

An Ancient Elixir: Beer in Sumer

Jared Kelly

Follow this and additional works at: <https://digitalcommons.northgeorgia.edu/issr>



Part of the [Anthropology Commons](#), [Economics Commons](#), [Geography Commons](#), [International and Area Studies Commons](#), [Political Science Commons](#), and the [Social History Commons](#)

Recommended Citation

Kelly, Jared () "An Ancient Elixir: Beer in Sumer," *International Social Science Review*. Vol. 95 : Iss. 3 , Article 1.

Available at: <https://digitalcommons.northgeorgia.edu/issr/vol95/iss3/1>

This Article is brought to you for free and open access by Nighthawks Open Institutional Repository. It has been accepted for inclusion in International Social Science Review by an authorized editor of Nighthawks Open Institutional Repository.

An Ancient Elixir: Beer in Sumer

Cover Page Footnote

Jared Kelly studies Political Science and Geography at the University of California, Berkeley and he has performed research for IRLE, the San Diego Archeological Center, and NASA.

An Ancient Elixir: Beer in Sumer

“He who does not know beer, does not know what is good”

Sumerian Proverb¹

Beer is an alcoholic beverage typically brewed from cereals such as wheat and barley. It is a global phenomenon as the most widely consumed alcoholic beverage in the world² and the third most widely consumed beverage behind water and tea.³ Beer experienced a convergent evolution, developing in many geographically diverse areas, including the Far East, the Americas, and the Middle East. In China, a beer brewed from rice, grapes, honey, and hawthorn fruits known as ‘kui’⁴ emerged around 7,000 BCE.⁵ The Inca Peoples of the Americas brewed a similar drink from maize known as “Chicha de jora,” traces of which have been found at sites such as Machu Picchu.⁶ The beverage was important to the Inca Peoples as a ritual consumption; and being forced to drink water in lieu of Chicha de jora was seen as a severe punishment.⁷ Evidence exists that beer may have been brewed as far back as 10,000 years ago in the Amazon Basin,⁸ making it a potential rival to the widely held belief that beer originated in Mesopotamia.⁹ Current research indicates the genesis of beer occurred as an accidental discovery by Natufian peoples of the Levant—the ancestors of the Sumerians—around 10,000 BCE. Their discovery occurred after wild barley, which they collected in jars, was incidentally moistened coming into contact with wild yeast, thus allowing the process of fermentation to occur.¹⁰ According to anthropologists Solomon Katz and Mary Voight, the Natufians continued this process as they sought the psychopharmacological effects of alcohol and the social and nutritional benefits the infusion provided.¹¹ The discovery of beer was revolutionary and spread throughout the world, eventually leading to the drink which is often consumed in modern times.

The intended purpose of this article is to demonstrate the fundamental role beer had in Sumerian civilization, and the broader implications the drink had for the civilizations which succeeded Sumer. This paper will begin by outlining how the desire to ferment beer likely led to sedentism and the domestication of cereals in the Near and Middle East, it will then examine the fundamental role played in both Sumerian spiritual and economic matters. The paper will then speak to the important nutritional role beer played in the diets of Sumerians, to conclude the paper will address the spread of beer to other cultures in the Near and Middle East.

Beer as a Precursor to the Neolithic Revolution

The desire for beer was likely an important factor in the establishment of settled agriculture and an impetus for the Neolithic revolution in the Near and Middle East. In 1953—in what has come to be known as the Braidwood Symposium—a debate emerged if, in fact, beer rather than bread was the first processed item to be made from domesticated grains.¹² Prior to the symposium, Robert Braidwood's research on the emergence of the Neolithic revolution at the Qal'at Jarmo site in modern day Iraq found evidence of early cereal and legume domestication. Jarmo villagers grew two varieties of wheat (einkorn and emmer), lentils, and a primitive form of barley.¹³ Braidwood published an article in *Scientific American* supporting a cause and effect relationship between the domestication of cereals in the Near East and the production of flour in order to produce breads.¹⁴ This closely linked relationship was challenged by archaeo-botanist Jonathan Sauer of the University of Wisconsin, who questioned if the domestication of cereals occurred to produce beer rather than bread, leading to the symposium, "Did man once live by beer alone?," hosted by the *American Anthropologist* journal. The symposium considered the question of whether the discovery of fermentation served as a precursor to targeted selection and the domestication of cereals. The symposium participants ultimately came to the consensus that

the cultivation of early cereal crops in the near East would have been better suited to produce beer as opposed to bread.

