

Origin

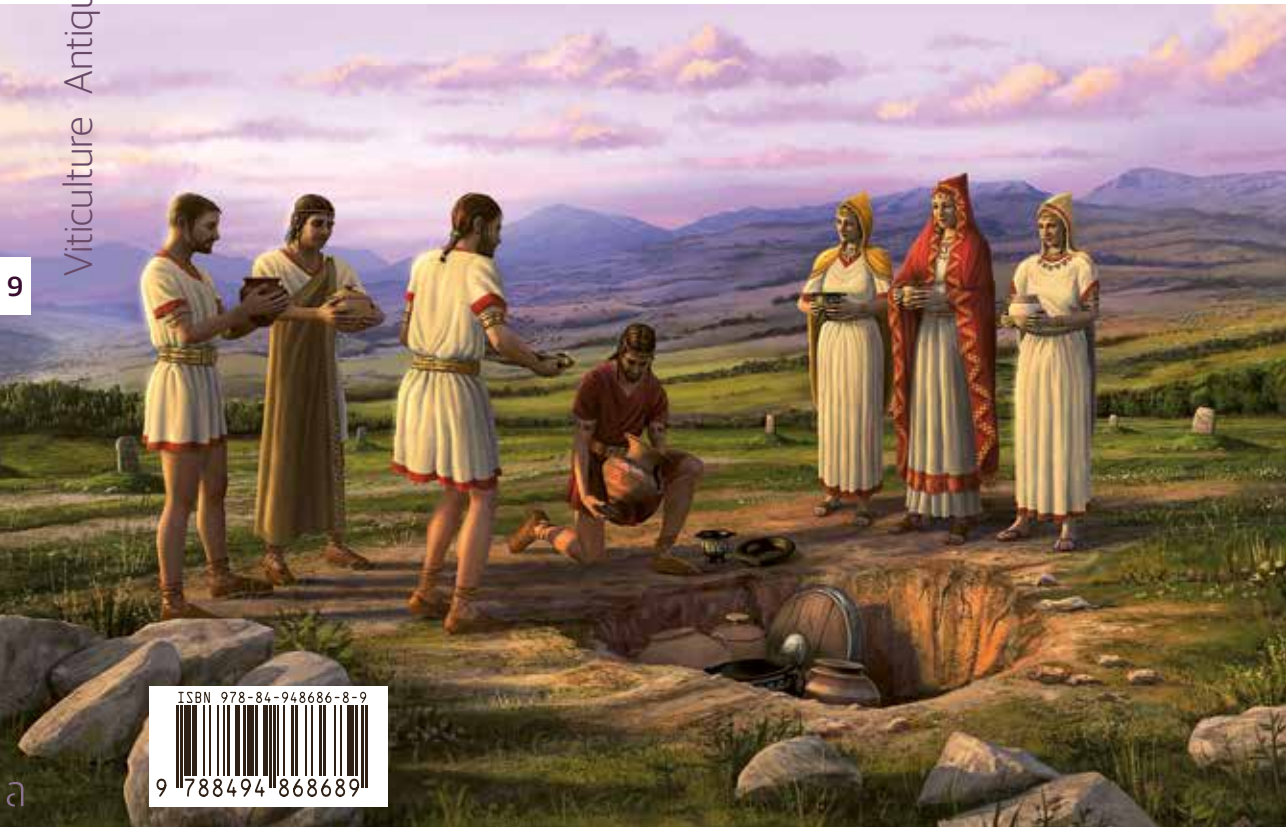
ATAPUERCA
NOTEBOOKS

Viticulture Antiquity Rome Foods Egypt Commerce Iberians

Wine

MEDITERRANEAN ROOTS

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Historian



Origin

ATAPUERCA
NOTEBOOKS

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COVER: Recreation of an Iberian burial, with pottery grave goods and offerings or banquets for the deceased, often including wine. MVVEL MUSEO DE VÉLEZ-MÁLAGA, JOSÉ EMILIO TORO

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The Mediterranean basin and its cultures are incomprehensible without wine. The domestication of wild grapevines and the fermentation of grapes began when sedentary societies emerged in Asia 8,000 years ago, giving rise to an alcoholic product that has fascinated all those who have come into contact with it. The essence of many religions, economies and cultures has been impregnated with the magnetic attraction of wine. Nature and humanity have progressed hand in hand, and grape growing has expanded around the world to build up a great industry, the pride of every grower.

A youth using an oinochoe (wine jug in his right hand) to take wine from a *krater* and serve it in a *kylix* (shallow cup in his left hand). His naked figure shows that he is a cup bearer at a symposium or banquet. Atica cup with red figures, 490-480 BC. BANQUET LOUVRE KYLIX G133. CAGE PAINTER.



Relief of Assyrian King Ashurnasirpal II of Nimrud, Iraq, pouring libations from a bowl of wine. 9th century BC. METROPOLITAN MUSEUM OF ART, NEW YORK.

V*ITIS vinifera L.* has always had a twofold connection to the grower's society: its consumption as fruit, either fresh or dried, and as an essential element in wine production. This quality led to a wide variety and genetic diversity in the genus *Vitis*.

Wine consumption was a symbol of power, prestige and social prominence for those who could afford it. Wine and its derivatives were used as food, medicine, preservatives, perfumes and insecticides. The liquid obtained from crushed grapes was found to contain alcohol and bactericidal power after it fermented. It became the most widely consumed drink in societies with water-borne diseases, where it was more popular than water.

Wine and grapevines have been treated as core symbolic elements in the religions of many cultures. The Egyptians related the life cycle of the grapevine to the god Osiris, the goddess Hathor and the annual floods on the Nile River. Greeks and Romans venerated Dionysus and Bacchus. Jews and Christians see the blood of Christ in wine. Even Muslims, whose Koranic precepts frown upon alcohol consumption, produced, drank and traded wine when they lived on the Iberian Peninsula.

The English word *wine* comes from the Proto-Germanic *winam*, a derivative from the Latin *vinum* which, along with the Greek *oínos*, originated in the Indo-European term *woinom*. The ancient Greeks had several etymological connections to wine. The most common one was King Oeneus (the origin of *oenology*, the science and study of wine-making) from Aetolia. There are two legends about him: one version says that the King gave wine its name, while the second says that it was the King who was named after the drink.

Chemical composition

GRAPES and their *must* (the juice and material obtained by crushing the fruit of the vine) have several natural components including water, lipids, minerals, carbohydrates, fermentable sugars (fructose and glucose), non-fermentable sugars (arabinose, xylose and maltose) and phenolic compounds. Each of these elements contributes to the different qualities (taste, smell, colour) and nutritional balance of grapes and wine, which influences the chemical and biochemical reactions that take place while the grapes are ripening and the must is fermenting during its transformation into wine.

Water is the most abundant component of grapes. Its availability directly influences the size of the plant and the fruit. If water is scarce, the cell expansion and division process is inhibited and the grapes are smaller.



7th Century BC relief of Assyrian king Ashurbanipal and his wife drinking wine under a shady grapevine. BRITISH MUSEUM, LONDON.

The most important organic acids in grapes are *malic* and *tartaric acid*. Thanks to the grapevine's adaptability to different climates and soils, its high yield and its ability to store large amounts of *tartaric acid*, which facilitates the action of yeast, the grape is now the most widely-harvested fruit in the world. Over 70% of the world's grape production used for winemaking.

