

Peter Kupfer

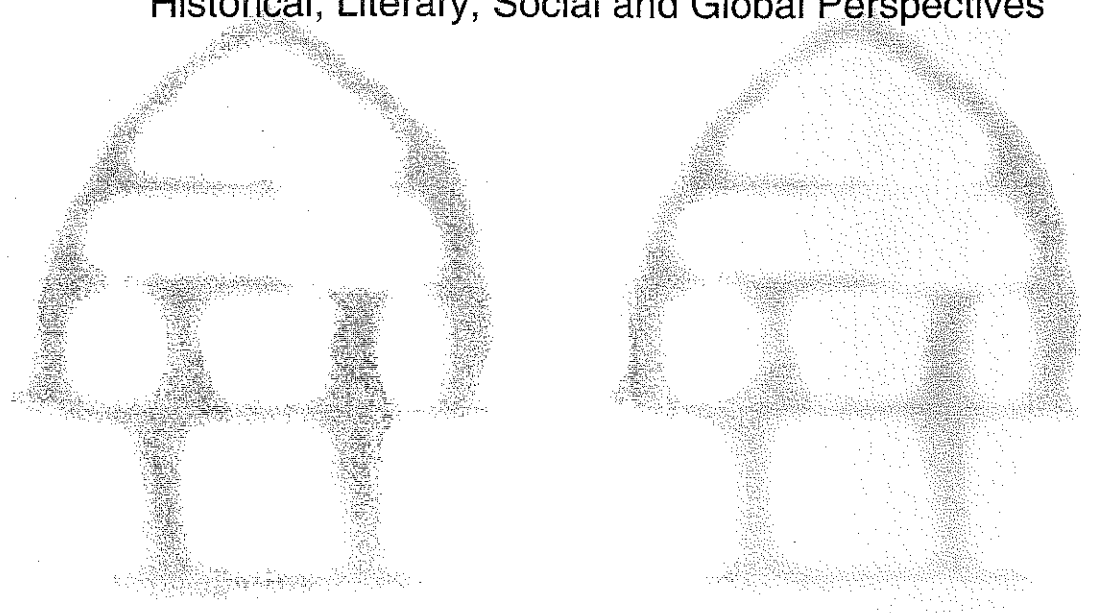


中国的葡萄酒文化

WINE IN CHINESE CULTURE

历史、文学、社会与全球视角的研究

Historical, Literary, Social and Global Perspectives



LIT

Wissenschaftsforum Kulinaristik

Herausgegeben von

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Preface by the editor

Wine – in the original sense of grape wine – seems, with the exception of milk, to be the oldest cultural drink in human existence. It has also been a universal phenomenon since prehistoric times. Its material basis is constituted by unique characteristics of the vine plant, which has spread over the course of millions of years in temperate zones around the globe, creating an unequalled variety, especially in the northern parts of China. As the phenomenon of wine is closely connected with the advancement of civilization and the awakening of cultural life in different regions of the world, it should be considered as one of the most important material as well as immaterial aspects of mankind's heritage. In 2004, news of the oldest evidence of an alcoholic beverage containing traces of grape wine spread around the world. This discovery, which was made by the American archaeologist Patrick McGovern, who analyzed 9,000-year-old pottery fragments of a prehistoric village in central China, stretched back the history of the production of fermented drinks almost two thousand years. Thus China not only began to develop the most abundant and complex fermentation techniques at least three thousand years ago, as had already been proved, it also proved to be the oldest civilization on earth to produce wine.

It was Patrick McGovern who strongly inspired and promoted the *International and Interdisciplinary Symposium on Cultural Studies of Wine in China and Germany*, held on October 4-7, 2007 at the School of Applied Linguistics and Cultural Studies (FASK) of Johannes Gutenberg University of Mainz in Gernersheim, a small town situated in the Palatinate, Germany's famous wine-growing area. Altogether 20 experts from the United States, China, Italy and Germany participated, focussing on several topics related to Chinese wine culture from different disciplinary perspectives.

