

Introduction

Dagmar SCHÄFER

Introduction

This special issue of *Crossroads* is dedicated to the historical role of fermentation and associated distillation methods in Eurasia from the eleventh to the thirteenth century. This project is the partly outcome of a conference held in Salzburg, Austria (2014), jointly sponsored by the Crossroads Research Centre in Salzburg, the Max Planck Institut für Wissenschaftsgeschichte in Berlin, the Hörst Görtz Institut in Berlin, and McGill University. It brought together ten experts: two from Germany, two from Mexico, one from Turkey, one from Korea, one from Mongolia, two from Kazakhstan and one from the United States.

Many, if not all, societies applied fermentation to process and preserve food. The patterns and techniques for its production were as various as the types of raw materials used. People processed sprouted grains, rice and fruits, or animals' milk through moulds, yeasts, and bacteria. Products included beers and wines, and the various Chinese rice liquors, *jiu* 酒, as well as staples such as bean pastes and soy sauce, not to mention cheeses and a multitude of other fermented dairy products. There are also various non-food products manufactured by fermentation, another subject vast in scope.

While basic fermentation processes, natural or controlled, were widely applied, methods of filtering, concentrating, or purifying the desired constituents developed only in some regions, often related to specific raw materials or uses of the end product. Such also was the art of distillation which used the different boiling points of substances to separate a mixture of liquids or to concentrate one constituent.

East Asia's history of food fermentation and associated techniques of distillation are well researched as cultural practices, but also as technology, because historians studied them in close association with the rise of modern science. Yet, as Hsing-tsung Huang insinuated in his expansive study of food technologies in China in Joseph Needham's monumental series *Science and Civilisation in China*, many issues of its development are far from solved. Huang himself in the year 2000 pinpointed, for instance, that the question when alcohol was first distilled on the East Asian plain – and whether this was before or after its popu-

larization in Europe – is “probably the most challenging unsolved problem in the history of chemistry and food science in China”.¹

The challenges that Huang addressed then are still as generic as they are particular to China’s historical sciences. Not only is the existence of a technology that worked with everyday utensils and that was regularly ignored by elite writing hard to prove. As Huang’s question also suggests, the historical association of distillation with trajectories of scientific and technological change has long had ideological ramifications for historical research, as this very technique became increasingly significant for the evolving nineteenth century discipline of chemistry and laboratory science. As such it also carried ideas of “modernity” and rational approaches to cleanliness and health.²

Distillation indeed proved to be an exception in China’s history of “first” inventions (compass, gunpowder, paper, printing) that was in need of further explanation and research because, as the author of the well-known *Materia Medica* (*Bencao gangmu* 本草綱目), Li Shizhen (1525–1593) noted, its most common application of “burning spirits is not a method of the ancients. This method was initiated by the Yuan period”.³

Articles in this volume prove the significance of events and the processes of refinements during the Mongolian era for the development/introduction of a scientific and everyday technique of distillation. The focus of the volume is, though, not on the origin but on the dissemination and popularization of the Mongolian fermentation and distillation method in Eurasia, past and present. The six contributions tackle historical issues on the one hand and, on the other hand, suggest anthropological and scientific approaches on technological change and uses. Angela Schottenhammer draws on recent archaeological research and historical texts to elucidate the role of fermenting and alcohol from Song to the Yuan era. Dashdondog Bayarsaikhan delineates the outsider’s view on Mongolian drinking habits and ceremonial uses of alcohol during the twelfth to fourteenth centuries in relation to modern research on genetic inclinations towards alcohol. Transfer and adaptation are the main themes of the following two articles: Hyunhee Park researches the impact of Mongolian methods on Korea and the locally increasing popularity of *soju* (*shaojiu* 燒酒); Moldir Oskenbay explains traditional technologies of preservation of souring

1 Huang 2000, 203.

2 Rogaski 2004, 121; Willis 2007.

3 燒酒非古法也。自元時始創其法。

and fermenting milks. María de la Paz Solano Pérez moves the view out of Asia. Illustrating alcohol consumption in New Galicia (Mexico) from the seventeenth to eighteenth century, she asks for the shifting view on inebriation from a sacred (and desired) to a profane (and despicable), combining historical, scientific and anthropological method. Batdorj Batjargal finally surveys the nutritional gradient of fermented mare's milk and modern scientific views on its use for the treatment of certain human diseases.

