UNIVERSITÀ
DI PAVIA

DIPARTIMENTO DI STUDI UMANISTICI

CORSO DI LAUREA MAGISTRALE IN

THE ANCIENT MEDITERRANEAN WORLD. HISTORY, ARCHAEOLOGY AND ART

Wine culture in Roman Italy: production and consumption

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ANNO ACCADEMICO 2023/24

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Abstract

This study investigates the production and consumption of wine in ancient Rome through a comprehensive analysis of both archaeological and written sources. The research also explores ancient writings on the consumption of wine in various contexts, including daily life, festivals, medical use, and religious rituals. By examining archaeological evidence, including grape remains, vineyard layouts, irrigation systems, tools, and architectural structures, this study provides material corroboration to the literary accounts, offering a fuller picture of Roman winemaking.

The research further analyzes how winemaking knowledge and practices spread throughout the Mediterranean, from their origins in the Caucasus and western Asia to their integration into Mediterranean cultures. Through a review of scholarly research on Roman wine production, the study highlights changes in methodology and the effectiveness of different approaches to understanding ancient winemaking. Written sources offer crucial details about grape cultivation, wine production methods, and the economic aspects of the industry, while archaeological findings shed light on the organization of vineyards and the tools used in winemaking. Additionally, the study examines the role of wine in Roman social and cultural life, exploring how it was consumed in various settings and the significance of wine storage and serving practices. Ultimately, the study provides a comprehensive view of how wine was produced, consumed, and integrated into Roman society.

Introduction

The investigation of viticulture in Roman Italy is a significant field of study within the realm of ancient history and archaeology. Wine exerted a substantial influence on the economy, culture, and religious rituals of the Roman Empire. Nevertheless, the historical analysis of winemaking has been mostly neglected. Nevertheless, current studies and archaeological digs are uncovering an increasing number of material artifacts that provide insights not only into the practices of wine production and consumption, but also into the movements of populations, evolving cultures, and global diplomacy. Recent archaeological discoveries, including remnants of vineyards, winemaking implements, and architectural constructions, offer enhanced insights into the intricacies of winemaking and its multifaceted influence on other facets of existence. This data aids in the reconstruction of the economic and social frameworks of ancient societies, unveils cultural interactions across various parts of the Mediterranean, and traces the impact of Roman wine culture on other civilizations.

The objective of this study is to document the main stages of wine production and consumption in ancient Italy throughout the Roman period, with a particular emphasis on how these phases are shown in archaeological findings and historical sources. Furthermore, it aims to analyze written and iconographic data to construct a thorough representation of the wine culture within that specific time frame.

For this study, archaeological and written sources were researched. The analysis of the description of agricultural processes and wine production was studied in Cato's *De Agricultura* (second century BCE), Varro's *De Re Rustica* (37 BCE), Pliny the Elder's *Naturalis Historia* (first century CE), Columella's *De re rustica* (first century CE), Palladius' *Opus Agriculturae* (fourth/fifth century CE) and others. A review of information from ancient sources on the consumption of wine in different situations such as everyday life, festivals, medical, and other special occasions is also presented in this study. The material evidence related to wine production and wine trade was studied. Archaeological findings and written sources can give us the highlights and allow us the comparison of written and material finds.

The study has four chapters:

1. Winemaking in the Mediterranean: the exchange of goods and ideas
The chapter gives an overview of the development of wine culture in the Mediterranean world. The directions in which wine knowledge and technology spread and the cultural exchanges that facilitated this process are examined. Archaeological evidence shows how

grapes and winemaking technologies spread across regions, from their domestication in the Caucasus and western Asia to their emergence in the Mediterranean and Europe.

2. Research History

The second chapter reviews key research on wine production and consumption in Roman Italy. The main methodologies used by scholars to study wine production are reviewed and their achievements and conclusions are analyzed. The review of studies shows how approaches to the study of wine production have changed and which methods have proved most effective.

3. Wine production in Roman Italy

This part analyses the descriptions of agricultural processes and winemaking in the works of ancient Roman authors. This allows us to understand the technological and economic aspects of winemaking at that time. Written sources provide valuable information on grape growing methods, wine production techniques, and economic aspects of winemaking. Archaeological evidence such as remains of grapes, vineyards, irrigation systems, tools, and architectural structures as well iconographical materials are analyzed. This evidence provides material corroboration to the literary sources and helps to reconstruct the winemaking process. Archaeological finds show how vineyards were organized, what tools were used, and what technological processes were employed.

4. Tradition of wine consumption

Ancient texts describing wine consumption in different contexts are examined: daily life, religious rituals, festive events, and medical and domestic needs. Written sources provide information on the social and cultural aspects of wine consumption. Archaeological finds related to the storage and serving of wine are analyzed, as well as iconographic images illustrating scenes of wine consumption in different contexts. This research is able to give highlights on wine consumption in everyday life and ritual and religious purposes.

The conclusion summarizes the research on the development of winemaking in Roman Italy and its impact on the cultural heritage of the Mediterranean.

Chapter I. Viniculture in the Mediterranean World: exchange of goods and ideas

As the wine starts with grapes, so should this work start with the information on the archaeology of grapes. The domestication of grapes is strongly connected to the discovery and production of wine, and till nowadays it remains unclear which process occurred first.[1] According to long-lasting research, the domestication of grapevine happened between 7000 and 4000 BCE, perhaps in different places independently of each other. The species that is used in wine production is called *Vitis vinifera* and is indigenous to Eurasia, and the wild grape existed everywhere in the Mediterranean. Usually, the researchers are talking about primary and secondary domestication. Genetic differentiation between table and wine grape cultivars has been observed at a notable level using microsatellite markers, with Muscat varieties also showing some distinctiveness. These differences may stem from divergent selection for traits such as berry size, as well as the involvement of the oriental gene pool during domestication events: one in the Near East and another in Western Europe, as revealed more recently through chloroplast microsatellite markers. Additionally, the development of table cultivars with large berries and clusters, alongside selection for the Muscat flavor in Muscat varieties, contributes to these genetic variations. Further differences have been noted between European wine cultivars from various regions, suggesting the possibility of two independent domestication events.[2]

Recent research by Y. Dong et al. demonstrated that the domestication of grapevine occurred around the fourth millennium BCE and had a dual character: wine grapevine was domesticated in the Caucasus, while table grapevine was domesticated in Western Asia (Fig. 1). However, the Caucasian wine did not play a significant role in European grapevine diversification as its spread was limited dispersal into the Carpathian Basin by the northern Black Sea. By comparison, the dispersal of Western Asian domesticated grapevine spanned Eurasia and North Africa.[3]

[1] MCGOVERN 2004. P. 12

[2] THIS ET AL. 2006. P. 511-519

[3] DONG ET AL. 2023. P. 892–901.

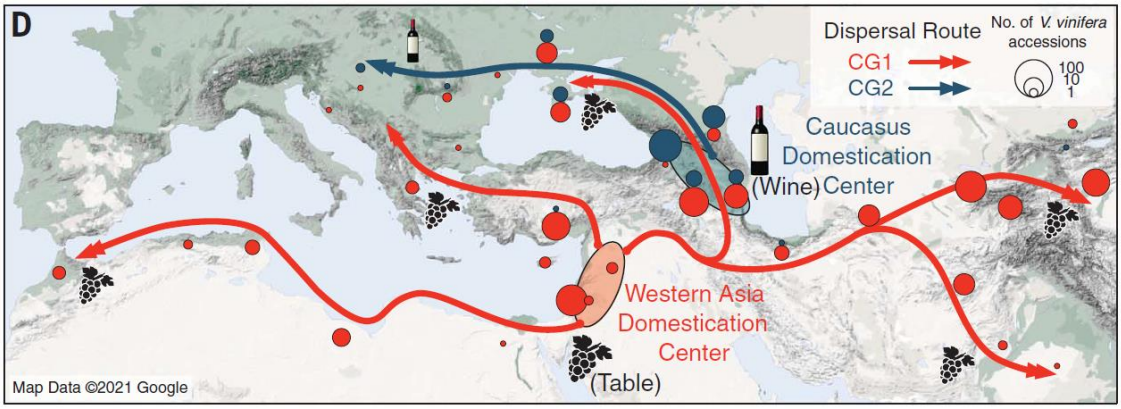

Figure 1. Human migration paths and routes of grapevines CG1 (Western Asian table grapevine) and CG2 (Caucasian wine grapevine) distribution from their domestication centers. (by Dong et al. 2023, fig. 3.D).

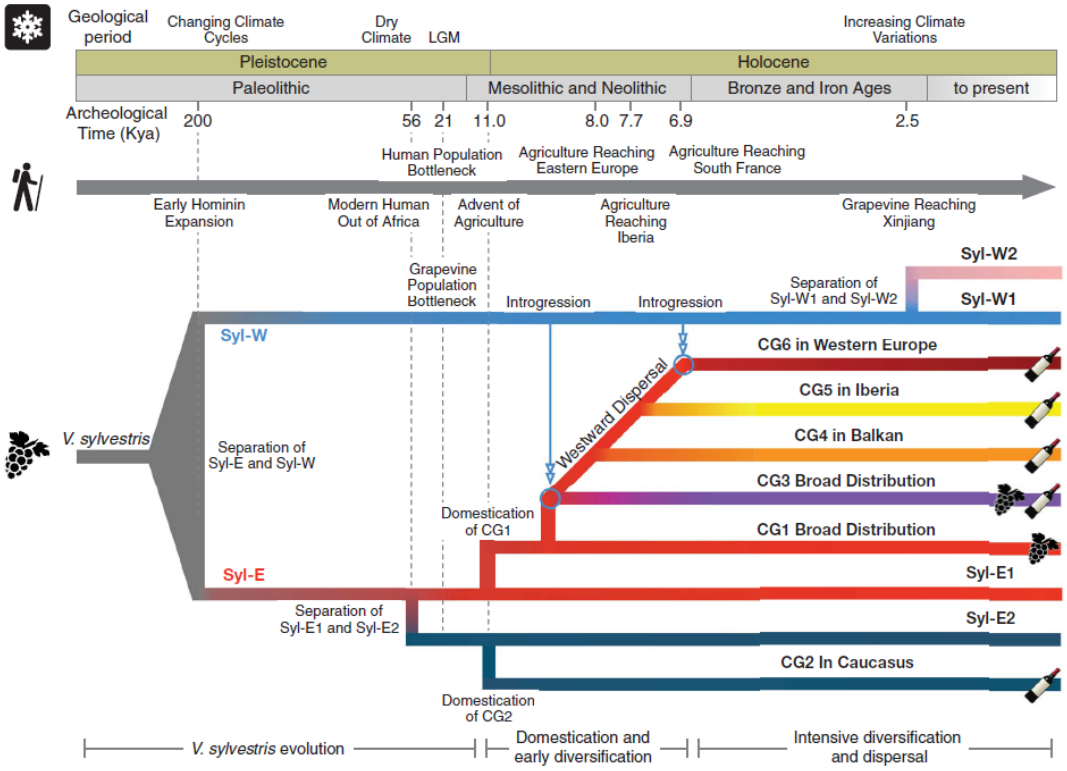

Figure 2. A diagram illustrating the evolution of grapevines alongside major global climate shifts and key events of human history (by Dong et al. 2023, fig. 6).

Starting from the primary center of domestication, the grapevine spread to the southeastern Mediterranean regions, Palestine, Southern Lebanon, and Jordan. During the Mesolithic and Neolithic periods, grapevines began to spread and diversify, leading to the development of distinct lineages in regions such as the Balkans, Iberia, and Western Europe. This diversification was influenced by the introgression of *Vitis sylvestris* into Western Asian table grapevines, reflecting early farming migrations across Europe and establishing viticulture as a foundational part of settled societies. From the Bronze Age onward, cultural exchange intensified, facilitating the trade of premium grape cultivars along commercial routes (Fig. 2). This is notably evident in Italian grape varieties, many of which show genetic contributions from three or more ancestral sources, complicating efforts to trace their exact genealogies. Additionally, genetically pure wild grapevines from Central Asia, historically affected by climate shifts and social upheaval, are now rare, limiting our ability to test Vavilov's hypothesis regarding a center of diversity or potential shifts in grapevine varieties due to the spread of Islam in the area.[4] Domesticated grapevines appeared during the first half of the third millennium BCE in Minor Asia, Southern Greece, Crete, and Cyprus. At the beginning of the second millennium BCE, domesticated grapevines were found in the Southern Balkans, while they made their first appearance in Southern Italy in the second half of the second millennium BCE and in Northern Italy, Southern France, Spain, and Portugal in the second part of the first millennium.[5]

Italy may also be considered among the secondary centers of grapevine domestication. The origins of Italian grape cultivars can be traced through two main pathways: direct domestication of local wild grapevines, and the introduction of domesticated varieties from various regions and periods, either during the early stages of viticulture or in subsequent historical eras.[6] The domesticated grapevine spread in Italy through a combination of multiple routes connecting various European viticultural regions and local domestication efforts. Genetic variability among Italian grapevines suggests influences from human migrations, particularly through Northern Europe, between France and Spain, and from Greece and the Middle East. These routes, identified as via dell'Ambra, via di Eracle, and via Egnazia, respectively, facilitated the flow of grapevine varieties into Italy. Molecular analyses of regional grapevine germplasm, such as those in the Aosta Valley and Southern Italy, support this hypothesis. Additionally, the discovery of domesticated grape-

[4] DONG ET AL. 2023. P. 900

[5] GRASSI ET AL. 2003. P. 1315–1320

[6] GRASSI ET AL. 2003. P. 1316

vines closely related to wild varieties in the Nuoro area of Sardinia points to a secondary domestication center on the island. The Bovale cultivars, exhibiting morphological traits of domesticated grapevines and an ancient origin, indicate local domestication due to limited agronomical varietal exchange in Sardinia. Thus, Italian grapevine cultivars originated both from introductions from established viticultural regions and from direct domestication of local wild vines.[7]

Talking about the earliest evidence of winemaking activity, it is connected to wild wine and comes from Georgia. At the Neolithic settlement of the Shulaveris Gora in Lower Kartili, in the jar of Neolithic "Shulaveri-Shomu Tepe culture", there were discovered traces of tartaric acid, which is the main biomarker for grapes.[8] The traces of the same character were also identified on the ceramic sherds at the contemporary site of the Gadachrili Gora (sixth millennium BCE).[9] Moreover, at both sites, the evidence of storage and consumption of wine has been identified, and the analysis of the local landscape has allowed to suggest that the wine production occurred either inside the settlements or in the area around them – where there were the sources of grapes. At the same time, the analysis of archaeological seeds demonstrated that the exploitation of wild grapes was common in ancient times, and only starting from the Iron Age onwards did the domesticated subspecies start to be used as well. Radiocarbon dating of the grape remains from the Shulaveris Gora indicates the beginning of the sixth millennium, within the range of 6020–5890 BCE at 95,4% probability.[10] The investigation of vessels from the Early Bronze Age cemetery of the Dedoplis Gora (Kura-Araxes culture, century 3400-2600 BCE) has shown also the presence of pollen of *Vitis vinifera* on different ceramic samples, including zoomorphic rhyton-like vessels that are supposed to be used in drinking ceremonies.[11] It may indicate the role of wine and other grape products in cult life from the very beginning of wine-making history.

Another example of early wine production evidence was discovered at Hajji Firuz Tepe, Iran, and is dated to the second half of the sixth millennium BCE. At this Neolithic site, were unearthed clay jars with the capacity of circa seven liters with the remains of tartaric acid inside together with terebinth resin. The resin from the terebinth tree could have been used to retard the growth of vinegar bacteria due to its antibacterial properties.[12]

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[7] GRASSI ET AL. 2003. P. 1319

[8] MCGOVERN 2004. P. 24

[9] MAGRHRADZE ET AL. 2016. P. 7

[10] MAGRHRADZE ET AL. 2019. P. 6–7

[11] MAGRHRADZE ET AL. 2019. P. 6

[12] ESTREICHER 2017. P. 2

In the fifth millennium BCE, wine production was attested in another region of the Southern Caucasus, at a cave of Areni-1, Armenia. The remains of *Vitis vinifera* have been discovered inside the cave and include wine pips, intact dried berries with skin, rachises, and segments of wood. In the central gallery of the cave, large jars were found together with a packed clay platform with a slope that goes in the direction of one of the jars. It has been interpreted as a wine production complex and dates to the Late Chalcolithic period, century 4000 BCE, making it the earliest known wine-making center.[13]

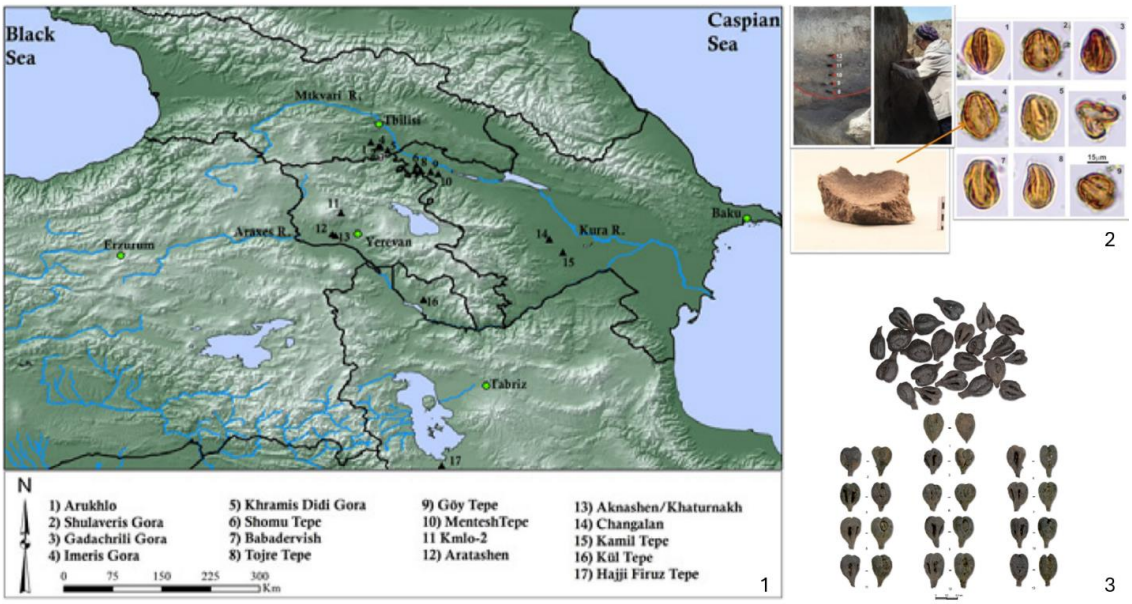

Figure 3. Earliest evidence of wine-making: 1) Map of sites of the Neolithic "Shulaveris-Shomu Culture", along with Hajji Firuz in Iran, which currently holds the earliest confirmed chemical evidence of ancient winemaking (Magrhradze et al. 2016. Fig. 1); 2) Palynological analysis from Gadachrili Gora and grape pollen discovered on the pottery sherd from the site of Gadachrili Gora (Magrhradze et al. 2016. Fig. 3); 3) Wine pips discovered in Areni-1, Armenia (Smith et al. 2014. Fig. 10).

