures were applied, representing heads of women, men, divinities and half – gods.

Dacia was also among the territories rich in natural resources. The manufacturers there processed iron, copper, silver and gold. Their workshops made necklaces, bracelets, rings and also armor elements. Apart from the specialized workshops, there were

nomad craftsmen who used to roam from city to city. Items from the 4th and 3rd century B.C. were discovered, which were made using the hammering technique to form stylized human and animal figures.

Among those jewelry items there were spiral bracelets, ornamental chains obtained by knitting threads and rings, bracelets with Hellenistic snake heads. The Geto-Dacian craftsmen also mastered the gold coating technique. The largest bracelet is an open cuff made of massive gold sheet, weighting 580 grams, decorated with 10 buttons fixed into holes.



**Fig. 7.** *Muff opened gold bracelet – The treasure is stored in The National History Museum from Bucharest.*

### 5. Metallic objects reminded in the Old and New Testament

During the exodus, the tent was a holy place for the Hebrew people (Exodus 33, 11). Its appearance and dimensions are mentioned in detail where Yahweh advises Moses to built it (Exodus 26) and where its building by the two skillful masters, Betaleel and Oboliah, is described (Exodus 36, 8-38). The most important objects are the altar of incensing, the candelabrum with seven arms (Menorah), the table for offerings, the Ark of the Covenant, the copper snake etc.



**Fig 8.** *The Law Shrine (from the Capernaum synagogue IV-III century before Christ).*

According to the description from Exodus (chapter 25, 10-22; 37, 1-9), the ark was a box made of acacia wood 1.25 m long, 0.75 m wide and 0.75m high. It was coated in gold and had rings fixed on it for transportation purposes. The lid of the ark was made of gold and had two cherubs with opened wings mounted on the sides. That lid was worshiped as “the throne of mercy”, where Yahweh would reveal himself to the people. Of all the descriptions and representations of the Lost Ark, we would like to mention the embossed representation found in the Capernaum synagogue (4<sup>th</sup> - 3<sup>rd</sup> century B.C.).

The contents of the Ark have been debated through the centuries. The general consensus is that the first tablets containing the Ten Commandments, which were broken by Moses, and the second tablets, which remained intact, were contained in the Ark.



**Fig 9.** *The candelabra with seven arms – Menorah.*

The New Testament mentions the following objects:

- the anchor (Acts 27, 29-30), a small coin - the smallest roman coin, rating a half of a condrat (Marcus 12, 12, Luke 21, 2)
- the cohort - the military unit of 1000 soldiers (Acts 10, 1: 21, 31, Mathew 27, 27, Marcus 15, 16, John 18, 3-12).
- the sword – defense weapon used especially in the old wars (Mathew 26,55: 47, 51: Marcus 14, 43: 47, 48: Luck 22, 52: John 18, 10).
- a vessel- recipient used at home or as cult object made of various materials, such as clay, wood, stone, copper, gold , silver etc. (Mathew 12, 29; Marcus 3, 26; Luck 17, 31).

In the New Testament, Judaism was not a closed world. Palestine was part of the Roman Empire and many Hebrews had connections with the pagan world, with the Hellenistic world, especially with those from Alexandria, in Egypt.



**Fig 10.** *The coins used in the New Testament.*

Long before coins were introduced, merchants traded in wares. Anything could be traded, from objects, metal, wood, food or livestock.

In the Old Testament the shekels and the talents served as coins. They were not coins but weights and remained as such at least until the 7<sup>th</sup> century. The traders weighted the silver or other metals and buyers carried their own weights in leather bags, for control (Deuteronomy 25, 13).

During the New Testament period there were three types of coins in Palestine: the official Roman coins, the coins of provinces, meaning the Greek coins and the local Hebrew coins, which were supposedly made in Cesarea. The contribution that Hebrews paid for the Temple was in Greek coins, those made at Tir - the drachmas, not in Roman coins. The coins were made of silver, gold and copper,, bronze or brass. The most usual coins mentioned in the New Testament are the Greek tetra-drachmas and the Roman dinars. Those were the coins paid to the workers. In the New Testament period, the financial system was well organized.

The Roman army was particularly well organized. Every military campaign was conducted by a general (dux) who was always an aristocrat. During the Republic, the generals were consuls or former consuls, or at least former praetors, to whom the Senate granted the title "imperium" or allowed them to conduct an army. During the empire, the supreme commander was the emperor, who named a general from his relatives or friends.

In the year 27 B.C., Augustus instituted new elite troops - the Praetorian Guards – with the exclusive mission to defend the emperor. At the beginning, they were nine cohorts, out of which three stayed in Rome and the others in the nearby cities.



**Fig. 11.** *The golden helmet- has fixed the imperial eagle.*

Later, the cohorts increased to twelve. The Praetorian uniform was similar to that of other legions, except for the helmet which was gold coated and had the imperial eagle on it.



**Fig. 12.** *Roman palladium.*

The shield had a rectangular shape, slightly curved, but also were oval shields. On the embossed center soldiers drew various motives, mostly personal symbols or those of the legion.

The sword was short with a metallic grip and a cross hilt guard (on the both margins of the blade), with simple or double edge, designed for close combat.

The javelin or pilum had a sharp tip followed by a thinner portion, designed to break on impact and leave the tip inside the victim.



**Fig 13.** *Roman soldiers endowed with fight equipment*

## 6. Had the metals importance diminished in the New Testament?

The Hebrew people were already formed. Metals were known, as well as cult objects, ceremonial and civil objects. The New Testament had another dimension. It presents the arrival of our Savior, Jesus Christ, His activity, the spreading of the Gospel, and it also presented the activity and the acts of the Holy Apostles with less focus on the social, political and economic life. The importance of metals in the New Testament did not diminish.

