

# Sergey Konstantinov

## BEER: A LECTURE



**Sergey Konstantinov. Beer: A Lecture (Tasting Included).**

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Beer. The most modest and unassuming beverage, a filler for supermarket shelves. At the same time — a staple of the economies of many nations for millennia. Egyptian pyramid builders were paid with it, polar explorers took it to the North Pole as a life-sustaining product, workers of Brussels once rioted because its price was up by two centimes.

In this book, a centuries-long beer history is told in a comprehensive, interesting, and *practical* manner. You will learn which beer styles were popular in each epoch, from Bronze Age to the 21st century, understand the reasons behind this popularity, and most importantly, explore the history by taste.

Illustrations & inspiration by Maria Konstantinova · [art.mari.ka](http://art.mari.ka)



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Source code available at [github.com/twirl/Beer-Lecture](https://github.com/twirl/Beer-Lecture)

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# PREFACE

## Chapter 1. Author's Note

The history of beer and brewing was always a practical study for me. I was always keen to try something new — and not just try, but learn from it: when this beverage occurred and why it tastes like this. Gradually, I involved myself in studying beer history and soon found that brewing was one of the hottest topics of historical science.

For many centuries in northern parts of Europe beer was if not the first sector of economics then at least second — the fact that both Medieval chroniclers and contemporary scholars turn a blind eye to. Up until the 1980s, the researchers were interested in the history of alcohol only in the context of consumption effects on personal and public health<sup>1</sup>. But as we all well know, alcohol, this ‘social lubricant’, plays a much greater role in society! Gradually, this fact reached academic studies. In the case of beer, it happened even later, at the beginning of the 21st century. It turns out that beer, an ordinary and democratic beverage, allows us to poke our noses into the most interesting and least documented part of the past: the daily routine of common folk.

Making one's way through beer history is incredibly fascinating — and equally challenging. Eyewitnesses didn't care about writing down such obvious and mundane things as beer brewing. Historical science made huge progress over many mysteries last years, and craft beer reenactors recreated lots of historical beers for everyone to taste. But our knowledge is still miserably sparse regarding many aspects and events, even quite novel ones.

While writing this book I hadn't pursued the goal of compiling some short beer history. First, it's impossible; second, I'm no scholar but a beer enthusiast. All I want is just acquaint you, dear reader, with good beer, and tell an interesting story along the way. Let us begin!

## An important remark

This book is written in a form of lecture-tasting. In each chapter, we're proposing to try a specific kind of beer matching the historical period described. Full description of how to read classifications and where to learn about suitable beer styles you might find in the Appendix.

## References

<sup>1</sup> Dietler, M. (2006), p. 230

## Chapter 2. What is Beer

Before starting our dive into the history of beer, we need to define what 'beer' is. Natural alcoholic beverages are a result of the biochemical process of alcoholic fermentation: various microorganisms (primarily yeasts, but not only them) are capable to extract carbohydrates (first of all, sugars) from an aqueous solution and break them down, producing ethyl alcohol and carbon dioxide, as well as some other organic compounds. Carbon dioxide makes the resulting drink sparkling; ethyl alcohol, interesting to humans.

Depending on what raw materials were used and what kind of sugar was fermented, the resulting beverages are called differently:

- if the raw material was grapes (or other fruit), juice of which contains a large amount of glucose, then the result of fermentation is called wine;
- if the raw material was apple (or pear) juice containing glucose and malic acid, then we get cider (or perry);
- if milk sugar lactose was fermented, then we get kumis;
- if we took honey rich in fructose saccharide as raw material, we get mead.

### It's interesting

Sugar cane juice, which consists mostly of sucrose dissolved in water, also quite fits for manufacturing of low-alcohol beverages, but humanity started to cultivate it for this purpose quite recently. At that moment the distillation technology was already known, and just strong drinks were produced, rum and cachaça for instance. The product of natural, without the use of distillation, fermentation of sugar cane is known in some countries under the name 'guarapo', being in very limited demand.

Finally, if sugars extracted from cereals were used for fermentation (first of all, we are talking about the disaccharide maltose), then the resulting low-alcohol drink is called ‘beer’. The grain of many cultivated plants, such as wheat, barley, maize, rice, rye, oats, millet, buckwheat, and others is suitable for beer production. Thus, such drinks made from cereals as Russian kvass, Finnish sahti, and traditional Japanese sake should also be considered ‘beer’.

Our distant ancestors, presumably, discovered the fermentation process by accident: it was enough to leave the water with grain in the open air for the wind to inoculate it with wild yeast. A few days at the right temperature — and you will get a refreshing low-alcohol drink.

The age of the known remains of fermented sugars is steadily moving further into the past. At the moment, the oldest such finding dates back to about the eleventh millennium BCE<sup>1</sup>. Thus, beer and mammoths were there at the same time for at least nine thousand years! Some researchers believe that beer may be older than bread: brewing is easier than baking. But we would disagree with them, for two reasons.

First, cereals themselves contain little to no low-molecular carbohydrates: the main component of grain is starch. To get maltose or glucose out of it, you need to somehow activate the processes of converting starches into saccharides. For example, you can chew rice: the enzymes in saliva help to start the processes of converting starch into glucose. This is how traditional Japanese sake *kuchikamizake* is prepared (not to be confused with modern sake, the production technology of which we will explain in the chapter ‘At the dawn of civilization’). If you have wondered why the heroine of the ‘Your Name’ movie is chewing rice, that’s it: she is producing traditional sake.

It is believed that the *kuchikamizake* technology (which was used not only by the Japanese but also by South American Indians, for example) is about 2.5 thousand years old (although we have not seen credible studies on this topic). Therefore the oldest beer was prepared somehow differently, and some other mechanism was employed to ‘activate’ the cereals. For example,

bread was baked or *malt* was prepared. The latter is a product of controlled sprouting: during the germination of grain, enzymes are produced. These chemical compounds are capable of converting starches into maltose under the right conditions, and such grain becomes suitable for the production of a beverage, which we call ‘beer’.

Another problem of beer production is the necessity to somehow introduce yeast into the solution. You can, of course, rely on sheer luck, but this method is poorly applicable for large-scale production. In order for fermentation to begin, a ‘starter culture’ is needed. It can be fruits (such as grapes or dates), on the surface of which yeast lives in the wild, baked bread, or yeast sediment from a previous cooking.

Based on this, we strongly doubt that ancient beer was produced by accident: ‘accidental’ beer should have been obtained too rarely and being too weak, unlike, for example, fermented milk or fruit juices. Brewing was exactly a *technology*, one of the first mastered by mankind<sup>2</sup>.

## References

<sup>1</sup> Liu, L., Wang J., Rosenberg, D., Zhao, H., Lengyel, G., Nadel D. (2018) *Fermented beverage and food storage in 13,000 y-old stone mortars at Raqefet Cave, Israel: Investigating Natufian ritual feasting*. Journal of Archaeological Science: Reports. Volume 21, October 2018, Pages 783-793

<https://www.sciencedirect.com/science/article/abs/pii/S2352409X18303468>

<sup>2</sup> Meussdoerffer, F.G. (2009), p. 4

# PART I. FROM SUMERIANS TO SADI CARNOT

## Chapter 3. At the Dawn of Civilization

Historical period: from the 10th millennium BCE to the 2nd century CE

Scene of action: Mesopotamia, Egypt, China, the Mediterranean

The Sumerians are widely regarded as the first civilization in human history. It was likely Sumerians who invented writing. And — what a coincidence! — they were also huge beer lovers. In the oldest clay tablets, dated 30-32 centuries BCE, beer is already mentioned as a staple product, manufacturing of which was controlled by the state<sup>1</sup>.

Sumerians loved beer so much that they have a separate beer goddess: Ninkasi. ‘A Hymn to Ninkasi’<sup>2</sup>, dedicated to the goddess, is itself an allegorical beer recipe, according to scholars<sup>3</sup>. The Hymn was written down circa 18th century BCE, but researchers suggest it's much older than that<sup>4</sup>. Apart from the Hymn, beer is also mentioned in one of the oldest Sumerian legends, ‘Inana and Enki’<sup>5</sup>.

There are many surviving images of people drinking beer (supposedly) from mugs or large vessels by the means of tubes<sup>6</sup>. Furthermore, it's the oldest known depiction of cocktail straws<sup>7</sup>, so it's quite probable they were invented specifically to drink beer.



Two sitting figures drinking from vessels by means of straw. 2600-2350 BCE

Image Credit: The University of Chicago

Babylonians, Akkadians, Ancient Egyptians — all these peoples adopted a taste for beer from Sumerians<sup>8</sup>. In the oldest of surviving epics, namely ‘Epic of Gilgamesh’, beer is mentioned in a very peculiar aspect. According to the myth, goddess Aruru created a ‘wild man’ Enkidu to confront Gilgamesh. But then Shamhat, a sacred temple prostitute, seduces Enkidu and civilizes him. To do so, she makes him eat bread and drink beer: the symbols of civilization, unknown to wild men<sup>9</sup>.

Then, beer is mentioned in the Epic once more<sup>10</sup>: goddess Siduri advises Gilgamesh to abolish his quest of seeking the meaning of life, and just enjoy small wonders — like beer. This character, Siduri, is considered to be the first written mention of ‘alewife’, e.g. a female brewer — bartender — tavern keeper<sup>11</sup>.

One of the first codes of law in human history, the Babylonian Code of Hammurabi, refers to beer four times<sup>12</sup>:

- §108: if a tavern keeper pours short of the paid amount of beer (or refuses to take grain as a payment), then she shall be drowned to death;

- §109: if a tavern keeper fails to report the powers about the planned coup which was discussed in her tavern, she shall be put to death (a method of which remains unspecified);
- §110: if a ‘Sister of God’ (e.g. the high priestess) runs a tavern or just enters one to drink beer, then, as you should have guessed, she shall be executed;
- §III: if a tavern keeper donates sixty *ka* of beer in the time of famine, then she shall be awarded fifty *ka* of grain afterward.

Let us point out that the Code refers to tavern keepers as females, and all the corresponding goddesses and legendary characters are females either. From the beginning of civilization up to the industrial revolution preparation of alcoholic beverages as a whole, and brewing beer in particular, was predominantly women's job<sup>13</sup>, with an exception of Christian male monasteries<sup>14</sup>. It appears that brewing and baking were not decoupled from each other, it was essentially the same occupation.



Model bakery and brewery from the tomb of Meketre, an Egyptian noble, chancellor to Pharaoh Mentuhotep II and several of his successors. Circa 1981–1975 BCE

Image Credit: The Metropolitan Museum of Art

In Ancient Mesopotamia, beer was something like a currency<sup>15</sup>. Daily workers (builders of the Giza pyramids, in particular) were paid in beer — something like 4-5 liters per person per day<sup>16</sup>.

## How to Try

The distinguished researcher of ancient civilizations' cuisine, prof. Patrick McGovern, managed to find traces of Egyptian beer and recreate it<sup>17</sup>. In collaboration with Dogfish Head Brewery the 'Midas Touch' beer, based on the recipe, was prepared. This is not the only attempt: another brewer, Fritz Maytag (of whom we will tell much more later) considers the procedure described in 'A Hymn to Ninkasi' so obvious that he brewed beer based on it and presented it at the annual meeting of American Homebrewers Association in 1991. Maytag hasn't released it commercially, since the technology doesn't preclude using preserving agents; other brewers are not so picky. Today, beers brewed according to ancient recipes (Sumerian, Egyptian, Celtic, Etruscan, etc.) are available in numbers. The most famous examples are:

- abovementioned Dogfish Head Midas Touch;
- Williams Bros. Fraoch, possibly the most widespread brand based on an ancient Celtic recipe (might be found as a part of the 'Historical Ales of Scotland' set);
- Thornbridge Hall Bracia, analogous Celtic beer from the neighboring brewery;
- another ale prepared by McGovern & Dogfish Head, Kvasir (recreated using the remains of 15th century BCE beer found on the territory of nowadays Denmark);
- Posca Rustica by Brasserie Dupont, based on 1st century CE Roman recipe;
- Birra del Borgo Etrusca, after Etruscans.

There is no specific name for such 'elder' beer; look into 'Ancient Herbed Beer' and 'Traditional' categories.

Nevertheless, we consider these reconstructions being a bit deceiving; in many cases, just a wild fantasy on historical themes. Let us name three reasons which make us think so.

Let's start with the Sumerians. The situation there looks paradoxical: we are well aware of many kinds of Sumerian beer (clay tablets mention 'Gold', 'Dark', 'Sweet Dark', 'Red', and other types), and we knew all ingredients of these beverages. But have totally no idea what these ingredients actually were, and how these beers tasted<sup>18</sup>.

Writing (cuneiforms on clay tablets) was expensive, so it was used for *important* things, like every kind of administrative order: deliver these amounts of those ingredients from point A to point B to make that amount of beer<sup>19</sup>. It went without saying that the receiver totally knew how she would brew the requested beverage, so nothing like precise recipes or brewery blueprints survived<sup>20</sup>.

Even basic facts are actually a set of assumptions. There are two main ingredients mentioned in all listings: *bappir* and *munu*. The former probably means barley bread (though it's measured in volume units, like something which might be poured), the latter should be barley malt<sup>21</sup>. That's actually all we know more or less reliably.

The oldest surviving beer recipe was written down by an Egyptian alchemist Zosimus in the 4th century CE (which is several thousand years after the heyday of ancient brewing), and, possibly, not by Zosimus himself, but by an unknown later scribe. The recipe prescribes soaking then drying barley, preparing a half-baked bread from it, soaking it again and leaving liquids to ferment<sup>22</sup>. No other details like amounts and types of ingredients or further actions are provided. It's also vexing that Zosimus recipe contradicts archeological evidence, so considering it genuine is a bit of an overstatement<sup>23</sup>. That's the first reason why authentic beer reconstructions are not possible.

Of course, we can still brew *some* beer based on this recipe or archeological findings. But there are also second and third reasons.

Modern beer is basically brewed using four components: grain, water, yeast, and hops. As we will explain in the next chapters, none of these ingredients existed before the High Middle Ages. Yeast was strictly airborne, e.g. ‘wild’, and we don’t know the exact species. Cereals that were prevalent in Ancient Mesopotamia and Egypt, namely emmer, spelt, and einkorn, were half-domesticated ancestors of modern wheat; ancient barley was a distant relative to modern barley either. Beer was sweetened and spiced with some flavor additives which we know nothing of. Finally, water in Mesopotamia was a rare commodity being very far from crystal clarity. Some reenactors choose similar (as they think) modern ingredients; some of them try authentic cereals. But no attempt to precisely reconstruct all four components has ever been made, as far as we know<sup>24</sup>.

And there is also a third reason, probably more important than the two previous ones. For industrial beer production, the technical parameters must be controlled with extreme precision, right up to degrees and per mills. Until the 18th century when the thermometer and the hydrometer were invented, brewer’s control over the processes of mashing, cooling, and fermenting was quite limited. Many factors, like weather or microorganisms, were totally out of their control. So ancient beer hasn’t had ‘a taste’: each batch brewed under some specific conditions had its own specific taste. Master brewers were probably able to produce the more or less consistent product; less skilled ones were preparing totally unique beverages each time, but constantly sour and cloudy. We can only agree that, according to the big numbers law, sometimes they must have brewed something close to a liquid we have just filled our glass with.

## The Decline of Ancient Beer

During the Bronze Age, beer was the most common beverage for almost every civilization, from the Sumerians to the Chinese. But in the 1st millennium BCE, the situation changed dramatically.

In China, supposedly under the rule of the Shang dynasty, circa 15-16th century BCE, a new method of producing alcoholic beverages from rice was discovered. A complex mixture of molds, yeast, and bacteria, known as ‘qū’ (麴 in traditional Chinese), cultured on a starch-rich substrate, is able to convert cereal starches to alcohol directly. The result is a rather strong beverage containing 8 to 20 percent alcohol by volume (ABV). Many traditional Eastern alcoholic beverages, such as Chinese ‘rice wine’ *huangjiu*, Korean and Japanese *sake* and *shochu*, are produced using *qū*<sup>25</sup>. This technology superseded beer brewing in the East, but for obvious reasons (the secrecy and lack of rice) were not adopted in the West.

But the West — Ancient Greece and, later, Ancient Rome — had their own technological know-how: grape wine. Archeological evidence indicates that it was already produced in 6-7 millennium BCE on the territory of nowadays Georgia (and probably in China either), but it was Phoenicians who spread the taste for wine through all the Mediterranean<sup>26</sup>.

Some scholars believe that late Bronze Age Greeks (Mycenaeans) inherited brewing traditions from their Minoan predecessors, and therefore drank beer or at least tolerated beer; maybe Dionysius was a god of beer and mead as well as wine<sup>27</sup>. However, starting from the 10th century BCE beer completely disappears from the Greeks' diet and is mentioned in written sources as a ‘foreign beverage’ — of Thracians, Phrygians, or Egyptians. To Ancient Greeks beer was a beverage of northern ‘barbarians’ Thracians and Peons<sup>28</sup>. In the 5th century BCE, Aeschylus in his plays counterposes ‘Dionysius beverage’ (e.g. wine) against ‘Thracian beverage’ (e.g. beer). Many other Greek dramatists had started to despise beer after Aeschylus<sup>29</sup>. Greeks believed that beer as a result of ‘decay’ of grain, in turn, makes humans decay, and also effemulates men. This opinion, voiced by Theophrastus<sup>30</sup>, is to be repeated constantly in the Ancient Greek and Roman literature. Beer was associated with excessive alcohol consumption attributed to Scythians and Thracians, while Greeks themselves were (of course!) considered inherently modest and temperate.

As a result, with the growth of Ancient Greece then Ancient Rome's influence, beer was universally dislodged<sup>31</sup>. Peoples living on the territory of nowadays France, Spain, Northern Italy, Germany had been drinking beer for millennia before wine and viniculture arrived on their soil<sup>32</sup>, but during the 2nd and 1st centuries BCE, Romans progressively defeated all beer-drinking nations: Celtiberians, Gaul, Carthaginians, Ligurians, Egyptians. Even Celts started to prefer wine over beer under Roman influence<sup>33</sup>. Wine prominence was also enforced by the swiftly spreading Christianity, which gave it a very special position in its rituals and sacred books. At the beginning of the Common Era, the only keepers of beer tradition in the world were the 'barbarians' on the outskirts of the Roman Empire.

## References

<sup>1</sup> Damerow, P. (2001), pp. 1-2

<sup>2</sup> A Hymn to Ninkasi.

<sup>3</sup> Meussdoerffer, F. G. (2009), p. 5

<sup>4</sup> <https://www.worldhistory.org/Beer/>

<sup>5</sup> Inana and Enki

<https://etcsl.orinst.ox.ac.uk/section1/tr131.htm>

<sup>6</sup> Meussdoerffer, F. G. (2009), p. 5

<sup>7</sup> Thompson, D. (2011) *The Amazing History and the Strange Invention of the Bendy Straw*

<https://www.theatlantic.com/business/archive/2011/11/the-amazing-history-and-the-strange-invention-of-the-bendy-straw/248923/>

<sup>8</sup> Paulette, T. (2020) *Brewing Mesopotamian beer brings a sip of this vibrant ancient drinking culture back to life*

<https://theconversation.com/brewing-mesopotamian-beer-brings-a-sip-of-this-vibrant-ancient-drinking-culture-back-to-life-142215>

<sup>9</sup> George, A. (1999), p. 14

<sup>10</sup> ibid, p. 76

<sup>11</sup> <https://en.wikipedia.org/wiki/Siduri>

<sup>12</sup> Johns, C. H. W. (1904), p. 52

<sup>13</sup> Dietler, M. (2006), pp. 236, 238

<sup>14</sup> Poelmans, E., Swinnen, J.F.M. (2016), p. 6

<sup>15</sup> Swinnen, J., Briski, D. (2017), p. 8

<sup>16</sup> Marks, T. (2018) *A sip of history: ancient Egyptian beer*. The British Museum Blog

<https://blog.britishmuseum.org/a-sip-of-history-ancient-egyptian-beer/>

<sup>17</sup> [https://en.wikipedia.org/wiki/Patrick\\_Edward\\_McGovern](https://en.wikipedia.org/wiki/Patrick_Edward_McGovern)

<sup>18</sup> Damerow, P. (2001), pp. 6-20

<sup>19</sup> ibid, p. 2

<sup>20</sup> Meussdoerffer, F. G. (2009), p. 5

<sup>21</sup> Damerow, P. (2001), pp. 6-8

<sup>22</sup> Hornsey, I. S. (2008), p. 49

<sup>23</sup> Nelson, M. (2001), pp. 124-126

<sup>24</sup> Schwartz, G. (2013) *A pint of the past: assessing authenticity in modern versions of ancient and historic ales*. Brewery History, 154

<http://www.breweryhistory.com/journal/archive/154/index.html>

<sup>25</sup> <https://en.wikipedia.org/wiki/Q%C5%AB>

<sup>26</sup> <https://en.wikipedia.org/wiki/Wine#History>

<sup>27</sup> Nelson, M. (2005), p. 14

<sup>28</sup> ibid, pp. 15-16

<sup>29</sup> ibid, p. 25

<sup>30</sup> ibid, p. 36

<sup>31</sup> Poelmans, E., Swinnen, J.F.M. (2012), p. 2

<sup>32</sup> ibid

<sup>33</sup> Nelson, M. (2005), pp. 52-53

## Chapter 4. The Barbarian Booze

Historical period: the 2nd — 10th centuries CE

Scene of action: Europe north of the Apennines and the Pyrenees

Paradoxically, it was Romans who left a lot of material evidence related to beer production. At the outskirts of the Empire, brewing continued on, both for locals and the Roman legions they hosted — and therefore some administrative correspondence was preserved. Particularly, the letter on the wooden tablet found in the remains of Vindolanda (a Roman outpost in England), in which Masculus, a decurion (head of a cavalry platoon), tells Flavius Cerialis, a prefect, that the soldiers have no beer (*ceruesam*) and asks for sending some<sup>1</sup>.

On the territory of nowadays Germany, Great Britain, and Belgium a number of Antic breweries were found. One of the oldest is located near Regensburg and dates back to the 1st-2nd centuries CE. It is notable not only for being the first known Roman brewery but also as the earliest evidence of using *kilns* for malting<sup>2</sup>.

Remember that barley itself doesn't suit brewing purposes well since it lacks fermentable sugars, so grain undergoes *malting* procedure: it's soaked, then allowed to germinate. The result of this operation, known as 'green malt', might be used for brewing directly, but it perishes very quickly. So green malt is usually dried, and in this form, it might be kept well-preserved for a long time.

In Mesopotamia and Egypt, malt was presumably dried in the sun, since it's quite hot and sunny there. In the Northern Europe conditions, drying malt in the sun was not an option. Alternatively, malt might be wind-dried, but that requires specific conditions either. So, in Europe, they started heating germinated grain in large ovens named *kilns*. A kiln was usually a stone

chamber with a hearth in it. The malt was spread on the floor, and then the fire was kept low for several days.

## How to Try

How this late Antic beer tasted is very hard to say because no written sources survived. Several Roman writers mentioned beer (most notably, Pliny the Elder in his ‘Natural History’), but they probably didn’t know anything about brewing in detail and weren’t actually interested. Technically, the Zosimus recipe we mentioned in the previous chapter falls into the discussed period of time, but it describes Egyptian technology. As for European beer recipes of late Antiquity and early Middle Ages, we know almost nothing<sup>3</sup>.

However, the mere fact of using early kilns gives us an opportunity to taste the past, so to say. Nowadays the same technology of smoking malt over beech wood is used to produce a special style of German beer called ‘Rauchbier’ (also, ‘island’ whiskeys). Rauchbier is totally not authentic from all other points of view, as modern barley, yeast, and hops are used to produce it. But as you instantly understand after the very first sip, it’s a hell of a taste, hardly manageable to get rid of. So from the tasting perspective, *Rauchbier* is the best approximation of late Antic ‘barbarian’ booze. (Conversely, modern reenactors that restored Celtic kiln of the 4th-5th centuries CE say that it was naturally a Rauchbier clone they’ve got from it<sup>4</sup>.)

Widely known beer in this style is produced by the Schlenkerla company (there are several distinct brands, any of them will fit). Also, a few craft breweries produce ‘smoked’ beer, for example, Dutch ‘De Molen’ (‘Bloed, Zweet & Tranen’ and ‘Rook & Vuur’ beers).

## The Time of the Cathedrals

A significant part in spreading brewing in Europe was played by Christian monks and priests. Beer 'promotion' already started in the time of the Roman Empire in Ireland, which wasn't under Roman rule. In the 5th century CE, Saint Brigid of Ireland was already converting water to beer, according to legends<sup>5</sup>.

Monks' interest in beer was quite understandable in those regions where cultivating grapes wasn't possible. Because of numerous strict fasts, they needed an additional source of calories like no others did<sup>6</sup>. Beer popularity in monasteries was additionally promoted by Louis the Pius who started enforcing so-called 'St. Benedict's Rule' on the territories he controlled, in accordance to the will of his late father, King Charlemagne<sup>7</sup>. The 'Rule' is a set of regulations for monks created in the 6th century CE by Benedict of Nursia. The Rule prescribed monasteries to be self-sufficient and therefore to produce everything their residents needed in place. Furthermore, monks were obliged to provide meals and shelter for travelers.

It's frequently stated that monasteries produced the largest share of beer in the Early Middle Ages, but it's highly likely not true. Brewing beer was a regular activity for Middle Age households, something quite similar to baking bread. But common people haven't left any written evidence of their everyday life while monasteries were documenting their operations extensively<sup>8</sup>.

## How to Brew Beer

Let us describe the technological process of brewing beer as it was developed in Medieval Europe and has reached our days almost unchanged.

1. First, the raw materials (e.g. malt) need to be crushed. The grinding must be rather coarse, not flour-like fine.
2. Ground malt is mixed up with water (the process known as 'mashing') and is heated up to approx. 70 degrees Celsius. At this temperature, enzymes that are present in malt convert starches to sugars. Then the solution is filtered out, and pure malt liquor called *wort* is prepared.

3. If beer is brewed with hops (see the ‘Word on Hops’ chapter), then the wort after mashing needs to be boiled down with an addition of hop cones for an hour or two. Sometimes wort is boiled longer to achieve a specific taste according to a recipe.
4. Then fermentation starts. Some starter is added to wort (which is often additionally filtered), or it just gathers the microbiota from the air. Depending on the microorganisms type and external conditions (like temperature or oxygen access) fermenting lasts from 2-3 days up to several weeks and more. During this time yeasts break down sugars and produce lots of chemical compounds — notably, ethyl alcohol and complex ethers. Which substances in which proportions are left after the fermentation defines the taste of beer. Other microorganisms compete with the yeast for edible sugars, first of all, *Pediococcus* and *Lactobacillus*. If they oust yeast, beer will sour.
5. Technically, beer is ready for consumption at any moment, though usually brewers wait until the fermentation ends. High-quality beers are usually left to mature for an extended period of time, up to several months or even years.
6. Some beers continue fermenting in barrels or bottles. To enforce this process, fresh yeast and additional sugar source are added.

At stages 4-6, beer might be additionally spiced with flavor additives, including hops (so-called 'dry hopping').

Until the 20th century, the raw materials were used several times, e.g. after the first mash is complete and the wort is filtered out, the malt remains were mixed with a new portion of water and mashed again and again, up to five times. The first wort was used to produce the best and strongest beer, while secondary worts were used to make cheap and weak ‘small’ or ‘table’ beer.

The most important parameter of wort, directly affecting beer qualities, is its original gravity. It's usually measured as wort to water density ratio and is denoted with the 'OG' abbreviation. The thicker the wort is, the more alcohol could the resulting beer contain (approximately 1% ABV per 1% of density, e.g. wort with OG=1.05 might be used to produce 5% ABV beer). Another important parameter is final gravity (FG): not all wort components are fermentable, and fermentation might be incomplete. The higher FG, the more sweet and thick the resulting beer. And vice versa: the closer to 1 FG is, the fewer non-fermented compounds remain. The ratio (the share of dissolved organics that was fermented into alcohol) is called *attenuation*. The higher the attenuation, the more effective conversion of sugars (and the less the final gravity).

### It's interesting

The final gravity might be less than 1 because alcohol is lighter in weight than water. To produce such 'very dry' beer, either yeast and bacteria should be allowed to consume all the organics in the wort, or (more plausibly) the brew should be chemically filtered.

The easiest way to raise alcohol volume in the beverage is to increase the proportion of sugars. In pre-industrial times, honey or fruits were used; later, sugar cane syrup or, in the case of cheap beer, molasses or other residues of sugar production.

The alcohol produced by yeast acts as a preservative since competing microorganisms do not tolerate its presence. However, the yeast itself can endure it up to a certain threshold: brewing beer containing more than 8% ABV requires selecting specific alcohol-tolerable yeast strains.

## References

<sup>1</sup> Correspondence of Flavius Cerialis. *Roman Inscriptions of Britain, ab.Vindol.*  
628

<https://romaninscriptionsofbritain.org/inscriptions/TabVindol628>

<sup>2</sup> Nelson, M. (2001), pp. 163-166

<sup>3</sup> ibid, pp. 12-17

<sup>4</sup> Stika, H.-P. (2011) *Early Iron Age and Late Mediaeval malt finds from Germany—  
attempts at reconstruction of early Celtic brewing and the taste of Celtic beer.*

Archaeological and Anthropological Sciences, 3(1):41-48, p. 46

[https://www.researchgate.net/publication/225682712\\_Early\\_Iron\\_Age\\_and\\_Late\\_Mediaeval\\_malt\\_finds\\_from\\_Germany-attempts\\_at\\_reconstruction\\_of\\_early\\_Celtic\\_brewing\\_and\\_the\\_taste\\_of\\_Celtic\\_beer](https://www.researchgate.net/publication/225682712_Early_Iron_Age_and_Late_Mediaeval_malt_finds_from_Germany-attempts_at_reconstruction_of_early_Celtic_brewing_and_the_taste_of_Celtic_beer)

<sup>5</sup> Meussdoerffer, F.G. (2009), p. 10

<sup>6</sup> Poelmans, E., Swinnen, J.F.M. (2012), p. 4

<sup>7</sup> Nelson, M. (2005), pp. 100-101

<sup>8</sup> Unger, R. W. (2004), p. 27

## Chapter 5. Bog Myrtle

Historical period: the 10th-14th centuries CE

Scene of action: Low Lands and the northern parts of nowadays Germany

The fall of the Roman Empire entailed lots of consequences, including those to the beer history. The pressure that 'civilized' Romans put on the brewing industry has ended. New powers of Ireland and Britain as well as Merovingian and Carolingian kingdoms were drinking beer with great pleasure. The Anglo-Saxons were using beer as a 'currency' for natural exchange: all kinds of duties and wages were paid with it.<sup>1</sup>

Medieval suzerains soon began attempting to control the production of this 'currency', just like any regular state would do in their place. The taxation mechanism was soon found: Emperor Charlemagne proclaimed brewing a state monopoly and started selling it to lords and bishops, who, in their turn, monetized their brewing rights by producing beer ingredients and selling them to local brewers. After Charlmagne's death, the Empire weakened, but the monopoly persisted in German and Low States lands<sup>2</sup>.

