The Ancient Indian Alcoholic Drink Called *Surā*: Vedic Evidence

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A drink called *surā* is the alcoholic drink mentioned in our oldest Indian text, the *Ṛg Veda*, and people continued to make a drink called *surā* for millennia. This article uses the methodology of the comparative study of fermentation methods in order to make sense of the earliest descriptions of *surā* brewing processes. *Surā* was brewed in a semi-solid state, using malts for saccharification, perhaps also with a complex microbial ferment starter as one sees elsewhere in Asia today. *Surā* was not distilled. Understanding this has philological value: if *surā* was brewed with this process, we can better understand certain words associated with *surā* in Vedic texts, e.g., the drink called *parisrut* ("fluid[-grain mixture]"), certain material objects (the *kārotara* filter-structure), and certain processes (*surā*, etymologically as squeezing or pressing). Although brewing instructions are varied and may reflect several modes of brewing, and although the process in surviving descriptions may have been ritually inflected to highlight resemblances with soma pressing, I argue we can still get a sense of the basic method of brewing. These are some of the earliest detailed descriptions of brewing a grain drink that, considered in the long term, has similarities with both Mesopotamian brewing and East Asian methods.

INTRODUCTION

An intoxicating drink, apparently alcoholic, called *surā* (*súrā*) is mentioned in our earliest Indian texts: the *Ṛgveda* and other Vedic sources.[1] This literature contains references to the components of this drink, the process of brewing it, and material objects connected to brewing, as well as other related drinks. This body of material is our earliest textual evidence for alcohol production in South Asia, a region often neglected in world histories of drink and drinking. The word *surā* remained remarkably stable in Sanskrit, and people made a grain drink called *surā* in Sanskrit texts for millennia in South Asia. Yet ancient *surā* as described in our sources is quite different from the *surā* from about the turn of the Common Era, which I explore elsewhere.[2]

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1. Here I examine *surā* as a named grain drink in Vedic texts. The word *surā* is also used in a derived, more generic sense to mean loosely "alcoholic drink," and in later sources a legal definition of *surā* as threefold, made from grains, jaggery, and honey/grapes, is quoted and reworked in many texts (originating in *Mānavadharmaśāstra* 11.95). I discuss these other uses of "*surā*" along with *surā* drinking culture, drinking laws, and the ritual uses of *surā* in a monograph (McHugh forthcoming a), where I also provide a much abridged version of this article.

2. McHugh forthcoming a. Later *surā* uses the method common in much of Asia where a starter (*kiṇva*, not containing malts in the recipe we have) is added to grains and achieves both saccharification and fermentation.

In this article I re-examine the earliest evidence for *surā* in order to find out exactly what sort of drink it was.[3] Comparing *surā* brewing to the production of other drinks in pre-industrial and traditional contexts helps us better understand how ancient *surā* was made. Once we understand the nature of *surā* and *surā* brewing we can make better sense of a number of words and concepts associated with this drink. Thus my method here is philological, but incorporates the comparative study of brewing technology.

MAKING INTOXICATING DRINKS FROM GRAIN

First, how does rice or another grain become an intoxicating liquid? In a simplified modern understanding of alcoholic fermentation, yeasts convert sugars to ethanol (alcohol).[4] If you start out with a sugary liquid, such as grape juice, you just introduce a yeast culture, but even this is unnecessary if yeast is naturally present in/on the sugary substance such that it will "spontaneously" ferment. (Note that in early periods people were not aware of the existence of yeast as we are today.) You also need to provide good fermentation conditions. Of course, making a drink such as wine is a complex affair, even when done in a premodern manner, but I leave that aside here.

Another major source of alcoholic drinks is cereal grains, used in making drinks such as beer and Japanese sake. Such grains, often a staple food, contain starches. In order to make an alcoholic drink from cereal grains you need to convert the starch to a fermentable sugar, a process called saccharification, which we now understand to rely on enzymes. Around the world humans have discovered many ingenious ways to achieve saccharification, but traditionally there are three sources of enzymes: sprouted grains, especially malted barley (= beer), starch-digesting (amylolytic) fungi (= Japanese sake, Chinese *huangjiu*), and salivary enzymes.[5] The most important drink produced by the use of salivary enzymes is *chicha* from the Andes region. This process need not concern us, as this method is not used in South Asia, nor has it ever been used there as far as I am aware, though the process may have been used in Japan at an early period (Huang 2000: 154).

As we will see, ancient Indian texts and modern ethnobotanical research reveal that in South Asia saccharification of starches to make alcoholic drinks has been achieved both with malted grains and with microorganisms. In the malting process cereal grains are moistened and allowed to germinate so that they produce saccharifying enzymes. These grains themselves become sweeter. The grains can be dried and stored in this malted state. When malt is crushed, mixed with water, and heated, the action of the enzymes is completed and remaining starches are converted into sugars. Sometimes the malted or unmalted grains may be toasted or even blackened to add flavors and colors (as in, e.g., Guinness). Many grains

Sometimes herbs are added in a mixture called *saṃbhāra*. The recipes are often simpler than the ones given in Vedic sources (i.e., grains + *kiṇva*), and mostly do not use malted grains.

3. There is no space here to give a bibliography of all references to this drink, as most works dealing in depth with Vedic religion touch on the subject, and the notion that it is some sort of "beer" is not new by any means. Kolhatkar 1999 is a study of the drink and its use in Vedic ritual, with a detailed bibliography. Kolhatkar describes the brewing process in detail, but is less interested in the technical manner of fermentation from a comparative point of view, something I argue here can elucidate much about *surā* the drink and the words associated with brewing. I have found it useful to deal with fewer of the recipes than Kolhatkar tackles, as collating all the data makes for a confusing picture.

4. For simplicity I refer to ethanol as "alcohol" and lump all sugars, maltose, etc., together as "sugar." The same goes for "yeast" and "starch." I often use the word "liquor" in the sense of an alcoholic drink, though *not* in the sense of a distilled drink.

5. On fermented foods where ethanol is a major product, with descriptions of the methods of fermentation, see Steinkraus 1996: 363–508. I derive much of the below account from this source.

can be malted, but malted barley contains a high quantity of the right enzymes, such that one can even use malted barley alongside other *adjunct* unmalted grains such as maize or even potatoes. German beers made to purity laws and "single malt" whiskies use only barley, but many other drinks use a combination of grains, including many mass-produced American beers and also American whiskies. One can supplement malt-based beers with sugars from fruit, sugarcane, dates, or honey, and these materials might carry native yeasts (McGovern 2009: 68).

The extracted sugars are then fermented with yeasts and sometimes with other microorganisms. These transform the sugars to alcohol and produce a variety of substances that contribute flavors, acidity, and even B vitamins, the latter rendering some less-filtered beers more nutritious than cooked unfermented grains alone (though I do not propose any sort of medical materialist argument here).[6] Note that ethanol has a calorific value, something that was considered to be a good thing in many cultures. In pre-industrial brewing, yeast is not added as a purified, isolated microorganism but might simply be present on the vessels used, on a special tool, or in some of the previous batch. In some methods a separate mash of saccharified grains is treated to allow the yeasts and acids to develop, as one sees with Japanese *kimoto* "yeast." In addition to alcoholic fermentation, bacterial lactic acid fermentation, "souring," helps yeasts to thrive and suppresses undesirable organisms (Steinkraus 1996: 410). Maintaining an even, favorable temperature for fermentation is vital.

The mash of grains can be filtered before fermentation to make a sugary "wort" (this is the process in English beer), or the fermentation may take place in an unfiltered mixture of grains and ferment. Most modern beers are pasteurized and can thus be stored and transported. The sorts of beers I am concerned with in this article are not so treated. Some such drinks do not keep for very long, but others with higher concentrations of alcohol (like Chinese yellow "wine") can be aged if stored carefully.

Non-industrial brewing processes are often more complex than modern ones, involving many stages and materials. To make Kenyan *busaa*, maize is ground, mixed with water to make a dough, and fermented at room temperature for three or four days (Steinkraus 1996: 429–32). This dough is powdered and toasted and can be stored in that form. Separately, finger millet is soaked in water, drained, and allowed to germinate for a few days. Then the millet is dried and ground, and this flour can also be stored. To brew *busaa* the roasted maize flour is mixed with water in a pot, the germinated millet flour is added, and the mixture fermented for two to four days. Note that two grains are used, one malted and one fermented and roasted. The roasting contributes flavors and color. In Sudanese *merissa*, only sorghum is used, which is treated in several ways: fermented, toasted, re-fermented, half-cooked into a paste, and well-cooked into a paste. Most importantly for us here: the substances/preparations at all these stages are referred to by different words (Steinkraus 1996: 432–33).

Another method of saccharification that is common in Asia, based on the use of certain molds, is still used in parts of India today, and I believe this method was also used in this region in the past, possibly even in the earliest period for which we have textual evidence. In this process one inoculates cooked grains with both sugar-producing molds and alcohol-producing yeasts and they (typically) work simultaneously on the grains, which ferment, liquefy, become sweet, and produce an alcoholic drink. Note that the grains transform from

6. Comparing African kaffir beer made from maize with equal quantities of unfermented grains, Steinkraus writes (1996: 414), "Most notable is the doubling of riboflavin and near doubling of nicotinic acid in the diet containing beer due to synthesis of vitamins during malting and fermentation . . . There is very little loss of calories during the fermentation. Persons consuming beer over a number of hours while working will utilize most of the ethanol for energy. Approximately 35% of the calorific intake of workers comes from beers."

a soft, semi-solid mass to a more liquid form that may then be filtered to remove remaining solids. The traditional terminology for such a simple process might also be simple: "grains" + "ferment." Yet as with malted drinks this process can be broken down into many stages and elements. The results vary from fragrant, clear, highly alcoholic drinks like sake—up to 20% alcohol is possible in some circumstances—to sweet/sour pastes that are eaten more like food.[7] How might we recognize liquor made in this way based on ancient textual descriptions? Most probably from an absence of malted/sprouted grains in the process and/or the use of an essential substance that apparently achieves both saccharification and fermentation.

