TOPIC TWO' EVOLUTION OF MAN, TECHNOLOGY AND ENVIRONMENT

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The Origin of man;

There are two theories which tries to explain the origin of man

i. Creation/Biblical theory,
ii. Evolution theory

A ***theory*** is a scholarly argument which tries to explain the origin of a certain phenomenon.

CREATION/ BIBLICAL THEORY

the theory states that ***"man was created by God"*** This theory dominated before 18th century, the biblical scholars argue that God created the world and all things in six days and rested in the seventh (7th) day, man happened to be created in the sixth day, the first set of human being Adam and Eve were created and blessed in the garden of Eden, God created the first people and those people reproduced and dispersed all over the world, therefore all people in the world came from those first people Adam and Eve,

Scholars who developed this theory are like Arch Bi-shop James Assher in 1593 he propounded an idea that the world was created on October23,4004BC at 9:00 in the morn ing, his idea was supported by Martin Luther,

EVOLUTION THEORY

INTRODUCTION.

Evolution –is the gradual changes of plants and animals from simple stage to more complex stage.

Evolution of man.-is the gradual changes of man from simple stage (*modern apes*) to complex stage (*modern man*). The evolution of man involved four main changes which are

i. Development of brain.
ii. Bi- pedal locomotion.
iii. Reduction of jaw anterior teeth and enlargement of cheek teeth.
iv. Tool use and manufacturing.

The theory tries to explain the origin of man by describing the changes that our ancestors underwent until they were like modern man,

The theory of evolution states that "***one living form could arise out of another ancestral form instead of being separate creation***" therefore according to this theory, ***the existing man is the product of gradual changes of man from modern Apes (gorillas, monkeys and chimpanzee) to modern man (Homo sapiens sapiens)***

By the rate 18th century some scholars who belonged to this school of thought were,

i. Carl Linnaeus, he concentrated on the classification of animals
ii. Erasmus Darwin, was a father of Charles Darwin
iii. Lamarck
iv. Charles Darwin.

Charles Darwin contributed in the discussion, in 1859 he published a book of "*The origin of species"* in which he applied the theory of evolution of man, he stated that "*man descended from the stock as the old world monkeys who had 32 teeth"*

According to the features which were found in Africa he concluded that *Africa was the place where human being originated*

Discoveries made at Olduvai Gorge provide us with the best examples in the evolution of man. Dr Leakey in 1959 in the Olduvai Gorge discovered a skull of one of the oldest ancestors of man,

In South Africa Raymond Dart in 1924 he discovered a fossilized skull of a child in a place known as Taung, the skull looked like an ape and he named ***Australopithecus Africanus*** which means ***southern apes***

EVIDENCE OF THE EVOLUTION OF THE HUMAN BEING

There are two pieces of evidence supporting the theory of evolution: comparative studies of modern animals, and fossil evidence.

- **Comparative studies of the evolution of the human being.** Evidence from comparative studies of the evolution of human teaches us that two groups of animals with similar features have the same ancestor. Therefore, the similarity of the features of humans to those of monkeys suggests that humans and monkeys share a common ancestor.
- **Fossil as evidence of the evolution of the human being.** This evidence is based on animal bones that have survived for many years under the ground. They are used to give evidence of the gradual change in the shape of humans as well as technological development. In Tanzania, for example, the earliest fossil evidence has been found at different sites. Such sites include Laetoli, Olduvai Gorge, Lake Natron, Lake Ndutu and Lake Eyasi in the Arusha region. Olduvai Gorge is the most important site in Africa in regards to the evolution of human being.

STAGES OF MAN'S EVOLUTION

1. **PRIMATES/MODERN APES** (Ape, Gorilla, Monkey, Chimpanzee)
   - Their bodies were covered by lots of hair.
   - They walked on four limbs
   - They lived in dense forest.
   - They had poorly mental abilities.
   - They totally depended on nature eg. ate raw food
   - They lived before the stone age
2. **AUSTRALOPITHECUS AFRICANUS**

Australopithecus Africanus evolved from modern apes (Gorillas, monkey and chimpanzees) and is divided into two groups

i. Zinjanthropus
ii. Homo habilis

- ***Zinjanthropus*** is a member of a large family of primates called ***Australopithecines,*** In this stage Man started to design, make and use tools. The skull of Zinjanthropus was discovered by **Dr Leakey** and his wife **Mary Leakey in 1959** in **olduvai gorge.** a more developed ***Australopithecines*** was ***Homohabilis***
- ***Homohabilis*** Means
  - the skillful man
  - he was the first systematic tool maker and had bigger bran than that of ***Zinjanthropus,***
  - he is believed to be a direct ancestor of modern man.