Those ingredients, or rather semi-products, were called *fermentum* in Latin, and *gruit* (*grut*, *grout* and other variants) in local languages. *Fermentum* means 'starter', e.g. some additive that makes bread and beer 'raise' (we now learned that starters contain yeasts, but in the Middle Ages nobody knew that). *Gruit* means 'grind', which looks totally unrelated. And nowadays we use the word *gruit* for a selection of aromatic herbs. This contradiction is resolved easily: medieval gruit was all of that at once.

Beer spoiling was the brewers' main problem. There were two main ways of avoiding it: increase alcohol content or add preservatives. Medieval *fermentum/gruit* helped with both. The preparation process included grinding the malt, cooking kind of a porridge, and evaporating it. The resulting malt concentrate was either a solid or a paste-like substance

depending on whether cereal residues were filtered out or not. This malt porridge could have been used for making pastries, which explains using the *fermentum* and *gruit* words to denote baked goods<sup>3</sup>. Additionally, some flavor additives, mostly herbal, were mixed in.

This malt concentrate was sold to brewers, and it was indeed quite useful: adding this gruit to the wort will cause yeast to proliferate quickly and produce a large amount of alcohol, thus suppressing the growth of competing microorganisms — which for an observer would look like if gruit indeed leavens the wort. Modern reenactors managed to achieve quite considerable shelf life for such gruit beer, more than three weeks<sup>4</sup>.

Flavor additives also played a major role. First, they had some antiseptic effect; second, helped to conceal an unpleasant taste and smell; third, because of them, beer was considered healthy and even curative. Different sources mention more than 40 distinct additives, and 14 more were added for medicinal reasons<sup>5</sup>: wild rosemary, yarrow, juniper, sage, ground ivy, anise, caraway, laurel berries; pine resins were also used. In fact, every town possessed its own unique gruit recipe depending on the local flora. However, there was one most important component: bog myrtle (*Myrica gale*), which was traditionally used as both sedative and antiseptic compound. In addition, bog myrtle is rather capricious and grows (surprise!) mostly in bogs, and was a convenient subject for the state monopoly<sup>6</sup>.

For medieval suzerains (barons and bishops) and, later, for city magistrates gruit was a handy and understandable method of collecting taxes<sup>7</sup>. Towns were buying the privilege (*gruitrecht*) from their seignors and opening the ‘gruit houses’ (*gruithuis*)<sup>8</sup>. Often, instead of buying gruit in the gruit house, brewers were paying their duties in money; such a levy was called *gruitgeld* (literally, ‘gruit gold’)<sup>9</sup>.

However, the significance of centralized starter production was gradually declining. Later records indicate that in the 13th century, gruit houses were purchasing much more herbs in proportion to malt than needed<sup>10</sup>. Some scholars believe that brewers were bringing malt to the gruit houses to be

mashed with gruit there (and therefore the exact recipe was kept a secret)<sup>11</sup>. Since nobody cared about writing down such obvious things as gruit usage (just like any other detail regarding brewing), later researchers were convinced that gruit was just a mix of herbs to flavor beer<sup>12</sup>.

## Beer in the Middle Ages

Let us stress that beer consumption was viewed in the Middle Ages quite differently than in other epochs. Medieval beer — which was either thick, sweet, and low-alcohol, or thin, refreshing, and almost alcohol-free, depending on which wort was used for its preparation — was a regular product on tables, just like, let's say, bread or dairy products. Medieval rations were far from being nutritious and balanced, and beer, which was considered healthy and curative, was a valuable addition to everyday meals. Some scholars claim that peasants were brewing beer more often than baking bread<sup>13</sup>. As brewing was rather labor-intensive, there was something like an unspoken schedule, which household brews beer which week. In England, for example, one-third to one-half of all households was occasionally brewing beer for selling<sup>14</sup>.

Of course, alcoholic intoxication was condemned by moralists; but they were condemning it using exactly the same wording as they used for condemning gluttony. Medieval beer rarely had significant ABV: to produce strong beer a lot of grain was needed, which made it luxurious and unavailable to an average person. It looks like common folk weren't consuming beer to get intoxicated; it was rather an ordinary drink meaning to get essential carbohydrates<sup>15</sup>.

### Beer Myth

Many popular sources claim that Medieval people preferred beer over water, the quality of which was poor. It's a kind of manipulation: yes, they were, in that sense that given the choice whether drink beer or water they would likely choose beer — just like a contemporary person would! In the Middle Ages, people were well aware of water quality —

related problems and knew quite well that the best water was that of rain or snowmelt, avoiding polluted water if they can. Some social groups like monks, sailors, or grandes, might have actually drunk beer instead of water, but that definitely wasn't a ubiquitous practice<sup>16</sup>.

## How to taste

Some breweries continue using gruit nowadays. These beers might be found by 'gruit beer' or 'herbed beer' keywords. The most notable examples are:

- Belgian Steenbrugge and Gentse Gruut;
- Dutch Jopen Koyt.

The 'historical ales' by Williams Bros. we have mentioned in the 'At the Dawn of Civilization' chapter in fact fall into the same category.

It's important to understand that these beers are just using bog myrtle and other herbs instead of hops. They are totally not authentic in any other sense; it's interesting mostly as a possibility to check the real sweet taste of beer which we in the 21st century are totally unfamiliar with.

However, we might still get a real medieval *gruitbeer*. One of the most popular beer varieties from those days called 'mumme' (aka *mum* or *mumm*), which emerged in the 14th century, was so popular that persisted almost unchanged until the 17th century. The recipe was written down several times, and comprised wheat malt with an addition of oats and beans, fir and birch tree-tops, elderberry, cardamom seeds, bay leaf, a lot of herbs — thistle, dewdrop, burnet, betony, marjoram, gravilat, marsh mint, thyme, — and fresh eggs<sup>17</sup>.

The beer enthusiasts had reconstructed *mumme* based on those recipes, and the style now enjoys some demand. Known examples are:

- Mumm by Scratch Brewing Company;

- Hansa Mumme brewed in collaboration by 7 Fjell and Vaat Alte;
- Schiøtz Mørk Mumme by Albani Bryggerierne;
- Kongens Bryghus Julemumme by Husbryggeriet Jacobsen.

Just don't get it mixed up: the real *mumme* must be dark, thick, alcoholic, and possess quite a peculiar taste closer to a coke than beer. Thin light beer proudly produced in Braunschweig under this name (as well as an energy drink and a sweet paste) is directly related to the former glory of the Braunschweig Mumme, but totally lost any resemblance to the original recipe over all those years.

## **Etymological**

All this confusion with the word *gruit* switching its meaning from 'starter' or 'pastry' to 'a set of herbs for beer-making' is quite a characteristical one. Almost every term related to brewing lost its original meaning, sometimes changing to quite the opposite one.

Romans and Greeks have different words for beer depending on the region of its origin: Phracian beer was called *brytos*; Spanish, *cervisia*; Egyptian, *zythos*. *Brytos* was possibly borrowed by the German tribes and became *breuwan* (or both these words derived from proto-Indo-European *bher*, to boil), which later gave birth to English *brew*, German *brauen*, and Dutch *brouwen*, and also *broth*, *bread*, and corresponding words in German, Dutch, and other European languages.

### **It's interesting**

Words 'Brazil' and 'bride' derived from the same root as well. The former, through Old French *bresil* (to burn) that became *brasil*, meaning 'red wood' in Spanish and Portuguese (probably, because of the wood color, resembling smoldering embers); the territory of nowadays Brazil was called 'terra de brasil' ('the land of redwood') by the

Portuguese. As for the latter, brewing beer was one of the many bride's duties, which is quite obvious in German: Braut stands for 'bride'; Brauer, for 'brewer'.

*Cervisia* became Spanish *cerveza* and Portuguese *cerveja*, beer. It's interesting that Romans borrowed the word *cervisia* from the Celtic tribes that lived in nowadays Spain, and its origin is proto-Indo-European 'kerm', making it of the same root as Slavic 'korm', forage.

Finally, *zythos* is nowadays widely used in modern craft subculture. For example, Martin Cornell, a well-known journalist and book author, writes on the [Zythophile](#) blog.

The simplest and clearest situation is with the word 'pivo' that stands for 'beer' in Russian and other Slavic languages. It derives simply from the verb 'piti', to drink. From proto-Indo-European it came to the Greek language (*pinein*, to drink); from Greek to Latin (*bibere*), from Latin to Spanish (*bebida*) and Old French (*potion*), from Old French to English (*potion*, *poison*, and *potable*). Interestingly, another English word for something drinkable — 'beverage' — is likely derived from the same *bibere*, though the direct connection remains unclear.

Germans enriched our vocabulary with two more roots: *beer* and *ale*. The etymology of both is quite foggy; the former probably meant mead or cider initially (and therefore shares the same root with 'bee') as the Germans made no distinction between various sources of sugar for their beverages; or boringly derived from the very same *bibere*. As for *ale*, it influenced Scandinavian and Baltic languages (probably, independently from English) where its derivatives (*øl*, *olut*) are still in use.

Sumerians, as we mentioned, used a lot of different words for different kinds of beer. One of them, *sikaru*, made it into Semitic languages for denoting any alcoholic beverage and was used in the Bible in this sense. Later, it entered Old French and became *cidre*.

Finally, the Latin word for a starter, *fermentum*, transformed into the scientific term ‘ferment’ and in this capacity entered dictionaries of most of the world languages.

## References

<sup>1</sup> Nelson, M. (2005), p. 88

<sup>2</sup> Meussdoerffer, F. G. (2009), p. 11

<sup>3</sup> Ruis, F. (2016) *A Note on the Essence of Gruit*. Brewery History, 166, p. 52

<http://www.breweryhistory.com/journal/archive/166/index.html>

<sup>4</sup> Verberg, S. *Reconstructing the substance gruit: an experiment*

<https://medievalmeadandbeer.wordpress.com/2021/03/29/reconstructing-the-substance-gruit-an-experiment/>

<sup>5</sup> Meussdoerffer, F. G. (2009), p. 15

<sup>6</sup> Unger, R. W. (2004), pp. 31-32

<sup>7</sup> ibid, p. 49

<sup>8</sup> ibid, p. 45

<sup>9</sup> ibid, p. 64

<sup>10</sup> Verberg, S. (2018), p. 55

<sup>11</sup> Swinnen, J., Briski, D. (2017), p. 17

<sup>12</sup> Verberg, S. (2018), p. 50

<sup>13</sup> Unger, R. W. (2004), p. 39

<sup>14</sup> Bennett, J. M. (1996), p. 19

<sup>15</sup> Unger, R. W. (2004), pp. 2-3

<sup>16</sup> Cornell, M. *Was water really regarded as dangerous to drink in the Middle Ages?*

<http://zythophile.co.uk/2014/03/04/was-water-really-regarded-as-dangerous-to-drink-in-the-middle-ages/>

<sup>17</sup> Hornsey, I. S. (2008), pp. 388-389

## Chapter 6. Word on Hops

Historical period: the 14th-16th centuries CE

Scene of action: German, Baltic, and Dutch Cities

Starting from the 14th century CE, gruit usage (and therefore gruit monopoly profits) begin to decline. The reason was the spread of a cheaper, more effective, and more convenient additive: hops<sup>1</sup>.

First, hop bitterness allowed to beat unpleasant odors off. Second, hops were a way more effective preservative than herb mixture: alpha acids (or rather their isomers produced by heating wort) present in hops suppress the growth of bacteria, which prolongs the shelf life of beer up to half a year and even more. Third, and probably most important, brewing with hops allowed for using the raw materials more efficiently. English documents from that time mention that adding hops results in producing twice (!) the amount of beer from the same amount of grain<sup>2</sup>: wort might be left to ferment longer, allowing more sugars to convert into alcohol without the risk of spoiling.

The monks were probably the first who started brewing with hops, as the monasteries were the only beer producers in the early Middle ages who made enough beer to care about prolonged keeping<sup>3</sup>. The first known mention of adding hops to wort comes from 822 CE in the instructions of Adalard, the abbot of Corbie, France, written for his brothers. In the 9th-10th centuries CE, the usage of hops in monasteries was already widespread, being found both in chronicles and archeological evidence. Furthermore, hops were sometimes a part of gruit<sup>4</sup>. And yet, it took several hundred years (!) for hops to dismiss gruit<sup>5</sup>. A few reasons were named by scholars.

1. Technological issues: hops start to work as a preservative only if boiled (which allows alpha acids to isomerize, and it's the isomers that possess anti-bacterial properties). Hops added to gruit are useless from that point of view, and they might even spoil the wort. So brewing with hops implies having an additional step of boiling wort with them for an hour or two. Hops became generally used when brewers accumulated enough capital to have separate vessels for mashing (e.g. preparing wort from ground grain and water) and boiling<sup>6</sup>.
2. The bitter taste of hopped beer repulsed consumers<sup>7</sup>. We now think that modern beer has a neutral taste, but for a 15th-century Englishman, the sweet taste of ale was so habitual that bitter beer was drunk only by Dutch ex-pats despite its production being twice more cost-effective<sup>8</sup>.
3. Hops undermined the monopoly on beer ingredients, so their usage was frequently opposed by local authorities, especially in the Dutch towns<sup>9</sup>.

One way or another hops started to supersede gruit in the 13th century, region after region. The important consequence of that (apart from bishops' and barons' whining about their incomes<sup>10</sup>) was the beginning of commercial brewing at scale. Beer became a product to deliver to other towns, not just local ones.

### It's interesting

The true meaning of the word ‘gruit’ was already forgotten in the 15th century. There are surviving examples of using it as a synonym for brewing tax (sometimes even as *hoppengruit*, literally ‘the hops gruit’) and also as a verb meaning mixing something as an ingredient<sup>11</sup>.

With technological advancement, the division of labor emerged. Brewing beer and selling it became different occupations. First brewers' guilds and beer trade regulating laws are known since the 13th century in English and German lands<sup>12</sup>.

Beer, however, is a product poorly fit for transportation because of its considerable volume and weight. Moving beer by roads is suboptimal: the cost of a barrel increased by 25-70% every 100 kilometers, depending on the ground type<sup>13</sup>. The beer trade wasn't a luxurious one, and its margins were low. But beer was quite a convenient commodity for maritime transportation, given that it was a customary product to provide drink and calories to the sailors. First mentions of the naval beer trade began in the Viking era, circa the 11th century CE; in the 12th century, Bremen and Brugge were already dealing beer at scale. But the *real* maritime beer trade started with the development of the Hanseatic League<sup>14</sup>.

One of the two founding cities of Hansa, Hamburg, had literally become the world brewing capital in the 14th century (partly because of being one of the earliest abolishers of the *gruitgeld*). In 1369, Hamburg exported 13.3 million liters of beer and consumed probably the same amount locally<sup>15</sup>, having around 14 thousand inhabitants. At its peak, the Hanseatic League sold more than 50 million liters per year, and the League's navy drank another 25 million<sup>16</sup>. Beer gave jobs to roughly half of Hamburg's craftsmen (475 out of 1075 in 1376). Other cities of the League weren't that far behind: there were 300 brewers in Bremen, 250 in Erfurt, 200 in Wismar and Leipzig (each), and 180 in Lubeck<sup>17</sup>. Another number is even more impressive: 25-40% of all the grain that those Medieval cities were buying was used by brewers<sup>18</sup>.

In the 15th century, however, the Hansa started to lose markets: the Dutch were forcing them out of the business as the more advanced maritime power and the more efficient beer producer alike<sup>19</sup>. During the second half of the 14th century, the Netherlands, figuratively speaking, converted from an agrarian village to an industrial city. The most important industrial sector was undoubtedly the textile one; but for sure brewing was the second-most important one<sup>20</sup>.

The Delft — Gouda — Haarlem triangle became a center of the Low Lands beer industry. These three cities were producing 100 million liters of beer in the second half of the 15th century and at the beginning of the 16th century<sup>21</sup>, having a combined population of approximately 40 thousand people. In the heyday of beer production in the Netherlands (starting from the end of the 15th century up to the beginning of the 17th century) the beer incomes (including excise, taxes, and customs duties) of many Dutch towns comprised one to two-thirds of the total income<sup>22</sup>.

## How to try

Given the ferocious competition between dozens of cities and hordes of brewers, there is no surprise that new beer trademarks were emerging, reaching heights, and disappearing into nothing *in hundreds if not thousands*. One expert, Heinrich Klaus, counted 150 types of German beer only. To denote all these beers a plethora of words with dubious etymology and ever-changing meaning was used<sup>23</sup>. Nevertheless, some of them gained so much popularity that they were still in use centuries after, and because of that, we may taste them today. (The longer a beer style existed, the higher the probability somebody bothered to write the recipe down was!)

The most authentic of such ‘dinosaurs’ is the modern reconstruction of one of the most popular beer styles of the 14th century, the Dutch *koyt* (also spelled *kuyt* or *kuit*). You may judge how influential this beer was by the fact that citizens of Leeuwarden revolted in 1487 because *koyt* imports from Haarlem had been banned<sup>24</sup>.

The notable characteristic of *koyt* is using a large proportion of oats (more than 50%) which was the most widespread grain in the Netherlands during those times and probably allowed brewing better beer for the same money<sup>25</sup>. Nowadays many microbreweries in the Netherlands (and some in the US) produce beer in this style:

- the most precise reconstruction named Klavervier Koyt; brewers from Klavervier not only produce authentic beers but also contribute to the research of brewing history;
- two Jopen brands, Padvinderskuiten and Frans Hals Bier (Jopen Koyt despite its naming *is not a koyt*);
- Oedipus Shampoo;
- Elora Windmolen Dutch Kuyt;
- Noord-Hollander Kuyt Bier;
- Grutte Pier Kuit;
- Ramses Bier Kuiter;
- Leidsch Kuitbier;
- High Oats by the Jabeerwocky-Nepomucen collaboration;
- Koyt by the Wander-Reuben's collaboration.

Another beer style originating in the 14th-16th centuries is called *bock*. It is told that its name derived from the city of Einbeck; that Martin Luther particularly loved that beer, and that he strengthened his will at the Diet of Worms of 1521 with it<sup>26</sup>. However, we tend to be very skeptical regarding this story as the sources that tell it are quite far from being reliable. Nevertheless, technically speaking *bock* is quite close to the alleged pinnacle of the brewers' art of the 16th century: dark (of course) aged (therefore lacking smoky flavors) strong (means 'expensive') hopped beer. Einbeck, being a Hanseatic League member, was famous for its rigid control over beer quality<sup>27</sup>.

What is called 'bock' in nowadays Germany is a totally different beer style, a dark strong lager (see the next chapter). Dutch brewers (La Trappe, Hertog Jan, Jopen) and the Belgian ones (Leute) are closer to the canonical recipe. Still, German *bockbier* (such as Ayinger Celebrator, Paulaner Salvator, Spaten Optimator, and other -or's) are quite good, though represent a later brewing tradition.

## References

<sup>1</sup> Swinnen, J., Briski, D. (2017), p. 17

<sup>2</sup> Bennett, J. M. (1996), p. 85

<sup>3</sup> Unger, R. W. (2001), p. 27

<sup>4</sup> Nelson, M. (2005), p. 110

<sup>5</sup> Unger, R. W. (2004), pp. 54-55

<sup>6</sup> ibid, p. 56

<sup>7</sup> ibid

<sup>8</sup> Bennett, J. M. (1996), p. 60

<sup>9</sup> Verberg, S. (2018), p. 56

<sup>10</sup> ibid

<sup>11</sup> ibid, p. 57

<sup>12</sup> Meussdoerffer, F. G. (2009), p. 13

<sup>13</sup> Unger, R. W. (2001), p. 27

<sup>14</sup> Meussdoerffer, F. G. (2009), p. 16

<sup>15</sup> Unger, R. W. (2004), p. 60

<sup>16</sup> Meussdoerffer, F. G. (2009), p. 17

<sup>17</sup> Unger, R. W. (2004), pp. 63-64

<sup>18</sup> Meussdoerffer, F. G. (2009), p. 15

<sup>19</sup> ibid, p. 20

<sup>20</sup> Unger, R. W. (2001), p. 55

<sup>21</sup> ibid, p. 73

<sup>22</sup> ibid, p. 69

<sup>23</sup> Unger, R. W. (2004), p. 185

<sup>24</sup> <https://history.stackexchange.com/questions/23532/what-exactly-happened-with-beer-and-leeuwarden-in-1487>

<sup>25</sup> Unger, R. W. (2001), p. 127

<sup>26</sup> Jackson, M. *Original Bock: the beer the doctor ordered*

<http://www.beerhunter.com/documents/19133-000034.html>

<sup>27</sup> Swinnen, J., Briski, D. (2017), p. 19

## Chapter 7. The Cold of Alpine Caves

Historical period: 15 century CE

Scene of action: Bavaria

Let's now discuss another vital beer ingredient: yeasts. Without them, you can't brew beer, make wine, or bake bread — which means they were in some sense 'domesticated' several thousand years ago. That makes the fact that we actually know very little about yeast domestication even more surprising.

We are now aware of more than 1500 yeast species. And when humanity started learning brewing, wine-making, and baking, many different 'wild' yeast kinds were used for leavening.

However, at the end of the 19th century when microbiologists began to study yeasts, it turned out that winemakers and bakers were using one very specific species: *Saccharomyces cerevisiae*, or simply 'baker's yeast'. How exactly did humans isolate that specific yeast from the broad spectrum of wild species is right now quite unclear. We don't even know whether our ancestors found *S. cerevisiae* in the wild, or bred it, and when this actually happened. The latest research demonstrates that quite probably *S. cerevisiae* was first isolated during the industrial revolution in brewing, e.g. relatively recently<sup>1</sup>.

But instead, we rather well know the history of another yeast species used by brewers, *S. pastorianus*. It was actually bred by humans as a result of the hybridization of the above-mentioned *S. cerevisiae* and 'wild' *S. eubayanus*<sup>2</sup> presumably in the 15th century CE in Bavaria. In those times brewers were struggling with beer spoilage and unpleasant odors, and low temperature helped with both. In their determination to produce better beer Bavarian brewers (probably, monks of the secluded monasteries<sup>3</sup>) began to keep their beer in the cold of Alpine caves, just several degrees above zero Celsius — and bred new yeast species. Traditionally, beer was left to ferment at room

temperature (around 20 Celsius) for several days; a new Bavarian technique implied a prolonged fermentation period (roughly 3 weeks) and then storing beer at 5-10° Celsius for an even longer period of time. This new type of beer was called 'lager', meaning 'to store' in German. A 'lagerization' as a specific brewers' activity was first mentioned in 1420 CE. However, it was not widespread until the 60s years of the 19 century, because of obvious reasons: the technology required a huge amount of ice to be used<sup>4</sup>.

## How to taste

First lagers were still dark beer (and remained as such up until the 20th century), so the most authentic ones are contemporary German dark lagers (so-called *dunkelbier*) or German *bockbier*, which is being produced utilizing the lager technology. You may take any *dunkel*: in fact, that's quite common modern dark beer. The most praised examples of the style are Ayinger and Andechser, though for a full submersion you might try to find Weltenburger (the brewery at the Weltenburg Abbey was founded in 1050 and is considered to be one of the oldest in the world) or Spaten Dunkel (which is produced since the 14th century).

## The taste and the temperature

Yeast kind defines not only the rapidity and the temperature of the fermentation but also how the process looks like. Baker's yeast ferments intensively, forming a think foam at the tank's surface which brewers often used as a starter for the next brew. At the same time, lager yeast behaves calmly, doesn't produce a lot of foam, and sinks to the bottom of the vessel. That's why corresponding beverages are colloquially called 'top-fermented' and 'bottom-fermented' beers respectively — though brewers had long ago developed baker's yeast strains that sank to the bottom as well. The 'high-temperature fermentation' (or 'warm-') and 'low-temperature fermentation' terms would describe the situation much more adequately but regrettfully see rare use.

For high-temperature fermented beers, the word ‘ale’ is now used almost universally (which has exactly zero historical justification), and the *S. cerevisiae* yeast is likewise dubbed ‘ale yeast’. In this book, we use the word ‘ale’ only for beverages that were called ales at the time they originated, and not for denoting yeast species. If such an indication is needed, in this book it’s always explicit. Other yeast species used by brewers (of *Brettanomyces* genus, for instance) are also considered ‘top-fermenting’.

The difference between high-temperature fermentation and low-temperature one is that chemical reactions happen more turbulently at higher temperatures and enrich beer with complex ethers that are responsible for the flavors of bananas, raisins, berries, etc. Low-temperature beer will have a more accentuated ‘bread-like’ profile and comprise fewer tinges in its taste and aroma. Interestingly, lager yeast might be forced to ferment at higher temperatures; the resulting beverage is called *steambeer*.

## References

<sup>1</sup> Gallone, B., Mertens, S., Gordon, J. L., Maere, S., Verstrepen, K., Steensels, J. (2017), p. 149

<sup>2</sup> ibid, p. 151

<sup>3</sup> Jackson, M. *The birth of lager*

<http://www.beerhunter.com/documents/19133-000255.html>

<sup>4</sup> Meussdoerffer, F. G. (2009), p. 28

# Chapter 8. The Beer Purity

Historical period: the 16th-17th centuries CE

Scene of action: Bavaria

Right after the beer trade had begun, early laws regulating it emerged. Two main issues are bothering authorities of all the brewing regions: ensuring the quality of the product and taxation. It's quite possible to take some specific areas and observe how the development of the brewing industry leads to the local legislation becoming more and more strict<sup>1</sup>.

The first laws that prescribed mandatory employing of some brewing techniques are known since the 12th century CE<sup>2</sup> and, generally speaking, were quite an ordinary thing for any brewing region. Still, one of them is outstanding: the Bavarian beer purity law of 1516, also known as *Reinheitsgebot* in German.

## It's interesting

'The Beer Purity Law of 1516' is not about the beer purity, and was not adopted in 1516. However, it is widely known under that name. Such laws were in effect independently in Munich since 1487 and in the remaining parts of Bavaria since 1493. After Bavaria was united under Munich those two laws were compiled into one, and this edition of Apr 23, 1516 is called 'Reinheitsgebot'.

Contrary to other cities' magistrates that were randomly adopting and then soon canceling their beer laws, the Bavarians demonstrated truly German obstinacy and love for order. Can you imagine that adopting the *Reinheitsgebot* country-wide was the condition of Bavaria joining the united Germany state in 1871<sup>3</sup>?

## Beer Myth

On the Internet, you might find the statements that the *Reinheitsgebot* was the first law regulating the quality of beer (which is not true) or even food in general (which is *absolutely* not true as those laws already existed in Ancient Rome). It is also incorrect to say that *Reinheitsgebot* is the oldest *acting* food industry law, as it was abolished by the European Court of Justice in 1987<sup>4</sup> — so the Bavarian adherence to principles got rather diminished in those 100 years that passed since the Bismarck times.

The law consists of several clauses that might be grouped into two categories:

- price regulation (the law sets both the maximum retail price and the maximum allowed grist for resellers);
- beer quality insurance.

### It's interesting

Many beer-regulating laws prescribed the maximum price just like the *Reinheitsgebot* did. So in case of poor harvest or monetary inflation, brewers were not able to raise the price. Instead, they lowered the quality bar by using less grain. That's why popular beer brands degraded quickly, and new ones were constantly emerging<sup>5</sup>.

In this law, the famous formula is stated: beer must be brewed with only three ingredients, namely water, barley, and hops. So nowadays in popular opinion, the *Reinheitsgebot* is something like a 'Silver Bullet' for ensuring the beer quality. Brewers often mention it in their commercials, and craft bars are frequently named '1516'.

In the reality, the importance of the formula was not about the ingredients it allowed, but rather ingredients it prohibited. First, *Reinheitsgebot* abolishes *gruit* and requires using hops only; second, it was meant to ensure the food security for the Bavarian burgers by prohibiting using non-forage crops for beer making, most importantly wheat.

## Bavarian White

In the 15th century Bavaria a fashionable beer style occurred: the white (*weisse*) beer that was lighter than the Bavarian lagers because of some brewing tricks. One of the means of ‘whitewashing’ beer is using wheat (*Weizen*): wheat beer got a high white foamy head, and wheat itself might be used fully or partly unmalted. Approximately at the end of the 15th century these two words — *Weissbier* (e.g. ‘white beer’) and *Hefeweizen* (literally, ‘yeast wheat’) — started to mean exactly the same: wheat beer.

There is no consensus among scholars whether using wheat for brewing was a real food security problem, but the fact is undeniable: by introducing the ‘Beer Purity Law’, Wilhelm IV had legally outlawed using any grain but barley. However, Wilhelm's son, Albrecht V, made an exception to this rule in a form of a state monopoly — presumably under the pressure of consumers that were not willing to comply. Initially, the right to brew wheat beer had been granted to Count Degenburg, but after his death returned back to the Crown. The reigning Duke, Maximilian I, had quickly learned that this monopoly might have brought considerable profits as Bavarians liked wheat beer much and were eager to pay for the ‘forbidden fruit’, especially as it was the only kind of beer allowed to be brewed in summer. Maximilian founded an entire network of state breweries, one of which — former Weisses Bräuhaus — has survived until today<sup>6</sup>.

Finally let us mention that beer made of wheat was produced for millennia, starting with Sumerians and Egyptians. 14th-century Hamburg was particularly praised for its wheat beer<sup>7</sup>. The Bavarians borrowed the technology from Bohemian brewers who had been producing wheat beers since the 12th-13th centuries CE<sup>8</sup>.

## How to Taste

Out of the ten oldest breweries in the world, several at once are located in Bavaria.

- Weihenstephaner: the brewery at the Weihenstephan Abbey was first mentioned in 1040 (though some scholars believe that the corresponding document is a later forgery, we know for sure about cultivating hops in the monastery garden since at least 768 CE) and is generally believed to be the oldest continuously operated brewery in the world;
- Weltenburger: mentioned in the previous chapter, this abbey brewery is ten years younger than Weihenstephaner;
- Augustiner-Bräu: the brewery at the monastery of Augustine order, it was first mentioned in 1328, and was supplying beer for Bavarian dukes' households until the end of the 16th century;
- two breweries that later formed the Spaten-Franziskaner Group, unsurprisingly that of Spaten (existed since 1397) and Franziskaner (since 1363); the former, however, does not produce wheat beers and is much better known for its lagers.

There are also two slightly younger breweries:

- Staatliches Hofbräuhaus (the ‘Hofbräu’ trademark) — the ‘state court brewery’ founded by Wilhelm V himself in 1589;
- G. Schneider & Sohn (the ‘Schneider Weisse’ trademark) — the venture of Georg Schneider's that had eventually bought several former ducal breweries in 1924; one of them, *the Weisses Bräuhaus* in Kelheim, was established by Maximilian I at the beginning of the 17th century to implement duke's monopoly on wheat beer.



