

Pullman/Moscow

# Beer Handbook



*I dedicate this little bookie to my older brother Ryan,  
who has been an inspiration to me in many ways—  
including the ways of beer.*

An informative and educational guide for learning about and  
enjoying beer in the Pullman/Moscow area.

by Brandon Billing

## Introduction:

My objective in creating this beer handbook has more to do with personal interest than with any noble cause for the betterment of humanity. I have chosen to write this handbook because I've recently become fascinated with beer seeing that it is not merely an implement of drunkenness, but a fine drink that peaks both my interest and taste buds. By researching the various facets of beer and reporting my research in this handy little booklet, I have greatly expanded my own knowledge about beer. I hope this document will be equally useful to you, the reader, who likely shares my curiosity about the substance. It is appropriate to inform the reader that this booklet reports on how beer and brewing are a very sophisticated part of society that hold great historical, scientific, and cultural value. This is not a handy guide to debauchery, but almost an exclusively educational work. My hope is that it is very informative to the reader and can aid in bringing a more elegant face to brewed drinks.

## Table of Contents:

Definition.....	1
The Origins of Beer.....	2
General Information about beer.....	5
The Brewing Process.....	5
Grain Selection.....	5
Malting.....	6
Mashing.....	6
Hopping.....	6
Fermenting.....	7
Two Basic Brew Types.....	8
Ales.....	8
Lagers.....	9
Main Ingredients and trends .....	11
Hops.....	11
Barley.....	11
Wheat.....	12
Beer Types in the Pullman/Moscow area.....	13
ALES.....	13
Amber.....	13
Brown Ale.....	13
IPA/ESB.....	13
Kolsch Style Ale.....	14
Pale Ale.....	14
Porter.....	14
Stout.....	14
Hefeweizen.....	14
LAGERS.....	15
Bock.....	15
Pilsner.....	15
Lager.....	15
The Beer Index.....	17

## Definition:

It is not fair to compile a whole handbook about beer, brewing, and beer styles without first defining what beer is. According to the New Encyclopedia Britannica, beer is “any variety of alcoholic beverages produced by the fermentation of starchy material derived from grains or other plant sources.”<sup>1</sup> Such a definition is quite adequate to describe what beer *is*, but an additional clause may be appropriate to describe what beer *is not*. Beer is not any drink derived directly from the fermentation of sugar sources like fruit (which makes wine). Nor is beer is a distilled drink (meaning that no evaporation processes are applied to the drink to separate and concentrate the alcohol, as with hard liquor). What remains then is what is suggested above: a beverage derived from fermented starchy substances such as grains.

## The Origins of Beer:

Much to my surprise, there is not a whole lot to be said about the origins of beer. There are no popular myths that are commonly circulated and no one culture trying to claim the brew solely as their own invention. Rather, there is a very anthropologic explanation for the origin of beer common to many sources.

Most sources agree that beer emerged at least as early as 4000 BC<sup>2</sup> from the Sumarians, Egyptians, and Mesopotamians. The drink came about likely because of the absence of an abundance of fruit in these geographies from which other cultures had been making wine. Instead, grains such as barley and wheat were readily available and methods later described in this book were developed and employed to convert starchy substances into fermentable sugars. Originally, a type of bread<sup>2 3</sup> was baked specifically for the purpose of mashing with water to form a fermentable substance. The end result was an alcoholic beverage we now call beer.

Since then, beer has made a remarkable appearance in several cultures across history. More specific to this book, beer has made a remarkable appearance in western culture throughout history. Prior to the 16<sup>th</sup> century, beer brewing was actually regarded as a domestic function more like baking and cooking than it is regarded today as a commercial process<sup>4</sup>. Eventually, during the Middle Ages, brewing became considered an art and was handed over to the churchmen for refinement. As a result, most monasteries were equipped with breweries and were often times made famous for their brews.