The quantity of acids and their interactions, along with the amount of potassium in the fruit, determine its acidity, a parameter that is essential during the transformation of must into wine. Amino acids are an essential part of the growth of bacteria and yeasts, which cause fermentation. They are also involved in determining the acidity through their *buffering* effect.

The amount of protein in wine depends on many factors including the plant's nitrogen fertilization, the temperature at which the must ferments and the interaction between bacteria and yeasts.

Grapevines and the diversity of the genus *Vitis*

VINES are amongst the oldest and most widespread plants on Earth. The genus *Vitis* emerged during the Eocene. The oldest known fossil specimen, *Vitis sezannensis*, was discovered in the Champagne region of France. It is more than 50 million years old. *Vitis sylvestris* was a wild dioecious plant (male and female plants) which grew during the Tertiary (66-2.6 million years ago).

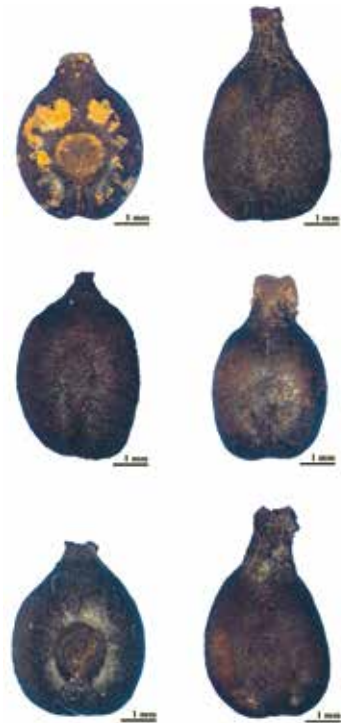
The *Vitaceae* family consists of 12 genera and about 700 species, most of which grow in tropical, subtropical and Mediterranean climates. It has 38 chromosomes, which has enabled its species to hybridize and *Vitis sylvestris* to mutate to *V. vinifera* through human intervention. The only native European species is *Vitis vinifera*, which extends from the Iberian Peninsula to the Maghreb and eastward to the Hindu Kush massif in Asia. Selected and domesticated during prehistory, it was the origin of today's hermaphrodite, self-pollinating vines, *Vitis vinifera sativa*. It was probably one of the first fruit plants to be domesticated thanks to its ability to take root in new soil, its easy reproduction from cuttings and also pruning (better grape quantity and quality).

Grapevines reproduce continuously, which has allowed them to diversify their habitats and produce large amounts of fruit with the help of hybridization. The selection of the most productive plants has also allowed their number to increase by vegetative means.

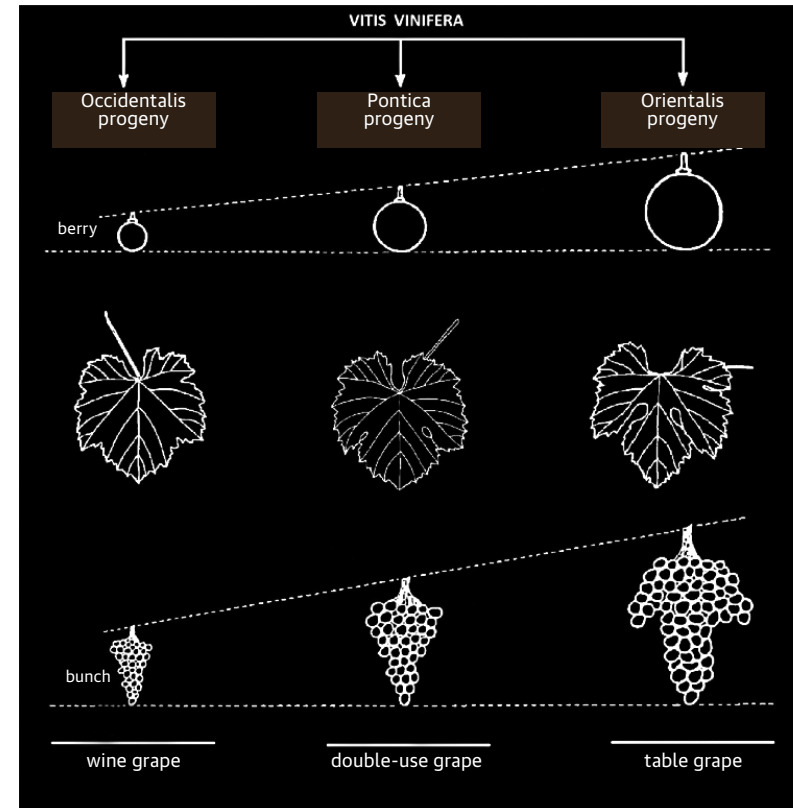
The Mediterranean region acted as a refuge for *Vitis sylvestris* during the glaciations and prevented its extinction during the coldest periods. Roughly 70% of the grapevines now growing on the Iberian Peninsula contain chlorotype derivatives from vines that originated in Western Europe. This lends weight to the hypothesis that the Mediterranean region acted as a refuge during the glaciations.

The retreat of the species due to the low temperatures of the last glaciation led to its genetic isolation. Some gene sequences changed, permitting differences in the shape of the plant and the fruit of each variety, although they were still able to cross-breed and grafted to each other. *Vitaceae* expanded during the following interglacial period and colonized new parts of Europe. Cross-breeding gave rise to the varieties that are grown today from Germany to Portugal (Pinot, Chardonnay, Merlot, etc.).

Vitis vinifera began to be grown as a crop when human populations became sedentary. They found that their vineyards started to be productive 3-5 years after plantation. The selection of wild grapevines led to the emergence of domestic varieties.



Top to bottom: Wild (left) and domestic (right) types of *Vitis* seeds from French sites: Parc St. Georges (250-300 AD), Gasquinoiy (100-200 AD) and La Lesse (0-50 AD). L. BOUBY. PLOS ONE.



Ecological-geographic varieties according to Negrul (1948). *Pontica* emerged from Transcaucasian *Lambruscas*, *Orientalis* were crossed with muscatels, and *Occidentalis* is a cross between these and local vines. JOSÉ CASANOVA (2008).

The oldest palaeontological remains of wild grapevines, from the Lower Pleistocene, have been found in North Africa and parts of Eurasia such as England, Italy, Greece and the Netherlands. In Spain, pollen evidence from peat bogs in Padul (Granada) and Gran Dolina (Atapuerca) dates back to the Middle Pleistocene, a little earlier than the records from Les Echets (France). There are many Holocene sites, including La Draga (Gerona) and Laguna de las Madres (Huelva). With domestication, hybridization and trade, *Vitis vinifera* gave rise to the domestic subspecies *Vitis vinifera sativa*, in three large groups according to Negrul:

1 Orientalis: Grown in Central Asia, Afghanistan, Iran, Armenia and Azerbaijan. Main features are bunches of large grapes.

2 Occidentalis: Grown from Germany to the Iberian Peninsula. Small grapes and bunches. Mainly for wine production.

THE OLDEST PALAEOLOGICAL SPECIMENS OF *VITIS VINIFERA SYLVESTRIS* ARE FROM THE LOWER PLEISTOCENE

3 Póntica: Grown in Georgia, Greece, Bulgaria Hungary and Romania. Intermediate features between *Orientalis* and *Occidentalis*.

