

BEER

In the early seventeenth century people consumed beer with a different purpose than people do today.

- Beer was a form of nourishment
- A dietary staple for the Pilgrims from infants to the aged.
- The Mayflower carried three times more beer than water
- Beer practically replaced drinking water in the Pilgrims daily lives.
- Records from the seventeenth century show that on average an individual consumed about three quarts of beer per day.

Civilization and Beer

Hypothesis 1

Some believe that formerly nomadic people settled in Mesopotamia because they found it impossible to travel and maintain a steady supply of alcohol or the grain from which to make it.

Hypothesis 2

Others believe that civilization began with the purposeful cultivation of the earliest farmed grains--wheat and barely--beer was discovered accidentally following settled civilization and the cultivation of barley.

WHO DISCOVERED BEER?

The first batch of beer is may have been accidentally made by some individual who left a bowl of barley out in the rain. The first recipe for "wine of grain" was inscribed on stone tablets in Mesopotamia about seven thousand years B.C. The earliest chemical evidence of beer was found at a Sumerian outpost where a yellowish residue was found on a piece of pottery and was chemically identified as being an oxalate salt, such as found on the insides of today's brewing tanks. This piece of pottery is over 5,000 years old.

Beer in Europe

Beer came to Europe by way of the ancient Greeks through forays into then brew-active Egypt. Beer then flowed north with Julius Caesars legions about 55 B.C. into Gaul and Britain. The first use of hops is generally attributed to the monasteries of Northern Gaul, where Gaulish monks applied the Celtic word beor to their concoction. Saint Arnold, 6th century A.D. was apparently the first person to introduce hops.

First Commercial Brewery

It wasn't until 1040 A.D. that the first commercial brewery, the Weihenstepan Brewery, was established in Freising Germany. In America, Peter Minuit opened the first public brewery on Manhattan Island. William Penn erected the first brewery in Pennsylvania in 1638 followed by Samuel Adams (father of the Revolution), Thomas Chittenden (Vermont's first governor) and George Washington (who was thought to have written the first recorded recipe for homebrew in North America..

Prohibition

During Prohibition, the availability of alcohol was limited due to the 18th Amendment to the Constitution of the United States. Fortunately the 21st Amendment repealed the 18th in 1933.

COMMERCIAL PRODUCTION OF BEER

Microbreweries--defined as producing less than 15,000 barrels of beer a year.

More concerned with taste and brew their beers naturally without artificial flavor or carbonation

»Much fresher with no preservatives

»Incorporate bold flavors and boutique and specialty beers

Superbreweries--Produce more than 15,000 barrels of beer a year

Anheuser Busch produces at least 70 million barrels of beer per year.

Miller produces 41 million barrels.

HOME BREWING

Once the initial equipment is produced, the price per batch is much lower than commercial beer

Many want to explore the possibility of brewing exotic tasting beers

The government made it legal for citizens to make their own beer--can make one hundred gallons per adult individual per household.

»It is illegal to sell homebrew.

»It is still illegal to make homebrew in eleven states.

Ingredients are malted barley, hops, yeast and water.

EQUIPMENT

Boiling kettle	Cooling coil	a fermentation lock
Long handled spoon	A hydrometer	bottling caps, bottles and a capper or
7-8 gallon bucket with a sealing lid	A thermometer	Pressure canister
a 7 gallon carboy	siphoning tube	

MAKING BEER

1. Sterilize the equipment--Clorox and hot water, pressure cooker. If the equipment isn't sterilized a number of contaminating organisms, both bacteria and fungi, and ruin the beer.
2. Malting--The barley grains are allowed to soak in water for about 40 hours, with draining and new water added every 8 hours. Once the barley grains reach 40-45% moisture the barley is allowed to germinate around 60° F. Germination of the grain allows for plant enzymes to convert carbohydrates into more simple sugars like glucose. Once the epicotyl forms, the grains are dried with a gradual rise in temperature (122° F for lagers, 221° F for ale malts).
3. Mashing--the barley has to be cracked open so that water can get inside and activate the enzymes. These enzymes called diastases, become most active around 150-160 degrees F. They convert the starches from the barley into simple sugars. This process is known as mashing. After the solids are strained out the dark, sweet liquid is called "wort."
4. The wort must be boiled for 30-90 minutes depending on the recipe. Hops are added at different times during this phase. Hops have tiny oil glands that contain oils and resin that contribute to the aromatic flavor and bouquet of the beer.
 - Hops contributing to the bitterness of the beer are added early in the boil so the resins have time to dissolve into the wort.
 - Hops that are added for their aromatic flavoring are added within the last few minutes of the boil. Otherwise the quickly dissolved oils get steamed out of the wort.
5. The wort is cooled, so the yeasts to be added next don't die. This is done quickly either with a cooling coil hooked up to the cold water tap or by "splarging" where the hot wort is poured into a sterilized container containing cold water.
6. The yeast is "pitched" either as a freeze-dried powder or as an actively growing liquid. Each has its advantages.
7. The yeast is allowed to ferment the wort for up to 10 days, depending on the type of beer. During this phase, the alcohol is made and the carbonation is allowed to escape through the fermentation lock.
 - Respiration--the yeast converts simple sugars to carbon dioxide and water. The yeast obtains its energy for fermentation and sedimentation during this phase.
 - Fermentation--the conversion of sugar to alcohol and carbon dioxide. It is the longest of the three phases. At its peak, which is also the start of sedimentation, the yeast has a density of 50 million cells per milliliter.
 - Sedimentation--the yeast cells settle to the bottom of the fermentation vessel because most of the sugars have been converted and utilized for respiration, and they begin to prepare for dormancy. Sedimentation last for 2-3 days. At the time the beer appears clear, the yeast's density is less than 1 million cells per milliliter.
8. At the peak of alcohol production (measured with a hydrometer) the beer is ready to bottle. Typically the beer is carefully siphoned off into a second sterile container to eliminate as much of the sedimented yeast as possible. If not the yeast forms a thick scum on the bottom of the bottle.
9. A small, but precisely measured amount of sugar is dissolved, and added to the brew. This is known as secondary fermentation, and allow the yeast one final fermentation cycle to produce the carbonation in the bottles. Frequently, there is a second siphoning step or even a filtration step to remove the remainder of the yeast before bottling. Some yeast is needed to do the secondary fermentation.
10. Aging. The bottles are then set aside in a cool, dark place and left untouched until ready to drink. "Green beer" can be drunk at one week after bottling. Most homebrewers leave their beer sit three or four weeks before the first bottle is opened.