Numerous experts have supported this hypothesis since the Braidwood Symposium, including Charlie Bamforth (the Chair of the Food Science Department at the University of California Davis¹⁵), and Solomon Katz of the University of Pennsylvania,¹⁶ as an explanation for the domestication of cereals. Emergent archeological findings further bolstered this hypothesis in recent years, including chemical analyses conducted on trough-shaped stone vessels that could hold 160 liters, found at the Göbekli Tepe, which is the currently-known oldest known temple in the world (approximately 11,600 years old). The analysis, conducted by Dr. Martin Zarnkow of the Technical University of Munich-Weihenstephan, found substances testing positive for calcium oxalate, a constituent that develops following the mashing, soaking, and fermentation of grains.¹⁷ In 2009, Dr. Patrick McGovern, the Scientific Director of the Biomolecular Archaeology Project at the University of Pennsylvania, found chemical evidence of tartaric acid, which accumulates during the production of alcoholic beverages, in stone vessels at the Neolithic site of Körtik Tepe.¹⁸ Archaeologists suggest that nomadic peoples used these vessels to brew beers from harvested wild grasses. As a result of these findings, it has been forwarded that hunter-gathers congregated at religious sites for ceremonies and were enticed to undertake communal work and as a result settle in order to worship more regularly and experience the mood altering effects and nutrition beer had to offer.¹⁹ This hypothesis has been bolstered by a team from the Norwegian University of Life Sciences in Oslo, who following the conclusion of genetic testing, determined that the earliest domestication of grain occurred in the area of Karacadağ very close to the Göbekli Tepe, providing additional evidence the production of alcohol and the domestication of grain were intimately interrelated.²⁰

The desire to consume alcohol and engage in rituals was a probable reason for the transition from a nomadic lifestyle to sedentism in both the Near and Middle East. For the Natufians, the consumption of alcohol had social benefits, as it had quick-acting elevating effects on emotions and contained perception-altering qualities. As a result, it was important in both secular and sacred events, such as during marriage ceremonies and social gatherings. Throughout the world individuals often appear to invest colossal amounts of energy and many times risk their safety in the pursuit of a food with mind altering or psychopharmacological properties. As a result, ritual practices often became intertwined with these foods. An example of this practice can be seen in the pre-Columbian rites of passage of the coastal Southern California Chumash peoples. A beverage known as *momoy* created using the cardiotoxic and hallucinogenic flowers of *Datura wrightii* was given to boys of about eight years of age. The rite was a challenge to help the boys make the spiritual transition into men, however not all boys who ingested *momoy* survived.²¹ To prevent conflict over competition for these substances, and to regulate their usage, religion intervened, imposing restraint by reserving these foods/ compounds only for ritual and social practices.²² The perceived need for the psychopharmacological and social properties of alcohol would be an adequate catalyst in prompting changes in society's behavior. In the context of beer this would have encouraged people to settle and produce cereals as the harvesting of wild cereals were not at a sufficient scale to support the consumption of beer by all people.²³ The importance of alcohol to both social and religious events, which this paper believes likely served as a prompt for the Neolithic revolution, continues in many of today's societies. Amongst the Luhya people of Kenya beer maintains both an important religious and social role for the Triki Tribe.²⁴ This pattern is present in the Judeo-Christian culture as well, where alcohol is often used for social events and plays an important role in rituals, including the Jewish metzitzah b'peh,

during which its consumption is a precursor to the Shabbat and during the Christian rite of the Eucharist.