Abundant archaeobotanical evidence for both wild and domesticated *Vitis vinifera* has been reported from the sites along the upper reaches of the Tigris and Euphrates Rivers, including Korucutepe, Tepecik, Kurban Höyük, Hassek Höyük, Hacinebi, Çayönü and several sites in the Urfa region. The dates of these sites span from the Aceramic Neolithic period (circa 8000 BCE) to the late Chalcolithic period (circa 3500 BCE). From an archaeobotanical perspective, the sequence of findings at Kurban Höyük is particularly compelling, showing a gradual increase in grape remains from the fifth millennium BCE to the early third millennium BCE. A pit of the middle-late third millennium date yielded not just masses of grape seeds but also stem and vine

[13] SMITH ET AL. 2014. P. 240

fragments, along with pressed cakes of the fruit itself, which imply the domestication of the Eurasian grape and winemaking on a large scale.[14]

Between the mid-to-late third and early second millennia BCE, wine started to become increasingly valuable as an elite commodity of ancient Mesopotamian societies, as it is reflected in both archaeological and textual sources. Written sources confirm what the archaeological data suggests: the separation between an area with higher rainfall more oriented towards wine production and another (i.e., Southern Mesopotamia) in which the lack of rain did not favor the cultivation of grapes. In fact, in Southern Mesopotamia even though the cuneiform sign for "grape" is attested already from the early Sumerian texts from Uruk, wine appears as an exogenous element and, thus, a rare commodity and an expensive import, because wine-drinking cultures began outside of Babylonia beyond the edges of the alluvium and wine consumption remained to the end primarily a prerogative of the gods and the aristocracy. The written data found at the palace of Zimri-Lim at Mari as well as at the site of Tell el-Rimah (possibly identified of Karana) and Tell Leilan (Shubat Enlil) all dated to the early second millennium BCE provide another indication that this trend continued (and most probably expanded) during the early second millennium BCE, when wine produced in southeastern Anatolia and northern Syria was considered a precious and expensive commodity for kings and gods. The ritualized consumption of wine and other alcoholic beverages in the Mesopotamian tradition of the third and second millennia BCE is also documented in numerous artistic representations. In fact, the depiction of such ritualistic behavior is depicted in the famous "banquet scene" typical of Southern Mesopotamian iconography of the Early Dynastic period, which depicts the ritualized consumption of liquids. Among the numerous archaeological evidence, in the Middle and Late Early Bronze Ages site of Titriş Höyük, a plaster basin is present in most of these houses and chemical analyses have proven it contained remains of tartaric acid that presumably was associated with the production of wine at a familial level. In Hirbemerdon Tepe, in the ceremonial complex of Building G, a stone platform with a drain along the wall in association with carbonized grapes was found.[15]

Looking into the culture of wine production and consumption in the Southern part of the Mediterranean, the historical tradition of wine consumption among the Ancient Egyptian royalty and nobility dates back to the earliest epochs of the Dynastic period with ample evidence gleaned from the abundance of wine-jars unearthed from archaeological sites. This practice finds further validation in written records and vivid depictions in wall paintings, elucidating the integral role of

[14] MCGOVERN 2004. P. 78-79

[15] LANERI 2018. P. 6

wine within ancient Egyptian societal customs. The earliest evidence of wine in Ancient Egypt comes from the tomb of Scorpio I in Abydos in Southern Egypt. It is dated 3150 BCE. This is very close to the time when Southern and Northern Egypt were united, marking the beginning of Dynastic Egypt. The tomb contained 700 resinated jars, 47 of which contained grape pips or even whole clusters of grapes. The total volume of buried wine was about 4500 liters.[16] Additionally, the esteemed archaeologist M.-C. Poo underscores that as early as the Fourth Dynasty, the presence of privately-owned vineyards became a notable aspect of Egyptian agricultural practices.[17] Concurrently, the emergence of wine production scenes (Fig. 4) adorning the walls of noble tombs serves as tangible evidence of the flourishing viticulture industry and the cultural significance attributed to wine within elite circles[18].

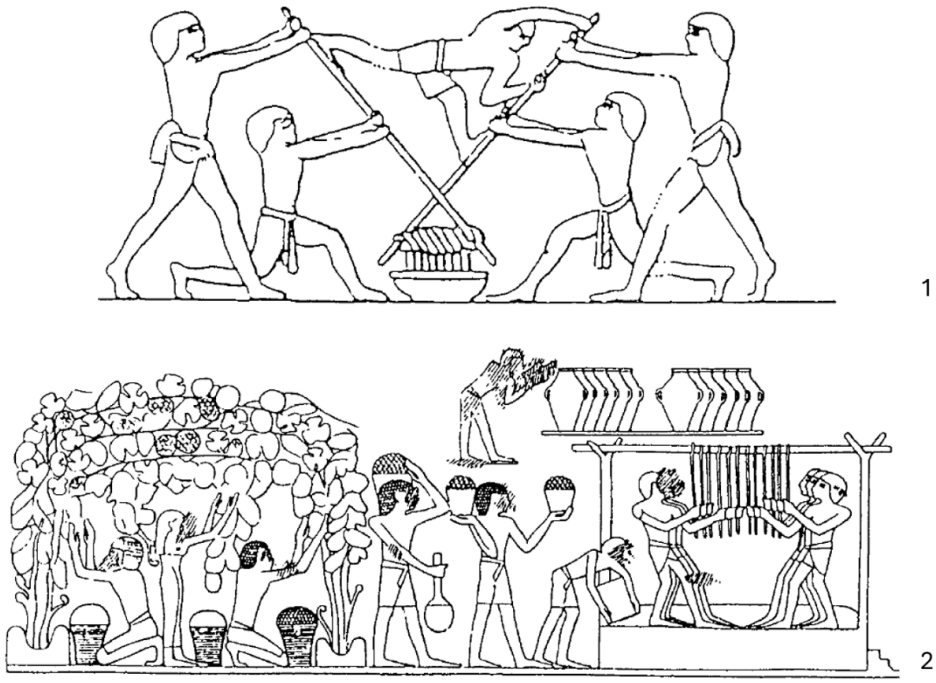

Figure 4. Scenes of wine production from Egyptian tombs: 1) wine-pressing scene (Ptahhetep's mastaba, East wall); 2) scene of vintage and wine-making (Paheri's tomb) (by Poo, 2009, fig. 2 and 3).

The further spread of wine-drinking culture in ancient Egypt is clearly demonstrated by the discoveries dating back to the Eighteenth Dynasty. The find in southwestern Thebes, at a site called

[16] CAVALIERI ET AL. 2003. P. 226-232

[17] POO 2009. P. 7

[18] POO 2009. P. 5–8

Malkata, a remarkable assemblage of *ostraca* with inscriptions is especially noteworthy. 20% of these *ostraca* indicate wine, in some containing detailed information pertaining to various aspects of wine, such as its origin, quality, the esteemed status or identity of the producer, as well as the precise year of production or shipment to the esteemed owner[19]. These *ostraca* are a great source to understand the main sources of wine production in Ancient Egypt. During the New Kingdom, they could have been located on the eastern and western sides of the Nile Delta.[20] Furthermore, additional evidence of ancient Egyptian winemaking practices comes in the form of a discovered winery dating back to the esteemed Eighteenth Dynasty. This winery, crafted from sturdy limestone, stands as a testament to the sophistication of ancient viticultural techniques. Noteworthy features of this winery include its monolithic structure, and a sloping surface meticulously designed to facilitate the pressing of grapes. Integral to its function is an external drain, ingeniously engineered to channel the extracted must into two tanks, whose remnants, unfortunately, have been lost to time. It is estimated that the operational capacity of this winery required the labor of one or possibly two workers, who could produce about 35 liters of the beverage per day.[21]

Going further to the north-west of the Mediterranean basin, the remains of wine inside *pithoi* were found in the Early Bronze Age Crete, at Myrtos-Phournou Koryphe dated to the Early Minoan II-B period, ca. 2200 BCE. Some *pithoi* preserved grape seeds, stems and skin remains inside, while others contained tartaric acid and tartaric salts. Moreover, the infrared and liquid chromatographic data showed the presence of a tree resin additive, whether pine, terebinth tree or some other species is uncertain. A small hole had been punched through the sidewall of some of the jars before they were fired[22], which, apparently, has also been observed on one jar from Hirbemerdon Tepe in Mesopotamia[23]. These jars may have been used for filtering the liquids and associated with grape processing. The discovery of 44 *pithoi*, each with a capacity of approximately 90 liters, at the site of Myrtos-Phournou Koryphe provides compelling evidence for the large-scale production of wine. These findings indicate that the site may have been involved in significant viticultural and vinification activities, suggesting an organized, almost industrial-level production of wine during the relevant period. However, the earliest evidence of the production complex on Crete is in six townhouses and a countryside villa at Kato Zakros in East Crete during the Late Minoan I period, about 1500 BCE. At nearby Palaikastro, a later plaster wine-pressing floor was

[19] MCGOVERN 1997. P. 71–72

[20] GUASCH-JANÉ 2019. P. 60

[21] MEEKS 1993. P. 22–23

[22] MCGOVERN 2019. P. 249–250

[23] LANERI 2018. P. 234

uncovered inside one of the houses and it is characterized by a slope that leads down to a *pithos* buried in the ground under the level of the house floor.[24]

Speaking about Italy, the knowledge of winemaking in the Middle and Late Bronze Age in peninsular Italy is supported by the presence of cups, strainers, bowls, kraters, and other vessels (sometimes in Mycenaean and more often in local forms) relevant to wine production and consumption. Vines were likely exploited from the Early Bronze Age on Sardinia, given the notable quantities of carbonized grape pips and charred *Vitis vinifera* wood. The slow movement of wine production both westward and within Italy is most visible archaeologically as early as the tenth or ninth century BCE via two streams of development: first, an influx of maritime Phoenician contact with native populations and, second, established local exploitation and possible viticultural activity in places where the native grapevine thrived.[25] An example of a local tradition of probable wine culture comes from Longola di Poggiomarino on the River Sarno in Campania, where pressed grape residues were discovered and dated to the tenth–ninth centuries BCE[26]. However, the additional external impetus, e.g. of the Phoenicians, by way of technical and practical knowledge, is hypothesized to have energized already developing Italian viticulture, as can be seen from the fact that local Italian (Villanovan and Etruscan) aristocracies adopted and adapted eastern Mediterranean behaviors and established hierarchical drinking customs, equipment, and self-representation.[27]

Archaeological evidence of wine production in pre-Roman Italy is notably found in the form of rock-cut threading basins on the island of Ischia, which date back to the Bronze and Early Iron Ages. One particularly significant example from Punta Chiarito on the southern coast of Ischia dated to the sixth century BCE presents clear indications of a fully developed winemaking facility. This site includes a rock-cut stone basin used for grape threading, as well as an adjacent structure that contained *pithoi*, amphoras (both local and imported from Corinth and Etruria), billhooks, and various tools used for vine pruning and harvesting. Additionally, the presence of fermentation facilities further corroborates the site's role in the production of wine, providing direct evidence of early viticultural practices in the region.[28]

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[24] MCGOVERN 2019. P. 252

[25] DODD 2022. P. 448–449

[26] CICIRELLI ET AL. 2008. P. 574–575

[27] DODD 2022. P. 448-449

[28] BRUN 2007. P. 55–68

Even though the vine also grew wild in Mediterranean coastal Spain and France, recent analyses suggest that, perhaps unlike Italy, cultivation did not commence until Phoenician, Greek, and Etruscan influence from the tenth century BCE, with no evidence for earlier progressive exploitation of local wild fruits and possible vinicultural activity. The oldest wine-making setup in Western Europe is at Castillo de Doña Blanca, about halfway between Cadiz and Jerez de la Frontera, dated around 600 BCE. Excavations on this site have unearthed wine presses and other associated facilities. However, these findings point to Phoenician involvement in viticulture, as the Phoenicians played a crucial role in spreading winemaking across the Mediterranean.[29]

In summary, the latest archaeological and genetic evidence suggests that grapevine domestication (*Vitis vinifera*) occurred independently in two distinct regions: the Caucasus and Western Asia. These centers of domestication developed separately, each contributing unique genetic lineages to the grape varieties we know today. Through human migrations, trade, and cultural exchange, domesticated grapes spread across the Mediterranean, with instances of secondary domestication, particularly in regions like Italy, where Sardinia became a significant center. Concurrently, winemaking practices evolved independently, initially utilizing wild grape species (*Vitis sylvestris*). The earliest evidence of this comes from the South Caucasus, indicating a long-standing tradition of grape processing predating full domestication. From the Bronze Age onwards, viticulture and winemaking became central to agricultural economies and social customs in the Mediterranean. Wine consumption was not only an economic activity but also held deep cultural significance, being integral to religious ceremonies and the social rituals of the elite. The distribution of domesticated grapevines and wine-making facilities throughout different regions reflect complex patterns of agricultural innovation, cultural exchange, and social transformation in the ancient Mediterranean world.

[29] DODD 2022. P. 450; ESTREICHER 2017. P. 3

Chapter II. History of Research

The study of ancient wine has fascinated scholars for centuries, revealing rich insights into ancient societies' practices, trade, and culture. In the nineteenth century, interest in understanding ancient wine production and consumption grew significantly. Much of the early research focused on examining pottery, especially amphorae, and references in ancient literature.

Distinctive shapes or materials of amphorae and other ceramic vessels used to transport, store, or consume wine gave the opportunity for scholars to develop numerous typologies reflecting on the chronology and geographical origins of different types. Pottery became a key focus for archaeologists and historians who sought to understand trade networks and storage practices. Scholars such as Heinrich Dressel, a German archaeologist, were pivotal in the study of amphorae. Dressel's typology, developed in the late 1800s[30], classified amphorae based on their shape, inscriptions, and origin, helping to track the distribution and origin of wines throughout the ancient world (Fig. 5). His classification has been updated by many other researchers and remains the most common typology used in modern studies.

In addition to *amphorae* and other pottery, pretty early on the scholars turned to ancient literary sources to piece together information about wine production, trade, and consumption. The texts have been helping historians to understand the cultural and economic significance of wine, and also indicated which wines were prized in antiquity, their flavor profiles, and the rituals surrounding wine drinking. Written sources are widely referenced by historians and archaeologists of both the past century and the present. The food historian A. Dalby[31], the archaeologist excavating wineshops and vineyards of Pompeii, W. Jashemski[32], and the wine archaeologist E. Dodd[33] provide a detailed analysis of written information on wine-making and wine-drinking.

[30] DRESSEL 1899.

[31] DALBY 2003.

[32] JASHEMSKI 1973A.

[33] DODD 2022.