The Weisse Bräuhaus in Kelheim, Bavaria. Constructed in 1607

Image Credit: Richard Huber

There are reasonable doubts regarding the continuity of all these beer producers' traditions. For example, the Weltenburg abbey was disbanded in 1803 and reinstated only 40 years later. Still, the benchmark Bavarian wheat beers are produced by those companies, and the Weihenstephaner is considered to be the best.

As with *bock*, it's hard to tell if nowadays Bavarian *Hefeweizen* really resembles the historical *Weissbier* of the 16th century. Out of general considerations, the duke beer of that period should be closer to what we now call a 'weizenbock', e.g. relatively strong wheat dark. The reference *weizenbocks* are Mein Aventinus (AKA 'Tap 6') by Schneider Weisse and Vitus by the Weihenstephan brewery.

## References

<sup>1</sup> Unger, R. W. (2004), p. 69

<sup>2</sup> Meussdoerffer, F.G. (2009), p. 26

<sup>3</sup> <https://en.wikipedia.org/wiki/Reinheitsgebot>

<sup>4</sup> Leonard, D.J. *10 Things You Might Not Know About the Reinheitsgebot (Beer) Purity Law of 1516*. Beer Syndicate Blog

<https://beersyndicate.com/blog/10-things-you-might-not-know-about-the-reinheitsgebot-beer-purity-law-of-1516/>

<sup>5</sup> Unger, R. W. (2004), p. 187

<sup>6</sup> Staudt, A. (2015) *Brewing Bavarian Weissbier – all you ever wanted to know*. brau!magazin

<https://braumagazin.de/article/brewing-bavarian-weissbier-all-you-ever-wanted-to-know/>

<sup>7</sup> Unger, R. W. (2004), p. 185

<sup>8</sup> The Oxford Companion to Beer (2012) *Weissbier*

## Chapter 9. Barrels and Bretts

Historical period: the 16th-17th centuries CE

Scene of action: England

After the Netherlands had switched to hopped beer, Britain remained the only bastion of the sweet malt beverage (which they called ‘ale’). At the beginning of the 15th century CE, England was consuming an enormous quantity of that: a gallon of ale per day (approx. 4.5 liters) was a golden standard for provisioning soldiers, servants, monks, and even hospital inmates<sup>1</sup>.

Quite detailed descriptions of British ale technology survived; importantly, they prescribe no boiling of wort, so ale was doomed to spoil very quickly. Furthermore, sometimes even gruit was not included in the recipe, which made the resulting product even less stable. A 1542 instruction specifically points out that ale should not be kept for more than five days<sup>2</sup>. Under those conditions, wort was not allowed to ferment fully: attenuation (e.g. the share of soluble compounds that yeasts had consumed) was low. Ale was much more thick and viscous than we are accustomed to nowadays. If required to make a beer that might be kept longer, brewers had to increase alcohol content and spend a ridiculous amount of grain.

### It's interesting

One of the most prized kinds of ales in the 16th-century England was a replica of German *mumme* (see the ‘Word on Hops’ chapter) — with a British accent, as some *mumme* ingredients were not growing in British isles.

Probably, that instability of ale (and therefore a lack of major producers) was one of the reasons why England resisted hops for more than 200 years. Archeologists found traces of hops in fossils dated all the way down to the 10th century CE, and the first documents mentioning hopped beer are known since the 14th century CE<sup>3</sup>. However, despite technological advancements, hops started to play a significant role in brewing only in the 16th century CE.

Initially, it was immigrants (German, Dutch, and Flemish ones) who started to brew hopped beer — to be consumed by themselves, and, ironically, to be sold to the Netherlands<sup>4</sup>. Englishmen even borrowed the word to denote the ‘foreign’ beverage: *bier*, which later became ‘beer’. That led to a paradoxical situation of two independent guilds — beer makers and ale makers — existing simultaneously and quite actively fighting each other<sup>5</sup>.

## Beer Myth

Using the different words for beer and ale resulted in a common misconception, shared by many scholars, starting with the witnesses of the epoch and ending with the authors of comprehensive monographs written in the 21st century — the one that states hops were prohibited in the 16th-century England. That's not true: it was prohibited to brew *ale* with hops, but it was never prohibited to make *beer* with them. This legend was first voiced by Thomas Fuller in 1662, and since then it continues traveling from one book to another. Also, it is sometimes stated that Henry VI banished hops as a ‘pernicious and wicked weed’: this false quote originates in the same book of Fuller's<sup>6</sup>.

Foreigners were seemingly losing this war; however, the sheer historical inevitability forced English monarchs into supporting ‘alien’ producers. England was struggling to become a naval power, and that was impossible without beer (and not just any beer, but that one of certain quality: it must have had enough shelf life to survive several months in a voyage, and ideally be cheap). In the 15th-16th century CE, beer was a norm of life for European sailors being literally consumed instead of water. Ships were

supplied with beer at the rate of 3 to 5 liters per a crewman per day universally throughout all the northern parts of Europe<sup>7</sup>, from Netherlands and Hansa to Russian Empire under Peter the Great<sup>8</sup>. English monarchs were shipping beer to their overseas garrisons since the 15th century<sup>9</sup>, and at the end of the 16th century Samuel Pepys, the Secretary of the Admiralty, secured a one-gallon daily ration of beer for sailors<sup>10</sup>.

The other reason why hopped beer was slowly but steadily advancing was the ability to brew stronger beverages. Because of low attenuation, English ale likely contained not more than 2.5% ABV; the elite ‘double’ (e.g. brewed with a double measure of grain) kinds of ale reached maybe 5%. Hopped ‘double’ beer might be 8-10%, and even stronger versions (so-called ‘doble-doble’, e.g. the ‘double-double’), up to 15%. In the 16th century, the English gentry was literally hunting for stronger beers, as they were a substitute for expensive imported wine and brandy. Edward VI, Mary I, and Elizabeth I were in turns fighting against the ‘doble-doble’ but had not succeeded, apparently<sup>11</sup>.

### It's interesting

The final victory of beer over ale happened in 1710, with the Parliament banned hop substitutes (of course, for taxation reasons)<sup>12</sup>. The language changed as well: starting from the 17th century, the words ‘ale’ and ‘beer’ began meaning slightly and strongly hopped beer respectively. Paradoxically, the legal distinction between beer and ale persisted: for example, beer was prescribed to be sold in 36-gallon barrels, while ale was to be sold in the 32-gallon ones<sup>13</sup>.

The beer production had been constantly increasing all over the 17th century, reaching its peak in 1691: London had brewed more than 2 million barrels, e.g. approximately 300 million liters, having a population of 600 thousand — that's five liters of beer per day per each inhabitant, including children.

The technology advancement impacted English beer bars (*alehouses*, taverns, or since the 17th century ‘pubs’ — short for a ‘public house’): if ale was to be sold short after it’s brewed, beer might be kept for a prolonged time, so new terms occurred: ‘mild ale’ or ‘running ale’ for fresh beer, and ‘keeping ale’ or ‘stale ale’ for aged beer — or rather aged beer actually came into being as a mass product. (Unhopped ales could be kept for a prolonged time as well, but only the strongest and most expensive ones<sup>14</sup>).

While producing those keeping ales, English brewers had created and developed a new technology (initially by accident, presumably). Beer stored in a barrel for a long time continued to slowly ferment: barrel planks gave shelter to yeasts, initially being inoculated by accident, and later simply absorbing remains of the previous brew. ‘Wild’ yeasts, unlike the baker’s and the lager ones, are much more resilient (it was impossible to purge them from barrels) and are capable of fermenting under little oxygen supply, breaking down complex sugars (maltodextrins) that are present in abundance in thick wort and normally are not consumed by regular baker’s yeasts — but they did it very slowly, for many months.

So, finally, after a year or two, the beverage in the barrel will be quite different compared to the initial one. First, beer loses its carbonation. Second, it becomes stronger in alcohol content and extremely dry: during the prolonged keeping time yeasts will break down all fermentable sugars. Third, the look and the taste change: beer becomes more clean and clear, the hop bitterness ceases, and the characteristic acidity (or even tartness) is added up alongside the taste of the barrel itself. As a result, tavern keepers got new work to do: mixing up a high-quality but stale aged ale with a fresh one to get some better-tasting beer to sell.

These aged beers were called ‘stale’ (from ‘stall’<sup>15</sup>), ‘keeping’, ‘old’, and starting from the 17th century — ‘stock’. Typically, they had 6% alcohol by volume, though stronger beers having 10% or even more were also produced to please the respected gentlemen’s tastes (such strong beers since the 19th century are known as ‘barleywines’).

British stock ales were aged sometimes for 5, 10 and more years (*much more*: there is a batch of Bass No. 1 strong ale brewed in 1869, *and it's still drinkable*<sup>16</sup>).

## How to taste

'Real' English ale can't be bought because of its short shelf life, but you might try brewing it yourself<sup>17</sup>.

Stock barrel-aged ales are not being produced for a long time now, but there are several craft reconstructions, most notably — Greene King Strong Suffolk / Olde Suffolk, which is being prepared as a mixture of fresh ale and the stale one, aged for two years.

Apart from authentic stock ales, there is a lot of 'old ales' being produced nowadays. However, 'old ale' is an umbrella term for several different beer styles of different ages. The closest to the 17th-century ales are dark barrel-aged beers. The classics are English Robinson Old Tom, Theakston Old Peculier, Adnams Tally Ho!, and Scottish Harviestoun Ola Dubh. Stock ales were quite popular in the US, so many American brewers produce them as well — for example, Alesmith Olde Ale or Founders Curmudgeon Old Ale.

As for beers that are called 'mild ales' today, it is a much more contemporary invention, having nothing in common with the 17th-century ones.

## It's all about yeasts

In the beginning of the 20th century, Niels Claussen, a Carlsberg Labs employee, found a new species of yeasts in British stock ale that were responsible for adding the famous 'British taste' to beer. Claussen named the new kind of microorganisms 'Brettanomyces', e.g. 'The British fungus', literally<sup>18</sup> (which is totally correct in Latin; however, somehow a variant with a typo became normative: *Brettanomyces*, with 'e'). Brettanomyces (or 'bretts' in the brewers' slang) today are the third choice of yeasts for a

brewer (after the lager and the bakers' ones). Some breweries specialize in 'bretts', and also some wineries employ them as well.

Almost every style of the 17th-18th century aged beers — stock ales, porters, pale ales as well, as we will tell in the next chapters — were passing a phase of secondary fermentation driven by 'bretts', simply because it was impossible to get rid of them. Nowadays, 'wild' yeasts are considered to be brewers' worst enemies, and all the equipment is sterilized to avoid inoculating wort with unwanted microorganisms. That's why contemporary 'old ales' have nothing to do with the original technology: except for craft restorations, only Belgian *saisons* and brown ales (which we will describe in detail in the second section of this book) preserved the original taste of those beers.

### It's interesting

Also, *Brettanomyces* are notable because of being the first patented microorganisms in human history, as Claussen was granted a patent No. GB190328184 for his discovery.

## References

<sup>1</sup> Bennett, J.M. (1996), p. 17

<sup>2</sup> Hornsey, I.S. (2008), p. 324

<sup>3</sup> ibid, pp. 309-312

<sup>4</sup> Bennett, J.M. (1996), p. 80

<sup>5</sup> Hornsey, I.S. (2008), p. 323

<sup>6</sup> Cornell, M. *Myth 2: Hops were forbidden by Henry VI*

<https://zythophile.co.uk/false-ale-quotes/myth-two-hops-were-forbidden-by-henry-vi/>

<sup>7</sup> Unger, R.W. (2004), p. 129

<sup>8</sup> Дуро́в, И.Г. (2014)

<sup>9</sup> Krenzke, J. R. (2014), p. 39

<sup>10</sup> Meussdoerffer, F. G. (2009), p. 22

<sup>11</sup> Cornell, M. (2010), pp. 157-158

<sup>12</sup> Cornell, M. *A short history of hops*

<https://zythophile.co.uk/2009/11/20/a-short-history-of-hops/>

<sup>13</sup> Cornell, M. (2010), p. 28

<sup>14</sup> Krenzke, J. R. (2014), p. 22

<sup>15</sup> Cornell, M. (2010), p. 26

<sup>16</sup> ibid, p. 160

<sup>17</sup> Kerthjalfadsson, T. (1998). Recreating Medieval English Ales (a recreation of late 13th - 14th c. unhopped English ales)

[https://www.cs.cmu.edu/~pwp/tofi/medieval\\_english\\_ale.html](https://www.cs.cmu.edu/~pwp/tofi/medieval_english_ale.html)

<sup>18</sup> Cornell, M. (2010), p. 161

# Chapter 10. The Beer of the Industrial Revolution

Historical period: the 18th century CE

Scene of action: London

At the end of the 17th century CE, all the prerequisites for the industrialization of brewing in England were in place. Chaotic and semi-professional ale producers were superseded by organized, commercially-minded beer brewers. There were more than 17 thousand licensed drinking premises in the country (one per 183 inhabitants)<sup>1</sup>, and the beer business comprised 28% per of GDP<sup>2</sup> — however, no real *industry* existed: beer was consumed on-premise in those thousands of alehouses.

The impetus that catalyzed the industrialization came in a form of an excise tax turmoil. England entered the Nine Years' War of 1688-1697 and in a search of additional funding the government, exquisitely as hell, created a total mess with taxation, raising beer levies dramatically<sup>3</sup>. Brewers were forced to seek ‘optimizing’ the taxes and soon found the loophole: from the legal point of view, there were ‘strong’ and ‘weak’ beers, but the exact alcoholic content was not prescribed. So to ease the tax burden, one could brew a batch of very strong beer, pay the levies, and then dilute it with weak beer. This beverage prepared for future blending was called ‘double’, ‘three-threads’, or ‘stout’ (meaning ‘hard’) beer. As a result, clandestine mixing of the semi-products to get a ready-to-use consumer product became a widespread practice among tavern keepers<sup>4</sup>.

## Beer Myth

It's often said that the ‘three-thread’ beer was a blend of three kinds of beer: stale, fresh, and pale. This is probably just an urban myth: ‘three-threads’ was just a mix of keeping and running ales<sup>5</sup>. Still, mixing up just two threads was nevertheless hard (and dangerous) job for tavern

keepers.

In the end, the beer production dropped, and the collected tax sums became even smaller than before (partially, that was because of ‘gray’ schemes, of course, but the overall beer consumption still decreased significantly). In order to overcome the illicit stout blending, lawmakers introduced an additional levy on malt itself, which led to further degradation of the industry<sup>6</sup>.

These hide-and-seek games with the government were finally resolved at the beginning of the 18th century in the most progressive manner: some nameless innovators started to brew a beverage called ‘entire-butt’ (or rather ‘intire-butt’ as they spelled it those days), e.g. ‘the full barrel’. To make this beer, all four or five worts prepared from one batch of grain (in this case, the cheapest ‘brown’ malt) were mixed back, intensively hopped, and then aged for some time in a large barrel (which was called ‘butt’).



Paul Sandby, ‘The encampment in Hyde Park’, 1781. The sign states: ‘Pooles / Intire Butt Beer / Fine Ale & Amber’  
Public Domain

There were other innovations: the inventors of that new beer were the first who approached the beer production with an engineer's pedantry to control *precisely* how the product is prepared. In particular, they started drying malt implying a specific temperature profile instead of just leaving it in a kiln for several days: the heat was gradually increasing, giving the sharp rise at the very end of the process, to make malt 'pop' like popcorn (this type of malt was conversely called 'blown'<sup>7</sup>). Wort made from this malt might ferment at a higher temperature meaning it was less likely to turn sour and was fit to be brewed in summer. As this beer got spoiled less frequently and generally became less capricious, the sizes of 'butt'-barrels began to increase thus allowing for scaling the production. This product was ready-to-use, no need to mix it with anything, and — the most important part! — it cost half-penny less than analogous blended beers<sup>8</sup>.

Interestingly, first 80 or so years this beer was called just 'entire-butts', but finally another naming prevailed: *porter*. This beverage was so enormously popular among port workers that *porter* (initially just a euphemism) superseded other names. One scholar claims that porter consumption provided 2000 calories per day for an average London port worker in the 18th century<sup>9</sup>!

Basically, the earliest porters were pseudo-'keeping ales' made from the cheapest malt with the lack of alcohol (typical 'old ale' was stronger) being compensated by adding hops in abundance. The scheme worked because lawmakers somehow overlooked the possibility of putting excises on hops as well<sup>10</sup>. Brown malt was cheap because it was dried in a wood kiln (thus absorbing smoky flavors) while quality malts were dried over more expensive straw. Even in the 1890s, some porters were advertised as having 'the flavor of the wood'<sup>11</sup>, so the consumers had probably developed something like a Stockholm syndrome towards that smell and taste.

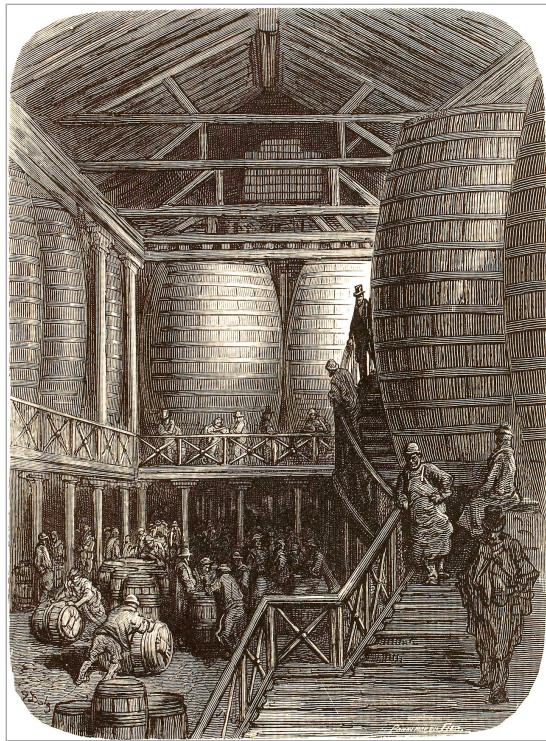
It's interesting

Later, in the middle 18th century, brewers started to keep porter for maturing, thus giving birth to terms ‘mild porter’ and ‘stale porter’, so tavern keepers were not enjoying abolishing beer blending for long. The word ‘stout’ had not rested in peace as well: it soon became a designation for the thickest and heaviest porters. Also, the porter itself was always a ‘beer’, not ‘ale’: up until the middle 20th century you would have got a pint of porter if you had asked for a ‘beer’ in a British pub.

London brewers took a pedantic approach not only towards brewing procedures but to the beer business as a whole, being very rigorous about the statistics: when the beer was prepared, whom it was sold to, what was the price, etc. It was probably the first time in history when the accountants became more important than master brewers themselves<sup>12</sup>. Later, in the 1770s, the Londoners were first to start using the measuring tools (namely, thermometers and hydrometers) for brewing, and it was them who installed the first steam engines in breweries as well<sup>13</sup>.

The combination of these three factors — effectiveness, cheapness, and readiness for immediate use — had made a revolution in the brewing industry, or rather *had created* the industry. ‘Entire-butt’ took over London alehouses with a lightning speed, and after them, the entire world. This beer style had quickly become truly global, being shipped to the New World, Australia, the Russian Empire, India, and every other corner of the globe.

The vat sizes were growing even faster. In 1736, Humphrey Parsons installed new barrels of a record 200 thousand liters each in his brewery; six decades later, the largest vat could hold quite close to three million liters of beer<sup>14</sup> with iron staples alone weighing 80 tons. In 1814, a relatively small 600 thousand liters barrel exploded and caused a real beer flood that killed eight people<sup>15</sup>.



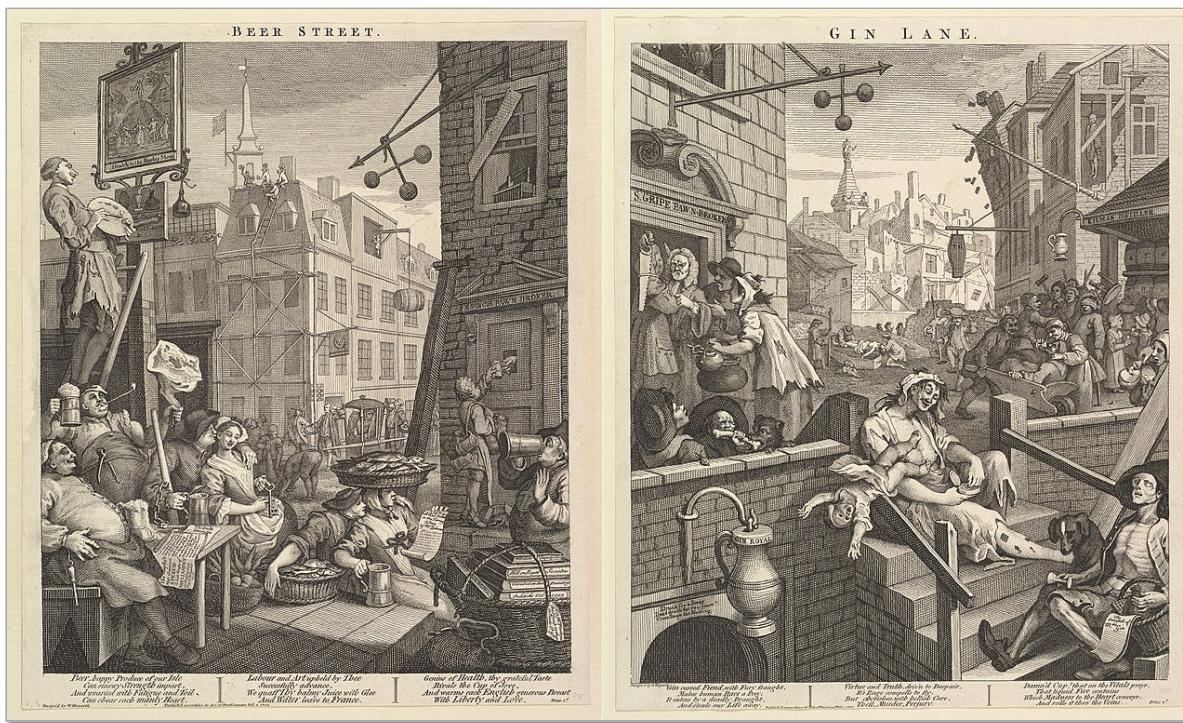
Gustave Doré, Blanchard Jerrold, 'London, a pilgrimage. Chapter XVI, The town of malt.'

'The great vats.', 1873

Public Domain

The production scale and the level of monopolization were increasing as well. Law favored large-scale brewers and in the middle 18th century just two of them — Calvert and Thrale — were controlling more than 40% of beer production in the city<sup>16</sup>.

In 1751, painter William Hogarth created a pair of prints named 'Beer Street' and 'Gin Lane'. The former depicts urban porter connoisseurs — cheerful, buoyant, and healthy. (The latter, as you might have guessed, portrays exhausted and insane lovers of that god-awful gin.)



William Hogarth, 'Beer Street and Gin Lane', 1751

Public Domain

## How to Taste

Sounds weird, but the first truly global beer style (e.g., porter) had eventually gone into decay and was not produced at all in the United Kingdom from the beginning of the 1950s till 1978. Stouts were luckier, as they were (and are) brewed by plenty of companies, starting with an international giant, Guinness. But you should take into account that contemporary porters and stouts are brewed using more modern technology, that of the second half of the 19th century (see the 'Age of Empires' chapter), which has nothing to do with an original 'entire-butt' porter. Several reconstructions exist, namely 'Entire Butt English Porter' by Salopian Brewery, but it's rather hard to find them. The best approximation of the early English porter is actually the brown ale of Flanders, the story of which we will tell in Section II of this book.

If we talk about modern porters, the most hailed ones are English Fuller's London Porter and Samuel Smith Taddy Porter and Scottish Harviestoun Old Engine Oil.

## The trust that went bust

The Hogarth's diptych graphically outlines the processes that were brewing in 18th-century England. Being one the most potent locomotives of the Industrial revolution and accumulation of capital, beer production was finally pushed back by more advanced technologies. The tea, coffee, soft drinks, and strong alcohol industries were blooming and had soon become competitive powers (partly because of the re-investment of capital made on brewing). Wealthy social stratum still preferred prestigious grape wine over beer; less prosperous common folk had switched to cheap gin<sup>17</sup>.

As the world population has been growing, the absolute beer industry numbers have also grown manifold since the 18th century. But the importance of brewing for the economy as well as average consumption had never reached those mind-blowing figures of early-industrial times.

## References

<sup>1</sup> Meussdoerffer, F. G. (2009), p. 22

<sup>2</sup> Steele, M. (2012), see chapter 2

<sup>3</sup> Krenzke, J. R. (2014), p. 194

<sup>4</sup> ibid, pp. 219-226

<sup>5</sup> Cornell, M. *The three-threads mystery and the birth of porter: the answer is ...*

<https://zythophile.co.uk/2015/06/05/the-three-threads-mystery-and-the-birth-of-porter-the-answer-is/>

<sup>6</sup> Krenzke, J. R. (2014), p. 228

<sup>7</sup> <https://brewingbeerthehardway.wordpress.com/2017/12/27/blown-vs-brown-malt/>

<sup>8</sup> Cornell, M. (2010), p. 55

<sup>9</sup> Cornell, M. *The forgotten story of London's porters*

<http://zythophile.co.uk/2007/11/02/the-forgotten-story-of-londons-porters/>

<sup>10</sup> Anderson, R. (2003) *Microbes and the Origins of Porter*. *Brewery History*, 113, pp. 27-30

<http://www.breweryhistory.com/journal/archive/113/bh-113-027.html>

<sup>11</sup> Cornell, M. (2010), p. 55

<sup>12</sup> Swinnen, J., Briski, D. (2017), p. 31

<sup>13</sup> Meussdoerffer, F. G. (2009), p. 24

<sup>14</sup> Hornsey, I. S. (2008), pp. 449-450

<sup>15</sup> [https://en.wikipedia.org/wiki/London\\_Beer\\_Flood](https://en.wikipedia.org/wiki/London_Beer_Flood)

<sup>16</sup> Krenzke, J. R. (2014), pp. 237, 248

<sup>17</sup> ibid, pp. 252-253

# **Chapter 11. It's All About Water**

Historical period: the 18th century CE

Scene of Action: Burton upon Trent

In the beginning of the 18th century, London was the world's brewing capital by a vast margin. Hansa hadn't recovered after the Thirty Years' War of 1618-1648; the Netherlands, which was severed by the wars of religion even stronger than the League, at the end of the 17th century had rebuilt its economics, but not the brewing industry — because of multiple reasons, from high taxes to the grape wine and strong alcohol expansion throughout Northern Europe. The growing popularity of porter strengthened London's superiority even further.

However, closer to the end of the 18th century, Londoners got an unexpected (and initially barely visible) competitor: the small town of Burton located on the banks of the Trent river, which population was mere 1800 citizens in 1710. Burton was well-known for its beer since the Middle Ages, but since it was quite far from trade routes, this popularity never exceeded its direct vicinity. The situation changed in 1712 when the Parliament extended the navigation on Trent from the port of Hull down to Burton.

The first commercial (e.g. not related to some local pub) brewery was opened in Burton by Benjamin Printon in 1708. With the trade possibilities expansion, other establishments emerged, including those by Benjamin Wilson (which later passed to Wilson's great-nephew, Samuel Allsopp), William Worthington, and William Bass<sup>1</sup>.

The opening of the river trade coincided with another important factor: the growing interest in English beer from the Baltic states, namely Poland and the Russian Empire. It is said that Peter the Great of Russia had brought from England that he visited at the end of the 17th century the love for English beer. No reliable source on the matter survived, and Peter in his

own vigorous way had, first of all, established the beer industry in Russia itself<sup>2</sup>. However, the maritime trade was growing, accelerating further towards the end of the century. Imports to Russia, the majority of which were controlled by Burton, comprised 100 thousand liters in 1750 and more than 1.5 million liters in 1775<sup>3</sup>.

Burtoners owed this expansion to water: first, the River Trent that gave access to British ports; second, the unique qualities of local water sources. Burton's water was hard and rich in calcium and magnesium sulfates. It turned out that this water suited brewing exceptionally well, stimulating the growth of yeasts and allowing for intensive hopping. Burton beer was more carbonated and much more clear than the London one (and it also got the unique 'Burton snatch' — the fleeting 'aroma' of sulfur that occurred shortly after pouring).

### It's interesting

London brewers were struggling to solve the puzzle of Burton water, and finally developed the 'burtonisation' process of enriching water with sulfates.

Yet another factor that contributed to the development of the brewing industry as a whole (and the Burton one in particular) was the spread of pale malts. England had been struggling with the wood shortage for decades and had converted to using coal quite early. One problem: coal might be used for heating wort, but not for kilning as the sulfur smell of burning coal was considered unacceptable<sup>4</sup>. As a result, malt was dried over expensive wood, even more expensive straw, or the best Wales anthracite, the supply of which was limited.

In 1603, Hugh Plat got a patent for his invention of producing coke from coal, analogous to the production of charcoal from wood. For some time, the invention remained unnoticed until the malt makers employed it in 1640s. Coke demonstrated extraordinary qualities: first, it produces no fumes; second, it burns in a much more controllable manner in terms of fire

temperature. Because of those, in controllable low-temperature conditions, brewers were able to produce malt that was not ‘smoked’<sup>5</sup>; this malt was called ‘pale’, and the resulting beer, ‘pale ale’.

Pale malt has a huge advantage over darker malts: it contains more sugars, which allows for more effective beer production (and the taste of the resulting beverage is much clearer as yeasts might break down a higher proportion of chemical compounds dissolved in wort). This fact was likely not known to brewers until the saccharometer (e.g. the sugar concentration measuring device) was invented; and if it was known, it would still make a little impact as coke initially was too expensive for commercial brewing. Pale ales were mostly produced in the households of wealthy gentry in Northern England.

Let us stress out that malt will be ‘dark’ or ‘pale’ depending on the temperature it was dried at. Technically, it’s possible to produce ‘pale’ malt in a wooden kiln (though it would still be ‘smoked’, e.g. dark in color). Making pale (and even non-smoked) malt was very much possible before the invention of coke, but required much more effort. Let’s just say that making brown malt required thrice less time<sup>6</sup>.

### It's interesting

The Netherlands started suffering from the lack of wood even earlier than England. However, instead of inventing coke, the Dutch just switched to using peat. You might imagine the taste of Dutch beer in the 16th century.

Those two factors, namely hard water and pale malt, led to the birth of the ‘Burton Ale’, which was a thick, strong, intensively hopped sweet beer. It was not literally pale: malt was additionally roasted or caramelized. Today, we would call this beer ‘amber’.

The history of Burton Ale consists of rises and falls, half a century in-between each. The period of prosperity based on the Baltic trade did not last long. In 1783, Russian authorities imposed a 300 percent tax on beer imports; then went the continental blockade of Napoleonic time and the annexation of Poland by Russia, which had closed the Polish market for English brewers. Finally, in 1822, a new Russian customs tariff was introduced that effectively banned all sorts of imports (including beer) from Britain. As a result, at the beginning of the 19th century, the Burton brewing industry deteriorated (four out of 15 breweries were closed, several others sold<sup>7</sup>) — just to make the rebirth from the ashes (story of which we will tell in the next chapter) even more spectacular.