In this context, beer also became closely tied to many religious celebrations, including marriage. In fact, the word “bridal”, of the English language is a result of Old English term “bride ale”, where

the bride of a wedding would pour the “marriage ale” for the guests of a wedding.<sup>4</sup>

When beer came to North America, it is said to have been a pivotal point in making the decision for the *Mayflower* to land at Plymouth Rock. According to the diary of William Bradford, the decision to land was made because “we could not now take much time for further search... our victuals being much spent, especially our beer.”<sup>2</sup> From that point forward until the prohibition in 1920, brewing progressed in North America with the same vigor as it had in its European background in the church. An especially noteworthy milestone in American beer production was the introduction of German lager-type yeast to North America in the 1840s. This spawned a unique and popular lager beer that has since been a characteristic style of American beer. There is not much to be said about how beer migrated west except that, from everything that has been written to this point, it is safe to say that where there are people, there is beer.

The greatest blow to high-quality style in American beer was likely the prohibition mentioned above that took effect as a result of the Eighteenth Amendment on January 16, 1920.<sup>3</sup> The prohibition had a tendency to stamp out the artistic progress that had been made in brewing so that, upon the reintroduction of beer on April 7, 1933, the brewing process had become highly industrialized and generic. The political climate that encouraged the end of the prohibition also played a key role in lowering the quality of American beer. The amendment was removed at the tail end of The Great Depression to provide “a much-needed source of revenue”<sup>3</sup> for the federal government and to increase employment. This, coupled with the artistic squelching mentioned above, served as a great blow to quality brewing as beer became more and more of an

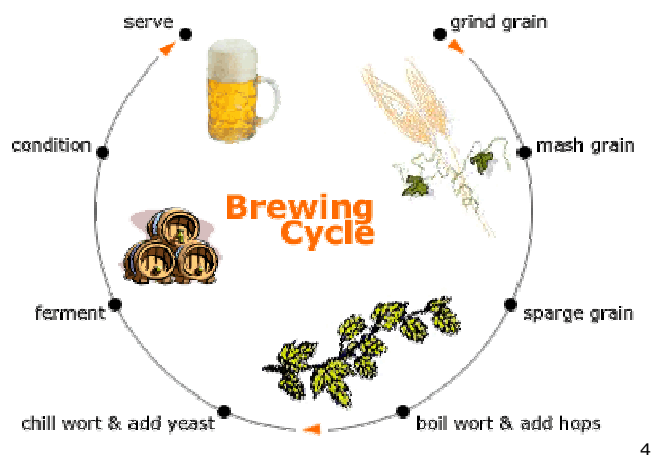
industrial product with the function of generating money, and less and less of an art form.

This trend of industrial brewing was dominant until the 1980s when craft brewing began to grow in popularity.<sup>2</sup> Through the past decades, brewing is once again gaining recognition as an art rather than a money-making process to appease the masses’ desire for drunkenness.

Not ironically, many of the breweries that caused this surge of craft brewing in the 1980s found their roots in the western United States, namely, the Northwest—where both hops and grains (such as wheat and barley) can be grown almost uninhibited. Much to the advantage of those in the Pullman/Moscow area, high quality brews are produced abundantly and in such close proximity that they are readily available for enjoyment at any beer-vending establishment.

## The Brewing Process

The brewing of beer is a five-fold process that is actually very scientific in nature, although it was probably stumbled upon serendipitously by its inventors rather than researched and implemented as its scientific nature seems to suggest. The five processes are: grain selection, malting, mashing, hopping, and fermenting.



4

### Grain Selection:

The primary grain used in brewing is barley, due to its high content of enzymes<sup>5</sup>, which make it easy to eventually ferment. Other grains used in beers likely to be found in the Pullman/Moscow area are wheat, oats, corn, rye, and rice. There are some economical reasons for choosing one grain over the other for the case of large-scale brewing. A more informative discussion of the different flavoring effects that different grains have is included in the *Ingredients and Trends* section later in this book.