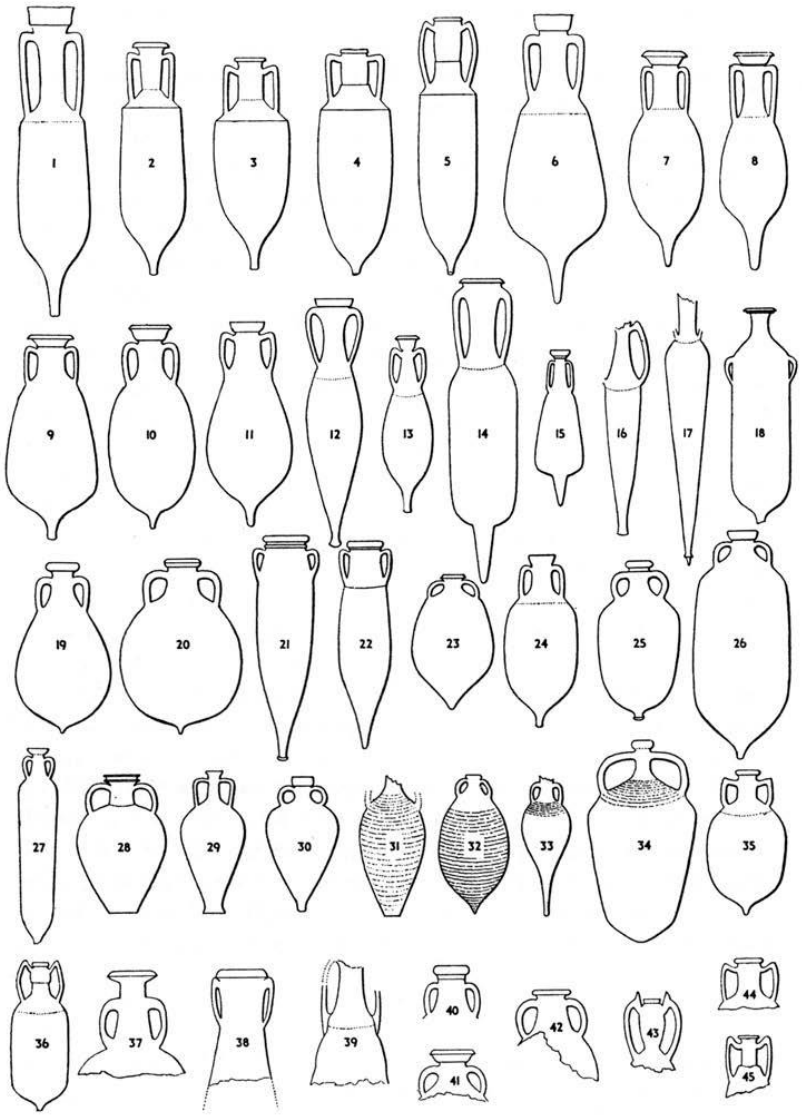

Figure 5. Typology of amphorae by H. Dressel (THURMOND 2017. Fig. 30, after Dressel, CIL XV, Tab. II).

Beyond amphorae and literature, archaeological discoveries in the 19th and 20th centuries began to uncover material evidence of wine production sites. Excavations revealed ancient vineyards, threading basing, pressing facilities, storage rooms, and other instruments as well as iconographical representations of wine-making and wine-drinking processes. Evidence of wine shops in cities such as Pompeii[34] and Herculaneum[35] further illustrated the social role of wine in ancient communities, where it was not only a commodity but also a central element of daily life and social interaction. Excavations and research done in Pompei should be mentioned separately. Jashemski, who has excavated in Pompei for a long time, a pioneering figure in the field of archaeobotany, mapped the vineyard by studying root cavities preserved in volcanic ash. This innovative method allowed her to reconstruct the planting patterns, revealing how urban residents combined residential and vineyard spaces.

Iconography from ancient artworks, such as mosaics, frescoes, and pottery decorations, often depicted scenes related to winemaking, storage, and consumption, providing a rich visual record. Scenes of vineyard work, grape pressing, and banquets also appear, revealing how wine was woven into both labor and leisure activities in the ancient world. This type of evidence is especially important for studies of wine-making and wine consumption in Late Antiquity. It has found reflection in the works of J. Rossiter[36] and D. Thurmond[37], who have conducted versatile studies of the winemaking process and its representation in the art and literature of ancient Rome in different periods.

More recent advances in archaeobotany and chemical analysis have opened up new avenues for studying ancient wine. By analyzing grape seeds, pollen, and grapevine remains found at archaeological sites, researchers have been able to determine which grape varieties were cultivated and even reconstruct some aspects of ancient winemaking processes. Chemical analysis of pottery residues, pioneered by scientists like Patrick McGovern[38], has allowed for the detection of tartaric acid and other wine-related compounds on ancient ceramics, providing direct evidence of wine storage. McGovern's work at the University of Pennsylvania, especially on vessels from sites like

[34] JASHEMSKI 1973a; JASHEMSKI 1973b.

[35] THURMOND 2017. P. 207

[36] ROSSITER 2008.

[37] THURMOND 2017.

[38] MCGOVERN 1997; MCGOVERN 2004.

Godin Tepe in Iran and Areni-1 in Armenia, helped confirm the presence of wine residues dating back as far as the Neolithic period.

It is worth honoring the merits of experimental archaeology, which provides an opportunity to glean more about the productivity and efficiency of ancient agricultural methods. Here one should mention the experiment of growing and harvesting grapes using replicas of ancient techniques and tools carried out by M. Indelicato et al. on the slopes of the Etna.[39]

These multidisciplinary studies have painted a comprehensive picture of Roman wine production as a complex industry supported by sophisticated agricultural practices, technical expertise, and an efficient distribution system. Together, the insights from ancient texts, archaeological excavations, and modern scientific methods have shown how Roman Italy developed a thriving viticulture that influenced both local economies and Roman cultural life. Archaeological and scientific discoveries, especially in recent decades, have transformed the field, allowing scholars to move beyond textual descriptions and visual representations and explore the material traces of ancient wine itself. As a result, the study of ancient wine now offers a multidimensional view of how this staple drink shaped daily life, trade, social rituals, and agricultural practices across the ancient world.

[39] INDELICATO ET AL. 2017.

Chapter III. Wine production in Roman Italy

In the context of the ancient world, viticulture was regarded as one of the most significant sectors of agriculture, holding a place of equal importance alongside cereal cultivation and olive oil production; wine, in particular, was considered a staple food product. This is evident from Domitian's edict on the reduction of vineyards, as reported by Suetonius[40]. During the Principate, viticulture was even viewed as a potential rival to grain cultivation, prompting restrictions on vineyard expansion within Italy and the partial dismantling of such estates in the Provinces. Cato the Elder categorized viticulture among the most lucrative and productive branches of agriculture, a view echoed later by Columella[41]. Despite its profitability, however, Pliny the Younger frequently lamented in his letters the challenges of poor harvests, which often resulted in financial hardship and indebtedness for the rural populace[42]. This contrast underscores the dual nature of viticulture in the ancient economy: while it was a highly valued and profitable enterprise, it was also subject to the vagaries of climate and market conditions, reflecting broader agricultural and economic dynamics of the era.

The development of Roman winemaking in Italy experienced significant fluctuations, influenced by a variety of external and internal factors. Notable examples include the eruption of Mount Vesuvius in 79 CE, which is reported to have devastated numerous vineyards in the Campanian region, leading to what is often referred to as a "wine famine" in Rome. In the ensuing centuries, the expansion of viticulture in the provinces of Hispania and Gaul further contributed to the decline of domestic Italian wine production, as these regions began to outcompete Italian vineyards, both in volume and quality.[43]

Information on ancient viticulture can be found both from written sources and archeological evidence. Among written sources on this subject, three comprehensive agricultural treatises dedicated to villa-based farming intended for the Roman elite are especially interesting for winemaking studies: the earliest being *De Agricultura* by Marcus Porcius Cato, written around 180 BCE, followed by *De Re Rustica* authored by the Augustan scholar Varro, and lastly, *Res Rusticae* composed by the mid-first-century agronomist Lucius Junius Moderatus Columella. Moreover, Pliny the Elder's extensive encyclopedic work, which covers a wide array of contemporary

[40] DOM. 14, 2

[41] CATO AGR. I, 7; COLUM. 3, 3

[42] PLIN. EPIST. 8, 2; 9, 16; 9, 37

[43] DODD 2023. P. 72

knowledge, contains a comprehensive treatise on viticulture integrated within his broader discourse on botany.[44] Many texts from the Republican and Imperial periods were influenced by, or directly drew upon, the earlier writings of Mago the Carthaginian, whose exact date remains uncertain. Although Mago's original agricultural treatise has been lost, it evidently dedicated significant attention to viticulture and wine production, as indicated by surviving fragments referenced in later works.[45]

The sources for late antique wine-making include technical manuals as well as non-technical writings. The main technical source is *Opus Agriculturae* by Palladius. Although the date and geographic context of Palladius's work are debated, it is possibly dated to around 470 CE and reflects agricultural practices in Italy during the fifth century. Palladius's work partially draws from an earlier treatise by Faventinus (*Artis Architectonicae Privatis Usibus Adbreviatus Liber*), typically dated to the late third century A.D. Both Palladius and Faventinus were heavily influenced by Vitruvius. In addition to these technical sources, other late antique writers provide valuable insights into contemporary wine production practices. Zeno of Verona, writing around the mid-fourth century, Symmachus, active from the fourth to the fifth century, Cassiodorus, and Pope Gregory in the sixth century all describe different aspects of wine-making that seem to continue earlier traditions.[46]

The archaeological evidence for ancient viticulture and winemaking can be classified into five main categories, each shedding light on different aspects of the production process and cultural practices associated with wine.[47] The first category encompasses the physical remains of grapevines, grape seeds, and the remnants of vineyards, which include features such as terracing, planting arrangements, and evidence of irrigation or hydrological systems designed to manage water resources effectively. These remains are crucial for understanding the agricultural techniques and environmental adaptations employed by ancient vintners. The second category consists of the tools used in viticultural activities, such as pruning knives, billhooks, and other specialized implements. These tools offer insight into the methods of vine cultivation, pruning, and harvesting, revealing details about the labor and expertise involved in maintaining vineyards. The presence and distribution of such tools at archaeological sites can also help reconstruct the seasonal activities and the scale of wine production in specific regions.

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[44] THURMOND 2017. P. 51

[45] DODD 2022. P.444

[46] *Ibid*. P. 444

[47] DODD 2023. P. 73

A third category involves the remains of wine presses, which are essential for understanding the processing of grapes into wine. Archaeological finds often include press components such as stone basins, pressing mechanisms, and weights. These elements help to reconstruct the technological advancements and regional variations in wine production techniques. The fourth category is represented by architectural structures associated with the winemaking process. These include features like fermentation vats, storage cisterns, and threading floors, which are often integrated into larger winery complexes. Such structures provide valuable information about the spatial organization of winemaking facilities, the capacity for grape processing, and the economic significance of viticulture within a given settlement or estate.

Finally, the fifth category encompasses evidence for the storage, transportation, and consumption of wine, found in the form of metal, ceramic, and occasionally organic artifacts. This includes *amphorae*, *dolia* (large storage jars), metal vessels, and even traces of organic residues that can be analyzed for chemical markers of wine. These artifacts not only illuminate the logistical aspects of wine distribution but also offer insights into the cultural practices surrounding the serving and consumption of wine in ancient societies.

III.1. Grape cultivation and harvesting

Vineyards and grape cultivation represented a vital aspect of agricultural practice and the broader economy, particularly in Italy, where viticulture thrived due to favorable conditions and significant demand for wine. According to agricultural writers like Varro and Columella, some of the most productive vineyards in Italy could yield between 165 and 200 hectolitres of wine per hectare, with exceptional sites reaching as much as 300 hectolitres per hectare. In Gaul, these high yields were notable enough to earn certain grape varieties the name *trecenariae*, as reported by Cato, indicating their capability of producing over 300 amphorae per *iugerum* (approximately 300 ha).[48] However, as viticulture expanded beyond Italy into the provinces of Gaul, Spain, and North Africa, the domestic wine economy faced growing competition. By the first century A.D., the situation became precarious enough that Emperor Domitian issued an edict in A.D. 92 prohibiting the planting of new vineyards in the provinces and mandating the uprooting of half the existing vineyards. This measure aimed to protect Italian viticulture, but it also likely responded to concerns that the spread of vineyards was displacing cereal cultivation, a less profitable but essential part of the agricultural landscape.

[48] SURICO 2000. P. 4-5

The size and scale of vineyards varied greatly, with Cato referencing estates as large as 100 *iugera* (about 25 hectares)[49] suitable for grape growing. It was not uncommon for several vineyards to be located side by side, with multiple vintages aged simultaneously across these neighboring estates. Initially, investment in viticulture was limited among the Roman senatorial class, who did not engage heavily in vineyard development until the imperial period. The transformation of Roman agriculture, including the consolidation of large estates and reliance on slave labor, was shaped by the aftermath of the Hannibalic Wars, when many small Italian landholders were displaced. Cato's writings, which focus on relatively modest farms, provide critical insight into this agricultural shift, despite the absence of direct evidence that his treatise was aimed at the senatorial elite.[50] One of the most important corollaries of attitudes was that senators were not much involved in investment viticulture until the imperial period. The existence of Cato's treatise lies behind the modern orthodoxy that, Hannibal disposed of together with conveniently large numbers of the former Italian smallholders, the Roman upper class seized huge tracts of land, avidly perused Hellenistic treatises on plantation agriculture, and were at once provided by a kindly fortune with the necessary colossal numbers of slaves to make it possible. For the agricultural aspects of this revolution Cato is of course almost our only evidence. There are obvious difficulties with this orthodoxy: Cato's treatise is about farms of modest extent and value, it justifies agriculture as the producer of military manpower, it is in places clearly addressed to the *vilicus* of the villa, there is no positive indication that it is addressed to senators, and indeed there are many suggestions.[51]

Columella[52], a key source on Roman viticulture, offers detailed instructions on grape cultivation and winemaking techniques. He emphasizes the importance of preparing the equipment properly, such as by coating fermentation jars with pitch, to ensure the quality of the wine. According to Columella, the best sites for vineyards were previously uncultivated lands rather than areas that had been used for grain or tree plantations. The poorest sites were old, neglected vineyards, where the soil was depleted and infested with deep vine roots, which could reach depths of up to 9 meters (30 feet). He advises against replanting vines in such exhausted soil for at least a decade, recommending instead that wild land be used, as its surface roots are easier to remove.[53] A notable technique described by Columella is *pastinatio*, an intensive form of deep trenching

[49] CATO AGR. I, 11

[50] PURCELL 1985. P. 8

[51] *Ibid.* P. 5

[52] COL. RR 3.11.1-6, 12.18.1-6

[53] THURMOND 2017. P. 51

used to aerate the soil and prepare it for new vines. This method involved breaking down and loosening the soil, a practice that remained common in later agronomic traditions, as evidenced by references from the nineteenth-century Sicilian agronomists.[54] Archaeological evidence supports the use of such techniques, with vineyard trenches dating back to the sixth and fifth centuries BCE. found at sites near Centocelle, and other examples in areas such as Fontanile del Sambuca in Blera (Lazio), Taranto (Apulia), and Acquarossa and San Giovenale in Etruria.[55] These findings illustrate the long-standing tradition and technical sophistication of vineyard management in the ancient Mediterranean world.

Pompeii has provided an incredible wealth of information about Roman viticulture, offering insights into how vineyards were managed and organized in ancient times. Over several years, archaeologist Wilhelmina Jashemski[56] and her team meticulously unearthed parts of Pompeii where grapevines were cultivated within the city's walls. Among the most famous examples is the vineyard located in the Foro Boario (region 2, *insula V*). This vineyard was preserved under layers of volcanic ash from the eruption of Mount Vesuvius. Remarkably, the layout of the vineyards remained almost intact (Fig.6), and, in a manner reminiscent of the preservation of human bodies at Pompeii, the vine and root systems were reconstructed using plaster casts. One of the most intriguing findings was the spacing of the vines: each vine was planted approximately four Roman feet apart (1 Roman foot is equal to 29.59 centimeters). This precise spacing suggests the vineyard was cultivated by hand. Ancient agricultural texts, such as those by Columella[57], offer additional context. Columella recommended that rows in vineyards should be spaced at least five Roman feet apart for hand cultivation, and even wider – at least seven Roman feet – if oxen and plows were used. This spacing in the Foro Boario vineyard aligns closely with traditional hand-cultivation techniques, providing a fascinating glimpse into Roman agricultural practices and the meticulous planning that went into managing vineyards in the ancient world. However, Pliny the Elder recommended planting vines four feet apart in rich soil[58]. This spacing aligns with the layout found in vineyards around Pompeii, which still use similar planting patterns. Moreover, it was noted that the root cavities had three or four depressions around them, resembling the water-holding basins they make around vines today. In ancient Pompeii, new vines were often propagated through layering, a technique still used today. This method involved bending a shoot into shallow soil to

[54] INDELICATO ET AL. 2017. P. 323

[55] DODD 2023. P. 82

[56] JASHEMSKI 1973a. P. 823

[57] COL. RR. 3.13.3–4

[58] PLINY. NAT. HIST. 17.35.10

encourage rooting, as detailed by ancient writers, such as Cato, Pliny and Columella[59]. Two well-preserved examples found in this vineyard showed one vine forming two roots, while another developed three large roots along a shoot over 100 cm long, illustrating a direct link between ancient and modern vine cultivation.[60]