Today in South Asia many drinks are made using this yeast/mold-process, with an impressive diversity in northeast India and the Himalayan region. Here people use dried cakes of rice flour that are naturally inoculated with the desired microorganisms and sometimes herbs (Steinkraus 1996: 450–80). A drink called *handia* (called *haria* in West Bengal) is made today by the Santhal people of Odisha. To make *handia*, de-husked rice is boiled and then spread on a mat to cool. Then several olive-sized tablets of a substance called *ranu* (sometimes called *bakhar*) are powdered and mixed with this cooked rice.[8] The *ranu* can be bought ready-made in the market or prepared at home. It is made from unboiled rice flour and powdered herbs mixed with water to make a dough. This is fermented in layers separated by straw, and then dried in the sun. When I observed the drink being made, about twelve *ranu* tablets were used for one pot of rice.[9] The cooked-rice and *ranu* mixture is placed in a large earthernware pot called a *handi*, from which the name of the drink is derived. After around four days the drink is ready. When I observed the first stages in the making of *handia* and tried the finished product, my informants told me that about three hours before the drink is collected, water is added to the jar and then the drink can be taken unfiltered, or a stronger (undiluted?) filtered version can be made, which is sold for twice the price. Another report of the drink describes a supernatant layer that is collected (Panda et al. 2014: 149–56). The drink as I tasted it was at room temperature, with no noticeable effervescence. It was slightly milky white in color, acidic, and refreshing, with a slight aroma and taste of yeastiness, with very little flavor of rice and none of the sorts of flavors and odors one gets in sake and Chinese "yellow wine." Analysis of several samples of *handia* shows that it contains approximately 1.3% alcohol (Panda et al. 2014: 154).

There are several ways of separating fermented drinks from residual solids in this type of brewing. In some cases people immerse a strainer into the mash, making a well of sorts. The drink is then scooped *up*, having seeped inside the strainer.[10] Sometimes the inoculated rice is placed in a cone-shaped basket from which the drink *drips down* as it is produced.[11] Sometimes the fermented drink is diluted and drunk as it is with the pieces of grain present, or this diluted drink can be filtered and *squeezed out*, say using a cloth. Sometimes a layer of clear liquid settles on the top of the mixture, and that layer is collected to drink.[12] Sometimes a filter-straw is immersed into the mash of grains (which can be diluted with water)

7. For a survey of many of these preparations see Steinkraus 1996: 439–81. The literature on the drinks of the northeastern states of India and the Himalayan region is too large to cite here.

8. For the similar Nepali *marcha* and several other similar starter cakes see Tamang 2010: 188. It is hard to exaggerate the economic importance and vast variety of these starter cakes in Asia.

9. I would like to thank Baidar Murmu of the Santhal community, as well as Dr. Purusottam Pattanail and Nilamadhaba Kanhar at the Tribal Museum Bhubaneswar, for arranging for me to see the production of *handia* in Bhubaneswar in the fall of 2015.

10. As in Malaysian rice wine: Steinkraus 1996: 469.

11. As in *ruhi* made in northeastern India: Steinkraus 1996: 474.

12. As in Philippin *tapuy*: Steinkraus 1996: 470.

and a liquid sucked out.[13] Or the liquefied grains can be filtered vertically, dripping down. I emphasize these options as they relate to one ancient Indian description of brewing, which I examine below, that has been called a description of distillation on the basis of such dripping and other elements. As will become clear, postulating ancient Indian distillation is absolutely not necessary to explain such movements of fluids.

People have also combined the malt method with the fungal saccharification. Although scholars of ancient Chinese texts on making "wine" (*jiu*) face similar difficulties to scholars of Sanskrit in ascertaining what substances and processes texts refer to, some early versions of Chinese wine were made with cooked grains, a ferment-substance, sprouted grains, and water. As Huang (2000: 163) notes of this procedure, "the sprouted grain could give a head start to the liberation of sugar so that the yeast present could begin proliferating and fermenting before the arrival of fresh fungal enzymes in quantity."

I should add that the work of the archaeologist Patrick McGovern (see esp. McGovern 2009) has also revealed the complexity of ingredients used in some ancient drinks in various regions, involving mixtures of grains, fruits, honey, and herbs. Such residue analysis of vessels from South Asia and Central Asia would be of great value to the study of ancient drinks for these regions.

The above complexity of stages, processes, names, as well as the use of herbs, is typical of many traditional grain drinks. It is also exactly what we see with the earliest *surā*. If the reader is confused, that is a good thing. Imagine if *surā* making was almost as elaborate as Sudanese *merissa*, yet all we now possess are schematic textual descriptions of the process in Sanskrit, and these texts are highly stylized, sometimes overlaid with allusions to preparing another quite different, raw, unfermented drink called *soma*.[14] Such is our starting point for ancient *surā*.

THE NATURE OF THE VEDIC EVIDENCE FOR *SURĀ*

There are references to *surā* in the *Ṛgveda*.[15] Yet, unlike with the drink called *soma*, these references reveal little about how *surā* was prepared.[16] Two quite early Vedic hymns, from the *Atharvaveda*, contain references to brewing, and I examine one of those below. But most of our detailed information on brewing is later, from texts on ritual performance, the *Śrauta Sūtra*s, which contain relatively detailed instructions on how to make *surā*.

The recipes in these texts vary, but in terminology they are all aligned with a single schema for *surā* brewing implied by the words of sacrificial formulas, *mantra*s, given in texts on ritual exegesis, the *Brāhmaṇa*s, which are early, though later than the *Ṛgveda*.[17] We might compare how Christian liturgy mentions water and wine, yet the actual practice in different traditions varies, with some Protestants even using pasteurized grape juice. Likewise with these Vedic texts there are two layers: a terminology used in liturgy that is common to all the recipes and the various corresponding brewing methods in different texts on ritual practice. These latter methods, though aligned with an inherited schema, are all plausible brewing

13. As with the *tongba* used in parts of the Himalayas: Tamang 2010: 200–203.

14. The *soma* drink was made by moistening and crushing stems of a plant and filtering the juice, which was then mixed with milk.

15. On the scant information we can infer from references to *surā* in the *Ṛgveda*, see below.

16. In the *Ṛgveda* a grain (*yava*), which is often translated 'barley', is evidently the most important grain, wheat and rice being absent, so perhaps early *surā* was largely *yava* based? (Prakash 1987, vol. 2: 59–65). On translating ancient words for grains see below.

17. "Recipe" is imperfect for these liturgical instructions, but a useful shorthand. For the *mantra*s associated with the brewing see Dumont 1965. Also Gonda 1980: 63–193.

processes. These methods may even preserve some features of ancient brewing because of the conservatism of ritual. Thus the recipes may help us to work out what the ancient, shared brewing schema might have looked like in practice, as well as revealing a variety of later brewing methods.

Possibly the schema in the liturgy and the various methods in the ritual texts may have seemed quite unlike contemporaneous brewing to people using these texts as centuries passed, adding yet another later of complexity. Given this complexity, can we learn anything from these texts? The conservatism and "Vedic structuralism" of these rituals and texts have surely obscured a lot. And no doubt the priests and teachers involved with these texts and rituals may not have been experts in making *surā*. Yet it would be a remarkable coincidence if a description of manipulations of grains and pots and filters, contrived for ritual and scholarly reasons, just happened to be a plausible brewing process like some of those we saw above.

Sorting out the tangle of all the Vedic texts that deal with making *surā* and how they and their recipes relate to one another, not to mention the question of their dates, is not a task I can attempt here, nor am I qualified to do so. Nevertheless reading just a few selected recipes and focusing in detail on one recipe will give a sense of how *surā* brewing was supposed to work in the first millennium BCE in parts of South Asia.

Let us begin by asking why these texts describe *surā* brewing. *Surā* brewing is a key element of the Vedic sacrifice called the Sautrāmaṇī, and *surā* is also used in some other Vedic rituals.[18] In Vedic sacrifices the usual drink that causes some sort of altered state of consciousness (*mada*) is the famous *soma*, a substance I will not consider here. In the Sautrāmaṇī, however, *surā* is offered to the twin Aśvins, to Sarasvatī, and to Indra Sutrāman ('Indra of good protection'), from whom the ritual derives its name.[19] Jamison (1991: 98) writes that the "*Sautrāmaṇī* is a healing or reinvigorating ritual, and, curiously, involves the drinking of surā, otherwise forbidden to Brahmans. This ritual is prescribed for people in a number of circumstances, but the common thread that connects them is loss of strength or vigor." One also performs the sacrifice for one who has vomited or purged the *soma* drink (and is thereby weakened) (Jamison 1991: 99). I discuss the significance of *surā* in Vedic rituals elsewhere, where I argue that the nature of *surā* (cooked, local, squeezed, staple-food-based, possibly the common drink of the masses) and the religious significance of the drink are not entirely unconnected.[20]

18. As Kolhatkar (1999: 3) writes, ". . . it is only the *sautrāmaṇī* sacrifice in which *surā* is **offered** and even **consumed** by the **sacrificer** and also by the **priests**" (my emphases). *Surā* is also used in the Vājapeya sacrifice, the Rājasūya, and the Punarabhiṣeka, and in some Gṛhya rites (ibid.), though it is only in the Sautrāmaṇī that the brewing process is an intrinsic part of the liturgy and thus described in such detail. Indeed, the drink used in the Vājapeya sacrifice is the related drink *parisrut* (discussed further below). We have no brewing instructions for the Vājapeya. At ŚB V.1.2.14 the *parisrut* for this sacrifice is clearly obtained ready-made, though at ĀŚS XVIII.1.9 it is said to be brewed using the manner for preparing *surā* (*surāyāḥ kalpena surāṃ saṃdadhāti*), perhaps because *parisrut* was not always readily available in later periods (especially for brahmins)? No more details are given there, and with regard to his translation of this passage (Caland 1928 ad loc.) Caland plausibly suggests the brewing instructions for the Sautrāmaṇī are implied. As far as I am aware there are likewise no instructions on preparing *surā* for the Rājasūya and Punarabhiṣeka. On *surā* in these rituals see Kolhatkar 1999: chs. 2, 3; and on the significance of *surā* in the Rājasūya see Malamoud 1992: 30–31.

