WINE for ETERNITY
STOCKING A PHARAOH'S TOMB

Civil War in the West
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Wine for Eternity

How molecular archaeologists identified the contents of vessels found in the tomb of an Egyptian king

by Patrick E. McGovern

In 1988, Günter Dreyer of the German Institute of Archaeology in Cairo excavated the tomb of one of Egypt’s first kings at Abydos on the Middle Nile. The burial chamber of the king, who lived about 3150 B.C. and may have been known as Scorpion I, held a shrine and an ivory scepter, while jars and plates for oils, fats, bread, and beer, as well as cedar boxes for clothing, stone vessels, and other ivory and bone objects, were amassed in seven other rooms. The most amazing find, which remains unique in Egyptian archaeology, was three rooms stocked with what proved to be wine jars. Three or four layers of them in two rooms, sherdS from additional layers, and depressions in the floor of the third chamber suggested that the tomb held some 700 vessels. If each jar in the tomb (designated U-j by the excavators) had been filled to capacity, the total stock would have amounted to almost 1,200 gallons of wine. The jars proved to be important evidence of Early Bronze Age trade between Egypt and Palestine, encompassing modern Israel, the West Bank and Gaza, and Jordan, and set the stage for understanding the emergence of the native Egyptian winemaking industry. Forty-seven of the 207 jars recovered contained grape pips, and several completely preserved grapes were also recovered. According to Friedel Feindt of the Botanical Institute of Hamburg University, the pips are morphologically most similar to a domesticated subspecies of grape. Vitis vinifera visneca. Eleven vessels had remains of sliced figs, which had been perforated, strung together, and probably suspended in the liquid. Although figs are otherwise unknown as an additive in ancient Near Eastern and Egyptian wine, they might have served as a sweetening agent or flavoring. Whole grapes were probably added for the same reasons.

How can we be sure the liquid inside the jars was wine, and not grape juice or vinegar? For one thing, it is extremely difficult to preserve grape juice. Under normal conditions and at room temperature, the natural yeast bloom on grape skins quickly ferments juice to wine. Slow-pressing methods in antiquity and high temperatures in the Middle East also contributed to rapid fermentation, which probably began even before the juice went into the jars. Moreover, the jars had clearly been sealed, most likely to keep the wine from turning to vinegar. Many clay sealings with rim and string impressions were found with the vessels. The sealings had probably been pressed onto leather or cloth covers tied over the mouths with string. Such covers would have been particularly appropriate for a young wine, from which fermentation gases still need to escape.

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Neutron activation analysis of jars found in Scorpion F 3 tomb showed they had been made in Palestine.

Where did the wine come from? The wild grapevine never grew in ancient Egypt, and the domesticated subspecies was not transplanted to the Nile Delta before the end of the fourth millennium B.C. The wine jars themselves held the answer.

A two-stage process in Early Bronze I interactions between Egypt and the southern Levant may account for the Abidos wine jars and the start of a native winemaking industry in the Nile Delta shortly thereafter. In the first phase, increasing Egyptian demand spurred trade in horticultural products, especially grapes and perhaps olive oil. Cultivation of the fig, an additive to the Abidos wine, had probably also begun in the southern Levant by this time. Once a market for wine had developed in Egypt, the second stage, the transplantation of grapevines to the delta and the production of wine, probably under the tutelage of foreign specialists, was possible. A thriving royal wine-making industry was established during Dynasties 1 and 2 (ca. 3050–2700 B.C.). Recent organic analyses of large jars, which were buried by the thousands in the tombs of the pharaohs at Abidos and Saqqara, provide the confirmatory evidence. Hieroglyphic seal impressions on the jars found in the tomb are from. In Early Bronze Age I, only sites in these areas have yielded what had been classified as domesticated grape pips and whole raisins, namely, 'En Bevor near Guza, Jericho, Bab edh-Dhra', and Jawa in northern Transjordan. If we assume that the jars were manufactured near where the wine was produced, then we can reason that Scorpion F 3 wine came from this region. According to NAA, the clay seals associated with the Abidos jars were made of Nile alluvial clay. Because of the clay's chemical heterogeneity, resulting from the mixing of diverse materials from upstream, the clay's precise geographic origin along the Nile cannot be determined. The finding does suggest that before the jars were deposited in the tomb, a final stopping and sealing process took place in Egypt, perhaps at Abidos or, alternatively, at a site in the Nile Delta where the wine entered Egypt.

Archaeological investigation has established that the use of the overland trade route between the southern Levant and the eastern Nile Delta—the Ways of Horus, as it was known to the ancient Egyptians—intensified during Early Bronze Age I. The exchange in both directions of goods and even technologies, like pottery making and metallurgy, can be documented at sites along the most easterly branch of the Nile. During the latter part of the period, the Egyptians took control of the route, establishing their presence in the southern coastal plain, notably at 'En Bevor.