After the sales were rerouted to other markets, Burton Ale of the middle-to-end 19th century became exquisitely pale (it's hard to tell what was the difference between 'Burton Ale', 'old ale', and 'barleywine' of that period), but in the early 20th century the pendulum swung in the opposite direction: the public adored dark caramel beers once again, and Burton Ale (in its original dark sweet form) gained its popularity anew. It was so popular that in the British Air Force there was a euphemism for those who had not returned from the mission — 'gone for Burton'<sup>8</sup>.

The 1960s proved to be disastrous for Burton Ale: it disappeared almost overnight.

## How to taste

The only Burton Ale that survived the 20th century is 'Winter Warmer' by Young. Other renowned examples of the style are '1845' by Fuller's and Ballantine Burton Ale, production of which was restored based on the surviving recipes, and also Marston's Owd Rodger and Theakston's Old Peculier. And of course, there are craft versions.

## References

<sup>1</sup> Webster, I. (2018), pp. 7-9, 19

<sup>2</sup> Дурлов, И.Г. (2014)

<sup>3</sup> Webster, I. (2018), pp. 9-10

<sup>4</sup> <https://www.beeretseq.com/where-theres-smoke-theres-pale-ale/>

<sup>5</sup> Cornell, M. Burton: NOT the first place in the world to brew pale beers

<https://zythophile.co.uk/2009/11/26/burton-not-the-first-place-in-the-world-to-brew-pale-beers/>

<sup>6</sup> Pattinson, R. *Mid-18th Century Malting*

<http://barclayperkins.blogspot.com/2009/09/mid-18th-century-malting.html>

<sup>7</sup> Webster, I. (2018), p. 29

<sup>8</sup> Cornell, M. (2010), p. 43

## Chapter 12. The Red Triangle

Historical period: the 19th century CE

Scene of action: Burton upon Trent

While the beer trade in the Baltics was stagnating, another prospective market was growing at a faster pace: 'The Jewel in the Crown', e.g. India. First beer shipments to Madras and other colonies were already mentioned at the beginning of the 18th century. Closer to the end of the century, however, all the trade was monopolized by a single London brewer named Hodgson. The brewery he owned, called 'Bow Brewery', which was not even on the London top-ten beer producers list, was quite fortunately located next to East India Trading Company headquarters. Hodgson pulled some strings, offered Company's captains an 18-months credit line — and became an exclusive beer supplier for India<sup>1</sup>. The trade volumes grew fivefold from 1775 to 1800 — from 240 thousand liters to 1.3 million.

Meanwhile, Burton brewing industry at the beginning of the 19th century was stagnating. Just one brewery was opened from 1803 to 1827<sup>2</sup>. However, in 1821, the wind of change reversed its direction, to Burtoners' greater glory. The East India Company got tired of Hodgson and his dubious practices of doing business and brewing beer alike — and approached Burton's leading brewer, Samuel Allsopp, offering the possibility to start Indian trade. Soon, another two Burton brewers joined Allsopp, namely Bass and Salt. Hodgson tried to counter-attack but his ale was of no quality to compete, and soon the market fell into Burtoners' hands almost entirely<sup>3</sup>. In 1830, William Worthington also entered the market.

Initially, in the 18th century, the most common types of beer were shipped to India: pale ale, porter, Burton ale, and even 'table beer'. Hodson was a porter producer (and porter was actually a standard drink for soldiers and petty officers, and was supplied in great quantities to military garrisons, including those based in India<sup>4</sup>). However, dark beers were considered to be too heavy for a tropical climate while low-alcohol and slightly-hopped

beers frequently were not surviving the long voyage. So Hodgson was shipping first of all his strongly hopped pale ale, and it was this beer that was brewed by Allsopp (according to the legend, in a teapot) when the Chairman Marjoribanks of the East India Company asked him to replicate the best Hodgson's recipe. Let us remind you about the qualities of Burton water that allowed for even more pale and sparkling pale ales.

### It's interesting

Marjoribanks approached not London porter brewers but Allsopp because Burtoners had got the expertise in long-distance ale shipping. As for Burton pale ales being so good, that's a bit of pure luck for us.

During the first five decades, nobody bothered to invent a designation for this product. Up until the end of the 1830s, there was *no specific name* for India-oriented beers, it was just 'beer'<sup>5</sup>. However, this style was slowly gaining such descriptions as 'pale ale prepared for East and West India climate', 'pale ale brewed for Indian market', and so on, to denote its export qualities. Starting from the 1850s, instead of these bulky constructs, the phrase 'India Pale Ale' prevailed. It looks like it was directly related to the extending railroad network to Burton in 1839. Bass and Allsopp shifted their focus to domestic sales and started to advertise their product extensively. Hodgson was not lagging behind as well: in 1844, his IPA was marketed as 'having an excellent reputation in India for more than a century' (sic). Shortly after, the IPA sales within Britain excessed Indian exports and IPA gradually became a beer for domestic consumption, a status drink for middle and upper classes<sup>6</sup>.

### Beer Myth

There is a beautiful legend, voiced in 1869 by Walter Molyneaux, a contemporary of the events, about a ship that wrecked near the British coast with its cargo of IPA later sold in Liverpool by the insurers; it is told that the commoners got a taste for the ale, and started seeking to

buy it in large quantities. Though the part about the shipwreck turned out to be true (though Molino was mistaken about the dates), the connection of the IPA popularity growth to the event is rather doubtful<sup>7</sup>.

The most prominent Burton brewer, William Bass, had created the first truly global beer brand. In 1887, at the peak of its fame, the Bass Brewery produced 150 million liters of beer in a year.



Édouard Manet. A Bar at the Folies-Bergère, 1882  
Public Domain

You might judge how popular Bass Pale Ale was by the fact it was depicted by several leading painters of the time, most notably in 'A Bar at the Folies-Bergère' by Édouard Manet. In this picture, there are two easily noticeable bottles with the red triangle; this is the famous logo of the Bass Brewery. Also, it's the first registered trademark in Britain: it is said that William Bass had sent a clerk overnight to be the first on the queue the day the bureau opened, as Bass' company was suffering from treacherous competitors selling low-quality beer stamped with the red triangle<sup>8</sup>.

## The bitter confusion

Let us note that no difference between ‘India Pale Ale’ and just ‘Pale Ale’ existed up until the second half of the 19th century. In particular, Bass Pale Ale was the canonical IPA that actually gave the style its fame. Many beer producers, noticing the growing popularity of ‘Ale for India’, were rebranding their most expensive pale stock ales as ‘IPA’<sup>9</sup>. Beer marked as ‘Pale Ale’ even in the second half of the century still had an impressive bitterness of 60-80 IBU<sup>10</sup> (see below).

All those (I)PAs were stock ales meaning they were aged for 4-12 months or even more and secondary fermented with the *Brettanomyces*. However, with the growing popularity of the style and further technical progress, British brewers started to produce ‘mild’ (e.g. unaged) versions by adding invert sugar (also, corn flakes and other additives) to wort and additionally refining it. This ale was denoted with the abbreviation ‘AK’ (sometimes, ‘KK’) and was sold in casks as fresh as possible<sup>11</sup> — in fact, it’s exactly the thing that we now call a ‘real ale’ (see the ‘Revitalisation’ chapter).

### It's interesting

Martin Cornell suggests that the letters ‘AK’ might mean ‘Ankel Koyt’ ('single koyt'), therefore being an artifact of that epoch when the Dutch expats were brewing hopped beer in Britain<sup>12</sup> (see the ‘Word on Hops’ and ‘Barrels and Bretts’ chapters).

Consumers, however, had adopted neither of the terms: pub patrons called these beers just ‘bitters’. As a result, four different designations of the same style emerged:

- India pale ale (British style);
- pale ale (British style);
- bitter;
- extra-strong bitter, or ESB.

Most classifications are currently identifying them as four different beer styles, though, in fact, they are just subtypes of the 'AK' beer, slightly varying in bitterness and alcohol content.

## How to taste

Finding an 'AK' is not a problem, as it's just a classical British ale. Out of breweries that had made it through the 20th century we might note American Ballantine India Pale Ale and British Worthington's White Shield (the latter still brewed in Burton). In general, British bitters got quite a characteristic taste and are now produced in numbers by fine breweries — let us mention Fuller's, Adnams, Thornbridge, Greene King, Samuel Smith, Harviestoun, Marston's.

Tasting a 'real' IPA, the one that Hodgson and Allsopp shipped to India, is unfortunately not possible. To begin with, we have no idea what they were actually shipping. Out of four original East India Company suppliers (namely, Hodgson, Allsopp, Bass, and Salt), none have survived. The Bass trademark was bought by AB InBev, and the Bass Pale Ale continues to be produced (under the pretentious 'Bass Trademark No. 1 Ale' name) with the red triangle being redesigned beyond any recognition; however, it has nothing to do with the original Bass, and, furthermore, the beer itself is quite mediocre.

Craft brewers make some aged intensively hopped stock ales that should be very much like the real IPAs. That's for example, Brett IPA by Allagash and Enjoy After Brett IPA by Stone.

## Bitterness Units

Bitterness of beer might be measured. There are two main scales: international (IBU, International Bitterness Units) and European (EBU, European Bitterness Units). Beer with less than 30 IBUs is usually considered not bitter at all (though an English man of the 15th century

wouldn't agree with that). Beer with 60 or more IBUs is definitely bitter, and many people will not like it (pale ale at this level of bitterness should be called an IPA). In the 30 to 60 range, every producer is free to decide whether to mark the beer as a pale ale, a bitter, or maybe an IPA as well.

Thicker and stronger beers conceal bitterness. Imperial stouts (see the next chapter) might easily have IBU 100, but it's hard to tell they did. Reaching more than IBU 100 is possible but makes no sense as humans can't sense it.

European bitterness scale theoretically should coincide with the international one. However, because of some technicalities, it's usually slightly lower.

## References

<sup>1</sup> Cornell, M. (2010), p. 101

<sup>2</sup> Webster, I. (2018), p. 27

<sup>3</sup> Cornell, M. (2010), p. 107

<sup>4</sup> Cornell, M. *More IPA myths that must die on #IPADay*

<https://zythophile.co.uk/2012/08/02/more-ipa-myths-that-must-die-on-ipaday/>

<sup>5</sup> Steele, M. (2012), see chapter 3

<sup>6</sup> Cornell, M. (2010), p. 115

<sup>7</sup> Cornell, M. *The IPA shipwreck and the Night of the Big Wind*

<https://zythophile.co.uk/2015/10/12/the-ipa-shipwreck-and-the-night-of-the-big-wind/>

<sup>8</sup> Cornell, M. *The Bass red triangle: things AB-InBev won't tell you*

<https://zythophile.co.uk/2013/06/28/the-bass-red-triangle-things-ab-inbev-wont-tell-you/>

<sup>9</sup> Cornell, M. (2010), p. 114

<sup>10</sup> Pattinson, R. *Defining Pale Ale*

<http://barclayperkins.blogspot.com/2021/09/defining-pale-ale.html>

<sup>11</sup> Pattinson, R. *What was AK*

<http://barclayperkins.blogspot.com/2021/06/what-was-ak.html>

<sup>12</sup> Cornell, M. (2010), p. 17

# Chapter 13. The Age of Empires

Historical period: the 19th century CE

Scene of action: London, Burton upon Trent, Saint Petersburg

The Russian customs tariff of 1822 that finally buried the Burton trade in the Baltics (see the ‘It’s all about Water’ chapter), contained one important exception: porter. Probably, because it was not produced in the Russian Empire itself but the demand was strong. Hence, the Burtoners lost the market for their ale — and the Londoners found the market for their porter. In 1815, Saint Petersburg imported 150 thousand liters of porter; in 1840 only British traders shipped 300 thousand liters in barrels and additionally more than 35 thousand bottles. The illustrative story from that time: in 1865, Russian officers invited their British best friends to a dinner to celebrate the end of the Crimean War. One of the attending English officers later told the story of how startled he was by the fact that the A. Le Coq porter was served as British officers themselves hadn’t had any porter in Crimea<sup>1</sup>!

As a result of this London-Burton reshuffling, the ‘Russian Imperial Stout’ was born. London beer makers, trying to reproduce the thick and strong Burton ale that Russian customers were so fond of, started to brew analogous porters. (Let us remind you that the word ‘stout’ initially denoted strong varieties of any beer, but later became associated with porters exclusively.)

## Beer Myth

It is sometimes said that Russian imperial stouts were made so thick and strong because regular stouts were frozen on their way to Saint Petersburg. This statement has nothing to do with not just history, but school physics as well: if the sea that the ship was traversing was not

frozen, then the beer barrels in the bilges wouldn't freeze either.

The word ‘Imperial’ in the ‘Russian Imperial Stout’ is not related to the Russian imperial court as one might think. It was a convenient name for ‘premium’ (which implies ‘strong’) beers in general (and it’s actually being used in this sense nowadays — this time, for a change, correctly from the historical point of view). As for the word ‘Russian’, it first popped up only at the end of the 19th century — in advertisements, of course<sup>2</sup>. (Before that, it would be rather not comme il faut to name something ‘Russian’, as the London-Moscow relations remained tense.)

### It's interesting

As a peculiar result of ceasing British trade with Russia, a local porter production emerged in Polish territories. This style is called ‘Baltic porter’ today and constitutes a strong dark lager. However, in the 19th century, Polish brewers had originally reconstructed the real British porter and had later changed the technology in a favor of cold fermentation under the German influence<sup>3</sup>.

In the 19th century, porter wasn't cheap murky booze as it was a century before. The spread of pale malt (many thanks to Burtoners), which allowed for more effective usage of raw materials, had affected porter production as well, as its cost efficiency was its main advantage. First, the porter grain bill changed to two parts of brown malt plus three parts of pale malt. Later, in 1817, Daniel Wheeler patented a revolutionary method of roasting malt at 400 degrees Fahrenheit that allowed for porters to be brewed from pale malt only — one part roasted, seven parts regular<sup>4</sup>.

### It's interesting

Contemporary brewers are now employing this technique universally. Almost all varieties of dark beer are made from pale malt, which is additionally roasted or caramelized if needed.

The Burtoners had also had to change the recipes as Burton Ale was much less popular in the country in the middle 19th century than abroad a century before. The Englishmen considered it too heavy; these thick ales and porters gained a reputation as beverages for high latitudes. (In 1852, Burton brewers prepared a special ‘Arctic Ale’ for Sir Edward Belcher’s polar expedition — extremely strong dark beer that demonstrated exceptional resilience: according to Belcher himself, it had not frozen even at -50 Celcius. Arctic ale had been being brewed for polar expeditions for the next one hundred years<sup>5</sup>!)

## How to Taste

Russian Imperial Stout (sometimes abbreviated as ‘RIS’) is nowadays one of the most popular styles of beer, solidly occupying the list-tops of many rankings. However, you should take into account the fact that the British tradition of brewing RIS had died in the 1980s, and was restored by American craft brewers (Goose Island, Stone, Bell’s, Founders, Cigar City, Oskar Blues, etc.) later. Some craft brewers are producing Arctic Ale as well, most notably, Harpoon Brewery.

## References

<sup>1</sup> Cornell, M. (2017) *Albert Le Coq and the Russian Stout trade*. *Brewery History*, 172, p. 3

<http://www.breweryhistory.com/journal/archive/172/LeCoq.pdf>

<sup>2</sup> Cornell, M. *Imperial Stout — Russian or Irish?*

<https://zythophile.co.uk/2011/06/26/imperial-stout-russian-or-irish/>

<sup>3</sup> Cornell, M.

<https://zythophile.co.uk/2021/01/16/its-baltic-porter-day-a-good-excuse-for-punching-a-few-baltic-porter-myths-in-the-face/>

<sup>4</sup> Cornell, M. (2010), p. 64

<sup>5</sup> ibid, p. 160

# Chapter 14. A Series of Unfortunate Events

Historical period: 1842 — ?

Scene of Action: Plzeň

Middle-19th century was a triumph of brewing as an engineering discipline. Equipped with precise measuring devices (thermometer, hydrometer, and areometer) and the newest microbiological discoveries (in 1837, Theodor Schwann proved that yeasts were living organisms), engineers-brewers made brewing a precise science.

One of the vivid examples of such transformations happened in the town of Plzeň, Bohemia (then a part of the Habsburg Empire). Local burghers, the owners of the brewing rights (given to them by no one else than king Václav II himself in 1295), utterly disappointed by the quality of the Plzeň beer, had dumped 36 barrels of sour beverage into sewers and decided to build a new state-of-the-art brewery. To do so, they invited a master named Josef Groll from nearby Bavaria, bought lager yeasts, from the Bavarians as well, and built the English-style kiln<sup>1</sup>.

## Beer Myth

According to some legend, the lager yeasts were smuggled by a runaway Bavarian monk; that couldn't be true simply because Bavarian monastic breweries were secularized by Napoleon. Burghers of Plzeň had absolutely officially bought the yeasts from Bavaria<sup>2</sup>.

The first beer batch was presented on November 11, 1842, and it was nothing like local ales or Bavarian lagers. Groll took the best Moravian barley, dried the malt at extremely low temperatures, and got light and crystal-clear beer — which anybody might have attested after pouring it into a goblet of Bohemian glass.

The taste of this new beer was quite unusual as well: light and clear, like the beverage itself. Also, Groll used rather bitter hops (initially, it was some less known local crops, but some time later Saaz AKA Žatec became a conventional hop for the beer). As a result, a new golden standard of beer was born: Pilsner (from ‘Pilsen’, a German name for Plzeň).

Surprisingly, the burghers of Plzeň were initially not eager to export this beer<sup>3</sup>, but it soon became not needed: all nearby brewers started to make their own pilsner.

Still, the technical issues impeded the pilsner triumph: to make lagers a huge amount of ice was still needed. However, scientists helped with this problem as well:

- in 1824, ‘the father of thermodynamics’ Sadi Carnot enunciated his heat engines theory (the so-called ‘Carnot cycle’);
- in 1834, Jacob Perkins got the first patent on refrigeration systems;
- in 1856, James Harrison built the first ice-making machine;
- finally, in 1862, Ferdinand Carré exhibited the ice machine based on the Harrison invention that used ammonia as a refrigerating agent — and from this point on cooling systems became commercially viable.

The effect of inventing refrigerators on brewing industry was overwhelming. In 1860, 32% of breweries in Bohemia were making lager; in 1870, it was 98%<sup>4</sup>, and in 1884 the last brewery that was still resisting progress and making warm-fermented beer was closed<sup>5</sup>. After Bohemia, pilsner conquered the rest of Austro-Hungary (with refrigerator vans invented, the morning ‘beer train’ from Plzeň to Vienna was launched<sup>6</sup>), then Germany, Netherlands, France, USA, and the entire world. So-called ‘eurolager’ is the most popular beer style to this day.

## How to taste

The original pilsner is still being made: in 1898, the Plzeň breweries union had officially registered the ‘genuine Plzeň’ trademark — Plzeňský Prazdroj in Czech, Pilsner Urquell in German — and continues to make lager beer under this brand nowadays.



‘Regards from Plzeň’ postcard, 1896  
Public Domain

In general, trying pilsner is one of the easiest things in the world. Just ask for a light beer in any bar or liquor store.

## Tread of triumphants

It's rather hard to tell why pilsner became a dominating beer style. Several factors converged:

- the aura of the most fashionable and technologically advanced beer;
- unusually light and clear appearance and taste;
- the predictability of manufacturing: with refrigerators in hand, brewers no longer needed years of trial and error to brew quality beer;

- the advance of moderation societies in Europe and the US;
- world wars and alcohol prohibitions in the first half of the 20th century that disrupted the traditional brewing business.

The light lager offensive was uneven: Central Europe gave up almost instantly, while in the 1960s England lager was still below radars<sup>7</sup>. Nevertheless, the lager domination became absolutely total at the end of the 20th century. Many countries were not producing beer of any other style at all. The entire generation of people had been raised, who think beer might be either light, dark, or unfiltered — e.g. a light, dark, or unfiltered *lager*.

### It's interesting

The prolonged British resistance against lager by coincidence killed the business of Allsopp — *that* Samuel Allsopp who brewed the first Burton IPA: in 1897, his heir, Samuel Allsopp Jr., had invested into lager production that turned out to be a fiasco and led to the ‘Samuel Allsopp & Sons’ eventual bankruptcy in 1911<sup>8</sup>.

Under lager pressure, many other beer styles were forced to the lowest common denominator — light, thin, 4.5% ABV potion. The classical example is the Braunschweig *mumme* evolution, which we mentioned in the ‘Bog Myrtle’ chapter.

The 60s-80s of 20th century were probably the worst time for a beer lover, as it was virtually impossible to get anything but lager anywhere on the Earth, except for Britain where stouts and bitters were strong, Germany with its *Weissbier*, and little Belgium, to which the next section of this book is dedicated.

## The hops geography

Until the 19th century, brewers didn't care about hop varieties. The main factor was a geographical one: beer producers were buying hops that were grown in specific regions. We might outline the three most important ones:

- Hallertau — the area in Bavaria where the hops were already being cultivated as early as in the 8th century CE; the Hallertau hops were a default choice for German lagers and many Belgian beers as well;
- Saaz (AKA Žatec) — the Bohemian region, hops from which are known since the 15th century CE and were included in the canonical pilsner recipe<sup>9</sup>;
- Kent — the county in England, where the hops were grown from the 15th century as well.

Two main Kent hops varieties became known in the 19th century as 'Golding' and 'Fuggle'. To make life a bit more uneasy, Fuggle was considered a variant of Golding and was often marked as 'Fuggle's Golding', so many of its derivatives do not contain the word 'Fuggle' at all — famous Slovenian 'Styrian Golding', for instance.

Fuggle and Golding were the progenitors of many contemporary hops varieties used by craft brewers. Both designations derived from surnames (most likely, of farmers that once were growing them); however, as it often happens with the beer industry, nobody bothered to write down anything on the matter, so we basically know almost nothing about who Mr. Golding and Mr. Fuggle actually were, except that they lived in the 18th-19th century England<sup>10</sup>.

### It's interesting

At the beginning of the 20th century, Belgium was a major hop supplier, with Aalst, Asse, and Poperinge being the main production regions. During the following 100 years, the crop area diminished 10 times, and Belgian hops were superseded by the German ones<sup>11</sup>.

## References

<sup>1</sup> Swinnen, J., Briski, D. (2017), p. 38

<sup>2</sup> Rail, E. *On the Founding of Pilsner Urquell, Part III*

<http://www.beerculture.org/2012/09/19/on-the-founding-of-pilsner-urquell-mistakes/>

<sup>3</sup> Rail, E. *On the Founding of Pilsner Urquell, Part II*

<http://www.beerculture.org/2012/08/29/pilsner-urquell-founding-document-of-1839/>

<sup>4</sup> <https://en.wikipedia.org/wiki/Lager>

<sup>5</sup> <https://czechbeeralliance.co.uk/bohemian-brewing-history>

<sup>6</sup> <https://www.prazdroj.cz/en/our-story/history>

<sup>7</sup> Pattinson, R. *Why do beer styles disappear?*

<http://barclayperkins.blogspot.com/2008/05/why-to-beer-styles-disappear.html>

<sup>8</sup> [https://en.wikipedia.org/wiki/Samuel\\_Allsopp\\_%26\\_Sons](https://en.wikipedia.org/wiki/Samuel_Allsopp_%26_Sons)

<sup>9</sup> [https://en.wikipedia.org/wiki/Saaz\\_hops](https://en.wikipedia.org/wiki/Saaz_hops)

<sup>10</sup> Cornell, M. (2016) *Finding Mr. Fuggle: The Largely Mysterious History of England's Two Greatest Hop Varieties*

<https://www.beeradvocate.com/articles/13523/finding-mr-fuggle-the-largely-mysterious-history-of-englands-two-greatest-hop-varieties/>

<sup>11</sup> Mulder, R. *The Lost Hop Varieties of Belgium*

<https://lostbeers.com/the-lost-hop-varieties-of-belgium/>

## PART II. THE GLOBE OF BELGIUM

### Chapter 15. Orange Zest, Coriander, and the Hoegaarden Milkman

Belgium is a small country with a huge beer tradition that spans many centuries in the past. Let's take, for example, the Belgian white beer — *witbier* or *bière blanche*. The history of this wonderful beer style begins in the XV century! Belgium was a part of the Netherlands then, which was a colonial empire that imported lots of exotic goods from overseas territories, including spices.

All beer was sour those days, and in order to get rid of this sourness, Belgian monastic brewers from the village of Hoegaarden started experimenting with these spices, particularly, coriander and famous oranges from the island of Curaçao. That's how the famous *witbier* recipe of 1445 was born, and closer to the 18th century Hoegaarden became one vast brewery.

Despite *witbier* production stopped in the middle-20th century (in 1957, the last remaining manufacturer — the Tomsin brewery — was closed), the villagers did not allow the recipe to vanish: a local milkman, Pierre Celis, restored the tradition in 1965<sup>1</sup>.

#### How to try

Of course, the beer lover's choice No. 1 is Hoegaarden itself. Apart from this, many other breweries (first of all, Belgian and American ones) produce *witbier*: St. Bernardus Wit, Allagash White, Blue Moon Belgian White, Blanche De Bruxelles, Kronenbourg 1664 Blanc, Blanche De Namur.

#### The *witbier* myth

We hope that a reader exclaimed ‘what a nonsense!’ at least 10 times while reading the previous two paragraphs.

Let's start with the fact the state of the Netherlands that could have controlled Belgium did not exist in 1445, nor couldn't it have New World colonies, as the Columbian expeditions happened half a century later. Furthermore, the Netherlands got colonies exactly because it had parted ways with Belgium in 1588 — or rather with the Habsburg empire that continued ruling Belgium until 1790. Oranges could not be known in Belgium earlier than in the 16th century as only Moors were growing citruses in those times.

Coriander, on the contrary, could easily be an ingredient in Belgian beer as it wasn't an exotic spice at all. It had been being cultivated in Europe since at least the second millennium BCE and was a part of *gruit*. Then why hops in the recipe, though?

Dutch beer of the 14th-16th centuries was at least half oats, which were then the main cereal. And it must have been dark, in the best case, amber, but definitely not pale. But there are neither oats nor dark malt in *witbier* — at least, in the ‘classical’ Hoegaarden one.

As for the sour taste, the late Medieval brewers were quite able to fight it without the use of coriander, as both chronicles and reconstructions demonstrate<sup>2</sup>, and orange zest could only increase acidity.

Finally, what monks-experimenters we're talking about? Monasteries were obliged to be self-sustainable — implying growing oranges locally, which looks quite unrealistic in Belgian climate — to say nothing about cities and guilds, not monks, being the main drivers of innovation in brewing in the 15th-century Netherlands.

The answer to all these questions is quite simple: though Pierre Celis actually got a recipe of authentic Hoegaarden beer from Loius Tomsin himself, the newly made *witbier* had nothing to do with it: the Tomsin recipe (and the earlier ones as well) contains no oranges or coriander, but does

contain oats (though let's be honest, Celis' Hoegaarden did include a small proportion of oats until 80s)<sup>3</sup>.

In 1985, Celis sold the Hoegaarden brand to the Artois company (now AB InBev) and moved to the US, where he opened a new brewery borrowing his name — the Celis Brewery. American consumers got a taste for *witbier*, and soon other brewers start to make it — above-mentioned Allagash, also Ommegang, Samuel Adams, Bell's, Canadian Unibroue, and even the mainstream giant, MillerCoors (under the Blue Moon brand).

We are certainly not trying to diminish Celis' achievements. He did a great job for the beer Renaissance of the late 20th century. His *witbier* is an elegant and balanced beer style. Still, it has nothing to do with the previous generation of Hoegaarden beers. As for the tale about monks adding orange zest to pale beer in 1445, it was probably just invented out of thin air.

## How to try real Hoegaarden

No way, unfortunately. Several authentic recipes of 'Belgian white beer' survived (not from the 15th century, certainly, but from the 19th). The variant described by George Lacambre in 1851 comprised wind-dried pale barley malt and unmalted wheat and oats<sup>4</sup>. Hoegaarden recipes also prescribed inoculating the wort with airborne yeasts (which means 'bretts' and sour taste). Gravity and attenuation of this beer should have been quite modest, giving maybe 2.5% ABV. And, of course, the shelf life of this beer was several days, maybe two weeks at the most. No surprise that nothing like that is being manufactured nowadays<sup>5</sup>. So your best option is to enjoy Pierre Celis' variant.

## Through the ages

If 'Hoegaarden' is not an authentic Belgian beer, then which one is? Which beer was not invented in the 20th century?

- Pilsners first occurred in Belgium at the very end of the 19th century and gained their market share in the interwar period<sup>6</sup> — a striking contrast to the nearby Netherlands where almost nothing except lager was brewed, not to mention Czechia where the pilsner revolution had ended two decades earlier.
- The main Belgian specialty — strong pale ale — was first brewed in the 1960s. Before that, all strong commercial beers were English-style barleywines.
- The famous monastery (aka Trappist) beers were first produced in the interwar period. Of course, many Belgian monasteries had been brewing beer for centuries; however, if we take specific beer recipes, their history will turn out to be much shorter, barely more than a century. (The oldest one is probably Westvleteren 8, which was first mentioned in the WWI times.)
- What is now called ‘abbey beer’ (in fact, commercial versions of monastery beers) started as an imitation of the Trappist beers, and therefore is even younger than them.

Almost every kind of beer that now makes Belgium famous was invented in the 1960s or the interwar period, except for a few cases that we will describe in the next chapters. Furthermore, Belgian beer exports became noticeable even later than that, in the 1990s<sup>7</sup>.

It might look like we're pushing the readers to a conclusion that Belgian beer culture is but a marketing decoy, but that's not true at all. If we take a look at the nearby Netherlands, we will learn that *not a single historical beer style* has survived 1960. Only German and Czech-style lager makers can boast about more than a century-long history<sup>8</sup>.

The 1990s success of the Belgian beer had happened only because at this point Belgium was the only country that, first, preserved its originality and, second, possessed not only the tradition but also a zeal to maintain and develop it. Unfortunately, all these processes were accompanied by active myth-making or sometimes sheer marketing lies. As a result, we now

have a paradox: Belgium with its beer diversity had become a Mecca for beer lovers, but it's almost impossible to find any genuine information regarding those beers and their history, even if we talk about the recent past.

## The real story of brewing in Belgium

The question of why it was Belgium (and not, let's say, the Netherlands) that preserved and improved traditional brewing is definitely awaiting its researcher-champion. What we can say confidently is that it must be the history of Belgium that holds the keys to solving this riddle.

Meanwhile, narrating the history of Belgium until it gained independence in 1830 is an unrewarding business. One is risking drowning in the multitude of names and dates. Let us state the following: during the preceding ten centuries, Belgium was a territory of conflict between close and not-so-close neighbors, from the dukes of Burgundy to the emperors of Austria. Probably, this constant struggle resulted in a certain Belgian stubbornness and rejection of alien traditions.