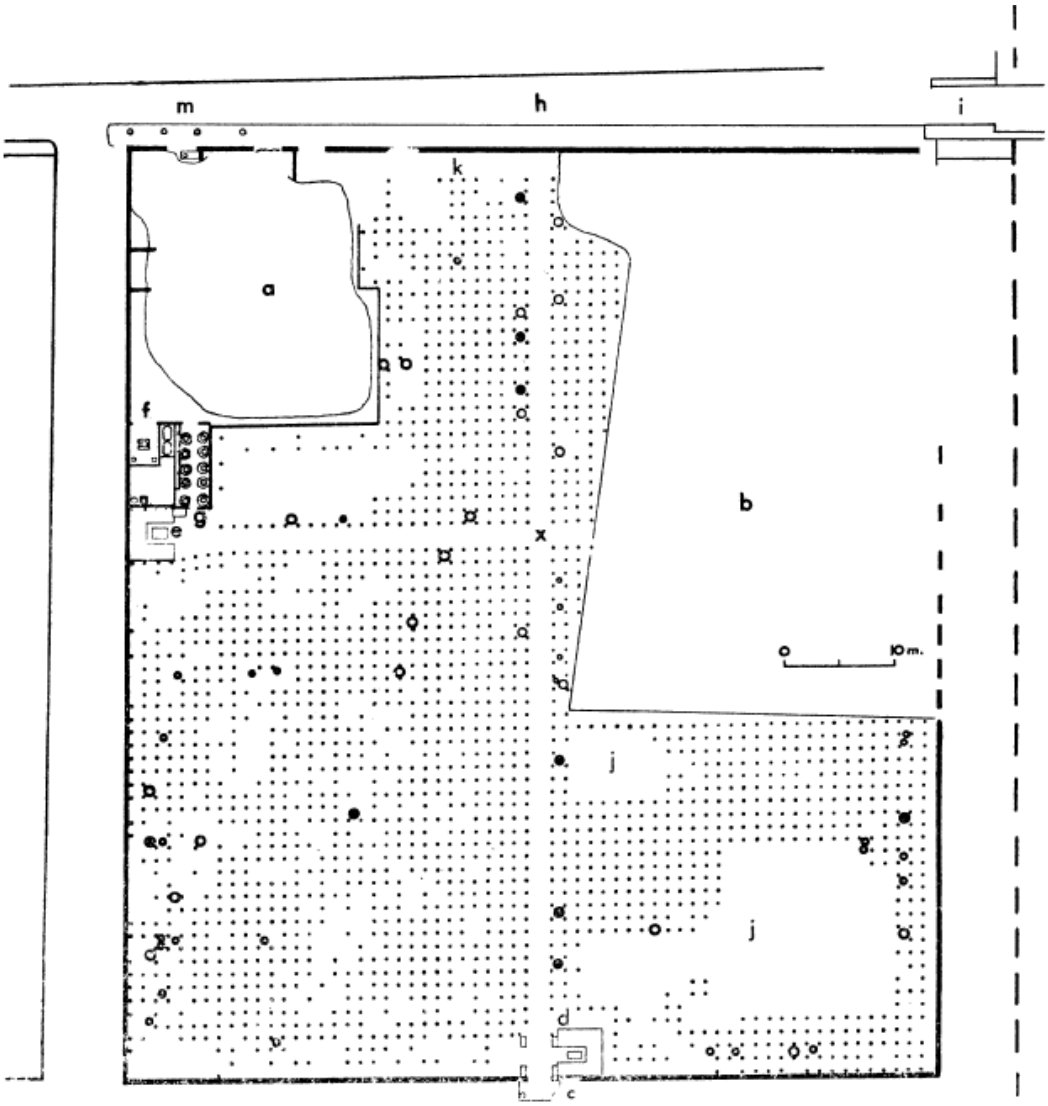

Figure 6. Vineyard from Pompei, Region II, *insula V* in the end of 1970 excavation season: a,b) unexcavated zones; c) s entrance; d,e) masonry triclinia; f) wine press room; g) storage room with ten dolia; h) via dell'Abbondanza; i) Sarno gate; j) areas of excavations in 1954-1955; k) path along the wall; m) wineshop with a portico; x) intersection of paths; dots show grapevine roots, circles indicate tree roots (JASHEMSKI 1973a, fig. 2)

[59] CATO. AGR. 33; PLINY. NAT. HIST. 17.35.10; COL. RR. 3.10.17–18

[60] JASHEMSKI 1973a. P. 823-824

Another significant archaeological discovery of ancient grape cultivation comes from trench structures dating back to the Imperial era, found at several sites across Italy. These trenches, previously thought to be drainage canals or *canali*, were located at sites including Masseria Martelli and Troia Nord near Lucera (Apulia); Pannaconi near Vibo Valentia (Calabria); Tor di Mezzavia, Osteria delle Capannacce, Ponte di Nona, Casal Bianco, and Tor Pagnotta near Rome; Musarna in Lazio; and Falciano del Massico in Campania.[61] Recent research suggests that many of these trenches were actually designed for grapevine cultivation rather than drainage, reflecting Rome's expansion of viticulture into its suburban landscape. The trench dimensions vary widely across Italy, yet the suburban trenches outside Rome are particularly striking. These appear as parallel, square-profile trenches cut into the soft tufa stone below the topsoil. They measure approximately 0,8 – 0,9 meters in width, spaced about 2,5 meters apart, that is slightly more than 7–8 Roman feet and therefore may indicate vine cultivating with the use of a plow. Narrower trenches with a concave profile found nearby likely served as water channels for irrigation or drainage, running parallel or adjacent to those for vines, underscoring the Roman skill in integrating water management with viticulture. Most of these trench systems date back to the Republican period and are located primarily east of Rome, where soil and climate conditions were well-suited to grape growing. This eastern area of the Roman suburbium appears to have been a hub for vine cultivation, likely producing grapes for wine consumed locally in Rome and neighboring towns. This area was likely interplanted with a variety of other crops—fruit trees, vegetables, wheat, and legumes – indicating a diverse and productive landscape that sustained the growing Roman population. The near absence of such vine trenches on the right bank of the Tiber, except for isolated sites, highlights a geographic preference for vine cultivation and suggests potential excavation biases in certain areas. These findings underscore the extent to which the Romans integrated viticulture into both their urban and rural landscapes, making it a critical part of daily life and local economy.

Special attention should be paid to the tools that were used in the cultivation of grapes. Among these, the *falx vinitoria* holds particular significance (Fig. 7.1-3). Described in detail by Columella[62], this handheld, curved blade served multiple purposes in vineyard work, primarily for

[61] DODD 2023. P. 83

[62] COL. RR. 4.25

pruning. Alongside it, workers also used a smaller tool, the *falcula vineatica*, which was specifically designed for carefully cutting grape bunches during harvest (Fig. 7.4).[63] A *falcula* is on display at the Trier Museum, discovered at Nattenheim, and another was found at Heddenheim, now housed in the Frankfurt Historical Museum.[64] These tools highlight the specialized equipment that supported the skilled labor involved in Roman viticulture.

Written sources in general pay much attention to the description of agricultural tools. Cato advised that 40 billhooks would be sufficient for managing a vineyard of 100 *iugera*[65]. Columella further suggests[66] that harvesters use the curved edge, or *sinus*, of the billhook rather than the straight *scalprum*, as the billhook's drawing motion allows for a cleaner, more precise cut. In contrast, the *scalprum* requires a hacking motion, which is less accurate and risks damaging the vine. The harvesting process should be visualized as follows: a worker holds a cluster of grapes in one hand while cutting it with the billhook in the other hand by a drawing motion.[67] These tools were widely used in Italian agriculture until relatively recently and are still found in some regions today.[68] Beyond the typical examples of billhooks found at sites like Grotta di Malconsiglio (near Sybaris in Calabria) and Benevento (Campania), a variety of sickle-like and hook-shaped implements were likely employed throughout the Roman Empire for diverse vineyard tasks.[69]

The harvested grape clusters were placed into baskets (Fig.8.1), known by various names such as *corbulae*, *fiscinae*, *fiscellae*, or *quali*, which seem to have been used interchangeably. These baskets were typically woven from materials like withies, vine cuttings, or small tree branches, and were either crafted during the winter months or purchased. The finest baskets were reportedly sourced from places like Nola, Sinuessa, Casinum, and Rome. To make them leakproof, the baskets were coated on the inside, and the standard size held 3 *modii* (about 3 bushels or 26 liters). Once filled, the harvest baskets were emptied into larger containers, known as *decemmodiae fiscellae*, *corbes*, *cophini*, or *corbulae amerinae*, each with a capacity of 10 *modii* (10 bushels or 86 liters). These larger baskets were then transported by porters to donkeys carrying

[63] WHITE 1967. PP. 93-97.

[64] JASHEMSKI 2017. P. 450

[65] CATO, *AGR.* 11

[66] COL. *RR* 12.18

[67] THURMOND 2017. P. 139

[68] DODD 2023. P. 85

[69] BROWN ET AL. PP. 753-754

panniers (*clitellae*) or loaded onto large trays made from single blocks of wood (*lintres*) mounted on carts (Fig.7).[70]

Representations in mosaic, fresco, and relief also provide an important archaeological and artistic source, particularly to observe aspects of cultivation, harvest, and the vintage, reflective of the world in which these people lived. A fourth c. CE ceiling mosaic from the Mausoleum of Constantia depicts the process of grape harvesting and winemaking, although we will focus on the winemaking process later. A worker carries the harvested grapes on a cart pulled by two oxen, while another worker pulls the oxen (Fig. 8.2).[71]

In conclusion, grape cultivation and the vintage process were foundational to the agricultural landscape of ancient Italy, driving both local economies and the broader trade of wine. The techniques developed and refined by Roman agriculturalists like Columella demonstrate the sophistication of their viticulture practices, from soil preparation to precise vine spacing and innovative cultivation methods such as *pastinatio*. These practices were complemented by specialized tools and labor, ensuring the high quality of the harvest. While the spread of viticulture to regions like Gaul, Spain, and North Africa created competition, it also expanded the Roman wine market, prompting measures like Emperor Domitian's edict to protect Italian vineyards. Archaeological evidence from Pompeii and other sites further illustrates the deep-rooted traditions and technical expertise involved in Roman viticulture. Ultimately, the Roman approach to grape cultivation not only influenced contemporary agricultural practices but also laid the groundwork for future developments in winemaking across the Mediterranean.

[70] THURMOND 2017, P. 140

[71] ROSSITER 2008, FIG. 2.

Figure 7. Tools used for grape harvesting: 1) experimental *falx vinitoria* (INDELICATO ET AL. 2017, fig. 4); 2-3) drawings of *falx vinitoria* by WHITE 1967, fig. 71-72; d) drawing of a *falcula vineatica* by WHITE 1967, fig. 75.

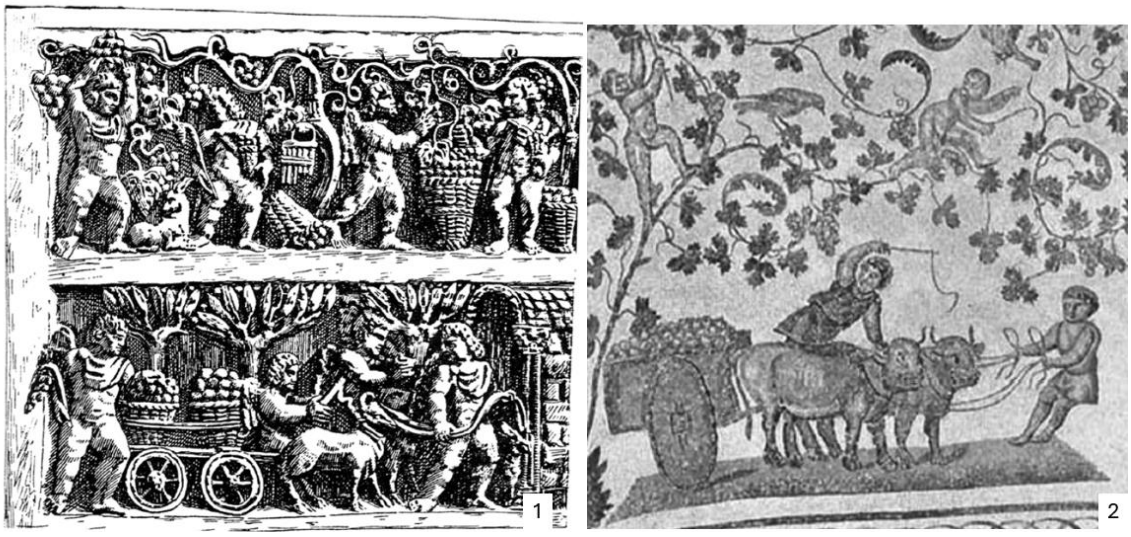

Figure 8. Representation of a vintage process in Roman art: 1) a scene of vintage from a Late Antique Christian sarcophagus in the Lateran Museum (THURMOND 2017, fig. 19); 2) grape-harvesting scene from the Mausoleum of Constantia, Rome (ROSSITER 2008, fig. 2)

III.2. Threading and pressing

Once the grapes were brought to the winery, they underwent a careful sorting process, known as *triage* in French. If any defective clusters had not already been removed earlier for use in making *vinum praeliganeum*, they were likely culled at this stage.[72] During the sorting process, the best quality clusters were separated for use as table grapes, while the remaining ones, of lesser quality, were reserved for winemaking. This sorting was done based on both the quality and variety of the grapes, as suggested by ancient sources like Varro[73] and Palladius[74].

Once sorted, the grapes were transported to a press room where the initial phase of threading took place. Threading process was described by Cato in great detail[75]. Threading, usually performed by laborers trampling the grapes barefoot on a threading floor (*calcatorium*), was a critical first step aimed at extracting the must without crushing the seeds, which could release bitter compounds. The juice obtained from this stage flowed either directly into large fermentation jars, known as *dolia picata*, or was first collected in a reservoir called *lacus vinarius*. The jars were typically coated with pitch to seal the porous surfaces and to help protect the must from oxidation, preserving its quality throughout the fermentation process.

Following the threading, the remaining grape pulp, known as pomace, was subjected to a mechanical press. This second stage of pressing extracted additional must, although this juice was often considered of lesser quality than the first extraction. In many accounts, this secondary product is referred to as *mustum tortivum*,[76] indicating its inferior status. Despite its lower quality, this must was not wasted; it was typically used for the production of common table wines or mixed with stronger wines to increase volume and extend the supply.[77]

In many cases, according to Columella,[78] the must was transferred directly from the threading floor to fermentation jars without passing through an intermediate reservoir, particularly when a quicker transfer was desired. This method aimed to preserve the freshness and flavor of the must, reducing the risk of premature fermentation or spoilage. Further refinement in wine production is

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[72] THURMOND 2017, P. 141

[73] VARRO. *RR* 1.54

[74] PALLADIUS. RR *3.9, 10.17*

[75] CATO. AGR. 25.1; 112.3

[76] CATO. AGR. 23.4

[77] ROSSITER 1981. P. 346

[78] COL. RR. 12.27-29, 32-42

evident in the practice of boiling down must to create a concentrated syrup. This was typically done in a specialized cauldron-room called the *cortinale*. The resulting syrup was used to fortify poorer quality wines, enhancing their sweetness, flavor, and alcohol content.[79]

Varro provides[80] a clearer distinction between the two stages of pressing, noting that the must from the second pressing was always stored separately. He also mentions that the leftover pressed material could be mixed with water to create a drink for farm workers during winter. Varro's description of winemaking aligns closely with that of Cato, though Varro does not indicate that the must from the initial threading flowed directly into fermentation jars; instead, it passed first into a reservoir before being transferred to jars. Both Varro and Cato describe varying fermentation and maturation periods depending on the type of wine and the specific seasonings or additives used.

Pliny later expands[81] on the production stages outlined by Varro and Cato, providing more details on how fermentation and storage methods differed by region. According to Pliny, the must from both the threading and pressing stages flowed into a reservoir, from which it was transferred into either ceramic fermentation vessels or wooden casks. Like Varro, Pliny describes repurposing the press residue to make a lower-quality drink for farm workers. Additionally, Pliny offers an extensive list of additives for flavoring and fortifying wines. These recipes reflect the Romans' experimental approach to winemaking, catering to a variety of tastes and preferences. By adjusting the composition and treatment of the must, winemakers were able to produce an array of wine styles, from the robust and aged varieties to lighter, everyday table wines.[82] He also noted that by 121 BCE, Italy was "beginning to appreciate her advantages, though the wine types had not yet achieved celebrity"[83]. Although Italy's vineyards were gaining recognition, the wines themselves had not yet reached the level of fame or distinctiveness they would later achieve. In Pliny's time (1st century CE), Italian wines had become highly regarded, and certain varieties and vintages were celebrated throughout the Roman Empire. This quote serves as a historical marker, highlighting the progression from Italy's early efforts in viticulture to its later prominence as a center of fine wine production.[84]

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[79] ROSSITER 1981. P. 347

[80] VARO. 1.54.2-3

[81] PLINY. NAT. HIST. 14.120-133

[82] ROSSITER 1981. P. 349

[83] PLINY. NAT. HIST. 14.94

[84] PURCELL 1985. P. 7

The account of winemaking provided by Palladius in *Opus Agriculturae*, likely written in the fourth or fifth century CE shows notable differences from those of earlier writers. Palladius does not mention the use of mechanical presses, which, while common, were not universally employed. In fact, presses were not essential, as the highest quality must was typically obtained through the traditional method of threading. Moreover, presses were costly, so farmers were likely to invest in them only if they were producing wine on a large commercial scale. Palladius describes an elevated threading platform from which the must flowed down into two lower reservoirs. From there, it was channeled into fermentation jars using terracotta gutters or pipes. If the jars were insufficient in capacity, wooden barrels could be used as additional storage.[85]

Palladius offers detailed guidance on the ideal placement of the *cella vinaria*, or wine cellar. He suggests that it should be positioned facing north to keep it cool and dim, and it should be located well away from sources of strong odors, such as baths, stables, ovens, compost piles, cisterns, or other potential contaminants. The cellar's size should be proportional to the expected harvest to prevent overcrowding. For cellars intended specifically for fermentation and aging in *cupae* (wooden casks), Palladius advises that the floors should resemble those of a threading vat, with low perimeter walls and tiled flooring. This design allows for easy recovery of any wine that may leak from the casks. Traditional cellars, by contrast, had unpaved floors to allow for the burying of *dolia* (large ceramic storage jars) in sand or soil. Interestingly, Palladius is the first to explicitly recommend positioning the *torcularium* (press platform) above the *cella vinaria* to enable gravity to carry the must down into the cellar – a practical arrangement likely adopted long before but previously undocumented in agricultural writings.[86]

