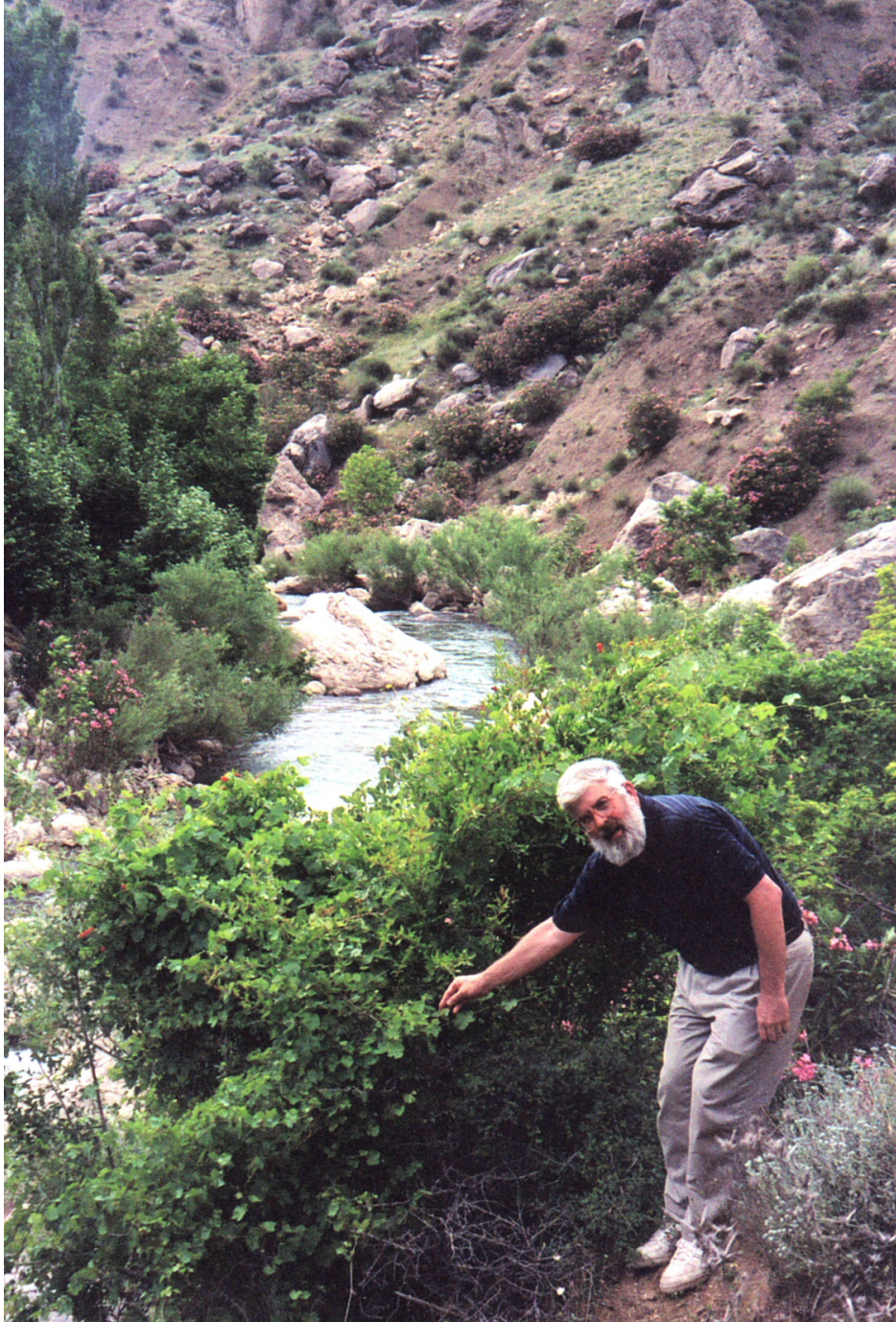


(memorable wine)



Looking for wild grapes on the banks of the Tigris

BEFORE **DIONYSUS**

Blake Edgar talks to archaeologist Patrick E McGovern about his ongoing quest to discover and recreate the earliest vintages of all, as well as about wines that are tens rather than thousands of years old

Photography courtesy of Patrick McGovern

Author and critic Clifton Fadiman once wrote: “To take wine into our mouths is to savor a droplet of the river of human history.” Patrick E. McGovern’s pioneering research in biomolecular archaeology attempts to trace that river to its headwaters in search of the oldest chemical evidence for wine and other fermented beverages. He combines expertise in both archaeology and chemistry in his work since 1997 as senior research scientist in the Museum Applied Science Center for Archaeology and as adjunct associate professor of anthropology at the University of Pennsylvania.