By comparing the seeds of wild and domestic vines found at archaeological sites, we can tell which types of grape were consumed the peoples who populated the Iberian Peninsula. From the carpological remains of seeds found at different sites, it seems clear that berries of the genus *Vitis* were consumed on a continuous basis over the ages.

Distinctive features

of *Vitis vinifera sativa* and *Vitis vinifera sylvestris*.

Encarnación Carreño Sánchez

	<i>VITIS VINÍFERA SATIVA</i>	<i>VITIS SYLVESTRIS SYLVESTRIS</i>
Leaf shape	Variable	Clear sexual dimorphism. Lobed in males, complete or almost complete in females
Petiole	Variable	Open
Inflorescence	Hermaphrodite or female	Hermaphrodite, female and male individuals
Flowering period	Mostly concentrated	Long
Bunch size	Large	Small
Grape colour	Yellow, green, reddish, blueish and black	Black-blueish. Occasionally white
Grape size	Large	Small
Grape shape	Rounded, ovoid, oblong	Rounded
Grape taste	Sweet	Bitter
Seeds per grape	1 to 4	0 to 2
Seed shape	Elongated	Round
Tip length	Short or long	Short
Pediceal prominence	Not pronounced	Prominent
Shape	Ovoid	Round
Ventral grooves	Convergent and marked	Divergent or parallel

Excavation at Gadachrili Gora (Georgia). The discovery of vessels containing tartaric, malic, succinic and citric acid proves that wine was made 8,000 years ago. STEPHEN BATIUK



Origins of grapegrowing

THE OLDEST evidence of winemaking as a deliberate (not accidental) human activity dates back to the Mesolithic. Occasional chance episodes may also have happened during the Palaeolithic, when wild grapes fermented spontaneously after being picked and stored. This is what is known as "fruit wine", possibly drunk in Çatal Hüyük (Turkey) 8,000 years ago.

The domestication of *Vitis sylvestris* was an artificial evolution process, triggered by the first sedentary societies who managed the annual cycle over a long period of time. Their selective pressure encouraged certain varieties over others to reproduce particular characteristics in each new generation of vines: grape colour and size, amount of sugar, better adaptation to the local climate and geography, etc. Each new species was different, influenced by the land and the prevailing climate. This selection process was successful thanks to the species' low water and mineral requirements and its efficient regeneration, being able to grow in places where other fruit trees and plants could not. The emergence of wine and the culture surrounding its production and conservation was a direct result of this domestication of grapevines.



5,000 year old zoomorphic vase from Argadeti, Georgia. It contained a large amount of *Vitis* pollen, evidence that wine was used in rituals by the Kura-Araxes culture. UNIVERSITÀ CA' FOSCARI VENICE



Detail of a relief on the East Stairs of Apadana, Persepolis, showing Armenian ambassadors bringing wine to the Persian emperor. PHILLIP MAIWAD (NIKOPOL).

Clay was a basic element in wine processing. Its malleability, porosity and hardening process made it ideal for recipients and vessels in which wine could be fermented and stored.

Early sedentary societies developed a variety of techniques and methods to process the foods they domesticated, ranging from fermentation, soaking, heating and cooking to seasoning. These societies are credited with having been the first producers of bread, beer, wine and a variety of meat and cereal dishes that are still made today. Wine was a highly appreciated substance and commodity. It was a social lubricant that soon became a cult product that marked the social status of those who could afford to drink it. Used as a trading commodity and in cooking, it spread rapidly.

The earliest evidence of domesticated grapevines, found at archaeological sites in the Syria-Anatolia-Mesopotamia and Transcaucasia region, is 8,000 years old. At the Shulaveris Gora and Gadachrili Gora sites (Georgia), several clay vessels from around 6000 BC have been found to contain remnants of *Vitis vinifera*. Chemical analyses of pottery vessels from the site shows evidence of tartaric acid and organic malic, citric and succinic acids. Chemical, archaeological, botanical and climatic data suggest that the Eurasian grapevine, *V. vinifera*, was grown widely in this part of Georgia.

Archaeological remains ranging from the Neolithic to the start of the Bronze Age have been found in Turkmenistan, Uzbekistan and Tajikistan.



Clay pots at the oldest known winery, Areni-1, inhabited during the Copper Age. Discovered in 2007. GREGORY ARESHIAN.

Several vessels at the Hajji Firuz Tepe site in the Zagros Mountains (Iran) contained tartaric acid and terebinth resins, obtained from the pistachio tree and used as preservatives, which proves that wine was made shortly before 5000 BC. Other early Neolithic sites include Chokh in Dagestan and Shomutepe in Azerbaijan.

A 6,000 year old wine production and storage cellar has been discovered in the Areni-1 cave complex, in the mountains of southern Armenia. This is the oldest winemaking complex found to date. It consists of a wine press, vats and pots for fermentation and preservation. Their distribution suggests that the Copper Age winegrowers trod on the grapes to produce wine, which they used in funerary rites. Luckily, the roof of the cave collapsed, which kept the complex intact until the site was discovered in 2007.

Grapevine growing and wine spread along trade routes to the rest of the production areas in Mesopotamia and the Mediterranean. From Anatolia, grapevines spread to the Jordan River valley, where the vines were grown and wine was produced between 4000 and 3500 BC. It then reached Mesopotamia, where there is evidence of cultivation but it is not clear whether wine was made there. The vine is mentioned as the tree of life in the Poem of Gilgamesh, an Acadian epic which describes the use of wine in offerings, libations and sacrifices 4,200 years ago.



8,000 year old vase from Khramis Didi Gora in Georgia, with grapevine motifs and tartaric acid particles inside. M. JALABADZE. NATIONAL MUSEUM OF GEORGIA.



Diorite stele
or Code of
Hammurabi
from 1750 BC.
Found in Susa
(Iran).
It regulates
wine trading,
amongst other
aspects. MUSÉE
DU LOUVRE.
PARIS.

Nineveh, a city in the Assyrian Empire, was famous for its wines. Bas-reliefs in the Temple of Ashurbanipal show scenes of people drinking wine, making libations and paying for services with wine.

Around 3,500 BC, grapevines were planted on small plots in the eastern Mesopotamian Zagros Mountains. The Sumerians imported wine for consumption in cities like Ur and Lagash. The vines were planted in specialized vineyards on hillsides to ensure their drainage and prevent large amounts of water from building up. This type of plantation required well-organised agriculture, manual labour, financial capacity and a politically centralised society.

Archaeologists have documented palace-based social and production systems in cities like Ugarit (Syria), along with the consumption of wine mixed with water, flour, spices and fruits. Professional wine blenders added water to wine in the right proportions. Another part of their job was to mix wine with different ingredients to produce new tastes and nuances, and also to extend the lifetime of the product and prevent it from turning to vinegar.

Babylonia reached its greatest splendour around 2000 BC, when grapevine farming reached the Tigris River valley. The famous Code of Hammurabi stele mentions the social importance of wine. It was used in religion as an offering, and was drunk by both the religious elites and the ruler, while lower ranks mostly drank beer. In the same millennium, the Egyptians described the Syria-Palestine region as the largest producer of top quality wine.

