

# "THE DISCOVERY OF IRON"

Type of Event: Utilization of a new metal

Time: C. 1500 BCE

Locale: Asia Minor (Anatolia)

In considering the discovery of iron as a historical event, two factors should be considered: first, the technological mastery of the process by which iron was made functional; and second, the political, social, and economic context of the technological accomplishment.

With increasing frequency in the last decade, archaeologists have been insisting that the classic division of civilization into stone and metal ages with the metals following in an orderly progression through copper, bronze, and iron is not a realistic way to periodize cultures and civilizations. Although meteoric iron, a natural alloy of nickel and iron, was on occasion used for making beads in pre-dynastic Egypt around 3200 BCE the significance of the knowledge of iron in this form at this early date should not be overestimated.

For a long time after metals were known, little progress was made toward using them, simply because they were less functional for many purposes than stone. Metallurgy advanced very slowly; it took generations to develop the combination of skills necessary to produce bronze that surpassed flint or stone, and it was a matter of centuries before iron replaced bronze as the metal of major importance.

At first iron was used like stone. Among certain Latin American Indians such as the Aztecs of Mexico, the Mayas of the Yucatan, and the Incas of Peru, the use of iron never advanced far beyond this stage; such cultures cannot be said to have advanced to an iron age. Nor can it be assumed that once the first process of refining iron was mastered, one invention would necessarily lead to another. The Vikings learned to make

iron anchors, but never learned to make steel swords with good cutting edges.

Wrought iron was discovered accidentally about 2500 BCE when smiths found that by hammering the small bead-like pieces of iron left as a residue after smelting copper they could form the particles into a mass. This kind of wrought iron, however, was good only for decorative purposes, and for more than two thousand years after iron remained a precious ornamental metal. Bronze, which was harder and capable of being sharpened to a fine cutting edge, continued to be the functional metal for tools and weapons.

The real advent of the Iron Age came not with the discovery of the metal, but with the invention of the process of casing or steeling it, probably about 1500 BCE. This happened when it was learned that by repeatedly reheating wrought iron in a charcoal fire and then hammering it, it not only became harder than bronze but also kept its hardness after long use. The next technological improvement, which again meant further hardening of the metal, was the process of quenching it that is repeatedly plunging the hot iron into cold water. It was only after this series of discoveries and inventions that the significance of iron on culture and civilization was appreciable felt.

Bronze did not extend man's control over nature nearly so much as did iron because of the scarcity and consequent costliness of copper and tin needed to make bronze. For this reason, iron has been called the "democratic" metal. Bronze could not furnish an important proportion of agricultural tools but was reserved largely for weapons. It remained, for the most part, a luxury item made for the wealthy by a small number of skilled craftsmen. In the Bronze Age, therefore, production remained basically based around stone tools. In contrast, widespread use of iron tools meant a general increase in living standards. For example, the use of iron axes brought about the clearing of forests, and much new land came under cultivation. Other

significant developments included the application of iron tools to sheep shearing and cloth cutting.

About 1500 BCE, the Hittites of Asia Minor enjoyed a monopoly in the manufacture of iron. For them it was a precious metal, worth five times the value of gold, and forty times the value of silver. Iron was used for ornaments; it seems likely that even when it began to be used for weapons, they were inferior to bronze and even stone. On an industrial scale, iron was not smelted or worked anywhere before 1400 BCE. There are grounds for suspecting that the Hittites jealously guarded the secret of iron because they realized the advantage of iron weapons in war; on the other hand there is evidence that they exported iron ornaments and daggers as gifts to foreign rulers. What is certain is that the change from a bronze to an iron technology meant a radical change in the manner of warfare. As long as bronze was the predominant metal, only a small number of men could be armed with metal weapons. The rank-and-file soldier was limited to stone clubs and stone tipped arrows. When steeled or cased iron came into common use for weapons, the destructive potential of an army increased dramatically.

Concerning the process and channels of diffusion of iron technology, research does not yet provide certainty. Surely the breakup of the Hittite Empire shortly after 1200 BCE was a major factor in the rapid and widespread dissemination of iron technology. Iron-working was practiced in Palestine and in the areas of the Aegean by 1000 BCE, but it was not adopted in the Nile valley until four hundred years later, when Egypt came under Greek influence. Before that time it did not answer a socially approved need of Egyptian culture.

In continental Europe, iron was known in the ninth century BCE, but it was not used on a comparatively large scale until the seventh century BCE. By the sixth century BCE, iron using cultures in Europe extended from the Balkan region and the eastern Alps to France, and extended north to the middle region

of the Rhine River. The next major advance in iron technology, true crucible steel, probably from India, did not reach Europe until the eleventh century CE.

In Africa, Carthage was making general use of iron tools at a date traditionally set at the end of the ninth century BCE. Iron technology in Africa was not preceded by the usual copper and bronze periods that came before iron elsewhere in the world. Many archaeologists believe the technology came to Africa from an outside culture, although some contend that iron technology developed on its own in Africa separate from any outside influence.

### READING QUESTIONS:

1. Why did it take so long for metals to replace stone and flint?
2. What is wrought iron? What was it used for?
3. What is the casing or steeling of iron?
4. What is quenching and how did it improve iron?
5. Why did iron eventually replace bronze?
6. What are 4 advantages of iron as a metal?
7. Describe the impact of the ax?
8. Describe the impact of bronze on warfare? Iron?
9. What kept the technology of iron from spreading faster than it did?
10. Do you think iron technology develop in Africa on its own or came from the outside? Why?