He describes much of this work in his book *Ancient Wine: The Search for the Origins of Viniculture* (2003) and is writing a new book that explores the role of alcoholic drinks in world cultures during prehistory. *Ancient Wine* received the 2004 Grand Prize from the Organisation Internationale de la Vigne et du Vin and a research prize from the Asociación Internacional de Historia y Civilización de la Vid y el Vino.

McGovern has led excavations in Jordan and collaborated on archaeological projects in the Middle East, Europe, and Asia. He has published several articles in the eminent scientific journal *Nature*, and the results of his research have generated international media coverage, as in 2004 when he announced the earliest evidence for an intoxicating beverage, from an archaeological site at Jiahu, China.

How did you begin to explore the origins of fermented alcoholic beverages?

The immediate circumstance that led to this research was when Virginia Badler telephoned me in 1988. She was doing a PhD dissertation on Proto-Urban Godin Tepe in the Zagros Mountains of Iran. She had some enigmatic jar shards with a red deposit, which she believed might be due to wine. We were skeptical at the time but had already had significant success identifying another organic compound, Royal or Tyrian Purple, inside amphorae. We went on to apply a whole series of analytical techniques, targeting tartaric acid and demonstrating to a high level of probability that the deposit on the Godin Tepe vessel was indeed from wine.

It also helped that my colleague at the time, Dr Rudolph Michel, had grown up in a wine merchant’s family in the Pfalz region of Germany, along the Rhine, a premier wine-producing area. He was as enthused as I was in uncovering ancient evidence for wine.

You’ve referred to alcohol as the “principal drug of antiquity.” Do we know with certainty which drink was invented first: wine or beer?

Although we don’t have the definitive evidence from the Paleolithic Period, simply because the vessels in which a fermented beverage might have been made or drunk have disintegrated, wine and honey would have won the ancient fermented beverage competition hands down over beer. Beer is not that easy to make. It requires a lot of processing—from sowing and winnowing the grain, to milling it in basalt grinders, and malting and fermenting it. You have to come up with a method to break down the starches in the grain into simple sugars, and then find an external source of yeast to get the

fermentation going. Grapes already have yeast on their skins, and once the juice is exuded from the fruit, it provides the perfect nutrient mix for fermentation. Honey only needs to be diluted to 30 percent honey and 70 percent water, and its native osmophilic yeasts will ferment the honey to mead.

Can you tell us about one or two archaeological sites that were crucial to the development of wine?

I have already mentioned Godin Tepe. It is extremely important as a military-cum-trading base, established by the first urban communities of the lowland Tigris-Euphrates Valley of Mesopotamia in the highlands to their east. Godin is along a principal trade route, which later became part of the Silk Road. It exemplifies how the exchange of goods can be a conduit for even more far-reaching cultural and technological changes, especially involving wine. It was also at the gateway to Central Asia and China, where other momentous developments in fermented beverages occurred, as attested by our research, including grapes as one of the additives as early as 7000 BC.

Hajji Firuz Tepe in the northern Zagros Mountains pushed back the date for the earliest chemically attested wine to the Neolithic Period (c.5400 BC), another two millennia earlier than Godin Tepe. The Neolithic was when the first year-round villages emerged in the Middle East, based on domesticated plants and animals. During a time of extensive experimentation, the grape was probably first domesticated and wine produced on a large scale. The invention of pottery around 6000 BC gave impetus to the process, as well as providing excellent samples for modern analysis, since special vessels for preparing and storing wine in stoppered jars could now be made.

In 2005, you traveled to the upper reaches of the Tigris River to study wild grapes and seek the possible place where they were first domesticated. Why look there, and what did you find?

Eastern Turkey was a hotbed of experimentation in the Neolithic, as shown by recent excavations at Nevalı Çori and Göbekli Tepe, only initiated because they were to be inundated by the Euphrates rising behind the Ataturk Dam, and older excavations such as at Çayönü, closer to the headwaters of the Tigris. At Nevalı Çori and Göbekli Tepe, what are believed to be religious shrines or temples are adorned with stupendous three-dimensional sculptures of animals and humans. DNA evidence supports the domestication here of one of the Neolithic “founder plants,” einkorn wheat, and chickpea and bitter vetch are also traced to this region, so why not the grapevine?

Our laboratory is now analyzing 9th-millennium-BC stone bowls and goblets, before the advent of pottery, which have yielded copious amounts of ancient organics. These vessels could well be important as the earliest evidence for wine having been prepared, drunk, and offered to the gods.

Are there places in the world today where one can still encounter beverages or ceremonies that connect to the most ancient wine cultures?