The appearance of both *Zinjanthropus* and ***Homohabilis*** marked the beginning of a period in man's history known as "*The Early or old stone Age*" it was known this because man's tools were made from stones, ***Australopithecus Africanus*** evolved into ***Homo erectus***

3. HOMO ERECTUS

Homo erectus means Upright man, the name came from the fact that man could walk on two hind limbs with his bark straight (Bipedalism), the fossils of ***Homo erectus*** have been found in ismila near Iringa, others have been found in Olorgesaille and near Turkana in Kenya. The most famous *Homo erectus* skeleton is of young female commonly called ***Lucy*** that was found in Hadar Ethiopia,

PHYSICAL FEATURES OF *HOMO ERECTUS*

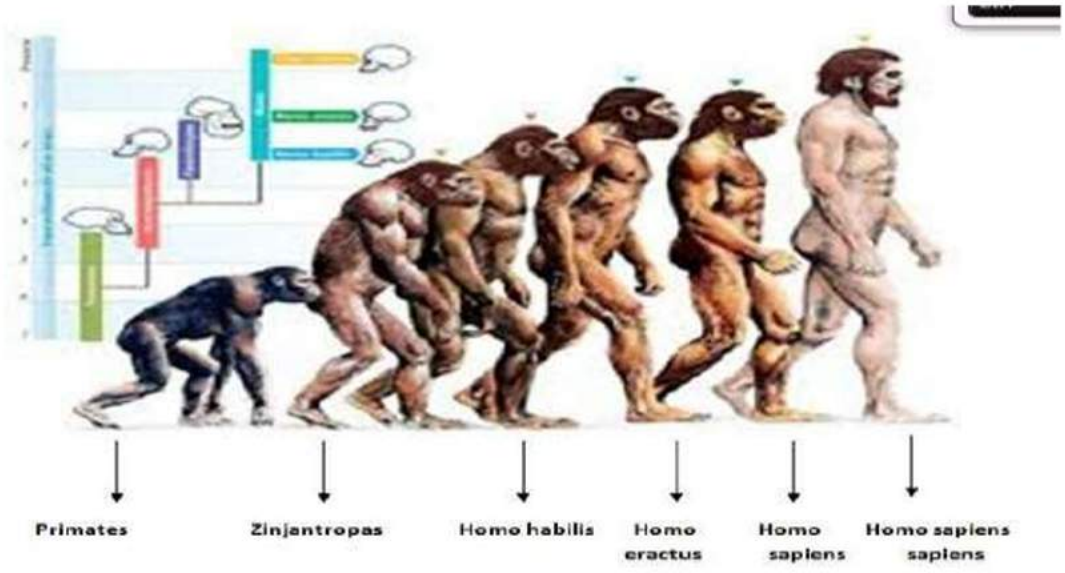
i. Bi-pedalism (the process of walking on two hind limbs).
ii. His height was about 5 feet and 6 feet
iii. He had large brain than *Homohabilis* about 700cm^3 to 1250cm$^{3.}$
iv. He developed language

4. HOMOSAPIENS

Homo sapiens means intelligent man or a thinking man,
Homo sapiens evolved from *Homo erectus*, he had a brain capacity of about 1000cm^3 to 1800cm^3. At this time man lived by **hunting, gathering, and fishing,** he also learned how **to domesticate plants and animals**, *Homo sapiens* made tools from **bones, woods,** and **stones** this tools called **Microliths** because of their small size.

5. HOMO SAPIENS SAPIENS.

Homo sapiens sapiens means **modern man**,
He had large brain and great intelligent, he is able to think about the past, plan for the future and discover things through research, he developed a more flexible and complicated use of language.



EVOLUTION OF TECHNOLOGY.

A. THE STONE AGE

Age - Is a period based on man's economic activities and type of the tools used. eg
Stone Age, Iron Age, Science technology Age etc.

The Stone Age refers to the period in human development where most of man's tools were made of stones. The Stone Age began with the first production of stone implements and ended with the first use of bronze,

Since the technological limits of the Stone Age was based on technological development rather than actual date range, its length varies in different areas of the world.