In the mid–fourth century CE, Zeno of Verona provides a detailed account of winemaking[87], covering the process from harvest to fermentation, closely following traditional Roman practices. He outlines the typical stages: harvesting the grapes, initial threading to extract the juice, secondary pressing of the remaining pulp, and transferring the must to storage vessels for fermentation. A unique aspect of Zeno's description is the use of two boards to hold the grape pulp in place under the press. While similar boards, called *orbes*, are mentioned by Cato[88], they are not referenced by any other known agricultural writers.[89]

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[85] ROSSITER 1981. P. 347–348

[86] THURMOND 2017. P. 147

[87] ZENO OF VERONA. TRACTATUS 2.27.2

[88] CATO. *AGR.*18.9

[89] ROSSITER 2008. P. 97

Historical texts make it evident that threading was a crucial step in ancient winemaking. Threading floors (*calcatoria*) or vats are some of the most distinctive archaeological indicators of Roman wine production. This method could extract up to 80% of the grape juice, producing wine of the second-highest quality.[90] Numerous examples of these threading floors have been found throughout Italy, ranging from large-scale Imperial sites like Villa Magna near Anagni, to elite villae rusticae around Boscoreale in Campania. Smaller, locally-focused operations have also been identified, such as the modest threading floor in insula I.20 at Pompeii, which drained directly into a single *dolium*.[91] Threading floors of various sizes have been uncovered along the Adriatic coast at sites like Tortoreto Muracche, Colombara di Acqualagna, and possibly Fontanelle di Monsampolo del Tronto. In Umbria, they have been found at San Giustino (Colle Plinio), and in Tuscany at Settefinestre. Near Rome, examples have been identified at Guidonia, along Via Nomentana (near S. Alessandro), Via Tiberina, and Via Gabinia, as well as at Villa Magna, Fosso di Montegiardino, and near Nemi in Lazio. In Campania, they are seen at Villa Columbrella near Mondragone, Villa Carmiano/Gragnano in Stabiae, and Somma Vesuviana. In Calabria, evidence includes Grotta del Malconsiglio and possibly the tanks and pavements at Pannaconi. There are also potential finds at Villa Russi and Bologna in Emilia-Romagna.[92]

Rock-cut threading areas, known as *palmenti*, feature adjoining vats – either single or multiple – for the collection, decantation, and fermentation of wine. While these structures are commonly found in Sicily and Ischia, recent studies have identified examples throughout peninsular Italy. Notable sites include San Biagio a Castel del Piano, San Sepolcro, Monte Amiata, Seggiano, and Vitozza in Tuscany; San Leo in Marche; Allumiere, Tolfa, Manziana, and Norchia in Lazio; Serramezzana and Novi Velia in Campania; as well as Ferruzzano and Bruzzano in Calabria. The *palmenti* typically have quadrangular shapes, though circular forms are less common, and vary in size and layout. They are often situated near water sources, on elevated terrain, and surrounded by vineyards. Due to a lack of clear dating evidence, these features have been attributed to a wide range of periods, from the Archaic and Roman eras to Late Antiquity, Medieval times, and even the pre-industrial age.[93]

A ceiling mosaic in the Mausoleum of Constantia in Rome, which has been mentioned above, illustrates winemaking, focusing primarily on grape threading. The scene depicts workers

[90] DODD 2023. P. 87

[91] DODD 2017. PP. 577-88.

[92] DODD 2023, P. 87

[93] OLCESE ET AL. 2020. PP. 31-41.: DODD 2023, P. 89

stomping grapes on a raised platform, with the juice flowing directly into sunken dolia, with no sign of a press or intermediary vat. A similar image appears on a porphyry sarcophagus, known as "Constantia's sarcophagus," from the same mausoleum. This relief shows Cupids threading grapes, with the juice flowing into free-standing jars through spouts shaped like lion heads.[94] The depiction of grape threading in early Christian art is no coincidence. This process was valued for yielding the first juice, considered the purest and highest in quality. The symbolism of this "first fruit" and its transformation into wine aligns deeply with themes in Christian spiritual doctrine.[95]

Threading floors could function independently, as seen in Pompeii, be paired with a mechanical press within the same area or be entirely separated from the pressing process.[96] The pressing process was just as crucial in winemaking. Throughout the Mediterranean, presses varied significantly in size, complexity, and technology, each of which influenced the level of expertise, investment, and labor required. These factors, in turn, affected the scale and purpose of production.

Figure 9. Threading the grapes: 1) the map of sites where threading facilities (palmenti) are known (by DODD 2023, fig. 2); 2) threading floor from the House II.9.6 in Pompei (JASHEMSKI 2017); 3) a drawing a mosaic found at Saint-Romain-en-Gal, now at the Louvre (THURMOND 2017, fig. 22)

[94] ROSSITER 2008. P. 98–100

[95] DODD 2022. P. 460

[96] DODD 2023. P. 88

Based on Cato's descriptions[97] and additional ancient sources[98] a clear picture of the press mechanism emerges. The fixed end of the press beam, known as the *prelum*, is identified as the lingua, while the posts on either side are referred to as arbores. The anchor sockets set into the ground are called *pedicini*. The opposite end of the press beam is stabilized between two upright posts, or *stipites*, and is connected to a pulley with a durable esparto rope, termed *funis sub-ductarius* or *capistrum*. Beneath this setup, the beam attaches to a capstan, known as the *sucula*, which includes a central metal loop, the *porculus*, where the capstan rope – referred to as *funis torculus* or *lorcus* – is secured. At each end of the capstan, sockets hold long iron levers, or *vectes*, used to crank down the *prelum* effectively.[99]

In the first century, Pliny the Elder described two main types of presses that were used throughout antiquity: the lever-and-drum press and the lever press (or lever-and-screw press).[100]:

1 The first type of press operates with a lever-and-drum mechanism fixed to the ground. It functions by using a winch and handspikes to lower the lever, which then applies pressure onto a platform that may also have been used for threading the grapes. Archaeological remains of this press typically show two square holes for vertical wooden beams that support the winch, along with a single hole at the rear for the press's support structure.
2 Another type of wine press features a large pressing surface embedded into the floor, encircled by a drainage channel, and equipped with a screw mechanism and counterweights. The pressing area and floor are typically constructed from *opus signinum* (a waterproof plaster) or *opus spicatum* (herringbone-patterned brick-work), and occasionally from tufa stone or monochrome mosaics. In some examples, a circular or square stone base includes a groove designed for juice drainage.[101]

[97] CATO. AGR. 18-19

[98] VITRUVIUS, ARCH. 10.6.3; PLINY, NAT. HIST. 18.317

[99] THURMOND 2017. P. 159

[100] BURTON ET AL. 2019. P. 551

[101] DODD 2022. P. 462–466

Pliny's first type of press is most notably exemplified in the elite agricultural villas of Campania, historically referred to as the "platform press". However, similar designs have now been identified in other parts of Italy. This press typically features a lever-and-drum mechanism securely fixed to the ground, which is lowered using a winch and handspikes (*sucula*). The press applies pressure onto a platform that was often also used for threading the grapes. Archaeological remains typically show two square holes designed to hold vertical wooden beams (*stipes*) that support the winch mechanism, along with a single hole at the rear of the press for an upright at the fulcrum end (*arbore*). Notable examples of this type of press in Campania include those at the villas of Pisanella, Regina, dei Misteri at the so-called Stazione, and the Giuliana farmhouses in Boscoreale,[102] as well as Villa C. Olius Ampliatus near Naples and Prato at Sperlonga. In other regions of Italy, similar lever-and-drum presses have been identified at Ca' Balduini di sopra, Piano della Monaca, and Tortoreto Case Ozzi in the central Adriatic region of Picenum (dating from the 2nd century BCE onward); Monte Canino and Capena in Lazio; San Giuliano and Villa di Leonessa in Apulia; and Ciminata, near Rossano, and Pannaconi, near Vibo Valentia, in Calabria.[103]

Figure 10. The wine-pressing scene on a mosaic from the villa at Piazza Armerina, Sicily (ROSSITER 2008. Fig. 1a).

[102] ROSSITER 1981. P. 348

[103] DODD 2023. P. 92–93

A lever-and-drum press is illustrated in the floor mosaics of the Late Roman villa at Piazza Armerina, Sicily, dating back to the fourth century. These mosaics depict various stages of wine production, including a worker carrying baskets of grapes into the pressing area, three workers threading the grapes, and a press beam fitted with two vertical support logs and circular planks used to press the pulp.[104]

This second type of press is widespread across Italy, with a particularly strong concentration in the central and northern regions. Notable vinicultural examples have been discovered at Varignano (Liguria), as well as in the areas surrounding Verona (Veneto) and Trento (Trentino). Other significant sites include Settefinestre and Via della Fattoria near Cosa (Tuscany); Chiarino di Recanati, Colombara di Acqualagna, Monte Torto di Osimo, Cupra Marittima San Basso, and Offida San Giovanni in the central Adriatic region (Marche); Via Nomentana and the Villa dei Gordiani (Lazio); and Scalea (Calabria). Additional remains suggest the presence of similar presses elsewhere across the Italian peninsula. A screw-operated press of this type was likely in use at a winery along the Via Gabinia just outside Rome, dating to the second to third century CE. Additionally, archaeological evidence from Via Cavalotti in Senigallia, including grape seeds and signs of a press, indicates the possibility of wine production in the mid-second century BCE through the first century CE. This further supports the widespread use of such presses across various regions of Italy during the Roman period.[105] Moreover. It is believed to be depicted on a third-century sarcophagus from Aquileia. The image shows two workers turning the handles of a vertical screw, which is connected to a crossbeam at the top.[106]

In conclusion, threading and pressing were essential and distinct stages in the ancient Roman winemaking process. Threading, often performed by foot on specially designed floors, was crucial for gently extracting the juice while preserving its quality. This method yielded the best must, which was considered the highest quality for fermentation. Pressing followed as a secondary step to extract the remaining juice from the pomace, often resulting in a lesser-quality must, yet still valuable for producing more common wines. Both techniques, whether done manually or with the aid of mechanical presses, were central to Roman wine production, demonstrating their sophisticated approach to viticulture and their keen understanding of how to maximize the yield and quality of wine.

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[104] ROSSITER 2008, 98.

[105] DODD 2023. P. 95-96

[106] ROSSITER 2008, P. 103.

III.3. Fermentation and storage

Once the grapes were trodden or pressed, the must was channeled through a network of pipes or channels, the complexity of which varied depending on the scale of the installation. At smaller sites, the must would flow directly into a vat, often lined with *cocciopesto* or a similar waterproof material, or into a dolium. In larger, more sophisticated facilities, the must would first be collected in intermediate vats, where sediment could settle, and primary fermentation could begin. From there, the liquid was either ladled, decanted, or channeled into the *cella vinaria*, a specialized storage room, which typically contained multiple *dolia* (*defossa*), a large, rounded earthenware vessel with a wide mouth and flat base, for further clarification, fermentation, and sometimes modification of the wine. *Dolia* were typically arranged parallel to the longer wall of the *cella vinaria*, often buried from half to two-thirds of their height in the soil.[107] Extensive magazines of sunken *dolia* have been discovered at several farm sites, including Casalotto, Gragnano-Carith, Gragnano-Messigno, Oplontis, Scafati-Sinel-li, Villa Magliano, and Vittimose, etc. (Fig.11).[108] In most cases, these magazines can be reasonably associated with wine production at the site.

The *cella vinaria* itself was often part of a larger storage complex that also housed vats for oil and containers for boiled musts, such as the *cella olearia* and *defrutarium*[109]. Ideally, the wine cellar should be situated close to the *torcularium*, or pressing area, for convenience. According to ancient authors, it should be located in the northern or eastern quadrant of the *pars rustica* for optimal temperature and ventilation[110]. It should be positioned far from baths, bakehouses, smokehouses, and other sources of strong odors, particularly those that may negatively affect the wine. Columella even suggests burning incense in the cellar to help preserve the wine's delicate aroma.[111] The winery of the Villa of the Mysteries[112] provides a good example of this arrangement: wine from a combined threading vat and press bed (*forus*) was transferred to a settling vat (*lacus*) and then channeled along a gutter to the *cella vinaria*, where it was stored in *dolia* for fermentation and aging.

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[107] DODD 2023. P. 96

[108] ROSSITER 1981. P. 353; LIMBERDEN KOMAR 2024. P. 85–101

[109] COL. RR 1.6

[110] VITRUVIUS, *ARCH.* 6.6; COLUMELLA, *RR* 1.6; PALLADIUS, 1.18

[111] RR 12.18.28

[112] THURMOND 2017. P, 144

Furthermore, the cellar should be spacious enough to accommodate more than one vintage, enabling extended aging of wines. Varro emphasizes that careful timing in the sale of wines, especially during peak demand, could double the selling price[113]. He also advises that the floor be slightly sloped towards a reservoir to collect any leaked wine, although this practice was not widespread in central Italy, where many cellars were open-air courtyards with sand floors in which dolia were embedded. Both Cato and Palladius[114] recommend purchasing a number of *dolia* beyond the capacity needed for a single vintage, enabling the storage of multiple vintages. Cato recommends[115] having enough *dolia* in a cellar to store the product of at least five vintages, totaling approximately 800 *cullei* (around 416,000 liters or 110,000 gallons). While this seems like an extraordinary amount, it may be a manuscript error.[116]

Columella[117] describes two types of fermentation jars: those embedded in the ground and those free-standing. Once fermentation was complete, the wine was racked into amphorae for storage. He also advises that, a month before the vintage, all the wine-producing equipment should be thoroughly cleaned. Some *dolia* should be repitched, while others should be scrubbed with brine or seawater and left to dry for at least 15 days. This suggests that *dolia* were repitched only when the old pitch had cracked or become brittle; usually, they were simply disinfected with saltwater.[118]

Across much of the Roman Empire, dolia were typically buried up to their rims in the ground, a practice that led to their being known as *dolia defossa*. However, in Hispania, freestanding dolia were common, as supported by both ancient texts and archaeological findings.[119] Wine storage sites featuring these vessels have been discovered throughout Italy and the western Roman provinces, with some of the most famous and best-preserved examples found at the Villa Regina and Pisanella farms in Boscoreale near Pompeii, as well as at the "Villa of Augustus" in Somma Vesuviana. [120]

Due to their immense size, *dolia* could not be crafted on a traditional potter's wheel as most pottery was. Instead, artisans shaped these vessels by coiling clay on a turntable, a technique that

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[113] VARRO, *RR* 1.13

[114] CATO. AGR. 11; PALLADIUS 1.18.

[115] CATO. AGR. 11

[116] THURMOND 2017. P. 167

[117] COL. RR 12.18.5

[118] THURMOND 2017. P. 171

[119] VARRO, *RR* 1.13.6

[120] LIMBERDEN KOMAR 2024. P. 85–101

required time, skill, and a coarse, durable clay. *Dolia* in Roman wineries across Italy varied greatly in capacity, typically holding between 150 and 2000 liters. At Pompeii, two primary sizes of spherical *dolia* were most common, with capacities of around 200 liters and 500–750 liters, while larger *dolia* exhibited even more diversity.[121] This range in size likely reflects functional differences: smaller *dolia* were often used in shops and taverns for food storage and sales, frequently refilled to maintain fresh supplies. Larger dolia, however, were usually found in vineyards and agricultural sites where they served for fermentation, production, and extended storage. These larger vessels were often sealed and opened only when the entire contents were to be used or transferred to amphorae for further storage or transport.

[121] CHEUNG ET AL. 2022. P. 798–814

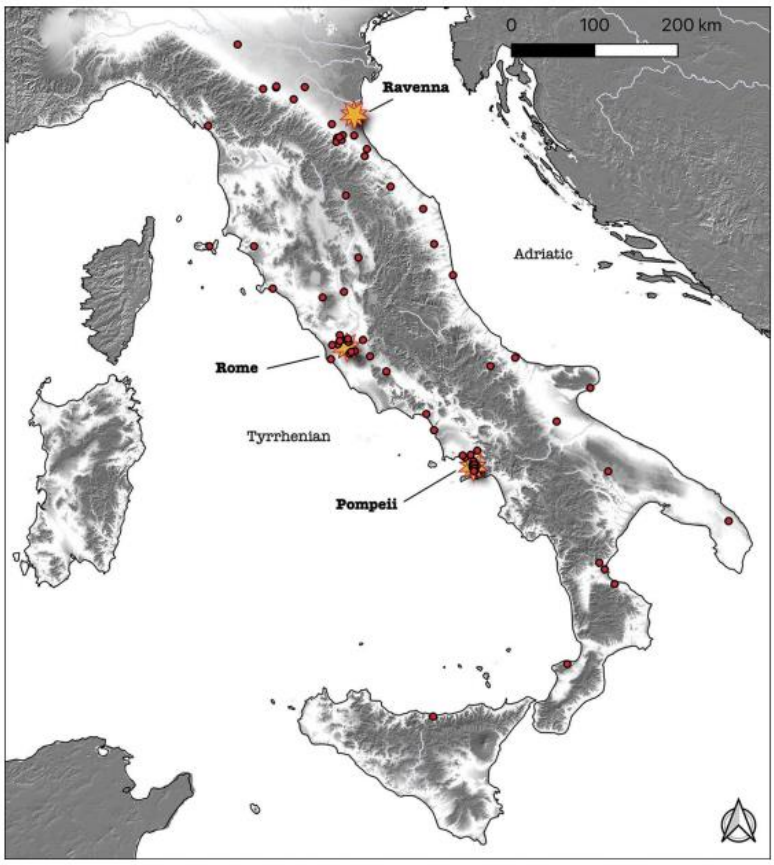

Figure 11. Wine cellars with *dollia defossa* found in Italy (Limbergen, Komar 2024, fig.1).