Georgia in Transcaucasia is an excellent example of a “wine culture” that permeates every aspect of life, from birth to death,

(memorable wine)

including rites of passage and major religious festivals. Every meal in Georgia is an occasion for celebration, presided over by a toastmaster who offers up numerous toasts throughout the meal to the motherland, family, and life itself, impossible to imagine apart from wine. Our analyses of ancient vessels from Neolithic sites in Georgia show that wine was likely an important part of the culture by at least 7000 BC, and this “wine culture” has continued up to the present.

The domesticated grapevine was planted later in Greece, Italy, France, and New World locales such as California, but those societies also show how, once wine is adopted, usually first by kings and the upper class, it eventually comes to dominate the economy, religion, and society as a whole.

What techniques do you use to conclude from the residues stuck inside clay vessels from archaeological sites what sort of liquid they once held?

When we began our wine studies, we relied principally on a combination of techniques: infrared spectrometry, liquid chromatography, gas chromatography, and wet chemical tests. Over the past 25 years, coupling mass spectrometry to liquid chromatography and gas chromatography has become extremely powerful. Where the results of the multiple analyses coincide with one another, we can be confident that we have correctly identified the ancient organic compounds.

Were certain ingredients more prevalent in ancient wine than what we are used to today?

Various tree resins—from terebinth and pine in the Middle East, to China fir and the aromatic elemi family in East Asia—are the most prevalent additives. Studies of numerous vessels from the Near East, ranging in date from the Neolithic to the Byzantine Period, show that “spiking” wine with a tree resin was a given for thousands of years. The resins contain terpenoid compounds that act as antioxidants. Resinated wine was one of the most widespread human medicines in antiquity. Pliny the Elder, the famous 1st-century Roman encyclopedist, devoted a good part of Book 14 of his *Natural History* to the problem of how to keep wine from turning to vinegar. Tree resins—pine, cedar, frankincense, myrrh, and, very often, terebinth, which was known as the “queen of resins”—were added to Roman wines for just this purpose.

Only Greece today carries on this ancient tradition with *retsina*—an acquired taste, to be sure, but one that is easily come by while sailing the wine-dark seas or lounging in a taverna in the Peloponnese.

As our techniques have become more precise, we have begun identifying many other herbs, fruits, and cereals that were added to wine. As one example, some 4,500 liters of wine in 700 jars were deposited in the tomb of one of the first rulers of Egypt, Scorpion I, around 3150 BC at the site of Abydos. Our earlier analyses had shown that this was a resinated wine, sometimes with fig as an additive, and it had been made in the Jordan Valley and transported by donkey and probably ship to Abydos, over a distance of 435 miles (700km). Importing the wine was a necessity for Scorpion, if he were to have this delectable beverage in the afterlife, since the royal winemaking



Residue analysis has made it possible to recreate ancient beverages

industry in the Egyptian Nile Delta was still several hundred years off. In reanalyzing the residue from the jars recently, we detected compounds derived from mint, which has long been a medicinal agent in the Middle East.

Are any winemakers attempting to revive some ancient practices in the vineyard or winery?

Italy appears to be most open to reviving and testing ancient practices, which might well hold the promise of producing better wines, since they went through an incubation period of empirical trial and error for thousands of years. For example, Josko Gravner and Castello di Lospida in northern Italy and Frank Cornelisse on the slopes of Mount Etna in Sicily are fermenting and aging their wines in underground jars, as was once common practice throughout the Middle East and in Italy. They argue that properly fired pottery of the right clay composition allows for more consistent oxidation and better aging over time. They claim that, unlike oak barrels that can impart lactones and other aromatics, pottery is less intrusive. You might say it lets the terroir of the grape show itself to better advantage.

The domesticated grape itself is the end result of ancient practice. Experimental vineyards in Italy have also been established to grow the numerous Italian varieties and to preserve their wealth of grape germplasm. Today, only a handful of varieties, mostly French, are used to produce most of the world's wine. Numerous other varieties (some estimate as many as 10,000) occur from the Middle East across to Europe and hold out the potential of providing extremely useful traits and new experiences in taste and aroma.

Some other modern wines made in Europe and the Middle East, besides Greek retsina, also carry on ancient traditions. Raisined passito wines are known as early as the Bronze Age in Turkey. Their production is described in detail by the Greek and Roman agriculturalists, especially Mago the Carthaginian, and mentioned even earlier in Homer and Hesiod. In this method, what were most likely Muscat grapes were dried. Then the dried grapes were treading, pressed, fermented on the lees in sealed jars for a month, filtered, and further aged in well-sealed jars. Modern vin santo and various Muscats (such as that made on the island of Pantelleria) are examples of this type of wine.