Another important factor was that Belgium finally gained independence being the most underdeveloped region of Western Europe. 19th-century Belgium was an eclectic patchwork of rapidly industrialized regions coexisting with the primitive rural agricultural sector (which included brewing). For example, the above-mentioned 'white' (e.g., wind-dried) malt for white beer was made by spreading a thin layer of grain on the rooftops of barns; a method, hardly suitable for large-scale production (because of the necessity to build a myriad of such rooftops, pest control issues, the dependency on weather, etc.) and thus it was almost not used outside of Belgium<sup>9</sup>.

Of course, the nuances of taxation played their role as well. Belgian brewers paid their levies based on the mash tun sizes<sup>10</sup>; also, not only beer production was taxed, but beer transportation as well. Both factors naturally favored small artisanal producers. Opening modern pilsner

breweries was a disadvantageous business in 19th-century Belgium as they were high-tech installations that generated a profit at a large production scale only. As a result, not only the number of independent breweries was stable (unlike England, Czechia, Germany, or the Netherlands — universally everywhere as beer production became monopolized by large companies), but it was even growing: in 1900, Belgium counted 3223 breweries, 15 thousand beer varieties, 185 thousand pubs (one for every 32 citizens) — and drank close to 200 liters of beer per person per year<sup>11</sup>!

## It's interesting

As brewing was a major source of income for Belgian cities, town (or village) mayors were often brewers, and their election rivals, competing brewers<sup>12</sup>.

## References

<sup>1</sup> <http://web.archive.org/web/2021110232136/https://hoegaarden.com/the-history/>

<sup>2</sup> [Garshol, L. M. Was all beer sour before Pasteur?](https://www.garshol.priv.no/blog/306.html)

<https://www.garshol.priv.no/blog/306.html>

<sup>3</sup> [Mulder, R. When Hoegaarden was still spontaneously fermented](https://lostbeers.com/when-hoegaarden-was-still-spontaneously-fermented/)

<https://lostbeers.com/when-hoegaarden-was-still-spontaneously-fermented/>

<sup>4</sup> [Lacambre, G. \(1851\), pp. 372-374](#)

<sup>5</sup> [Mulder, R. When Hoegaarden was still spontaneously fermented](https://lostbeers.com/when-hoegaarden-was-still-spontaneously-fermented/)

<https://lostbeers.com/when-hoegaarden-was-still-spontaneously-fermented/>

<sup>6</sup> [Hallen, van der P. \(2007\), p. 14](#)

<sup>7</sup> [Mulder, R. What is Belgium's oldest beer?](https://lostbeers.com/what-is-belgiums-oldest-beer/)

<https://lostbeers.com/what-is-belgiums-oldest-beer/>

<sup>8</sup> [Mulder, R. What is Holland's oldest beer?](https://lostbeers.com/what-is-hollands-oldest-beer/)

<https://lostbeers.com/what-is-hollands-oldest-beer/>

<sup>9</sup> Briggs, D.E. (1998) *Malts and Malting*. ISBN 0412298007, p. 440

<https://books.google.ru/books?id=s9tf7oWk3bYC>

<sup>10</sup> Pattinson, R. *A British brewer describes Belgian beers in the 1880s (part four)*

[https://barclayperkins.blogspot.com/2020/01/a-british-brewer-describes-belgian\\_31.html](https://barclayperkins.blogspot.com/2020/01/a-british-brewer-describes-belgian_31.html)

<sup>11</sup> Poelmans, E., Taylor, J.E. (2009), pp. 21-22

<sup>12</sup> ibid, p. 23

## Chapter 16. White, Yellow, Brown

And still: what did 19th-century Belgians drink exactly? Certainly, it's very hard to categorize 15 thousand beers, but we may try to highlight some trends and summarize common knowledge. From the parliamentary documents from that time (which were, of course, discussing taxation nuances), we might compile the following table with the prices for the most common beer types<sup>1</sup>:

Beer style	Price, centimes per glass
Bavière	18,00 / 18,57
White (of Leuven)	8,83 / 9,50
Brown	10,34 / 10,72
Brown (of Diest)	9,00
Faro	12,00 / 12,00
Hoegaarden	8,50 / 9,00
Yellow	7,53 / 7,51
Lambic	15,67 / 16,00
Mars	7,50 / 9,00
Peeterman	10,00 / 10,00
Uitzet	10,40 / 11,50

The first number stands for a price of a mug of beer in regions where no local taxes on beer imports ('octrois') existed, while the second is for regions where there were some.

'Bavière' means 'Bavaria' in French, e.g. German lagers. As you can see, it was a very expensive beer and common folk couldn't afford it.

Other beers might be rather unappetizingly split into three large categories:

- 'white' beers (e.g. brewed from wind-dried malt and unmalted wheat) that we described in the previous chapter; two main 'white' varieties were Leuven and Hoegaarden ones, with Peeterman being closely related to them;
- 'yellow' beers (e.g. a bit darker than 'white', usually with a large proportion of wheat in the grist); the most widespread (and cheap) category of beer, plainly speaking, just regular pale beers (Belgium was one of the most prominent coal suppliers in Europe those times, so making pale malts was not a problem) brewed by small local manufacturers; Faro, Lambic, and Mars were considered 'yellow' as well;
- 'brown' (e.g. dark) beers, being represented here as simply 'brown' and two of its local varieties: one from Ghent ('uitzet') and one from Diest.

## The Full Treatise

In 1851, Georges Lacambre, a French engineer and a Belgian brewer, issued a rather large (more than 500 pages) book named 'Full Treatise on Brewing Beer and Distillation of Grains', which we might without any doubt call the study book for any Belgian brewing tradition researcher. Among many other things, it features detailed recipes of Belgian beers of that period.

It's not that easy to get the text (it exists in a scanned form<sup>2</sup>, but the French text is not digitized), but the book totally worth it as it provides full and complete articles on brewing techniques, and also wondrous descriptions of bizarre Belgian eclectics.

Lacambre (who, let us remind you, was a French engineer, and, furthermore, an apt adopter of German and English technological advancements) describes several important features of Belgian brewing:

- a huge amount of different regional beer styles and their varieties;
- extensive use of wheat (he estimated that three-quarters of Belgian beer industry output was brewed with wheat) and other cereals:
  - beer from 100% barley was rather a novelty; for example, in the chapter dedicated to Leuven, Lacambre points out (with a certain degree of boasting) that the only Leuven brewery capable of producing beer from pure barley was Lacambre's own installation built 'several years ago', and other brewers don't possess technical means of doing so;
  - disregard the fact that the author clearly considers all-barley beer being more technologically advanced, he still admits that wheat beer sometimes has 'more palatable taste than the barley one, especially served fresh or young' and that it even 'reaches the subtlety of wine';
- Belgian artisanal brewing is quite rational but rather unproductive.

## It's interesting

According to Lacambre, many Belgian beers, including, let's say, Lambic and white of Leuven, had been degraded more than 30 years before the book was written, and in the Lacambre times (the book was issued in 1851) they were already brewed negligently. The final section of the book is dedicated mainly to criticizing Belgian laws that led to the deterioration of the industry \\_(`)\_/.

## How to taste

Out of all these beers, three kinds survived the 20th century (furthermore, being almost intact): lambics ('Faro' and 'Lambic' itself), saisons (a subtype of 'Mars'), and Flemish brown. We will dedicate a separate chapter to each of them.

All other thousands of beer styles were lost, alas, to no surprise: the process of making any traditional Belgian beer involved several dozens of manual artisanal procedures: germinate the malt to three quarters, dry until it gets amber color, get rid of rootlets, leave it in the open air for three-four days to absorb some moist, lay a 2-3 inch layer of wheat husks on the floor of the mashing tun, strain the wort through the false bottom, and so on, and on, and on. Of course, only the geek-reenactors are following those instructions nowadays — and, fortunately, in the 21st century, we've got some! News regarding re-creating some historical beers comes not every day of course, but still quite regularly. We know about five reconstructions claiming to reproduce old recipes more or less precisely.

1. Peeterman, a thicker and darker ‘honey’ variety of Leuven ‘white’ (‘Peeterman’, meaning ‘men of Peter’, was a nickname of the citizens of Leuven, the main square of which hosts the St. Peter’s Church), being traditionally brewed with wind-dried barley malt and unmalted wheat<sup>3</sup>. Today, *peeterman* is produced by the Breda brewery from Leuven.

(A sad story: Leuven is the birthplace of the Artois company that eventually evolved into the world's largest beer producer, AB InBev, headquarters of which are still located in Leuven. Peeterman was a signature Artois beer for many decades. However, the world's flagship brewer discontinued the Peeterman production without breaking a sweat.)

2. Uitzet, a ‘brown’ beer from East Flanders region; in 1798, a Ghent doctor named Wauters wrote a whole treatise on this beer, claiming that *uitzet* was invented in Wetteren in 1730, that it had a very clear yellow-brown color, and that in 1791 it saved people of the town from the dysentery epidemic being extremely simple and healthy drink<sup>4</sup>.

Today, *uitzet* is produced by the Paeleman brewery in once-saved Wetteren.

3. Seef, a ‘white’ beer from Anwerp, which was once so popular that one of the city districts is named after it<sup>5</sup>.

Production was reinstated by Johan Van Dyck, a beer enthusiast and coincidentally then a marketing specialist at Duvel Moortgat brewery, and is now being sold under the ‘Seefbier by Antwerpse Brouw Compagnie’ brand. Oats and buckwheat are included in the recipe as they should be.

4. Jack-Op, a blended beer that was produced by mixing ‘brown’ beer with Lambic. It enjoyed huge success at the end of the 19th century, and at the beginning of the 21st one the manufacturing was restored by Frank Boon and is being produced by the brewery of the same name<sup>6</sup>.
5. Zoeg, a pale sweet beer that *almost* survived the 20th century (it was produced in Tienen until 1955). Three of the five brewery founders were medics, so the beer was known as ‘the doctors’ beer’; according to a local legend, the doctors were rather excessive drinkers so the logo featured a pig<sup>7</sup>. In 2010, the beer production was resumed by a Tienen entrepreneur, Miel Mattheus, and is now being sold as ‘Zoeg Tienen’ by Brouwerij De Vlier.

(It actually might be that there are much more historically-precise reconstructions than these five: at least a dozen of other beers are said to be recreated after authentic recipes. The author of this book leans toward considering them all free fantasies on historical themes — and might well be wrong as it’s usually not that simple to check such claims.)

## References

<sup>1</sup> Mulder, R. *Beer riots in 19th century Brussels*

<https://lostbeers.com/beer-riots-in-19th-century-brussels/>

<sup>2</sup> Lacambre, G. (1851)

<sup>3</sup> Pattinson, R. *Brewing in Leuven in the 1830's*

<http://barclayperkins.blogspot.com/2009/05/brewing-in-leuven-in-1830s.html>

<sup>4</sup> Mulder, R. *Lost Belgian beers: Uitzet*

<https://lostbeers.com/lost-belgian-beers-uitzet/>

<sup>5</sup> Mulder, R. *A recipe for Antwerp seef*

<https://lostbeers.com/a-recipe-for-antwerp-seef/>

<sup>6</sup> Mulder, R. *Five 'lost' Belgian beer brands that came back on the market*

<https://lostbeers.com/five-lost-belgian-beer-brands-that-came-back-on-the-market/>

<sup>7</sup> Mattheus, M. (2013) *De Zoeg, een heel apart verhaal*

## Chapter 17. Biology and Chemistry

Out of the traditional beer styles of Belgium, *lambic* definitely holds the top spot as the beer possessing the greatest popularity and the longevity of the tradition alike. We assume that almost every human in the world had heard at least vaguely about the famous beer fermented with unique yeasts that reside only in the Brussels area (or maybe in the Belgian province of Lambic) or tried its cherry variety.

Surprisingly, despite the universal acclaim, we know very little about the history of this beer and its origin. Today we use three different words to denote lambic variants:

- ‘lambic’ itself for the base version;
- ‘faro’ to mark young sweetened lambic;
- and ‘gueuze’ (or ‘geuze’) meaning the blend of young and aged lambics.

All those words were still historically denoting subtypes of the very same beer as today, but their meaning had changed over centuries. The oldest one is ‘faro’: it was first mentioned in 1721 as the strongest Brussels beer. In 1794, the word ‘lambic’ occurred as a designation of the strongest and the most expensive *faro*, and in 1829, even stronger *gueuze* emerged. All those beers were ‘yellow’, and were brewed using a significant amount of unmalted wheat. (The proportion of which had been steadily declining throughout the 19th century; we might suppose that with the spread of pale malts the necessity of using expensive wheat to clarify the beer had been reducing.)

The word ‘lambic’ was initially spelled like that: ‘allembique’. So it can't derive from the town of Lembeek (which sometimes becomes a non-existent ‘province of Lambic’ in popular myth). It seems to be borrowed from Arabic (e.g., ‘al lembic’), being a variation of spelling the word ‘alembic’, meaning the distillation cube. How exactly lambic was connected to alembic is not yet understood fully. Some scholars suppose that strong and clear lambic was thought to be a product of distillation by

contemporaries; others say it was some slang word. Both hypotheses, however, are just guessing as we lack any facts they can possibly rely upon<sup>1</sup>.

Still, why were faro/lambic/gueuze unusually clear and strong beers? As we have learned from the ‘Barrels and Bretts’ chapter, the main practical method of achieving both characteristics was aging beer in barrels where it was undergoing secondary fermentation caused by ‘wild’ yeasts. The technology was well known in 17th-century England, and it had probably reached Belgium in the 18th century.

## Beer Myth

It is often said that lambic is known since at least the 15th century, despite the fact the word first occurred in 1794. Also, it is often quoted that peasants at the Peter Breughel the Elder paintings were drinking lambic — though no single fact supports this claim.

The Belgians, however, went much farther in the adoption of the technology than the English brewers. If ‘bretts’ were rather unavoidable in the stock beer manufacturing, the lambic brewers were deliberately adjusting recipes to adopt fully spontaneous fermentation — at least the 1829 and 1834 descriptions fully feature it. To achieve this goal, the wort was poured into the large shallow vessels and left in the open air to ‘soak’ the atmosphere. After that, future lambic was placed in the controllable environment — plainly speaking, into a barrel with a regulated oxygen inflow — and left for fermenting at least for a year. In fact, the production of lambic is just a process of a controllable spoilage of wort<sup>2</sup>.

Scientists tried to study in detail the microbiology of lambic at least twice. The first attempt was made by researchers from the University of Leuven in 1977<sup>3</sup>. It turned out there were at least four different stages of fermenting, each dominated by different types of microorganisms.

1. Enterobacteria are first to start consuming dissolved sugars breaking them down into lactic acid, acetic acid, and ethyl alcohol; amino acids — into amines, peptides, myristic and linoleic acids. Enterobacteria dominate the first days of future lambic's life, and then *kloekera apiculata* yeasts join them, which consume glucose and produce the protease enzyme that helps to break down complex proteins.
2. In two weeks' time, both bacteria and *kloekera* are superseded by regular baker's yeasts. At this stage, normal alcohol fermentation happens: glucose, maltose and maltotriose are converted into ethyl alcohol and different saturated fatty acids such as caprylic and capric ones.
3. Next four months, lactic acid bacteria (mainly of *pediococcus* genus) dominate. They significantly increase acidity by producing lactic acid, acetoin, and diacetyl.
4. Finally, starting from the ninth month, 'bretts' suppress the growth of the remaining microbiota and start slowly but steadily reprocessing everything generated at the previous stages — including lactic, acetic, and other acids — emitting complex esters that are responsible for the taste and the aroma of lambic.

And that's not all: apart from the above-mentioned, yeasts of Pichia, Candida, Hansenula, Cryptococcus genus as well as other microorganisms are making some contribution. To brew a proper lambic, you need not just some particular kind of yeast but a package of specific lambic biota.

In 2014, another group of researchers repeated the experiment. The results were controversial: though the stages remained the same, the concrete kinds of microorganisms dominating each stage were totally different<sup>4</sup>, which inevitably leads us to the next question.

## Mixing, mixing...

From the above-written, it should be obvious that lambic is an extremely complex product to produce. It is definitely not a Medieval beer but rather the outcome of the stock ale technology evolution, so it's unlikely it emerged before the 18th century. (Usage of just wheat and barley, without oats, spelt, and buckwheat that were a characteristic of earlier Belgian and Dutch beers, actually tells us the same story: lambic was quite a new and advanced beer style.) We should rather ask ourselves: how was it possible to produce such an elaborate product in those primitive conditions without precise measuring tools? How could one control if the fermentation stages in young lambic were developing properly?

Certainly, brewers might regulate oxygen inflow thus suppressing or buffering the growth of specific microorganisms. Weather provided some control as well; in particular, the increase of lactic acid bacteria presence corresponds with warm summer months. Of course, the brewers' books from those times contain lots of tips and tricks on how to mitigate undesirable changes; for example, to counter the over-increased acidity, adding eggshells was prescribed, though we might guess it hardly helped at all. Still, one extremely effective tool was available: the blending, or plainly speaking just mixing up different batches of the beverage. Lacambre wrote that the brewer's job was a very difficult one as every barrel of lambic possessed its own unique taste<sup>5</sup>. To achieve consistent quality, huge experience (and luck) was required, and few brewers were able to do it well.

The blending of lambics apparently led to changing the meaning of the words. Let us remind you that 'faro', 'lambic', and 'gueuze' up until the second half of the 19th century meant the grades of lambic 'elitism': faro was less strong and aged less, while gueuze was the high-end quality beer matured for 5 years. But why make several versions of the same beer if you can just mix it up? That's how the late-19th century faro was born, as a blend of lambic with young 'march' beer with an addition of sugar for continued fermentation.

With gueuze, the story is even more curious. At some moment, the unknown experimenters had applied the champagnization technology to lambic — as one might guess, the same one used for making sparkling wines. Namely, young lambic was mixed up with an aged one, then the sugar was added and the blend was left maturing in bottles, so carbon dioxide won't leave the reservoir as it happens with barrels. The result exceeded the expectations: the 'beer champagne' was not only sparkling, strong, and clear, but also cost a third less than five-year lambic. So at the turn of the century the word 'gueuze' became associated with the new champagne-like blend, and barrel-aged queuze quickly disappeared.

## How to taste

Lambic is probably the only beer that is nowadays produced exactly as it was made in the 19th century, maybe even the 18th. The Holy Grail for the style lovers is the lambics made by Brasserie Cantillon. Though founded not so long ago, in 1900, Cantillon (the only acting lambic brewery in Brussels) continues to make beer in accordance with the original artisanal technology, including the proverbial pouring wort into shallow tanks to capture the airborne microbiota. It's rather hard to find Cantillon, but that is perhaps the most authentic beer in the world. They don't even use refrigerators and make beer only in proper weather conditions.

Apart from Cantillon, there are several lambic breweries that have even more honorable history:

- their main rival 3 Fonteinen that was founded in 1883;
- Girardin and Oud Beersel known from 1882;
- even older Lindemans Faro and De Troch Lambic (the latter being sold under the brand name 'Chapeau') that were first mentioned in the 1820s.

Besides historical enterprises, today lambic is being made by many contemporary Belgian manufacturers and craft breweries alike.

Pure unblended lambic is rarely sold (though it might be found if one really wants it: Cantillon, 3 Fonteinen, and Boon are selling unmixed lambics), and it's usually blends that you might find on sale: faro, gueuze, and the fruit varieties of the latter.

## References

<sup>1</sup> Mulder, R. *Lambic: the real story*

<https://lostbeers.com/lambic-the-real-story/>

<sup>2</sup> Guinard, J. (1990), p. 5

<sup>3</sup> Oevelen, D. van, Spaepen M., Timmermans P., Verachtert H. (1977)

<sup>4</sup> Spitaels, F., Wieme, A.D., Janssens, M., Aerts, M., Daniel, H.-M., Van Landschoot, A., De Vuyst, L., Vandamme, P. (2014)

<sup>5</sup> Lacambre, G. (1851), p. 348

## Chapter 18. March

The ‘lambic’, ‘faro’, and ‘gueuze’ words were changing their meaning but still kept referring to the same technology; with ‘march’ beer it’s more complicated. This word was used to denote different beverages that had just a common feature — the timing. March was traditionally considered to be the best month for brewing, as stable low temperatures allowed for making the finest beer. In Belgium, they used the ‘march’ designations ('Mars', 'Meert', 'bière de Mars') for keeping beers, aged for 4 to 6 month: weak lambics and so-called ‘saisons’, or ‘bière de garde’<sup>1</sup>. The main difference between the two was that the former was fermented fully spontaneously, absorbing the ‘wild’ airborne microorganisms, while the latter was prepared by first adding regular yeasts, then surrendering to the ‘bretts’ after the primary fermentation.

(There is also a German ‘march’ beer — *Märzen* — but it's a lager.)

First *saisons* were brewed in Liège at least from the beginning of the 19th century. Liège saison was dry, relatively strong, and, as a typical product of the period, contained a large proportion of spelt malt and unmalted wheat. At the end of the century, saisons became popular in Charleroi and other towns of the Hainaut province, though the word was not strictly referring to a specific style, but rather just a keeping beer in general: darker beer could be marked as ‘bruin saison’ as well<sup>2</sup>.

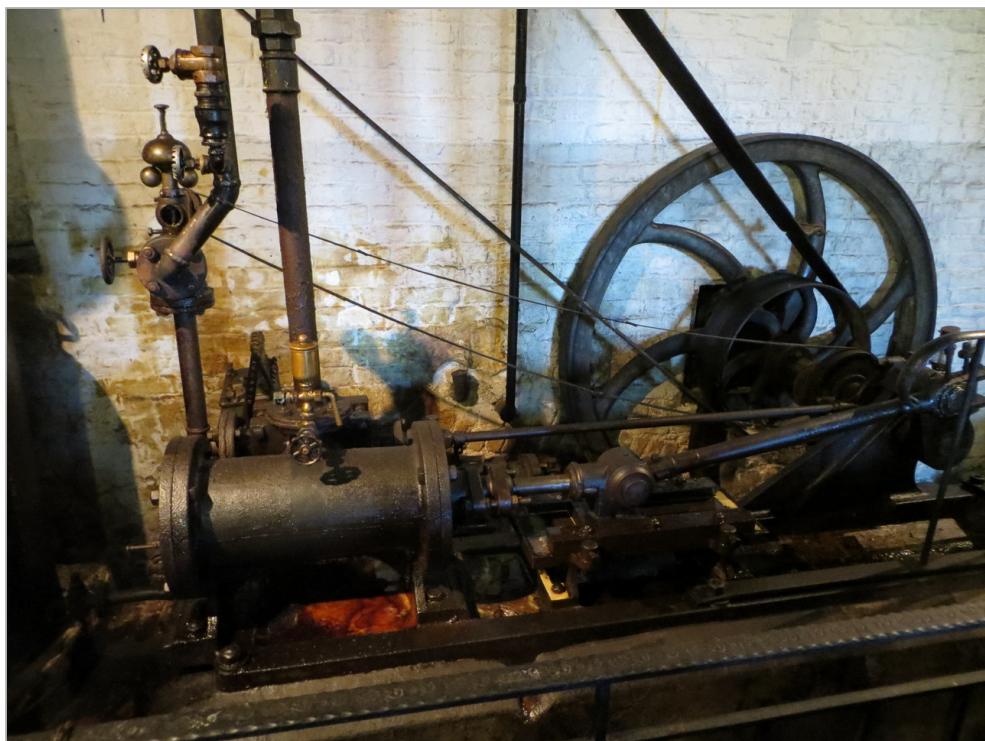
However, it later got a more specific meaning: pale keeping beer (implying mixed fermentation, partially fermented with ‘bretts’), dry, made from barley and wheat. Closer to the end of the century it became almost indistinguishable from ‘grisette’ — initially, cheap dark beer for miners.

### How to taste

Three companies have been continuously brewing saison for more than a hundred years. They are:

- Brasserie à Vapeur with their Saison de Pipaix;
- Brasserie de Silly with Silly Saison;
- Martens from Limburg with a bunch of ‘Sezoens’ beers.

The Brasserie à Vapeur is also notable for the 19th-century Watt steam engine that still powers all the mechanisms in the brewery. (The words ‘à Vapeur’ literally mean ‘steam-powered’.)



The 19th-century steam-powered engine installed in the Brasserie à Vapeur  
Image Credit: Bernt Rostad



The 19th-century mash tun installed in the Brasserie à Vapeur. Machinery operates on steam power.

Image Credit: Bernt Rostad

Many other Belgian breweries are making saisons nowadays, most notably Fantôme Saison and Saison Dupont. Among craft brewers, Hill Farmstead and Two Side Project have made saisons their specialties. French version of the style known as ‘bière de garde’ is being produced by Brasserie 3 MONTS and Brasserie Duyck, to name a few.

Grisette also enjoys some demand, though it's rather hard to notice any difference between modern saison and grisette.

## Seasonal confusion

And one more thing: saison happened to be the main victim of dilettante historians. Almost everything written about it (both online and offline) is not true. If you search for information on this beer style, you will learn that it was a beer made by farmers during winter and spring using their own grain to be consumed by seasonal workers in the summer and autumn

months and that it was a typical beer from the Hainaut province. In fact, it was quite the opposite<sup>3</sup>:

- first, the beer was made by professional brewers from purchased grain; saisons were actively sold to other regions and countries, and even participated international expos and competitions;
- second, it is started to be produced in Hainaut much later than in other regions; ‘saison’ beer was known in Liège from at least 1832, while the oldest mention of making it in Hainaut comes from 1858;

The Lacambre's treatise doesn't mention any farmhouse production of saisons as well. In 1851, ‘saison’ meant Liège beer made from spelt and wheat in winter or early spring, aged 4-6 months (if the beer was brewed in march itself, it was aged until the end of the year)<sup>4</sup>.

Despite the fact that literally no evidence suggests that saisons were brewed by farmers, the entire category of these mixed-fermented beers is now known as ‘farmhouse ales’. And grisette is told to be a saison for miners, whatever it might mean.

## References

<sup>1</sup> Janssen, D. *Biere de Mars (the lambic version) and Lambic in the mid 1800s (part I)*  
<http://www.horscategoriebrewing.com/2015/11/biere-de-mars-lambic-version-and-lambic.html>

<sup>2</sup> Mulder, R. *What was a 19th century saison really like?*  
<https://lostbeers.com/what-was-a-19th-century-saison-really-like/>

<sup>3</sup> Mulder, R. *Fact check: Yvan De Baets on saison (and the results may shock you)*  
<https://lostbeers.com/fact-check-yvan-de-baets-on-saison-and-the-results-may-shock-you/>

<sup>4</sup> Lacambre, G. (1851), pp. 376-378

## Chapter 19. Turning Red

The knowledge we have about the third authentic Belgian beer style, the Flanders brown, is even more scattered than data on *lambic* and *saison*, given that the latter is to be gathered bit by bit. The first known mention of the former comes from the recipe omnibus from 1829, and it only tells that the beer was made from barley only that was boiled for a long time (from 15 to 30 hours) to achieve a characteristic brown color<sup>1</sup>. The Lacambre's treatise only additionally specifies that the beer was ready to consume only after two or three months of aging<sup>2</sup>, which makes the Flanders brown another kind of keeping ale (which in turn implies additional fermentation with 'bretts').

Even the 1879 recipe book still just reiterates Lacambre's words; apparently, the Flanders brown was but a local variety of 'brown' beer of little interest to the wider public. However, in the 1880s the situation changed dramatically: the style became immensely popular thanks to the efforts of Eugène Rodenbach from Roeselare. After accomplishing training in England, the young Rodenbach became a partner in the family brewery (which belonged to his father, Edward) and refurbished it in an accordance with the latest British fashion. Particularly, he started to leave the beer for additional maturation in large wooden barrels called 'foeder'-s (often those that previously housed wine, cherry brandy, cognac, or other grape-based alcoholic drinks)<sup>3</sup>. Some sources claim the idea was borrowed from the Greene King brewers that are still producing similarly-looking beer<sup>4</sup>.



The foeders in the Rodenbach brewery cellar

Image Credit: Dirk Van Esbroeck

Interestingly, until the 1880s, the Rodenbach beer was considered an *uitzet*, and it most likely became acknowledged as a separate beer style because of Eugène's improvements. The consumers got a taste for that new recipe, and, at the beginning of the 20th century, many local producers started to replicate it. The most successful were the brewers from Oudenaarde: their beers were hailed as equal to wine<sup>5</sup> (an unprecedented compliment to beer!) The beer-makers were using this extensively in their advertisements, even adopting the motto 'It's wine!'

The Rodenbach beers were and still are made utilizing the following process<sup>6</sup>:

- during the first seven days, the primary fermentation is carried out with the regular baker's yeasts (though the microorganisms package used in the brewery comprises several quite specific *S. cerevisiae* strains as well as several other species of *Saccharomyces* class and some *Lactobacillus*);

- unlike *lambics*, the Flanders brown at this stage contains no traces of *Enterobacteria* and acetic acid bacteria, which results in lower acidity;
- then the future beer is poured into the vessels for secondary fermentation to age for 4 to 5 weeks, during which mostly *Lactobacillus* are working (in particular, *Lactobacillus delbrueckii* subsp. *bulgaricus* which is used to make yogurts);
- then it's *foeder* time, when the beer undergoes the classical tertiary fermentation with *Brettanomyces*;
- the final product is a blend of young and matured beers (other breweries might mix strong beer with a weak one, or with *lambic*).

Though the process of making it closely resembles the making of porter (which actually makes Rodenbach a better approximation of historical porter than modern beverages carrying this name), there are several important differences:

- the porter-making required a lot of hops, both for speeding up the maturing of the beer and for beating off unpleasant odors of cheap raw materials while the Flemish brewers often use a minimal amount of hops so the resulting bitterness is below the threshold of human perception;
- malt gets the proper taste, aroma, and dark color with additional boiling for many hours (the tradition rooted in the 18th century at least); the Rodenbachs, in particular, for a long time had been producing the quality malt in their own malting kiln installed in the brewery's grounds.



The old malting kiln (nowadays a museum) at the Rodenbach brewery, constructed in  
1872

Image Credit: Zeisterre

The resulting beverage is a pretty well-balanced one, with its acidity parameters indeed comparable to wine.

## How to taste

The legacy of the founding fathers of the Flanders brown is still thriving nowadays. We're talking about two breweries:

- Rodenbach of Roeselare;
- Liefmans of Oudenaarde, with their Liefmans Oud Bruin.

Apart from Rodenbach and Liefmans, some other brewers are making the Flanders brown since the 19th century:

- Brouwerij Roman with their Adriaen Brouwer Audenaerds Bruyn (a truly legendary brewery founded in 1545, and still run by the Roman family);
- Brouwerij Omer Vander Ghinste with their Oud Bruin; they also produce another popular (though relatively novel) variety of the style named Cuvée Des Jacobins.

Alongside the historical brewers, there are several modern interpretations of the Flemish classics:

- Bourgogne des Flandres (made under Timmermans brand owned by John Martin Brewery);
- Duchesse De Bourgogne by Brouwerij Verhaeghe.