The controlled cultivation of grapevines in India, China and Japan was probably introduced by nomadic Aryan tribes around 2500 BC. In China, nearly 7,000 year-old grape seeds and tartaric acid residue has been found in Jiahu, with possible evidence of spontaneous fermentation. Wine became famous during the Han dynasty. In India, ancient Hindu texts mention *Drahska*, vine in Sanskrit, and the fermentation of its fruit.

From Mesopotamia, wine spread across the Near East to the Mediterranean Sea. This expansion was continued along the Mediterranean coast by the Phoenicians, Greeks, Etruscans and Romans. Wine production increased and its consumption became more widespread. Wine drinking was probably first introduced to areas where planting methods were unknown, followed by grape vine growing techniques. Various strains of *Vitis* reached the Iberian Peninsula in different periods, brought and cultivated by all the peoples who traded and settled along the coast.

Wine in Egypt

THE oldest evidence of grapes in Egypt, from the pre-Dynastic period (4,000-3,050 BC), has been found at the *Tell Ibrahim Awad and Tell el Farain* sites on the Nile delta. These and later discoveries at the *El-Omari* site (3,000 BC) show that Egyptian society knew about and drank wine right from the start of its civilization. Wild and tended vines coexisted in the Pre-Dynastic period. Evidence of *Vitis vinifera* plantations have been found in the form of remnants of raisins at *El-Omari*. Wine production and consumption in Egypt has been solidly documented on papyrus, statues, wall paintings and reliefs, with depictions of work related to grape harvesting, winemaking, movement and transportation to the storage point.

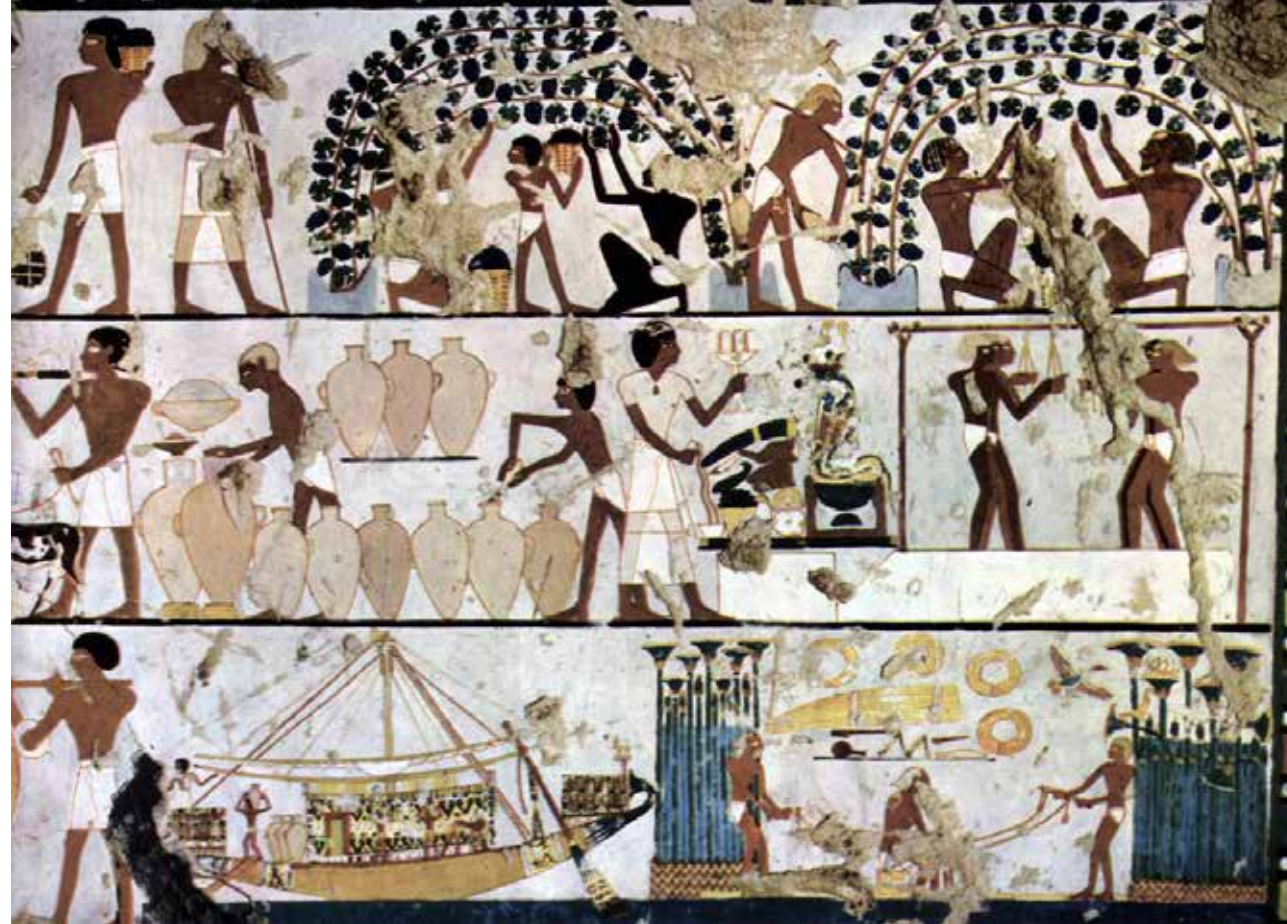
During the pre-Dynastic period, grapes were grown in the Nile valley and delta and at several oases. Vines were planted in areas near the river that were not flooded. The growers seemed to look for the benefits of predominantly gravel soils near the desert. Inscriptions on amphorae from the tomb of Tutankhamen and texts by classical authors such as Athenaeum, Strabo and Pliny indicate that they practised multi-cropping, with other types of fruit trees grown in addition to vines.

One of the best-known wine production areas was not far from Lake Mariut, south-east of today's Alexandria. Each wine had an appellation, depending on its origin: wine produced in Alexandria was *Alexandriotis*, and the one from near Lake Mariut was *Mareotis*.

During the Old and Middle Empires, wine was drunk by the political and religious elite. It was considered a prestigious luxury item, more highly appreciated than beer or palm and date wine, which were widely consumed by the lower classes.

There was also a flourishing wine trade, evidenced by the 5,000 year old wine amphora covers, clearly of Egyptian origin, discovered during excavations in Nahal Tillah (Israel).

Evidence of wine from the Dynastic period has been found amongst the grave goods in royal tombs. Priests made wine offerings to the gods. They related the annual cycle of the grapevine to Osiris and the annual floods on the Nile. After the harvest, which coincided with each flood, the vine lost its leaves and looked dead. Then, after a few months, it came back to life like Osiris, fertilizing the land flooded by the Nile, which gave life to animals and plants. The Egyptians related the reddish colour of the Nile floodwaters, caused by erosion in the mountains, with the colour of their wine.



In the Old Kingdom (2700-2200 BC), noble tombs began to be decorated with scenes from the daily life of the Egyptians. These paintings are an excellent source of information about viticulture and wine production. This type of funerary art remained in force until the 18th and 20th dynasties (1350-1250 BC), when Egyptian funerary culture reached its greatest splendour. The tombs depict scenes from the different processes involved in wine production, including techniques that are not so different from those used today.