19. On this ritual, in addition to Malamoud 1992, see Kolhatkar 1999; Jamison 1991: 98–103; Oberlies 1998: 293–95.

20. See McHugh forthcoming a, chapter on mythology and ritual. Steiner (2001: 375) suggests that the material nature of *surā* does not matter for the interpretation of the ritual. Although I agree in some respects, I believe that the origin of *surā* in common food grains and the distinctive labor of brewing both deliberately contrast with *soma* pressing. *Surā* brewing could no doubt be seen in the village far more often than in the sacrificial area, unlike the pressing of imported, exclusive *soma*. Indeed Steiner does note this food-related and everyday nature of *surā*

One Vedic *Surā* "Recipe"

The recipe below is from the *Baudhāyana Śrauta Sūtra*, from a description of a version of the Sautrāmaṇī sacrifice called the *Caraka Sautrāmaṇī*.[21] The date of this text is uncertain. Many scholars believe this is the earliest of the *Śrauta Sūtra*s (texts of practical instructions for major rituals). For our purposes we need only know that the text was composed prior to the turn of the Common Era, possibly sometime around 500 BCE.[22]

First there is a list of items one obtains for the sacrifice (BŚS 17.31). Among many items of ritual use (tiger hair) and practical use (a stand for a pot), the *surā* components one obtains are "*śaṣpāṇi ca* (sprouted barley), *tokmāṇi ca* (sprouted rice), *vrīhīn* (rice paddy, that is to say, rice that still has the husk on it), *nagnahuṃ cūrṇakṛtaṃ* (powdered *nagnahu*, probably a ferment additive of some sort that has been powdered, which implies two things: it is dry and it starts out as a solid mass)." Note that the *nagnahu* is obtained ready-made in this case. The sprouted grains are referred to as *surāsoma*, and thus compared to the *soma* stalks that are processed to make the *soma* drink. Yet whereas *soma* the plant and *soma* the prepared drink have the same name, this one term excepted, the raw materials for *surā* and the drink itself do not.

One places these materials near one of the three fires of the sacrificial area, the *gārhapatya* fire, in which the foods to be offered in sacrifices are prepared, functioning as a sort of domestic "householder's" ritual kitchen:[23]

> BŚS 17.31 . . . *Athaiteṣāṃ vrīhīṇām ardhān avaghnanty. athetarān gārhapatya ekakapālam adhiśritya bharjanti. teṣāṃ ye phalanti lājās te bhavanty. atha ya u na phalanti tās taryo. gārhapatye navāṃ kumbhīm adhiśritya prodakam ivaudanaṃ śrapayanty. athainaṃ visrāvya kaṭhine vā pājake vā viṣajanty athainān bhṛgṇān avaghnanty. teṣāṃ yāni ca kṣudrāṇi yāś ca taryas tā utseke saṃprakiranti. taṃ māsara ity ācakṣate. 'tha mānam ādāya vimimīta ekaṃ śaṣpāṇāṃ dve tokmāṇāṃ trīṇi lājānāṃ catvāri nagnahor athaitam odanaṃ cūrṇair anuprakiran māsareṇāvokṣan saṃpādayati*.
> 17.32 . . . (mantra)
> *athaitām āsandīm agreṇāhavanīyaṃ paryāhṛtya dakṣiṇato nidadhāty. asandyām iṇḍvam iṇḍve kumbhaṃ kumbhe kārotaram avadadhāty athaitam odanam abhitaḥ kārotaraṃ paricinoty athainam apidhāyābhimṛśati* . . . (mantra)
> *tisraḥ saṃsṛṣṭā vasati. tisro hi rātrīḥ krītaḥ somo vasatīti brāhmaṇam* . . .
>
> BŚS 17.31 . . . Then they pound (*avaghnanti*)[24] half of the paddy (*vrīhi*). Then, placing an earthen pan upon the *gārhapatya* fire they parch[25] the other half [of the paddy]. Such of these as burst open (*phalanti*) become *lājā*. Such, indeed, as do not burst open, they are *tarī*. Placing a new jar (*navāṃ kumbhīm*) over the *gārhapatya* fire, they cook it (rice) like moist/wet rice

making, which no doubt did demarcate how it was perceived (and interpreted?) ritually, as opposed to the less everyday *soma* drink. On the brevity of descriptions of *surā* brewing in these texts, she writes (p. 375), "the knowledge of the preparation of *surā* was generally taken for granted." Nevertheless the *Śrauta Sūtra* authors go to considerable lengths to regulate what must have been a variable procedure and, most importantly, to align it with the liturgical *tokma-māsara-śaṣpa-nagnahu* brewing schema of the *mantra*s.

21. I have used Caland's edition alongside the translation in the *Śrautakośa*, referring to the comments in Kolhatkar (1987, 1999: ch. 8).

22. On the difficulties of dating these texts see Gonda 1977: 476–87. On the relative early date of the *Baudhāyana Śrauta Sūtra* see ibid., p. 514. For a date of around 500 BCE see Witzel 1989: 142–43.

23. I have adapted or re-translated (with some brewing-reading changes) Dandekar's translation of this text in the *Śrautakośa* (vol. 1, pt. 2: 903–5).

24. Although *ava* √*han* can mean 'thresh', the grains are probably already separated from the straw here, and this refers to the pounding of rice to remove the hull.

25. In his edition Caland notes that some manuscripts have *bharjayanti*.

(*prodakam ivaudanaṃ*) [in it]. Then they pour it (i.e., the wet-cooked rice) out into a [pot called] *kaṭhina* or *pājaka* and hang up [that pot]. Then they pound the parched ones (*bhṛgṇān*).[26] Of those, they scatter the ones that are small and the *tarī* (i.e., unburst roast paddy) into the scum/overflowings (*utseke*) [of the rice now in the hung-up pot?]. This is called *māsara*. One should then take a measuring vessel (*mānam*) and measure out one [measure] of *śaṣpa* (spouted barley), two of *tokman* (sprouted rice), three of *lājā* (the popped rice), and four of *nagnahu*. Then he completes the cooked rice by scattering with those powders and besprinkling with the *māsara* [liquid]. (17.32 And recite *mantra*s . . .)

(17.32 continued . . .) Then, taking the stool along the east of the *āhavanīya* fire he puts it down towards the south. He puts the support (*iṇḍva*) upon the stool (*āsandī*), the jar (*kumbha*) upon the support, and the *kārotara* (fermentation-drainage structure) on the jar. Then he heaps up the cooked rice all around the *kārotara*. Having covered it (*kumbha? kārotara?* both*?*) he touches it [uttering] the *mantra* . . . Mixed, it remains for three [nights]. [For] it is said in the *Brāhmaṇa* "The *Soma*, which is purchased, remains (undisturbed) for three nights."

Another section, probably somewhat later in date,[27] of the same text explains some of the technical terms:

BŚS 26.22 *atheyaṃ sautrāmaṇikī surā pādakiṇvā vā bhavaty api vā pañcikā. śaṣpāṇi ca tokmāṇi ceti. yavānām u ha śaṣpāṇi bhavanti vrīhīṇām u ha tokmāṇi māṣās tu nagnahur. athāyaṃ kārotaro dārumayo vā vaidalo vā mṛnmayo vā carmaṇā tvevābhividi syād*.

BŚS 26.22 The *surā* for the Sautrāmaṇī [sacrifice] is a quarter *kiṇva* (*pādakiṇvā*)[28] or a fifth. "*Śaṣpa* and *tokman*" [means] *śaṣpa* is of barley, and *tokman* is of rice, and *nagnahu* is urad lentils (*māṣāḥ*). Then the *kārotara* should be made of wood or of split bamboo (*vaidala*) or clay (*mṛdmaya*), and it should be covered with hide (*carman*) on all sides.[29]

After three nights the prepared *surā* is filtered with a hair sieve in/into an object called a *sata* (note that fabric filters always require a supporting framework) and used in the ritual:

BŚS 17.34 . . . *pratiprasthātā sata udīcīnadaśena vālena surāṃ punāti* . . .

. . . the pratiprasthātṛ priest purifies the *surā* in the *sata* with a hair sieve with its fringes to the north. . .[30]

In the light of my observations about traditional brewing, these instructions should be fairly straightforward. Although this process is ritualized, the basic method of making this drink is clear. The principal ingredient is rice. Half of this is pounded to remove the hull/husk and then cooked in a pot with water. Note that rice requires both threshing to separate the grain from straw and pounding to remove the husk. This results in a jar of wet boiled rice that is hung up in a vessel that somehow allows the scum to be removed (Kolhatkar 1999: 198).

26. So Caland's edition. Some manuscripts have *bhugnān* 'crooked'. As these things are being pounded, the reference is presumably to some of the prepared grains. Dandekar takes them as the *tarī* grains, but there is no reason why this should not be both the roasted ones, popped and not-popped.

27. Caland (1903: 6–7) suggests that this section of the text, the *karmānta*, which clarifies points of the ritual, is later than the main text, which would still make this an early usage of the word *kiṇva*. Even at this early stage this, later standard, brewing schema was used to explain the "Vedic" brewing system. *Kiṇva* is the ferment-agent used in the later *surā* brewing schemas (grains+*kiṇva=surā*); I explore this in McHugh forthcoming a, chapter on *surā*.

28. Caland notes several variants of this word in the manuscripts, but nevertheless this is a very plausible reading, as will emerge from my discussion.

