UNIT 2  BRONZE AGE CIVILIZATIONS I

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2.1 INTRODUCTION
In this Unit, we will introduce you to the cultural and geographical settings of the Bronze Age Civilizations in Egypt, Mesopotamia, India and China and to the use of metals. In 1871, E.B. Tylor suggested that human institutions have succeeded each other in sequence in a substantially uniform way across the world. He suggested that the remarkable similarity of cultures of far flung regions and diverse races was because of the ‘uniform action of uniform causes’. Thinking along similar lines, L.H. Morgan, author of the path breaking Ancient Society, thought that parallel developments in the history of the world were largely because the ‘germs’ of the main institutions of society were present in the early stages of development. In the later nineteenth century systematic excavations began in Egypt, Crete and Mesopotamia. Each of these, in different ways, suggested to Europeans the roots of their own civilization.
Yet it was also said that in Egypt, for example, there were periods of marked culture change that could only be ascribed to migrations or invasions. Some intellectuals began to insist that if there were parallel developments in the world, these were because of contacts between the relevant regions. Such an approach was partly influenced by the idea that ‘savages’ could never have invented the finer aspects of civilization, and that a few people like the Egyptians made all the major inventions, which others borrowed.
It was left to V. Gordon Childe to point out, in the 1940s and 1950s, that in history both evolution and diffusion were powerful forces. Many regions of the world went through the Stone, Bronze and Iron Ages, and in that order. The urban revolutions of Egypt, Mesopotamia, and India were based on the same set of discoveries in metallurgy, transportation, etc. Moreover, it was not accidental that city life and writing emerged together. Yet evolution and diffusion complement each other: human cultures ‘evolve’, but unlike organisms, have the capacity to borrow from one another. Key developments like the smelting of copper, the wheeled cart, and the alphabet were invented only once but were subsequently learnt and utilized by several groups. In this way, the forces of civilization spread from Egypt and Mesopotamia to the Mediterranean and southern Europe, and ultimately to Western Europe. Thus, paradoxically, diffusion is unique to the evolution of human cultures.
Evolution has come to mean the development of social structures in a sequence of stages, from simple to complex. Complexity refers to internal differentiation, increasing division of labour and specialization, more and more tools and techniques for different tasks, and more social roles in the given society. Note that this does not always entail a gradual process of accretion, and is not necessarily tantamount to ‘development’ or human progress. Most tribal societies in the world did not develop a Bronze Age; also, in South Asia at least, there was a reversion, after the Bronze Age, to tribal life.

We now catch a quick glimpse of the land and their historical periods, and the developments that led to the beginnings of civilization covering Egypt, Mesopotamia, Harappa and the Shang Civilization of Northern and Central China.

### 2.2 EGYPT, THE GIFT OF THE NILE

The Egyptian culture region lies north of Aswan and the First Cataract of the Nile valley northward to the Delta. The valley of the river Nile is 700 km long in this stretch, but on average only about 10 km wide. It is sunk between two deserts. The Delta of the Nile consists of three major distributaries and their numerous branches. The ancient Egyptians distinguished the two regions as Lower Egypt (the Delta) and Upper Egypt south of it.

Since prehistoric times, people exploited a variety of micro-environments not only in the alluvial valley, but also near the hills of the western desert, and along the wadis (seasonal rivers) of the eastern desert. There are a few springs in the western desert, making the growth of vegetation possible. And when it rained there was grazing. The ostrich, oryx and ibex were hunted there. In Egyptian art, the inhabitants of the western desert were portrayed as men with curly hair, wearing feathers on their heads. The eastern desert, with its numerous wadis and occasional grazing, was a source of various metals (copper, gold), building stones (granite, porphyry, sandstone, etc.), and semi-precious stones (amethyst, onyx, carnelian, translucent alabaster, etc.). Fine-grained wood that could be seasoned, was not, however, available in these arid zones, and so for boats, cedar wood was imported from the Lebanon.

The immensely long Nile gets most of its water in the high mountains of Ethiopia in the monsoon season, so that the high flood reaches Aswan in June. The floods proceed north. In Upper Egypt, flood water stands for four to six weeks in small basins (say, 7 × 5 km) on either side of the river channel, after which, in early October, the flood subsides, having left behind a film of silt that is very fertile. Sowing of wheat or barley starts in November, and the crop usually needs no irrigation—in spite of rainfall being less than 100 mm in the year—because the standing flood water in the basins has moistened the soil adequately. Egypt is truly the gift of the Nile.