The Old Testament contains the history of humanity preparing for the savior and that savior comes in the New Testament. Both Testaments are parts of the same divine purpose: the savior of humanity, prepared in the Old Testament and described in the New Testament.

The Savior Jesus Christ is a unique figure in human history. Many studies were made about His

life and work, each in compliance with certain historical, philosophical, social, political and economical ideas. That is why He is presented at one time as a thinker, then as a philosopher, a moralist, an ideal dreamer, or a visionary.

Nevertheless, for the Christians, Jesus Christ is a divine human being, He is the Son of God, Whose mother is Holy Virgin Mary and Who lived as a historical person in the time of the emperors Augustus (31 B.C. -14 A.D.) and Tiberius (14 – 37 A.D.). The Gospel preached by Jesus Christ, is a moral and religious, message, not a social, political or economic one [11 -12].

Evan though Jesus preached to the Hebrew people, His teaching has a universal meaning. It is destined for the whole world.

Written by different authors, with different goals, each book and each author with a different personality, the books of the New Testament reflect the social customs and the realities of the distant periods when they were written.

## 7. Basilicas built by the emperor Constantine

In the first three centuries of the Christian era Christianity was forbidden and Christians were persecuted because of moral principles which defied the faith in many gods, and the cult for the Empire.



**Fig. 14.** *The fish- Christins symbol.*

Constantine the Great was the first emperor who understood that the persecutions amplified the internal disorder. Realizing that the new religion could become a powerful aid for the state, he gave full freedom to the new religion trough the Mediolanum Edict (Milan of today) from the year 133 A.D.. The faith spread all over the empire and across its borders, during Theodosius I the Great (379 - 395 A.D.) becoming the only religion allowed by the state [19-20].

### 7.1. *The God' s Birth Basilica*

The Church of the Nativity in the heart of Bethlehem marks one of Christianity's most sacred sites - the birthplace of Christ.

Situated on Manger Square 8 kilometres (5 miles) from Jerusalem, the church is built over a grotto where the Virgin Mary is said to have given birth to Jesus. The church's large fortress-like exterior stands as a testament to its turbulent history. For centuries, it was one of the most fought over holy places. It was seized and defended by a succession of armies - including Muslim and Crusader forces.

In 333 A.D. the Emperor Constantine completed the basilica, which attracts thousands of pilgrims from around the world every year. The original structure was completely destroyed in the early 6th century. It was rebuilt in its present form in 527-65 A.D. during the rule of Emperor Justinian. Over the years, the site has been expanded.

### 7.2. *The church of the Holy Thumb*



**Fig.15.** *The church of the Holy Thumb (Jerusalem - exterior from the church).*

The Church of the Holy Sepulchre (Latin: Sanctum Sepulchrum), also called the Church of the Resurrection (Greek: Ναός της Αναστάσεως, Naos tis Anastaseos; Arabic: كنيسة القيامة, Kanīsat al-Qiyāma) by Eastern Christians, is a Christian church within the walled Old City of Jerusalem.

The site is venerated by many Christians as Golgotha,[1] (the Hill of Calvary), where the New Testament says that Jesus was crucified,[2] and is said to also contain the place where Jesus was buried (the sepulchre). The church has been an important pilgrimage destination since at least the 4th century, as the purported site of the death and resurrection of Jesus. Today it also serves as the headquarters of the Greek Orthodox Patriarch of Jerusalem, while control of the building is shared between several Christian churches and secular entities in complicated arrangements essentially unchanged for centuries.

### 7. 3. *The Holy Sophie church from Constantinople*

The Holy Sophia church was built by the emperor Constantine the Great in the forth century, at Constantinople. There is nothing left from the first constructed church. Short time after its destruction,

the second church was built by his son, Constantine and by the emperor Theodosius the Great.



**Fig 16** The Holy Peter basilica- general view.



**Fig. 17.** Gold coins( the solidus) during the Constantine the Great

#### 7.4. The Holy Peter basilica from Rome

The Holy Peter basilica in Rome was built on the spot of the Caligula and Nero circus, where, according to the Christian tradition, Peter was crucified in 67 A.D.. The church was constructed between 319-329 by Constantine the emperor, to shelter the chain with which Saint Peter was tied when he was held prisoner in Jerusalem. The chains are kept under the main altar in the basilica. In the 15<sup>th</sup> century, the building was in ruins and Pope Julius the Second decided to build a new, higher basilica. The construction of the current building began on 18 April 1506 and ended in 1612, during the time of Pope Paul V. The basilica was sanctified on 18 November 1626 by Pope Urban the 8<sup>th</sup>. [20, 21].

### 8. Conclusions

The early metallurgy included two ages: the Bronze Age and the Iron Age. It coincided with the period in which the events related in the Bible happen.

In history, one of the most important elements for development was metal, including the New Testament period. Metals are presented in the Bible from the first Book. In the Old Testament they mention: gold,

silver, copper, iron, lead and tin.

The importance of metals in the New Testament did not diminish. Metals were used in all domains: social, political, economic, military and religious.

The Old Testament describes the history of the chosen people and their life in compliance with the Commandments given by God to Moses.

The New Testament has another dimension: the arrival of our Savior, Jesus Christ, His activity, the spreading of the Gospel, and it also presents the activity and the acts of the Holy Apostles.

The Hebrew people were already formed. They knew the metals, the cult objects and the civil and religious laws.

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