

The **Copper Age**, also called the **Chalcolithic** (English: /ˌkælkəˈlɪθɪk/; from Greek: χαλκός *khalkós*, "copper" and λίθος *lithos*, "stone") or **(A)eneolithic** (from Latin *aeneus* "of copper"), is an archaeological period characterized by regular human manipulation of copper, but prior to the discovery of bronze alloys. Modern researchers consider the period as a subset of the broader Neolithic,^[a] but earlier scholars defined it as a transitional period between the Neolithic and the Bronze Age. It is also considered the first phase, of three, in the Metal Ages.^[2]

The archaeological site of Belovode, on Rudnik mountain in Serbia, has the world's oldest securely dated evidence of copper smelting at high temperature, from c. 5000 BC (7000 BP).^[3] The transition from Copper Age to Bronze Age in Europe occurred between the late 5th and the late 3rd millennia BC. In the Ancient Near East the Copper Age covered about the same period, beginning in the late 5th millennium BC and lasting for about a millennium before it gave rise to the Early Bronze Age. Nevertheless, a study in the journal *Antiquity* from 2013 reported the discovery of a tin bronze foil from the Pločnik archaeological site dated to c. 4650 BC, as well as 14 other artefacts from Bulgaria and Serbia dated to before 4000 BC, showed that early tin bronze was more common than previously thought and developed independently in Europe 1,500 years before the first tin bronze alloys in the Near East.^[4]

Terminology

The multiple names result from multiple definitions of the period. Originally, the term Bronze Age meant that either copper or bronze was being used as the chief hard substance for the manufacture of tools and weapons. Ancient writers, who provided the essential cultural references for educated people during the 19th century, used the same name for both copper- and bronze-using ages.^[5]

The concept of the Copper Age was put forward by Hungarian scientist Ferenc Pulszky in the 1870s, when, on the basis of the significant number of large copper objects unearthed within the Carpathian Basin, he suggested that the previous threefold division of the Prehistoric Age – the Stone, Bronze and Iron Ages – should be further divided with the introduction of the Copper Age.

In 1881, John Evans recognized that use of copper often preceded the use of bronze, and distinguished between a *transitional Copper Age* and the *Bronze Age proper*. He did not include the transitional period in the Bronze Age, but described it separately from the customary stone / bronze / iron system, at the Bronze Age's beginning. He did not, however, present it as a fourth age but chose to retain the tripartite system.^[5]

In 1884, Gaetano Chierici, perhaps following the lead of Evans, renamed it in Italian as the *eneo-litica*, or "bronze–stone" transition. The phrase was never intended to mean that the period was the only one in which both bronze and stone were used. The Copper Age features the use of copper, excluding bronze; moreover, stone continued to be used throughout both the Bronze Age and the Iron Age. The part *-litica* simply names the Stone Age as the point from which the transition began and is not another *-lithic* age.^[5]

Subsequently, British scholars used either Evans's "Copper Age" or the term "Eneolithic" (or *Æneolithic*), a translation of Chierici's *eneo-litica*. After several years, a number of complaints appeared in the literature that "Eneolithic" seemed to the untrained eye to be produced from *e-neolithic*, "outside the Neolithic", clearly not a definitive characterization of the Copper Age. Around 1900, many writers began to substitute *Chalcolithic* for Eneolithic, to avoid the false segmentation.

But "chalcolithic" could also mislead: For readers unfamiliar with the Italian language, *chalcolithic* seemed to suggest another *-lithic* age, paradoxically part of the Stone Age despite the use of copper. Today, *Copper Age*, *Eneolithic*, and *Chalcolithic* are used synonymously^[6] to mean Evans's original definition of Copper Age.