### Malting:

Malting is the process of converting the starches in the grain selected for brewing into fermentable sugars.<sup>9</sup> It is carried out by soaking the grain in water while stirring it at ideal temperatures that are conducive to germination (which is the point, for all practical purposes, at which the seed first begins to turn from merely a seed into a growing organism). Germination generally takes about 5 days to commence. Once germination begins, the enzymes in the grain begin to metabolize the starches stored in the grain and turn them into sugars, which are the necessary ingredients for fermentation to occur. Finally, when germination has taken its course, the germinated grain is roasted, which prohibits further growth. This dried product is referred to as the malt.<sup>3 6</sup> Roasting of the malt is actually the key player in the darkness of a beer. A heavily roasted malt produces a darker, bolder beer, while a less-roasted malt will result in a lighter beer.<sup>3</sup>

### Mashing:

After the malt is developed (as described above), it is ground up and mixed with hot water, forming what is called mash. The mashing process is where all of the existing starches are reduced down to dextrins and sugars, to a degree specified by the brewer. The result is called wort, which is a high-sugar content fermentable substance.<sup>5</sup>

### Hopping:

Most beers are hopped before they are fermented. Hopping beer refers to the addition of dried hopps (described later in this book) to the wort to promote certain flavors and qualities in the final brew as well as to impart a preservative effect through the releasing of a natural mild antibiotic contained in the hopps.<sup>5 2</sup>

**Fermentation:**

Once the wort is hopped, it is ready for fermentation. During fermentation, a yeast is added to the mix that then begins metabolizing sugars in the wort. The products of the yeast's metabolism of sugars are alcohol and carbon dioxide. There are two types of fermentation used for the production of beer: top fermenting and bottom fermenting. Each type of fermentation produces a different style of beer, so are described in greater detail in *Brewing Styles*, later on in this book. Once the wort is fermented it is fully beer. However, this substance is not pleasantly drinkable because it contains an excess amount of unnecessary (not to mention distasteful) debris left over from the wort and fermentation that will settle out with aging or filtration. Aging of a beer can last anywhere from a few days to several months, depending on the fermentation process. Top fermented beers are typically aged for a matter of days, while bottom-fermenting beers are typically aged on the order of weeks or months in a process called lagering.<sup>3 7 6 8</sup>

## Two Basic Brew Types

As mentioned in the *Brewing Process* section earlier, there are two separate types of fermentation that form two different basic beer types: lagers and ales.

**Ales**

Ale comes from a top-fermenting process. As a beer type, it encompasses the broadest range of beer styles compared to its lager counterpart.<sup>7</sup> It is also historically the older style of beer because the process took less discovery than lagering.<sup>8</sup>

The name of the yeast usually used in the production of ale is called *Saccharmyces cerevisiae*.<sup>3</sup> This yeast is called top-fermenting because as it metabolizes the sugars contained in the wort (i.e. ferments), it floats to the top of the brew and stays there throughout the fermentation process. This type of yeast ferments best at around room temperature, therefore ales are brewed at between 50-70°F.

After the ales are fermented, they are aged for only a short period—less than a few weeks—for the purpose of clarification and settling of particulates left over from the fermentation. Because of the short aging period, however, many ales do not clarify substantially which leaves much of the ‘body’ in the beer. Most ales, then, are characterized as having a heavy body with a rich, full flavor and texture.<sup>6</sup>

The basic styles that are a subcategory of ales are Ambers, Browns, ESB, IPA, Kolsch, Pales, Porters, and Stouts. Because of the nature of ale brewing, there are fairly relaxed boundaries on these styles and it is not uncommon to brew an ale that falls outside of the above style classifications.

## Lagers

The other type of beer is called lager. The word lager actually comes from the German word *lagern*, which means 'to store'<sup>1</sup>. As its name suggests then, lager beers are beers that have been stored (or lagered) for a long period of time; on the order of weeks or months. Lager beers were actually a discovery made as a result of storing top-fermented ales at cool temperatures over long periods of time. The following is an interesting story about the discovery of the lagering process:

"The biggest problem with ... [top fermentation] brewing was the instability of the beer. It would go bad quickly if it were not kept in a cold place. Thus, brewing was somewhat seasonal, with most production occurring during the winter and spring months. Then the brew was stored in cold cellars or alpine caves, in sufficient quantities to last through the hot and thirsty summer and fall months...