Figure 12. Wine cellars with *dolia defossa* in: a) Pompeii, b) Boscoreale (photographs by E. Dodd); c) Tortoreto Muracche (Abruzzo) (photograph by Fr. Pizzimenti) (Limbergen, Komar 2024, fig.2).

The initial stage of fermentation, known as the vigorous or tumultuous phase, generally lasted from nine to 30 days.[122] During this period, the dolia remained open to facilitate the intense conversion of sugars into alcohol. Once this stage concluded, fresh must was added to fill the vessels and minimize exposure to air, and the containers were sealed with either a plaster-coated terracotta disc, a wooden lid, or even animal skins.[123] As Varro[124] noted, sealing the *dolia* required careful timing – sealing too soon may have led to carbon dioxide buildup, causing the vessels to crack from the pressure. Once properly sealed, wine would generally age in the dolia for about five to six months, with reopening typically taking place around the spring equinox. Meanwhile, archaeological discoveries at Villa Regina and Pisanella have shown evidence of a double-sealing technique, where a second domed ceramic lid (*tectorium*) was added for extra protection.[125]

Pliny noted[126] that burying *dolia* offered protection against temperature swings. Positioning these earthenware containers underground helped to maintain a consistent internal temperature, providing optimal conditions for both fermentation and aging year-round. The fermentation temperature is closely influenced by the size of the vessel, affecting not only the speed of the process but also the wine's final qualities.[127] Warmer temperatures speed up fermentation and enhance the extraction of color and tannins, while cooler temperatures slow the process and promote the development of fruity aromas. This allowed winemakers to choose different vessel sizes based on their preferred fermentation approach and desired wine style.

Apart from *dolia*, Roman winemakers used various other ceramic vessels, with the *seria* being particularly noteworthy. The *seria* resembled the shape of the larger *dolium* but had a significantly smaller capacity.[128] According to Columella[129], a standard *seria* could hold around 7 amphorae (approximately 182 liters or 48 gallons), which is about a quarter of the size of a typical *dolium*. He also refers to an even smaller variant known as the *seriola*. During times of abundant

[122] LIMBERDEN KOMAR 2024. P. 90

[123] COL. RR. 12.28.3, 12.39.2

[124] VARO, RR 1.13.6

[125] LIMBERDEN D. V., KOMAR P. 2024. P. 90

[126] PLINY, NAT. HIST. 14.27

[127] LIMBERDEN D. V., KOMAR P. 2024. P. 93

[128] THURMOND 2017. P. 167

[129] COL. RR. 12.28

harvest, some villa estates opted for a cement basin (*lacus*) set into the floor of the cellar for additional storage[130]. Pliny mentions[131] a vintner who, in lean years, had to resort to storing his fresh wine in a *piscina,* a water tank.

The placement, structure, and size of *cellae vinariae* and fermentation facilities varied widely throughout Roman Italy, influenced by factors like climate, socioeconomic status, and intended use. In the warm climates of Campania and Apulia, rows of sunken fermentation dolia were often kept in (semi-)open-air spaces, while in Etruria further north, they were housed within large storage buildings. In the southern regions, double-layered locking lids were employed to shield the dolia from the elements and maintain a stable environment for fermentation.[132]

In Roman times, bottling methods were similar to modern practices, though different materials were used. For fine wines, the Romans used amphorae or *cadi* as their primary containers. Amphorae could either be purchased from local or regional workshops or produced directly on the estate, much like the large dolia. Some villas, such as the Stabian Villa of Fondo Bracaccio, contained large quantities of amphorae, indicating that bottling took place on-site. In estates like Fondo d'Acunzo and Villa XVIII in Stabia, proximity to public roads allowed for the establishment of a *caupona* (an inn or tavern) on the property, where estate wine could be sold retail directly from large storage vessels. At other sites, such as the Villa Regina in Boscoreale, the absence of amphorae suggests that wine was sold wholesale to merchants, who likely transported it in leather skins or large containers like *utres* and *cullei* for delivery to urban markets.[133]

To sum up, the Roman winemaking process was a highly organized and diverse practice that involved careful planning, the use of specialized equipment, and a deep understanding of fermentation and storage conditions. The construction and arrangement of facilities, such as the *cella vinaria*, and the use of *dolia* for fermentation, clearly demonstrate the importance of maintaining optimal conditions for wine production and aging. Different techniques, such as double-sealing and the use of varied vessel sizes, allowed for flexibility in winemaking across different regions and climates of the Empire. The incorporation of barrels, animal skins, and smaller ceramic vessels also highlights the Romans' adaptability in wine transport and storage.

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[130] CATO, *AGR.* 67

[131] PLINY. NAT. HIST. NH 18.319

[132] DODD 2023, P. 98

[133] THURMOND 2017. P. 204

III.3. Late wine production centers

Both archaeological and written sources seem to prove the continuation of large-scale wine production in Late Antiquity in Italy. Wineries that can be definitively attributed to the Late Antiquity period have yet to be fully excavated. The majority of identified Late Antique wineries were originally established during the Early Imperial era and remained in use throughout subsequent centuries. However, some information on wine-making in the Late Antiquity can be craved.

Cassiodorus[134] in the sixth century mentions an excellent wine that comes from Istria. Istria as a region seems to become by the time of the Late Empire one of the biggest centers of wine production in Italy. The archaeological evidence of the Late Antique wine-making process comes from the island of Brijuni off the coast of Istria. The Roman villas with "industrial" facilities found there are mostly dated to the Early Imperial period but were still in use in Late Antiquity. One villa at Verige Bay featured a sizable winery containing an elevated brick platform, which served for both grape threading and pressing, a cut stone channel, and a mortar-lined tank, from which the primary liquid was distributed to jars in the cellar for fermentation. Similar layouts have been found at nearby villas in Kolci and Castrum, with multiple presses in Kolci and additional press rooms in Castrum.[135]

The sixth century CE seems to be a time of transition from full-scale production of wine for commercial realization in the Roman Empire to localized production for domestic use.[136] It is impossible to argue the fact that in the fifth and sixth centuries, a significant number of Roman villas were abandoned, re-configured, or transferred to the ownership of the Church or Gothic owners. The impact of this transformation on winemaking is unclear yet. However, studies of wine amphorae, particularly an Italian type Keay 52, have shown that the fifth and sixth centuries were a time of active wine trade from southern Italy. The trade took place both within Italy and, in smaller quantities, outside Italy, for example to Constantinople.[137]

One of the main centers of wine production in the fifth and sixth centuries of Italy, as evidenced by written and archaeological sources, is Calabria. There were located the production centers of the amphorae of Keay 52 type, which were used for the transportation of wine. In addition, wineries of this time have been found in Calabria, concentrated particularly in the Ferruzzano

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[134] CASSIOD. *VAR.* 12.22.1–3, 12.26.3

[135] ROSSITER 2008. P. 107

[136] DODD 2022. P. 473

[137] ROSSITER 2008. P. 114

area. They consist of vats, usually made by excavating the rock or by building masonry. Each winery consisted of two vats communicating through an opening: grapes were crushed in the upper one and liquids together with the pulp were poured after 24–48 hours into the lower vat where the pulp was pressed. The wine thus obtained went into tanks, where it was left to ferment and then poured into some jars or wine amphorae.[138]

Another evidence of Late Antique wine production comes from Campania, where archaeologists have uncovered a wine-making facility at the site of the so-called "Augustus Villa" in Somma Vesuviana. The installation includes three distinct vats: the western and eastern vats are large and shallow, while the northern vat is deeper and narrower. A connecting channel links the eastern vat to the northern one, enabling the transfer of liquid between them. Additionally, seventeen *dolia* for wine storage were found at the site, demonstrating quite a large-scale production of wine. This entire setup has been dated to the latter half of the fourth century.[139]

A unique winery dated to the fourth century was found at San Giusto in Apulia. It contained two wine presses, both mounted on circular, tile-flagged platforms. These were probably straight screw presses. Pipes under the press platform diverted the liquid from it to a large collecting tank (*lacus*) located in an adjacent wine cellar. In the fifth century, the winery at San Giusto was repaved. It was also modified with a new funnel device and a wine collection tank installed next to one of the presses.[140]

Moreover, in the Late Antiquity grape, wine and wine-producing processes became one of the most common motifs in art due to the important role of wine in Christianity.[141] It has been mentioned above the presence of illustrations of vintage process, threading and wine-pressing on the mosaic from the Mausoleum of Constantia and so-called Contantia's sarcophagus, as well as on the mosaics of the villa at Piazza Armerina in Sicily and sarcophagus from Aquileia.

Concluding the discussion above, it remains to consider that even though Late Antiquity was a time of transformation of Roman society, wine production in Italy kept its ancient traditions. Although the archaeological data on this issue are not yet significant, it is evident that in the fourth and the sixth centuries wine production was maintained for both domestic and commercial purposes. The winemaking process consisted of harvesting, initial threading, pressing of the resulting

[138] FILOCAMO 2006. P. 92

[139] PECCI 2013. P. 4493

[140] ROSSITER 2008. P. 109

[141] DODD 2022. P. 460

pulp, and fermentation of the retained liquid in large tanks. These stages of winemaking are reflected in numerous mosaics, and sculptural reliefs on sarcophagi, and are also confirmed by excavations of wineries.

In summary, wine production was a cornerstone of ancient Roman agriculture, deeply integrated into the social, economic, and cultural life. Roman innovations in grape cultivation, including precise techniques for soil preparation, vine spacing, and the use of specialized tools, showcase a sophisticated approach to viticulture that was initially centered in Italy but later expanded across the provinces. The dual processes of threading and pressing, along with careful fermentation and storage practices, reveal the Romans' advanced understanding of winemaking. They utilized specialized facilities and equipment, such as mechanical press, *cella vinaria,* and *dolia*, and implemented diverse methods for maintaining and transporting wine, adapting their techniques across varied climates and regional demands. Even through the shifts of Late Antiquity, Roman wine production retained its traditional methods, serving both domestic and commercial markets. Ultimately, these practices not only highlighted the Romans' agricultural expertise but also laid enduring foundations for Mediterranean winemaking.

Chapter IV. Tradition of wine consumption

In ancient societies, wine was far more than a mere beverage; it was a fundamental element of daily life, deeply intertwined with dietary, medicinal, social, and ritual practices. From as early as the second millennium BCE, wine began to hold a prominent place in the food systems of the populations along the northern Mediterranean coast. By the time of ancient Rome, it had become a central component of the dietary triad, alongside staples such as bread and olive oil.[142]

The wine was widely believed to provide physical strength and vitality, and its nutritional significance was well recognized. In addition to its dietary importance, wine was extensively utilized for its medicinal properties. Its use in wound cleaning and water purification highlights the ancient understanding of its antimicrobial qualities. Beyond its dietary and medicinal uses, wine played a crucial role in the social and ritual life of the Mediterranean. It was a central feature at religious ceremonies, festivals, and social gatherings. The wine was an essential part of the *symposia* or Roman *convivia* – banquets where it facilitated social interaction, intellectual discourse, and entertainment. At religious festivals, wine was often offered as a libation to the gods, symbolizing piety and divine favor. The Dionysian and Bacchanalian festivals, dedicated to the gods of wine, celebrated the intoxicating and liberating effects of wine, reinforcing its cultural and spiritual significance.

Wine held a significant place in the Roman world, primarily due to its unique combination of affordability, versatility, and pleasurable taste, making it a staple in the daily lives of many. One of the key factors behind its popularity was its relatively low cost.[143] Unlike many other food and drink options of the time, wine was widely accessible, making it a practical choice for people across various social classes. The combination of good taste, mood-enhancing properties, and practicality made wine a favored choice in the Roman diet, cementing its status as a beloved and indispensable part of daily life in antiquity.

Due to the significant role of wine in both the economy and cultural practices of ancient Roman society, this chapter focuses on examining the key aspects of its consumption. It explores how wine was made accessible to the inhabitants of ancient Italy, evaluates its quality, and analyzes the quantities consumed as well as the various social and ceremonial contexts in which it was typically enjoyed.

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[142] LIMBERGEN 2018. P. 3

[143] THURMOND 2017. P. 15

IV.1. Wine distribution

Most Roman wine was locally produced and often consumed near its origin, with short-term storage and transport commonly managed using animal hides or smaller ceramic vessels. Barrels and large skins, known as *cullei* (Fig. 14.2), played a vital role in the storage and movement of wine, particularly suited to specific regions, markets, and trade needs. Barrels, in particular, saw a growing presence in the central and western Mediterranean from the first century BCE onward. Although few barrels or skins survive archaeologically, Roman art offers insights into their use and design. A wall painting in Pompeii's region VI.10.1, for instance, depicts men transferring wine from a *culleus* on a horse-drawn cart into amphorae (Fig.13), while a sculpture from the Nymphaeum of Claudius at Baiae shows a smaller wine-filled skin. Additional examples, such as a bas-relief from Nona on the Via Praenestina and another from Minturnae, now housed in the British Museum, depict *cullei* transported by ox-drawn carts. As barrels became more prevalent in northern Italy, their use gradually overtook amphorae in some areas. This transition, seen through the disappearance of certain amphora types by the first or second century CE, likely reflects the barrel's practical advantages rather than a decline in winemaking.[144] By the late Empire, Rome's wine port featured an unloading station known as the Ciconiae Nixae, or "The Leaning Storks", named for the cranes employed to offload cargo. By the fourth century, barrels had become a common method for both transporting and storing wine, not only in the Gallic regions where they originated but throughout much of the Empire. One can envision barrels being lifted and lowered through ship hatches by derricks, much like modern-day practices. Additionally, it is known that dolia were used for wine transport in Gaul as early as the first century BCE, suggesting that similar

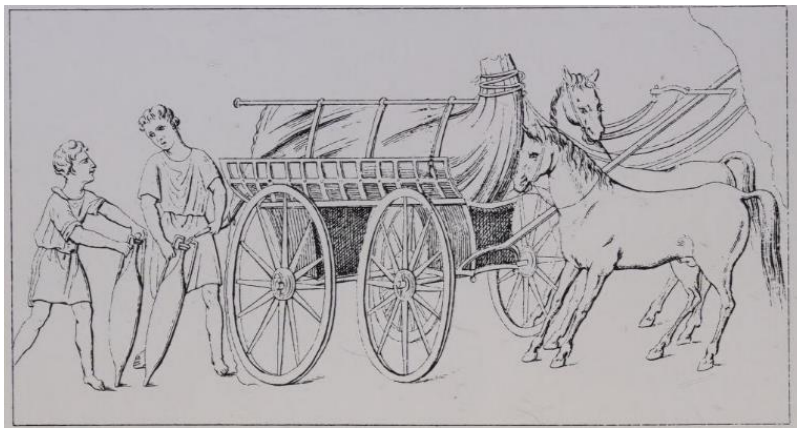

Figure 13. A drawing of a wall painting from Pompei depicting a transportation of wine in the *culleus* (Jashemski 1979, fig. 326).

[144] DODD 2023. P. 100

crane systems may have been employed there as well, and potentially in Ostia and Rome, if not from the outset.[145]

Some information is known about the delivery system of wine to the consumers themselves. It seems like the distribution of wine to consumers was facilitated through a system reliant on specialized containers and labor. Apart from *cullei* mentioned above, the amphorae were in use for this reason as well (Fig.14.1). These amphorae were delivered by porters using this method: a long pole was inserted through one handle (or "ear") of one or more amphorae, with the ends of the pole placed on their shoulders for easier transportation (Fig. 14.3). Such a scene is depicted in a wine merchant's residence and shop in Pompeii (IX.ix.6-7) on the Via di Nola,[146] located conveniently close to the Porta di Nola for receiving deliveries from the surrounding rural areas.

Excavations of the shop itself uncovered[147] a substantial collection of amphorae: 114 in total, with 63 bearing stamps. An additional 42 amphorae were found in the shared garden, while 29 empty vessels were stored upside down in a small adjacent room, indicating their reuse. Several labels on the amphorae confirmed that they had been repurposed. Inside the shop, five amphorae were neatly arranged, suggesting bulk sales rather than by-the-cup retail, especially given the absence of a typical street counter. It is possible, however, that wine may have been served in the atrium of the merchant's house. Among the discovered wines were varieties of high repute, including an amphora of the esteemed Falernian wine, two Surrentine wines, and a Lampha (or Lympha), a clear white wine produced on the slopes of Vesuvius. Additionally, the presence of a dolium (large storage vessel) and several vine roots in the garden indicates that some wine production may have occurred on-site, supplementing the merchant's stock.

