Metallurgy-Part I

Background

- Story of early humans began when they started making changes to their surroundings and started to interact with their environment. The ability to survive and make tools led to the beginning of cultural transformations.

- The earliest tools were made of stone and with the technique of flaking (peeling out small pieces of stone from a larger one) the first tools were turned into distinct shapes and could be put to different functions.
- The distinctions in shaping and functioning of the tools emerged as a significant marker of distinction between various cultures.
- The story of human development starts from making simple tools for agriculture and then making innumerable changes, which modified the history of the humanity.

million years ago when humans began to develop stone tools .

Mesolithic age: literally meaning the middle stone age, it refers to the marked the transition from a hunting

Neolithic: new stone age which important events of human history as it brought agriculture or the food

Mehrgarh in Baluchistan, where a small copper bead was recovered

Metallur
Harappa

metals from different

• Limestone Sukkur and Rohri Hills
• Copper Khetri Hills, Rajasthan • Tin Tosam area of modern Haryana

Internal Production and Trade

• Harappans had a well-established network of internal and external trade. • Trade was based on barter (no coinage at this time).
• Important metals produced and exchanged internally within the Harappan sites include:

Product Place of Production (within Harappan civilization)

- Lead and zinc Rajasthan

- Gold Kolar fields of Karnataka
(also exported cattles)
- Semi-precious stones for bead making Gujarat

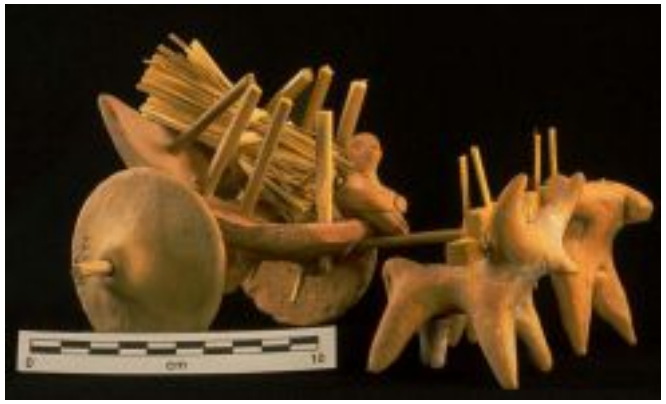
Long Distance Trade

Important zones of long-distance interaction included:

- Mesopotamia
- Central Asia
- Persian Gulf

Metals procured by Harappa from other lands:

- Tin, Lapis lazuli: Afghanistan
- Jade: Turkmenistan
- Tin: Central Asia
- Shells, Chlorite vessels: Oman



Modes of Transportation

1. Two-wheeled carts evident through bronze and terracotta models of carts found at various sites. No carts survive but their tracks have been found at various sites.

2. Caravans drawn by oxen, sheep, goats and donkeys.

3. Camels: evidence suggest that they came to be used towards the end of the mature Harappan phase.

4. Boats-depicted on seals and clay tablets at Lothal and Harappa.

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Evidence suggests that the trade was carried out by organised merchant groups as well as nomadic peddlers.

• The primary metals that were used in this period include – Copper, Gold and Silver.

The Bronze Age

• A new metal, Bronze which is an alloy of copper and tin came to be used in this period.

• Harappans, as we saw in the previous slide, maintained a significant inland and long distance trade network and archaeological excavations have shown that Harappan metal smiths obtained tin from Afghanistan and copper ore (either directly or through local communities) from the Aravalli hills, Baluchistan and beyond.

• They soon discovered that adding tin to copper produced bronze, a metal harder than copper yet easier to cast, and more resistant to corrosion.

• Whether deliberately added or already present in the ore, various impurities (such as nickel, arsenic or lead) enabled the Harappans to harden bronze further, to the point where bronze chisels could be used to dress stones, heralding a Bronze Age.

• The use of bronze also brought in new technological innovations, the most important being the intricate ciré perdue or lost wax

technique. This

New Technologies

technique uses Bronze alloy to cover the clay mold. Best example: ‘The Dancing Girl’.

• Another metallurgical innovations of the period was the true saw where the Harappan craftsmen used their teeth and the adjoining part of the blade set alternatively from side to side to carve out a type of saw unknown elsewhere until Roman times.

• The third important technique was the eye needle* (find out what it means)