The jars held the answer to the wine's origins: the lowlands of Israel, the Palestinian uplands, Jordan Valley, and Transjordan.
Wine’s Prehistory

Credit our Neolithic forefathers with a discerning taste for the wild grape.

by PATRICK E. MCGOVERN

Winemaking on any kind of scale required the cultivation or even the domestication of the wild Eurasian grapevine (Vitis vinifera sylvestris), which grows today throughout the temperate Mediterranean basin and into south, west, and central Asia. During the Neolithic, when wetter conditions prevailed, it might even have grown somewhat farther south in the Zagros Mountains of Iran and the hill country of the southern Levant. Somewhere in this vast region the wild grapevine began to be cultivated. The domesticated vine’s advantages over the wild variety derive from its hermaphroditism: bisexual flowers enable self-pollination by the wind and fruit production by nearly every flower. By rooting branches or grafting one vine onto another, people then cloned hermaphroditic plants that yielded larger, juicier, and tastier fruit with fewer seeds. The Eurasian vine was ultimately transplanted throughout the temperate regions of the earth, now accounting for almost all the world’s wine, whether red Merlot or white Chardonnay.

Based on current archaeological information and historical considerations, a single origin for the domesticated grapevine in some northern mountainous region of the Near East makes the most sense. Around 4000 B.C., the domesticated grapevine was transplanted from somewhere in the north to the Jordan Valley, where the wild grapevine grew, and then around 3000 B.C., at the beginning of the Early Dynastic period, to the Nile Delta, where it formed the basis of the newly established royal winemaking industry. A similar progression of the domesticated grapevine can be traced in the Zagros Mountains, along the eastern side of the Fertile Crescent.

As part of the University of Pennsylvania Museum’s Haslun Project in northwestern Iran, Mary M. Voigt directed in 1968 an excavation at the Neolithic site of Haji Firuz Tepe, southwest of Lake Urmia in the northern Zagros Mountains. The wild grape still grows there, and pollen cores from the lake established that it grew there in Neolithic times. During the excavation, an intriguing yellow residue was noted on the inside lower half of a jar. At the time, Voigt thought it might be from milk, yogurt, or some other dairy product, but the chemical analysis was negative. One of the sherds from the same jar was “reexcavated” from the museum’s Near Eastern storage room some 25 years later and reanalysed using more sophisticated chemical techniques. A second jar, with a reddish residue on its interior, was also analysed.

The battery of infrared, liquid chromatographic, and other chemical analyses, carried out by the laboratory at MASCA, clearly showed the presence of tartaric acid, calcium tartrate, and tannin residues. The vessels had been found, together with four similar jars, embedded in the earthen floor along one wall of the kitchen of a mud-brick building dated to ca. 5400-5000 B.C. They had originally contained a liquid, judging by their relatively long, narrow necks and the fact that the residues were confined to their bottom halves. Clay vessels of approximately the same diameter as the mouths were found nearby, indicating how the jars had been sealed. The evidence supported the conclusion that the Haji Firuz jars originally contained red, tannin-rich grape juice, much like that placed in Scorpion Is’ tomb more than 2,000 years later (see page 20).

The quantity of wine in the kitchen, about 14 gallons if all six jars were filled, was enough to suggest fairly large-scale production and consumption for a household. If the same pattern of usage were established across the whole of the site’s Neolithic stratum, only one part of which was excavated, one might conclude that the grapevine had already come into cultivation. One might even propose that the Neolithic residents enjoyed both red and white wines, based on the colors of the residues inside the jars, but such a romantic idea must await a more searching chemical analysis for a red-colored anthocyanin such as cyanidin and a yellowish flavonoid such as quercitin.

RELATIVELY LITTLE IS KNOWN ABOUT WINEMAKING AT NEOLITHIC SITES farther north and at higher elevations in the Taurus and Caucasus mountains, where the wild subspecies thrives today. Few Neolithic sites in this region have been excavated. tantalizingly, domesticated grape pits have been reported from Chokh in the Daghestan Mountains of the northeastern Caucasus, dating from the beginning of the sixth millennium B.C., and from Shumsepe and Shelvani along the Kura River in Transcaucasia, dating from the fifth through early fourth millennium B.C. Such finds, if confirmed and expanded upon, may point to the ultimate origins of viniculture.