The desire to brew beer necessitated a society where some elements of sedentism were necessary, including settling for more extended periods to build implements, to brew, and to grow or gather. This encouraged a transition from the Stone Age hunter-gatherer who had a primarily nomadic lifestyle to one marked by greater degrees of sedentism. The region of initial settlement contained rich soil as it was situated between the Tigris and Euphrates rivers.²⁵ Stable settlements began to arise with the cultivation of soil, and as a consequence of stability, a coevolution occurred with the domestication of animals. This established the precursors of modern agricultural sciences, as Sumerians engaged in practices of artificial selection engaging in animal husbandry with livestock and the selective breeding of crops.²⁶ Around 4,000 BCE significant shifts in the climate resulted in a drier landscape and a lower water table leading to the concentration of people in smaller spaces and serving as a precursor to the development of the large cities of Sumer.²⁷ The cities that emerged in the first half of 3,500 BCE saw the birth of the Sumerian culture which we know today. In these cities, the technology of record keeping developed where clay tokens, numerical tablets, seals, and the evolution of proto-cuneiform writing arose into a fully-fledged writing standard. These advancements were important milestones that eventually led to the complex accounting and record-keeping systems for which the Sumerians are known.²⁸ In this time period we see the emergence of some of the earliest writings. Among these is the first recipe for beer on a tablet dating back to 1800 BCE. The recipe is part of a poem entitled *Hymn to Ninkasi*, which praises Ninkasi, the Sumerian goddess of beer, and contains a recipe to produce beer from barley via bread.²⁹ Settlement was necessary for the

processing of cereals for beer which enabled the necessary developments that brought forth the Neolithic Revolution.

Sumerian Culture and Beer

Beer was instrumental to the development of the Sumerian economic structure. Sumerians understood beer could be used as money as it had an intrinsic value, was easily divisible, and could serve as a unit of account. Around 3,500 BCE, in the Sumerian city of Uruk, there is evidence of residents bartering with beer, trading the beverage for more scarce and precious resources, such as precious stones, timber, and metal.³⁰ This period of city settlement saw group stratification and the rise of social classes and wage labor.³¹ This is seen from a cuneiform tablet uncovered from the city of Uruk that outlines the rations of beer a worker is to receive in payment for their labor.³² Temple laborers would receive 1.75 liters for a day's worth of work, while those of a higher class, such as senior dignitaries, would receive approximately five times that amount.³³ Beer played a significant role in women's lives, as it provided economic opportunity in a heavily patriarchal culture. Mesopotamia was a patriarchal society where women retain significantly less rights than men, and many families sold daughters into slavery or prostitution.³⁴ The primary economic avenues for women were prostitution, becoming a temple priestess, or becoming a baker/ brewer. Sumerians saw brewing as synonymous with food preparation and therefore a female role/ chore.³⁵ As a result, women regularly brewed beer in preparation for their meals and were responsible for providing a household with bread and beer. The brewing of beer and the baking of bread provided an egalitarian economic venue for Sumerian women who were excluded from most professions. Women could sell excess products and many established bakeries and taverns. Brewing was a well-respected profession, as Assyriologist Adolf Leo Oppenheim notes, "The Brewer's craft is the only profession in

Mesopotamia which derives divine protection and social sanction from a goddess—in fact from two female figures of the pantheon: Ninkasi and Siris."³⁶ The fact that the profession of brewing and the consumption of beer received divine sanction and representation in this manner suggests that both were indeed crucial aspects of Sumerian civilization.



Cuneiform tablet from the city of Uruk. The tablet contains some of the earliest known writings in the world (3100 BC) and records beer rations for workers. Source: Wikimedia commons posted by the User: Babelstone on 25 March, 2012. From the British Museum (ME 140855).

The importance of beer to Sumerians cannot be overstated as its importance permeated all aspects of Sumerian culture, including intertwined sphere of the spiritual, religion, mythology, and literature. Beer is central to a Sumerian creation myth noted in the poem “Inanna and the God of Wisdom.”³⁷ Inanna, the tutelary deity of Uruk, attempts to increase the city’s glory by

bringing them the *mes* (The sacred laws of civilization). However the laws are guarded by her father, the god Enki who uses them to govern his city of Eridu. Enki becomes very drunk one night off beer and at this time Inanna asks for the laws; he concedes while inebriated. When Enki becomes sober he searches for the laws but realizes his actions will be too late to recover the laws. Inanna successfully delivers wisdom and tools of civilization to humans causing irreparable damage to men, leading to man's imperfections today.³⁸