In the Delta, the basins remain flooded for long weeks after the floods, and only some parts are cultivable. There is dense reed growth, and the Delta was the pastoral region of Egypt where huge herds of cattle (The ancient Egyptians bred not only animals but also flocks of ducks and geese. They caught other birds and fattened them for important sacrifices.) grazed after the flood subsided. Among the reeds that grew in the Delta was the papyrus (Cyperus), now almost extinct. The outer casing of its stalk was removed, several strips of the sticky
pith were placed alongside one another, and they were moistened and beaten flat into a smooth sheet.

The cultivation of wheat, barley, beans, gram and other winter crops (The flax plant was cultivated and linen was the fabric made out of it for clothes) required little labour when compared with South Asia. For irrigation of the soil before planting, Egyptians had to pay attention to their local natural basins, making cuts in, or raising, their walls according to need, and guiding the flow of the flood from one place to another, so that the maximum area was inundated. Occasionally a natural basin might have to be subdivided with low mud walls, or the overflow channels deepened. Because of this and the fact that the gradient of the Nile is gentle, ancient Egyptian agriculture did not utilize radiating canal networks. In other words, ‘irrigation’ was neither labour-intensive nor a centralized system dependent on the state for its implementation. It was organized at the level of the local flood basin. Thus the origins of the Egyptian state and kingship do not appear to have been connected with the needs of irrigation.

Egypt was a highly productive land through the centuries, and as late as the Roman period was the supplier of the bulk of the wheat that the city of Rome consumed. Yields were high in terms of seed and labour inputs. Correspondingly, population densities were high. We are reminded of the fact that the gigantic pyramids could only have been built by a huge labour force recruited from perhaps the entire valley, at no cost to agricultural production. Besides, dense populations could mean, theoretically, that at certain times and in some places, land became scarce, and hence a resource that was fought over. Warfare over land can result in the subjugation of one group by the leader of another group. However, in the case of Egypt it is unlikely that population pressures built up in the period just before the emergence of the state. We thus have no ready explanation for the evidence of war heroes in the Archaic or pre-dynastic period.

Between about 3500 and 3000 BC, certain settlements appear to have developed as centres of political-military or economic importance. In southern (Upper) Egypt there was Nekhen or Hierakonpolis, where archaeologists have found a perimeter wall, a sacred precinct with the remains of stone columns, and a cache of beautifully carved stone vases, ivory labels for goods, and cosmetic palettes, some of which appear to depict kings exercising military power. There is also a cemetery in which a few burials, with jewellery of gold, silver, turquoise, carnelian and garnet, appear to be those of the elite.

Near the head of the Delta, south of Cairo, was the settlement of Maadi, which, after about 3500 BC, reveals many cultural elements such as carved palettes and pottery of the Upper Egyptian sort, but also certain kinds of houses and pottery that are Palestinian in origin. As much copper occurs at the site, and also bones of the donkey and material from Upper Egypt, it is believed that Maadi handled an overland trade between the Nile valley, Sinai (a rich source of copper and turquoise), and Palestine.

This was a period of political unification in which the Pharaoh or king assumed the protection and patronage of certain deities and wore the crowns of both Upper and Lower Egypt, and when a fairly unified material culture extended along the Nile valley. Writing came into existence, and technological advance related to copper metallurgy was made. Many of these developments will be discussed in later pages.
Ancient and Medieval Societies

In the Old Kingdom the most spectacular innovation was the advent of the pyramid, a huge stone memorial cum tomb that ensured not only the survival of the bodily remains of a dead pharaoh, but also that people on earth worshipped the dead and deified ruler. Many of the pyramids were built near the apex of the Delta, where also, on the left bank of the Nile, the city of Memphis was founded. All the early pharaohs were crowned at Memphis. Nearby were the mastabas, stone-built tombs of the nobility. Meanwhile, Abydos was another centre with newly emerged elites, judging from its brick-built and roofed tombs with jewellery and boat models, and also flanked by store rooms, presumably stocked with provisions for the dead in the after-life. The large tombs were surrounded by clusters of humble graves.

The most striking elements of ancient Egyptian civilization are its material prosperity, exquisite writing, painting, and reliefs on the walls of temples and tombs, pyramid building and cultural emphasis on mortuary memorials and the cult of dead kings, expert craftsmanship in several stones and metals, and continuous contacts with the world outside: Nubia, Sinai, Palestine, and the Mediterranean islands.