This volume contains 16 revised and enlarged papers from the conference and represents the first attempt to establish an interdisciplinary research forum on Chinese wine culture from a global and comparative view. In order to encourage a broad international discourse on the topic, we favored a bilingual Chinese-English publication within the framework of this series on Culinary Studies edited by Alois Wierlacher and Regina Bendix, to whom I am very grateful for their assistance. I also would like to express my deep gratitude not only to the authors for their patience and unremitting cooperation in the past years, but also to my colleagues and students for their valuable advice and contributions, especially Mr. YIN Wen for doing the bulk of the editorial work, Mr. Eric Kuchle, who was responsible for translating/revising the English texts, Ms. Silvia Fricker, Ms. LUO Wei and Mr. Michael Poerner for final touches to the printable version.

Gernersheim, spring 2010

Peter Kupfer

and talk about recent archaeological discoveries, do some DNA sleuthing, reexamine ancient art and writings, and draw in some ethnography and experimental archaeology as well.

My specialty is archaeological chemistry or biomolecular archaeology, which I have helped to pioneer over the past 20 years. A revolution in modern chemical techniques has made it possible to identify the fingerprint compounds of ancient organics and natural products, and even re-create ancient beverages and other foods.

My research into ancient fermented beverages really got going when I organized a conference on "The origins and ancient history of wine" at the Robert Mondavi Winery in the spring of 1991 (McGovern, et al.). The star of the show at our 1991 Mondavi conference was this rather nondescript pottery jar from Godin Tepe, dated to about 3500 BC, which provided us with the earliest chemical evidence for wine at the time. That the vessel came from high up in the Zagros Mountains of Iran, which now outlaws alcoholic beverages, made it all the more intriguing!

Our analyses of the reddish residue inside the jar showed the presence of tartaric acid, the finger-print compound for grapes in the Middle East, and terebinth tree resin. In other words, we had a resinated wine. That's a grape wine to which a tree resin (usually terebinth or pine) has been added to help preserve and give a special taste to the wine. Some of you have probably tried Greek *retsina*, and have some idea of what a resinated wine tastes like – definitely an acquired taste, but one easily come by while traveling in Greece.

This Godin Tepe jar inspired me to look for even earlier evidence of wine, so after the conference I decided to take a closer look at the Neolithic period, from about 8500 BC down to 4000 BC, when a revolution in food and beverage production occurred, likely including both beer and wine.

Neolithic villages being excavated at Hajji Firuz Tepe, and in the Zagros Mountains of Iran but farther north than Godin Tepe and dating back to 5400 BC, were a direct result of humans taking control of their food resources by domesticating a variety of plants and animals, leading to the first, permanent, year-round settlements. The invention of pottery around 6000 BC gave more impetus to the process of settling down, since special vessels for preparing and storing wine and other foods and beverages in stoppered jars could now be easily made. What can be termed a Neolithic cuisine emerged. A variety of food processing techniques – fermentation, soaking, heating, spicing – were developed, and Neolithic peoples are credited with first producing beer, bread, and undoubtedly an array of meat and cereal entrées that we continue to enjoy today.

My home base at the University of Pennsylvania Museum was the ideal place to look for Neolithic evidence of wine, since it has one of the best collections of well-documented excavated artifacts in the world. Among them, one vessel is

now our earliest evidence for wine, and again, it's resinated. This vessel and another five were found sunk down into the clay floor of a kitchen of a typical mudbrick house at Hajji Firuz – you can read more about this in my book on *Ancient wine*. All the vessels appear to have held wine – altogether some 60 liters, quite a lot for an ordinary household.

But the Near East wasn't the only place that revolutionary developments were occurring in the Neolithic period, as people settled down and domesticated plants that could be used to make and enjoy a fermented beverage. Our most recent published discovery of what can also be described as a wine comes from an area that I would have considered implausible only a few years ago – on the other side of Asia in the Yellow River valley of China.

There, at the site of Jiahu (Henan Provincial Institute of Cultural Relics and Archaeology 1999), around 7000 BC, the people were making, enjoying, and using a somewhat different kind of fermented beverage in their burial and religious ceremonies. And this turns out to have be the earliest chemically attested alcoholic beverage in the world, earlier even than any beverage we've yet discovered from the so-called "Cradle of Civilization" in the Near East.