29. My translation, though I am indebted to the translation in the *Śrautakośa.* The final description here of the hide and the *kārotara* is tricky: *carmaṇā tv evābhividi*. I have used Dandekar's translation but this is far from certain. At the most we might assume the hide is somehow involved with this object, though see below for a second description of the *kārotara*, where it is wound on the frame.

30. My translation.

The other half of the paddy, not pounded and retaining the husk, is parched on a hot plate, such that some pops and becomes puffed rice, and some does not. This dry-roast rice would be somewhat toasted in color and flavor. This is pounded and the smaller fragments and the grains that did not pop are added to the scum of the cooked rice. That mixture, probably a brown, toasty rice-water, is said to be the *māsara* (think of the powerful flavor of roast rice in Japanese *genmaicha*). It is also possible that this mixture underwent some sort of fermentation or souring, at least in a non-ritual brewing context. Or this could just be a way to infuse the flavor and color of those dark grains prior to a *solid state* fermentation where adding dried materials, as with hops in wort, would not work so well. Then a mixture is prepared using the rice plus other substances. This is one part sprouted barley, two parts sprouted rice paddy, three parts popped rice paddy, and four parts powdered *nagnahu*, which was obtained in advance. At another part of the text this is said to be urad lentils. The sprouted grains here, particularly the barley, would have saccharified the rice, and the urad lentils might well contribute microorganisms as they do in a traditional fermented *dosa* batter today. Or perhaps *nagnahu* was some sort of starter, for a later, yet still early, Indian recipe for a ferment starter contains these lentils.[31] The ferment starter (*qu*) for some Chinese wines contains peas, so by no means only cereals are used in such starters (Zheng et al. 2011: 85). It is unclear if the malts are fresh, i.e., green malt, or dried or roasted. Although exactly how the fermentation would work is pure speculation, we can see there are several quite suitable factors present here. These four components are scattered as a powder on the wet-boiled rice along with the *māsara*, the toasted-rice infusion. Thus we have 1) malts, 2) possibly some sort of ferment-starter, and 3) a flavoring-coloring (?) infusion added to the rice.

So far this is not enormously unlike the way *handia* is made today, except that the rice is scattered with more substances. This mixture is then heaped up in/around a special vessel called a *kārotara*, which was made of a rigid material, and placed over a jar near a fire for three days. This is a good length of time for making this sort of drink, though a day or so more would work well, depending on conditions. As some of the ritual texts explain, three days is ritually analogous to how long the *soma* plant remains after it is bought, and thus one aspect of a typical rice-beer making procedure, no doubt based on actual, maybe seasonally flexible practices, was selected and fixed to make a neater ritual structure.[32] Presumably the fermenting liquefied drink drips down from the *kārotara*-filter into the jar, whence it can be filtered again to make a clearer drink, which was quite possibly like *handia* but reddish brown and aromatic from the toasted rice, with the flavor of malted grains.

How much of this drink was brewed? Possibly quite a lot. *Kiṇva* is the common word in later Sanskrit texts for a ferment/starter. Let us assume that the mixture of malts, popped rice, and *nagnahu* is considered to be the *kiṇva*-agent in the second passage above. That ferment-mixture consists of ten measures altogether according to our recipe. And if the *surā* should consist of a quarter or a fifth part of *kiṇva*, as we are told in the separate comment, then we have thirty or forty measures of rice (before cooking?). Of course, we have no idea what size the measure in question was, but unless the measure used was incredibly tiny, this is quite a large quantity of grains, which would produce a decent amount of *surā*.

The Mising people of northeast India make a drink that is similar to this type of *surā* (Pegu et al. 2013: 12–17). I am not suggesting that that drink is a survival of an ancient process, just a useful comparison. It is one variety of a drink called *apong* and is made by add-

31. See the recipe for *kiṇva* in the *Arthaśāstra* (2.25.25), which contains urad lentils (*māṣa*-), rice, and herbs.

32. As we see in the recipe translated above. Kolhatkar gives more references to this correspondence to the *soma* ritual (1999: 122). As Kolhatkar (1999: 132–33) notes, there are references in *Śrauta Sūtra* texts to rites being performed simply when the *surā* is ready; e.g., *Kātyāyana Śrauta Sūtra* XV.10.1–2.

ing ashes of paddy husks and straw to cooked rice along with powdered starter-cakes. This mixture is fermented in a jar, and when ready, the mash is placed in a cone-shaped bamboo basket, lined with banana leaves—a "filter cone." This object is suspended pointing downward over a vessel, and water is poured over the rice to extract the *apong*, which collects in the vessel below. This drink is "generally straw coloured; sometimes it may be reddish-black depending upon the skill of the woman concerned" (Pegu et al. 2013: 12–17). Though different in several respects from the ancient *surā*, nevertheless this process helps us to better imagine that drink, certainly the role of the *kārotara*.[33]

VEDIC BREWING TERMINOLOGY AND THE NATURE OF EARLY *SURĀ*

The Vedic recipes use distinctive terms, such as *nagnahu*, which are evidently in need of explanation even at an early date. These words are essential, being used in *mantra*s in the liturgy, and demarcating parts of the ritual, so the practitioner needs to know what things to align with the words. The brewing process corresponding to these words varies in the recipes we possess in various *Śrauta Sūtra*s. But what is the essential schema of the Vedic *surā* brewing method reflected in the liturgy? I cannot compare all extant recipes here, but let us briefly consider one more set of instructions for making a ritual *surā* from the *Āpastamba Śrauta Sūtra*.[34] This *surā* is made for a different version of the Sautrāmaṇī sacrifice called the *Kaukilī Sautrāmaṇī*, which is probably a later form of the rite.[35]

First one purchases (*krītvā*) paddy, barley, and a grain called *śyāmāka* ('millet') (*vrīhiyavaśyāmākān*) (ĀŚS XIX.5.7). One makes *tokman* (malted/sprouted paddy) by binding the paddy in a linen cloth, presumably wetted, to malt it (*kṣaume vāsasy upanaddhān vrīhīṃs tokmāni kurvanti*), and one slightly heats (roasts?) the barley (*yavān īṣadupataptān*) (ĀŚS XIX.5.7). This barley, made into flour and added to curds or buttermilk, covered with darbha grass and "deposited" (*nidadhāti*) becomes a version of *māsara* (ĀŚS XIX.5.8–9). Although somewhat different from the previous *māsara*, this is still a mixture of ground toasted grains with a liquid. Then the coarse part of the (toasted barley) flour (*sthūlacūrṇāni*) is to be sprinkled with the liquid remnants (of curds, etc.? of the oblation? *saṃsrāveṇa*), and this is the *nagnahu* (ĀŚS XIX.5.10).[36] Then one makes the *śyāmāka* (millet) grains into grist (*śyāmākān saktūn kṛtvā*). At the time of fermenting/brewing the *surā* (*saṃdhānakāle*)[37] one assembles the *surā* components: the *tokman* (malted rice), the *māsara* (roast barley and curds), and the *nagnahu*. Then one sprinkles that mixture with one third of the *śyāmāka* (millet) grist and the milk of one cow. Then after one night one adds another third of the millet grist and the milk of two cows. And after another night one adds the last third of the grist and the milk of three cows.

Not only are the grains different from the BŚS recipe, with *śyāmāka*, probably some sort of millet, as the principal grain, but the milk is unusual. Kolhatkar (1999: 132–33) suggests that the milk is not an essential part of the *surā* and "the main purpose behind the addition of the milk is to achieve similarity with the *soma*-ritual, and to elevate the drink surā by

33. Since rice liquefies when it ferments after saccharification, one would not need to add water to produce the drink, and indeed it could drip out during the fermentation.

34. ĀŚS XIX.5.7–11. I have consulted Garbe's edition as well as the translations in the *Śrautakośa* and also that of Thite.

35. A relatively similar *surā* is described also in the *Kātyāyana Śrauta Sūtra* (XIX.1–5). See *Śrautakośa*, vol. 1, pt. 2: 931–37; also Oberlies 1998: 292.

36. Dandekar has a sprinkling with water (*Śrautakośa*, vol. 1, pt. 2: 922). I prefer Thite's interpretation as "the remains of the mixture" (2004, vol. 2: 1111). Gonda (1980: 163) suggests that the remainder of the oblation is used.

37. On brewing/fermentation as "putting together" see below.

comparing it with *soma*." More generally Malamoud (1992: 23) writes "la *sautrāmaṇī* présuppose le rite somique; elle lui est une adjonction, une réplique ou une contrepartie." This interpretation of the milk is therefore plausible; maybe this version of *surā* is more strongly inflected by the *soma* process than the previous recipe we examined. Yet, isolating certain features of *surā* brewing and emphasizing them as analogous to steps in the preparation of *soma* do not mean they are purely ritual contrivances: some ritual features could well be doing double duty in the developed ritual system, both practical and ritual.

There is also a possibility that this recipe has echoes of an actual alcoholic fermented milk/grain drink (milk liquor is attested in South Asia at a later date).[38] The use of milk in this type of *surā* calls to mind the Central Asian drink called *koumiss*, an alcoholic drink made from fermented mare's milk.[39] A nineteenth-century method of producing koumiss started with a porridge of water and millet flour mixed with warmed milk that was allowed to ferment for one or two days. This mixture was the ferment-starter for larger quantities of the milk (Carrick 1881: 80–81). Milk was gradually added in stages to the fermenting koumiss over the course of a day (Carrick 1881: 86–89). That is not to say that this method of making koumiss is necessarily ancient, nor do I wish to suggest any connection between this milky *surā* and koumiss. However, given that this method of making koumiss works, and produces alcohol, the gradual addition of milk to a grain mixture is a plausible brewing method, and the milk in the ĀŚS recipe need not be interpreted entirely as a symbolic action or ritual parallel. Even if we subtract the (possibly) symbolic milk from this ritual, the use of rice-malt, roast barley, and millet, with staged charges of grain, looks like a very real and practical brewing tradition, comparable to brewing Japanese sake and also brewing in medieval China (Huang 2000: 174–77).