PHASES OF STONE AGE

The Stone Age is divided into three phases

i. The Early/old Stone Age/ Paleolithic Age
ii. The middle Stone Age/ Mesolithic Age
iii. The late/New Stone Age/ Neolithic Age

THE EARLY STONE AGE { 2.5 million years ago up to 500,000 B.}

The appearance of both *Zinjanthropus* and *Homo Habilis* marked the beginning of the Early Stone Age, it Is believed that the Early Stone Age started from 2.5 million years ago up to 500,000 B.C and it was a longest Stone Age period in the world. the Early Stone Age has been divided into two phases which are

- **OLDOWAN**
- **ACHEULIANS**

***Oldowan* stone tools**

Oldowan tools were named after Olduvai Gorge in Tanzania where they were first discovered. also they have been found on the shores of Lake Turkana in Kenya and the **Omo and Hadar valleys in Ethiopia**.

Oldowan tools were **simple and crude**, and they were obtained **from hard natural rocks;** sometimes, little modifications were made. In some other cases, such stones were not modified at all; instead, they were used to perform certain tasks as they were picked. The *Oldowan* tools included **flakes, choppers, and cores.** These tools were mainly used for simple activities such as **killing, skinning animals and breaking bones to obtain marrow.** They could also be used for breaking nuts and digging roots. The maker of Oldowan stone tools was ***Homo Habilis.***

***Acheulian* stone tools**

Acheulian stone tools were discovered first at St. Acheul in France. These tools were more advanced than the *Oldowan* tools because **they were made by breaking small sharp pieces of stones from hard bigger rock**. This process is called **flaking**.

The *Acheulian* stone tools included **hand axes, cleavers, and picks**. They were used for heavy-duty activities such as **cutting trees, killing animals and processing meat**. The maker of *Acheulian* stone tools was ***Homo erectus.***

Acheulian stone tools are found in Isimila, Olduvai Gorge, Lake Natron and Laetoli in Tanzania; around Lake Turkana in Kenya; and St. Acheul in France. Apart from making stone tools, *Homo erectus* lived

together in small camps, hunted animals, and shared food. the technology used was known as **full flaks technology**

TYPES OF TOOLS MADE DURING THE EARLY STONE AGE

The tools made during this period were **simple, heavy, and crude,** they were made from hand sized pebbles and blocks of stones, man used stone to strike off flakes (small stones) from another stone in order to produce tools. The most notable tools made during this period were **pebble tools, chopping tools, hand axes, spears**, etc

USES OF STONE TOOLS DURING THE EARLY STONE AGE

i. Killing animals
ii. Cutting animal fresh
iii. Digging up roots
iv. Self defense
v. cutting branches and sharpen woods

HOW HUMANS OBTAINED FOOD DURING THE OLD STONE AGE

During this age, humans obtained food **by hunting wild animals** using simple and crude tools, and **gathering roots, tubers, eggs and fruits** from the surrounding. They hunted antelopes, buffaloes, and other animals. Bones of animals hunted by human beings during this age have been found at Olduvai Gorge in East Africa.

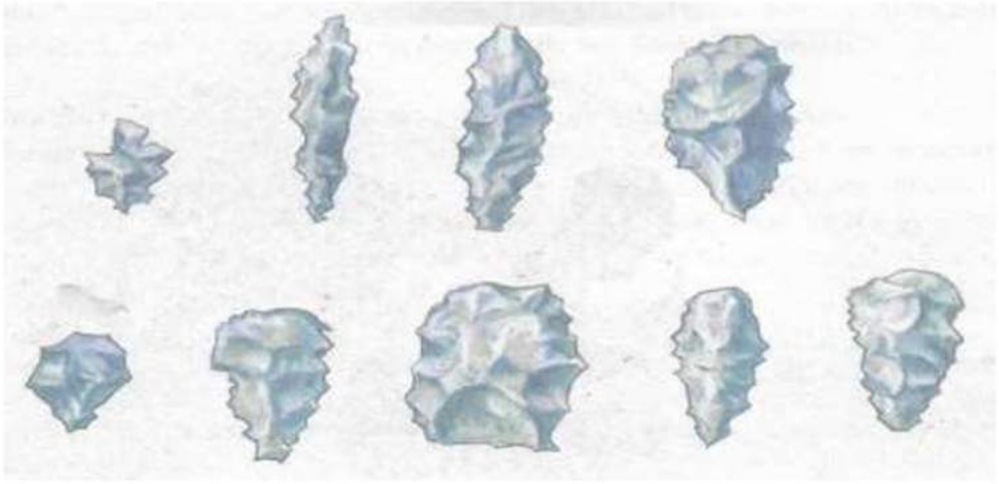
WAYS OF LIFE DURING THE EARLY STONE AGE

In spite of several developments in the early Stone Age, man's life in the Old Stone Age was poor