Wine production began when the grapes were picked during the harvest and placed in wicker baskets to let the juice escape through the gaps and prevent the grape from fermenting prematurely. A supervisor informed the scribe about the point of origin, the quality and quantity of the harvested grapes, the date of the harvest and the distribution of the labour. Four to six people entered the wine cellar to trample the grapes. After trampling out the must, the remaining material –skin, pulp, seeds and stalks– formed a paste which was scraped into a press, possibly made of sackcloth, to extract as much additional must as possible. There are no archaeological remains of this type of press due to the perishable nature of the cloth and the lack of a particular location in the cellar where it was used.

Grape growing, vinification and trade in ancient Egypt, Thebes. 1500 BC. THE YORK PROJECT. ZENODOT VERLAGSGESSELLSCHAFT MBH.

THE EGYPTIANS
MADE WINE
4,000 YEARS
AGO



The Mediterranean in the Punic period. Stars ★ show the location of *Vitis vinifera* taxa documented in Phoenician-Punic contexts. PRADOS MARTINEZ. GERIÓN.

The fermentation process was completed in amphorae. The must was fanned while it was fermenting to limit the effect of high temperatures and prevent it from being spoiled. Once the wine was ready, the amphorae were sealed with a lid made of reeds or mud, with a clay stopper labelled with the name of the product, the owner, the year of harvest and the quality of the wine. This information was important for the Egyptians, who used it to choose which wine to offer to the gods and accompany them in their afterlife, as in the case of the royal tombs of Abydos.

Most Egyptian wine was probably red, since the first known mention of white wine is in texts by Athenaeum (332-395 BC) about *Mareotis* wine. In the first century BC, the poet Virgil praised the white grapes grown near Lake Mariut. However, the Egyptians also made another product with a stronger, sweeter taste than wine, which they called *Shedeh*. It was thought to have been made from pomegranate juice, but recent research on vessels from Tutankhamon's tomb has shown that it was red grape juice. This was possibly a more exclusive product than wine, because it was made in much smaller amounts. *Shedeh* was a deeply symbolic product. It is mentioned in moral precepts, literature and depicted in wall paintings as an offering. There are references to *Shedeh* in the Book of the Dead, which stipulates that it should be placed near the deceased.

El Phoenician-Punic wine and trade

AROUND 2900 BC, the Phoenicians, natives from the shores of the Sea of Oman (known as the Erythraean Sea in ancient times), emigrated to present-day Lebanon on the Mediterranean coast. The extremely rugged, mountainous geography of their new land forced them to obtain their needs by sea. They built up a sea trading route that was faster and more efficient than the land-based one, with colonies and city-states dotted along the shores of the Mediterranean. These permanent Phoenician settlements were in constant contact with other colonies. Their largest trade hubs included cities like Tyre, Biblos, Ugarit, Arados and Sidon. They brought Eastern and Western civilizations into contact thanks to their trade with Egypt, Greece, Rome, the Iberian Peninsula, Arabia, China and India. They were responsible for introducing viticulture and several species of *Vitis vinifera* to their areas of influence, planting grapevines in North Africa (Carthage) and the Iberian Peninsula (Gadir and Malaka). Classical authors like Eutymos and Strabo refer to the vineyards tended by the Phoenicians in Jerez. This has been confirmed by archaeological discoveries at Doña Blanca Castle, which prove the presence of Phoenicians in Cadiz (Gadir).



Sub-Mycenian pottery fragments from the Llanete de los Moros site. CORDOBA ARCHAEOLOGICAL MUSEUM.

THE PHOENICIANS SPREAD VITICULTURE ACROSS THE MEDITERRANEAN BASIN

The Phoenicians traded all kinds of goods, products and raw materials. Thanks to this vast commercial network, they became the most active disseminators of viticulture until the rise of the Greeks and Romans. Vines, viticulture and wine had a privileged role for Phoenicians as a traded food and for ritual uses. Nautical archaeologists have discovered wine amphorae in several shipwrecks around the Mediterranean. In some of them (e.g., Ashkelon, Israel) the wine was still well-preserved.

Some hypotheses suggest that Phoenician wine originated in Ugarit, a city that had wine production under tight control and devoted most of its arable land to vineyards. The Phoenicians' attention to their wine industry is described by Mago, the author of a treatise on the best vine-growing methods (planting, pruning, harvesting...).

The Phoenicians used the term *Cherem* for grape fermentation. They defined their wine qualities based on the treading process: the most highly appreciated wine was from the first tread, and the quality diminished with each new trample.

Wine in ancient Greece

Greece

In ancient Greece, wine played a major role in everyday life, the economy and the worship of various divinities. That is why there are so many literary, agricultural and medical references to wine, written on papyrus and stone inscriptions. Archaeological evidence includes pottery shards, paintings and coins. The exact beginning of the wine culture in ancient Greece is not well documented, surrounded by a shroud of legend. Dionysus, the Greek god of wine, is attributed with having brought it to several parts of Hellas.

Like other non-producing societies, wine was initially a minority product, only consumed by the upper classes. However, it quickly became appreciated as an excellent food and the greatest gift that the gods had given mortal humans, and soon spread to all levels of Greek society as a drink for socialising, celebrations, prayers, libations and sacrifices.

Archaeological remains show that the first place where wine was fermented in Greece was on Crete in the Minoan period (approx. 2,200 BC). Vineyards later spread to Minoan and Mycenaean palaces thanks to trade with Egyptians, Syrians and Phoenicians. From Crete, vine growing and winemaking jumped across to the continent. This expansion is recorded in the myth of Oenopion, the son of Dionysus and Ariadne. Oenopion travelled from Crete to Chios, where he introduced viticulture and winemaking techniques. Other hypotheses suggest that grapevine growing was brought to Greece by sea from Anatolia, via Thrace and Macedonia.

To satisfy the high demand for wine, vineyards were grown throughout Greece and as a result, new varieties of vines and wines appeared. The Greeks made a distinction between natural, table and prepared wines, in which resin, fruit or honey was added to the must. They also had aged wine, generally with a higher alcohol content, which was used for drinking, as a condiment in cooking, in perfumes and for medicinal use.

The Aegean islands were the largest centres of wine production and exportation. The islands in the south produced widely appreciated high-quality raisin wine, while those in the Ionian Sea produced lower quality wine.

Agricultural work on the vineyards was primarily manual, aided by tools and animal power. Specialists were employed for more specific tasks such as pruning and grafting. After the harvest, the grapes were trampled and the juice was poured into large earthenware vats sealed with resin to ferment. All sorts of materials and spices were added to stabilize and preserve the wine for as long as possible.

GRAPEVINES
PLANTED LONG
BEFORE THE
19TH CENTURY
PHYLOXERA
PLAGUE ARE
STILL GROWN IN
CRETE



The Greeks and Phoenicians expanded winegrowing to their colonies across the Mediterranean basin. The Phoenicians brought their vineyard technology to North Africa, while the Greeks did the same on the Black Sea coast, Sicily and Magna Greece, where vines may have already existed, and introduced their wine-related culture and pottery. From Marseilles (France), the Greeks spread to the western shores of the Mediterranean.

6th century BC *krater* from Attica showing Dionysus, the god of wine and his entourage. MUSÉE DU LOUVRE.

Phoenician and Carthaginian influence in Iberia

THE introduction and consumption of wine on the Iberian Peninsula are two processes under continuous review. We know that *Vitis vinifera sativa* has existed in Iberia since the start of the Orientalizing period in the 8th century BC. However, this does not necessarily mean that wine was not previously imported from elsewhere as a trade commodity or produced by chance when *Vitis sylvestris* grapes were stored improperly, as mentioned earlier.