International Workshop

University of Salzburg, History Department

May 11, 12 and 13

“Recovery of Traditional Technologies I: A Comparative Study of Past and Present Fermentation and Associated Distillation Technologies in Eurasia and Their Roots”

May 11, 2015 (Room: HS 382)

15.00–15.20: Welcome and Orientation

Archaeological Evidence from a Yuan Dynasty Tomb (Angela Schottenhammer, Salzburg University)

15.20–16.05: Fermentation, Distillation and the History of Science (Dagmar Schäfer, Max Planck Institute for the History of Science, Berlin)

16.05–16.50: Seeking Perfection through Purification: the Role of Distillation in Islamic Medicine and Alchemy (Sara Nur Yıldız, Orient Institute, Istanbul)

16.50–17.35: The Earthly Path, from the Sacred to the Profane, of Ferments in New Galicia (María de la Paz Solano Pérez, Museo Regional de Guadalajara)

17.35–18.20: Five Types of Distillation Devices Based on Asiatic Stills Used for Mezcal Production in Mexico (Ana Valenzuela, Universidad de Guadalajara)

May 12, 2015

9.15., (Room: HS 381, Foyer): A Mongol-era Arabic-medicine Hospital Manual from China (Paul Buell, Max Planck Institute for the History of Science, Charité Berlin)

(Room: HS 389)

14.00–14.45: Drinking Traits and Culture of the Imperial Mongols in the Eyes of Observers and in a Multicultural Context (Dashdondog Bayarsaikhan, National University of Mongolia, Ulaanbatar)

14.45–15.30: Probiotic Properties of Lactic Acid Bacteria Isolated from Mongolian Fermented Mare's Milk (Batdorj Batjargal, National University of Mongolia, Ulaanbatar)

15.30–16.15: Peter Pallas and the Distilling of the Kalmucks: Accounts from the 18th century (Paul Buell, Max Planck Institute for the History of Science, Charité Berlin)

16.15–16.45: Break

16.45–17.30: Fermented Dairy Products: Methods of making Kazakh Qurts and its Health Benefits (Moldir Oskembay, Al-Farabi Kazakh National University, Almaty)

17.30–18.15: Traditions and Change: Distillation Technology and Mongol Korea (Hyunhee Park, Seoul National University, Seoul)

18.15–18.30: Closing Remarks (Paul Buell)