Comparing these two above traditions of brewing *surā* we see the following shared schema:

1. *māsara* (mixture of toasted grains with some liquid, flavoring? fermented?).[40]
2. *nagnahu* (cake-form starter? In powdered form? Definitions vary, though is sometimes obtained ready-made through exchange, so we may be seeing substitutes in the ritual manuals).
3. *tokman*/*śaṣpa* (sprouted grains, i.e., malts).
4. One or more principal grains for brewing.

This brewing schema may use molds as well as malts for saccharification if the *nagnahu* was that sort of starter (we may never know). What seems to be an infusion, *māsara*, is intrinsic to brewing this type of *surā*, which we read elsewhere was reddish, possibly in part due to this toasty addition.[41] This fermentation was done in a relatively solid state, like sake, and there is no word for a liquid *wort* (a sugary solution of infused malts) as used for European beer. Water is used to cook the grains and make some of the mixtures, but the assembled fermenting *surā* would be a mass of cooked grains with additives, and this mixture goes by

38. In the *Mahāprajñāpāramitāśāstra* attributed to Nāgārjuna (ca. second century CE) surviving only in a Chinese translation made in year 404 or 405 CE (Lamotte 1944, vol. 1: preface). For the discussion of liquors see chap. XXII.5 (vol. 2: 816–19). Of course, the milk may have been introduced in the Chinese translation.

39. Kolhatkar (1999: 135) also mentions the resemblance of this type of *surā* to koumiss.

40. In the *Kātyāyana Śrauta Sūtra māsara* is scum of cooked grains and *nagnahu*, which is also added to the *surā*-to-be as a powder (4.5.13–14). The composition of *māsara* in the *Varāha Śrauta Sūtra* is the exception: it is a mixture of parched grains, *tokman*, and *nagnahu*. However, Dandekar considers this line corrupt (*Śrautakośa*, vol. 1, pt. 2: 916).

41. Note that although ethnobotanists tend to search for a scientifically useful purpose for all the elements of such brewing, this is of course by no means always the case. For the color of *surā* see below.

another name discussed below. The two recipes I have examined assume that a number of grains were available: rice, barley, and millet.

My translations of grains here are tentative, for it is difficult to identify the real-world referents of words for plant products from over two thousand years ago. Take *śyāmāka*. This is quite possibly a type of millet, maybe sawa millet (*Echinochloa frumentacea*) (Meulenbeld 1974: 605; Nesbitt 2005: 56–57; de Wet et al. 1983: 284). There are numerous references to the grain *śyāmāka* in Vedic texts, though not in the *Ṛgveda* (Prakash 1987, pt. 2: 64). More broadly, several types of millet, as well as sorghum, were cultivated in South Asia from the third and second millennia BCE, long before the period in which these *surā* recipes were composed (Southworth 2005: 198, 200–201, 204; 206–8, also Nesbitt 2005: 50). In addition, English "millet" is not one thing, but a generic term for a number of grasses that produce small grains. Archaeobotanists Weber and Fuller (2006: 69–70) write that in "several parts of the world the earliest archaeological plant finds include millets, as is the case in regions of India . . . The small millets, however, have received much less attention by archaeologists and botanists than the 'big' cereals (rice, wheat, barley, and maize)." Moreover words for millets may have undergone semantic shift in South Asia (Weber and Fuller 2006: 81–82). Given the prominence of millets in *surā* brewing as well as the finds of millet in the Bronze Age in the Bactria-Margiana "*soma*" jars (see n. 47 below), one can make a strong case that this type of grain deserves more attention, confusing as millets may be. As for other grains, varieties of barley were present in the Indus Valley and Gangetic plane from the third millennium BCE (Southworth 2005: 196–97). Types of domesticated wheat were also present in parts of South Asia from the earliest periods, especially in northwestern areas, being a major crop for the Harappan culture (Southworth 2005: 198). Yet such archaeological evidence for the many grains possibly available for these early *surā*s does not lead to certainty as to what grains the words in the recipes refer to (Sanskrit dictionaries are of little use here). That is because even at those ancient periods people in different areas may have used the same words to refer to different grains, and usage could have changed over time. According to Weber and Fuller (2006: 81–82), "Evidence for differing referent millets in related modern languages that must derive from the same ancient root word imply that semantic shift has occurred in the linguistic history of Southern India just as different millet crops have changed in importance . . . In some cases ancient names for millets appear to have been transferred to rice . . ." Thus any more exact botanical identifications than vague translations like "barley," "rice," and "millet" should be received with caution.

The origins of many ancient Indic brewing words are complicated and sometimes hopelessly obscure. However, the origin of the word *surā* itself is straightforward: it is reconstructable for Proto-Indo-Iranian, given its Younger Avestan cognate *hurā*. The most plausible etymology (see EWA s.v. *súrā*) derives the Sanskrit word from the root √*sav* 'press', from which *sóma* is also derived. This root etymology thus suggests that *surā*'s preparation, at least originally, involved pressing/squeezing out a liquid, which would make sense if "proto-*surā*/*hurā*" was made in the same sort of manner as that in Vedic sources, with a solid state fermentation.[42] The other brewing words have varied origins. First, there are two words for what is effectively malt. *Tokman*, whose cognates in Old Iranian—Younger Avestan *taoxman*-, Old Persian *taumā*—are in the realm of seed, family, and kinship, simply means

42. Parpola (2015: 66) suggests that the "Proto-Aryan" word was borrowed into Uralic in Proto-Permic as **sur* 'beer'; it is difficult to evaluate this claim. Nonetheless, given the antiquity of this word archaeologists might bear the essentially pressed/filtered nature of (Vedic) *surā* in mind when considering the purpose of finds of strainers. See Dubova et al. 2016: 238 on strainers in the Bactria Margiana Archaeological Complex (BMAC), and note also that the so-called *soma* jars from the BMAC apparently contained millet (see n. 47).

sprout or shoot and evidently implies a germinated grain in this context (EWA s.v. *toká-*). The origin of *śaṣpa* is not entirely clear.[43] *Nagnahu* may well be an Iranian loanword.[44] *Māsara* may be related to Dravidian *mucar* meaning buttermilk,[45] which may imply that buttermilk was once used or that this mixture is somehow analogous to buttermilk. Certainly the *māsara*s here are soupy liquids. Another substance sometimes associated with *surā*, called *kīlāla* (already ṚV), is probably a loan word of unclear origin.[46] According to Mayrhofer (EWA s.v. *kārotará-*), the etymology of *kārotara* is likewise unclear.

43. EWA s.v. *śáṣpa-*. The word seems to refer to shoots of a grass, though whether this includes an attached grain is not clear. However, the brewing context makes the retention of the enzyme-containing grains likely. In one of the *mantra*s used in this ritual the *tokman* and *śaṣpa* are compared to body hair: "Just as his hairs (were produced) by malted grains of barley in great quantity and by malted grains of rice" (*lómāni śáṣpair bahudhā́ ná tókmabhiḥ*. *Taittirīya Brāhmaṇa* 2.6.4, tr. Dumont 1965: 315–16). This suggests that the sprouts were somewhat "hairy" and thus perhaps they were malted longer than modern malts, until a shoot emerged (unless the sprouting refers to the emergence of a rootlet, removed in modern malting).

These hairs are the first in the list of parts of the "canonical creature" of early Sanskrit texts, as described by Jamison (1986: 172–78). The multiple canonical parts of a creature's (Indra's) body that need reassembling in this ritual may have been another reason to retain the more complex, archaic *surā* brewing schema, which is aligned with the body parts as follows in these mantras: sprouted barley and rice = hairs, parched rice = skin and flesh, bones and marrow = *māsara*-liquid and *kārotara*-filter (perhaps the bones are the rigid *kārotara* even though they are given in the reverse order). The *nagnahu* is said to weave the red juice (*rásam ... róhitam*—probably the finished *surā*) with the *parisrut* (unfiltered *surā*), and this corresponds to the weaving of the form/body (*vápuḥ*) of Indra. The fermented, finished *surā* thus corresponds to the "put together" complete canonical body (though the *saṃ √dhā* form is not used in this passage). (*Taittirīya Brāhmaṇa* 2.6.4, tr. Dumont 1965: 315–16.)

44. Mayrhofer (KEWA, EWA s.v. *nagnáhu-*) connects *nagnáhu* with Iranian **nagna* 'bread' (first attested in Middle Iranian) and suggests that it could be an Iranian loanword into Indo-Aryan. The curious final *-hu-* he derives by a complex chain of borrowing and metathesis from **nagna-xᵛāda-* 'bread-seasoning', with representatives in New Persian. Possible but by no means assured. In the context of the brewing processes described in this article it is plausible that *nagnahu* could be some sort of (herbal?) fermentation starter like one used for bread, or that it might even have had a bread-like form as many starters do today in Asia. In the lexicon of Amarasiṃha, of uncertain date, possibly sixth century CE (Vogel 1979: 309–10), *nagnahu* is a synonym of *kiṇva*, the later word for a starter or ferment (*Amarakośa* 2.10.42). Gonda (1980: 163) notes that Uvaṭa and Mahīdhara, commentators on Vedic ritual texts, also explain *nagnahuḥ* as *kiṇvaḥ*.

45. Mayrhofer (KEWA, EWA s.v. *mā́sara*) considers it likely to be a Fremdwort and tentatively suggests the Dravidian connection, though since it is attested already in the *Paippalāda Atharvaveda*, this connection should be evaluated cautiously.