Fragments of a Sub-Mycenean Greek *krater* have been found at the Llanete de los Moros archaeological site in Cordoba, and remains of larger vessels have been unearthed at the late Bronze age Cuesta del Negro site. These records suggest that the Phoenician colonisation of the Iberian Peninsula went hand-in-hand with wine consumption and production.

Some researchers have suggested that grapevines may have been domesticated independently in Iberia prior to the arrival of the Phoenicians, but this idea has not received widespread support. Expert David Thurmond says that the seeds and pollen found at the Laguna de las Madres site (Huelva) and El Prado (Jumilla, Huelva) are not solid evidence for this theory. Another possibility is that before the Phoenicians settled in Iberia, wine was brought by different traders as offerings, exchanges and gifts. Shards from typical Egyptian wine-drinking vessels, for example, have been found in Almuñécar (Andalusia). Later, the same peoples may have introduced plantation and farming techniques to profit from the product.

The convergence of different wine cultures facilitated the hybridization of vines brought by Phoenicians, Greeks and Romans in their trade with indigenous Iberians. Crosses between different *Vitis* species could have been due to natural causes or grafts by the civilisations that came to live on the Peninsula. Wine culture was also transmitted between Iberian society and foreign traders, especially the Phoenicians and those who came after them, the Punic or Carthaginians. After the seizure of Tyre (Lebanon), the North African city of Carthage became more important than others such as Gadir (Cadiz). Wine from Carthage won fame as an important product along their trade routes by sea and land.

In the 6th century BC, the Greeks tried to colonise Sicily and other Phoenician trade hubs. Carthage attempted to stave them off by invading north-western Sicily. These occupations led to frequent contact between the two cultures, and Punic society adopted Greek wine-drinking habits, which they transferred to their territories, including the western Mediterranean. In 348 BC, Rome and Carthage signed a treaty under which Rome forswore the establishment of colonies in Mediterranean areas controlled by Carthage.

Texts by Diodorus Sicilius, Herodotus and Polybius compensate to some extent for the lack of archaeological information from the Carthaginian period. They all describe Carthage as a land full of vineyards which intensified its grape growing to the detriment of cereals. They reduced overseas wine production and ordered Sicilian vineyards and fruit trees to be uprooted in order to prevent competition and secure a monopoly on the wine trade.



Plato's *Laws* and Aristotle's *Economics* describe Carthaginian prohibitions of wine drinking, an indication of widespread consumption in society. Homes were divided into two parts: residential and *Pars rustica*, where they installed *dolia* and *pithoi*, recipients used to hold wine and oil lined with hydraulic concrete (*Opus signinum* for the Romans) and oil presses. At the Poblado de San Cristóbal site in Puerto de Santa María, two presses have been found beside tanks and round structures where the must was fermented. These homes are similar to Phoenician evidence from Doña Blanca Castle, Cádiz.

In Carthage, wine drinking was not as widespread as in Greece and Rome, an indication that most of the volume was for exportation. As a result, they had no special dishes or rituals associated with wine. Texts by Mago mention initial restrictions on the use of wine, which was only drunk by the Carthage elite on particular occasions. Wine and its consumption only started to become widespread during the Hellenization of Carthage in the 4th century BC.

The southern part of the Iberian Peninsula came under Roman rule following the defeat of Carthage in the Punic wars. Roman colonization brought new winemaking techniques and also a road grid, essential for the dissemination and trade of Hispanic wines.

Reproduction of an Iberian wine press in Calafell. FUNDACIÓ PERE TARRÉS EXARC.

CARTHAGE
DOMINATED THE
MEDITERRANEAN
AFTER THE FALL
OF TYRE



700 BC Protocorinthian *cotila* from Almuñécar (Granada), used as a measuring unit and wine cup (0.27 l). JOSÉ BAREA.

Tartessus

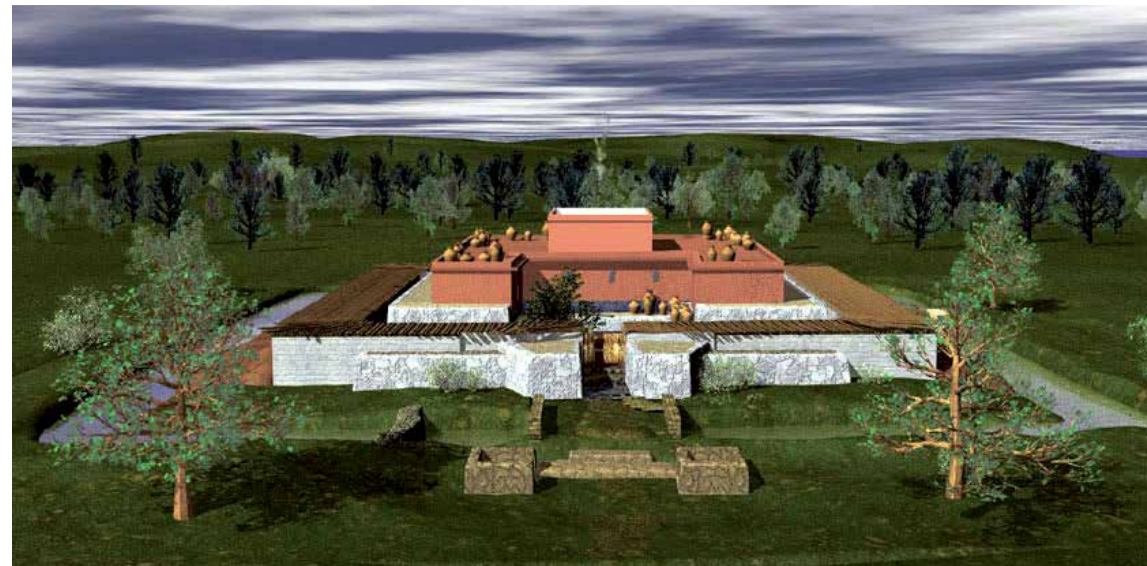
THE orientalisation of the Iberian Peninsula's coastal villages and then the Tartessian society in the Guadalquivir and Guadiana River valleys and southern Portugal, was due firstly to the Phoenicians and then the Ionian Greeks from *Phocaea*. Contact between the two cultures was probably close and continuous. Tartessus had no prior knowledge about winemaking: no relics of wine presses have been found, an indication that the wine that was drunk –only by the ruling elite– had to be imported. Its symbolic and monetary value made it an exotic luxury item that projected a sense of social prestige, and it was not until the Hispano-Roman period that wine consumption started to become more popular.



Roman winemaking scene in a mosaic from Amphitheatre House in Merida (1st century AD). Grape trampling and must collection. MONUMENTAL CITY OF MERIDA CONSORTIUM

Wine was present in Tartessian religious rituals (*Silicernia*) and ceremonies due to its psychotropic properties, distancing the user from reality after drinking large amounts. These specific situations gave rise to an ideal social context for restricted consumption and occasional, regulated trade.