19.00: Reception

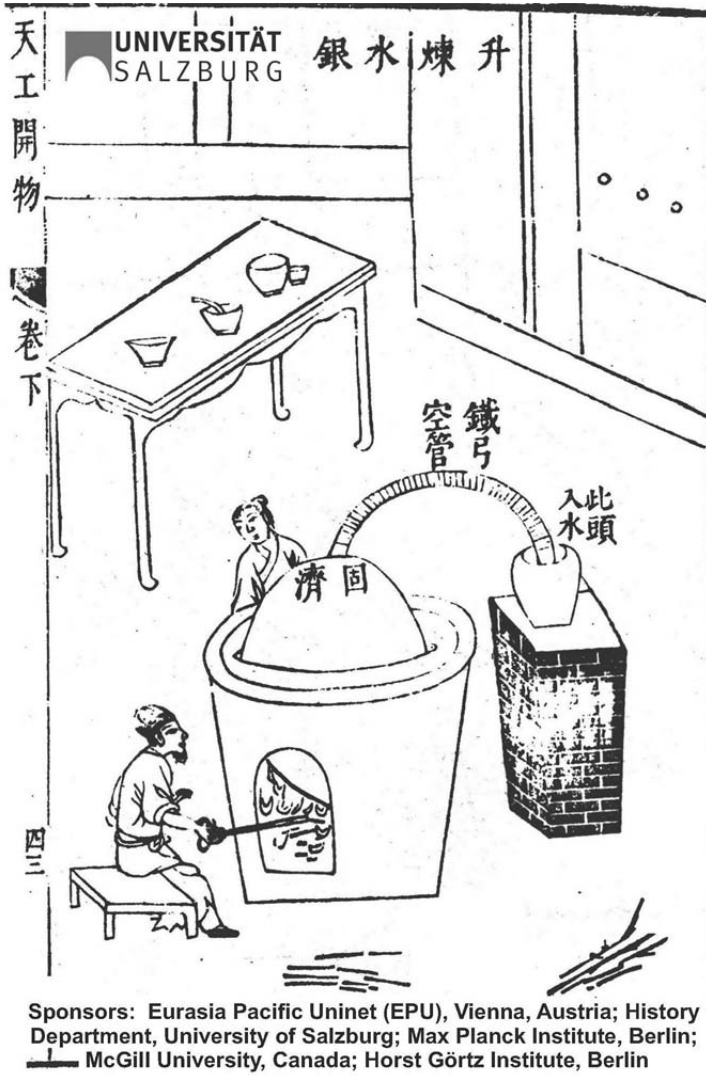
May 13, 2015 (Room: U10)

11.15–12.45: Gastrosophy in México (Ana Valenzuela, María de la Paz Solano Pérez)

(Room: HS384)

14.00–17.00: Internal discussion, future prospects

Organiser: Crossroads Research Centre, Salzburg



From the viewpoint of technological choices, the Mongolian method is special because the raw material was and still is distinguishably local and a cultural choice. Different from the Chinese, who used rice and grains, Mongols habitually collected mare's milk to produce brandy. For this purpose, the milk was left to ferment in the traditional way (in a large bag, positioned near the door so those going in and out can manipulate it to keep the process of fermentation going, vital in making mare's milk ferment) which generated a low proof liquor.

The process is well-documented. The result, *kumiss* or *kymiz* among the Turkic-speakers, *airag* among the Mongols, is still the great prestige food for Altaic peoples. But even when clarified (*kumiss* is usually white and opaque unless clarified), the product of such fermentation was vulnerable to decay. Mongol rulers placed great importance on distilling the mare's milk, as they used its rarity to establish it as a prestigious status-food that they then highlighted in secular and religious ritual, also as a way to keep their retainers happy.⁴

Political ambitions and changing power schemes (by the early era of the *Pax Mongolica* in the thirteenth century various Mongolian tribes dominated almost the entire Asian continent) led to the wide-spread importance of distillation among the cultures of the Eurasian heartland. While the types of still may have varied locally, the word for distilled liquor, *aragi*, seems almost the same everywhere, quickly achieving general validity as a summary designation for distilled liquors all across Asia.

Researchers are particularly prone to use textual sources, though it is primarily archaeological and iconographic evidence that has thus far helped substantiate the greatest concern of modern Chinese historians, namely to verify the earliest use of distilling techniques. This volume, emphasizing the Mongolian side, aims at introducing a counterpoise to this historical obsession with text. Adjacent studies also reveal the challenges and opportunities of studying a topic and practice that often lived and developed beyond the radar of written historical accounts.