The discovery of our ancient Chinese "wine" – it made the front page of the *San Francisco Chronicle* and the *New York Times* story went around the world. In China itself, the main government news agency, *Xinhua*, gave such prominence to the finding that my colleague in Beijing and one of my coauthors on the original scientific paper in *The Proceedings of the National Academy of Sciences*, Cheng Guangsheng, wrote to say that "you are now a celebrity of the CCP – the Chinese Communist Party".

Since my principal area of interest is the Near East, how did it come about that I got involved in China? If anyone can be held responsible, it's Anne Underhill, an archaeologist at the Field Museum in Chicago who initiated one of the first recent American expeditions on the mainland and who is convinced that fermented beverages are intimately involved in the earliest Chinese culture, playing a similar role to what they do today in social relations, religious ceremonies, and feasts and celebrations. She proposed that I take part in the excavations of the late Neolithic site of Liangchengzhen in Shandong Province, and chemically analyze some of their vessels. At that time – only the year 2000 but it seems like ages ago – China was beginning to open up, and it seemed like too good an opportunity to pass up, even if I knew virtually nothing about ancient Chinese civilization and couldn't read a Chinese character to save myself. I took the leap, and then began considering other sites that I might sample ancient pottery from if I was going to be there anyway.

I was especially helped along during my travels by Wang Changsui, at the University of Science and Technology in China, one of the main research universities. Changsui was previously head of the archaeometry department there, and before I knew it, he had set up an extensive itinerary for me to visit

leading archaeologists and scientists in Beijing and at sites along the Yellow River. He even accompanied me on overnight train trips, serving as my interpreter and boon companion, introducing me to modern Chinese life, its customs, and especially its cuisine. Banquets were a daily occurrence, and as the guest of honor, I was expected to take the first bite of the barbecued or baked fish with my chopsticks – if adeptly managed, I was roundly applauded. Toasting with fermented beverages was *de rigeur* at these meals – with distant roots in the past, as I was to discover – and good health and the success of our research were constant refrains. To avoid the potent high-alcoholic distilled beverages, made from sorghum or millet, I usually requested and got some milder, more aromatic rice wine. After all, I was studying a period before distillation was introduced.

Tight bonds of collegiality were the result, and paved the way for getting samples approved, through customs, and back to our lab in the Penn Museum. This is easier said than done in China, and it helps to have friends in the right places, and also to have colleagues who were as enthused and interested as I was in finding out more about ancient Chinese beverages by making use of the latest scientific instruments.

So just what did we discover at Jiahu? First of all, China began making pottery earlier than in the Near East (10,000 BC versus 6000 BC), and this was crucial to our discovery. As people settled down and began domesticating various plants and animals and developing their unique cuisines, pottery enabled special vessels to be made for cooking, storing, and serving. At the same time, especially for liquids, the pores in the pottery absorbed the ancient organics and preserved them for us to analyze thousands of years later.

The pottery that we analyzed were jars with high necks, flaring rims and handles, which were ideally shaped to hold and serve liquids. I won't go into all the details here – in the interests of the chemically challenged – except to say that a whole host of chemical methods were employed, including infrared spectrometry, liquid and gas chromatography coupled to mass spectrometry, isotope analysis, and more traditional wet chemical analyses (McGovern, et al. 2004, 17593-17598).

Together with collaborators in China at the University of Science and Technology in China and at the University of Beijing – Europe (Max Planck Institute in Leipzig), and the U.S. (Dept. of Agriculture in Wyndmoor, PA), we focused on so-called finger-print compounds to ferret out the original ingredients of the fermented beverage. As we analyzed the extracts from one pottery vessel after another, the same chemical compounds kept showing up. The finger-print compounds of beeswax told us that one of the constituents was high-sugar honey, since beeswax is well-preserved and almost impossible to completely filter out during processing. Tartaric acid told us that grapes or hawthorn tree fruit, which has three times the amount of the acid than that in

grapes, were the likely fruits. Finally, close chemical matches with other compounds (viz. phytosterol ferulate esters) pointed to rice as the third main ingredient.

You could call this extreme beverage a "Neolithic cocktail or grog". It was comprised of honey mead and a combined "wine" made from rice, grapes, and hawthorn fruit. I use the term "wine" in the sense of a relatively high-alcoholic beverage – say 9-10% compared to the 4-5% of beer – and for a beverage with pronounced aromatic qualities.

