



# BREWING WINEMAKING & Fermented DRINKS

BY JOHN MASON AND STAFF OF ACS DISTANCE EDUCATION

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# CHAPTER 1 HISTORY, SCOPE AND NATURE OF ALCOHOLIC DRINKS

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*Beer and wine are very much a part of modern day culture but their use evolved many centuries ago. In fact, the crudest type of alcoholic drinks made from fermented grains can be traced back to the Neolithic period in South West Asia around 6,000 to 8,000 BCE.*

## A BRIEF HISTORY

Studying the making and use of alcoholic beverages over time tells us a lot about the development of civilisations and cultures around the world. Alcohol has been used in rituals, religious ceremonies and cultural celebrations for thousands of years. Beer was used as an important source of food and nutrition and also as a medicine. The Egyptians included it in their daily diet some 5,000 years ago as a source of nutrition, but it was in a very raw state – more like a kind of gruel of fermented grains. The fermentation involved in alcohol production increases the levels of amino acids and vitamins in the end-product and this made alcohol (and still does) an important source of nutrition in populations with otherwise poor diets.

Alcoholic beverages were also consumed to replace contaminated water in regions where water was so polluted it was unfit for consumption. Even as recently as 18th century Paris where water contamination was a part of everyday life, alcohol, being cheaper than both tea and coffee, was consumed as a replacement for fouled water.

Although the exact date is unknown, humans started to produce alcoholic beverages thousands of years ago; the unearthing of stone-age beer vessels dating back to 8,000 BCE proves that humans were brewing beer 10,000 years ago. The first written records of beer brewing is by the Sumerians in around 4,000 BCE and clay vessels found in Iran, dating back to 9,000 BCE, were tested and found to have evidence of their use for beer brewing. Egypt is the home of the world's oldest known brewery dating back to 3,400 BCE. Descriptions of winemaking appear in pictorial symbols (known as pictographs) on Egyptian clay vessels that date back to the 5,000 BCE.

The dawn of civilisation, as nomads changed to permanent settlers, was also thought to be influenced by brewing. The need to grow grains meant that previously nomadic tribes settled in one place. where they took up agriculture and started to live in organised and socially developed communities.

Beer brewing appears to have preceded winemaking by at least one thousand years or longer, since the earliest vessels containing alcohol residues from wine date back to 7,000 BCE. These were discovered in China and

analyses found that the residue in the vessels was from fermented drinks made using honey, grapes, hawthorn berries, and rice. Beer brewing (known as 'kui') in China also dates back to around 5,000 BCE. In Europe, the production of mead from wild honey was thought to have been developed around 2,000 BCE.

It is generally considered that the Egyptians taught the Greeks, the Greeks taught the Romans and the Romans taught the Britons how to brew beer.

With the dawn of the Christian era monks started building breweries and brewing beer to serve the travellers and pilgrims of the time. St. Luke, St Nicholas and Saint Augustine are the considered by Christians as the patron saints of brewing.

In centuries past, alcohol was also used as currency. It was used to pay workers (and to keep them working as they developed an alcohol addiction) and buy slaves in ancient Mesopotamia and Egypt. It was also used to pay tolls, taxes, rent and debts in medieval England.

Governments have used taxes on alcohol as a valued source of revenue for thousands of years. In 18th century England a bizarre situation occurred where gin became so incredibly cheap (against very heavily taxed imports) that it was the cheapest source of alcohol available. Made from poor quality grain that was unsuited to beer brewing, literally thousands of 'gin shops' sprang up around London. Termed the 'Gin Craze' alcoholism became epidemic and it was almost the downfall of England.

Good sense prevailed and in 1736 taxes on imports were decreased causing what became known as the 'gin riots'. Further tax decreases over the ensuing years, ended the gin crisis.



*Today alcohol is seen as a 'social lubricant' rather than currency as it sometimes was in the past.*

## THE MODERN INDUSTRY

The foundations to today's beer, wine and spirits industry was laid down in the 1800s (during the industrial revolution) when fermentation and aging processes were developed. At this time the beer industry was dominated in Europe by Germany and Britain but another player was about to get on board - the Czech Republic. They developed a clear beer in the city of Pilsen, or Pilsen, which is about 90km from Prague. This clear lager beer was a hit with the Germans who set about creating their own variations on it. Lagers became very popular around the world although only in the 1950s did they provide stern competition for pale ales in Britain, where many brewers still used warm fermentation methods to produce ales and real ales which were racked straight from fermentation containers into barrels.