In fact, artefactual and archaeological studies, often pursued by Asian researchers, frequently offer only inconclusive evidence on this technique that only very late in history came to rely on specialized glassware, such as vessels with long necks pointing sideways at a downward angle, copper alembics or plastic tubes. In principle, this technology could be surely implemented through the use of everyday means and utensils. The adept only needed to control temperature (firing, steaming, or freezing) and then simply figure out how to arrange a set-up that allowed the separation of liquids by using their different boiling points and contain the desired substance(s) in one or the other container for further use. In principle, almost all pots with lids and covers were suitable. Poetry and novelistic accounts of this region by contrast indicate that alcohol was widely known, though it might not have been distilled. Other distilled

4 F. Luo 2012. Note that the cow's milk distillate is, in any case, in no way inferior to that made from horse's milk even if perhaps more mundane.

substances such as perfumes, however, were common-place goods, which implies that the principle was widely known. Beyond food production salt brokers regularly applied what we now call simple and fractional distillation, dissolving salt from water.⁵ Doctors and pharmacologists concocted medicines. Housewives and farmers refined vinegar and extracted essences such as blood from animals or oil from plants that they then refined and fortified also through distilling to produce dyes, soap ingredients or food.

Encountering such ubiquitous references, technological cross-fertilization seems increasingly more likely. Since the products vanished after use, such issues are as difficult to study as it is difficult to find conclusive evidence of where distillation could have been used for the first time, used the most or used to produce the most significant outcome. When considering all of the involved factors, researchers nowadays assume that fermentation and associated techniques of filtering and concentration by distillation had multiple origins and ongoing variations.⁶

But it is also true that new scientific research methods, such as the biological analysis of ancient remains of dried yeast that scientists undertook to answer origins and authenticity concerns, offer interesting avenues to think with and about the local boundedness of techniques in knowledge transfer. Brewery sites were discovered in 1999 in Sichuan and later in 2002 in Jiangxi. Both finds suggest that a few actors may have occasionally monopolized the techniques and dominated the trade. Asian historians regularly connect early traces of alcohol production to celebration rituals, political and social feasting, or Daoist healing *neidan* 内丹 traditions.⁷ Historical records from later periods contain legal measures against the consumption of alcohol, or measures penalizing its extensive use. Song traditions, from a period during which alcohol and alcohol-related discourses move increasingly into public view with the ascent of wine-houses on city streets, are especially well-studied.

It is thus clear that also before the Yuan alcohol fulfilled social, ritual, and political needs in dynastic China. However, how much of this alcohol was distilled is open to debate. That most research on alcohol by historians in China concentrates on the Song – and not the Yuan or later periods – tellingly underlines that the concern with origins has yet to be overcome.⁸

5 Zhou, Martín-Torres, Chen and Li 2014; Zhou Wenli 2014, 307-319.

6 Edgerton 2008.

7 Chen Jian 2001.

8 Li Huarui 2001; Cao Yuanyu 1979.

The lack of written accounts on distillation constitutes a spur to transdisciplinary approaches. On the Jiangxi site that covers in total 15,000 m² and on which more than 800 utensils were revealed, archaeologists, ethnobotanists, historians, and geneticists studied liquor production from the Song dynasty, into the Yuan and Ming as well as the late Qing Dynasty. Researchers divulged a hugely specialized trading site. Utensils for steaming rice evolved in that period into liquor steamers. This steamer could produce more than 250 kg in one go. There were places for cold and hot water distillation processes. A mould-like distiller was used and a steel wok/pan was added. The final alcohol product was stored in cellars with an attached kitchen including a stove which could be used for steaming as well as for the distillation. Some of the utensils resemble those still in use at the surrounding villages today, indicating also the importance of studying the survival of such techniques in contemporary times.⁹

Modern chemical and genetic analyses also enable researchers nowadays to show that the basins found in these cellars were used for unfiltered wines and beers. We could also posit that these were used to ferment the sorghum. In front of the stove we can find three platforms, probably used to dry the original materials, for stirring and saccharification. Shards of several sizes indicate refilling practices. Distillers' grains were collected by Chinese scientists, who attempted to revive the microorganisms for future use.