i) Man could not control his environment
ii) His life was not safe
iii) He did not have enough food to eat
iv) Man depended on the environment for his life, for example they lived by digging up edible roots, picking wild fruits, catching insects and fish from their surroundings,
v) Their major activities were **hunting and gathering,** and these were the main ways used by man to obtain food during the early stone age
vi) Hunting was done either individually or in a small hunting band or groups.
vii) People had no permanent settlement, they were on the move most of the time searching for food, shelter, and security.
viii) They lived near water sources such as lakes, and rivers

THE MIDDLE STONE AGE

The Middle Stone Age started around 500,000B.C and ended around 50,000 B.C, the main difference between the old and the middle Stone Age lies in the **quality** of tools which were made. In this period, man-made **better, a**nd **specialized tools,** tools were made of **bones, woods, and stones,** they were **smaller, sharper and easier to handle**, they include **spears, arrowheads, knives, and stone picks,** The makers of tools in this period were *Homo erectus* and *Homo sapiens.*



Pictures showing Middle Stone Age tools

The major technological development during this period was **the discovery and use of fire**, which **was made by striking stones against each other. Later on, they learnt how to make fire by hand drilling a stick on a dry wood (ulindi and uwimbombo).** With fire and such tools, human beings controlled their environment better than before.

A man's ancestor making fire by **hand drilling a stick on a dry wood (ulindi and uwimbombo).**

USES OF FIRE DURING THE MIDDLE STONE AGE

i) Fire was used to scare away wild animals and thus keep man safe.
ii) During the night, man used fire as source of light.
iii) Fire provided warmth during cold nights and seasons, especially in the mountainous area.
iv) Man used fire to cook his food. He cooked tough or poisonous roots and seeds to make them edible and also he roasted them. Therefore, man was able to include a larger variety of foods in his diet.
v) Fire also was used to fell trees and clean land. Making it easier for man to occupy new areas.
vi) Fire was used to confine animal when man was hunting.
vii) Some communities used fire to communicate.

viii) Fire or smoke signals were used to pass messages from one area to another.
ix) Fire and smoke could be used to preserve food, for instance when drying meat.
x) Man used fire to harden the tips of tools such as spears, produce improved implements
xi) Later, man used fire to make gum soft. This gum was used to join tools to their handles.
xii) When man discovered how to make pottery, he used fire to harden the clay items to make them durable

IMPACTS OF THE DISCOVERY OF FIRE

i. Destruction of environment
ii. Increase of food variety
iii. Through the discovery of fire man managed to clear and live in thick wood land and in mountainous region
iv. It changed the life style of the people
v. Intensification of security.

USES OF TOOLS DURING THE MIDDLE STONE AGE

Stone tools during the Middle Stone Age were used for

i) Killing animals
ii) Cutting animal fresh
iii) Digging up roots
iv) Self defense
v) Fishing
vi) Cutting tree branches and sharpen woods

Evidence of Middle Stone Age tools have been found at Olduvai Gorge, Lake Eyasi basin, Laetoli, isimila and Kilwa in Tanzania; Koobi Fora and Chesowanja in Kenya; and Swartkrans in South Africa

MAN'S WAYS OF LIFE DURING THE MIDDLE STONE AGE

i. During this period man practiced **hunting and gathering** and **fishing** as the only ways of getting food, hunting was done in groups with better tools
ii. During this period man painted pictures of animals on the cave and on the rocks especially animals that served as food, such picture can still be seen in Kondoa and Singida in Tanzania and Apollo II cave in south Africa.
iii. Man lived in caves for example Gambles cave in Kenya.

PHYSICAL FEATURES OF MAN DURING THE MIDDLE STONE AGE

i. Man had a bigger brain of between $1000cm^3$ and $1500cm^3$
ii. Man was intelligent
iii. Had smaller teeth as well as rounded fore head
iv. Man became more concerned about their appearance
v. Man began to make clothes from animal skins
vi. Social organization started to appear for the aim of enhancing security.