Both names point to Burgundy, thus reminding, first, of the times when Belgium was a part of the Duchy of Burgundy in the 14-16th centuries, and, second, of Burgundian red wines.

And, of course, many craft brewers produce this beer as well; the most popular ones are Americans: The Lost Abbey and Bruery Terreux.

## What's in my name

If one takes a look at beer labels, one will surely notice that it's usually 'Flanders red' ('rood'), not 'brown' ('bruin'). However, as we can see, in the 19th century it was just 'brown', with no other naming. It looks like the beer became 'red' simply because the famous writer, the author of 'The Great Beers of Belgium', and just a beer enthusiast, Michael Jackson (not to be confused with the famous singer) decided so, and the brewers had no other choice than to follow his lead<sup>7</sup>. The division into 'red' and 'brown' varieties is now stated in the dictionaries and classifications, though no one can tell for sure what's the difference.

## References

<sup>1</sup> Mulder, R. A small history of Flemish old brown (and red) – I

<https://lostbeers.com/a-small-history-of-flemish-old-brown-and-red-1/>

<sup>2</sup> Lacambre, G. (1851), p. 312

<sup>3</sup> Mulder, R. A small history of Flemish old brown (and red) – I

<https://lostbeers.com/a-small-history-of-flemish-old-brown-and-red-1/>

<sup>4</sup> Bailey, P. Rodenbach Brewery

<https://baileysbeerblog.blogspot.com/2015/09/rodenbach-brewery.html>

<sup>5</sup> Mulder, R. A small history of Flemish old brown (and red) – 2

<https://lostbeers.com/a-small-history-of-flemish-old-brown-and-red-2/>

<sup>6</sup> [http://www.milkthefunk.com/wiki/Flemish\\_Red-Brown\\_Beer#Microbes\\_and\\_Flavor\\_Compounds](http://www.milkthefunk.com/wiki/Flemish_Red-Brown_Beer#Microbes_and_Flavor_Compounds)

<sup>7</sup> Mulder, R. Flemish brown, red or red brown? How Michael Jackson invented a beer style out of thin air

<https://lostbeers.com/flemish-brown-red-or-red-brown/>

## Chapter 20. Spéciale Belge

Apart from the rich history and peculiar legislation, one more factor contributed heavily to Belgian beer heritage: persistence — sometimes even stubbornness! — in preserving the national tradition.

At the end of the 19th century, when the advance of foreign beers and, in particular, German lagers became intimidating (the beer import more than tripled from 1891 to 1903), Belgian citizens hadn't sat on their hands. In 1901, the Union of Belgian Brewers put forth the idea of creating a national beer style that would be able to compete against Munich, Pilsen, and Dortmund lagers (and also British ales). In cooperation with the Belgian brewery schools association, they agreed to conduct a contest in 1904 and announce the winners at the 1905 World Expo that had to be held in Liège.



Official poster of the 1905 World Expo in Liege  
Public Domain

The organizers took into account the capabilities of the local brewing industry as well as the realities of the time: the new beer was to have an original gravity between 1.045 and 1.05 (which implies around 5% ABV) and cost 15 to 25 centimes per glass. Initially, these requirements were met with extensive criticism as they were quite uncharacteristic in those times (the typical gravity of the end-19th century Belgian beers was much less than that). However, the organizers were resolute in their decision: the new beer must comply with the modern lager and bitter parameters — and history proved they were absolutely right<sup>1</sup>!

All in all, 73 breweries participated in the contest. The winner was ‘Belge du Faleau’ by Brasserie Binard from Châtelaineau, and the style became known as ‘the Belgian special’ (*Spéciale Belge*). It was a light warm-fermented amber beer, made from slightly roasted pale malt. Soon, many other breweries started to imitate the style<sup>2</sup>; however, it became truly popular after the World War I, once the large manufacturers started to produce it: Affligem Brewery in 1925 and Palm Breweries in 1928.

## How to taste

Today, *Spéciale Belge* is a protected ‘regional product’ designation given to just five beers<sup>3</sup>. Four of them have been being made for a century or more:

- Spécial De Ryck and Contreras Tonneke, both in production since 1920;
- the Belgian special by the Palm Breweries, which is simply marked ‘Palm’ — probably, the most canonical one;
- famous Bolleke by Brouwerij De Koninck — the iconic beer from Antwerp; being produced since 1925, it was known as just ‘De Koninck’ until the 2019 rebranding (originally, *bolleke* was a brand-name of De Koninck glassware).

The last one is Spéciale De Poes made by the modern brewery Brouwerij De Poes.

## References

<sup>1</sup> Van den Steen, J. (2016), pp. 15-16

<sup>2</sup> Persyn, D., Swinnen, J.F.M., Vanormelingen, S. (2010), p. 5

<sup>3</sup> <https://www.streekproduct.be/weetjes/amberkleurige-speciale-belge-ale-bieren-behoren-tot-onze-rijke-biertraditie>

## Chapter 21. The Rose of Brussels

One more universally acclaimed beer style (a set of styles, to be precise) also tracks its history from the beginning of the 20th century: *fruit lambic*. We will probably not be grossly mistaken if we say that's the most popular Belgian beverage in the world, of which even those who are not interested in beer at all have heard something about.

Some sources claim that using cherries in brewing had been known since the 18th century<sup>1</sup>. However, those cherry beverages should have had very limited popularity — all in all, there is no traceable continuous tradition. The oldest known recipe of *kriek lambic* was published in the ‘Petit Journal du Brasseur’ in 1907 and requires macerating blended *lambic* in wooden barrels with cherry berries for 4 to 5 months and then additional maturing in bottles for at least half a year<sup>2</sup>. Though the style should have enjoyed some popularity by this moment, it's unlikely this popularity exceeds the 20th century's boundary.

Two years later, raspberry beer came into play: the *framboise*. Paul Cantillon wrote that he had had more barrels of raspberry *lambic* than the cherry one. Looks like the public's tastes were changing fast and unpredictably — so fast that *framboise* was already forgotten in the 1930s, and restored only in 1973<sup>3</sup>.

Fruit *lambic* of the 1970s was much paler than the modern one and was often used as a cocktail base (for example, the mix with the strawberry liquor was known as ‘Kir Brussels’). Jean-Pierre Cantillon started experimenting with visuals, finally resolving on a gentle pink hue — which, in turn, inspired Belgian watercolorist Raymon Coumans to draw a famous frivolous label for the beer, depicting a naked woman with a skin of the color of roses sitting on a lap of mythical king Gambrinus. Coumans made the artwork after taking Cantillon's word the beer would be renamed to Rosé De Gambrinus<sup>4</sup>.

## It's interesting

For the US market, the label was considered ‘indecent and obscene’, and Coumans had to cover the woman with a long light-blue dress — saying that ‘but most importantly, and the Americans need to know this, underneath the dress she’s in the buff’. The Playboy Magazine even published an article on the matter, comparing the two variants of the label.

In the 1980s, with the Cantillon beer popularity growth, *fruit lambic* saw the Renaissance. Brewers started to make it using every kind of fruit available: peaches, black currant, grapes, strawberries, apples, bananas, pineapples, apricots, plums, blueberries, lemons, and also even kiwifruits and cloudbERRIES.

## How to taste

It looks like the only *kriek* that had existed before the 1980s is Cantillon Kriek. It's rather hard to find it, and it's a brave man's beverage as Cantillon doesn't sweeten their beers. Conversely, the only authentic *framboise* is Cantillon Rosé De Gambrinus.

Interestingly, the 1907 recipe recommends using not just any cherry but a very specific variety — that of Schaerbeek. Some brewers are nowadays producing *kriek* made specifically with the Schaerbeekse cherry:

- 3 Fonteinen Schaerbeekse Kriek
- De Troch Oude Kriek
- Hanssens Scarenbecca Kriek
- Oud Beersel Schaarbeekse Oude Kriek

The notable exclusion from the rule is none but Cantillon Kriek itself, which is being made using Turkish cherry. However, the Schaerbeekse variety is also represented in their assortment under the ‘Lou Pepe’ brand.

Apart from those, *kriek*, *framboise*, and all other kinds of fruit *lambic* are nowadays produced by many breweries, both in Belgium and abroad. But be warned: words ‘kriek’ and ‘framboise’ are not protected designations, and the base beer might be of any kind. Many cheap ‘krieks’ are actually just sweetened lagers. So choose carefully: search for beers explicitly marked as ‘lambic’.

## References

<sup>1</sup> Lambic.Info. Kriek

<https://www.lambic.info/Kriek>

<sup>2</sup> Janssen, D. A Recipe for Kriek from 1907

<http://www.horscategoriebrewing.com/2018/10/a-recipe-for-kriek-from-1907.html>

<sup>3</sup> Lambic.Info. Cantillon Rosé de Gambrinus

[https://www.lambic.info/Cantillon\\_Ros%C3%A9\\_de\\_Gambrinus](https://www.lambic.info/Cantillon_Ros%C3%A9_de_Gambrinus)

<sup>4</sup> ibid

## Chapter 22. Not Brewers

Before we continue to the next Belgian beer style, we need to make a journey into a very distant past. Let us remind the reader that in the early Middle Ages King Charlemagne (through the efforts of his heir, King Louis the Pious) promoted the Rule of St Benedict in the lands he controlled. The monks following the Rule were known as ‘the Benedectines’.

However, several centuries later, some theologians began to express their dissatisfaction with the liberties the Brotherhood allowed themselves while following the Rule, and in 1098, the Cistercians emerged — those who followed the Rule of Benedict of Nursia more strictly and obediently.

However, several centuries later some theologians began to express their dissatisfaction with the Cistercians being too relaxed in fulfilling their duties. In 1664, the founder of the La Trappe monastery in France, Armand-Jean de Rancé, reformed the way of life in the convent, introducing the most strict rules: mandatory hard physical labor, the vow of silence, harsh diet, and the isolation from the outside world. The Rancé's followers started to call themselves the Cistercians of the Strict Observance, or the Trappists (after the La Trappe monastery).

In 1790, in a course of the French Revolution, monastery property was secularized, and the monasteries in the French territories, including the Trappist ones, were disbanded. Monks initially moved to Switzerland, but during the Napoleonic Wars almost all Swiss, Dutch, Belgian, and German convents were disbanded as well, if not destroyed. Friars were able to return to their customary lifestyle only after Bonaparte's fall, when they were allowed to rebuild monasteries — both in France and abroad. La Trappe itself went under the Brotherhood's control in 1815 and was consecrated again in 1832.

During all their history, the Trappists brewed their own beer (and made their own cheese) as they were very strict about fasting. So it's not surprising that they started to build breweries in all the newly created or restored monasteries. In 1836, the brewery at the **Abbey of Our Lady of the Sacred Heart in Westmalle** was opened; in 1839, at the **St. Sixtus' Abbey in Westvleteren**. Both convents were located in the territories that became parts of the newly created Kingdom of Belgium. During the 19th century, the Trappists built or restored many other monasteries, and several of them started to brew beer. Some share of the output was sold in the vicinity (for example, in 1870, the physicians praised the strong beer from the **Scourmont Abbey in Chimay** for its curative properties<sup>1</sup>); however, the influence of the Trappist brewing (and even more so, the monastic brewing as a whole) in Belgium was negligible. For example, Lacambre didn't mention any abbey beers.

Despite being an isolated community, the monks were nevertheless keeping pace with the technical progress. Particularly, Father Dominic from the **Abbey of Notre-Dame de Saint-Rémy in Rochefort** studied in Leuven, and, at the beginning of the 20th century, even won several medals in brewing competitions<sup>2</sup>.

## The specificities of Belgian prohibition law

Soon, however, the Belgian beer diversity suffered two crushingly hard blows in a row: first, during the First World War, many breweries were closed, their equipment confiscated, and production banned; second, after the war, Belgium adopted its prohibition law.

The regulation of 1919 was primarily aimed against *jenever* and other strong alcoholic beverages. It was prohibited to sell them in bars and other public places. Still, the consumption of beer, which was heavily taxed, dropped dramatically as well. The law was strict, however imperfect: it didn't take into account how strong a beer was (probably because a typical Belgian beer from that time had quite modest alcohol content, around 3% ABV). As a

consequence, the demand for strong beers (including monastic ones) increased.

In 1922, the monks from Westmalle literally invented a new type of beer which they called ‘dubbel’. It’s rather hard to explain this phenomenon — why of all Belgian and world brewers it was monks who defined the new fashion. What they had done is probably more ‘craft’ beer than many contemporary experiments.

Technologically speaking, *dubbel* is a dark beer with an addition of caramel syrup (‘candi sugar’; not to be confused with raw sugar clods that are called ‘candi sugar’ by Americans) to the wort, fermented twice: after the primary fermentation is finished, fresh yeasts and more syrup are added, and the future beer is bottled for the secondary fermentation. Undisputedly, all the elements taken individually were already known — dark beer, syrup, yeasts, bottle conditioning, etc. — but, as a whole, the process is a unique invention having no direct predecessors.

The result of this double fermentation is a rather strong (initially the strength was around 5% ABV, then it gradually reached 7%), soft, full-bodied, and surprisingly smooth beer — a signature product of Belgian monastic brewing.

## How to taste

The Abbey of Our Lady of the Sacred Heart continues producing this beer under the ‘Westmalle Dubbel’ brand. Apart from it, six other Trappist monasteries brew *dubbel*:

- the Scourmont Abbey with ‘Chimay Rouge’ beer;
- the Abbey of Notre-Dame de Saint-Rémy with ‘Rochefort 6’;
- the St. Sixtus’ Abbey with ‘Westvleteren 8’;
- the **Koningshoeven Abbey**, under the brand name ‘La Trappe Dubbel’;
- the **Engelszell Abbey** (‘Stift Engelszell Benno’).

Of course, many secular brewers are making *dubbel* as well. First of all, we should mention Pater 6 by St. Bernardus: to this brewery (physically located on the street called Trappistenweg) Westvleteren monks were outsourcing the beer production, and there it was prepared for the monasteries from 1946 to 1992. Another one, 'Achel 8° Bruin', was produced by the **Saint Benedictus-Abbaye in Achel**, but the brewery had lost the Trappist logo as the monastery itself was closed (though, the Abbot of Westmalle comes to Achel once a week to oversee the production).

Apart from those, we might mention Belgian *dubbel* by Corsendonk ('Pater'), Duvel Moortgat ('Maredsous 8 Brune'), Grimbergen, Bornem ('Double'), Affligem, Petrus, Val-Dieu ('Brune'), St. Feuillien ('Brune'). Of course, American craft brewers that specialize in Belgian beers are making it as well: Unibroue ('Maudite'), Ommegang ('Abbey Ale'), Allagash, and others.

## Strict observance

There is a big difference between real Trappist beers and those who imitate it. To have a right to the 'Authentic Trappist Logo' sign, three conditions must be fulfilled:

- the beer is to be brewed within the Trappist monastery walls by monks themselves or under their control;
- brewing must be a secondary occupation and must not affect the monastic way of living;
- the venture must not make any profit as any income above the monastery's needs shall go to charity.

The Saint Sixtus' Abbey in Westvleteren even forbids re-selling their beers: they must be bought in the monastery for a fixed price, and there are no labels on the bottles (which, of course, does not stop profiteers from smuggling them; today, the bottles with the recognizable caps might be bought in many large cities). The Westvleteren monks even had a motto: 'We are not brewers. We are monks. We brew beer to be able to afford being

monks'. With time passing, it became more laconic: 'We brew to live, not live to brew'.

Today, Trappist monks are usually not involved in brewing directly and just control the process. In most monasteries, the head brewer position is occupied by a civilian manager (though it was monks who established the basics — let's say that Father Theodor from Chimay had selected the yeast strains suitable for making monastic beers with his own hand). Still, running a Trappist brewery *implies restrictions*. Jacques Petre, the former head of the Orval brewery, described the contradictions, 'Before anything happens, you have to explain it to the monks; you have to explain it to the board; you have to explain it to the workers; you have to explain it to everybody. It takes time, and for a monk time doesn't exist in the way it does for most people'.

When Trappist beers gained popularity, many brewers, both conscientious and not-so-conscientious, started marking their beers as 'Trappist' to exploit the monasteries' reluctance to increase the output. The monks, which were always very zealous regarding the quality of the product sold from their name, organized the International Trappist Association in 1997 and set the above-mentioned strict rules for obtaining the 'Authentic Trappist Product' logo.

Initially, the Association comprised eight abbeys:

- Orval, Chimay, Westvleteren, Rochefort, Westmalle, and Achel in Belgium;
- Koningshoeven in the Netherlands (sells beer under the 'La Trappe' trademark);
- Mariawald in Germany (though it had already ceased to produce beer at that moment).

Today, there are 20 abbeys in the Association, of which 11 brews Authentic Trappist beers; apart from the above-mentioned, it is:

- the monasteries of **Zundert** in the Netherlands and Engelszell in Austria;

- the **Abbey of Saints Vincent and Anastasius** in Italy (makes ‘Tre Fontane’ beers);
- the **Mount St Bernard Abbey in England** (the ‘Tynt Meadow’ brand).

Three more breweries sell beer but have no rights to the logo:

- the above-mentioned Achel;
- Mont des Cats in France (beers under this brand are actually brewed by Chimay);
- Cardeña in Spain (the production site is located outside of the monastery, which is disallowed by the rules).

One more brewery — once run by the **St. Joseph Abbey in Spencer**, USA — had been making Trappist beers for eight years and was closed in May 2022.



11 Trappist beers. The orange-capped bottle with no label is Westvleteren XII

Image Credit: Philip Rowlands

By the way, the Association members also produce many other Trappist products: bread, yeasts, soap, chocolate, cookies, honey, jam, liquors, mushrooms, olive oil, wine, cheese, and many other things, from ceramic jugs to canned quinces from monastery gardens.

## References

<sup>1</sup> Hieronymus, S. (2005), p. 33

<sup>2</sup> ibid, p. 36

## Chapter 23. The White Cap

After *dubbel* was created, the Westmalle carried on. The 1920s and 30s were the time Trappists were engaged in close cooperation with civilian brewer specialists, and most notably, with Hendrik Verlinden — a writer and beer expert, who promoted the scientific approach to brewing beer in general and yeast selection in particular. After the First World War ended, yet another wave of pale lager offensive on Belgian soil began, and Verlinden was one of those who sought an alternative. In collaboration with the Westmalle monks, he created a beer style that was later called ‘tripel’ (sometimes spelled as ‘triple’ or ‘trippel’) — a beer based on light abbey ale and elaborated over to increase the alcohol content (typically, around 8%) with the *dubbel* technique of adding *candi sugar* and conducting secondary fermentation in bottles. Like *dubbel*, *tripel* is highly drinkable as it isn’t as thick as comparable strong beers like *barlewine* or imperial stout.

Verlinden released his own tripel under the ‘Witcap Pater’ brand in 1932, and that was the only case when the monks allowed a civilian to borrow the ‘Trappist beer’ designation. Westmalle released their version of tripel named ‘Superbier’ a year later, in 1933. In 1956, Superbier was renamed into Tripel, and at the same time the first and only correction of the recipe happened: brother Thomas decided to add more hops to *tripel*. Since that, the Westmalle Tripel recipe has never changed<sup>1</sup>.

### How to taste

Both original versions of *tripel* are still being produced: Witcap Pater is now being made as ‘Witcap Tripel’ by the Slaghmuylder family brewery and Westmalle Tripel is still being prepared under the Abbey of Our Lady of the Sacred Heart monks’ control. Other Trappist breweries are making *tripel* as well: Chimay, La Trappe, and Tre Fontane, though the last one is rather far from the ‘golden standard’ of Brother Thomas’. Also, St. Bernardus, Achel (as Achel 8° Blond), and Cardeña are making it.

Of course, many civilian brewers, both Belgian (Duvel Moortgat Maredsous 10, Gouden Carolus Tripel, etc.) and American (Unibroue La Fin Du Monde, Allagash Curieux, New Belgium Brewing Company Trippel, Samuel Adams New World Tripel, etc.), are producing *tripel* as well.

Also, a very interesting variation of *tripel* under the brand name ‘Tripel Karmeliet’ was introduced in 1996 by the Belgian Bosteels brewery (owned by AB InBev). It is claimed that the recipe, dated back to 1679, was found in the Carmelite monastery, and has nothing to do with the Trappist *tripel*. It is, of course, a bit of trickery: though the recipe does exist, and includes the same proportion of barley, wheat, and oats as used in Tripel Karmeliet production, no pale ales or bottle conditioning might have been known in the 17th-century Belgium. But it is still a very interesting (and tasty!) beer.

## References

<sup>1</sup> Hieronymus, S. (2005), pp. 71-73

## Chapter 24. The Valley of Gold

Alongside Westmalle and Westvleteren, monks were creating beers in another, truly legendary, monastery: the Notre-Dame d'Orval Abbey in the Belgian province of Luxembourg. According to a legend, the name 'Orval' and the land's coat of arms ascend to Queen Mathilda of Tuscany who accidentally dropped her wedding ring in a local spring; as the queen had recently been widowed, she was grieving about the loss of the ring a lot and kept praying to the God — and then a trout appeared, bearing the ring in its mouth. 'It's truly *the valley of gold*', the gladdened queen exclaimed ('Val d'Or' in French), and decided to found a monastery there. In commemoration of this legend, both monastery's coat of arms and the label of the beer that is made there feature a trout bearing a ring in its mouth.

Throughout almost a thousand years of history, Orval was a home for the Benedictines (that came from Calabria in 1070), the Cistercians (that settled there in 1132), and the Trappists as well. The monastery was burned down thrice (in 1252, 1637, and 1793) and remained in ruins for a long time until finally the land was given to the Trappists in 1926. Soon, the new building was erected — with a brewery, as one might have guessed. The first chief brewer, Martin Pappenheimer, came from Germany, and his assistant, John Vanhuele, from East Flanders (and in addition, he worked a lot in England). Together, they created a truly miraculous beer in 1932: today we would call it a 'fusion' of all those German, Flemish, and English traditions, enhanced with the latest Westmalle friars' developments. Unlike other beers, Orval was never a subject of a legend claiming it derived from some ancient recipe, as such recipes simply do not exist.

The ingredients needed to make Orval comprise five types of malt, *candi sugar*, and classical Styrian Goldings and Hallertau hops. The beer is to be fermented thrice: first, the regular warm fermentation for five days; then, a package of fresh yeasts (a mix of baker's yeasts and *Brettanomyces*) and more hops are added, to ferment for another three weeks; finally, before the beer is bottled, more sugar syrup and yeasts are put there to work for yet

another month — which is a clear homage to *saison* (see the ‘March’ chapter), probably, introduced by Vanhuele.

What is even more remarkable, it's not the ingredients that define the spirit of Orval — it's the Orval spirit that defines the ingredients to use. Jean-Marie Rock, who was a brewmaster at Orval for 28 years, told that each year he, similarly to what Michelin chefs do, tasted the grain samples of the new harvest to select those that will be used to recreate *that taste*.

‘Bretts’ (which are, by the way, ‘local’, e.g. gathered in the Orval valley) comprise a small share of the yeast package that is added during secondary and tertiary fermentations, but their effect is a long-playing one. Orval is usually considered to be fully ready to be consumed in nine months after bottling, after the *Brettanomyces* have finished their job<sup>1</sup> (out of the author of this book's experience, that's not enough: it requires several years to fully develop *the Orval taste*).

## How to taste

The obvious choice is, of course, Orval itself. However, in recent years it became notoriously hard to find it. And as for the substitutes... well, it's complicated.

For a long time, Orval was considered just a Belgian strong pale ale despite having little in common with other beers of that kind. The only attempt to replicate the recipe was made by the craft brewers from Mikkeller who released the mockingly-named ‘Årh Hvad?!’ beer (later renamed to ‘Hva Såå?!’); the author of this book might testify that the copy was easily distinguished from the original by look alone, to say nothing about the taste.

Recently, however, a notable amount of ‘Orval-like’ beers emerged, and louder became the voices of those who propose to name Orval a beer style in its own right<sup>2</sup> — which we hope will soon happen. There is a special ‘orval-clone’ tag on Ratebeer for these beers.

## References

- <sup>1</sup> Hieronymus, S. (2005), pp. 54-55
- <sup>2</sup> Boak & Bailey's Beer Blog: *Hoover, Google, Orval?*  
<https://boakandbailey.com/2018/03/hoover-google-orval/>

## Chapter 25. Gradus ad Parnassum

The gradual development of the Trappist beer, interrupted by the Second World War, continued after it had ended. The new milestone was associated with two other monasteries: the Scourmont Abbey in Chimay and the Abbey of Notre-Dame de Saint-Rémy in Rochefort. While Chimay was founded by Westvleteren monks in 1854, the Rochefort history is comparable in its grandeur to Orval only: it started in 1230, when Gilles de Walcourt, count of Rochefort, established a Cistercian nunnery in his lands. Like Orval, the Rochefort Abbey was plundered several times over the years and taken apart in the Napoleon era. The monastery was reconstructed by monks from Achel in 1887.

Both abbeys started to brew beer shortly after they were restored, and their products even enjoyed some limited popularity (see the ‘Not Brewers’ chapter). However, the true success came after the War.

At that time, monks from Chimay, who had their brewery destroyed by Germans, decided to rebuild it in a state-of-the-art fashion. To do so, Father Theodor went to Leuven to study with a famous professor Jean De Clerck (getting ahead, their cooperation lasted for more than four decades). After returning to the convent in 1948, the Father enthusiastically proceeded to enhancing the monastic brews. With De Clerck's help, he isolated pure yeast strains and employed the *dubbel*-like bottle-conditioning technique. The beer with the red label from Chimay ('Chimay Rouge') had quickly won customers' appreciation, and at the end of 1948 Father Theodor prepared an even stronger winter brew — with a blue label, 'Chimay Bleue'.

At the same time, Rochefort was also increasing production, starting to sell their special strong beer that was initially created for the sick and wounded in the war times. In 1949, the monks even bought a truck to deliver the beer to nearby villages.

At this point, the heroes of our story knocked their foreheads together: the growing popularity of high-quality (and stronger) Chimay beer caused Rochefort's sales to slump down. But let us remind you that both of them were monks, not brewers, and as Abbey of Notre-Dame de Saint-Rémy's representatives had arrived in Chimay to ask for ceasing sales in the Rochefort vicinity, the Scourmont brothers proposed another solution: to help in enhancing beer quality. With the help of the monks and again De Clerck's, the brewery was modernized and in 1952 a new beer was prepared in Rochefort that was named 'Merveille' ('The Miracle'). Later, the product range broadened, the 'Rochefort 6' and 'Rochefort 8' beers were added, and 'Merveille' was renamed into 'Rochefort 10' (the number stood for a duration of bottle-conditioning in weeks). At this point, the 'blue' Chimay ceased to be a 'winter special' brew and began to be sold as a regular product from 1954 on. A bit later, 'St. Bernardus 12' joined the lineup (and 'Westvleteren XII' as well, after the St. Sixtus' Abbey reverted to brewing on-premises)<sup>1</sup>.

That's how at the beginning of the 50s, a new type of Trappist beer was conceived: the extra-strong dark. Chimay Bleue had 9% ABV, while Rochefort 10 reached the imposing 11.3%. Unlike in less thick *dubbel*, this strength required numerous technological advancements: selecting suitable yeasts, increasing gravities, and adding more syrup. The resulting beer is extraordinarily easy-drinkable for such gravity, featuring a rich and well-balanced taste.

When the La Trappe brewers (who were always much more market-oriented — to the extent that they were once temporarily expelled from the Trappist association) started to make analogous beer in 1991, they named it 'quadrupel' (sometimes shortened to *quad*) by analogy with *dubbel* and *tripel*, thus creating some confusion as it's not exactly clear at which point an 'extra-strong dark ale' becomes a 'quadrupel'. Chimay Bleue is usually considered the former, while Rochefort 10 is the latter.

What is more important, this beer has a firmly established reputation as the best beer in the world. When Ratebeer started to bestow its ‘Best Beer’ award back in 2001, Westvleteren, Rochefort, and Chimay were ranked 1st, 2nd, and 4th respectively<sup>2</sup>. Though the focus had shifted to craft beers since then, Westvleteren XII and Rochefort 10 still solidly occupy their place in almost every rating top.

## How to taste

Of course, the original Trappists are the most authentic extra-strong暗/quals:

- Westvleteren XII (which, let us remind you, is supposed to be sold on-premise only, and it's rather hard to find one);
- Rochefort 10;
- Chimay Bleue;
- and St. Bernardus 12, though it's now a secular brew.

A bit less famous are the beers made by the Association members who joined it a bit later:

- La Trappe Quadrupel;
- Stift Engelszell Gregorius;
- Achel Extra Bruin;
- Zundert 10.

And, of course, a throng of commercial brewers are making *quadrupel*. To name a few: Belgian Gouden Carolus, Straffe Hendrik, and De Struise; craft ones including Three Philosophers by Ommegang and Terrible by Unibroue.

## References

<sup>1</sup> Hieronymus, S. (2005), pp. 48, 62-63

<sup>2</sup> [https://www.ratebeer.com/ratebeerbest/default\\_2002.asp](https://www.ratebeer.com/ratebeerbest/default_2002.asp)

## Chapter 26. The Devil for Sale

With the monks working hard for themselves and for all other beer-makers in the world, commercial brewing in Belgium steadily began moving forward as well. The Prohibition law and competing foreign beers gave it some impetus. At the beginning of the 20th century, Belgian beers typically had 2.5% to 4.5% ABV (only *lambic* was stronger, around 6%). Though German and Dutch lagers were also around 3% to 5%, British brews were much stronger, even more so, their export versions. So it was not surprising that early strong Belgian beers were... British<sup>1</sup>.

In 1923 (or 1918, as some sources claim) the Moortgat brewery released its special strong ‘Victory Ale’ to celebrate the end of the First World War. To do so, one of the Moortgat brothers, Albert, went to Scotland searching for proper yeasts (and had found them either at William McEwan’s or William Younger’s brewery — the sources are again inconclusive)<sup>2</sup>. More importantly, he brought not only the yeasts, but the recipe as well: in fact, Victory Ale was a Belgian interpretation of the classical Scottish Ale (which was, in turn, the Scottish interpretation of the classical English barleywine) and had the impressive 8.5% ABV. So impressive that the local shoemaker named Van De Wouwer reportedly called it ‘the real devil’ (‘nen echten Duvel’ in the local dialect) — and the Moortgats unhesitatingly renamed ‘Victory Ale’ into ‘Duvel’.

### It's interesting

One brewer named Alfred Dubuisson went even further than this. After inheriting the family brewery in the Hainaut province, he decided to compete against British beers and, in 1933, prepared a special version of barleywine as strong as 12% ABV. The brew was named ‘Bush’ to stress the connection — in fact, he translated his very last name into English!

Both alcoholic exercises were dark (amber in the case of ‘Bush’) thick barleywines, quite uncharacteristic for Belgium of that period, and, probably, because of that were not particularly popular. Changes were brewing, and they happened in the 1960s. Emile Moortgat, who represented the third generation of the Moortgat family brewers, enlisted Jean De Clerck to help re-inventing Duvel. And De Clerck succeeded: he bred pure yeast strains and altered the technological processes of malting and brewing to create a new beer style in its strength and aroma comparable to *tripel* and in its lightness and clarity, to lager. Today this beer style is usually denoted as ‘Belgian strong pale ale’ or ‘Belgian strong golden ale’.