The United States had its own evolution, beginning with ales produced by early migrants and then being superseded by lager beers with the arrival of German and Dutch migrants in the mid 1800s. In fact, German migrants dominated the American brewing industry for many years.

When it comes to beer, 'old world' refers to the brewing nations of Europe such as Germany, England, Ireland, Belgium and Czech Republic. Similarly old world wines are associated with France, Italy, Spain and Portugal as well as parts of North Africa. New world wines are considered to come from Australia, New Zealand, South Africa, North America and South American nations e.g. Chile and Argentina. However, each of these

nations, whether considered old or new, makes quite distinct varieties and styles of wine or beer. Connoisseurs can usually pinpoint a country or region of origin with remarkable accuracy.

## TRENDS IN BEVERAGE CONSUMPTION

Data relating to alcohol consumption is derived from statistics relating to purchases of alcohol. This is prone to errors because it doesn't take into consideration alcohol which has been homemade, nor does it account for wastage. Nevertheless, this is the most accurate data available for assessing the industry.

Over the years the beverage industry, like other industries, is subject to trends as different products become more sought after and new products are developed. Most Westernised countries have experienced population growth over recent decades and along with that they have witnessed an increase in alcohol consumption generally. But that doesn't reveal the full picture. Some countries actually revealed a decrease in alcohol consumption between 1997 and 2011. Denmark led the way with a decrease of more than 25 litres per capita. Slovenia wasn't too far behind with a decrease of almost 20 litres per capita, although this bucked the trend for Eastern European countries where countries such as Estonia, Russia, Lithuania, Ukraine, Poland and Belarus showing the biggest per capita increases.

However, some sectors of the market have been more vibrant than others. Beer consumption seems to have

been fairly stable in most Westernised countries or at best has shown a modest increase. In some countries there has been a slight decline. But this doesn't reveal the full picture. On a global level, beer is by far the most widely consumed alcoholic beverage where consumption averaged about 17.5 litres per person in 2011 which is up from about 13 litres per capita in 1971. In 2011 beer was followed by wine consumption which was a distant second at 3 litres per person, and spirits which were consumed at 2.2 litres per person.

If we scrutinise beer consumption we can see that much of Eastern Europe's increase in per capita consumption can be directly attributed to beer, whereas in North America beer consumption has declined by about 4 litres per capita. If we look more closely we can see that there has been increased interest in certain sectors of the beer industry. In Canada, for instance, light, no and low alcohol beers accounted for 72.5% of beer sales in 2011. This would correlate with increased levels of health awareness amongst consumers. Strong beers at 11% accounted for the next

most popular group of beers in Canada at this time. Another emergence has been the rise of craft beers. Consumers have been looking for more variety in their beers and many smaller beer makers have been able to get a foothold in the market. Of course, nothing escapes the large players in the beer and wine industry and they have been quick to buy out some of these small craft beer makers and microbreweries, as well as market their own 'craft' beers.

Beers have also been developed to cater for particular groups of consumers, such as women. Here, light and low alcohol beers have been successful where the emphasis has been placed on low calories. However, wine also has perceived health benefits.

On a global level wine consumption has been fairly stable from 1997 to 2015. However, it has shown signs of increased popularity in some countries. In fact wine consumption in developing markets such as China has also been rising as more people become middle class and have access to disposable income.



*Although consumption of wine is stable in most countries - in China it is increasing.*

## ALCOHOL & HEALTH

When discussing making alcohol and alcohol consumption, it is impossible to do so without also talking about health impacts of alcohol. Generally the study of alcohol and health focuses on the volume of alcohol consumed by individuals and whether they are daily consumers or binge drinkers. As already outlined, statistics relating to consumptions may be skewed by errors. Statistics relating to personal alcohol consumption are also prone to errors because most people underestimate their alcohol consumption, or are not particularly forthcoming due to social stigma.