We don't know at this point whether hawthorn fruit or grape alone or in combination was used. After we announced that these were the most likely fruits based on our chemical results, a study of the botanical materials at the site – a discipline that has recently begun to be practiced in China – seeds of just those two fruits and no others were found. Although not helping us to decide whether either or both were used for the "wine", this provided excellent corroboration for our findings.

Of course, the use of grape this early – likely a wild Chinese species such as *Vitis amurensis* with up to 20% simple sugar by weight – came as a great surprise. As far as we know – though continued exploration may change the picture – none of the many grape species found in China were ever domesticated. Yet, this is the earliest evidence of the use of grape in any fermented beverage. And high-sugar fruit, with yeast on its skins, is crucial in making the argument that the liquid in the vessels wasn't just some kind of weird concoction but actually was fermented to alcohol by the yeast.

Like the grape, we don't know yet whether the rice was wild or domesticated, but it was the principal source of starches that needed to be broken down into simple sugars for making a fermented beverage. But how was the rice starch broken down into sugar at this early date? Modern ethnographic examples of chewing rice to break down the starches can be cited from Japan and Taiwan; like the method of making corn beer or *chicha* in the Americas, an enzyme (ptyalin) in human saliva acts to cleave the larger molecules into simple sugars. Rice can also be sprouted and malted like barley, or unique to China, the starches can be broken down by a special mold concoction (*Aspergillus*, *Rhizopus*, *Monascus*), as is still done today to make rice wine and sake (Huang 2000).

However the rice was broken down and fermented, it still leaves lots of debris that floats to the surface, and the best way around that is to use a drinking-tube or straw, the time honored method to drink beer in ancient Mesopotamia and here rice wine in a traditional village of south China – what you might call extreme beverage-drinking.

The broader implications of the early Neolithic beverage discovery were equally exciting. Jiahu isn't just your run-of-the-mill early Neolithic site. As ably excavated by the Chinese, it has yielded some of the earliest pottery in

China, as well as some of the earliest rice. In addition, some three dozen bone flutes were recovered from many tombs at the site, with two to eight holes carefully drilled into them.

Intriguingly, the flutes are all made from a specific wing bone, the ulna, of the red-crowned crane. This bird, with its snow-white plumage accented by black and red, engages in an intricate mating dance, replete with bows, leaps, wing extensions, and of course ringing musical notes. Perhaps the musicians at the site who were buried with these flutes took their cues from the birds.

The six-holed instrument, as shown by experimental playing, yields the traditional pentatonic scale of Chinese folk music by covering all but one hole in turn. They are the earliest playable musical instruments ever found.¹

Jiahu has also produced what are arguably the earliest Chinese written characters ever found (Li, et al. 2003, 31-34), incised on tortoise shells like those that occur at the fabulous Shang Dynasty capital cities, such as Anyang, thousands of years later. Such inscribed shells are believed to have been used by shaman-like priests to predict and assure a good future. We don't know if the Jiahu shells, assuming they bear some kind of early Chinese writing, have the same significance as later, but the hypothesis gains credibility from their association with the musical instruments and especially the mixed fermented beverage, all-important parts of later Chinese religious and funerary ceremonies.

From later texts², with traditions going back to the Shang and Western Zhou dynasties, we know that when a family member died, one person, called the *shi*, was selected to communicate with the ancestors (Paper 1995). The *shi* was to drink nine goblets of millet or rice wine. Assuming that Neolithic vessels were about the same size as Shang Dynasty goblets and contained a beverage with about 10% alcohol, the liter and a half consumed by a Neolithic *shi* would certainly have been enough to cause inebriation.

But that was the whole idea. Like the shamans of the northern tundra, an altered state of consciousness enabled one to enter the spirit world. In the process of the *shi* getting drunk, it is said that "the sprits are all drunk". Music and drums signaled the end of the later ceremony, and it's not difficult to imagine the Neolithic bone flutes serving the same purpose.