There are now two lines of research into wine consumption and production in Tartessian society. One is studying the rituals concerned with winemaking and drinking (*Silicernia*), with a heavy eastern Mediterranean influence. The second line is investigating the tools and recipients used for drinking, which have mostly been found amongst grave goods. There is a striking difference between the large number of objects related to and used for drinking and the dearth of images. This might be because it was



Virtual image of Iron Age Cancho Roano palace-sanctuary, Mérida. GOVERNMENT OF EXTREMADURA.

still an imported product. At the Pozo Moro archaeological site, a funerary tower contains scenes in high relief of ritualised food consumption, but not of drink.

Suitable vessels were obviously necessary when wine was the central part of a ritual. The Greeks used a special set of bowls to mix wine with water. This differentiated them from the Barbarians, who drank unmixed wine. On the Iberian Peninsula, wine consumption was associated with the use of Greek pottery to highlight the social differentiation of the ruling elites.

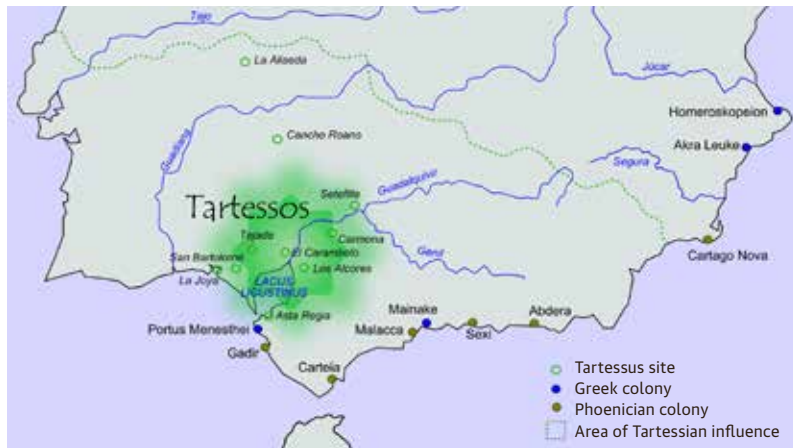
The extreme fragility of Greek *kraters*, large recipients used for diluting wine with water, might be the reason why they have not been found at archaeological sites in Tartessus. Their large size also made sea transportation difficult. Other important elements in Tartessian wine rituals were the pitchers and brazier-like vessels used in libations and hand-washing before the start of rituals. Rougher, lower-quality local Tartessian pottery discovered at the Cancho Roano sanctuary replaced Greek earthenware.

Phoenicians and Phocaeans brought wine by sea to Iberia in amphorae. However, the few unearthed amphorae are attributed to their later use as cereal and oil recipients. Wineskins and animal hides were used to transport wine across the Iberian Peninsula.

Two types of fossil indicators are used by archaeologists to base their claim that wine was drunk in Tartessus. One is Greek pottery (*kraters*, cups and pans) used in wine consumption rituals, and the other is the amphorae used by Phoenicians to transport and store their wine. The

presence of both types on the southern coast of the Iberian Peninsula is due to the connection between Phocaeen trade and the Phoenician colonisation of the south. Fragments of imitation Phoenician amphorae have also been found. They date from the 6th century BC onwards, when production began at Phoenician factories in Iberia.

The Phoenicians searched for suitable land to plant their vines, improve the quality of their wine and increase the distribution area further inland. The two oldest sites linked to wine are Alt de Benimaquia (near modern-day Denia) and Quéjola (Albacete). In the 6th and 5th centuries



Map of Tartessus
ALBERTO PORLAN
<https://terraantiquae.com>

BC, amphorae with imitated Phoenician-Punic forms were produced at both sites at a time when there was a Greek presence on the coast.

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THE POZO MORO
FUNERARY
TOWER IS
PART OF THE
TARTESSIAN
HERITAGE



L'Alt de Benimaquia (Denia) was a fortified settlement in the ancient Iberian and orientalisation periods (6th century BC). E.DÍAS F. CHINER. DENIA ARCHAEOLOGICAL MUSEUM.

Iberians

THE Iberians were one of the peoples who lived in the east and south of the Iberian Peninsula from the 6th century BC until the Roman conquest. Their hierarchical society included groups of warriors, an economic and social structure based on the domination of land, resources and trade. This permitted the development of a winemaking industry.

Wine production was regarded as an identity mark for Iberians, who had a particular concept and approach to their wine culture. When the power of Tartessus began to decline, the peoples on the periphery may well have taken advantage of the situation to exploit the vineyards more and increase their wine production, generating a surplus that could then be traded. Increased use of wine by the Iberians in this period has been documented in both coastal and inland areas. They used recipients to prepare, serve, preserve and transport wine, including a "tripod-mortar" for mixing and "*simpulum*" for serving.

The architecture and layout of Iberian settlements and the area and size of their wine press facilities shows that they produced more than they needed for local consumption. This implies that the surplus was redistributed to other regions. Wineries have been identified in the east and west of Andalusia (La Quéjola, El Campello, Verdú, Alt de Benimaquia, Las Cumbres and Doña Blanca). They all have a similar

Bicha de Balazote (Albacete). Limestone sculpture of an androcephalous bull. Part of a former 6th century BC funerary monument. NATIONAL ARCHAEOLOGICAL MUSEUM.



structure to wine presses depicted in Egyptian iconography. They consist of pools dug into the earth at different heights and rendered with lime or clay to prevent filtration. Many charred seeds have also been found in Avinyonet del Penedés and Calafell. In Avinyonet, wine consumption has continued since the 6th century BC. At first it was foreign wine, brought in Phoenician and Carthaginian amphorae, and then local viticulture began in the Penedès area. This development pattern may have been repeated in a large part of Iberia.

Burial sites used by the Iberian elite between the 5th and 4th centuries BC such as Pozo Moro, Los Villares, Cabezo Lucero and Baza show evidence of rituals at each funeral in which wine was the central element, much like its social use to encourage fraternity.

Amphora shards found at these sites have similar shapes and styles to Phoenician and Punic pottery: clear evidence that wine was drunk in and around the burial area, possibly at banquets. The Etruria site is one such case. According to anthropologist Josefina Urrea, pottery vessels used by the Greeks to drink wine were employed by the Iberians as funerary urns.

IBERIANS
PROBABLY
USED GREEK
POTTERY
DRINKING
VESSELS AS
FUNERARY
URNS



6th century AD mosaic from Musara, Jerusalem showing grapes and vines with an Armenian inscription. DICKRAN KOUYMJIAN.

Rome. Uses and customs

THE Etruscans and Greeks were probably the first peoples to influence winegrowing on the Italian Peninsula. The Mycenaeans also played a role in their first settlements in southern Italy, around 800 BC. Roman wine culture was influenced by the techniques they found in the conquered regions which became part of the Roman Empire. Greek vineyards and production in southern Italy came under Roman rule in 270 BC. Etruscan vineyards were important until they were conquered by Rome in the 1st century BC. The Punic wars also influenced Roman viticulture when translations of Mago's treatise on agriculture gave them an insight into Carthaginian farming techniques. The rise and development of the Roman Empire was accompanied by an unprecedented evolution in the technology and understanding of wine production, which eventually spread to every corner of the Empire.

This information is reflected in texts by experts like Cadiz-born Lucio Junio Moderato Columela, who wrote the Twelve Books of Agriculture in the 1st century BC. Volumes III and V are dedicated to vineyards, and Volume XII deals with winemaking. Thanks to Columela, we know important details such as the vineyard work calendar, the grape varieties, their productivity, the land and the climate considered by the Romans to be most suitable for grape production and its transformation into wine. Other documentary sources include texts by Horace, Palladius, Pliny, Varro and Virgil, pictorial mosaic scenes and artwork found in tombs and buildings.