2.3 MESOPOTAMIA AND ITS CITIES

If we were to sum up the personality of Bronze-Age Mesopotamia in a similar way, we would mention its precocious urban development and its cultural emphasis on the superiority of city life; in contrast to Egypt, there were numerous city-states often contesting power, trade routes, and land. Rather than high populations per se, this region saw an exceptional degree of nucleation of population in large urban centres. Also characteristic of Mesopotamia is the wealth of its cuneiform literature on clay tablets, and the propensity of the state system to keep written records of all public transactions. Exquisitely carved cylinder seals that were rolled on clay tablets after they were written but still wet, or on the clay sealings of jars or packages, represent an extension of literacy. There was also openness to the world from a very early date. Most important were Mesopotamia’s contributions to the development of mathematics and astronomy.

Mesopotamia is the land of the Euphrates and Tigris rivers, and the Euphrates is the ‘lifeline’ of the ancient civilization (the Tigris is prone to unexpected floods and did not attract early settlement). Here too, as in Egypt, it was the flood plain of a major river that was cultivated by what appears to have been a prosperous peasantry.

The southern plains are also called ‘Sumer’, for this was the land of the Sumerians, (They spoke the Sumerian language) the first city dwellers of the land. Sumer is a semi-arid desert, sparsely vegetated. In the lowest reaches of the Euphrates and Tigris rivers, the land is marshy, and boats connect the small villages to one another. Fishing is important to the economy, and in the tall reed growths, birds and wild pigs were hunted. Before the full development of agriculture, the earliest settlements of Sumer—of hunters and fisherfolk—were located in this southern marsh region.

In Sumer the rainfall (below 200 mm a year on average) is not adequate for the staple crops, wheat and barley. (There were also lentil, peas, beans and
vetch; onions, garlic, cucumber and lettuce; and date cultivation in summer. Flax was the vegetable fibre.) Agriculture therefore depended on the rhythm of the Euphrates. The Euphrates rises with the onset of winter and spring rains on the mountains of Turkey in November, and reaches its height in April. Because of the slope of the land, the river branches into several arms (there were five of them in the Bronze Age) on entering Sumer; these divide into further branches, so that the force of the water is dissipated. Thus, between November and April, with a simple technology the water of the Euphrates can be diverted into canals or ditches and thence into individual fields. To regulate the flow of water to the fields, huge rolls of date palm-leaf mats were placed across the ditches, and topped with mud. When the rolls were lifted from one end, the water was released. Irrigation and the use of the seeder plough contributed to tremendously high outputs per hectare and labour input, and high yields per sown seed.

Unlike the Nile, the Euphrates brings down salts dissolved in its water. In the extreme heat of the Iraqi summer, capillary action in the harvested fields causes the salts to be brought to or near the surface, which is not good for the crop that will be sown in the following autumn. Thus the traditional method has been to leave fields fallow in alternate years, so that bushes grow wild and their deep roots lower the water table. These weedy bushes are eaten by goats and sheep; and letting flocks graze on fallow fields contributes fertilizing manure to the soil. This practical dovetailing of animal herding with agriculture had important social and political consequences in ancient Mesopotamia.

Pastoralism was complementary to agriculture, and often members of the same community could be either pastoralists (taking the animals out in winter and spring to graze on the steppe or desert), or cultivators. Because some families specialized in pastoralism, the animal wealth of ancient Mesopotamia was enormous and wool, the chief fabric, was exported. Pastoral produce (milk and milk products), together with river fish, provided a reliable buffer against harvest failures. This wide-based subsistence base was offset by poor mineral wealth. Mesopotamia’s wood for carts, boats, and roof beams came mostly from the Zagros and the Lebanon. So too, metals were imported from the Zagros and the Anatolian and Iranian plateaus.

The system of irrigation made for conflict between agricultural communities. Those who utilized the upstream section of a channel could either use too much water, or neglect to clean the bed of the channel, or release destructive water, to the detriment of downstream fields. Friction over irrigation schedules between upstream and downstream users has through history led to the repudiation of kinship between communities in Iraq. Moreover, this is an unstable system because canals get silted rapidly and are short-lived; and the channels of the Euphrates may abruptly change their course, leaving a settled tribe without irrigable land. Warfare over land, in other words, was always in the offing, not because land was scarce for the population, but because of the volatile ecosystem.