Sumerians believed that beer was a gift from the gods, which had the goal of promoting human well-being and happiness.³⁹ In worship to the gods and goddesses, the Sumerians would present beer as offerings in their respective pantheons and temples.⁴⁰ In addition, there are four deities in the Sumerian pantheon who have a close association with beer: Siris a goddess whose name is often metonymically used to refer to beer,⁴¹ Siduri, the goddess who covers the enjoyment of beer,⁴² Nisaba the goddess of harvest—the primary product being that of barley,⁴³ and Ninkasi, the tutelary goddess of beer and the daughter of Inanna, the goddess of heaven.⁴⁴

Outside of a religious context, beer is commonly mentioned in Sumerian literature highlighting the reverence people had for the beverage. In the Sumerian work the *Epic of Gilgamesh*, the character Enkidu is created by the gods to prevent Gilgamesh from oppressing the people of Uruk.⁴⁵ Before Enkidu can complete this task he must be educated in the ways people live. There is a passage that details how Enkidu “did not know how to eat bread, / nor had he ever learned to drink beer!”⁴⁶ This passage suggests knowing how to properly drink beer was an important quality of civilized people. Enkidu was later educated in the ways of civilization by a temple harlot named Shamhat, who taught him how to properly drink beer amongst a variety of other lessons.⁴⁷ Beer was often consumed during intimate occasions and often went hand in hand with sexual intercourse, as evidenced by erotic scenes which often contain beer or references to

beer.⁴⁸ Furthermore, references to beer are common in Sumerian erotic poetry. One such poem creates the comparison of the sweetness of one's beloved to "the sweetness of honey and dates" and the "sweetness of butter and beer."⁴⁹

Health Benefits of Beer

In Sumerian society beer was often one of the most nutritionally dense items an individual could consume. The beer consumed by Sumerians varied significantly from the commercially available beers consumed throughout the world today. Beer was not brewed with hops as is common today, instead including the fermentation of "bappir," or a hard, twice-baked bread and the addition of crushed grains, not involved in the fermentation process.⁵⁰ Sumerian beer contained a diverse array of additives for flavoring, including fenugreek, coriander, dates, safflower, lupine, mandrake, grape pips, and orange skins.⁵¹ As a result, Sumerian beer was thick with a viscous consistency much like that of porridge or gruel.⁵² The alcohol content of this beer was somewhat low, ranging from 2-to-5 percent alcohol by volume.⁵³ As a result of its dense consistency and low alcohol content, beer was often featured centrally as part of meals rather than as an accompaniment, where it was served at room-temperature. Beer was considered more of a foodstuff and individuals consumed approximately 1 liter per day.⁵⁴ Beer was considered to be preferable to bread as bread was often used to produce beer, and many avoided eating bread altogether except in instances of famine.⁵⁵

The consumption of beer provided a selective advantage for individuals who consumed it and their offspring as compared to those who abstained from its consumption. The cereals most commonly used in the Sumerian brewing of beer were barley and wheat which had a high degree of nutritional potential at 13-to-20 percent protein and contained a small source of fat.⁵⁶ Despite its prospective nutritional profile it was significantly limited in many ways including: containing

low levels of lysine, insufficient B-vitamin content, and containing a percentage of phytic acid.⁵⁷ The inadequate levels of lysine in barley and wheat made it difficult for the human body to synthesize the grain's amino acids into proteins usable by the human body. The grains contained only trace amounts of vitamin B, notably thiamine, riboflavin, and niacin, however the amounts present were not sufficient enough to meet daily nutritional requirements. A major shortcoming of the cereals was high phytic acid content; phytic acid binds to essential minerals such as calcium, creating phytates which prevent mineral absorption in the digestive tract. The procedure of brewing contains the antidote for the pitfalls of wheat and barley through the process of fermentation. Fermentation promotes the growth of yeast bacteria cells which are high in lysine and B-vitamin content. Furthermore, the process of fermentation converts starches into sugars and activates phytase enzymes which break down phytic acid.⁵⁸ As a result, less phytates are present in the digestive tract, allowing humans to process more nutrients from what they are consuming. Producing beer was preferable to the processing of cereals to make bread, as bread was typically unleavened preventing the growth of yeast. If yeast began to grow the baking of bread requires heat which kills yeast and stops the enhancement of protein content.⁵⁹ The process had tremendous benefits and most importantly fermentation could occur almost anywhere throughout Mesopotamia as yeast was abundant and wild yeast strains would begin to ferment a simple mixture of cereals and water. After this process has occurred once, it was easily replicable as cultures could be obtained from existing brews and used as starters for the baking and brewing of future batches speeding up the process of fermentation.⁶⁰ As a result, beer was likely the food source with the greatest substance nutritional inputs in the Sumerian diet with the exception of animal proteins.