46. Mayrhofer (EWA s.v. *kīlā́la-*) connects it with much later Sanskrit *kilāṭa*, a concentrated, cooked, possibly curdled milk, and related MIA words. Burrow and Emeneau link the word to Dravidian, comparing Tamil *kiṛāaṉ*, buttermilk/curds (DED[2] s.v. *kiṛāaṉ*), while Parpola (2015: 82) suggests the word may originate in the Bactria-Margiana Archaeological Complex. Kuiper (1991: 45) classifies it with a group of words in the *Ṛg Veda* with an *-āla* suffix that he considers non-Indo-Aryan. The drink may have been a sweet, grain-based drink, probably fermented and associated with *surā*. For the association with *surā*, note that at *Taittirīya Brāhmaṇa* 3.4.9 a *surā* maker (*surākārā́ṃ*) is associated with *kīlāla* in a list of people offered in a symbolic mass human sacrifice (see Dumont 1963: 180). Also, *Āpastamba Dharmasūtra* 1.17.25 is a prohibition on the herbs for *kīlāla*, which follows a total prohibition of intoxicating liquor (*madya*) for Vedic students. The drink is mentioned in connection with milk products at AVŚ IV.11.10, and the earth is said to have a *kīlāla*-udder (*kīlā́lodhnī*) at AVŚ XII.1.59b, though the metaphorical nature of the latter reference need not imply a dairy connection. What else do we know about this drink? It is mentioned in the ṚV (X.91.14), where Agni is said to be a "*kīlāla*-drinker who has soma on his back" (tr. Jamison and Brereton 2014), so perhaps it was sometimes offered into the fire? It is prominent in the *Atharvaveda*. At AVŚ IV.26.6 and IV.27.5 heaven and earth and the Maruts are said to be satisfied (*tṛp*) with *kīlāla* and ghee. At AVŚ VI.69.1 *kīlāla*, along with *surā*, is said to be sweet. And *Vājasaneyi Saṃhitā* III.43 refers to the *kīlāla* of food/cooked rice (*anna*), also mentioned at AVŚ VII.60.5. Note that the saccharification of brewing produces sweet liquids as well as alcoholic ones. Made from grains, associated with brewing, and sweet, one might compare this drink to such preparations as *amazake*, the creamy, sweet, very slightly alcoholic type of sake made in Japan. Thus *kīlāla* would be some sort of sweet semi-fermented grain-based pap, perhaps also connected to dairy products in appearance or in composition?

Thus, on the one hand, some *surā* brewing words have deep Indo-Iranian roots, while others appear to be non-Aryan loan words, some perhaps from Dravidian. What does this teach us about ancient Indian brewing? Certainly later Indian *surā*s made to the (*kiṇva*-starter)+(grain) mold-saccharification process more resemble East and Southeast Asian drinks than beers to the west in Mesopotamia and Europe, which, like the Vedic *surā,* used malts. As such South Asia in later periods (maybe earlier depending on how we understand *nagnahu* and *māsara*) is a transition zone for world grain-brewing traditions.[47] If we consider the later sugarcane liquors, grape-wine-as-import, toddy, and betelnut alongside this Asian-style brewing we find a most distinctive alcohol-drug ecology in South Asia by the mid-first millennium CE.[48] Of course we are missing a chapter on brewing, if there was any, in the Indus Valley civilization, and the nature of early Iranian "beer" is also uncertain.[49] Also we should by no means view this ancient Indian brewing as somehow peripheral to, or a hybrid of, several other brewing cultures.

Surā is innately compounded, and this is reflected in the word for fermenting. In later Sanskrit the word *saṃdhāna*- and related forms seen in the recipe above mean "fermentation" in the sense of alcoholic fermentation.[50] If one were ignorant of that usage one might simply read *sāmdhānakāle* in the ĀŚS passage above as "at the time of putting together (the components of the *surā*-to-be)." In fact both translations are correct. There was no concept of alcohol appearing as a new substance, and nothing intoxicating was added to the mixture. Rather in the ancient Indian understanding of brewing when you put together certain materials they transform over time and become intoxicating. So, in Sanskrit, to assemble is to ferment. And this is why essential catalysts like *nagnahu* and the rest were so notable.

LEATHER AND BAMBOO—EARLY FILTERS AND STORAGE

The equipment used to make and store *surā* gives some sense of the material culture of brewing in this very early period. Although the *Ṛgveda* reveals almost nothing about how *surā* was made, it does contain two references to vessels associated with *surā*. These are the earliest textual references to the technology of brewing in South Asia. We hear of the special structure called a *kārotara* and a jar (*kumbha*) in a hymn addressed to the twin deities, the Aśvins, who are elsewhere connected to *surā*:[51]

47. Archaeology and residue analysis may be of use here. As noted above, some early Chinese grain liquors from before the Common Era used both sprouted grains and a ferment starter, and although textual references to the exclusive use of a mold-yeast-starter (*qu*) for saccharification-fermentation date only from the late third century BCE, McGovern suggests that the mold method was used far earlier, possibly the mid-third millennium BCE in China. On Mesopotamian brewing methods see Damerow 2012. For vessels discovered at the Bactria-Margiana Archaeological Complex containing broomcorn millet, see Bakels 2003. Might these jars have contained, not a proto-*soma* but rather a grain drink, maybe even with connections to the Indo-Iranian *hurā*/*surā*?

48. See McHugh forthcoming a, chapters on *surā* and on other drinks.

49. On a Middle Persian word (**wašak*) that has been translated as 'beer' see Henning 1955. The nature of this drink is uncertain. I thank P. Oktor Skjaervo for this reference.

50. For example, the chapter on preparing fermented medicines (*saṃdhāna*-) in the *Śārṅgadharasaṃhitā* (probably thirteenth or fourteenth century CE), where such preparations are said to be *saṃdhitaṃ*, and these drugs are alcoholic drinks including *surā*. *Śārṅgadharasaṃhitā* II (*Madhyama*) 10.1. On the date see Meulenbeld 2000: 206–7.

51. Gonda (1980: 73–74) relates the following myth given by the commentator Skandasvāmin: "when the Aśvins were wandering about a group of boys who were drinking and had got drunk asked them for *surā*; the gods produced the above quantity from the hoof of their horse and gave it to them." However, Gonda plausibly suggests this myth "has in all probability been concocted in order to enhance the intelligibility of the above hemistich."

ṚV I.116.7cd *kārotarā́c chaphā́d áśvasya vṛ́ṣṇaḥ, śatáṃ kumbhā́ṁ̀ asiñcataṃ súrāyāḥ*
You poured from the filter (*kārotarā́t*), the hoof of the bull-like horse, a hundred pots (*kumbhā́n*) of liquor (*súrāyāḥ*). (tr. Jamison and Brereton 2014)

Recall in the BŚS passage above that the *kārotara* is not a sieve, but probably a rigid structure with a drainage opening. If this early version was such an object, then probably the same fermenting method, with a mass of grains, was used at this early period. Here it is compared to a horse hoof, maybe because of its shape?

Another verse in the *Ṛgveda* hints that *surā* was sometimes placed in a wineskin-like container called a *dṛti*.[52]

ṚV I.191.10ab. *sū́rye viṣám ā́ sajāmi, dṛ́tiṃ súrāvato gṛhé*
I fasten the poison on the Sun, the skin (*dṛ́tiṃ*) (containing it) on the house of the possessor of liquor (*súrāvato gṛhé*) [=Indra]. (tr. Jamison and Brereton 2014)

Leather bags have the advantage of allowing a large quantity of liquid to be transported without breakage or spillage. Might the fastening on the house here be an antecedent of the later prominent *surā*-banner (*surā-dhvaja*), the only retail sign of ancient India?[53] There would be little need to place *surā* into a skin from a jar unless one had in mind to move it, unless very large jars were not available locally, or they needed to be freed up to make more batches. Since *surā* may have been perishable and relatively easy to prepare from grains and water, one assumes there was typically not a long-distance trade in it (unlike the dried *soma* plant). However, it is possible that *surā* might be taken on a journey in an unbreakable skin as a source of both nourishment and drink. *Surā*-skins and travel are indeed mentioned in a somewhat confusing myth recounted in two *Brāḥmana*s, where a figure called Pañcavājas, who, "having put on (his cart) a leathern bag of *surā* (*surādṛtim*), used to ride out for *soma*."[54] Presumably on the outward journey he has *surā* from home on the cart and on the way back he has *soma*, which originates far away, already implying a conceptual separation of the two drinks: he needs the (local, common, human) *surā* to sustain him on the journey (or to trade?), in order to fetch (remote, more precious, divine) *soma*.

Above we saw the *kārotara* drainage device described as some sort of rigid vessel lined/covered with hide from which the *surā* drips/oozes down, presumably slowly, into a jar. As far as I am aware this object was only used in making *surā*. In another account of brewing, however, the *surā*-to-be is placed in a pit (*avaṭaṃ*) in order to ferment (see ĀŚS XIX.1.7). Another text explains that this pit (in this case called a *śvabhra*) is lined with hide, no doubt to waterproof it, the fermenting/fermented mixture (*parisrut*—see below) added, and the *kārotara* deposited in it.[55] Or the purified, fermented grain mixture can pass from the

52. The more explicit *surā-dṛti-* '*surā*-skin', found in two passages in the Brāhmaṇas discussed below, supports that interpretation here. The *dṛti* is mentioned as a vessel, potentially leaky, for water in MBh 5.33.65. See also EWA on *dṛti*.

53. I am grateful to Stephanie Jamison for this suggestion (p.c. August 26, 2019). On the *surā* banner see McHugh 2017.

54. *Jaiminīya Brāhmaṇa* III.228. As translated in Caland's note to *Pañcaviṃśa-Brāhmaṇa* XIV.11.26, which also mentions this *soma* journey (Caland 1931: 384–85). Compare to Caland's German translation of the same passage in *Das Jaiminiya-Brahmaṇa in Auswahl* (Caland 1919: 277–78). In his English translation he omits "of *surā*," which I have inserted into his translation. See also Raghu Vira's edition of the *Jaiminīya Brāhmaṇa*. I thank Finn Moore Gerety for helping me locate these materials.