The plains of the lower Tigris and Euphrates were occupied soon after about 5000 BC, in the Ubaid period. There were small fishing settlements in the beginning, but agricultural life was established soon thereafter. Material culture was limited. The significance of the Ubaid period also lies in evidence for Mesopotamian ventures into the Gulf, and in the fact that the temple, which was to develop into the urban institution par excellence, is already present. At
In the following, Uruk, period (about 4000 to 3100 BC), the population rose, many more villages came into existence, there is evidence for the plough and the wheel, and, towards the end of the period, written records are attested. The late Uruk period, best represented at the extensive site of Uruk (Warka), also saw the invention of the cylinder seal, and experiments with the construction of large, monumental, temples. The range of materials in use widened considerably. How these developments in the south are linked with an ‘expansion’ up the Euphrates and eastward into what is now Iran, has not been worked out. All we know is that Mesopotamian temple architecture, writing, and pottery forms appear to have been emulated by several communities outside Sumer, alongside their own material culture. It is not easy to read the archaeological evidence as ‘trade’. Yet, what is significant is that, as in Egypt, many developments seem to occur together in a short span of time (in this case, in the Late Uruk phase, around 3300 to 3100 BC) preceding the first evidence for rulers and city life.

During the short Jamdat Nasr period (3100 – 2900 BC) the writing system and seal carving underwent some development. Thereafter, the Early Dynastic is the period of the city-state with its numerous temples and fortified palaces. There was no particularly smooth progression, however, from the Late Uruk into the Early Dynastic periods. Many architectural modes attempted in Uruk were abandoned. In size and prosperity Uruk was superseded by city-states such as Lagash.

Map

Source – Shirin Ratnagar, Understanding Harappa, p. 49 Tulika Print Communications, New Delhi, 2001
2.4 THE HARAPPAN WORLD

In the Harappan world, subsistence depended on much the same species as in western Asia and Egypt. On the greater Indus plains, barley and wheat, together with peas, gram, sesame and mustard, were grown. Cotton was grown for fibre. Sheep, goat and cattle bones attest to animal husbandry, and cattle comprised both western Asiatic species as well as the humped Indian variety. In Kutch, millets are attested, and at Lothal rice husk impressions have been detected in clay.

The Harappan heartland lay in a transitional zone between the winter rainfall regime of western Asia and the monsoon rainfall system of South Asia. Punjab may get only 120 mm rainfall in winter, and Sind just 30 mm (both regions have heavier rainfall during the monsoon), but even this is of critical importance because wheat and barley are winter crops.

More reliable—and therefore important—than rainfall, however, is ground or subsoil water. You may remember that the city of Mohenjo-daro had an estimated 700 wells for its domestic water supply. Along the now dry stretch of the Hakra river in Pakistan, the water table is high and wells would have been important. Several Harappan sites in western Sind lie close to natural springs or artesian wells. Until recently, in Sind and western Punjab good wheat crops have been connected with well irrigation. At Allahdino, a small Harappan settlement near Karachi, it appears that water from a stone-lined artesian well was utilized. In Saurashtra, Lothal and other settlements were located near a low trough containing, until the 19th century, fresh water that was lifted to irrigate wheat-Gujarat has no winter rainfall. At the important site of Dholavira on Khadir island in Kutch, where there are no perennial rivers, bunds were constructed across the channels of minor rivulets to pond the seasonal flow and divert it into reservoirs in the city. But what about the majestic Indus river?

The annual discharge of the Indus is roughly eight-fold that of the Euphrates, and more than twice that of the Nile. Because of the volume of water that it carries, and the slope of the land, the velocity of the Indus is also much the highest. It is therefore a destructive river, and does not bring sheet floods. Much of the flood escapes in well-defined and wide channels like the Western Nara, but in living memory the Indus has also been known to have swept away hundreds of villages.

The seasonal rhythm of the floods is also unique. Being at its highest in August (because of heavy rainfall in the Himalaya), the level of the river is low between April and February, the wheat and barley season. Thus canal irrigation would not have been possible for these winter crops in protohistoric times. Moreover, it was only in places where the floodwater stood for some time and thoroughly soaked into the ground, that the winter crops could be raised without further irrigation. In areas that had not been so flooded, farmers would have raised water from pools, springs, depressions, or lakes. This in turn meant that irrigation required high labour inputs in comparison with irrigation in the Nile and Euphrates valleys. Lift irrigation would have depended on animal power working sweeps or lifts, so that in this region the cattle population would have been high. In such a system, working cattle would have had to be raised within/near the villages, although sheep and goat herders could have moved over long distances. In Harappan agriculture therefore, we infer that there were labour
bottlenecks in the winter months, and that cattle breeding was a major factor in the raising of crops.

The Harappan settled area was not distanced from sources of good wood, or stone or metal, in the same way as were Egypt and Sumer. Good wood from the shisham was available in northern Punjab, teak in parts of Gujarat. Settlements like Ropar gave access to the Shivaliks and the wood of the cedar for the roof beams of Mohenjo-daro. Not far south of Mitathal and Rakhi Garhi lived the copper producing tribes of northern Rajasthan. Shells were obtained off the coast of Saurashtra. And within the greater Indus valley, at Rohri, there were outcrops of chert stone, used all over the Harappan region for household tools.