Since Roman times down to the present day, the winemaking process has followed the guidelines set out Columela's calendar, including the *Vinalia Rustica* festivity held on 14 August to consult the auspices of the god Jupiter, and *Meditrinalia* on 11 October, which marks the end of the grape harvest. Wine was so important to the Romans that they celebrated *Vinalia priora*, when the fermentation of the new wine was completed, usually in mid-April.

Once all the grapes were harvested, they were pressed by human or mechanical means. Treading by foot was one of the most widely depicted events. The grapes were crushed in the *Calcatorium* (today's cellar or winery). The liquid flowed out into earthenware or wooden vessels and the skins were separated from the must in order to prevent their bacteria from multiplying. Remains of the structures used for the trampling process have not been preserved, since they were made from perishable material like wood. However, architectural structures used for mechanical crushing can still be found because materials like *Opus signinum* (crushed tiles and lime mortar) were used. One such example is Carrenque Roman villa (Toledo). The size and shape of these buildings was adapted to the requirements of each cellar and room, and also the needs of each step of the winemaking process. There are many artistic depictions of grape trampling and must collection. One outstanding example is a 3rd century AD mosaic from the *Amphitheatre House* in Merida.

Producers invested in new machinery and technology to increase yield. One of the first such machines was the screw press, which improved the efficiency of grape crushing by extracting a larger volume of juice. Original mechanical presses have been unearthed at the Herculaneum and Pompeii archaeological sites in Italy. This was the most widely used press system in Mediterranean agriculture. It was easy to manoeuvre, it could be adapted to the needs of each user and the investment soon paid off.

The next step in the development of the grape press was the *Praelum*, which employed the law of the lever, relying on the weight of the beam



that crushed the bunches of grapes. There were two systems: a lever-and-screw press and a vertical screw. Clear archaeological evidence of these types of press in Iberia has been left since the Flavia period thanks to their construction in stone or brick. They were not only used for winemaking, but also to extract olive oil.

The next stage was the transformation of must into wine by fermentation and a subsequent chemical process. However, the resulting product was unstable, which caused major preservation problems, bearing

Wine shipment in Roman Gaul: amphorae were used to transport wine and other products by sea across the Mediterranean. The Gauls began to use barrels. FABRICE PHILIBERTCAILLAT.

POSCA, A COOL DRINK FOR SOLDIERS AND COMMONERS, WAS SPOILED WINE WITH ADDED WATER AND HERBS

in mind that wine was expected to be consumed widely throughout the year. During this period, attempts were made to prolong the wine's lifetime by altering the fermentation processes with various materials (plaster, lead, honey, etc.) that were added to the vats. These additives gave flavours and other nuances to the brews, which gave rise to different types of wine.



Coins with motifs alluding to wine: Ceca de Acinipo (Ronda, Málaga) with bunches of grapes and as de Ulia (Montemayor, Córdoba) with bunches and shoots. ILDEFONSO RUÍZ LÓPEZ.

Wine was a basic foodstuff for the Romans. Under the Roman Empire, wine ceased to be a luxury reserved for the few and became an everyday consumer product. It was drunk by all social strata and classes, except for women. Women who drank were generally frowned upon, and were even banned from drinking wine. Since wine was a food, the laws became more tolerant. According to Pérez Ballester, Rome had nearly a million inhabitants at the time of the change of era. This population needed from one to two million hectolitres of wine every year, which gave rise to an enormous wine industry. Recipients (*dolia*) with a capacity of up to 1300 litres were brought to Rome by boat.

Each stratum had its own type of wine, a symbol of hierarchy, power and wealth. The most notable wines were *Alban*, *Caecuban* and *Falernian* from Campagna, consumed by the Roman elite. Another big wine centre was Pompeii, the main source of wine consumed in Rome. The eruption of the volcano Vesuvius in 79 AD was a disaster for the Roman wine industry. Not only were the region's vineyards destroyed, burned under lava and ashes, but also its wineries and wine stored from previous years. This triggered a major wine shortage in the Empire.

Lower-quality wine was altered with additives and preservatives such as pitch, salt and even sea water in attempts to increase its longevity. Chalk and marble powder was added to reduce the acidity. Below these wines was *Posca*. This drink was made from water mixed with spoiled and vinegar wine, which was presumed to kill the germs in the water. It was generally drunk by Roman soldiers when higher quality wine was not available.

Corollary

THE cultivation of grapevines has continued uninterrupted since the first sedentary societies, generating a vast compilation of material and immaterial knowledge that has borne fruit in what we know as our Wine Culture. Grape growing and winemaking require a labour of love throughout the year. They also involve a range of trades and techniques which, in the course of history, have acquired major cultural, social and economic importance.

Grapevines and wine are part of the foundations of Mediterranean civilization. Their study helps us to understand the roots and the evolution of our culture. That is why wine is part of the Mediterranean triad, along with oil and wheat, and why it plays such an important role in our eating habits.



Satyr working at a wine press with wicker mats (1st century AD Roman relief). BRITISH MUSEUM.

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Milestones

YEARS BC

6000	Shulaveris Gora and Gadachrili Gora sites (Georgia). Oldest evidence of tartaric acid in wine amphorae.
5400	Evidence of wine grape (<i>Vitis vinifera</i>) at Hajji Firuz Tepe site, Mt. Zargos (Iran).
5200	Medicinal use of wine in Egypt. Pitchers impregnated with wine in tomb of Pharaoh Scorpion I
5000	Hajji Firuz Tepe site (Mt. Zagros). Remains of tartaric acid and terebinth resin in wine vessels.
4000	Oldest known wine press, Vathypetro site, Crete.
4000	Wine mentioned on Sumerian clay tablet. Receipt for wine jars in Cuneiform script.
3300	First record of white wine in Egypt. Tomb of Pharaoh Tutankhamun.
3300	First sample of oriental grape wine (<i>Vitis orientalis</i>).
2200	40 vats containing wine. Tel Kabri (Israel).
1700	Phoenicians introduce viticulture to the Iberian Peninsula.

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• Celestino Pérez, S. and Blázquez Pérez, J. (2013) *Patrimonio Cultural de la Vid y el Vino*. Universidad Autónoma de Madrid (UAM). Madrid-Almendralejo • Francia Verde, R. (Coord.). (2015) *Historia y Arqueología en la Cultura del Vino*. Historia Arqueología, Instituto de Estudios Riojanos. Logroño • Mangado Alonso, M. C. (2010) *El vino de los faraones*. Fundación Dinastía de Vivanco. Museo de la Cultura del Vino • Celestino, S. (ed.) (1995) *Arqueología del Vino. El origen del vino en Occidente* Consejo regulador de Jerez. Jerez de la Frontera • Sáez Fernández, P., Cerrillo Martín de Cáceres, E. et al. (1999) *El vino en la antigüedad romana: Simposio de arqueología del vino*. UAM. Madrid • 'Irep En Kemet' project *Wine of Ancient Egypt*. Faculty of Social and Human Sciences, Universidade Nova de Lisboa. <http://www.wineofancientegypt.com/>, <http://www.wineofancientegypt.com/the-project>.



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