[145] THURMOND 2017. P. 215

[146] JASHEMSKI 1979. P. 221

[147] THURMOND 2017. P. 210

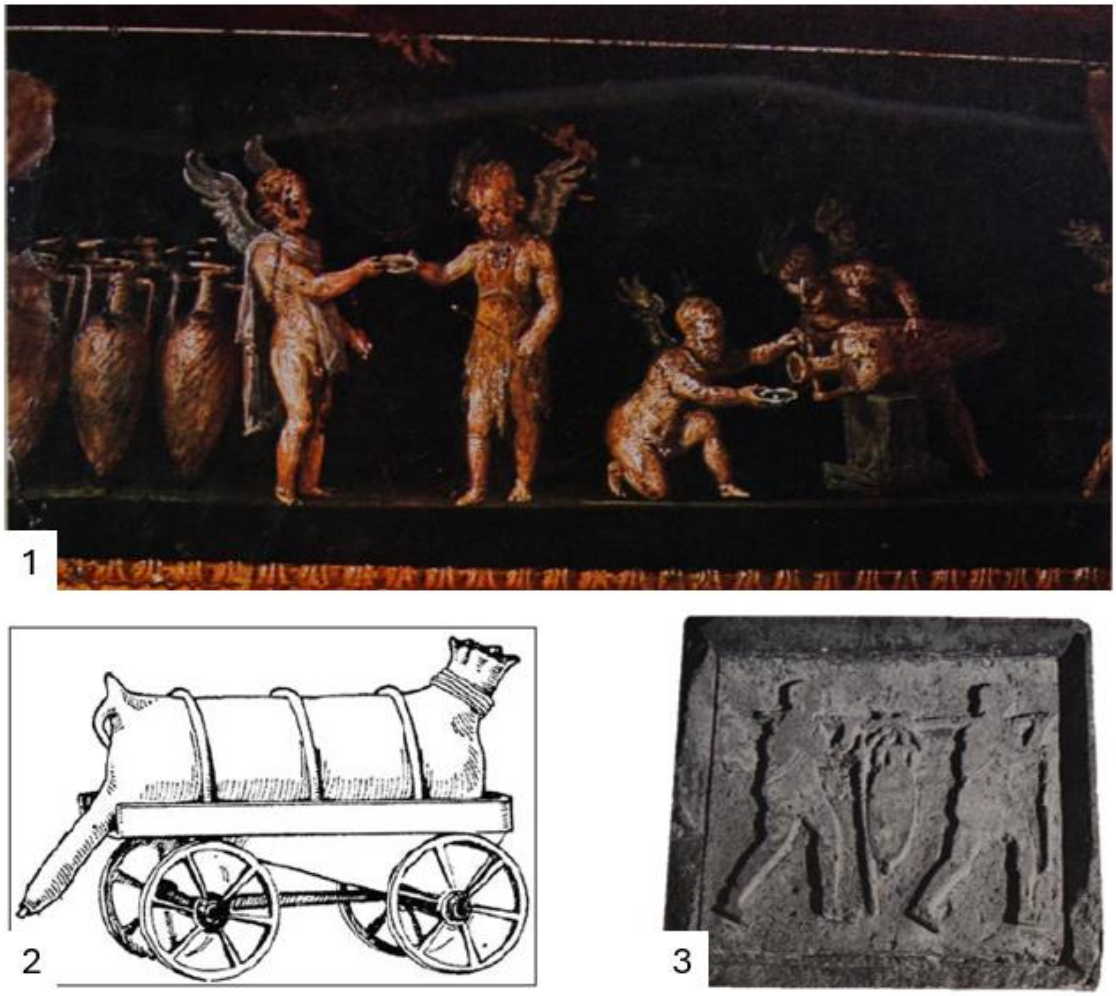

Figure 4. Wine distribution and delivery: 1) wall painting from the House of Vettii, Pompei (Jashemski 1979, fig. 328); 2) a drawing of the *culleus* (Thurmond 2017, fig. 32); 3) Wine porters on a shop sign from Pompei (Jashemski 1979, fig. 329)

Speaking of a wine trade to private consumers in ancient Rome, a valuable iconographic representation of the ancient wholesale wine trade is preserved in a marble bas-relief from the catacombs of ex-Vigna Chiaraviglio, part of the Catacombs of Callistus, located approximately three kilometers from Rome along the Appian Way.[148] The relief shows a well-stocked shop with rows of amphorae stacked against the back wall. A young man pours wine from an amphora into a krater, using a tall podium (likely an *incitega*) to control the heavy vessel, while an older customer signals to stop the flow and holds a sack of coins, suggesting a customary sampling before purchase. Nearby, a wicker stand holds an *urceus* and a shelf displays a beaker, ladle, and bowl, typical tools for serving. The proprietress, seated behind a counter, receives a beaker from a young

[148] THURMOND 2017. P. 216-217

assistant, with a *tintinnabulum* (small bell) featuring Mercury's head above her, symbolizing commerce. Coins are clearly displayed on the bench, indicating active transactions. To her left, a woman returns from overseeing deliveries, offering a sack of coins while a small dog, the shop's mascot, leaps at her. Two men in short tunics and leather bands are seen carrying amphorae on their shoulders, showcasing the labor involved. The entire scene conveys a vivid image of a bustling and prosperous wine trade operation.

Another example of a detailed depiction of an ancient retail wine shop is found on a funerary relief (Fig. 15) now housed in the Archaeological Museum of Dijon[149]. The relief illustrates a man and a woman, likely a husband and wife team, serving wine from a high counter to a group of four customers standing below. Two basins are visible on the counter, each fitted with a drain that leads to a funnel extending beneath it. In the scene, a child holds a wineskin under one funnel, while a young man holds a *lagoena,* flagon, under the other, ready to receive wine. The process depicted suggests a standardized method of measuring and dispensing wine. A specific quantity of wine would be poured into the stoppered basin from a standard-sized serving vessel. Once the stopper was removed, the wine would flow directly into the customer's container, ensuring consistent measures. Behind the counter, a shelf displays several of these standardized vessels, likely *sextarii* based on their size, which were commonly used as measuring units. To the right of the scene, an *uter*, a large wineskin, is shown being handed between the woman and a young assistant, indicating the transfer of bulk wine. The depiction aligns with similar scenes on other funerary monuments, where small measuring jugs are also shown. In both cases, the vendor pours wine into a basin, and the customers hold their pitchers beneath the funnel to receive their purchase.

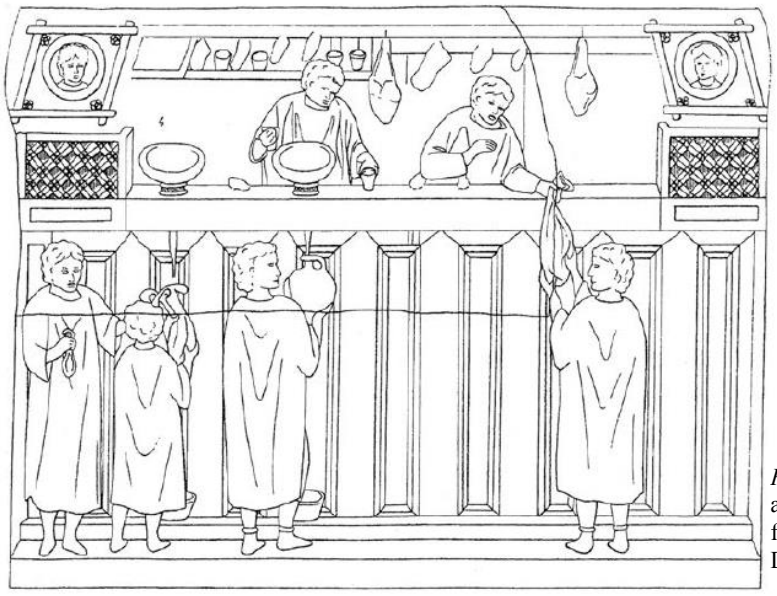

Figure 15. Drawing by C. Touzel of a wine shop on a funerary monument from the archaeological museum in Dijon (Thurmond 2017, fig. 217).

[149] THURMOND 2017. P. 218

Archaeological discoveries of Roman wineshops, or *popinae*, across Italy offer insights into their common features and importance to daily life in ancient urban centers. Found predominantly in cities like Pompeii[150], Herculaneum[151], and Ostia[152], these establishments typically featured large counters embedded with *dolia* where wine was stored and served directly to patrons. The counters were often stone-covered, with built-in shelving for cups and small bowls, while many *popinae* also included frescoes or mosaic decorations depicting food, drink, or humorous scenes, creating a lively and inviting atmosphere. In Pompeii, nearly every block had its own tavern, which reflects the high demand for social drinking spots. These Pompeian taverns were usually small with simple decor, open to the street, and often equipped with benches or tables for patrons to linger. Larger versions, like those in Ostia, were more complex; some featured inner courtyards, separated dining spaces, and more sophisticated decorations, indicating a shift toward more structured dining environments under imperial influence. Ostian taverns often show evidence of cooking facilities as well, suggesting that they served as *thermopolia,* "hot-food bars", in addition to wine shops.

In addition, the free distribution of wine played a significant role in popularizing its consumption across various social strata. Such distributions often occurred through a patron-client relationship, where a wealthy benefactor provided wine to his dependents, or even to entire communities. This practice of largesse helped to establish and spread the taste for wine, introducing what were previously considered urban luxuries to the poorer inhabitants of Roman towns. Notably, the distribution of *crustulum*, pastries, and *mulsum*, wine sweetened with honey, was a well-documented tradition[153], though a comprehensive modern study on these distributions remains lacking. The generosity of affluent benefactors extended beyond individual patronage; it also took the form of public feasts, such as the *cena* or *epulum*, where entire communities were invited to partake. Numerous inscriptions record these events, often organized by wealthy citizens as a display of civic virtue. At Amiternum, for example, a relief depicts such a scene: reclining dignitaries partaking in a *cena* on the left, while lower-ranking officials or Augustales are seated on the right

[150] LASHEMSKI 1979. P. 221–226

[151] KLEBERG 1957. P. 44–45

[152] HERMANSEN 1981. P. 125-184

[153] PURCELL 1985. P. 14

at an *epulum*. This visual representation aligns with inscriptional terms like reclining diners *discumbentibus*, seated diners *vescentibus*, and general public enjoying a picnic-style meal *epulantibus*.[154]

In parallel, the rise of *collegia* – associations of the urban poor – further facilitated the spread of wine culture. These groups frequently gathered for communal meals where wine was a central feature, reinforcing the social bond through shared drinking. Philostratus even associates such gatherings with instances of public disorder in Eastern cities, highlighting the strong link between wine and social activity. Moreover, the large-scale wine trade of the first century BCE, particularly the distribution of Dressel II-IV amphorae geared towards provisioning the Roman legions, contributed to the diffusion of wine culture among soldiers,[155] further spreading the taste for wine as they returned to civilian life.

In conclusion, the archaeological and artistic record of ancient Roman wineshops, wine trade, and distribution practices paints a vivid picture of wine's deep integration into Roman daily life and urban culture. From wine shops and taverns to the public feasts and meals of *collegia*, these elements reveal how wine became a staple for all social classes.

IV.2. Quantity and quality

Wine held a central place in the daily lives of ancient Romans, across all social strata. It's estimated that the average person in antiquity consumed around half a liter of wine daily.[156] This amount may appear high by modern standards, but Roman wine often served various purposes, including hydration, calorie intake, and as a safer alternative to potentially contaminated water. Unlike today's wine, Roman varieties were much stronger and denser in calories, resembling modern Italian *passito* or even fortified wines like port, which contain around 900 to 1650 calories per liter.[157]

Cato the Elder[158] allocated approximately 25 liters of wine per slave annually, distributed irregularly: while certain major festivals allotted as much as 11 liters, other months provided only diluted grape-wash. Although generous by post-classical standards, this ration highlights the value

[154] DUNBABIN 2003. P. 72–83

[155] THURMOND 2017. P. 239

[156] LIMBERGEN 2018. P. 1052

[157] *Ibid.* P. 1061

[158] CATO. AGR. 57

placed on wine as a source of sustenance and energy. However, it should be noted that the alcohol content of Roman wine is not known nowadays.[159] Moreover, Cato says about 7 "amphorae" for each slave, and even though "amphora" was a standard measure in Rome and it was calculated by researchers as approximately 25 liters, the real amount cannot be measured as amphorae sizes and capacities varied in different centers of production.[160]

Romans seldom drank wine undiluted. Diluting wine with water was customary and varied from a modest 50/50 mix, providing around 100–400 calories, to heavier dilutions, a practice rooted in both cultural norms and concerns about health and sobriety.[161] Drinking undiluted wine was generally frowned upon, and deemed both unhealthy and uncivilized. Physicians of the time, including Hippocrates[162], often recommended moderate, diluted wine consumption for health, even in small amounts for children.

For Roman elites, the act of diluting wine was more than a mere preference; it was a refined practice steeped in cultural symbolism and rooted in traditions passed down from the Greeks. The Romans approached wine dilution with a carefully considered "cultural chemistry", mixing varying amounts of water – and sometimes other substances like seawater – to adjust the wine's potency and establish its place in a meal's ritual.[163] This intricate system of dilution carried social implications, subtly signaling the status of the diners and the occasion itself. The principles governing this practice drew from ancient physics, which viewed food and drink in terms of the balance of elemental qualities like hot and cold, or wet and dry. Water was not seen as a mere neutral diluent but as a substance with its own complexity, contributing to the overall character of the drink.

Roman wine customs also included additional refinements, particularly among the wealthy. One such practice, which Pliny the Elder criticized[164], was the custom of consuming an apéritif before meals, a trend that gained popularity during Tiberius's reign. Roman elites even adapted their wine to seasonal preferences, warming it in winter and chilling it in summer. The wine was typically decanted from large storage vessels, or amphorae, into a krater, a large mixing bowl often

[159] PURCELL 1985. P. 14

[160] THURMOND 2017. P. 215

[161] LIMBERGEN 2018. P. 1061

[162] HIPPOCRATES, *AER.* 9, 2.40, 5–7

[163] PURCELL 1994.

[164] PLINY. NAT.HIST. 14.148

made of ceramic or bronze, where it was diluted with water. From the krater, the mixture was ladled into wine flagons and finally poured into a variety of drinking cups.[165]

The Roman wine market offered a range of quality, catering to both elite tastes and the demands of ordinary people. On the high end were premium vintages like Falernian and Caecuban wines, which Pliny praises as the "Grand Cru" of Roman wines[166]. Lower-cost options included *mulsum*, which Columella's recipe describes[167] as a sweet, highly caloric blend of must, honey, and spices. A large portion of common wine was inexpensive, made from the leftovers of grape pressing, and often mixed with water. These affordable options were accessible to the lower classes and served in local shops, including the *thermopolium* on Pompeii's Via degli Augustali, where the menu offered basic wine for an as, a mid-tier wine for two asses, and a cup of the finest Falernian for four asses.[168] Common among soldiers was *posca*, a vinegar-like drink made from soured wine mixed with water and herbs, providing a low-cost, hydrating alternative for those on the front lines.

Roman vintners also crafted wines of diverse colors and flavors, from light white, *album*, and tawny, *fulvum*, to rich red, *sanguineum*, and even deep black, *nigrum*, as Pliny details[169]. This variety allowed for a broad spectrum of wine experiences, further reflecting the Romans' sophisticated and ritualized approach to wine and its consumption across social classes.[170]

Despite wine's popularity in Roman society, excessive drinking was generally discouraged, with habitual drunkenness regarded as a vice and sometimes even morally condemned.[171] Ancient sources, including Hippocrates and other writers, spoke against overindulgence, associating it with physical and moral decline. Pliny the Elder offers[172] a vivid account of the ill effects of excessive drinking: he describes how drunkards never see the dawn, thus reducing their lifespan. He notes the signs of heavy drinking – pale faces, sagging cheeks, bloodshot eyes, trembling hands that struggle to hold anything steady, and the restless nights marked by nightmares. In Pliny's view, drunkenness brings with it not only physical debilitation but also leads to reckless behavior and a

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[165] THURMOND 2017. P. 232

[166] PLINY. NAT, HIST. 14.80

[167] COL. RR. XII, 41

[168] THURMNOD 2017. P. 232

[169] PLINY. NAT. HIST. 14.80

[170] THURMOND 2017, P. 153

[171] LIMBERGEN 2016.

[172] PLINY. NAT. HIST. 14.141-142

loss of self-restraint. He describes how drinkers awaken the next day with wine-soured breath and a blank memory of the night before, a sort of death of the mind. Pliny goes on to list notorious heavy drinkers from history, concluding with the triumvir Marcus Antonius, who was rumored to have documented his own exploits with drink in a book about his own drunkenness.[173]

Concerns over the negative effects of drunkenness extended beyond Pliny, as other ancient writers also warned against its impact on health and bodily functions. Caelius Aurelianus, for example, noted[174] that excessive drinking could impair the retention of semen and disrupt digestion in the days following conception, causing violent or distressing bodily responses to nourishment. During pregnancy, he observed that drunkenness could worsen a condition known as *kissa* in Greek, characterized by alternating cravings and aversions to certain foods. These observations contributed to a wider discourse on the physical and moral pitfalls of excessive drinking in ancient thought.

Roman society's discourse on social morality extended beyond written literature, finding expression in the decorative themes of both elite residences and public spaces. Statues and artwork often illustrated themes of moderation and excess, reflecting society's moral boundaries. One notable statue type, inspired by earlier Greek art and found in several Roman contexts, depicts an elderly woman, elegantly dressed yet visibly drunk, clutching a decorated wine jar[175]. This image belongs to a broader array of visual and literary portrayals that captured figures at the edges of social propriety. In the theater, for example, Terence's *Andria* includes[176] a scene featuring the drunken Lesbia, serving as a character study on the fringes of acceptable behavior.

To sum up, wine was central to Roman life, serving both nutritional and social functions. Daily consumption averaged half a liter per person, and wine quality varied greatly across social classes. Elite Romans prized prestigious vintages like Falernian, carefully diluted to emphasize refinement and social status, while everyday wines, often sold cheaply in local shops, catered to the general populace. Wine-based drinks like *mulsum* and *posca* provided accessible nourishment for lower classes and soldiers. Roman wines came in varied colors and strengths, reflecting their advanced winemaking techniques and appreciation for diversity in flavor and potency. Altogether,

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[173] GOUREVITCH. DEMIGNEUX 2013. P. 73–87.