Once winemaking had established itself as a viable enterprise in the Neolithic period, wine began to be traded, and as markets developed, the domesticated grapevine was transplanted farther south and into lowland regions, as we have already seen for the Jordan Valley and Nile Delta. Similar developments can be traced in Mesopotamia. By the late fourth millennium B.C. (the Late Uruk period), spouted and piniform vessels, which containedained wine according to the chemical tests, were being traded to the major lowland city-states, including Uruk and Tello in southern Iraq and the Elamite capital of Susa in Iran. The transplantation of the domesticated grapevine to the southern Zagros/Mesopotamia area.

It has been argued that the use of alcohol was the result of the desire for the alcoholic beverage of choice in ancient Sumer, since grapevines are grown with difficulty in the hot, dry climate of southern Iraq and the textual evidence for viniculture and wine production was limited.
Drinking in Mesopotamia is minimal before the second millennium B.C. The new chemical evidence, however, shows that wine was already being enjoyed, at least by the upper classes, in the Late Uruk period. Early Dynastic (ca. 2900–2350 B.C.) cylinder seals depict royalty and their entourages drinking beer with straws from large jars and a second beverage, which can now be interpreted as wine, from hand-held cups and goblets.

The wine imported into lowland, southern Mesopotamia could have been brought from the northern Zagros or other parts of the Near East, at least 370 miles away. The Greek historian Herodotus describes shipping wine down the Euphrates or Tigris from Armenia in the fifth century B.C. River transport was also an option in the Late Uruk period, and might have been coordinated at an entrepôt established for the purpose in Upper Mesopotamia, where grapes, usually identified as the wild subspecies, have been recovered from several late fourth-millennium B.C. sites. If demand for the beverage was great enough, transplantation of grapevines to locales in the central Zagros and possibly as far south as Susa would be expected. When the Late Uruk trade routes were mysteriously cut off at the end of the period, ca. 2900 B.C., the pressure to establish productive vineyards closer to the major urban centers would have intensified.

The late fourth- and third-millennium B.C. site of Tepe Malayan (the ancient Elamite capital of Anshan) in the Shiraz region of the southern Zagros has yielded numerous grape pips and even grapevine wood, identified by MASCAs archaeobotanist, Naomi F. Miller. These finds indicate that the domesticated plant had already been transplanted to the southern Zagros by at least the mid-third millennium. Images on Elamite cylinder seals, foreshadowing scenes on the Assyrian reliefs of Assurbanipal two millennia later, depict males and females seated under grape arbors drinking what is most likely wine from cups.

The story of wine is in many ways the story of civilization—its possible beginnings in the small, mountainous Neolithic villages of the Near East and its spread to lowland Egypt and Mesopotamia and eventually around the world. The archaeological chemistry of ancient wine, however, is only in its infancy. Organic compounds, which until recently could only be surmised from ancient writings or ethnographic analogies, are now routinely detected by highly sensitive laboratory instruments. Combined with inorganic proveniencing techniques such as neutron activation analysis, these tests are helping archaeologists to reconstruct ancient trade routes and economies. But there is much to learn.

DNA analysis, for example, has yet to be applied to ancient grape and wine remains. By extracting nucleic acids from desiccated or fossilized material, it may be possible to determine when and where the Eurasian grapevine was first domesticated. Genetic family trees might be constructed, indicating the relationships between well-known varietal grapes in different parts of the world. Like the Eve hypothesis, which traces all of humanity to an original mother in East Africa on the basis of mitochondrial DNA lineage trees, a“Noah” hypothesis would seek the progenitor of modern domesticated grape varieties and their sequence of development and transplantation. (Noah, the biblical “first vintner,” is said in Genesis to have planted a vineyard after the Great Flood, later becoming drunk on its wine.)

As a taste of things to come, consider what is believed to be the ca. 700 B.C. tomb of King Midas at Gordion in central Turkey, excavated by Rodney S. Young of the University of Pennsylvania Museum in 1955 and 1956. The amazingly well preserved tomb was encased in wooden timbers inside a huge tumulus. Serving vessels and tableware from the funerary feast were recovered, together with elaborately inlaid furniture. Among the drinking vessels were a lion-headed and a ram-headed bronze situla, or bucket. Pottery bowls within large metal cauldrons still held the remains of the final meal for family and friends. The MASCA laboratory recently began to reinvestigate the contents of these artifacts, in an effort to determine what the ancient Phrygians were eating and drinking on that momentous occasion. Already we have an inkling. When the excavators first opened the tomb, they are said to have been overcome by the smell of “stew.” It would appear to have been a lamb stew washed down with a mixed fermented beverage of wine, barley beer, and honey mead. Only chemical analysis will allow us to know for sure.

Assyrian relief depicts the king Assurbanipal (668–627 B.C.) and his queen banqueting under a grape arbor.