

# Iron Age of Ancient Indian History

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**ABSTRACT:** The Iron Age is the final epoch of the three-age division of the prehistory and protohistory of humanity. It was preceded by the Stone Age (Paleolithic, Mesolithic, Neolithic) and the Bronze Age. The concept has been mostly applied to Iron Age Europe and the Ancient Near East, but also, by analogy, to other parts of the Old World.

The duration of the Iron Age varies depending on the region under consideration. It is defined by archaeological convention. The "Iron Age" begins locally when the production of iron or steel has advanced to the point where iron tools and weapons replace their bronze equivalents in common use.<sup>[1]</sup> In the Ancient Near East, this transition took place in the wake of the Bronze Age collapse, in the 12th century BC. The technology soon spread throughout the Mediterranean Basin region and to South Asia (Iron Age in India) between the 12th and 11th century BC. Its further spread to Central Asia, Eastern Europe, and Central Europe is somewhat delayed, and Northern Europe was not reached until around the start of the 5th century BC.

The Iron Age is taken to end, also by convention, with the beginning of the historiographical record. This usually does not represent a clear break in the archaeological record; for the Ancient Near East, the establishment of the Achaemenid Empire c. 550 BC is traditionally and still usually taken as a cut-off date, later dates being considered historical by virtue of the record by Herodotus, despite considerable written records from far earlier (well back into the Bronze Age) now being known. In Central and Western Europe, the Roman conquests of the 1st century BC serve as marking for the end of the Iron Age. The Germanic Iron Age of Scandinavia is taken to end c. 800 AD, with the beginning of the Viking Age.

In the Indian sub-continent, the Iron Age is taken to begin with the ironworking Painted Gray Ware culture. Recent estimates suggest that it ranges from the 15th century BC, through to the reign of Ashoka in the 3rd century BC. The use of the term "Iron Age" in the archaeology of South, East, and Southeast Asia is more recent and less common than for Western Eurasia. In China, written history started before iron-working arrived, so the term is infrequently used.

**KEYWORDS:** iron age, history, ancient, Indian, culture, archeological, world, Eurasia, ashoka, records

## INTRODUCTION

The time and context of this Iron Age era varied by geography or country.<sup>[2]</sup> Please note that classically, it is said that this era occurred in the 12th century BC.<sup>[3]</sup>

The three-age system was introduced in the first half of the 19th century for the archaeology of Europe in particular, and by the later 19th century expanded to the archaeology of the Ancient Near East. Its name harks back to the mythological "Ages of Man" of Hesiod. As an archaeological era, it was first introduced for Scandinavia by Christian Jürgensen Thomsen in the 1830s. By the 1860s, it was embraced as a useful division of the "earliest history of mankind" in general<sup>[4]</sup> and began to be applied in Assyriology. The development of the now-conventional periodization in the archaeology of the Ancient Near East was developed in the 1920s to 1930s.<sup>[5]</sup> As its name suggests, Iron Age technology is characterized by the production of tools and weaponry by ferrous metallurgy (ironworking), more specifically from carbon steel.

Increasingly the Iron Age in Europe is being seen as a part of the Bronze Age collapse in the ancient Near East, in ancient India (with the post-Rigvedic Vedic civilization), ancient Iran, and ancient Greece (with the Greek Dark Ages). In other regions of Europe the Iron Age began in the 8th century BC in Central Europe and the 6th century BC in Northern Europe. The Near Eastern Iron Age is divided into two subsections, Iron I and Iron II. Iron I (1200–1000 BC) illustrates both continuity and discontinuity with the previous Late Bronze Age. There is no definitive cultural break between the 13th and 12th centuries BC throughout the entire region, although certain new features in the hill country, Transjordan and coastal region may suggest the appearance of the Aramaean and Sea People groups. There is evidence, however, of strong continuity with Bronze Age culture, although as one moves later into Iron Age the culture begins to diverge more significantly from that of the late 2nd millennium.