The Harappa civilization (2600-1800 BC) was contemporary with the Egyptian Old Kingdom and First Intermediate period, and the later-Early Dynastic to the Isin-Larsa period in Sumer. Details are not repeated here, but we can revise a few points.

The formative period, dating approximately 3300 to 2600 BC, saw the spread of agricultural settlements over the plains of the Indus system, and the cultivation of the same crops and animals as in the urban period. This included the cultivation of cotton, and large numbers of bone awls (needles without eyes) may reveal the use of leather also. In the formative period there was building in brick, the use of wells, the beginnings of working with copper, the fashioning of stones such as steatite and shells into ornaments, the use of the plough, and contacts at a distance across the highlands of Baluchistan and Afghanistan. Although there were regional cultures, there was also much contact between them. Paradoxically, there is also evidence for inter-community warfare, including the appearance of perimeter walls around certain settlements. Two frontier villages, Mehrgarh and Rahman Dheri, that had grown to large size and had several craft activities, could have been the seats of tribal chiefships. Perhaps at these two centres, chiefships developed in the process of managing relationships between the local agriculturists and nomadic pastoralists who brought their herds of goats and sheep down from the mountains of Baluchistan to graze on the plains in winter.

In South Asia, as in Egypt and Sumer, there is evidence for the gradual development of some techniques, but there were also disjunctures or abrupt changes in settlement, including the abandonment of several sites after this antecedent period and the establishment of new villages or towns in the following period. Rahman Dheri and Mehrgarh, for instance, do not have urban Harappan material at all, even though these villages did flourish at least partly contemporary with Mohenjo-daro and Harappa. It is also significant that in the urban period the pattern of external contacts changed. Instead of interaction with the uplands of Baluchistan and Afghanistan, there was now sea trade with Oman, Bahrain, and southern Sumer. The carving of ivory for various kinds of domestic and ornamental artefacts; the prolific use of faience, a synthetic quartz-containing substance, for ornaments, cosmetic vessels, and seal tokens; the making of long and thin beads in lustrous red carnelian stone; the decoration of small carnelian beads with etched white designs; stamp seals with the emblems of usually wild animals; the use of silver containers; skillfully fashioned gold ornaments; large baked brick structures for storage; and writing are some of the new elements connected with city life in the Harappan period proper.
2.5 THE SHANG CIVILIZATION OF NORTHERN AND CENTRAL CHINA

China was the last of our regions to see the Bronze Age. Although neolithic cultures in China are dated as early as 6000 BC, the first phase of the Bronze Age, called the Erhliou phase, when the Hsia (sometimes written Xia) dynasty ruled and bronze came into use, dates between 2200 and 1760 BC. In this phase, Erhliou was one of the main settlements, with walls of rammed earth encircling it.

The Hsia dynasty was succeeded by the Shang, whose tenth ruler established the city of Chengchou around 1500 BC. Ritual human sacrifice is now in evidence and so also, writing. The widest distribution of Shang sites occurred in this middle phase. The civilization is named after the chief ruling dynasty, even though there was probably no political unification and other states also contested for power. The twelve last Shang kings ruled from the city of Anyang, for a period of almost three centuries. The dynasty was defeated by the Western Chou in about 1122 BC.

In the neolithic stage villages were founded on the Huang Ho (the ‘Yellow River’) and the Yangtze. Foxtail millet (Setaria italica.), broomcorn millet (Panicum miliaceum) which was to be the chief crop of the Shang villages, and rice were domesticated, the latter along the east coast and in the Yangtze valley. Hemp gave a coarse fibre for clothing. The tools of cultivation were made of bone and stone. Although specialized pastoralism, with emphasis on the milk products of animals, was never important in China, the buffalo, cattle (Bos exiguus), goats, sheep and pig were kept, and also poultry. (In the Shang period, the most frequently occurring animal bones are those of the buffalo.) Grain was stored in sunken pit structures. A fine grey pottery was made in the Longshan neolithic culture on the wheel, (The potter’s wheel was used to thin the walls of the pots, not as an aid to quick, and therefore mass, production) but no wheeled transport existed until the Shang period. The carving of jade, the exquisite but hard stone of China, began in the neolithic cultures. There is little evidence of a chalcolithic stage in China.