Most early grains from Mesopotamia were likely consumed as a cooked gruel or as beer as opposed to bread.⁶¹ A similar role for beer as a key foodstuff can be seen in the Kofyar community of Nigeria where the processing of a millet beer makes up a significant portion of the communities total caloric intake and is consumed by men, women, and children.⁶² The process of brewing afforded greater nutritional benefits than the consumption of bread or unprocessed cereals. The fermentation of beer in Sumer provided a nutritional and social advantage to those who consumed it as fermentation made the grain easier to digest, and increasing the nutritional value inherent in wheat and barley.

Beer after the Sumerians

Beer continued to play a major role in the civilizations which succeeded the Sumerians. The Babylonians who conquered the Sumerians inherited brewing culture as a consequence of their actions. Beer continued to play a fundamental role in Babylonian culture and society. Women continued the tradition of brewing and received kits for beer brewing as bridal presents, and the traditions of paying people in beer continued as palace employees received beer rations in exchange for their work, ranging from a gallon to quart per day depending on their social status and rank, with administrators and high priests receiving the greatest allotment per day. Beer's importance is reflected in the Code of Hammurabi, one of the earliest known set of codified and published laws established by the sixth Babylonian king, Hammurabi. The law code contains a handful of statutes (codes 108-110) in regards to beer, often imposing harsh penalties for violators. The code calls for the penalty of death for tavern keepers who water down beer/ short changed patrons, do not report criminal wrongdoings in their tavern, and for the execution of a "sister of god" should she chose to open a tavern or enter a tavern for a drink.⁶³ Following the Babylonians, the beverage continued its important role in Assyrian times, when it maintained

a high status in society. Following the completion of King Ashurnasirpal II's palace in at Kalhu, he organized a ten day festival where nearly 70,000 people were invited and 10,000 barrels of beer were consumed.⁶⁴ The Assyrian king Shamshi-Adad called for a consistent maintenance of a royal beer stock for his consumption,⁶⁵ and a 2,000 BCE Assyrian tablet states that beer was among the list of foods Noah provisioned for his ark.⁶⁶ The beverage spread to Egypt as a result of Babylonian trade, where a fondness for the beverage was immediate. Beer became a staple of Egyptian culture as Egyptians claimed the brew was invented by the god Osiris and a new hieroglyph was invented for "brewer."⁶⁷ In Egyptian tombs beer recipes and the infrastructure to brew beer were discovered as the Egyptians held it was important to consume beer in the afterlife.⁶⁸ However beer was not valued in by all ancient peoples, as beer spread from Egypt to Greece, the Greeks preferred wine,⁶⁹ and the Romans after the Greeks considered beer to be a lower class drink of barbarians. The Roman writer Tacitus stated "To drink, the Teutons have a horrible brew fermented from barley or wheat, a brew which has only a very far removed similarity to wine."⁷⁰ The Roman emperor Julian the Apostate when so far as to compose a poem entitled the "Two Dionysi," which conflates the scent of wine to that of nectar, while making a comparison of the smell of beer to that of a goat.⁷¹ In modern times a fondness for the substance has prevailed, and market research estimates predict that by 2022 the global beer market will reach the size of \$750 billion USD.⁷² This figure would be larger than the combined market value of the gold, silver, copper, and iron combined in 2016.⁷³

Conclusion

Beer has a unique history from convergent evolution in various geographic locations to the fundamental role it played in Sumer. In Sumer, the beverage provided nourishment, played an important role developing Sumerian culture, and shaped the societies which succeeded Sumer.