Making such a strong beer that is at the same time so pale and clear requires employing intricate techniques:

- exposing to high temperatures is to be avoided at any stage, as it results in darker beers;
- sugar syrup is replaced with the dextrose one;
- attenuation is increased: Duvel is an extraordinarily dry beer.

## How to taste

Of course, the No. 1 choice is Duvel itself, which can be found even in corner shops. Apart from the original Duvel, one of its first competitors in this style deserves a special mention: ‘Delirium Tremens’ by Brouwerij Huyghe (they are also producing one more magnificent strong golden ale under the ‘La Guillotine’ brand).

As the style became popular, many brewers, both traditional and craft ones, began to make it. Those most critically acclaimed are:

- Blonde by La Chouffe (which was, by the way, bought by the Moortgats at some point);
- Gnommegang by Ommegang (which was — guess, what? — also bought by the Moortgats);
- Gouden Carolus Cuvée Van De Keizer Imperial Blond;

- Piraat by Van Steenberge;
- Stille Nacht by De Dolle.

The above-mentioned Dubuisson brewery also makes a strong golden ale named ‘De Charmes’.

## The wind of change

As the history of Belgian brewing demonstrates, just making a quality product is not enough — the art of selling it is a must-have as well. At the beginning of the 80s, Belgium was producing a mind-blowing range of beers to suit any taste:

- *faro, lambic, gueuze*, and their cherry and raspberry varieties;
- *dubbel, tripel*, and (how they will later call it) *quadrupel*;
- Orval and *saison*;
- the Flanders brown;
- strong golden ales after by the Moortgats;
- *witbier* after Pierre Celis;
- ...and regular *pilsner* and pale ales as well.

The changes were brewing not only in Belgium but across the seas as well, in Britain and the United States. Only a sparkle was needed to start the fire of the craft revolution — the story of which we will tell you in the next chapter.

## References

<sup>1</sup> Gillman, G. *Trappist Ale And English Ale – Connections*

<https://www.beeretseq.com/trappist-ale-and-english-ale-connections/>

<sup>2</sup> Kearney, B. (2021) *The Duvel's in the Detail. How a Belgian Golden Strong Ale Became So Iconic*. Belgian Smaak

<https://www.belgiansmaak.com/the-duvels-in-the-detail-duvel-moortgat/>

## PART III. THE NEW HOPE

### Chapter 27. The Chronicles of the Catastrophe

The first half of the 20th century, with all the wars, depressions, and prohibition laws, was a long-lasting shock for beer-makers. The result of the shock was an unprecedented consolidation and even a monopolization of the brewing industry. The number of independent beer producers started its free fall at the beginning of the 20th century and eventually decreased several dozen times by the 1980s<sup>1 2</sup>.

Year	UK	Belgium	USA	Netherlands
1900	6447	3223	1816	~500
1920	2914	2013	—	~200
1950	567	663	407	~100
1980	142	123	101	13

Those countries that hadn't had extensive beer traditions of their own, might still have the two-producers duopoly as of today, and some markets (like South African, Turkish, or Colombian) are dominated by a single company controlling more than 70% of the entire beer production<sup>3</sup>.

The natural result of the consolidation was that not only the producers' number collapsed but also the number of available beer styles as well — e.g. the entire assortment was reduced to pale and dark lagers only (plus unfiltered varieties, sometimes). Even in Belgium, the market share of lagers was 55% as early as 1928, and since then it increased up to 70%<sup>4</sup>. In the United States, 101 breweries were producing just two porters in 1970<sup>5</sup> and one IPA<sup>6</sup>.

One of the notable exceptions was the United Kingdom, where lagers were losing to bitters and stouts up until the 1990s — although, it didn't prevent the industry from being monopolized: in the 1980s, the six largest brewers produced 75% of all beer in the country and controlled almost every pub<sup>7</sup>.

One of the moving forces of the lagerization and the consolidation was the incessant process of mergers and acquisitions that had finally culminated in creating the global beer conglomerate AB InBev, which consumed American Anheuser-Busch, Brazilian Ambev (which was in turn the joint venture of Brazilian brewers Antarctica and Brahma), and Belgian Interbrew (which was the result of the Artois-Pidboef merging), joined by SABMiller (which in turn was created after the SAB and Miller deal) in 2016. In some countries, the AB InBev market share exceeds 90% (for example, in Brazil and Uruguay) and even 99% (in the Dominican Republic)<sup>8</sup>.

This company — as well as the smaller conglomerates: Heineken N.V., Carlsberg Group, MillerCoors, and China Resources Snow Breweries Ltd. — owns literally hundreds of beer brands. Does it worth mentioning that almost all of these brands are totally identical pale lagers that the consumers aren't able to distinguish one from another<sup>9</sup>? In 2012, the four largest brewing companies in the world controlled 70% of the income in the industry<sup>10</sup> — the unprecedented digits that surpassed even those from the London porter oligopoly times.

## **First they ignore you**

This story, of the rebirth of the brewing out of ashes, in defiance of the industry giants, valued many billions of dollars each, is spectacular per se. But the fact that it was started *by one single person* makes it truly extraordinary.

Of course, events of such a magnitude never happen because of someone's individual efforts only: the changes build up for decades thanks to many people and are finally realized with the help of thousands and millions of enthusiasts. But the fact still is: for eleven years, from 1965 to 1976, there was exactly one man at the world's craft scene.

Frederick Louis 'Fritz' Maytag III was born in Newton, Iowa, in 1937 in a family of hereditary entrepreneurs. His great-grandfather, Frederick Louis Maytag, was the founder of the Maytag corporation that was making house appliances (washing machines, first of all). His father, Frederick Louis Maytag II, founded the Maytag Dairy Farm company that was producing dairy products. The hero of this story founded the craft revolution (though never yearned to do something like this).

In August, 1965, 'the smallest of the 50 US breweries', the Anchor Brewing Company, was scheduled to be closed. (As we remember, there were 101 breweries in the US; but there were just 50 independent companies that owned them.) Anchor was producing a specialty beer: the so-called 'American Steam Beer', which is made by forcing lager yeasts to ferment at a higher temperature. This style was considered to be a traditional American one (one might even say 'California common') and was enjoying some limited popularity among the frequenters (one of whom was Maytag) of the 'Old Spaghetti Factory' bar in San Francisco. As Fritz would later tell, he wasn't actually very fond of *steam beer*: it was rather a concept of traditional local beverage that attracted him<sup>II</sup>.

After learning from the bar owner that the *steam beer* production was to shut down, Maytag bought 51% of the shares (eventually increased up to 100% in 1965) — which cost him like a used car, as Fritz later admitted. This decision was, if not exactly spontaneous, at least very optimistic. First, Maytag had no idea of how to run the brewery; second, the business health of the Anchor Brewing Company was somewhere in-between intensive care and the morgue. Thousands of decisions like that in the 20th-century world had ended ingloriously — with bankruptcy and a fresh grave in the cemetery of history.

Anchor was doomed, as it had no chance to compete against the giants that were producing predictable and understandable lagers at a colossal scale. Anchor beer wasn't even bottled, the quality left a lot to be desired, and the entire sales network comprised several local bars. While an average American brewery in 1965 was producing more than 5 million liters of beer per month<sup>12</sup>, for the same period Anchor could brew... 100 kegs.

So, how was Maytag able not only to save the brewery but to make it a rival to giants?

First, he took the task of organizing beer production seriously and created a 'laboratory' on Eighth Street. Cheap substitutes, like corn syrup, were dropped and the beer taste was improved (surprisingly, by returning to the original, e.g. the 19th-century, recipe!), and, most importantly, the Maytag's team managed to achieve a decent shelf life without employing preservatives.

Second, Anchor started to work for its consumer: selling bottled versions, and not only in local bars but across the entire country as Maytag had found distributors for the product. The company used to grasp any marketing possibility to promote the beer.

And third, with his relentless advocacy and passion for the beer 'alchemy', Fritz Maytag encouraged many people to rebel against the world of identical pale lagers. California gradually became the center of what was later named 'the craft revolution': many other beer enthusiasts started to open their microbreweries inspired by Maytag and the Anchor Brewing Company example<sup>13</sup>.

## How to taste

Though Maytag sold the Anchor Brewing Company in 2010, his work lives on. The American steam beer aka the California common is being made by many small independent breweries (just like Fritz was dreaming of): American Toppling Goliath, Widmer Brothers, Smuttynose, Port City

Brewing, and European Mikkeller and To Øl. Of course, ‘Anchor Steam’ should be considered the canonical one.

## On ‘craft’ and ‘The Craft Revolution’

In the previous chapters, we had used the phrase ‘craft breweries’ quite a handful of times, and this part of the book will be exclusively dedicated to them, so it would be nice to actually define ‘craft’ before telling its history.

Alas, it's not that simple. Early craft brewers were defining themselves through quality: we make better beer and do not use cheap ingredients. But as we all understand, it's not entirely true: a brewery is a commercial venture which has to economize; the question is just where the borderline is, e.g. which cost-saving practices are acceptable and which are not.

Later, the ‘microbrewery’ term emerged, and beers made by these small independent producers became the ‘craft’ ones. But this definition is outdated as well, as many craft brewers had built real factories since then and their output is now pretty impressive. Also, many of them are not independent: some were sold to giant corporations (like the Anchor Brewing Company that Maytag ceded to Sapporo Holdings) or were from the beginning special ‘craft’ branches of such enterprises (like the Blue Moon Brewing Co. that was launched by MillerCoors).

Today, the best definition of ‘craft’ is a ‘subculture’: the subculture of people who value and appreciate interesting (to them) beers.

## References

<sup>1</sup> Poelmans, E., Swinnen, J.F.M. (2016), p. 20

<sup>2</sup> Dijk, M., Kroesen, J., Slob, B. (2018) *From Pilsner Desert to Craft Beer Oasis: The Rise of Craft Brewing in the Netherlands*, p. 10

[https://www.researchgate.net/publication/321947981\\_From\\_Pilsner\\_Desert\\_to\\_Craft\\_Beer\\_Oasis\\_The\\_Rise\\_of\\_Craft\\_Brewing\\_in\\_the\\_Netherlands](https://www.researchgate.net/publication/321947981_From_Pilsner_Desert_to_Craft_Beer_Oasis_The_Rise_of_Craft_Brewing_in_the_Netherlands)

<sup>3</sup> Howard, P.H. (2013), p. 4

<sup>4</sup> Hallen, van der P. (2007), p. 23

<sup>5</sup> Jankowski, B. (2012) *American Porters*

[https://www.morebeer.com/articles/american\\_porters](https://www.morebeer.com/articles/american_porters)

<sup>6</sup> Steele, M. (2012), see chapter 6

<sup>7</sup> <https://publications.parliament.uk/pa/cm200405/cmselect/cmtrdind/128/12805.htm>

<sup>8</sup> <https://www.nbwa.org/resources/look-inside-global-beer-market>

<sup>9</sup> Howard, P.H. (2013), p. 2

<sup>10</sup> *ibid*, p. I

<sup>11</sup> <https://www.latimes.com/archives/la-xpm-1996-03-10-tm-45141-story.html>

<sup>12</sup> Poelmans, E., Swinnen, J.F.M. (2016), p. 20

<sup>13</sup> Acitelli, T. (2013), see chapter ‘The Last Shall Be First’

## Chapter 28. The Revitalisation

Though Maytag was bearing the banner of the craft revolution all alone, many others were as well worried about the problem of protecting local brewers from extinction. If the United States had almost nothing to lose but Anchor Brewing Company, the Europeans still got some.

We doubt anybody is surprised by the fact that the European wing of the revolution was led by the Brits. On March 16, 1971, four young admirers of good ale — Michael Hardman, Graham Lees, Jim Makin, and Bill Mellor — gathered together in the Kruger's Bar, Dunquin, Ireland and founded one of the most influential consumer organizations in history: Campaign for the Revitalisation of Ale aka CAMRA. (Fortunately, they soon decided to replace the cumbersome ‘revitalisation of ale’ with just ‘real ale’, provided it makes the same abbreviation but spares a lot of letters. So ‘CAMRA’ now stands for ‘Campaign for Real Ale’.) The goals of the Campaign were set as follows: preservation and long-term development of real ale (and later — cider and perry as well) and pubs as a part of the cultural heritage of the United Kingdom. Starting the next year, in 1972, the Campaign began to issue its own magazine (‘What's brewing’), and, in 1974, its own book (‘The Good Beer Guide’). From 1977 on, the Great British Beer Festival is being held.

The impact CAMRA had on the British (and even global) industry of brewing is hard to underestimate. The Campaign became highly popular immediately (got five thousand members in just two first years), and soon turned into a power to be reckoned with. It was CAMRA that pushed the adoption of the so-called Beer Orders (formally, ‘Supply of Beer Order 1989’) to break down the oligopoly of the six main beer producers (which we described in the previous chapter) that controlled almost all pubs in the country, thus making it complicated for the smaller competitors to get on tap.

The ‘real ale’ from the CAMRA’s point of view must be ‘live’, e.g. contain enough yeasts and sugars to continue fermenting in a vessel it’s stored in. Most notable ‘real ales’ are ‘cask’-conditioned ones (e.g. kept in a small ‘cask’ barrel) at the normal atmospheric pressure (e.g. the excess carbon dioxide is evaporated): those cask ales are considered the true ones<sup>1</sup>.

## How to taste

Ideally — go to the UK, find a bar that participates in the Campaign (fortunately, today it’s not a problem at all), and have a pint of fresh cask ale. Meanwhile, CAMRA is preserving not only beer (and cider, and perry) but also authentic bar interiors. All these treasures (both bars and interiors) are listed in the Good Beer Guide that the Campaign issues (also available in the app)<sup>2</sup>.

If you can’t go to the UK, you might try ‘real ale’ in a bottle, as CAMRA also bestows the ‘Champion Beer of Britain’ award. The list of the champions might be found [there](#); let us just point out the most admired ones:

- the multiple-times winner in almost every category, Fuller’s with its flagship ‘London Pride’, ‘ESB’, ‘1845’, ‘Vintage Ale’ beers;
- Greene King—Old Speckled Hen, Abbot Ale, Olde Suffolk, IPA;
- Harviestoun — Old Engine Oil, Ola Dubh;
- Adnams — Broadside, Ghost Ship, SSB;
- Orkney — Skull Splitter, Dark Island;
- Ockham — Citra, Green Devil IPA, Jeffrey Hudson Bitter;
- Caledonian — Deuchars IPA, McEwan’s India Pale Ale, John Courage Amber.

Let us also note that ‘real ale’ is not a beer style but rather a set of rules on making and storing beers. CAMRA names 12 basic British beer styles, and a lot of sub-kinds to each of them — of every taste, color, and aroma.

## References

<sup>1</sup> <https://camra.org.uk/learn-discover/the-basics/what-is-live-beer/>

<sup>2</sup> <https://camra.org.uk/about/publications/the-good-beer-guide/>

## Chapter 29. American English

It was the beginning of the 70s, and the Anchor Brewing Company's situation remained uncertain. Maytag even managed to get some profit out of his enterprise, but the necessity to expand and modernize the production lines forced him to draw from his savings more and more. In search of additional sources of income, Fritz decided to enrich the beer assortment, and his glance quite logically fell upon another beer style that put down roots deep into American soil: porter. In 1974, the first batch of Anchor Porter was brewed, and in the same year, Maytag came to Great Britain and with some amusement learned the thing that we remembered from the 'Beer of the Industrial Revolution' chapter: porter hadn't been produced in its homeland for two decades already<sup>1</sup>. (Later, Anchor would add pale ale to the roster, as we will tell you in the next chapter, and after that, *barleywine* — two typical English beers).

Meanwhile, the wind of changes was steadily rising in California, and other enthusiasts joined Maytag. In 1976, New Albion Brewery was opened — the first brewery since the Prohibition times (formally, a winery: since the same time homebrewing was still banned in the US). Jack McAuliffe, being deeply impressed by British beers that he had got a taste for during his military service, after getting enthusiastic inspiration at Maytag's Anchor Brewing Company he had visited, was able to convince Susie Stern and Jane Zimmermann to invest in a brewing startup. The three of them created the second craft brewery in the world, located in the town of Sonoma, California — as they couldn't afford San Francisco rent rates.

The New Albion founders considered American beer 'a national disgrace': it tasted all the same and, to make production cheaper, the manufacturers weren't squeamish about using preservatives, cheap grain substitutes, stabilizers, and all kinds of recent developments in the field of chemistry. McAuliffe declared his goal was to make *quality* beers equal to the best English ales. And, despite the startup's limited funding forced them to literally build everything from scratch — fermentation tanks were

refurbished 200-liters coke syrup barrels, labels were glued to bottles manually with the vintage mechanical device made in 1910, etc. — the startup founders had managed to achieve that goal<sup>2</sup>.

New Albion Brewery started to make porter as well (and also other English specialties, such as stout and pale ale), thus completing the passing of the baton: while English breweries were stagnating, and famous porters and Burton ales were disappearing, the Americans began rebuilding the tradition.

The years 1975 to 1980 turned out to be the tipping point in the history of craft brewing. Several important events happened in this timeframe:

- CAMRA organized the first Great British Beer Festival in 1975;
- New Albion Brewery was opened in 1976;
- the British beer enthusiast and the first beer historian at the same time, Michael Jackson (not to be confused with a pop singer) on the heels of raising public interest in ales, inspired by CAMRA<sup>3</sup>, issued the first edition of his famous ‘World Guide to Beer’ in 1977;
- homebrewing was officially legalized in the US in 1978; the same year, amateur brewers came out of hiding and, thanks to the efforts of Charlie Papazian, the American Homebrewers Association was founded, the homebrewers journal ‘Zymurgy’ and the first recipe almanac ‘Joy of Brewing’ were issued;
- a year later, the first US-wide competition in homebrewing was held<sup>4</sup>;
- finally, two more craft breweries were opened in California (DeBakker Brewing Company and California Steam) and two more in other states: in Boulder, Colorado (simply named Boulder Brewing Company) and in Albany, New York (William S. Newman Brewing Company)<sup>5</sup>.

Education degrees and professional occupations of almost every newly established brewer had nothing to do with beer: McAuliffe, an ex-submarine crewman, was working as an optical engineer; two of the Boulder Brewing founders, David Hummer and Randolph Ware, were astrophysics teachers; Papazian was a school teacher as well; Zimmermann later became a distinguished therapist.

Still, what all of them were offering to the American beer lover? All the same British specialties:

- Boulder was brewing bitters, stouts, and porters<sup>6</sup>;
- DeBakker brewed porter<sup>7</sup>;
- the first issue of the Zymurgy journal featured the recipes of ‘Vagabond Black “gingered” Ale’ and ‘Black Lava Ale’<sup>8</sup>;
- the first National Homebrew Competition bestowed awards in four categories: beers and lagers, ales, stouts, and ‘unusual brews’<sup>9</sup>;
- Bill Newman was producing cask ales in the English manner, buying hops in the UK<sup>10</sup>.

## How to taste

Alas, none of the craft startups of the late 70s have survived until today. DeBakker and California Steam were short-living; New Albion was closed in 1982. Despite gaining great authority among homebrewers, McAuliffe, Stern, and Zimmermann were unable to convert it into a sustainable business. However, they made a definitive impact on future craft brewing by vividly demonstrating how a private microbrewery might be founded and launched — without buying a whole factory. More precisely, they *have invented* microbrewing in the modern understanding of the world. Boulder Brewing Company, which even went public in 1980 but declared bankruptcy a decade later (and was re-launched then as Boulder Beer Company), and Wm. S. Newman Brewing Company, which was closed in 1993, held on longer than others.

Still, the American porter remains one of the most popular craft beer styles. Maytag and McAuliffe brought American boldness to the brew: unlike the Brits, the Americans make their porter more complex, aromatic, and even daring, while experimenting a lot with the ingredients and the recipe.

With New Albion, DeBakker, and Boulder versions no longer available, the most interesting challenge is, of course, to find Anchor Porter. Of course, any self-respectful American brewery has one in its portfolio nowadays. The experts value greatly, for example, Everett Porter and Twilight Of The Idols by Hill Farmstead, Maple Bacon Coffee Porter and Last Snow by Funky Buddha, Edmund Fitzgerald by Great Lakes, Black Butte Porter by Deschutes, etc.

## References

<sup>1</sup> Acitelli, T. (2013), see chapter 'The Most Influential Beer'

<sup>2</sup> ibid, see chapter 'Chez McAuliffe'

<sup>3</sup> Cornell, M. Michael Hardman MBE – Mighty Beer Enthusiast

<https://zythophile.co.uk/2008/12/31/michael-hardman-mbe-mighty-beer-enthusiast/>

<sup>4</sup> Hindy, S. (2014), see chapter 2

<sup>5</sup> Acitelli, T. (2013), see chapter 'The Fireman and the Goat Shed'

<sup>6</sup> <https://www.craftbeer.com/featured-brewery/this-is-40-boulder-beer>

<sup>7</sup> <https://brookstonbeerbulletin.com/new-albion-vintage-beer-tasting/>

<sup>8</sup> <https://www.homebrewersassociation.org/homebrew-community-culture/zymurgy-magazine-issue-1-throwback-to-1978/>

<sup>9</sup> ibid

<sup>10</sup> <https://ediblecapitaldistrict.ediblecommunities.com/drink/bill-newman-godfather-american-craft-brewing>

## Chapter 30. USDA 56013

Until some moment, the craft revolution, though opposed to mass production, still hadn't made anything truly revolutionary: those English-style ales and porters by Anchor, New Albion, Boulder, Newman, and DeBakker were representing the classical styles, maybe with just some peculiarities. At the beginning of the 80s, with the third wave of craft startups coming, the situation began to change.

In the 70s, Anchor Brewing Company was using every occasion to bring attention to its products, and in 1975, such an occasion came very handy: the bi-centennial anniversary of the US independence from Britain. To mark this date, Maytag conceived a plan to brew a special celebration ale; and as Fritz had just visited the Timothy Taylor brewery in West Yorkshire, England, he chose traditional English pale ale as a model (oh, irony!) for his upcoming beer. The first try (the limited batch under the 'Liberty Ale' brand) was mediocre and got heavily criticized. Maytag didn't give up and produced a second batch (dubbed as 'Christmas Ale') for the Christmas of 1975. Two things were to be abolished: adding sugar to the wort and German hops<sup>1</sup>. In search of Hallertau replacement, Maytag contacted a farmer named John Segal known for his expertise in hops. A fortunate coincidence: Segal was just cultivating an experimental specimen No. 56013, a part of the United States Department of Agriculture (USDA) program aimed at developing new crop varieties. The new hops were bred by a group of researchers from Oregon State University, led by Jack Horner, by cross-breeding Fuggle with Russian Serebryanka (and some unknown third variety).

These hops (which soon got their own name: 'Cascade', after the Cascade mountains) turned out to be very interesting. First, they were bitter enough to suit Maytag's goal; second, apart from bitterness, they demonstrated a unique grapefruit-citrusy aroma and taste.

## It's interesting

The program to develop experimental hops kicked off back in 1933, but the Cascade was the first variety that saw any real usage.

## The chemistry of hops

The properties of hops (the taste and the corresponding bitterness) depend on the organic compounds it contains. These compounds might be divided into three groups:

- alpha acids that got isomerized after heating and give the bitter taste to beer and also provide some anti-septic qualities;
- beta acids act in the same manner but in the heat got oxidized, not isomerized;
- essential oils — the various compounds (most notably humulene, caryophyllene, and myrcene) that are responsible for ‘citrusy’, ‘piney’, ‘flowery’ flavors, etc.

Depending on the proportion of those compounds, hops are classified as bittering (typically, boiled with the wort to give bitterness to beer), aromatic (added after boiling and cooling the wort — in a course of so-called ‘dry hopping’), or dual-used (suit both needs)<sup>2</sup>.

Classical European ‘noble’ hops, such as Hallertau and Saaz, contain 4% alpha acids and a bit more (around 5%) beta acids. Kent hops, namely Fuggle and Golding, contain more of the latter but less of the former. The Cascade hops turned out to be richer in all three components<sup>3</sup>!

Hop variety	Alpha acids	Beta acids	Essential oils, in 100 g
Hallertau	3,5%	3,5-4,5%	0,6-1,2 ml
Saaz	2,5-4,5%	4,0-6,0%	0,4-0,8 ml

Hop variety	Alpha acids	Beta acids	Essential oils, in 100 g
Golding	5,0-6,0%	2,0-3,0%	0,9 ml
Fuggle	2,4-6,1%	2,1-2,8%	0,4-0,8 ml
<b>Cascade</b>	<b>4,5-8,9%</b>	<b>3,6-7,5%</b>	<b>0,8-1,5 ml</b>

Christmas ale by Anchor Brewing Company differed strikingly from British ales (and even more so compared to contemporary light lagers). It was quite bitter (around 50 IBU; it was definitely an IPA to the British consumers, and to Americans, accustomed to fivefold less bitter pilsners, it should have tasted like hell) and at the same time aromatic, crisp, and fancy beer.

Initially, the advents and retirements of Christmas Ale (Anchor had been carrying on experimenting, releasing new batches with updated recipes every December) made exactly zero impact on connoisseurs as simply nobody knew about the beer<sup>4</sup>. New Albion and Boulder (as well as mainstream Coors) were also using Cascade which was ‘trendy’, but nobody remembers that either. It’s not enough to just add aromatics hops to wort; one needs to make the beverage fit to encompass all the qualities of the hops.

The general offense of Cascade upon the beer lovers’ taste buds happened in 1981 as Ken Grossman and Paul Camusi released the first batch of Sierra Nevada Pale Ale: light, Cascade-hopped, bottle-conditioned. The new ale was a blast: the sales doubled in one year. Two years later, Maytag made his special pale ale a regular brew — and started to sell it under the restored ‘Liberty Ale’ brand.

The success of the Sierra Nevada creation wasn’t fortuitous: as Grossman later told, he and Camusi had a clear vision of the highest-quality aromatic ale they were going to make<sup>5</sup>, and had spent half a year in order to improve the recipe and got the result that had finally satisfied them with the eleventh try<sup>6</sup>.

## **How to taste**

The beer style inspired by Anchor Christmas/Liberty Ale and Sierra Nevada Pale ale is now known as American Pale Ale (APA). Unlike British pale ales that use hops for bitterness, American pale ales must be moderately bitter but utterly aromatic.

Some authors (Mitch Steele in particular) consider Liberty Ale not a true APA but rather an IPA, unlike Sierra Nevada Pale Ale. Though it's rather hard to mark the exact demarcation between the two styles, we can't but stress that both beverages are very similar to each other, both formally (5.9% ABV / 47 IBU versus 5.6% / 38 IBU) and tasting-wise (at least in the author of this book's taste).

Both 'breakthrough' beers are being made today. Anchor Liberty Ale enjoys the fame of the first craft beer in history as it marked an important milestone: the incipient craft subculture had for the first time made a totally new product, not a replica of some existing one. Sierra Nevada Pale Ale is less revered, but still is one the highest-selling craft beers in the world.

Apart from those two, we might recommend several other American pale ales made with Cascade: Alpha King by Three Floyds, Pale Ale by Founders, Mirror Pond Pale Ale by Deschutes, etc. In general, many craft breweries make APAs, and Cascade remains one of the most popular hop varieties.

## **...Then they laugh at you**

The Sierra Nevada Brewing Company's history at a first glance looks typical for those times: the founders were homebrewers, got impressed by Maytag with his new-old beers, and talked a lot to McAuliffe about how the New Albion Brewery was organized. But they had made one thing differently: they made provisions for future growth.

In the 1970s, no bank or venture investor imagined funding a beer startup. New Albion Brewery, being formally profitable, wasn't able to scrap any money to scale the production, which eventually resulted in the closing of the company. Maytag had to draw from the family budget and spend the inherited savings in order to save Anchor. Sierra Nevada was initially built in a manner that would allow future expansion once the planned production capacity starts generating income. Furthermore, the estimation proved correct, and the Sierra Nevada Brewing Company is worth more than a billion dollars nowadays.

Grossman and Camusi's success had marked a new era in the Craft Revolution history: brewing startups — new wave, rational and ambitious ones — were not just surviving but expanding and increasing outputs. In 1981, the RedHook brewery was opened; in 1983, the Kalamazoo Brewing Company (later renamed into the Bell's Brewery); in 1984, the Boston Beer Company (founder of which, Jim Koch, even had the Harvard MBA!); all of them are functioning today.

In the meantime, relentless Papazian organized the Great American Beer Festival (GABF), which name gives a clear hint of what Campaign was taken as a role model. The first GABF was held in the very same Boulder, Colorado, in 1982: 22 participants demonstrated their products to 850 attendees for 5 hours. Not very impressive, but that was only the beginning. (Also, a year later, GABF started to bestow awards based on visitors' voting. Sierra Nevada Pale Ale got the first prize, while Sierra Nevada and Anchor-made porter got the second and the third ones.)

## References

<sup>1</sup> Steele, M. (2012), see chapter 7

<sup>2</sup> <https://beermaverick.com/types-of-hops-aroma-noble-bittering-dual-purpose/>

<sup>3</sup> <http://www.hopslist.com/>

<sup>4</sup> Acitelli, T. (2013), see chapter 'The Most Influential Beer'

<sup>5</sup> <https://www.foodandwine.com/beer/craft-beer/25-most-important-american-craft-beers-ever-brewed?slide=ff26a990-6ab3-48f6-9cco-0b7d3ea33e5b#ff26a990-6ab3-48f6-9cco-0b7d3ea33e5b>

<sup>6</sup> Acitelli, T. (2013), see chapter 'The West Coast Style'

## Chapter 31. The 4 C's

Right after the American interpretation of British pale ale was born, Sierra Nevada Brewing Company made an American IPA as well — stronger, more bitter and more aromatic. The craft movement got its own signature: a love for immensely bitter and fragrant hop beverages. In the 90s, almost every brewery made a practice of brewing at least one IPA, and the most innovative ones got much further than this: ‘Belgian API’ emerged (fermented with Belgian yeast strains), then ‘Black IPA’ (made from darker malt), and also ‘double’, ‘triple’, and ‘imperial’ Indian pale ales. In 1999, IPAs already constituted the majority of beers at the Great American Beer Festival (maybe even earlier as we haven't found prior records).

Some researchers tell about the ‘Four C's Revolution’: after Cascade, in the 80s and 90s, Chinook, Columbus, and Centennial hit the market (the latter was even advertised as ‘Super-Cascade’). The proportion of alpha acids and essential oils broke Cascade's record with more than a double margin. But it was still not enough for modern horticulturalists as many new hop varieties demonstrate even more impressive numbers<sup>1</sup>.