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The Iron Age as an archaeological period is roughly defined as that part of the prehistory of a culture or region during which ferrous metallurgy was the dominant technology of metalworking.

The characteristic of an Iron Age culture is the mass production of tools and weapons made from steel, typically alloys with a carbon content between approximately 0.30% and 1.2% by weight. Only with the capability of the production of carbon steel does ferrous metallurgy result in tools or weapons that are equal or superior to bronze. The use of steel has been based as much on economics as on metallurgical advancements. Early steel was made by smelting iron.

By convention, the Iron Age in the Ancient Near East is taken to last from c. 1200 BC (the Bronze Age collapse) to c. 550 BC (or 539 BC), roughly the beginning of historiography with Herodotus; the end of the proto-historical period. In Central and Western Europe, the Iron Age is taken to last from c. 800 BC to c. 1 BC, in Northern Europe from c. 500 BC to 800 CE.

In China, there is no recognizable prehistoric period characterized by ironworking, as Bronze Age China transitions almost directly into the Qin dynasty of imperial China; "Iron Age" in the context of China is sometimes used for the transitional period of c. 900 BC to 100 BC during which ferrous metallurgy was present even if not dominant.

## II.DISCUSSION

The earliest-known iron artifacts are nine small beads dated to 3200 BC, which were found in burials at Gerzeh, Lower Egypt. They have been identified as meteoric iron shaped by careful hammering.<sup>[6]</sup> Meteoric iron, a characteristic iron–nickel alloy, was used by various ancient peoples thousands of years before the Iron Age. Such iron, being in its native metallic state, required no smelting of ores.<sup>[7][8]</sup>

Smelted iron appears sporadically in the archeological record from the middle Bronze Age. Whilst terrestrial iron is naturally abundant, temperatures above 1,250 °C (2,280 °F) are required to smelt it, placing it out of reach of commonly available technology until the end of the second millennium BC. In contrast, the components of bronze -- tin with a melting point of 231.9 °C (449.4 °F) and copper with a relatively moderate melting point of 1,085 °C (1,985 °F) -- were within the capabilities of Neolithic kilns, which date back to 6000 BC and were able to produce temperatures greater than 900 °C (1,650 °F).<sup>[9]</sup> In addition to specially designed furnaces, ancient iron production required the development of complex procedures for the removal of impurities, the regulation of the admixture of carbon, and the invention of hot-working to achieve a useful balance of hardness and strength in steel.

The earliest tentative evidence for iron-making is a small number of iron fragments with the appropriate amounts of carbon admixture found in the Proto-Hittite layers at Kaman-Kalehöyük in modern-day Turkey, dated to 2200–2000 BC. Akanuma (2008) concludes that "The combination of carbon dating, archaeological context, and archaeometallurgical examination indicates that it is likely that the use of ironware made of steel had already begun in the third millennium BC in Central Anatolia".<sup>[10]</sup> Souckova-Siegalová (2001) shows that iron implements were made in Central Anatolia in very limited quantities around 1800 BC and were in general use by elites, though not by commoners, during the New Hittite Empire (~1400–1200 BC).<sup>[11]</sup>

Similarly, recent archaeological remains of iron-working in the Ganges Valley in India have been tentatively dated to 1800 BC. Tewari (2003) concludes that "knowledge of iron smelting and manufacturing of iron artifacts was well known in the Eastern Vindhya and iron had been in use in the Central Ganga Plain, at least from the early second millennium BC".<sup>[12]</sup> By the Middle Bronze Age increasing numbers of smelted iron objects (distinguishable from meteoric iron by the lack of nickel in the product) appeared in the Middle East, Southeast Asia and South Asia. African sites are turning up dates as early as 2000-1200 BC.<sup>[13][14][15][16]</sup>