...While the beer was stored for long periods of time in a cold environment, pubservers noted that after the yeast settled to the bottom the brew would keep indefinitely. Eventually a method was devised ... to brew the beer from the beginning with the yeast on the bottom."<sup>8</sup>

Specific to the cool environment (32-36°F) used in lagering is a strain of yeast called *Saccharmyces carlsbergensis*.<sup>3</sup>, which does indeed settle to the bottom of the brew during the lagering process. Since lagered beers are allowed to age for such a long period of time, much of the particulate matter also settles out during lagering. The long period of fermentation used in lagering also allows for an abundance of carbon dioxide to be released into the

beer during fermentation. The end result is highly carbonated, clear, crisp beer with very mellow and light character compared to most ales.

Lager beers have more well-defined subcategories into which most lagers fit. These basic styles are Bocks, Pilsners, Helles, and Dry beer. In America, specifically the Moscow/Pullman area, only Pilsners and Bocks are likely to be encountered as lager style beers. However, I do not want to make it sound like I am shortchanging the popularity of lagers; the most popular styles of American beers are lagers.<sup>2</sup>

## Main Ingredients and Trends

According to the world's oldest food purity law—the German Reinheitsgebots—established by Bavarian Duke Wilhelm IV in 1516, the only four ingredients of beer are yeast, hops, barley malt, and water.<sup>8</sup> Not much has changed in respect to the ingredients of beer, although other cultures have experimented with other grains for malt such as oats, rice, corn and rye. Below are described the most common ingredients in beer and the characteristics they tend to add to the flavor of beer.

### Hops

Hops are simply the female flower of a perennial vine called a hop plant. The hop plant is of the mulberry family. In appearance, a hop is a cone-shaped spike that is green and has a 'leaf' structure that vaguely resembles an artichoke heart.<sup>3</sup> A graphic of a hop is included in *The Brewing Cycle* diagram on page 5.

In general, hops add bitterness to beer. They are added to the wort prior to fermentation, wherein various oils and resin contained in the hop are released. Hops also contain mild antibiotics which allow the beer to be stored for longer periods of time without spoiling.<sup>2</sup> This preservative characteristic was noted by English brewers and exploited for the invention of the IPA brew which is described in greater detail in the *Beer Types* section of this booklet.

### Barley

Barley is the primary grain used for making malt because of its high enzyme content.<sup>2</sup> Since it is the primary ingredient, its contribution to flavor is simply that it makes beer taste like beer. The roasting of the malt will certainly affect the flavor of the beer, as discussed more thoroughly in the *Brewing Process* section.

### Wheat

Wheat is the most popular grain to be mixed into the barley malt. Wheat in the malt will add a characteristic 'smoothness' to the end result.<sup>9</sup> Wheat beers are commonly called Hefeweisen's.

Other grains that are used as starch sources are oats, rye, rice, and corn. Typically rice and corn are selected as alternatives to barley by macro-breweries for the sake of economic advantages. As a result, beers brewed from corn or rice malt have no vivid characteristics.<sup>10</sup> Oats and rye are likely to add their own flavor to the beer they are brewed in. Simply put, an oatmeal stout will have an 'oaty' tinge, or a beer brewed using rye will have 'hints of rye,' much like the drinker would expect.



## Beer Types in the Pullman/Moscow Area

The following is a brief description of each beer style that is likely to be found in the Pullman/Moscow area. Hopefully this section is of some assistance in informing the reader about what to expect from each beer.

### Ales

#### **Amber**

An amber ale is an all-American brew that seems to encompass several of any beers that have a light copper to light brown color. Some ambers are brewed with a distinct red color or copper. Sometimes these are labeled 'red ales' and 'copper ales', respectively, but are also included in the amber category.

Despite the ambiguity of what all an amber includes, there are a few broad notable characteristics. In body, they will be moderately heavy. Their flavor will have a distinct bitterness due to the American varieties of hops used to brew them. Additionally, ambers should exhibit a caramel maltiness that may even produce slight roasted overtones.<sup>11 12</sup>

#### **Brown Ale**

Brown ale is an English tradition. Newcastle Brewery lays claim to the original brown ale.<sup>13</sup> Brown ales will have a deep amber to brown color. Distinct of brown ales is their very sweet and smooth flavor. Also, they will tend to have chocolaty, nutty, or malty overtones. A brown ale is very easy to drink.