Most importantly, the mind-altering effects stemming from alcohol consumption likely served as a catalyst that sparked the Neolithic revolution in Mesopotamia. Since the time of the Sumerians beer maintains an important role as it is mentioned in all texts of the Judeo-Christian tradition (Torah, Bible, and Quran).⁷⁴ Today rather than regarded as a gift by the gods meant to be consumed by all, the beverage holds a rather complex place in society. Beer is the third most commonly consumed alcoholic beverage in the world, however it is simultaneously vilified. Many do not enjoy the fondness of the beverage largely as a result of its public health externalities including: complications with childbirth, birth defects, liver disease, kidney damage, alcohol dependency, and accidents resulting from the operation of machinery while inebriated. Thirty-three countries around the world have mandatory health warning labeling requirements for alcoholic beverages warning consumers of what they are ingesting.⁷⁵ In addition, beer is banned in many countries or by their subnational authorities. Notably this occurs in countries with a high Muslim population,⁷⁶ including states in the Fertile Crescent whose history relates to the origins of beer.⁷⁷ Despite the negative perception held of beer by many today, it is likely that the beverage played a role in encouraging the transition from nomadism to an agrarian lifestyle in the Near and Middle East.

ENDNOTES

¹ Stephen Bertman, *Handbook to life in ancient Mesopotamia*, Oxford University Press, 2005, 292.

² Jason Treat and Ryan T. Williams, "Our 9,000-Year Love Affair With Booze," *National Geographic*, January 17, 2017. Accessed February 07, 2018. <https://www.nationalgeographic.com/magazine/2017/02/alcohol-discovery-addiction-booze-human-culture/>.

³ Max Nelson, *The Barbarian's Beverage: A history of Beer in Ancient Europe*, Routledge, 2005, 1.

⁴ Mark Patterson and Nancy Hoalst-Pullen, *The Geography of Beer: Regions, Environment, and Societies*, Springer Science & Business Media, 2014, 25.

-
- ⁵ Patrick McGovern, Juzhong Zhang, et al., "Fermented Beverages of Pre-and Proto-Historic China," *Proceedings of the National Academy of Sciences of the United States of America* 101, no. 51 (2004): 17593.
- ⁶ Bethany Turner, George D. Kamenov, et al., "Insights into immigration and social class at Machu Picchu, Peru based on oxygen, strontium, and lead isotopic analysis," *Journal of Archaeological Science* 36, no. 2 (2009): 317-332.
- ⁷ Patterson and Hoalst-Pullen, *The Geography of Beer*, 25.
- ⁸ *Ibid.*
- ⁹ Nelson, *The Barbarian's Beverage*, 10.
- ¹⁰ Patterson and Hoalst-Pullen, *The Geography of Beer*, 23.
- ¹¹ Soloman Katz and Mary Voigt, "Bread and Beer," *Expedition* 28, no. 2 (1986): 27-28.
- ¹² Robert J. Braidwood, Jonathan D. Sauer, Hans Helbaek, et al., "Symposium: Did Man Once Live by Beer Alone?," *American Anthropologist* 55, no. 4 (1953): 515-526.
- ¹³ Ehud Weiss and Daniel Zohary, "The Neolithic Southwest Asian Founder Crops: Their Biology and Archaeobotany," *Current Anthropology* 52, no. S4 (2011): S244. doi:10.1086/658367.
- ¹⁴ Braidwood, et al., "Symposium," 515.
- ¹⁵ Steve Mirsky, "Ale's Well with the World," *Scientific American*. May 01, 2007. Accessed February 10, 2018. <https://www.scientificamerican.com/article/ales-well-with-the-world/>.
- ¹⁶ Katz and Voigt, "Bread and Beer," 23-34.
- ¹⁷ Oliver Dietrich, Manfred Heun, Martin Zarnkow, et al., "The Role of Cult and Feasting in the Emergence of Neolithic communities. New evidence from Göbekli Tepe, south-eastern Turkey," *Antiquity* 86, no. 333 (2012): 687.
- ¹⁸ Patrick E. McGovern, *Uncorking the Past: The Quest for Wine, Beer, and Other Alcoholic Beverages*, Univ of California Press, 2009, 81.
- ¹⁹ Michael Dietler and Brian Hayden, eds. *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, University of Alabama Press, 2010, 240-264.
- ²⁰ Manfred Heun, Ralf Schäfer-Pregl, Dieter Klawan, et al., "Site of Einkorn Wheat Domestication Identified by DNA Fingerprinting," *Science* 278, no. 5341 (1997): 1312-1314.
- ²¹ Garcia, Cecilia, and James D. Adams, *Healing with medicinal plants of the west*, Abedus Press, 2005.
- ²² Katz and Voigt, "Bread and Beer," 27.
- ²³ *Ibid.*
- ²⁴ *Ibid*, 28.
- ²⁵ The term Mesopotamia came from Greek meaning "between two rivers." The region had rich soil due to the periodic flooding of the Tigris and Euphrates.
- ²⁶ Lynn Hunt, Thomas R. Martin, Barbara H. Rosenwein, et.al., *The Making of the West: A Concise History, Combined Version: Peoples and Cultures*, Macmillan Higher Education, 2010, 3-7.
- ²⁷ Hunt, Martin, Rosenwein, et.al., *The Making of the West*, 8.
- ²⁸ *Ibid*, 11-12.
- ²⁹ John Dyneley Prince, "A Hymn to Ninkasi," *The American Journal of Semitic Languages and Literatures* 33, no. 1 (1916): 40-44.
- ³⁰ Eline Polemans, and Johan F.M. Swinnen, "A Brief Economic History of Beer," In *The Economics of Beer*, 1. New York, NY: Oxford University Press, 2011, 4.