Modern archaeological evidence identifies the start of large-scale iron production in around 1200 BC, marking the end of the Bronze Age. Between 1200 BC and 1000 BC diffusion in the understanding of iron metallurgy and the use of iron objects was fast and far-flung. Anthony Snodgrass<sup>[17][18]</sup> suggests that a shortage of tin, as a part of the Bronze Age Collapse and trade disruptions in the Mediterranean around 1300 BC, forced metalworkers to seek an alternative to bronze. As evidence, many bronze implements were recycled into weapons during that time. More widespread use of iron led to improved steel-making technology at a lower cost. Thus, even when tin became available again, iron was cheaper, stronger and lighter, and forged iron implements superseded cast bronze tools permanently.<sup>[19]</sup>

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The Iron Age in the Ancient Near East is believed to have begun with the discovery of iron smelting and smithing techniques in Anatolia or the Caucasus and Balkans in the late 2nd millennium BC (c. 1300 BC).<sup>[20]</sup> The earliest bloomery smelting of iron is found at Tell Hammeh, Jordan around 930 BC (determined from <sup>14</sup>C dating).

The Early Iron Age in the Caucasus area is conventionally divided into two periods, Early Iron I, dated to around 1100 BC, and the Early Iron II phase from the tenth to ninth centuries BC. Many of the material culture traditions of the Late Bronze Age continued into the Early Iron Age. Thus, there is a sociocultural continuity during this transitional period.<sup>[21]</sup>

In Iran, the earliest actual iron artifacts were unknown until the 9th century BC.<sup>[22]</sup> For Iran, the best studied archaeological site during this time period is Tepe Hasanlu.

In the Mesopotamian states of Sumer, Akkad and Assyria, the initial use of iron reaches far back, to perhaps 3000 BC.<sup>[23]</sup> One of the earliest smelted iron artifacts known was a dagger with an iron blade found in a Hattic tomb in Anatolia, dating from 2500 BC.<sup>[24]</sup> The widespread use of iron weapons which replaced bronze weapons rapidly disseminated throughout the Near East (North Africa, southwest Asia) by the beginning of the 1st millennium BC.

The development of iron smelting was once attributed to the Hittites of Anatolia during the Late Bronze Age. As part of the Late Bronze Age-Early Iron Age, the Bronze Age collapse saw the slow, comparatively continuous spread of iron-working technology in the region. It was long held that the success of the Hittite Empire during the Late Bronze Age had been based on the advantages entailed by the "monopoly" on ironworking at the time.<sup>[25]</sup> Accordingly, the invading Sea Peoples would have been responsible for spreading the knowledge through that region. The view of such a "Hittite monopoly" has come under scrutiny and no longer represents a scholarly consensus.<sup>[25]</sup> While there are some iron objects from Bronze Age Anatolia, the number is comparable to iron objects found in Egypt and other places of the same time period; and only a small number of these objects are weapons.<sup>[26]</sup>

The Iron Age in Central Asia began when iron objects appear among the Indo-European Saka in present-day Xinjiang (China) between the 10th century BC and the 7th century BC, such as those found at the cemetery site of Chawuhukou.<sup>[41]</sup>

The Pazyryk culture is an Iron Age archaeological culture (c. 6th to 3rd centuries BC) identified by excavated artifacts and mummified humans found in the Siberian permafrost in the Altay Mountains.

## East Asia

In China, Chinese bronze inscriptions are found around 1200 BC, preceding the development of iron metallurgy, which was known by the 9th century BC.<sup>[42][43]</sup> Therefore, in China prehistory had given way to history periodized by ruling dynasties by the start of iron use, so "Iron Age" is not typically used as to describe a period in Chinese history. Iron metallurgy reached the Yangtse Valley toward the end of the 6th century BC.<sup>[44]</sup> The few objects were found at Changsha and Nanjing. The mortuary evidence suggests that the initial use of iron in Lingnan belongs to the mid-to-late Warring States period (from about 350 BC). Important non-precious husi style metal finds include Iron tools found at the tomb at Guwei-cun of the 4th century BC.<sup>[45]</sup>

The techniques used in Lingnan are a combination of bivalve moulds of distinct southern tradition and the incorporation of piece mould technology from the Zhongyuan. The products of the combination of these two periods are bells, vessels, weapons and ornaments, and the sophisticated cast.