55. As with many of these texts, what exactly happens here is a little uncertain, though I agree with the Dandekar's interpretation, which is reflected in my description in the text: *śvabhraṃ khātvā kharam apareṇa carmāvadhāya parisrutim āsicya kārotaram avadadhāti kārotarād vā carmaṇi mantraliṅgāt pūtām ādatte* (*Kātyāyana Śrauta Sūtra* 19.2.7, cited in *Śrautakośa*, vol. 1, pt. 2: 932).

kārotara into the skin-lined pit. It is then filtered again to make the finished *surā*. Presumably in the first version the liquid seeps up into the *kārotara*, and in the second drips down from the *kārotara*.

A leather-lined pit is a large makeshift waterproof vessel. Putting liquids into such a sunken vessel is easy, but more effort is involved with removing them. A lined pit saves making or transporting a massive clay jar. The above description of a lined pit suggests that people also had the option of placing the filter inside it, such that the liquids flowed *up* into the space in the filter. This is like the bamboo conical filter (*yongsu*) used in making Korean *makgeolli* rice beer. *Surā* produced in this manner in a pit would still need to be scooped *upward* to collect it, and then presumably poured from the scooping vessel/ladle into another vessel to filter. So depending on how you used a *kārotara* drainage structure, there could have been oozing up or dripping down in the pit, following by scooping up, and then pouring down into a vessel. And then a secondary filtering, which might well involve dripping downward. Again, I emphasize those varied movements as they will be important when we examine a hymn from the *Atharvaveda* that describes the production of *surā*.

The *kārotara* might also function simultaneously as a fermentation vessel for the assembled, relatively solid *surā* mash, with the liquefied part dripping out of the opening. The *Āpastamba Śrauta Sūtra* XIX.6.1 gives a clear description of a *kārotara*, and here it is explicitly stated to be an alternative to the option of using a pit. Presumably this refers to using a *kārotara* placed above a vessel to drip down. The same text also explains the following about the *kārotara*:

ĀŚS XIX.6.2. *baidalaś carmanaddho bhavati*.
3. *tasmin baidalaṃ śuṇḍāmukham avadadhāti*.
4. *tasya bilaṃ carmaṇā pariṇaddhaṃ bhavati*.
5. *tasmin yadā sravati sā parisrud bhavati*.
2. It is made of split bamboo that has been wound with hide.
3. In/on it one places an elephant-trunk-outlet made of split bamboo.
4. Its hole is wound around with hide.
5. When it flows on/in that it is *parisrut*.[56]

The *śuṇḍāmukha*, a bamboo tubular outlet, literally 'trunk-mouth', is placed or deposited in or on the *kārotara*. This thing has a hole covered in leather into which the *parisrut* ('flowing round') flows.

Parisrut (f.) is a tricky term used in connection with *surā*, though I think it probably refers to the liquefied, fermenting or fermented grain mash prior to filtration, which was apparently a drink in its own right. The use of the term is not limited to Vedic sources.[57] Remember that this type of brewing starts with a soft mass of inoculated grains that slowly liquefies before the liquid is collected and filtered. It is the solid mash that has now become 'flowing around': literally the 'fluid (mash)'. *Parisrut* is no longer the soft mass of just-assembled *surā* ingredients, but is already a drinkable fluid, yet still not the finished, filtered *surā*. It is comparable to Japanese *doburoku*, liquefied sake mash prior to any filtration, distinguished technically and legally from finished sake, *seishu*. At *Āpastamba Śrauta Sūtra* XIX.1.8 the merely assembled *surā* mash is called *parisrut*. This usage is consistent with my theory of the drink, because the assembled *surā*-to-be probably gradually changed consistency from the just-mixed and rather solid, to the fermented, liquefied, unfiltered alcoholic substance, with neither being the finished drink. *Parisrut* is an ambiguous substance, a changing, halfway

56. My translation, though with reference to Thite's (2004) text and translation.
57. In the story of Kīcaka and Draupadī in the *Mahābhārata* Kīcaka has *parisrut* prepared. MBh 4.14.7, 4.15.5.

state, neither solid mash nor filtered *surā*. Arguably this explains a passage in the *Śatapatha Brāhmaṇa* where one buys *parisrut* for the Vājapeya sacrifice from a long-haired man (= neither male nor female, a true gender-fluid fluid), with lead (= neither iron nor gold) "and the Parisrut-liquor is neither Soma nor Surā . . .," perhaps implying that it is neither unfermented nor fermented, and is an intoxicating drink yet not purified.[58]

Although it is difficult to visualize the *kārotara* in the passage above, it has some sort of tube or spout, made rigid with bamboo and covered with hide to waterproof it, which is a channel for a fluid-mash (*parisrut*).[59] The use of the word *śuṇḍā*[60] 'elephant-trunk' here is notable, as this and related terms are common in later texts to refer to drinking and brewing-related phenomena. If the two uses of the word are connected—which is by no means certain—we might compare this situation with the way that "**tap**ster" (and archaic "tapper") are English terms for people who serve ale.[61] Allchin (1977: 789–90) suggested that this 'elephant's trunk' word was associated with drink in India because ancient stills resembled an elephant's head and trunk (boiler and condensing tube). One thing that is certain, however, is that the *surā* as described in the two recipes above, as in others, is only fermented. And the above material furnishes us with another equally plausible explanation for the usages of the *śuṇḍa* word.

Despite the ritualization of *surā* brewing in our sources and the variety of methods described alongside the shared ancient terminology, we get some sense of how this drink was made at very early periods in parts of South Asia. Like other traditional grain drinks these early forms of *surā* were complex preparations. In "Vedic brewing" saccharification is done with malts, at least partially, for we are not sure what the *nagnahu* did. Some grains were probably roasted and infused, possibly to add color and flavors. Quite possibly some sort of ferment substance was also used—this may have been like early "yeast" preparations, or it may have effected saccharification too, or perhaps it was flavoring (or our categories may well just not capture what it was for). These components were prepared separately. Fermentation occurred when they were assembled in what may have been quite a large vessel, maybe a bamboo cone lined with hide or a lined pit. Fermentation quite probably took place in a (semi) solid state as in some Asian grain drinks today. Like cooking a complex meal on a large scale, *surā* brewing would require considerable organization, skill, and hard work for several days, probably involving several people, and strong people at that. It would be a quite impressive process to witness, and was arguably more complex than the preparation of the *soma* drink. While the preparation of *soma* is something one would only see in the context of Vedic sacrifices, performed by priests, *surā* brewing would be far more familiar from life outside the sacrifice. Yet at later periods this ritualized *surā* brewing, as with Roman Catholic liturgical wine preparation, would have both sounded and looked quite archaic. These ancient recipes use an ancient brewing terminology, and some elements (the sprouted grains, the *māsara*-toasty-infusion) may preserve those older forms of brewing. The variations in ritual instructions may reflect changing and localized traditions of brewing. As we saw above, one of these texts aligns the older terminology with the later (*kiṇva*) starter + grains brewing method. Thus recipes like those above helped ritual practitioners see how *surā* brewing in a given time and place could be construed along the lines of the ancient ritual liturgy.

58. ŚB V.1.2.14 (ed. Weber 1855), tr. Eggeling 1900.

59. Dandekar translates as 'spout' (*Śrautakośa*, vol. 1, pt. 2: 922).

60. Mayrhofer notes that the origin of this word is unclear, possibly non-Indo-European (KEWA; EWA s.v. *śuṇḍā-*).

61. Oxford English Dictonary, s.v. tapster (accessed March 1, 2016). "Tapster" is originally the feminine form of "tapper" and is attested from 1000 CE in this sense.

SURĀ BREWING IN THE *ATHARVAVEDA*

Finally, let us consider an ancient hymn that describes *surā* brewing. Although, as noted above, the *Ṛgveda* does not describe brewing, there are references to the process in the *Atharvaveda*, the second oldest Sanskrit text. Two hymns in the *Paippalāda* recension of the *Atharvaveda* are addressed to *surā*. Lubotsky (2002) edited and translated one of these challenging texts, and I reproduce his translation here. Again, I am not interested here in the symbolism of *surā* so much as the brewing process.

The hymn (AVP 5.10) begins with the pounding/dehusking and grinding of grains:[62]

iyaṃ yā musalāhatā dṛṣatpiṣṭā viṣāsutā |
tapur agnis tapur dyaus tapus tvaṃ sure bhava || 5.10.1
This [Surā], which is crushed with a pestle, ground with a grind-stone, is a poison-brew. Agni (the fire, fire-god) is burning heat; heaven is burning heat. Become, O Surā, burning heat yourself.

Then the malted rice, apparently "raised" separately, is added:

viṣaṃ te tokma rohayanto 'bruvan viṣaṃ kumbhe 'va srava |
viṣaṃ ta āmanaṃ sure viṣaṃ tvaṃ hasta āhitā
viṣaṃ pratihitā bhava || 5.10.2
Those who were raising the malted rice (*tokma*) called you poison. Being poison, flow down into the jar. Poison is your affection, O Surā; poison are you when taken in the hand. Become poison when put to [the lips].

Next the rice, perhaps the principal grain, is mentioned as well as a substance called *paryodana-*, a hapax, which may refer to the *māsara*, as Lubotsky suggests. Or maybe this is some sort of cooked-rice scum like that used for the *māsara* in the version above, since the word implies something that is somehow around (*pari-*) the cooked rice (*-odana*)? The *nagnahu* ferment is also added. As Lubotsky observes, the references to the animals here presumably allude to the addition of animal hairs to the *surā* in the *Sautrāmaṇī* sacrifice:

siṃhas te astu taṇḍulo vyāghraḥ paryodanam |
pṛdākūr astu nagnahur vṛkasya hṛdi saṃ srava || 5.10.3
Let your [rice] grain be a lion, the gruel (*paryodana*) a tiger, let the ferment (*nagnahur*) be a panther. Flow into the wolf's heart.