Our re-created Neolithic beverage, which is called Chateau Jiahu, is of course named after the site in China where the pottery was excavated that led to our analysis and reconstructing the ancient recipe. Sam Calagione of Dogfish Head Brewery, whose experimental prowess is the equal of any Neolithic beverage-maker, brought it back from the dead, along with his colleagues Mike Gerhart and Bryan Selders.

We've also analyzed some intriguing, quite different Chinese beverages from the later Shang Dynasty. A *you* jar from the upper-class tomb of Changzikou in

another part of Henan province amazingly still contained a liquid sample from 3000 years ago. Because of the tight lids on the vessels, which had corroded to the neck, the liquid inside had only partly evaporated – down to about a third of its full capacity – and then had been hermetically sealed off until it was excavated thousands of years later.

What is equally amazing is that the liquid sometimes has the characteristic fragrance of a fine rice or millet wine made the traditional way, slightly oxidized like sherry but also aromatic. By using highly sensitive techniques for volatile aromatics, we discovered that the liquid in this vessel contained camphor and alpha-cedrene. These monoterpenes with fragrant aromas (although camphor is usually associated with fighting off moths) provided marker compounds for either a tree resin (particularly China fir), a flower such as chrysanthemum, or an herb in the *Artemisia* family (this is the same genus that includes wormwood used in making the very bitter absinthe). One of the open vessels in the tomb suggested how these compounds might have been incorporated into the beverage. A large vat had been filled with leaves of another aromatic tree – *Osmanthus fragrans* – and held a ladle, implying that it had once been filled with a liquid. The leaves of this tree, which have a floral aroma, were apparently steeped in the liquid, not unlike how tea is made today.

But these Shang Dynasty beverages represent a further development from the mixed fermented beverage of the Neolithic period, and as yet we haven't re-created any of them. They likely represent one of beverages described in the oracle bones, probably *jiu*, a fully fermented "wine" or *chang*, an herbal beverage. But in keeping with our focus on the earliest fermented beverage in the world, I'll leave you with a question: "Who did develop the first fermented beverages on the Earth?"

So far, Jiahu is earlier than anything that we've analyzed from the Middle East, but the western side of Asia isn't out of the running yet.

For instance, right now, we're analyzing stone vessels from eastern Turkey dating back to about ca. 8500 BC (approximately the same time as Jiahu), which look extremely promising for grape wine. Today, the barren terrain along the upper Euphrates River might not appear to be conducive to growing grapes for wine, but recent excavations paint a different picture.

It is now known from DNA evidence that einkorn wheat, which might well have been used in the production of beer and was one of the eight founder plants of the Near Eastern Neolithic food revolution, was first domesticated here, probably around 8000 BC (Heun, et al. 1997, 1312-1314). Bitter vetch and chickpea were likely domesticated here, as well. DNA studies (e.g., Vouillamoz, et al. 2006, 144-158) point to nearby Georgia in Transcaucasia as the region where the Eurasian grape was first domesticated.

What are believed to be religious shrines or temples, which are stunningly adorned with stupendous three-dimensional sculptures, have been uncovered

¹ See also the contribution of Zhang Zuzhong in this volume.

² e.g., *Liji*, *Book of Rites*, and *Yili*, *Book of Conduct*; 1st c. BC-1st c. AD.

(Özdoğan / Başgelen 1999). Stone goblets and bowls with strange carvings of possible ceremonies (such as a male and female dancing with a turtle) especially intrigue me.

These bowls or goblets are made of chlorite, a clay mineral with highly adsorbent properties. They're never made in pottery, because the discovery of pottery-making is over 2000 years in the future around 6000 BC. We are now in the progress of analyzing the copious amounts of ancient organics absorbed into the pores of this mineral. These bowls could well be important as the earliest evidence for a grape wine or other kind of beverage having been prepared, drunk, and offered to the gods.

The upshot of these initial investigations is that we could well have evidence for a Near Eastern wine of approximately the same date as that from Jiahu. Yet, the use of rice and hawthorn fruit in the Chinese beverage makes it distinctly different, and suggests that ideas associated with domestication and making fermented beverages were being transferred – however fragmentary the process and over and over again at short distances – across the expanse of Central Asia, perhaps using a forerunner of the Silk Road.