#### **IPA (India Pale Ale) / ESB (Extra Special Bitter)**

IPA's were a result of the English occupancy of India. When English soldiers in India requested a beer from England, English brewers found that the only way to keep a beer from spoiling on its

long voyage to India was to add excessive hops. This excessive hopping resulted in a very bitter beer that has gained great popularity over time. IPA's are light bodied and have a golden deep copper color.

#### **Kolsch Style Ale**

Kolsch-style ale is usually found as a summer ale with a uniquely pale color.<sup>8</sup> Kolsch is mild in taste having little bitterness with fruity and sweet overtones.<sup>14</sup> It is also only lightly carbonated.

#### **Pale Ale**

Pale ale is a light colored brew that is fairly light in body. The flavor should have a distinctive hoppy, bitter tone.

#### **Porter**

Porter beer got its name because it was a beer popular among the London street porters. It was first served as a mix of three beers: a third pint of ale, a third pint of lager, and a third pint of the strongest beer in the house. Eventually, brewers discovered how to build a porter into one brew that resulted in a highly hopped beer with roasted malts that make it dark, usually black.<sup>7</sup> Porters are not exceptionally heavy in body, but have very rich flavor complexities, often exhibiting chocolaty overtones.

#### **Stout**

Stouts are porters that are brewed exceptionally strong. As a result of the heavily roasted malt, a stout will have a very bitter and burnt flavor and a heavy body. To compensate for the strength, often times stouts are sweetened just before bottling.<sup>15</sup>

#### **Hefeweizen**

Hefeweizens are wheat beers, as described in the *Main Ingredients and Trends* section. A Hefeweizen will have a distinct yeasty

flavor. Also, because Hefeweizens are lightly hopped, there will be little to no bitterness, which unveils a characteristic sweetness. Hefeweizens are typically bright golden and have a tendency to be cloudy.

### **Lagers**

#### **Alt**

The term 'Alt' refers to an old style of brewing developed in the early days of lagers. Alt beers have a distinctly copper coloring with a bitter, hoppy flavor, but are less carbonated than most lagers.<sup>8</sup> Some alt beers will also have mild fruity hints.<sup>16</sup>

#### **Bock**

Bock beers were traditionally a result of lagering a beer all throughout the winter months. It was often the first beer used in spring celebrations. The term Bock came from the beer's geographical origin, Einbeck, Germany. Since the coining of the term bock, the beer is often associated in advertising with billy goats, since 'bock' in German means 'billy goat.'<sup>8</sup>

Because of its long lagering period, Bock usually defines a very strong beer with a high alcohol content. Its color is usually medium to dark brown and is often very heavy and full-bodied. Although they are a robust beer, their flavor is accented more by malt than hops, with a notable sweetness.<sup>16</sup>

#### **Pilsner**

Pilsner beers are lighter than bocks, but are characteristically bitter because of their heavy hopping.<sup>8</sup> In body, they will be well carbonated and taste very crisp and refreshing, compared to a heavy ale.

#### **Lager**

Many beers found in the Moscow/Pullman area are labeled 'lager', plain and short. In general terms, a lager is going to be lighter in texture and more carbonated than an ale. Also, they will have a mellowness to them that results from a longer fermenting period. Lagers are more refreshing than ales.

## The Beer Index

### ALES

#### Amber Ales

Alaskan Amber  
Amber Ale  
Amber light  
Chinook Northwest  
Style Ale  
Dos Equis XX  
Drop Top Amber Ale  
Fat Tire  
Huckleberry Ale  
Oktoberfest (seasonal)  
Oktoberfest  
Pintail  
Rally Cap Ale  
Rip Curl  
Ropewalk Ale  
Switchback Red Ale  
Twilight  
Velvet Antler

#### Brown Ales

Brown Ale  
Moose Drool

#### Dark Ale

1554  
Negra Modelo  
Pike Kilt Lifter  
Scottish Ale

#### Hefeweizens

Belgian White  
Honeymoon Wheat  
Manderine  
Hefeweizen

#### IPA/ESB

ESB  
Foster's Bitter

### IPA

Quale Springs  
Wapati

### Kolsch

Curve Ball (seasonal)  
Summer Ale

### Pale Ale

Blue Boar  
Blue Heron  
Fire Rock  
Mirror Pond Pale Ale  
Pale Ale  
Rolling Rock