The *surā* is then removed from the pit in which it has apparently been fermented—the verses below refer to the myth of a boar who lifted up the earth from the ocean (per Lubotsky's comments). *Surā* emerges ready to wreak havoc. Note how the flavor of the malt stands out:

iyaṃ yā pātra āsutā śaṣpasrakvā vighasvarī |
varāhamanyur ajany uttānapādam ardaya || 5.10.4
udardanī pracyavanī pāṃsupiṅgā vighasvarī |
utkhātamanyur ajani yat paścāt tat puras kṛdhi || 5.10.5
This [liquor], which is brewed in a cup, is [with the taste] of malted barley (*śaṣpa-*) in the mouth, nutritious (?). Boar's wrath has arisen: shake the one with stretched legs. (4)
[The Surā] is shaking, agitating, dust-yellowish, nutritious (?). The wrath of the dug-up one has arisen: what is behind, make in front. (5)

62. See Lubotsky's (2002) edition and translation for extensive notes on this hymn. Note that there are several hapaxes in this hymn, and some of Lubotsky's translations are tentative. I have added a few annotations in parentheses to help readers not familiar with Vedic concepts, and I have also modified the translations of the malted grains to accord with the definitions of them given in BŚS 26.22 (see above).

The drink is then strained and produces what is apparently a red liquor. *Surā* is also ruddy in a Buddhist Pāli *jātaka* that describes how humans discovered *surā*,[63] and is possibly also "dust yellowish" above, though that may perhaps refer to the mixture before filtration? (either way the drink is colored). Here the dripping red *surā* is also possibly associated with the flush of drunkenness, and definitely with the blood spilled by drunken violence:

viṣaṃ te pavane sure rudhiraṃ sthāle astu te |
mathnantv anyo anyasmā iṣudhīṃs tvad dhanus tvad || 5.10.6
viṣapāvāno rudhirāś caranti
pātāro martās tavase sura ime |
hatāso anye yodhayanty anyāṃs
tam ic chaṃsa mahimānaṃ surāyāḥ || 5.10.7
tān vīrudho vi sravo balena-
-ut pātaya mādaya yodhanāyai |
bhinnāratnir bhinnaśīrṣṇā sam ṛchatām
ārtacelo visravan te surāpaḥ || 5.10.8
viṣāsutāṃ pibata jarhṛṣāṇā
asnā saṃsṛṣṭāṃ rudhireṇa miśrām |
chinnahastaś carati grāme antar
vairahatyāni bahudhā paṇāyan || 5.10.9

O Surā, let poison be in your strainer, the blood-red [substance] (*rudhiraṃ*) in your jar. Let them rob each other of the quivers and the bow. (6)

The poison drinkers walk around red, these mortals drinking for strength, O Surā. Some who are hit set others to fighting: praise that power of Surā. (7)

Due to the strength of the plant flow out to them, make [them] fly up, make [them] drunk so that they set [others] to fighting. Let the one with a broken elbow fight the one with a broken head. With afflicted garments, (blood-)dripping is your drinker, O Surā. (8)

Drink you, who are excited, the poison-brew, [which is] united with blood, mixed with red. He, who has his hand cut off, walks through the village, praising all kinds of men-killings. (9)

The *surā* is removed from the *sata* vessel where (into which?) the final filtration happens, and there is a plea for *surā* to create violence and destruction, which is presumably the aim of this particular hymn:

asimatīm iṣumatīm un nayāmi satād adhi |
mādayābhi mādaya- -ahir ivāinān pra ropaya-
-anyo 'nyasya moc chiṣan || 5.10.10

The knife-sharp, arrow-sharp [Surā] do I raise up from a *sata*-pot. Make [them] intoxicated, make [them] tipsy. Like a snake, cause them racking pain, let them leave nothing of each other.[64]

The brewing process implied in this hymn is consistent with that treated above, with the brewing of *surā* in a hole in the ground followed by removal and filtration. If the hymn describes this particular process based on a familiarity with actual brewing practices, we can assume these methods were quite widespread and enduring, though it is possible that brewing here is based on textual traditions, with deliberate allusions to liturgical terms.

Oort (2002) has suggested in this journal that this and another hymn from the *Atharvaveda Paippalāda* (AVP 8.12) imply the use of distillation in making *surā*. As I argue elsewhere, the evidence usually cited for ancient distillation is not as convincing as scholars sometimes

63. The prose part of the *Kumbha Jātaka* (no. 512; Fausbøll ed., vol. 4, p. 12, l. 10): *salohitavaṇṇaṃ*.

64. I do not agree with Oort's suggestion (2002: 358) that "a beverage with a stronger alcohol content than beer is the cause of the bloodthirsty violence" in this hymn. Many years in the pubs of Leeds repeatedly taught me that drinking beer, even quite weak beer, can easily provoke violence.

suppose.[65] Also we have plenty of positive textual evidence here: it is relatively clear how *surā* was made, and it was only fermented, not distilled. It goes without saying that we must discount stray references to "spirituous liquors" in dictionaries and translations of Sanskrit texts.

So what of Oort's distillation-reading of the hymns? Do they perhaps contain evidence of ancient Vedic distillation? Should we overturn our concept of ancient *surā* brewing? Respectfully, I am not convinced. First, the language of these hymns is very difficult, at times quite obscure, as Oort herself notes. Nevertheless, Oort understands certain terms relating to bubbling and the directions of flow and dripping of liquids to be consistent with distillation. Although the language may be "consistent" with distillation, distillation is not a necessary hypothesis. The *surā* brewing we saw above involved all manner of equipment (tubes/spouts) and processes, such as boiling, straining/separating, oozing-up-or-down, dripping-down, lifting up-and-out, no doubt with plenty of bubbling, steaming, and foaming at certain points, connected with fermentation and cooking. A reference to one pot placed "on top" to drip ("piss") into another by no means implies distillation, any more than my "pissing" coffee filter "placed on top" implies the presence of home-made moonshine in my kitchen. Moreover, *surā* is colored in the one hymn above and elsewhere. But a freshly distilled alcoholic drink is always colorless and clear.[66] The color of whiskey and other distilled drinks is derived from wooden barrels or various additives.

CONCLUSION

The drink called *surā* is mentioned in the most ancient textual anthology we possess from South Asia, the *Ṛgveda*, though we learn very little about how it was made from that source. Later texts explain how it was brewed. *Surā* was a fermented alcoholic drink. Despite the complexities of the surviving evidence, we know it was made with malted grains, a base of cooked grains, perhaps some sort of toasted grain infusion, and a special additive of some sort, perhaps a fermentation agent or flavoring. Like ancient Mesopotamian and ancient Chinese beers, *surā* used the saccharification of malted grains, and depending on how we understand the nature of *nagnahu* and *māsara*, *surā* may have used the microbial saccharification method found in other parts of Asia. The alcoholic drink culture reflected in the Vedas, however, is certainly a grain drink culture, like Mesopotamia and ancient China, and other drinks such as those made from sugarcane and grapes have yet to appear in these texts (which may, of course, not reflect the reality on the ground).

Surā was a relatively complex drink in this period and required the use of a number of specialized objects, skins, frames, jars, and, of course, fire. Comparison with other traditional methods of making grain liquors not only helps us understand what sort of drink *surā* was, but once we understand ancient *surā* we can better understand and translate a number of

65. To summarize: on close analysis Marshall's (1951: vol. 2, 420–21; vol. 3, pl. 125) "still" excavated at Taxila was not found as a connected assemblage by any stretch of the imagination, but rather assembled from quite disparate (spatially and by strata) finds along the model of contemporary stills Marshall had evidently seen elsewhere, simply in order to explain the function of just one of the vessels. Allchin (1977, 1979) builds on Marshall's flawed hypothesis regarding the function of certain vessels, and his textual evidence is not convincing. He likewise does not find the still assemblage, but rather a large number of one of the vessels, with very few of the other parts. Mahdihassan's (e.g., 1972) methodology is so loose that one can find stills in any time and any place. For my full argument see McHugh forthcoming b. Note that Kolhatkar (1987: 44), who also examined *surā* in detail, comes to the same negative conclusion about ancient distillation.

66. I thank flavorist/perfumer Marlène Staiger and perfumer Christophe Laudamiel for confirming this fact (p.c., December 2018).

Sanskrit words connected to *surā* and brewing, such as *parisrut* and *kārotara*. There is no need to postulate ancient distillation to explain descriptions of the process.

Early recipes for this "Vedic" *surā* vary and may have been trying to fit contemporaneous brewing technologies to a brewing schema established in even earlier ritual texts. As I have noted, it is also quite possible that some aspects of this ritual *surā* brewing were altered, or at least construed, to align it with *soma* pressing. Though there is considerable debate about what plant or plants it was made of, *soma* was a non-fermented, pressed, squeezed, filtered cold-water infusion, quite unlike *surā*. Where prestigious *soma* was restricted to ritual uses, *surā*, a drink made of food that also caused a type of *mada* (intoxication? exhilaration?), was no doubt more widely drunk. While *soma* was fossilized as a ritual offering, its psychoactive properties apparently no longer relevant, *surā* thrived and evolved—a drink and a word with a history of over two thousand years in South Asia.[67]

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Abbreviations

ĀŚS	*Āpastamba Śrauta Sūtra*
AVP	*Atharvaveda Paippalāda* recension
AVŚ	*Atharvaveda Śaunaka* recension
BŚS	*Baudhāyana Śrauta Sūtra*
DED[2]	Burrow and Emeneau
EWA	Mayrhofer 1986–
KEWA	Mayrhofer 1953–
MBh	*Mahābhārata*
ṚV	*Ṛgveda*
ŚB	*Śatapatha Brāhmaṇa*

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67. I discuss the long history of *surā* in McHugh forthcoming a. Finally: how should we translate *surā*? In its more generic sense, perhaps as "liquor"; with regard to the specific grain-based drink it is perhaps best not to translate it, as with Japanese sake and Mexican *pulque*.

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