THE LATE/NEW STONE AGE

The Late Stone Age, also known as the New Stone Age, The period lasted from 50,000B.C to the first millennium A.D, the period is associated with *Homo sapiens* and *Homo sapiens sapiens*

During this period man made and used better tools compared to those used during the middle and Early stone age. He made ***small, sharp*** *and* ***refined tools*** known as ***Microliths*** which were produced by grinding stones against each other. ***Microlithic technology*** was the technology developed during the late Stone Age.

Late Stone Age tools

The makers of these tools were ***Homo sapiens sapiens.*** Tools made during this period were, **stone axes, blades, barbed arrows, spears, harpoons, boats etc**,Barbed arrows and harpoons were made by bones and were used for fishing together with boats, most late Stone Age sites are found in caves near lakes and rivers, they include **Nsongezi**, along the river Kagera, **Magos** in Uganda, gambles cave in Kenya among others,

Archaeological findings from these places indicate that there were **settled communities.** The first evidence for that is the **presence of large quantities of remains of tools in those** areas and large quantities of fish, fowl and animal bones. The second evidence is **drawings and paintings in caves and rocks** that show hunting and other activities of settled communities. The paintings indicate that the Late Stone Age's societies **held religious beliefs, made religious symbols, and decorated their bodies.**

PHYSICAL FEATURES OF MAN DURING THE LATE STONE AGE

i. Man had small teeth than that of the man in the Early Stone Age
ii. Man had a large brain size and capacity compared to his ancestors ($1000cm^3$ to $1800cm^3$)
iii. The shape of his skull was similar to a modern man's
iv. Bi-pedalism developed on long straight legs
v. Man had less body hair

CHANGES WHICH TOOK PLACE DURING THE LATE STONE AGE(*NEOLITHIC REVOLUTION*)

Neolithic revolution was the rapid changes whereby man started domestication of animals and plants. Man at the first time started to domesticate DOG which was used for hunting purpose. In most societies women were responsible for gathering plants and seeds, therefore they may have been the first to plant seeds, men usually were the hunters, women began planting and harvesting their crops in the same place year after year

Neolithic revolution took place during the last phase of the late Stone Age and marked the transformation from Stone Age to Iron Age, the following changes took place during this period.

i. ***Beginning of agriculture***, man started agriculture because of scarcity of prey due to climatic changes and over consumption of animals by humans, to ensure that he got constant supply of meat he began to tame a young of wild animals he hunted, by taming large animals such as sheep, goats, and pigs people developed ready source of meat, milk, wool and skin.
ii. ***Creation of permanent settlement***, agriculture required farmers to settle in one area for a long period in order to prepare fields, plant, weed and harvest, therefore man was forced to build simple houses for his shelter, he used branches of trees and grasses to construct the dwellings.
iii. ***Development of social and political organizations***, as the early villages grew there was a need for leadership or authority to regulate activities, for example there was a need of a system to distribute farm land fairly to all villagers and settling disputes arising in villages in this way social and political ties developed forming the basis for today's civilized societies.
iv. **Population expansion**. This was mainly a result of increased food production and permanent settlement. Increase in birth rates was vital to offset increase in death rates and that required settled occupation of territory that encouraged population expansion. In permanently settled communities, population expanded faster due to the sharing of child raising responsibilities
v. ***Specialization of labor***, specialization of labor is whereby different people do particular type of work, during the new Stone Age specialization of work was in two levels.At **family level**, where by men were the breadwinners i.e. hunting and developed other activities such as pastoralism or fishing, women were responsible for taking care of the family including all the domestic chores. At a **community level** where some people were hunters and gatherers while some became pastoralists or farmers and others became fishermen. The specialization of labor led to the development of trade system.
vi. **Spread of diseases**. The domestication of animals and permanent settlement spread diseases easily than during the period of hunting and gathering. Inadequate sanitation and man's closeness to animals was the cause in the spread of environmental and animal diseases such as Small Pox, Measles and Nagana/Sleeping Sickness that attacked man and his livestock
vii. ***Development of arts and crafts***, in the late Stone Age man developed various types of arts and crafts, these include painting, poetry, weaving and carving, cave painting were the way of expressing customs and beliefs.
viii. ***Religion***, the development of agriculture made man more interested in natural phenomena such as season and weather changes, it is believed that man started to think about life after death, these are some of the factors that led to the development of religious practice. Proofs of such practice have been found in Njoro river caves and Hrax hill in Kenya

ix. **Conflicts and wars**. The increase in population and improvement of productive forces, contributed to scarcity of resources that led to conflicts and wars. Societies with greater improvement of productive like iron technology plundered and expanded into others to grab them of their resources like land, livestock and food

x. **Increased energy possibilities**. Domestication of animals like oxen, donkeys, horses and camels made man access more energy possibilities. Such animals facilitated intensive subsistence farming as man could open more land for farming. Also improved transport that enable man to move for long and short distances for trade and other issues like adventure.