[174] CAELIUS AURELIANUS, *GYNAECIA,* I 59, 493; 60, 507; 67, 571-2

[175] PURCELL 1994. P. 195–201

[176] *Ibid*.

Roman wine culture showcased a sophisticated balance between quantity, quality, and social significance.

IV.3. Wine festivals and social drinking

The scholarship on Roman cults and festivals is abundant. For this reason, the focus here will be on the consumption of wine itself as a separate part of Roman religious and cultic life.

In Roman society, wine held a significant place not only as a prestigious product at public feasts and holidays but also as an integral component of both household and state religious rituals. The wine was commonly used in libations, a practice in which a portion of the wine was poured as an offering to the gods, reflecting its symbolic value in seeking divine favor. Such offerings were made both in private domestic settings and during public ceremonies, highlighting wine's role as a bridge between daily life and the sacred sphere.[177]

Among the numerous Roman festivals, two were particularly centered around the vine and its produce: the *Vinalia Urbana* and the *Vinalia Rustica*. The *Vinalia Urbana*[178], celebrated on April 23, marked the beginning of the vine's critical growth phase, particularly the flowering and fruit setting. This festival was dedicated to Jupiter, the god of weather, whose favorable conditions were essential at this stage of the vine cycle. During the celebrations, the vintage wine from the previous autumn – *vinum spurcum* – was tapped for the first time, signifying the culmination of the winemaking process and the beginning of its public enjoyment.

The *Vinalia Rustica*, held on August 19, focused on the grape harvest and the subsequent process of vinification. This festival was jointly dedicated to Jupiter and Venus Obsequens, an archaic form of Venus associated with cultivated crops. Here, Venus's role is particularly intriguing; though traditionally a goddess of gardens (*horti*), she became linked to viticulture over time due to her association with land cultivation. During the festival, the Flamen Dialis, Jupiter's high priest, would ceremonially pick the first cluster of grapes, bless the harvest, and perform sacrificial rites to ensure a successful vintage.[179]

While the distinction between the two festivals as *Vinalia priora* (Urbana) and *Vinalia altera* (Rustica) is not found in the official Roman calendar, it is frequently noted in antiquarian

[177] THURMOND 2017. P. 219

[178] PLINY. NAT. HIST. 18.287

[179] THURMOND 2017. P. 219

literature, suggesting that this terminology was well-known among the priests and likely recognized by the broader populace.[180] Over time, Venus's association with the *Vinalia Rustica* grew stronger, as evidenced by the celebration of the *Natalis* (anniversary) of two Venus temples on the same date. One such temple, located near the Circus Maximus and consecrated in 295 BCE by Q. Fabius Gurges, became increasingly prominent, overshadowing the original focus on Jupiter. This shift reflects the evolving nature of the festival and the increasing importance of Venus as a symbol of fertility and cultivation.[181] Interestingly, by the time of Plutarch's writings, the festivals were no longer referred to as the *Vinalia*, but rather as the *Veneralia*,[182] emphasizing the dominant role of Venus in these celebrations. This transformation highlights the dynamic relationship between religious practice and agricultural cycles in ancient Rome, with wine consumption and its associated rituals playing a central role in both the social and spiritual life of the city.

Although the use of wine in religious contexts was nearly universal, there were notable exceptions that serve to highlight the typical prevalence of this practice. For instance, the cult of *Mercurius Sobrius* (Sober Mercury) in the city of Rome explicitly eschewed the use of wine, emphasizing temperance within its worship. Additionally, an early Roman legal provision, cited by Pliny the Elder[183], prohibited the pouring of wine onto funeral pyres. This prohibition was likely intended as a sumptuary measure, aimed at curbing excessive displays of wealth and indulgence during funerary rites.[184] Such restrictions, however, are rare and underscore the norm rather than contradict it, as they demonstrate how the use of wine was otherwise deeply ingrained in ritual contexts across Roman religious practice.

Another aspect of social drinking in Roman Italy was banqueting. In the late Republic and early Empire, public banquets funded by state officials emerged as a prominent social institution, reflecting the evolving relationship between political power and public spectacle in Roman society.[185] These events, which often involved lavish displays of wealth and hospitality, were designed to solidify the status of their sponsors and to foster communal solidarity. One notable example is Julius Caesar's grand banquet held in celebration of his Spanish triumph in 60 BCE, where he provided each table with amphorae of prized Falernian and Chian wines. He repeated this gesture

[180] BÖMER 1941. P. 30-58.

[181] PLUTARCH. R. 45

[182] BÖMER 1941. P. 38.

[183] PLINY. NAT. HIST. 14.88

[184] PURCELL 1994. P. 199

[185] THURMOND 2017. P. 219

in 46 BCE, during his third consulship, and famously became the first to serve four different grand cru wines at a public feast, a display of opulence that set a precedent for future banquets.[186]

Wine played a crucial role in these public feasts, as well as in the social gatherings such as *convivia*. Early depictions of such gatherings often feature all-male participants, or scenes reminiscent of Greek symposia, where female figures appear as hetaerae, characterized by their revealing attire and suggestive behavior. However, as time progressed, Roman art began to reflect a different kind of social dynamic at these banquets, one influenced by Etruscan customs. Respectable women, portrayed as *matronae*, are increasingly shown participating in these events alongside men, indicating a shift towards a more inclusive and egalitarian form of social engagement.[187]

In the broader context of Roman social and religious life, the exclusion of women from the consumption of wine was not uncommon, paralleling their exclusion from many religious rites, especially those conducted in the public sphere. Generally, both private and public sacrificial rituals were dominated by men, reflecting a gendered division of religious roles. However, women did have a place in certain religious observances, often serving as an essential yet liminal element within the rituals. The Vestal Virgins, for example, held a unique and highly respected position in Roman religion, highlighting the complex interplay between gender and religious authority.[188]

One significant exception to the prohibition of wine for women is found in the cult of the *Bona Dea*, an exclusively female ritual conducted in secret by the wives of Rome's highest magistrates. During these ceremonies, the participants used euphemistic language to describe the ritual objects: the wine-bowl was referred to as a "honey-pot", and the wine itself was called "milk"[189]. This deliberate misnaming points to an awareness of the inherent tension and ambiguity surrounding the consumption of wine by women in a religious context. The use of such deceptive terminology may have been intended to obscure the true nature of the ritual from outsiders and to protect the sanctity of the ceremony. The secrecy and exclusivity of the Bona Dea rites, along with the unconventional participation of women in wine consumption, made these ceremonies a target for satire and moral critique in Roman literature.[190] Cynical and misogynistic accounts often portrayed the women involved as indulging in drunkenness, suggesting that the inversion of social norms in these rituals was a source of unease for the broader society. This tension, however, may have been

[186] PLINY. NAT. HIST. 14.97

[187] THURMOND 2017. P. 237

[188] PURCELL 1994. P. 200

[189] PLUTARCH. R. 6

[190] PURCELL 1994. P. 200

integral to the ritual's effectiveness, emphasizing the sacred nature of the event by deliberately challenging conventional boundaries. Thus, the portrayal of the Bona Dea rites in both historical and literary sources reflects broader societal anxieties about gender, power, and the appropriate contexts for wine consumption in Roman culture.

Despite the prominence of banqueting in Roman culture, certain aspects are notably absent from the visual and monumental records of the time. There are few surviving representations of the banquet in official Roman art, and none depict the emperor as a participant in such feasts. This absence is surprising, given the detailed biographical accounts of imperial feasts and the political utility of the banquet for many emperors. It is possible that scenes of imperial banqueting once adorned wall paintings or mosaics in private palatial settings, but the lack of surviving evidence suggests that these scenes were not a significant feature of the public iconography of the empire. The omission points to a deliberate choice, perhaps reflecting an attempt to distinguish the emperor's public image from the potential associations of excess and indulgence that banquets might convey.[191]

In summary, wine was deeply integrated into Roman religious, social, and political life, serving as a vital link between the sacred and secular. Ritual offerings like the Vinalia festivals highlighted its agricultural and symbolic importance, with wine used to seek divine favor and mark the changing seasons. Public banquets, such as those hosted by Julius Caesar, showcased political power and elite generosity, while also reflecting shifting social norms, including the increasing presence of respectable women. The ambiguity surrounding female participation in wine consumption, especially in rites like the Bona Dea, underscores broader societal anxieties about gender roles and religious authority. The exclusion of banquet imagery from imperial art, despite its political significance, suggests a deliberate effort to portray the emperor as restrained and virtuous. Overall, wine in Roman culture was much more than a mere drink—it was a powerful symbol of wealth, religious devotion, and social cohesion, central to the identity and practices of Roman society.

IV. 4. Wine as the medicine

In Roman society, wine was not only a beverage for enjoyment but also an essential component of medical practice, with its use in health treatments well-documented in ancient texts.

[191] DUNBABIN 2003. P. 72–74

Pliny the Elder encapsulated[192] this medical significance by asserting that two liquids were most beneficial to the human body: wine, which aided internally, and oil, which was used externally. Although this view simplifies the full range of wine's medicinal applications, it reflects the essential roles that wine and oil played in Roman health practices.

The origins of wine's medicinal use in Greco-Roman culture can be traced to Hippocratic physicians, who were among the first to prescribe undiluted wine as a therapeutic substance. Though the Hippocratic writings are generally restrained in their claims about wine's curative powers, wine's popularity is evident in the wide array of ailments for which it was prescribed. Over the centuries, Roman medical thought adapted and expanded upon these practices, identifying three primary medicinal uses for wine: as a disinfectant and astringent, as a remedy for internal ailments, and as an effective base for mixing with other medicinal ingredients.[193]

Internally, wine was believed to offer therapeutic benefits for a variety of ailments, particularly gastrointestinal and digestive disorders. It was regarded as an important part of a healthy diet and often used as an aid in food preparation and digestion.[194] Physicians often recommended small quantities of wine to relieve symptoms like indigestion and abdominal pain, leveraging its mild stimulating effect to soothe discomfort and stimulate appetite. The wine was also thought to warm the body, helping to balance the body's touches of humor – a core aspect of ancient medical theory, which held that health depended on maintaining equilibrium between qualities like hot, cold, wet, and dry.[195] Wine was widely used as a treatment for fevers, a purgative, and a diuretic. For feverish patients, weaker wines were preferred, often mixed with cold water to help lower body temperature. Physicians recommended various preparations, such as white raisin wine, diluted grape wine, sweetened wine, boiled barley water, and an "old Thasian wine," which was especially mild with a blend of 25 parts water to 1 part wine.[196] However, Pliny advised against giving wine to individuals with a fever, except in cases where the patient was elderly or when the symptoms had already started to subside.[197]

One of wine's critical roles was as a disinfectant, particularly for treating wounds. While this use falls outside Pliny's classification of wine as an "internal" aid, it highlights its value in

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[192] PLINY. *NAT. HIST.* 14.29

[193] DONAHUE 2016. P. 611

[194] THURMOND 2017. P. 2

[195] DONAHUE 2016. P. 612

[196] HIPPOCRATIC. *DISEASES* 3.17; CELSIUS 3.14.1–2; 3.15; 3.16

[197] PLINY. NAT. HIST. 23.24

Roman medical procedures. For instance, the second-century physician Galen described soaking exposed abdominal organs in wine before carefully repositioning them in the body, recognizing its role in sterilizing and reducing the risk of infection. This application reveals a sophisticated awareness of wine's astringent properties, which could clean and constrict tissue, facilitating wound closure and preventing contamination.[198] Apparently, Galen specifically mentioned[199] several Italian wines, such as Gaurianos, Albanos, and Neapolites, as well as Asian varieties like Tibenos, Arsyenos, and Titakadzenos as those that help to remain healthy. He noted that many wines from the Mediterranean region were not as widely known as these, primarily because they could not be exported due to their inability to withstand long journeys.[200]

The wine was valued for its antiseptic qualities and commonly used as a disinfectant for wound care, either on its own or combined with other bactericidal agents such as metal salts referred to as "*enhemes*".[201] Although the underlying biological mechanisms were not known at the time, wine was widely utilized for its healing effects. Roman physicians frequently combined wine with other ingredients to enhance its medicinal effects. Wine served as a solvent or base in concoctions involving herbs, minerals, and other substances, creating complex remedies tailored to specific conditions. By mixing wine with ingredients like honey, herbs, or spices, healers could produce compounds that harnessed both the wine's properties and those of the added elements, resulting in versatile treatments for infections, respiratory issues, and other common ailments.

The therapeutic effects of wine were also believed by Pedanius Dioscorides, a Greek physician from Anazarbus who briefly served in the Roman army under the emperors Claudius and Nero. He made a lasting contribution to medical science with his extensive work, *De materia medica*. This treatise, composed in the first century CE, is a comprehensive compilation of medical knowledge on substances derived from plants, animals, and minerals. Among the various remedies discussed, Dioscorides dedicates a section in Book V specifically to the medicinal applications of wine, underscoring its importance as a therapeutic alcoholic beverage[202]. The inclusion of wine in this seminal work reflects the prevailing medical consensus of the time regarding its health benefits, an opinion that was also shared by other notable physicians, such as Galen of Pergamon. Dioscorides, in line with the traditions of Hippocratic medicine, emphasized the therapeutic value

[198] FEHÉR ET AL. 2007. P. 381; RZEŹNICKA, KOKOSZKO 2020. P. 615–655

[199] GALEN, *DE REBUS BONI MALIQUE SUCI*, VI.14.806

[200] RZEŹNICKA Z., KOKOSZKO M. 2020. P. 630-631

[201] THURMOND 2017. P. 2

[202] DIOSCORIDES. DE MATERIA MEDICA. V.

of wine, highlighting both its general and specific properties. He provided detailed descriptions of branded (appellation d'origine) and unbranded types of wine, and even cataloged recipes for medicinal, aromatized wines. His analysis extended to the inherent characteristics of wine, noting its slight acidity and its warming, digestive properties. Dioscorides argued that pure, undiluted wines were not only easily digestible but also beneficial for the stomach, aiding in digestion and increasing appetite. Furthermore, he observed that wine could promote relaxation and better sleep, strengthen the body, and even enhance skin appearance.[203]

In summary, wine occupied a prominent place in Roman medical practices, valued not only as a beverage but also as a healing agent with versatile applications. Whether used on its own or combined with other substances, wine was a foundational element in the Roman approach to medicine, exemplifying the ancient belief in the dual purpose of familiar foodstuffs in sustaining both health and pleasure.

Concluding the discussion above, wine was deeply embedded in everyday life, serving both practical, including culinary and medicinal, and symbolic functions across all social strata. Archaeological findings, such as wine shops, taverns, and feasts, illustrate wine's central role in Roman urban and social culture. The average daily consumption of wine was around half a liter per person, with the quality and type varying significantly based on social class. The varied wines reflected advanced Roman winemaking techniques and a deep appreciation for the diversity of flavors and potencies. Wine was not only a daily necessity but also a central element in Roman religious, political, and social practices. Rituals like the Vinalia festivals underscored its agricultural and divine significance, while public banquets served as displays of power and social solidarity. Wine also played a key role in medical practices, often used for its therapeutic properties, both alone and in combination with other substances. Overall, Roman wine culture was sophisticated, balancing quantity, quality, and social symbolism. It was much more than a drink; it was a marker of social status, a medium for religious expression, and a vital part of both public and private life.

[203] RZEŹNICKA Z., KOKOSZKO M. 2020. P. 627-629

Conclusions

By the second millennium BCE, wine became an important part of the economy, cuisine, and culture of the Mediterranean. Roman Italy was no exception. Roman Italy was no exception to the widespread cultivation and consumption of wine in the ancient Mediterranean world. The Romans developed and refined winemaking techniques that not only facilitated the production of vast quantities of wine but also elevated Roman wine to one of the most sought-after products in the region. These methods of viticulture, as documented in both literary sources and supported by archaeological evidence, reveal a sophisticated approach to grape cultivation that varied according to local climatic and geological conditions. Roman viticulturists employed both manual labor and oxen-drawn plows to prepare the soil for planting, often intercropping vines with fruit trees to optimize agricultural productivity. Harvesting was performed manually, using specialized tools such as the *falx vinitoria*.

Upon arrival at the winery, the harvested grapes were initially sorted and then pressed on the inclined floor of a *calcatorium*. The resulting must was channeled into storage vessels, and this method of pressing was considered the most desirable for producing high-quality wine. For additional extraction, secondary pressing was performed using mechanical presses. Storage and fermentation took place in large *dolia* vessels, which could hold up to 2000 liters of wine, and the *cella vinaria* was designed to accommodate multiple years' worth of harvests.

These advanced techniques enabled the large-scale production of wine throughout the Roman world, and despite the economic and cultural decline in the later stages of the Empire, winemaking persisted in Italy through the final centuries of Roman rule. The widespread production and consumption of wine were closely tied to the drink's popularity and versatility in Roman society. It is estimated that the average Roman consumed approximately half a liter of wine per day, equating to around 25 liters annually. The proliferation of taverns, wine shops, and local production, alongside communal feasting traditions, ensured that wine was accessible to all social

classes. While wine quality varied, its availability in different forms and quantities allowed for its consumption across different segments of the population. However, excessive drinking was socially condemned, and even practices such as the Bona Dea festival, where women participated in wine consumption, were subjects of critique by Roman intellectuals.

Wine was also regarded as an important element of a healthy diet and was widely acknowledged for its medicinal properties, particularly for its antipyretic and antiseptic qualities. Thus, wine in Roman Italy was not only a staple of daily life but also an integral part of both social rituals and medical practices.

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