Bronze-Age sites were spread along the Huang Ho valley and to its north (up to Beijing) and south (but not along the Yangtze) and to a small extent on the coast. There were settlements on the River Wei, a tributary of the Huang Ho, in the loess region, and on the River Hwai as well. The range of animal species represented by bones at Anyang testifies to dense forest growth in the Huang Ho basin in ancient times. Unlike the other major rivers mentioned above, the Huang Ho is not navigable in any stretch. While this river provides an expanse of cultivable alluvium, it is the Yangtze, flowing further south, that is the larger river, its rice cultivators taking advantage of the higher rainfall in its valley, and, in modern times, the more urbanized zone. The Huang Ho, the millet and wheat growing region of China, is a turbulent river carrying a huge load of yellow silt, frequently flooding or changing course. Most Bronze Age sites were settled near small tributaries rather than on the Huang Ho itself.

This valley of northern China has harsh winters and temperatures can fall to -8°C. It is the summer that is the wet season, monsoon rains amounting on average to 360 mm a year. Rain water is supplemented by water from wells or from small ditches cut from the tributaries to sown fields.
Erhlitou, a major settlement of the Hsia dynasty, was situated in south-west Shanxi on a tributary of the Huang Ho. In some ways it provides a transition between neolithic and Shang China. The use of rammed earth for building the perimeter wall and house foundations was characteristic of the Chinese Bronze Age. Some of the fine grey pottery was made with hollow legs, as would be the bronze sacrificial vessels of the Shang. Metal tools such as knives were rare. It appears that the same language was in currency from Hsia to Western Chou times.

The tenth Shang king moved his capital to Chengchou, on a plain fed by three small tributaries of the Huang Ho as it leaves the mountains. There were graves with sets of pots for the afterlife, the buried personage often accompanied by a dog. There were bronze casting areas to the north and south of the settlement enclosure wall. Many kinds of bronze tools and vessels were excavated, and a few inscribed bones were found.

The Shang period is characterized by the use of bronze on an enormous scale, although stone sickles and bone tools and weapons such as arrowheads remained in use; writing; the use of the horse and chariot in warfare; and walled settlements. The population of a Shang walled town consisted of one or more lineages, whose leading clan provided the rulers. Anyang, 150 km north of Chengchou, was built by the nineteenth Shang king as his capital. It lies on the plain of the Huan, a tributary of the Wei, which flows into the lower Huang Ho. Its best excavated area is Hsaio Tun, with pit houses as well as structures on beaten-earth platforms, craft workshops, storage facilities, and elite graves with ritual bronzes and jade, with or without human sacrifices. Sixteen elite burials in underground wooden chambers had chariot trappings, weapons and armour. The two-horse, two-wheeled chariot had arrived fully developed (from Central Asia, probably) around 1200 BC at Anyang and became a mark of royalty. (Chariot burials would continue in China until about 400 BC, when horse riding and cavalry warfare developed. Cavalry renders the chariot warrior a liability on the battlefield). This, in a region that had no previous history of wheeled transport! The horse chariot was an instrument of warfare, but exactly how effective it was, we cannot tell. A text of a later period refers to the injuries suffered by a prince when he fell out of one.

Fine white pottery made of kaolin clay was in use together with other pottery. Wooden furniture was lacquered red with the substance of a tree. Coarse hemp cloth was worn, and silk came into use. Marine cowrie shells were in use. The substance par excellence, however, was jade and it was used for many kinds of ornaments and ritual objects.

The material culture labelled “Shang” occurs at sites from Shensi to the Pacific ocean, and scholars have suggested that no single state could have encompassed such a huge region. “Shang”, therefore, refers to a period and a civilization that laid the foundations of classical Chinese civilization, but politically probably involved several state polities in contact with each other, the Shang being the most powerful and ritually supreme of them.

2.6 THE USE OF COPPER AND BRONZE

Copper was the first metal to be used in most parts of the world, followed by bronze, an alloy of copper with a low percentage of either arsenic, lead, or tin. The advantage of these metals is not necessarily that they are more resilient
than stone, but that they can be melted and cast into a wide range of shapes and sizes of tools and weapons, with their working edges or points in the desired form. Bevelled-edge chisels in a range of sizes, toothed saws, adzes with sharp edges, and heavy-duty axes were tools possible or more effective in metal rather than stone. They made good tools for carpentry, for carving stones and ivory, for cutting shells or leather, and so on. In addition, copper is malleable, and can be beaten into thin sheets or vessels of the desired shape. This makes for very thin objects, not possible when copper is cast, and thus is an economical use of the metal.