Binge drinking has an adverse effect on health. Whilst different authorities have slightly different explanations for what constitutes binge drinking, one definition which seems to be quite widely accepted is that binge drinking is where a person drinks a lot of alcohol in a short space of time so that their blood alcohol level is 0.08g per decilitre. This usually occurs when a woman consumes 4 drinks or a man consumes 5 drinks in less than 2 hours. In the United States about 90% of alcoholic drinks consumed by people aged 21 years and younger are said to be through binge drinking. Most people who binge drink do so on an average of 4 occasions per month; it is suggested that one in six people in the USA binge drink.

Binge drinking is associated with a higher prevalence of violent and aggressive behaviour, increased likelihood of hurting oneself and others through accidents or violence, and an increased risk for suicide. Most of those who binge drink are not alcoholics or dependent on alcohol. When it comes

to alcohol dependence, Russia has the highest rate with as many as 20 percent of adult males being dependent. Europe and Latin America have high prevalence rates with typically three to four times as many men affected than women. Latvia and Lithuania have the highest recorded rates for alcohol related hospitalisations at 2,00 per 100,000 residents.

One of the reasons why alcohol related health problems have increased in some countries is due to a lack of suitable policies to control the marketing and advertising of alcohol. A lack of education concerning the health consequences and cultures which actively encourage the consumption of alcohol also contribute. In countries where alcohol related problems and the amount of alcohol consumed per capita have decreased this is often linked to better policies and awareness. The implementation of drink driving laws, restrictions on advertising, increased taxes on alcohol and greater availability of alcohol-related treatment services, have all been effective in this regard. The World Health Organisation has implemented a Global Information System on Alcohol and Health (GISAH) as a kind of watchdog which presents data and information on alcohol consumption and alcohol related problems, along with the effectiveness of policies to control its consumption. It features data on more than 100 countries.

We believe that anyone who partakes in making wine, beer, spirits or other alcoholic beverages should be aware of the health risks to themselves and others, and take a responsible approach to production and consumption of alcohol. With this in mind, making alcohol can be a fun and satisfying pastime or career.

## GLOBAL WINE PRODUCTION

The global production of wine in 2015 was around 275 million hectolitres which worldwide was a steady decline over 5 years since 2010. Countries like China, Chile, Germany, South Africa, Spain and the United States have all seen steady rises in production since 2010 however overall global production dropped due to the reduced production of countries such as Australia, Argentina (a massive 43% reduction), France and Italy.

### World wine production in 2015 in hectolitres (where 1 hectolitre = 100 litres):

|                   |      |
|-------------------|------|
| Italy             | 48.8 |
| France            | 47.3 |
| Spain             | 36.6 |
| USA               | 22.1 |
| Argentina         | 13.3 |
| Chile             | 13.8 |
| Australia         | 12.  |
| South Africa      | 11.7 |
| China             | 11.1 |
| Germany           | 8.8  |
| Portugal          | 6.7  |
| Russia            | 4.9  |
| Romania           | 4    |
| Hungary           | 2.9  |
| Brazil            | 2.7  |
| New Zealand       | 2.35 |
| Austria           | 2.35 |
| Rest of the World | 20.7 |

## GLOBAL WINE CONSUMPTION

USA leads the world in wine consumption, consuming some 339 million 9 litre cases of wine per annum followed closely by France at 296 million, Italy 288 million, Germany 274 million, China 144 million, The UK 133 million and Australia at 68 million.

Per capita, wine consumption is led by Italy then France, Switzerland, Portugal and Austria.

## GLOBAL BEER PRODUCTION

Beer is still the drink of choice for most people world-wide, (Asia, which also has a very high rate of spirit consumption). The global production of beer in 2014 was around 191 million kilolitres.

### World beer production in 2015 in kilolitres (where 1 kilolitre = 1,000 litres):

|         |       |
|---------|-------|
| China   | 44.9  |
| USA     | 22.6  |
| Brazil  | 14.15 |
| Germany | 9.56  |
| Mexico  | 8.2   |
| Russia  | 7.64  |
| Japan   | 5.47  |
| UK      | 4.12  |
| Poland  | 3.99  |
| Vietnam | 3.89  |