Near East

The emergence of metallurgy may have occurred first in the Fertile Crescent. The earliest use of lead is documented here from the late Neolithic settlement of Yarim Tepe in Iraq,

The earliest lead (Pb) finds in the ancient Near East are a 6th millennium BC bangle from Yarim Tepe in northern Iraq and a slightly later conical lead piece from Halaf period Arpachiyah, near Mosul.^[7] As native lead is extremely rare, such artifacts raise the possibility that lead smelting may have begun even before copper smelting.^{[8][9]}



Chalcolithic copper mine in Timna Valley, Negev Desert, Israel

Copper smelting is also documented at this site at about the same time period (soon after 6000 BC), although the use of lead seems to precede copper smelting. Early metallurgy is also documented at the nearby site of Tell Maghzaliyah, which seems to be dated even earlier, and completely lacks pottery.

The Timna Valley contains evidence of copper mining in 7000–5000 BC. The process of transition from Neolithic to Chalcolithic in the Middle East is characterized in archaeological stone tool assemblages by a decline in high quality raw material procurement and use. This dramatic shift is seen throughout the region, including the Tehran Plain, Iran. Here, analysis of six archaeological sites determined a marked downward trend in not only material quality, but also in aesthetic variation in the lithic artefacts. Fazeli & Coningham^[10] use these results as evidence of the loss of craft specialisation caused by increased use of copper tools. The Tehran Plain findings illustrate the effects of the introduction of copper working technologies on the in-place systems of lithic craft specialists and raw materials. Networks of exchange and specialized processing and production that had evolved during the Neolithic seem to have collapsed by the Middle Chalcolithic (c. 4500–3500 BC) and been replaced by the use of local materials by a primarily household-based production of stone tools.^[10]

Arsenical copper or bronze was clearly produced in eastern Turkey (Malatya Province) at two ancient sites, Norşuntepe and Değirmentepe, around 4200 BC. According to Boscher (2016), hearths or natural draft furnaces, slag, ore, and pigment had been recovered throughout these sites. This was in the context of Ubaid period architectural complexes typical of southern Mesopotamian architecture.

Norşuntepe site demonstrates that some form of arsenic alloying was indeed taking place by the 4th millennium BC. Since the slag identified at Norşuntepe contains no arsenic, this means that arsenic in some form was added separately.^[11]

Europe

A copper axe found at Prokuplje, Serbia contains the oldest securely dated evidence of copper-making, c. 5500 BC (7,500 years ago).^[12] The find in June 2010 extends the known record of copper smelting by about 800 years, and suggests that copper smelting may have been invented in separate parts of Asia and Europe at that time rather than spreading from a single source.^[3]

Knowledge of the use of copper was far more widespread than the metal itself. The European Battle Axe culture used stone axes modeled on copper axes, even with moulding carved in the stone.^[13] Ötzi the Iceman, who was found in the Ötztal Alps in 1991 and whose remains have been dated to about 3300 BC, was found with a Mondsee copper axe.

Examples of Chalcolithic cultures in Europe include Vila Nova de São Pedro and Los Millares on the Iberian Peninsula.^[14] Pottery of the Beaker people has been found at both sites, dating to several centuries after copper-working began there. The Beaker culture appears to have spread copper and bronze technologies in Europe, along with Indo-European languages.^[15] In Britain, copper was used between the 25th and 22nd centuries BC, but some archaeologists do not recognise a British Chalcolithic because production and use was on a small scale.^[16]



Painting of a Copper Age walled settlement, Los Millares, Spain

South Asia

Ceramic similarities between the Indus Valley civilisation, southern Turkmenistan, and northern Iran during 4300–3300 BC of the Chalcolithic period suggest considerable mobility and trade.^[17]

The term "Chalcolithic" has also been used in the context of the South Asian Stone Age.^[18]

In Bhirrana, the earliest Indus civilization site, copper bangles and arrowheads were found. The inhabitants of Mehrgarh in present-day Pakistan fashioned tools with local copper ore between 7000 and 3300 BC.^[19]

The Nausharo site was a pottery workshop in province of Balochistan, Pakistan, that dates to 4,500 years ago; 12 blades and blade fragments were excavated there. These blades are 12–18 cm (5–7 in) long, 1.2–2.0 cm (0.5–0.8 in) wide, and relatively thin. Archaeological experiments show that these blades were made with a copper indenter and functioned as a potter's tool to trim and shape unfired pottery. Petrographic analysis indicates local pottery manufacturing, but also reveals the existence of a few exotic black-slipped pottery items from the Indus Valley.^[20]