Metallurgy was specialist work. Not everyone could recognize ores on the ground, or know their properties under heat, leave alone build and control the working of a kiln, using the best charcoal. It is possible that early metallurgy was a skill and lore passed down the generations among some small groups of people. These people would need to be mobile because the ores of copper, lead and tin are scarce and dispersed on the crust of the earth, and also because in their own tribes the scope for utilizing copper would have been limited. Metallurgy came into its own when specialists produced objects for royal ancestor rituals as in China, or tools for urban workshops of the Mesopotamian temple and palace establishments, or for mortuary cults as in Egypt. Not only were such institutions a source of sustained demand, but the infrastructure, such as fuel, raw material and the day-to-day needs of metallurgists, could be provided. Hence the implications of metallurgy were fully realized only with the coming of states and/or cities, and not in the context of neolithic, cultivating or animal-herding, tribal society.

In western Asia copper was first used by tribal agriculturists around 7000 BC. Native copper (copper found in its metallic state) was beaten into ornaments in this first stage of technological development. Farming villages in northern Mesopotamia learnt to use native copper around 5000 BC. In the Ubaid culture in the south of Mesopotamia, casting (pouring molten metal into a mould) of artefacts was known. The smelting of copper ores (in which metallic copper exists in chemical combination with other minerals) requires brick kilns or even simple clay-line depressions in the ground, in which wood charcoal and the powdered ore are placed for some hours in temperatures around 700°C. (This applies to oxidic ores such as azurite and malachite, with beautiful colours, and rich in copper. Such ores are usually found in the upper profile of a copper deposit. Sulphidic ores that are reached at greater depths, however, require reduction. The ore is powdered and roasted so that sulphur is lost. In the smelting kiln, thereafter, the ore is smelted). For casting copper—its melts at 1084°C—a higher temperature is required, though for a short time, and the molten metal is quickly poured into a mould to set in the required shape. The ancient Egyptians are known to have used blow pipes and bellows to increase the oxygen supply in the kiln, and thereby raise the temperature. Allying 9 to 17 per cent tin with copper effectively lowers the melting point of the metal. Bronze with, say, 10 per cent tin melts at 1000°C (and lead bronze at an even lower temperature). Another advantage is that tin bronze is a harder material than pure copper.

Complex casting, with the use of closed (two-part) mould and lost wax techniques, came into use in Early Dynastic Mesopotamia for temple statuary, for shaft-hole axes used as weapons, etc. Beaten copper helmets were worn by warriors. In Mesopotamia, arsenic alloying was more common in the earlier
stages, but tin bronze came into more frequent use around 2500 BC. The range of tools and weapons of copper and bronze excavated at third-millennium sites in Sumer testify to mastery over metallurgy, but no early production centre has been excavated so far. Copper was acquired from the peninsula of Oman, and from several places in upland Anatolia and Iran.

Egypt acquired copper from the peninsula of Sinai (where turquoise, a blue stone containing copper and aluminium phosphate, was also available), and later also from the Eastern Desert, from Cyprus, etc. Unalloyed copper was in frequent use, and also some arsenic bronze. The regular use of tin bronze is evidenced after about 2000 BC.

In Egypt, the use of native copper and some smelting began after 3500 BC, the major artefact types being daggers and axes. In the Archaic period too, much copper production went towards weaponry, mainly spearheads and daggers. Saw marks have been detected on a stone bowl. Thereafter, we have evidence for a prolific range of copper tools for carpentry, stone work, leather industries, etc. Splayed and convex-shaped knives were used for cutting leather; adzes, chisels of varying shapes and sizes, saws, nails, and piercers for advanced carpentry for the construction of boats; the carving of stone palettes and vases also required metal tools of appropriate size and accurate working edges.

In South Asia excavated material of the period preceding the cities of Mohenjo-daro and Harappa has produced very little metal. A few crucible fragments, and some pieces of rods and bangles, are the main finds. We see a marked increase in the variety of metal tool forms and techniques with the onset of the urban Harappan period. Hard and fine-grained ivory, one of the new materials in use, could not have been carved without fine and sharp metal chisels and drills. The perforation of long and slender carnelian beads also was done with the use of bronze drills. Blocks of steatite, for making seals and ornaments, would have been cut with saws. Faience carvings would have been finished off with a knife. Seal carvers’ tool kits would have included small awls, drills, and burins (all pointed tools). Shell cutting was done with metal saws. There were, in addition, metal fishing hooks and razors for everyday use. Large vessels were beaten out of copper. Weighing-scale pans were made of metal, for accuracy. Metal weaponry included arrows, daggers, and sword blades; as elsewhere, there was weaponry both in bronze/copper and in stone.