Please describe the process of your collaboration with the brewers at Dogfish Head Brewery in Delaware, using archaeological evidence to recreate long-forgotten fermented beverages.

It is one thing to identify the natural products in ancient vessels; it is another thing to see if the “recipe” that you come up with actually works. This is experimental archaeology at its best. You learn about an ancient technology by trying to replicate the process today. In trying to bring ancient beverages “back to life,” we make the assumption that ancient peoples had essentially the same sensory organs as we do and, allowing for some cultural differences, would have been enticed or repelled by a beverage in the same way that we are. Other assumptions must be made about the production process, since none of this is written down anywhere. Sam Calagione and his fellow brewers at Dogfish Head put themselves in the place of experimental Neolithic wine- and beer-makers and concocted what can be called “extreme fermented beverages.”

Midas Touch was our first collaboration, based on residues inside vessels from what is believed to be the tomb of King Midas himself, or one of his royal predecessors, at the site of Gordion in central Turkey. Our analyses showed that wine, barley beer, and honey had been mixed together. At the time, the very thought of mixing wine and beer seemed preposterous. I have since come to discover that “mixed beverages” were more common in antiquity, since sugar sources were limited and these beverages had an additional medicinal function. Sam came up with a wonderful interpretation of this beverage, with saffron as the bittering agent. It has become the brewery’s most awarded beverage, garnering gold medals, appropriately enough, in major tasting competitions.

Chateau Jiahu is a re-creation based on our analyses of what is at present the oldest alcoholic beverage in the world. The pottery shards that we tested come from the Neolithic site of Jiahu in the Yellow Valley of China, dated to around 7000 BC. They also revealed a mixed beverage, in this case combining grapes, hawthorn fruit, rice, and honey. The use of grapes this early—likely a wild Chinese species such as *Vitis amurensis*—came as a great surprise. China has more species of grape, about 40, than any other place on Earth, but there is no evidence yet that any of these were domesticated.

It took some tinkering to get this beverage to work. The first trial batch came out too sour and smoky to my taste, because of an excessive amount of hawthorn, which can be very mouth-puckering and chalky tasting. Any self-respecting

Neolithic villager would have wanted a sweeter beverage, I argued, because sugar was in short supply. In the final concoction, fresh whole hawthorn fruit and Muscat grapes, wildflower honey, and rice malt with the hulls were brewed together and fermented with a sake yeast. It’s strangely different but immensely satisfying. The latest version of Chateau Jiahu hits all the right notes: an inviting, grapey aromatic nose, a Champagne-quality carbonation with extremely fine bubbles, a taste-bud-tingling aftertaste, and a deep yellow color worthy of the Yellow Emperor and the Yellow River.

Other than Chateau Jiahu, do you have a particularly memorable wine experience to share?

My first exposure to winemaking was in a small town, Trittenheim, on the Mosel River in Germany. It was 1971, and my wife and I were traveling the world to see archaeological museums and sites. But we needed some money to keep us going, so we went from village to village on the Mosel, asking the local mayors whether anyone needed some help in the vintage. If so, we could be contacted by writing to poste restante [general delivery] in Munich—this was in the days before the Internet and cell phones. We got our positive answer on arriving in Munich and soon found ourselves climbing the steep slate terraces around Trittenheim to pick Riesling grapes. I will never forget the first night with the vintner, Ferdinand

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Kettern. He would descend into his cellar and bring up one bottle of wine after another. He wouldn’t show us the year; we had to guess. By the end of the evening, we knew that 1959 was a memorable year and 1967 was terrible. As it turned out, 1971 became the vintage of the century. I learned a great deal about vintages and terroir from this experience.

Returning 20 years later, I drove through the beautiful valley lined by vineyards and directly to the house in the village. There were Herr and Frau Kettern in the front yard, and they shouted out “Patrick!” in unison. I was ushered in to their parlor, where the vintner brought me one of his last bottles of 1971, the label roughly scrawled with the date. It was delightful.

I recently attended a conference named “Chinese and German Wine Cultures” in the Pfalz region, and I revisited Trittenheim. Herr Kettern had died two years earlier, and the vineyards had been sold. But the cellar was still full of wine, and Frau Kettern insisted that I take 15 bottles of their finest Auslesen and Kabinette—they could never drink it all. How could I refuse? Upon opening the oldest, a 1978 Trittenheimer Altärchen Auslese, to see whether it was still good, we were amazed to discover an ethereal ambrosia that carried us back to our experiences in the vineyards 35 years ago. ■