### Porters

Black Butte Porter  
Blackhook

### Stouts

Cream Stout  
Extra Stout  
Oatmeal Stout  
Obsidian Stout

### Other Ales

Apricot Ale  
Blonde  
Loft  
Pumpkin Ale  
Summer Honey  
Sunrye  
Winter Ale

### LAGERS

#### Bock

Amber Bock

### Lager

Arriba  
Aspen Edge  
Cerveza Sol  
Clara  
Corona  
Dos Equis XX  
Foster's  
George Killian's Irish  
Ale  
Grolsch  
Heineken  
Jamacan Lager  
Kokanee  
Longboard  
Michelob Ultra  
Michelob Ultra X  
Molson Canadian  
Northwest Trail  
Sam Adams  
Samuel Adams  
St. Paul Girl  
Steinlager  
Strawberry Blonde  
Tecate  
Tsingtao

### Pilsner

Blue Paddle  
Canadian Pilsner  
Pilsner Urquell

## References:

- <sup>1</sup> New Encyclopedia Britannica. Volume 2. © 2002 Encyclopedia Britannica, Inc. Chicago. p 45
- <sup>2</sup> Free-Definition.com. Ref: Beer. Date Viewed: 10/31/04. Address: [hppt://free-definition.com/Beer.html](http://free-definition.com/Beer.html)
- <sup>3</sup> Collier's Encyclopedia. Volume 3. © 1994 P.F. Collier, L.P. New York, NY. p 770-773
- <sup>4</sup> Washington Brewer's Guild. Ref: Education Process. Date Viewed: 10/3/04. Address: [http://www.washingtonbrewersguild.org/education\\_process.htm](http://www.washingtonbrewersguild.org/education_process.htm)
- <sup>5</sup> Word IQ.com. Ref: Malt. Date Viewed: 10/3/04 Address: <http://www.wordiq.com/definition/Malt>
- <sup>6</sup> Academic American Encyclopedia. Volume 3. © 1997 Grolier, Inc. Danbury, Connecticut. p 162-163
- <sup>7</sup> FAQs.org. Ref: Beer FAQ. Date Viewed: 10/3/04. Address: <http://www.faqs.org/faqs/beer-faq/part1/index.html>
- <sup>8</sup> Hawthorn, Larry. The Beer Drinker's Guide to Munich. © 1991 Freizeit Publishers. Honolulu, Hawaii. p148-50
- <sup>9</sup> Pyramid Brewery. Date Viewed: 10/3/04. Address: <http://www.pyramidbrew.com/home.php>
- <sup>10</sup> German Beer Guide.com. Ref: Pilsner Beer. Date Viewed: 10/3/04. Address: <http://www.germanbeerguide.co.uk/pils.html>
- <sup>11</sup> BJS Brewhouse. Ref: Jeremiah Red Ale. Viewed: 10/31/04. Address: [www.bjsbrewhouse.com](http://www.bjsbrewhouse.com)
- <sup>12</sup> Free-Definition.com. Ref: Amber ale. Date Viewed: 10/31/04. Address: <http://www.free-definition.com/Amber-ale.html>
- <sup>13</sup> Newcastle Brown.com. Date Viewed: 9/25/04. Address: <http://www.newcastlebrown.com>
- <sup>14</sup> German Beer Guide.com. Ref: Kolsch. Date Viewed: 10/3/04. Address: <http://www.germanbeerguide.co.uk/kolsch.html>
- <sup>15</sup> Benelux Beer Guide. Ref: Beer Styles. Date Viewed: 9/25/04. Address: [http://www.dma.be/p/bier/0\\_3\\_uk.htm#Ale](http://www.dma.be/p/bier/0_3_uk.htm#Ale)
- <sup>16</sup> German Beer Guide.com. Ref: Alt Beer. Date Viewed: 10/3/04. Address: <http://www.germanbeerguide.co.uk/altbier.html>