I brought up this example to illustrate the opportunities for transdisciplinary research, combining methods of the historical and natural sciences. The changing landscape of modern scientific methods, such as ethnobotany, archaeology or microbiological research have helped in the recent decade to elucidate what has not been commented on in texts. Without doubt, by digging into the past, natural science research also plays an important role in shaping the future, and there are challenges here too, for instance, when textual and archaeological records are referenced to provide hard evidence for the historical authenticity of China's old brands (*lao zihao* 老字號)¹⁰ within a globalizing market economy. Consider for instance the now world-renowned and brand-protected Shaoxing wine (*Shaoxing jiu* 紹興酒).¹¹ As the economy is prospering, and the modern urbanized Chinese life style has developed a taste for European wines, the local industries try to latch on incentivizing its customers to

9 Fu Jinqun 2003.

10 Wang Yongbin 1999.

11 Hamilton 2006.

buy “indigenous” products, especially those with a seemingly culturally rooted and older pedigree too.

Historical accounting has also become of central relevance to a newly global Chinese medical culture, with newly emergent biomedical and food cultures that draw on seemingly historically prevalent techniques. A research group in Maoist China thus claimed to have been guided by a fourth-century Chinese medical text when they distilled artemisinin (now a vital antimalarial drug) from the medicinal plant *qinghao* 青蒿.¹² Such examples illustrate that scientists make history as much as historical research stimulates scientific method. Research agendas are mutually informative and should be reciprocally informed.

It has thus been the aim of this issue of *Crossroads* to combine the view of the historical objects of fermenting and alcoholic drink with that of ethnobotanical and anthropological research on these themes. We can see that *arqi*, said to have first appeared among the Mongols as a general designation for distilled liquors, seems almost the same everywhere. But as Angela Schottenhammer also reveals, Chinese historians and archaeologists in the past decade have dedicated substantial resources to tracing the historical development of distillation in earlier times. Schottenhammer’s work has divulged not only the “Chinese” origin of this everyday technique, but also displays in the same vein how substantially Mongols changed the cultural role of alcohol and influenced the development of the distillation technique in Asia, whereas María de la Paz Solano Pérez shows that technical change as well as cultural exchange went hand in hand in the secularization of stills in Mexico. As Hyunhee Park illustrates, origin, transfer, and notions of adaptation of what was a new technology or product line has also dominated research on Korean spirits and stills. Linguistic and scientific analysis as well as textual research indicates furthermore that as Mongolians were popularizing new drinking habits throughout East Asia, their techniques of fermentation and distillation also catalyzed new developments in Korea. There, the technology of alcohol production localized and led to the rise of *soju* (*shaojiu*), a brandy with an alcohol content of more than 20%.

The Korean story of alcohol is one example showing that historical research on localizing traditions of food and drink has achieved an ambiguous political status in Asia, as a political means of cultural identity construction, not only since the UNESCO policy on Intangible Cultural Heritage. But as Batdorji

12 Hsu 2015.

Batjargal also emphasizes in this volume, history can as well act as a central counterpoise by showing that drinking habits may have been less erratic and uncontrolled as the public memory of historical Mongolia suggests.

When Batdorji Batjargal by these means also divulges the political nature of a scientific research that leads geneticists to search for a “Mongolian” drinking gene, she shows that history is important to science as much as that scientific analysis is utterly historical, not only when it helps to elucidate the production process of traditional technologies that textual sources do not sufficiently or not at all describe. In this sense this special issue also highlights that the subtle entanglement of science and history and the politics that surround both fields require more attention.

This volume thus encourages us to think across disciplines and to make new connections. Anthropologists in particular deal with topics in theoretical ways that historians do not. Where historians see a bag of fermenting *kumiss* hanging to one side of the threshold as part of the fermentation or distillation process, the anthropologist sees social interaction and a broader social context within which the fermentation takes place. In this sense this special issue seeks to contribute to the beginning of a discussion on the historical development and use of a ubiquitous technology as much as it wishes to advance transdisciplinary discourse.