## South Asia

Iron was being used in Mundigak to manufacture some items in the 3rd millennium BC such as a small copper/bronze bell with an iron clapper,<sup>70</sup> a copper/bronze rod with two iron decorative buttons, and a copper/bronze mirror handle with a decorative iron button.<sup>[52]</sup> Artefacts including small knives and blades have been discovered in the Indian state of Telangana which have been dated between 2,400 BC and 1800 BC.<sup>[53][54]</sup> The history of metallurgy in the Indian subcontinent began prior to the 3rd millennium BC. Archaeological sites in India, such as Malhar, Dadupur, Raja Nala Ka Tila, Lahuradewa, Kosambi and Jhusi, Allahabad in present-day Uttar Pradesh show iron implements in the period 1800–1200 BC.<sup>[12]</sup> As the evidence from the sites Raja Nala ka tila, Malhar suggest the use of Iron in c.1800/1700 BC. The extensive use of iron smelting is from Malhar and its surrounding area.<sup>68</sup> This site is assumed as the center for smelted bloomer iron to this area due to its location in the Karamnasa River and Ganga River. This site shows agricultural technology as iron implements sickles, nails, clamps, spearheads, etc, by at least c.1500 BC.<sup>[55]</sup> Archaeological excavations in Hyderabad show an Iron Age burial site.<sup>[56]</sup>

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The beginning of the 1st millennium BC saw extensive developments in iron metallurgy in India. Technological advancement and mastery of iron metallurgy were achieved during this period of peaceful settlements.<sup>[71]</sup> One ironworking centre in East India has been dated to the first millennium BC.<sup>[57]</sup> In Southern India (present-day Mysore) iron appeared as early as 12th to 11th centuries BC; these developments were too early for any significant close contact with the northwest of the country.<sup>[57]</sup> The Indian Upanishads mention metallurgy.<sup>[58]</sup> and the Indian Mauryan period saw advances in metallurgy.<sup>[59]</sup> As early as 300 BC, certainly by 200 CE, high-quality steel was produced in southern India, by what would later be called the crucible technique. In this system, high-purity wrought iron, charcoal, and glass were mixed in a crucible and heated until the iron melted and absorbed the carbon.<sup>[60]</sup>

## III.RESULTS

In the prehistory of the Indian subcontinent, the Iron Age succeeded Bronze Age India and partly corresponds with the megalithic cultures of India. Other Iron Age archaeological cultures of India were the Painted Grey Ware culture (1300–300 BCE)<sup>[1]</sup> and the Northern Black Polished Ware (700–200 BCE). This corresponds to the transition of the Janapadas or principalities of the Vedic period to the sixteen Mahajanapadas or region-states of the early historic period, culminating in the emergence of the Maurya Empire towards the end of the period.

The earliest evidence of iron smelting predates the emergence of the Iron Age proper by several centuries.<sup>[2]</sup> R. Tewari (2003) radiocarbon dated iron artefacts in Uttar Pradesh, including furnaces, tuyeres, and slag between c. 1800 and 1000 BCE. The use of iron and iron working was prevalent in the Central Ganga Plain and the Eastern Vindhyas from the early second millennium BCE.<sup>[3]</sup> The beginning of the use of iron has been traditionally associated with the eastward migration of the later Vedic people, who are also considered as an agency which revolutionised material culture particularly in eastern Uttar Pradesh and Bihar. Scholar Rakesh Tewari states that new finds and their dates suggest the need for a fresh review. According to him, the evidence corroborates the early use of iron in other areas of the country, and attests that India was indeed an independent centre for the development of the working of iron.<sup>[4][5]</sup>

The earliest Iron Age sites in South India are Hallur, Karnataka and Adichanallur, Tamil Nadu<sup>[6]</sup> at around 1000 BCE.<sup>[7]</sup> Mahurjhari near Nagpur was a large bead manufacturing site.<sup>[8]</sup>

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