If so, perhaps that would help to explain the marked similarity between our ancient Chinese alcoholic beverage pictogram of the jar with three drops to one of the earliest signs for beer in ancient Mesopotamian – the proto-Sumerian pictogram *kaš*, which dates back to 3500 BC. The latter sign doesn't have the drops, but the pointed-base form of the storage jar is quite similar to the Chinese one.

Moreover, how did it come about that ethnic groups in southern China still drink their rice beer through drinking-tubes, like the ancient Mesopotamian peoples did?

Obviously, we may never have answers to these questions without more exploration and excavation in Central Asia. My inclination is to believe that there was at least some short-range transmission of how to domesticate plants and make a fermented beverage in general that bridged this expanse, to account for the comparable experimentation at approximately the same time.

Chateau Jiahu is just one example of re-creating the past using molecular archaeological techniques. There is still much more to do, and we hope to bring many more delectable ancient beverages back to life. You might think of Chateau Jiahu as recapitulating a dynamic history of human innovation going back thousands of years.

中国古酒揭秘 — 从考古学和化学的角度发现世界最古老的“葡萄酒”

Patrick E. MCGOVERN

内容摘要

考古化学和分子考古学界在不断为人们带来有关古代文明的新发现。借助于高精密的仪器，科学家们可以辨认出含量及其微小的生物标志（比如采用将液体和气体层析法与质谱仪相结合的办法），为古代发酵饮料的研究提供新的资料。

生物分子学和考古学研究这条途径的兴起源自在伊朗 Hajji Firuz 地区的一个土丘中发现并被正式公布的迄今最早的葡萄酒（约公元前 5400 至 5000 年）所带来的启发。这里的发现也被用来与在位于中国黄河大峡谷的贾湖遗址所发现的，通过化学测试证明是用米、蜂蜜加葡萄或山楂酿成的，且历史甚至可能更加久远的古酒（约公元前 7000 年）来相比较。

Hajji Firuz 地区所发现的酒出自于扎格罗斯山脉北部的一个新石器时期的村庄。容器中的酒经过了树脂处理。和其他遍布中东地区的村落一样，这个村庄也是人类通过种植庄稼和饲养动物来掌控自己食物来源这一过程的直接产物。它们也构成了人类历史上最早的、四季均可使用的永久性定居点。公元前 6000 年左右，陶器的发明使人类可以轻松地制作出可密封的、用于制作和储存酒以及其他食物和饮料的陶罐，于是，人类定居的进程就被大大加快。这样一来，新石器时期特有的，以发酵、浸泡、加热和调味等食物加工技术为基础的烹饪技术也就得以逐渐形成。

在 Hajji Firuz 的一栋典型土房的厨房里，科学家们发现了六个陷入泥地中的陶罐。所有的这些容器中都盛有葡萄酒，总量大约为 60 升。如果考虑到这个村庄里还有其他民房，似乎可以认为，该地区的人们已在大规模酿造葡萄酒，继而还可以推断，欧亚种的酿酒葡萄（*Vitis vinifera vinifera*）在这时已经开始被人工种植。

但是，新石器时期人类定居和酿酒葡萄种植活动的革命性的发展并不仅仅出现在中东地区。近期发表的有关研究成果表明，位于亚洲大陆另一侧的中国黄河大峡谷地区也发现了产于古代的葡萄酒。而这种说法在几年前是没有人会相信的。

早在公元前 7000 年的贾湖，人们就已经开始在葬礼和宗教仪式上使用和饮用一种特别的自酿发酵饮料。经化学测试后这种饮料被确定为世界上

最古老的酒。它的历史甚至要早于在被称为“文明摇篮”的中东地区发现的古酒。

中国制陶的历史（公元前 10,000 年）早于中东（公元前 6000 年），这一点也成为了我们发现的关键。当人们渐渐安定下来，开始种植作物和饲养动物，并发展自己传统的烹饪技术时，他们也会用到各种特制的容器来烹调，储存和盛装食物。而陶制容器上的小孔能够吸收在其中被盛装过物质中、尤其是液体中所含的有机成分，并将其保存几千年。