Metallurgical techniques in use in the Harappan world included cold hammering, shallow casting, two-piece stone moulds, and occasionally (for the Dancing Girl, for instance), lost wax casting. There is also evidence for soldering, rivetting (piercing two pieces of metal and holding them together with another metal piece), etc. In the Harappan period, pure copper, lead alloys, and tin alloys were in use.

In China there is scarce evidence of a chalcolithic or copper-stone stage, but we can tell from the fine, thin grey ceramics that the technology of the reducing kiln had been mastered in the early Shang period and probably earlier. Pottery kilns were not simple bonfires, but two-tier clay structures with flues or air circulation devices, the fuel burning in the lower chamber and an upward draught being created. No potter’s bonfire could give steady temperatures above 900°C as these kilns could.

The advent of metallurgy itself may have been far speedier in China than in western Asia. In the Erhlitou phase copper was alloyed with either tin or lead,
and multiple-piece moulds were used for casting. A large proportion of metal output, as evidenced archaeologically, was vessels for the ancestor rites. Such bronze vessels often imitated the shapes of pottery. The Shang procured their copper from regions beyond their political boundaries: mines in mountains near the Yangtze and North Shensi, and tin from South Shensi province. There were several sources of copper and tin within a 100-km radius of An Yang. In the Chinese tradition as known from records of later periods, it was held that the founder of the Hsia dynasty commissioned the mining and casting of round four-legged bronze vessels, with ‘all the myriad creatures’ depicted on them. These were in time handed down to the Shang rulers, and then to the Western Chou. This tradition indicates that bronze casting, closely associated with royal sacrifice, symbolized power and legitimacy. The horse-drawn chariot was constructed of wood with presumably bronze tools, and had a bronze draught pole, tubular bushings for mounting the wheels, and harness.

The bronze ritual vessels of the Shang have been written about voluminously. There are dozens of complex shapes, for cooking, storing, serving food, for washing and for water. At feasts, each aristocratic person was served his food in a set of dishes. Ornate figurative schemes on the vessels were possible because they were cast with the use of multiple-piece clay moulds that were carefully fitted together. The decorative schemes were appropriate to the ancestral feast in that they portrayed mythological elements such as the dragon, the symbol of water, the phoenix which embodied the wind, and so on. One of these vessels is inscribed, “King Wen Ding is making a sacrifice to his Mother.”

Such vessels have been excavated in huge numbers. Once used, they were buried away, never to be melted and re-fashioned into utilitarian objects. True, tools made of bronze were in use in Shang China. Yet these have not been found in large numbers because they were the kind of objects that would have been melted down. Instead, it is stone or clay moulds for arrows, socketed axes, knives, leaf-shaped spearheads; also jingles used with chariots; and a few heavy rectangular axes (probably weapons) that have been found. This said, the seemingly wasteful use of bronze is only partly explained by the ample supplies
of tin and copper in China. More relevant to the scale of utilization was the needs of ritual vessels. In the tomb of a Shang queen were buried 217 of these sacrificial vessels, incorporating 21 different forms. There were 130 bronze weapons also, so that the total weight of the bronze in this single tomb was 1,625 kg. (In addition there were 590 jade objects and 7000 cowries.) The inscribed vessel mentioned above was 133 cm high and weighed 875 kg. (It may intrigue you, however, that jade is harder than ordinary steel, and therefore did not await the invention of bronze tools in order to come into use in China. Its use goes back to the neolithic cultures. In fact it was cut with stone (say, slate) knives and abrasives like quartz sand.)

In summary, we can state that the Bronze Age represents a true leap in technology as far as metal work, and therefore other crafts using metal tools, are concerned. Most important is a point realized best by Gordon Childe: these were produced for the urban elite rather than the populace. The frequent use of moulds points to mass production, at least where metal weaponry is concerned. The social contexts of such technological development was the emerging division of labour and specialization, and also demand from ruling elites and their productive establishments.

2.7 SUMMARY

Introducing you to the Bronze Age Civilizations we have discussed in brief four civilizations, namely, Egyptian, Mesopotamian, Harappan and Shang. We have mainly focused here on the lands, geographical features and the human settlement in four different geographical areas. We have also explained briefly the technological base of these civilizations giving reference to the use of copper and bronze. In the next Unit we will discuss about other important features of the Bronze Age Civilizations.

2.8 EXERCISES

1) Write a brief note on ancient Egyptian civilization.
2) What are important characteristics of early Mesopotamian civilization?
3) In what ways the Harrapan civilization was unique?
4) Discuss the importance of the Shang civilization.
5) ‘Bronze Age represents a true leap in technology as far as use of Bronze and Copper are concerned.’ Explain.