-
- ³¹ Hunt, Martin, Rosenwein, et.al., *The Making of the West*, 4-5.
- ³² Charles Singer, Eric J. Holmyard, Alfred R. Hall, et al., *A History of Technology: From Early Times to Fall of Ancient Empires*, Vol. 1, Clarendon Press, 1956, 279.
- ³³ *Ibid.*
- ³⁴ Gerda Lerner, *The Creation of Patriarchy*, Oxford University Press (1986), 215.
- ³⁵ Eline Polemans, and Johan F.M. Swinnen, "A Brief Economic History of Beer," In *The Economics of Beer*, 1. New York, NY: Oxford University Press, 2011, 6.
- ³⁶ Fred Minnick, *Whiskey Women*, Potomac Books, Inc., 2013, 1.
- ³⁷ Samuel N. Kramer and John R. Maier, *Myths of Enki, the Crafty God*, Oxford University Press, USA, 1989, 160-162.
- ³⁸ *Ibid.*
- ³⁹ Samuel Noah Kramer, *The Sumerians: Their history, culture, and character*, University of Chicago Press, 1963, 214.
- ⁴⁰ Geoffrey Dobson, *A Chaos of Delight: Science, Religion and Myth and the Shaping of Western Thought*, Routledge, 2016.
- ⁴¹ Mikhal Dayagi-Mendeles, *Drink and be merry: wine and beer in ancient times*, Vol. 417. The Israel Museum, 1999, 100.
- ⁴² Charles Russell Coulter and Patricia Turner, eds. *Encyclopedia of Ancient Deities*, Routledge, 2013, 430.
- ⁴³ *Ibid*, 332.
- ⁴⁴ *Ibid*, 346-347.
- ⁴⁵ Andrew George, ed. *The epic of Gilgamesh: the Babylonian epic poem and other texts in Akkadian and Sumerian*, Penguin, 2002, 1.
- ⁴⁶ *Ibid*, 14.
- ⁴⁷ *Ibid*, 9.
- ⁴⁸ Peter Damerow, "Sumerian Beer: The Origins of Brewing Technology in Ancient Mesopotamia," *Cuneiform Digital Library Journal* 2 (2012): 18.
- ⁴⁹ Bertman, *Handbook to life in Ancient Mesopotamia*, 180.
- ⁵⁰ Damerow, Sumerian Beer, 6.
- ⁵¹ Charles Bamforth, *Grape vs. Grain: A Historical, Technological, and Social Comparison of Wine and Beer*, Cambridge University Press, 2008, 28.
- ⁵² Ian S. Hornsey, *A history of beer and brewing*, Royal Society of Chemistry, 2007, 86.
- ⁵³ William K. Stevens, "Does Civilization Owe A Debt to Beer?" *The New York Times*, March 23, 1987. Accessed February 09, 2018. <http://www.nytimes.com/1987/03/24/science/does-civilization-owe-a-debt-to-beer.html>.
- ⁵⁴ Charles W. Bamforth, *Beer: Health and nutrition*, John Wiley & Sons, 2008, 32.
- ⁵⁵ Sewell, *The Geography of Beer*, 23.
- ⁵⁶ Katz and Voigt, "Bread and Beer," 30.
- ⁵⁷ *Ibid*, 30.
- ⁵⁸ Mattias Fredrikson, Thomas Andlid, A. Haikara, et al., "Phytate Degradation by Micro - Organisms in Synthetic Media and Pea Flour," *Journal of Applied Microbiology* 93, no. 2 (2002): 199.
- ⁵⁹ Katz and Voigt, "Bread and Beer," 31.
- ⁶⁰ *Ibid.*
- ⁶¹ *Ibid*, 27.