我们分析过的陶器都是有瓶颈、镶边并带把的陶罐，它们的形状特别适用于盛装液体。为了确定这些发酵饮料的原始成分，我们采用了被称作“残留化合物鉴别法”的鉴定方法。在对多个陶罐中的提取物进行分析后确定，其所含的化学成分相同。其中采集到的蜂蜡成分说明液体中的一种物质是含糖量很高的蜂蜜，因为蜂蜡残留成分保存得很好，并且几乎不可能在鉴定过程中被完全过滤掉。样本中发现的酒石酸的浓度是其在葡萄中含量的三倍，这就说明用于酿酒的水果可能是葡萄或山楂。最后，化学成分分析还证明了稻米是这两者之外的另一种被用来酿酒的主要原料。

人们可以将这种古老的饮料称作“新石器时期的鸡尾酒”。这种饮料可以用蜂蜜酒加一定比例用稻米、葡萄和山楂酿成的“葡萄酒”混合配制而成。我之所以称其为“葡萄酒”是因为它的酒精浓度相当高，达到了 9% 至 10%，高于普通啤酒的 4% 至 5%，而且酒香宜人。

至于人们酿酒时采用了山楂还是葡萄进行发酵，抑或是两者同时被使用，就不得而知了。我认为，经过化学分析，这两种是最可能当时被用于酿酒的水果，此后，一项植物材料学的研究——这在中国还是一门新兴学科——也证明被用到只可能是上述两种水果。虽然这还是不能帮助我们确认到底是两种水果同时被用来发酵，还是只用到了其中一种，但是至少为我们发现正确性又一次提供了有力的验证。

这么早的时期就已利用葡萄酿酒——极有可能是一种在中国本土生长的野生葡萄，比如含糖量在 20%、名为 *Vitis amurensis* 的野生葡萄——这一发现让我们感到难以置信。当前的研究表明，在中国发现的葡萄品种中，还没有一种是人工种植的。当然今后新的发现很有可能会改变这一观点。

这也是迄今为止最早有关古代中国人利用葡萄发酵酿酒的证据。含糖量高的水果表皮上有酵母存在，这也是证明发掘出的容器中的液体并非什么神秘之水，而正是经酵母发酵而成的酒的关键。

同葡萄一样，我们也不知道酿酒时用到的稻米在当时是野生还是已通过人工种植。稻米是淀粉的主要来源，而淀粉分解成的单糖是酿酒过程中不可或缺的。可是，古代的人们是怎样使淀粉水解的呢？在日本和台湾都有现代人通过咀嚼使稻米分解成淀粉的例子；而在美洲，人们也能利用唾液淀粉酶来将多糖分解成单糖，从而酿造玉米啤酒。此外，还可以用使稻米发芽的方法制作麦芽糖，或者运用中国的传统方法，使用一种特殊的霉

（如曲霉 *Aspergillus*、根霉 *Rhizopus*、红曲霉 *Monascus*）来将淀粉糖化。后一种方法直到今天都还被应用在米酒的制作工艺中。

但是，即便大米已经通过糖化和发酵作用分解，还是会有一些残渣漂浮在酒的表面，因此，在饮用中避开这些渣子最好的办法便是使用吸管或是麦管。这曾是在古代的美索不达米亚地区非常流行的一种饮用啤酒的方法。而直到今天，中国南部的一些传统村庄的居民仍然使用此法喝米酒。

按照目前的发现，贾湖古酒的历史要早于所有中东地区发现过的酒，当然，今后在土耳其东部和高加索地区可能出现的新发现也许会改变这一结论。我们认为，东亚和西亚都有可能很早的时期就已开始大规模酿酒。不过中国采用稻米和山楂进行发酵的方法与西亚的制酒工艺有着显著的区别，从另一方面讲，也说明当时两个地区都没有直接地学习对方的酿酒技术。不过我更愿意相信当时的双方在葡萄种植和酿酒技术方面有过交流。在丝绸之路出现以前，这些交流是途经广袤的中亚地区得以实现的。当然，发酵技术应该是在临近地区间分段逐步进行传播的。

这一系列的发现不仅揭示了人类的在利用当地资源制酒过程中所取得的创新性成就，也反映出酒在人类历史的社会、宗教和医学方面均占有的重要地位。

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