xi. **The Rise of social classes of exploiters and exploited**. The upper classes of leaders and people with special duties like diviners and healers, who though did not directly engage in production, organised certain aspects of production and utilised the accumulated wealth produced by others (their subjects). They dominated their communities by means of property control and decision making. For example while as land could be collectively owned by the community but it was entrusted to the leaders to distribute it

B. **IRON AGE**.

The Iron Age was a period when human beings used **iron** in making tools and weapons. iron was obtained from iron ore (**stones which contain iron**). iron ore was smelted to get pure iron, which could be forged to make iron tools.

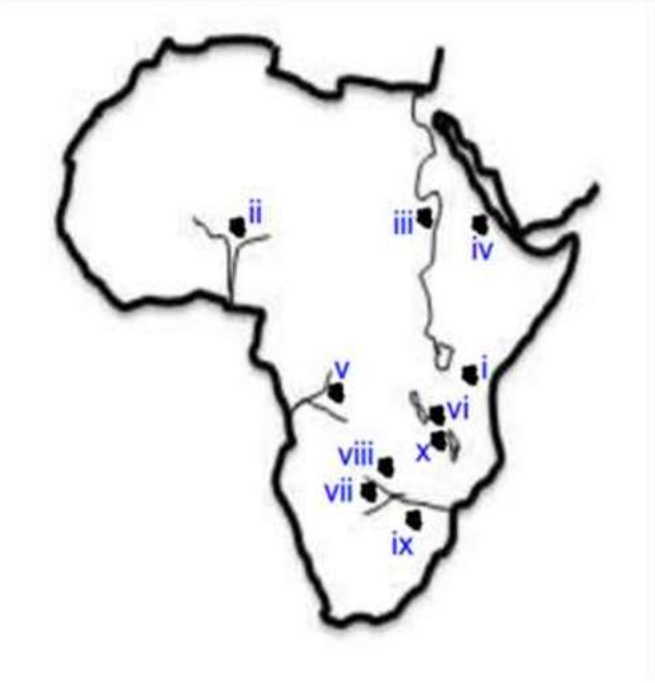
Iron smelting is the process of changing iron ore into pure iron through heating. The pure iron was forged to make iron tools.

Iron forging, Means processing and shaping smelted iron into usable objects such as hoes, axes, knives, machetes, and others.

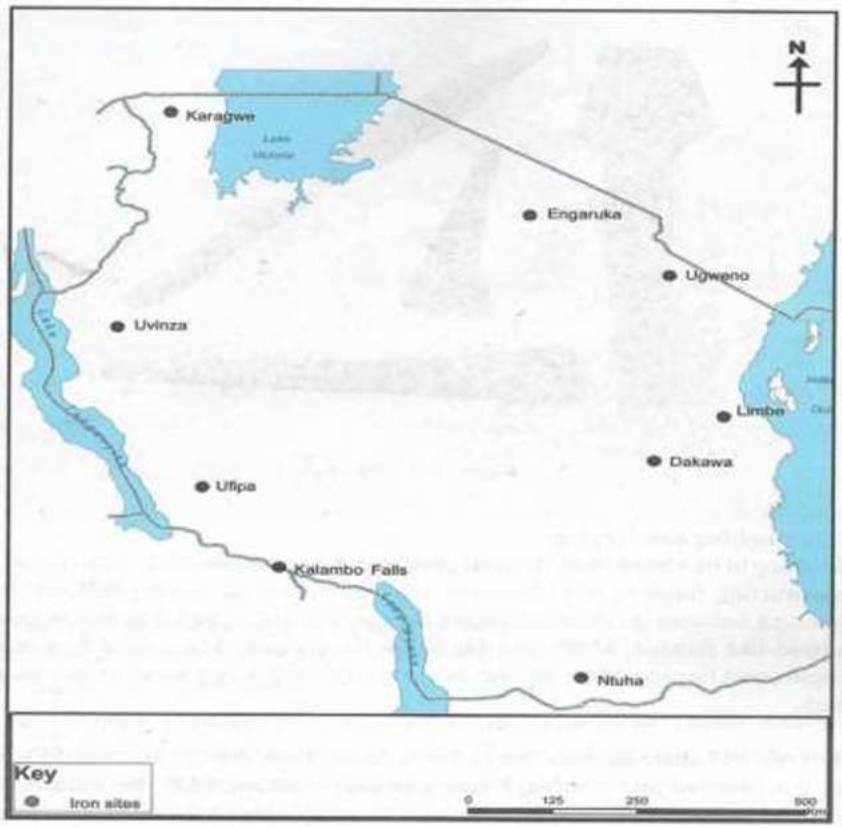
In most parts of Africa Iron Age is believed to have started during the first millennium A.D, some societies entered Iron Age early than others. The most famous iron sites in East Africa were discovered in **Engaruka** in rift valley in North Tanzania, other sites include Uvinza, Karagwe, and Ugweno in Same district. In Africa the most famous iron centers are **Nok, Axum** and **Meroe,**