⁶² *Ibid*, 28.

⁶³ "Code of Hammurabi," The Avalon Project: Documents in Law, History and Diplomacy. Accessed February 10, 2018. <http://avalon.law.yale.edu/ancient/hamframe.asp>.

⁶⁴ Bertman, *Handbook to life in Ancient Mesopotamia*, 23.

⁶⁵ *Ibid*, 29.

⁶⁶ "The History of Beer," All about Beer -- History. Accessed February 11, 2018. <https://people.cs.pitt.edu/~mehmud/cs134-2084/projects/Team4/history.html>.

⁶⁷ Patterson and Hoalst-Pullen, *The Geography of Beer*, 24.

⁶⁸ Garrett Oliver and Tom Colicchio, *The Oxford Companion to Beer*. Oxford University Press, 2011, 437-438.

⁶⁹ *Ibid*, 437.

⁷⁰ Patterson and Hoalst-Pullen, *The Geography of Beer*, 25.

⁷¹ Eline Polemans and Johan F.M. Swinnen, "A Brief Economic History of Beer," In *The Economics of Beer*, 1. New York, NY: Oxford University Press, 2011, 3.

⁷² *Beer Market by Product (Light Beer and Strong Beer), by Production (Micro Breweries and Macro Breweries), by Category (Premium, Super Premium and Normal) and by Packaging (Canned, Bottled and Draught): Global Industry Perspective, Comprehensive Analysis and Forecast, 2016 – 2022*. Report. Zion Market Research. New York, NY: Zion Market Research, 2017. 1-110.

⁷³ Jeff Desjardins, "This Infographic Shows How Gigantic the Energy Market is Compared to the Metals Market," Business Insider. October 17, 2016. Accessed February 11, 2018.

<http://www.businessinsider.com/comparison-between-oil-and-metals-markets-2016-10>.

⁷⁴ Beer is mentioned multiple times in the texts, in the Bible and Torah it is seen in Leviticus 10:9, Judges 13:4. In the Qu'ran it is seen in verses 2:219, 4:43, 5:90.

⁷⁵ "Health Warning Labeling Requirements - Data by Country." International Alliance for Responsible Drinking. Accessed February 11, 2018. <http://www.iard.org/policy-tables/health-warning-labeling-requirements/>.

⁷⁶ Alcohol is illegal in Afghanistan, Brunei, Iran, Libya, Kuwait, Mauritania, Saudi Arabia, Somalia, Sudan, and Yemen. Prohibitions exist on Muslim alcohol consumption in Bangladesh, Pakistan, and the Maldives. Subnational provincial restrictions on alcohol exist in India and the United Arab Emirates.

⁷⁷ Iran, Saudi Arabia, and Kuwait.