Bibliography

- Andrews, Bridie. *The Making of Modern Chinese Medicine, 1850–1960*. Vancouver: University of British Columbia, 2014.
- Cao Yuanyu 曹元宇. “Shaojiu shiliao de souji he fenxi” 烧酒史料的搜集和分析 [Analysis of collected historical sources on brandy], *Huaxue tongbao* 化学通报 1979.2 (1979), 68-69 (164-166).
- Chen Jian 陈剑. “Sichuan jiuwenhua kaogu xin faxian shuxi” 四川酒文化考古新发现述析 [Analysis of new excavations of alcohol culture in Sichuan], *Zhonghua wenhua lunyun* 中华文化论坛 2001.2, 129-133.
- Edgerton, David. *The Shock of the Old: Technology and Global History since 1900*. London: Profile Books, 2008 [2006].
- Fu Jinquan 傅金泉. “Cong Lidu yizhi kan woguo baijiu shi” 国白酒史 [Discussion on Liquor History in China through the Study of Lidu Memorial Site], *Jiuliang keji* 酿酒科技 2003.3, 95, 94.

- Hamilton, Gary G. *Commerce and Capitalism in Chinese Societies*. London: Routledge, 2006.
- Hsu, Elisabeth. “From Social Lives to Playing Fields: ‘the Chinese antimalarial’ as Artemisinin Monotherapy, Artemisinin Combination Therapy and Qinghao Juice”, in: Pordié and Hardon 2015, 75-86.
- Huang, Hsing-tsung [Huang Xingzong 黄兴宗]. *Fermentation and Food Science*. Science and Civilization in China (ed. by Joseph Needham), Vol. 6: Biology and Biological Technology, Pt. 5. Cambridge: Cambridge University, 2000 [Chin. tr. Beijing: Kexue and Shanghai: Shanghai guji, 2006].
- Li Huarui 李华瑞. *Songdai jiu de shengchan he zhengque* 宋代酒的生产 and 征榷. [Wine production and tax monopolies during the Song Dynasty]. Baoding: Hebei daxue, 2001.
- Luo, Feng [Luo Feng 罗丰]. “Liquor Still and Milk-Wine Distilling Technology in the Mongol-Yuan Period”, in X. Luo and Covey 2012, 487-518.
- Luo, Xin [Luo Xin 罗新], and Roger Covey (eds.). *Chinese Scholars on Inner Asia*. Bloomington: Sinor Research Institute for Inner Asian Studies, Indiana University, 2012.
- Pordié, Laurent, and Anita Hardon (eds.). *Drugs Stories and Itineraries. On the Making of Asian Industrial Medicines*. Special Issue of *Anthropology & Medicine* 22.1 (2015).
- Rogaski, Ruth. *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China*. Berkeley: University of California, 2004.
- Wang Yongbin 王永斌(ed.). *Beijing de shangyejie he laozihao* 北京的商业街和老字号 [Beijing's commercial streets and old brands]. 3 vols. Beijing: Yanshan, 1999.
- Willis, Justin. “‘Clean Spirit’: Distilling, Modernity, and the Ugandan State, 1950–86”, *Journal of Eastern African Studies* 1.1 (2007), 79-92.
- Zhou Wenli 周文丽. *Jian gu zheng jin: chuantong gongyi yu keji kaogu wencui* 鉴古证今—传统工艺与科技考古文萃 [The technological traditional of zinc distillation and other crucible smelting processes in China]. Heifei: Anhui kexue jishu, 2014.
- Zhou, Wenli, Marcos Martínón-Torres, Chen Jianli, and Li Yanxiang. “Not so Efficient, but still Distilled: The Technology of Qing Dynasty Zinc Production at Dafengmen, Chongqing, Southwest China”, *Journal of Archaeological Science* 43.3 (2014), 278-288.