Iron tools

(i) ENGARUKA
(ii) NOK
(iii) MEROE
(iv) AXUM
(v) TSHKAPA
(vi) KALAMBO
(vii) DAMBWA
(viii) KAPWIRIMBWE
(ix) GOKOMERA ZIWA
(x). MWAVARAMBO



iron centers in Africa



The map of Tanzania showing iron sites

THEORIES ON THE DISCOVERY OF IRON

Two theories are used to explain the discovery of iron

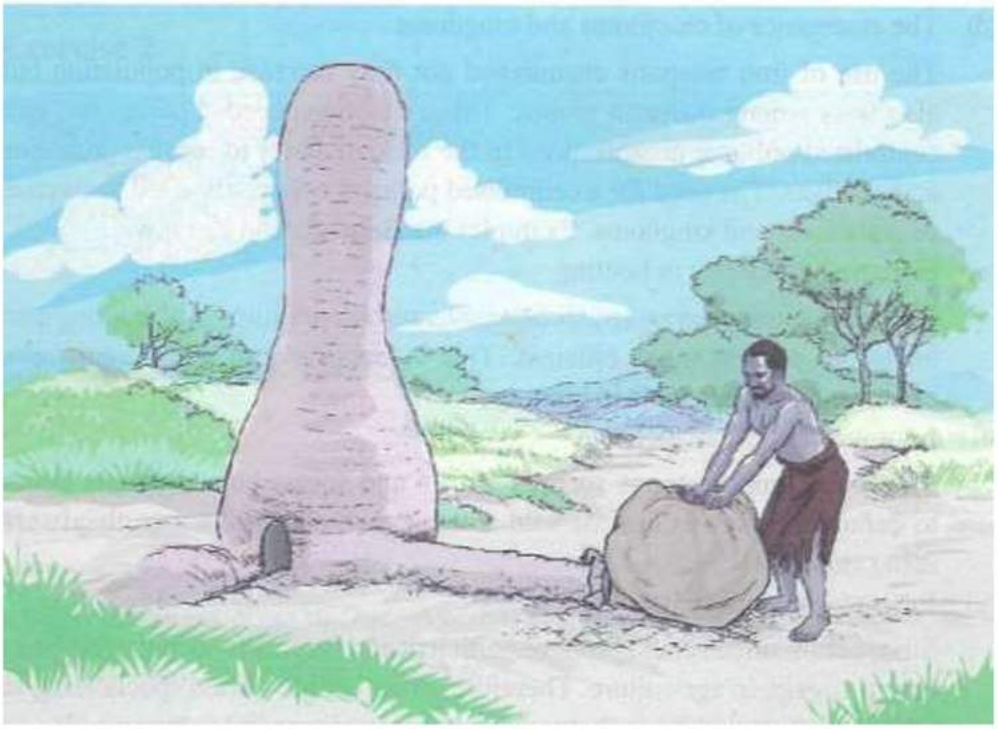
- Mistaken identity, the theory states that iron was discovered mistakenly when man mined iron instead of cooper,
- Fire forest theory, the theory suggests that the forest fire melted iron ore that were on the earth's surface

IRON SMELTING AND FORGING

Smelting of iron began with the collection of iron ore and charcoal. It also involved constructing **furnaces** and **blowpipes** *(tuyere)* as well as making bellows. Iron smelting furnaces in African societies were of two basic types.

I. A bowl-like furnace, which was dug below the ground.
II. Constructed furnace on the ground that was approximately a meter or two meters high.