In India, Chalcolithic culture flourished in mainly four farming communities – Ahar or Banas, Kayatha, Malwa, and Jorwe. These communities had some common traits like painted pottery and use of copper, but they had a distinct ceramic design tradition. Banas culture (2000–1600 BC) had ceramics with red, white, and black design. Kayatha culture (2450–1700 BC) had ceramics painted

with brown colored design. Malwa culture (1900–1400 BC) had profusely decorated pottery with red or black colored design. Jorwe culture (1500–900 BC) had ceramics with matte surface and black-on-red design.^{[21][22]}

Pandu Rajar Dhibi (2000–1600 BC) is a Chalcolithic site in the eastern part of the Indian subcontinent. It is located on the south bank of Ajay River in West Bengal. Black ware, painted Koshi ware, pottery, various ornaments made of pearl and copper, various types of tools, pieces of fabric woven from Shimul cotton thread, human and various animal skeletons, burnt clay fragments have been found at the site.^[23]

In March 2018, archaeologists had discovered three carts and copper artifacts including weapons dating to 1800 BC in Sanauli village of Uttar Pradesh. The artifacts belongs to Ochre Coloured Pottery culture.^[24]

Pre-Columbian Americas

Andean civilizations in South America appear to have independently invented copper smelting.^[25]

The term "Chalcolithic" is also applied to American civilizations that already used copper and copper alloys thousands of years before Europeans immigrated. Besides cultures in the Andes and Mesoamerica, the Old Copper Complex mined and fabricated copper as tools, weapons, and personal ornaments in an area centered in the upper Great Lakes region: Present-day Michigan and Wisconsin.^[26] The evidence of smelting or alloying that has been found in North America is subject to some dispute and a common assumption by archaeologists is that objects were cold-worked into shape. Artifacts from some of these sites have been dated to 6500–1000 BC, making them some of the oldest Chalcolithic sites in the world.^[27] Furthermore, some archaeologists find artifactual and structural evidence of casting by Hopewellian and Mississippian peoples to be demonstrated in the archaeological record.^[28]

East Asia

In the 5th millennium BC copper artifacts start to appear in East Asia, such as in the Jiangzhai and Hongshan cultures, but those metal artifacts were not widely used during this early stage.^[29]

Copper manufacturing gradually appeared in the Yangshao period (5000–3000 BC). Jiangzhai is the only site where copper artifacts were found in the Banpo culture. Archaeologists have found remains of copper metallurgy in various cultures from the late fourth to the early third millennia BC. These include the copper-smelting remains and copper artifacts of the Hongshan culture (4700–2900) and copper slag at the Yuanwozhen site. This indicates that inhabitants of the Yellow River valley had already learned how to make copper artifacts by the later Yangshao period.^[30]

Sub-Saharan Africa

In the region of the Air Mountains, Niger, independent copper smelting developed between 3000 and 2500 BC. The process was not in a developed state, indicating smelting was not foreign. It became mature about 1500 BC.^[31]

See also

- Arsenical bronze
- Proto-city

Footnotes

- a. "**Chalcolithic** /,kælkəl'ɪθɪk/ **adjective** *Archaeology* of, relating to, or denoting a period in the 4th and 3rd millennium BCE, chiefly in the Near East and SE Europe, during which some weapons and tools were made of copper. This period was still largely Neolithic in character. Also called **Eneolithic**... Also called **Copper Age** – *Origin* early 20th cent.: from Greek *khalkos* 'copper' + *lithos* 'stone' + **-ic**".^[1]
- b. Middle Eastern archaeologists use "Chalcolithic" regularly, whereas the literature of European archaeology generally avoids the use of "Chalcolithic": The term "Copper Age" is preferred for Western Europe, "Eneolithic" for Eastern Europe. "Chalcolithic" is not generally used by British prehistorians, who disagree as to whether it is appropriate in the British context.^[6]

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