Iron ore and charcoal were put in the furnace. Then the furnace was lit while air was pumped into it through ***tuyere*** that were connected to the bellows. Air from bellows entered the furnace through the *tuyere* (Figure 2.10). There is plenty of remains showing that iron smelting and forging was widespread in Africa. Examples of such remains include furnaces, *tuvere*, bellows, blooms, slags, anvils, and iron objects.



A man smelting iron using a furnace

ADVANTAGES OF DISCOVERY OF IRON

(a) Expansion of agriculture. Agriculture expanded because people started to use better iron tools such as machetes, axes, and hoes for production. These tools enabled human beings to cultivate larger pieces of land than before.

(b) Consolidation of settled life Expansion of agricultural activities due to the use of iron tools led to the production of sufficient and sometimes surplus food. This encouraged the formation of large communities, which produced surplus food.

(c) Population increase Surplus food production due to the use of iron tools led to an increase in population. This increase also resulted from the immigration of people from different regions to iron producing areas.

(d) The emergence of chiefdoms and kingdoms The use of iron weapons encouraged not only increase in population but also wars among different groups. These situations needed permanent and centralised political organisations in the form of states to resolve problems and conflicts. The need for a centralised political organisation led to the rise of chiefdoms and kingdoms.. Examples are Buganda and Karagwe.

(e) Increased efficiency in hunting The use of iron weapons such as arrows and spears improved hunting and made the process more efficient. This is because iron tools were more effective than stone tools in hunting.

(f) Improvement of self-defence The use of iron weapons such as arrows and spears helped people better to defend themselves against wild animals than during the time they were using stone tools.

(g) Emergence of specializations Since communities could produce sufficient and surplus food, not everybody had to engage in agriculture. Therefore, other people started specializing in other activities such as basketry, pottery, pastoralism, and fishing.

(h) it led to the growth of trade. Iron producing communities exchanged iron tools with other items produced by non-iron producers. In this way, the exchange of commodities increased between communities

HOW THE EARLY STONE AGE PEOPLE DIFFERED FROM THE IRON AGE PEOPLE

People who lived during the Iron Age differed from people of earlier ages in many ways, the differences were mainly due to the increase of man's mastery of nature using iron tools. Specific differences include the following

i. **Superiority of tools and weapons**, iron age people made and used more developed iron tools such as, spears, bows, and arrows, while the people in the stone age only made and used simple or crude stone tools like pebbles and chopping in economic activities,
ii. **Increase in production**, they differed in the size and amount of products, iron age people produced too much or surplus products because of using stronger tools compared to the stone age people who did not produce a large quantity of products due to the use of simple tools,
iii. **Population size**, the number of people during the stone age was still small, people lived in bands of a few people mainly together practicing hunting and gathering, but the iron age had many people who lived in large communities, this was cause by the increase of food supply
iv. **The level of political development**, Stone Age people did not have political institutions like kingdoms and chiefdoms but during the Iron Age the clans which had knowledge of making iron became leaders as chiefs or kings to govern others in the society.
v. **Development in trade**, there was no trade in the period of Stone Age, people produced for their immediate use, on the other hand, in the Iron Age people traded among themselves, societies which did not have iron working skills had to obtain iron tools from blacksmiths in exchange for salt, crops, meat, milk or other items which they produced.
vi. **Ability of mastering environment,** the Stone Age men and women did not have advanced ability in mastering their environment effectively. That is why some times they depended on what was given to them by the environment as they collected fruits, roots and hunted animals to feed themselves, on the other hand the people of the iron age mastered their environment according to their needs, for example they could clear land and cultivate crops according to their needs.

Exercise

1. Briefly explain the following terms:
   a) The Iron Age
   b) Iron Smelting
   c) Iron Forging
2. Mention five sites with evidence of iron technology in Tanzania.

Exercise

1. Explain the concept of Stone Age.
2. Name the periods of the Stone Age.
3. What are the differences between *Oldowan* and *Acheulian* stone tools?
4. What were the advantages of using fire by ancient people?
5. Mention five advantages of the discovery of iron.
6. Describe the physical characteristics of human beings during the following periods:

(a) The Early Stone Age
(b) The Middle Stone Age
(c) The Late Stone Age

EVOLUTION OF MAN, TECHNOLOGY, AND ENVORONMENT

CIVICS FORM TWO

CIVICS FORM FOUR

HISTORY FORM THREE

HISTORY FORM ONE

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