Hop Variety	Alpha acids	Beta acids	Essential oils, in 100 g
Cascade	4,5-8,9%	3,6-7,5%	0,8-1,5 ml
Centennial	9,5%-11,5%	3,5%-4,5%	1,5-2,5 ml
Chinook	12%-14%	3%-4%	1,5-2,7 ml
Columbus	14%-18%	4,5%-6%	1,5-4,5 ml
Citra	10%-15%	3%-4,5%	1,5-3,0 ml
Amarillo	8%-11%	6%-7%	1,5-1,9 ml
Mosaic	11,5%-13,5%	3,2%-3,9%	1,0-1,5 ml
Apollo	15%-20%	5,5%-8%	1,5-2,5 ml

But it's not only about increasing the alpha acids and essential oils content: soon plant breeders started to search for varieties featuring specific flavors. Depending on which exactly essential oils are dominating, hops will have different aroma:

- caryophyllenes give a ‘herbal’ and ‘spicy’ smell and taste;
- myrcene — pine, citrus, fruit;
- farnesene — fresh green, woody;
- geraniol — flowers, berries;
- etc.

Though one might easily create one's own classification, usually around 10 different hop flavors are differentiated<sup>2</sup>:

Flavor	Example hops
Citrus	Cascade, Centennial, Amarillo, Citra, Simcoe, Galaxy
Tropical fruit	Mosaic, Idaho 7, Azacca, Citra, Simcoe, El Dorado
Stone fruit	Idaho 7, Eureka
Berries	Nelson Sauvin, Simcoe
Floral	Cascade, Centennial, Ella
Resin / Pine	Centennial, Chinook, Mosaic, Saaz
Herbal	Sabro, Nugget, Columbus, Hallertau, Ekuanot
Spice	Columbus, Chinook, Magnum, Saaz, Hallertau

Some hop varieties are bred on purpose bearing some very specific (and sometimes exotic) aroma in mind. For example, Nelson Sauvin has ‘vinous’ taste (or more precisely, the taste of Sauvignon Blanc grapes) and Sorachi Ace, the matcha one. Others were created to encompass the entire palette of different flavors in one hop cone — examples include Sabro, Apollo, and Mosaic.

## **How to taste**

The most convenient approach to understanding the impact the chosen hops made on beer taste is tasting several ‘Single Hop’ beers from one series. This implies the brewery makes several identical beers that differ only in hops. For example, the Mikkeller ‘Single Hop’ series comprises almost a dozen of different kinds of hops. Such sets are also featured by Hill Farmstead (‘Single Hop Pale Ale’), Toppling Goliath (‘Pseudo Sue’), Flying Dog (‘Imperial IPA Single Hop’), De Molen (‘Single Hop’), and Sierra Nevada (‘Single Hop’).

## **References**

<sup>1</sup> <http://www.hopslist.com>

<sup>2</sup> <https://beermaverick.com/the-science-behind-identifying-hop-aromas/>

## Chapter 32. New Belgium

As strange as it may sound, American craft brewers, indefatigable in their rally for recreating classical British recipes, had been ignoring for a quite long time the tradition of another ‘beer Mecca’: Belgium. By the beginning of the 90s, only one Belgian-style ale produced in the US was the Redhook Ale and its creation was quite anecdotal: yeasts for the new ale of 1982 were borrowed from the University of Washington, and they made the beverage taste like cloying overripe bananas; consumers were considering the beer just spoiled. It was Michael Jackson, the beer writer, who saved the business by pronouncing the Redhook product ‘Belgian-style ale’, as it soon began being advertised<sup>1</sup>.

The real advent of Belgian tradition to American soil is tied to the name of Jeff Lebesch. Jeff was an electrical engineer and one of the first Papazian's pupils when the latter was giving master classes in homebrewing (by the way, illegal at that time) in his kitchen. In 1988, Lebesch realized his old dream, inspired by Jackson, and spent a vacation traveling Belgium on bike, guided by Jackson's almanac. From this journey, he brought back a journal full of notes on Belgian brewing, and a firm determination to make Belgian-style beers of his own. In 1991, Josh and his wife Kim Jordan launched a craft startup in the basement of their Fort Collins home. The logo of the new brewery featured a bike, and the first beer they made was named ‘Fat Tire’. It was an amber ale in the *Spéciale Belge* style (see the corresponding chapter). Soon, Lebesch started to brew a second beer, ‘Abbey’, in the Trappist *dubbel* style.

New Belgium Brewing Company was an instant success. In 1993, ‘Abbey’ was awarded a gold medal at the Great American Beer Festival — in the ‘Various, Special’ category as nobody in the US has heard anything about ‘dubbel’. Ten years later, the brewery was making fantastic (for craft brewing) 180 million dollars in sales.

Almost immediately, other ‘Belgian’ craft startups popped out: Canadian Unibroue was founded in 1993, Allagash Brewing Company in 1995, Brewery Ommegang and Russian River Brewing Company in 1997. Also, the Celis Brewery was opened in 1992 by Pierre Celis who moved to the US after selling Hoegaarden to Artois, though calling his *witbier* a traditional Belgian beer is rather a stretch (see the ‘Orange Zest, Coriander, and the Hoegaarden Milkman’ chapter).

Interestingly, the boom of ‘Belgian’ craft brewing in the US preceded the boom of Belgian beer exports by a decade. Even in 2005, when New Belgium alone was producing 70 million liters of beer per year, real Belgian beer exports to the US comprised modest 2 million liters, and it was mostly Stella Artois and Jupiler lagers<sup>2</sup>. In fact, American craft brewers reinvented Belgian beer totally independently (as they did with British beers twenty years before that).

## How to taste

The author of this book considers craft Belgian pale ales such as let's say, Gnommegang by Brewery Ommegang or Damnation by Russian River, a beer style in its own right, in some sense more ‘Belgian’ than real Belgian beers. Craft versions are more characteristic, the ‘Belgian’ traits are more extreme in them. We would suggest the reader try and make their own conclusions.

## References

<sup>1</sup> Hindy, S. (2014), see chapter 1

<sup>2</sup> Persyn, D., Swinnen, J.F.M., Vanormelingen, S. (2010), pp. 11, 34

## Chapter 33. The Alchemist from Vermont

Beer is a democratic beverage: we have never heard ecstatic stories about the finest harvest of 1967 used to make a single batch of beer, each bottle worth 10 thousand euros (but don't let them deceive you: only the barley from the southern slope counts). Yes, there are rare and hard-to-reach beers like Westvleteren or Cantillon; however, first, you might find them for something like 20 euros if you try hard enough, and, second, to be frank, craft varieties of the same beers are hardly worse than the originals. In the 80s, it was, of course, much more complicated, and one needed to go to Belgium and reach remote monasteries by bike, but in the 21st century, in every big city, one might get literally everything one wants.

And that makes the story that happened right before our eyes in the backwater town of Waterbury, Vermont, even more fascinating. In 2003, John and Jen Kimmich opened there a small bar named 'The Alchemist' and a brewery at it. For his bar, John was making a special IPA he called 'Heady Topper'. Brews were not regular — just two times a year. Then three times. Then four.

The Kimmichs never advertised Heady Topper and didn't care about marketing. However, they soon found patrons were making lines outside of their bar. Beer lovers from all across the country were heading to Vermont to try this beer and then tell everyone about it. Furthermore, some of the buyers were secretly pouring the beer into bottles to re-sell it at an exorbitant price.

In 2011, John convinced Jen to start selling Heady Topper in cans and installed a small packaging line. (Ironically, the same week, Tropical Storm Irene washed the pub away.) In the first year the output increased four times; next year, another six. In 2013, Heady Topper stormed the BeerAdvocate rating, ending the year in 4th place, and since then never left the top 5<sup>1</sup>.

But what was the alchemy that John Kimmich was making in this small Vermont pub? He actually did the following: brewed a double IPA with hops not being used for bitterness, but for aroma taste only. And yes, he had to apply a lot of magic! Heating wort with hops needs to be totally avoided, dry hopping applied multiple times, and special hops selected to balance flavors.

This beer style is now known under many names: Vermont IPA, NE IPA (NE = New England, a region that includes Vermont), East Coast IPA (opposing the West Coast there California with its classical American IPAs is located), DDH IPA ('Double Dry Hopped'); also 'hazy' or 'juicy' IPA — because of the best examples of the style, including the Heady Topper one, featuring mostly tropical juice aroma; there is (usually) no real juice in the recipe. And the 'hazy' adjective is the result of the general cloudiness and opaqueness of the drink.

For a long time, classifiers failed to recognize NE IPA as a beer style in its own right. The dam got busted in 2018 when the Great American Beer Festival organizers finally introduced separate 'juice or hazy' pale ale categories — which immediately dislodged the traditional IPAs as the most popular beer style by the number of entrants.

## How to taste

Ideally — find the very Heady Topper (or other beer in this style from The Alchemist named 'Focal Banger'), but that's still quite complicated. Among the US brewers, Hill Farmstead, Tree House, and Trillium are considered experts in making superb Vermont-style ales.

Other beers marked as 'NE IPA' shall be treated with a certain degree of incredulity, as many 'NE IPA'-marked beers are just regular IPAs, thanks to the immense popularity of the style and the complexity of producing a proper product. The 'DDH' mark is usually more reliable, as double dry hopping at least guarantees the rich aroma and flavor. In general, there is no such question as 'how to distinguish NE IPA from IPA': proper NE IPA

should be hardly distinguishable in its appearance from orange or pineapple juice.

## References

<sup>1</sup> Riches, S. (2017) *The Story of Heady Topper, America's Most Loved Craft Beer*. Longreads and Food & Wine Magazine | March 2017

<https://longreads.com/2017/03/01/the-story-of-heady-topper-americas-most-loved-craft-beer/>

## **Chapter 34. The Three Whales of the Craft Revolution**

In those five decades that passed since Maytag reinvented The Anchor Brewing Company, the craft movement made a huge step forward and is nowadays a large heterogenous subculture. Describing all the styles, trends, and tendencies in craft brewing is rather a dead cause as new ones occur at a much faster pace than the author of this book's writings.

Frankly speaking, we don't actually aim to describe *every* existing kind of beer. As we told readers many times in the previous chapters, beer is a democratic beverage. For many years already the credo of a true beer lover is very simple: drink local beer. Drink what is made here and now.

Still, to help you, dear reader, to navigate the modern craft scene, let us describe the main trends — the 'three whales' of craft brewing.

### **1. Preserving cultural tradition**

Craft enthusiasts do love history and made great efforts to preserve and revive it. From porter, pale ale, and *lambic* — to Dutch *koyt*, German *mumme*, and Ancient Egyptian *zythos*; from authentic British pubs to hoary Norwegian village breweries. There are *practical* researchers among modern historians who not only read the elder annals but reenact Medieval technology to clarify dubious and obscure wording. We described many such reconstructions in Part I of this book.

### **2. Brewing bitter beers**

Breeding hops and making bitter ales with them is the signature trademark of the craft subculture. IPA and its derivatives continue to reign over craft beer styles both in terms of popularity and sales. Since the 90s, countless variations of the recipe were invented:

- Double / Triple / Imperial IPA, with its high alcoholic content increased; history started in 1994 when the Russian River Brewing Company created ‘Pliny the Elder’ — the first modern strong IPA;
- Black IPA, made with an addition of dark or black malt; invented by the Vermont Pub & Brewery at the beginning of the 90s;
- Belgian IPA, brewed with Belgian yeast strains; first made by Belgian brewery ‘Urthel’ after its brewmaster toured the US in 2005;
- New England / Vermont / East Coast / Hazy / Juicy / DDH IPA — see the previous chapter;
- Brut IPA, a full antithesis to the previous one — a crystal clear beer with all the sugars and other residual compounds removed; invented by the Social Kitchen and Brewery in 2010;
- Sour and ‘Wild’ IPA, fermented with *Brettanomyces* / *Lactobacillus* / packages of microorganisms akin to Belgian spontaneously fermented beers; introduced by New Belgium Brewing in 2011;
- Red, Brown, Rye, and White IPA, brewed with amber, brown, rye, and wheat malt respectively;
- Session / ‘Micro’ IPA, with its alcoholic content reduced down to 4% / 2% ABV respectively.

### 3. Experimenting!

As one might have guessed from the previous paragraph, experimenting with recipes is like catnip for a craft brewer. It was imaginers from the Goose Island brewery who set the fashion in the early 90s by inventing bourbon barrel-aged stouts — which are now solidly occupying the rating tops.

If you subscribe to some craft beer resource maillist, you will soon discover quite a lot of novelties. The last such a maillist the author of this book got included the proposal to try:

- *barleywine* aged in rum barrels;
- sour ales with blueberries and raspberries;
- Imperial dessert stout;
- *tripel* with cardamom, orange zest, and coriander;

- *lassi gose* — literally, sour salty beer prepared like the Indian beverage *lassi*, utilizing mango puree, yogurt, and *Lactobacillus*;
- Imperial *gose* with raspberries, peanut butter, vanilla, and lactose;
- ‘smoky’ *quadrupel*.

And I may assure you that *some* of those beverages deserve your attention!

## Then you... win?

As the 1960s were the worst time for a beer lover to live, the 2020s look like the best of all possible worlds. According to the BeerAdvocate annual report, they counted 20 thousand breweries in the world (half of them outside the cradle of the craft revolution — the United States of America). And if this number is actually comparable to what we had at the beginning of the 20th century, another figure is completely mind-blowing: in 2020 alone more than 67 thousand new beers hit the market<sup>1</sup>.

Still, the full victory is definitely not achieved yet. Despite the impressive numbers, the share of ‘non-mainstream’ beer in total sales is embarrassingly low (12% in the US, even lower than that in other countries). The bad news is that this share is actually decreasing slowly<sup>2</sup>. The ‘Big Brewers’ continue the endless process of mergers & acquisitions, protracting more and more former craft breweries into their gravity wells. Many major brands in the craft beer market lost their independency years ago: AB InBev controls Goose Islands and many smaller producers, Heineken owns Lagunitas, Kirin Brewing Company — New Belgium and the Brooklyn Brewery, Sapporo Breweries — Unibroue and the legendary Anchor Brewing Company.

Will we end this book with this premonitory remark? Well, we actually do believe that the future diversity of our beloved drink is safe — while there are people who prefer real tasteful beers over identical insipid chemical compounds. And we hope that, after reading this book, there is one more such a person in the world.

## References

<sup>1</sup> <https://www.beeradvocate.com/articles/18304/the-year-in-beer-breaking-down-2020/>

<sup>2</sup> <https://fortune.com/2021/04/06/craft-brewers-2020-sales-market-share-closings-beer-independent-brewers-association/>

## APPENDIX

### Chapter 35. On Beer Styles, Ratings, and Recommendations

This book is written in a form of ‘lecture-degustation’: there are recommendations in each chapter, which beer style to try to fully understand the subject.

Today, there are several comprehensive and influential classifications of beers:

- ‘The World Guide to Beer’ by Michael Jackson<sup>1</sup>;
- ‘The Oxford Companion to Beer’<sup>2</sup>;
- Beer Judge Certification Program (BJCP) guidelines<sup>3</sup>;
- beer style guidelines by the Brewers Association<sup>4</sup>.

All those, beyond any doubt, monumental works are, regrettably, equally monumentally contradict each other, and, even more regrettably, do not take into account the historical aspect: how all these beers emerged and what evolution underwent. That leads to anecdotal situations when the classifications sometimes recognize outright marketing hoaxes — for example, the ‘Irish Red Ale’ which was simply invented by French Pelforth brewery in 1974<sup>5</sup>.

That's why in our recommendations we're trying to outline, first, modern beers closest to the historical styles (which frequently doesn't go well even with the most elaborate classifications; for example, Burton Ale or ‘entire-butt’ porter haven't earned their place in the guidelines yet); and, second, the best modern interpretations of the style, sharing the same spirit with the original ones.

As for selecting the ‘best’ or ‘most notable’ beers, we’re relying on different sources, namely, the most popular web services that provide beer ratings. Today, there are three of them:

- [beeradvocate.com](http://beeradvocate.com)
- [ratebeer.com](http://ratebeer.com)
- [untappd.com](http://untappd.com)

These three sites are of the most use if you seek for recommendations. However, one needs to learn the basics of working with them first:

- stronger brews are usually much higher rated, so the consolidated top is not very relevant as almost every Imperial stout will have higher grades than almost every session IPA;
- tops by style are more demonstrative but are susceptible to another problem: they might easily comprise obscure beers with a dozen ‘A’ grades given by brand enthusiasts.

All three services feature their own classifications of beer styles (needless to say, all three differ from one another, and from the above-mentioned guidelines as well). Ratebeer also provides a system of ‘tags’ that is much more convenient for searching non-standard beers than ‘styles’.

## References

<sup>1</sup> Jackson, M. (1997)

<sup>2</sup> The Oxford Companion to Beer (2012)

<sup>3</sup> Beer Judge Certification Program 2015 Guidelines

<https://dev.bjcp.org/beer-styles/introduction-to-the-2015-guidelines/>

<sup>4</sup> Brewers Association Beer Style Guidelines

<https://www.brewersassociation.org/edu/brewers-association-beer-style-guidelines/>

<sup>5</sup> Cornell, M. *How one Irishman's ginger beard helped launch an entirely bogus style of beer*

<https://zythophile.co.uk/2021/08/25/how-one-irishmans-ginger-beard-helped-launch-an-entirely-bogus-style-of-beer/>

# Chapter 36. The Summary of Recommended Beer Pairings by Chapter

For every chapter, the closest beer style in the BJCP guidelines is provided, as well as links to the beer-rating websites. If there are several rows in the table, they are sorted by historical accuracy (descending).

## At the Dawn of Civilization

The best choice:

- Dogfish Head Midas Touch
- Dogfish Head Kvasir
- Williams Bros. Fraoch
- Thornbridge Hall Bracia
- Brasserie Dupont Posca Rustica
- Birra del Borgo Etrusca

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Ancient Herbed Beer	Subtype of 27. Historical Beer	Subtype of Traditional Ale — Other	Subtype of Gruit / Ancient Herbed Ale, Herb and Spice Beer	Subtype of Historical Beer — Other, Gruit / Ancient Herbed Ale

There is no separate category or tag for ‘ancient’ beer, read the descriptions carefully.

## The Barbarian Booze

The best choice: Aecht Schlenkerla Rauchbier Märzen.

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Rauchbier	6B. Rauchbier	Smoked — Rauchbier	Lager — Rauchbier	Rauchbier
Smoked Beer	32. Smoked Beer	Smoked — Other	Smoked Beer	Smoked Beer

## Bog Myrtle

The best choice:

- Scratch Brewing Company Mumm
- Schiøtz Mørk Mumme
- 7 Fjell / Vaat Alte Hansa Mumme
- Kongens Bryghus Julemumme

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Mumme	Subtype of 27. Historical Beer	Subtype of Flavored — Other, Traditional Ale — Other	Subtype of Gruit / Ancient Herbed Ale, Herb and Spice Beer	Mumme
Gruitbier	30A. Spice, Herb, or Vegetable Beer	Gruit	Gruit / Ancient Herbed Ale	Gruit / Ancient Herbed Ale

*Mumme* is recognized as a separate beer style only on Untappd. There is a special ‘[mumme](#)’ tag on Ratebeer. Otherwise, look for a dark thick beer with a word ‘mumme’ (‘mumm’, ‘mum’) in description.

## Word on Hops

The best choice:

- Klavervier Koyt — Kuit — Kuyt
- Oedipus Shampoo
- Jabeerwocky / Nepomucen High Oats

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Koyt	Subtype of 27. Historical Beer	Subtype of Traditional Ale — Other	Subtype of <a href="#">Gruit / Ancient Herbed Ale, Herb and Spice Beer</a>	—
Bock / <i>boekbier</i>	Subtype of 6C. Dunkles Bock	Subtype of <a href="#">Bock — Dunkler Bock</a>	Subtype of <a href="#">Bock — Traditional</a>	Subtype of <a href="#">Bock — Single / Traditional</a>

There is no separate category for either *koyt* or warm-fermented *bock*. *Koyt* beers usually have the ‘koyt’ (‘kuit’, ‘kuyt’) word in their names (the one exception is Jopen Koyt). There is a ‘[koyt](#)’ tag on Ratebeer. As for *bock*, any Dutch or Belgian one will do (note that it's frequently classified as a subtype of Strong Ale).

## The Cold of Alpine Caves

The best choice:

- Weltenburger Kloster Barock Dunkel
- Spaten München Dunkel

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Dark Munich Lager	8A. Munich Dunkel	Subtype of <a href="#">Dark Lager — Dunkel / Tmavý</a>	Lager — Munich Dunkel	Lager — Munich Dunkel

Ratebeer doesn't have a separate category for Bavarian dark lagers.

## The Beer Purity

The best choice:

- Schneider Weisse Mein Aventinus (Tap 6)
- Weihenstephaner Vitus

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Weizenbock	10C. Weizenbock	Weissbier — Weizenbock	Bock — Weizenbock	Bock — Weizenbock
Dark Weissbier	10A. Weissbier, 10B. Dunkles Weissbier	Weissbier — Hefeweizen, Weissbier — Dunkelweizen	Wheat Beer — Hefeweizen, Wheat Beer — Dunkelweizen	Hefeweizen, Dunkelweizen

## Barrels and Bretts

The best choice: Greene King Strong Suffolk / Olde Suffolk.

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Stock Ale	Subtype of 28A. Brett Beer	Subtype of Old Ale	Subtype of Brett Beer	—
Old Ale	17B. Old Ale	Old Ale	Old Ale	Old Ale

There is no specific designation for stock ale, look for the words 'stock ale' in the description. Not every Old Ale fits: ideally, take the one that indicates the usage of *Brettanomyces*.

## The Beer of the Industrial Revolution

The best choice: Salopian Entire Butt.

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Entire-butts	Subtype of 27. Historical Beer	Subtype of Porter	Subtype of Porter — English	Subtype of Porter — English
Porter	13C. English Porter	Porter	Porter — English	Porter — English
Stout	15. Irish Beer, 16. Dark British Beer	Stout	Stout — English	Stout — English

There is no category for the original ‘entire-butts’ porters; the reconstructions are just named ‘entire-butts’.

## It's All About Water

The best choice:

- Young's Winter Warmer
- Fuller's 1845
- Ballantine Burton Ale

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Burton Ale	Subtype of 17A. British Strong Ale	Subtype Strong Ale — English	Winter Warmer	Burton Ale, Winter Warmer

Burton ale is a thick dark subtype of British strong ales, sometimes marked as ‘winter warmer’. There are ‘burton-ale’ and ‘winter-warmer’ tags on Ratebeer, and there are ‘Winter Warmer’ and ‘Burton Ale’ categories on Untappd. However, Burton ales might fall into almost every category of

British strong beer, including Old Ale, Bitter / Extra Strong Bitter, Barleywine, and British / English Strong Ale.

## The Red Triangle

The best choice:

- Allagash Brett IPA
- Stone Enjoy After Brett IPA
- Ballantine India Pale Ale
- Worthington's White Shield

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Brett IPA	Subtype of 28A. Brett Beer	Subtype of IPA — Sour / Wild	Subtype of Brett Beer	Subtype of IPA — Brett
IPA	12C. English IPA	IPA — English	IPA — English	IPA — English

The most authentic variants are strongly hopped British IPAs (IBU > 60, ideally made with Golding or Fuggle hops). There is a ‘brett-ipa’ tag on Ratebeer.

## The Age of Empires

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Russian Imperial Stout	20C. Imperial Stout	Stout — Imperial	Stout — Russian Imperial	Stout — Imperial / Double

## A Series of Unfortunate Events

The best choice: Pilsner Urquell.

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Pilsner	3A. Czech Pale Lager	Pilsener — Bohemian / Czech	Pilsner — Bohemian / Czech	Pilsner — Czech

## Orange Zest, Coriander, and the Hoegaarden Milkman

The best choice: Hoegaarden

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Witbier	24A. Witbier	Witbier / Belgian White Ale	Wheat Beer — Witbier	Wheat Beer — Witbier

## White, Yellow, Brown

Style	Manufacturer
Peeterman	Breda Peeterman
Uitzet	Paeleman Uitzet 1730
Seef	Antwerpse Brouw Compagnie Seefbier
Jack-Op	Brouwerij F. Boon Jack-Op
Zoeg	Brouwerij De Vlier Zoeg Tienen

Each of these beers is made by just one brewery and is not recognized by official guidelines.

## Biology and Chemistry

The best choice:

- Cantillon Gueuze
- 3 Fonteinen Oude Geuze
- Lindemans Faro
- Oud Beersel Oude Geuze

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
<i>Faro</i>	—	Lambic — Faro	Lambic — Faro	Lambic — Faro
<i>Lambic</i>	23D. Lambic	Lambic — Unblended Jonge / Oude	Lambic — Traditional	Lambic — Traditional
<i>Gueuze</i>	23E. Gueuze	Lambic — Gueuze	Lambic — Gueuze	Lambic — Gueuze

For unknown reasons, BJCP does not recognize *faro* as a separate beer style.

## March

The best choice:

- Saison de Pipaix
- Silly Saison

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
<i>Saison</i>	25B. Saison	Saison / Farmhouse / Grisette	Farmhouse Ale — Saison	Farmhouse Ale — Saison, Grisette
<i>Bière de Garde</i>	24C. Bière de Garde	Bière de Garde / de Mars / Brut	Farmhouse Ale — Bière de Garde	Farmhouse Ale — Bière de Garde, Farmhouse Ale — Bière de Mars

## Turning Red

The best choice:

- Rodenbach Alexander
- Liefmans Oud Bruin

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Flanders brown ('red') ale	23B. Flanders Red Ale, 23C. Oud Bruin	Sour Flemish — Flanders Red / Oud Bruin	Sour — Flanders Red Ale, Sour — Flanders Oud Bruin	Sour — Flanders Oud Bruin, Sour — Flanders Red Ale

## Spéciale Belge

The best choice:

- Palm
- De Koninck Bolleke
- De Ryck Special
- Contreras Tonneke

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
The Belgian Special	24B. Belgian Pale Ale	Subtype of Belgian Ale — Dark / Amber	Subtype of Pale Ale — Belgian	Subtype of Pale Ale — Belgian

Though *Spéciale Belge* is an amber ale, BJCP, BeerAdvocate, and Untappd call it ‘Belgian Pale’. Furthermore, in the BJCP guidelines, the Belgian Special is the only type of beer in this category, while all other pale Belgian beers fall into the ‘25A. Belgian Blond Ale’ category; at the same time, BeerAdvocate and Untappd mark no difference between the Belgian Special and other

Belgian pale beers. Finally, Ratebeer classifies *Spéciale Belge* as a part of the ‘Belgian Ale — Dark / Amber’ category, but at least it also features the ‘speciale-belge’ tag.

## The Rose of Brussels

The best choice:

- Cantillon Rosé De Gambrinus
- Cantillon Kriek Lambic
- Cantillon Fou' Foune
- 3 Fonteinen Schaarbeekse Kriek

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Fruit Lambic	23F. Fruit Lambic	Lambic — Flavored	Lambic — Fruit	Lambic — Kriek, Lambic — Framboise, Lambic — Fruit

## Not Brewers

The best choice: Westmalle Dubbel.

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Dubbel	26B. Belgian Dubbel	Dubbel	Dubbel	Belgian Dubbel

## The White Cap

The best choice:

- Westmalle Tripel
- Witkap Pater Tripel
- Tripel Karmeliet

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
<i>Tripel</i>	26C. Belgian Tripel	<a href="#">Tripel</a>	<a href="#">Tripel</a>	<a href="#">Belgian Tripel</a>

## The Valley of Gold

The best choice: Orval.

Formally, Orval is classified as a Belgian strong pale / golden ale, but in fact, Orval is a beer style in its own right. Craft replicas of Orval might be found on Ratebeer by the '[orval-clone](#)' tag.

## Gradus ad Parnassum

The best choice:

- Chimay Grande Réserve (Bleue / Blue)
- Trappistes Rochefort 10
- Westvleteren XII
- St. Bernardus Abt. 12

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Belgian Strong Dark Ale	26D. Belgian Dark Strong Ale	<a href="#">Belgian Ale — Strong Dark</a>	<a href="#">Strong Ale — Belgian Dark</a>	<a href="#">Belgian Strong Dark Ale</a>
<i>Quadrupel</i>	26D. Belgian Dark Strong Ale	<a href="#">Quadrupel / Abt</a>	<a href="#">Quadrupel (Quad)</a>	<a href="#">Belgian Quadrupel</a>

BJCP doesn't recognize *quadrupel* as a separate Belgian beer style.

## The Devil for Sale

The best choice: Duvel.

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Belgian Strong Pale Ale	25C. Belgian Golden Strong Ale	Belgian Ale — Strong Pale	Strong Ale — Belgian Pale	Belgian Strong Golden Ale

## The Chronicles of the Catastrophe

The best choice: Anchor Steam.

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
Steambeer	19B. California Common	California Common / Steam Beer	California Common / Steam Beer	California Common

## The Revitalisation

The best choice: Fuller's London Pride.

'Real ales' have [their own classification](#) as it's the set of requirements for beer production, not a specific beer style.

## American English

The best choice: Anchor Porter

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
American Porter	20A. American Porter	Subtype of Porter	Porter — American	Porter — American

Ratebeer doesn't recognize American porter as a separate category, but does have the closely related '[robust-porter](#)' tag.

## USDA 56013

The best choice:

- Sierra Nevada Pale Ale
- Anchor Liberty Ale

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
American Pale Ale	18B. American Pale Ale	Pale Ale — American (APA)	Pale Ale — American	Pale Ale — American

BJCP, BeerAdvocate, and Untappd classify modern Anchor Liberty Ale as IPA, not APA; BJCP even stresses that the initial Liberty Ale of 1975 was much closer to the APA style.

## The 4 C's

Style	BJCP guidelines	ratebeer	beeradvocate	untappd
American IPA	21A. American IPA	IPA — American	IPA — American	IPA — American

For this chapter, we recommend trying several beers of the same lineup made with different hops. There is the '[single-hop](#)' for such beer series.

## New Belgium

The best choice:

- New Belgium Brewing Company
  - Fat Tire
  - Abbey
  - Le Terroir

- La Folie
- Unibroue
  - La Fin du Monde
  - Trois Pistoles
  - Maudite
  - Terrible
- Allagash Brewing Company
  - Tripel Reserve
  - Interlude
  - Curieux
  - Evora
  - White
- Brewery Ommegang
  - Abbey Ale
  - Fleur De Houblon
  - Tripel Perfection
  - Gnomegang
- Russian River Brewing Company
  - Supplication
  - Damnation
  - Redemption
  - Perdition

There is no category for American varieties of Belgian ales, as it's basically any craft beer in the Belgian style.

## The Alchemist from Vermont

The best choice: The Alchemist Heady Topper

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<b>Style</b>	<b>BJCP guidelines</b>	<b>ratebeer</b>	<b>beeradvocate</b>	<b>untappd</b>
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Style	BJCP guidelines	ratebeer	beeradvocate	untappd
New England IPA	Subtype of 21A. American IPA	IPA — Hazy / New England (NEIPA), IIPA DIPA — Imperial / Double Hazy (NEIPA)	IPA — New England	IPA — New England, IPA — Imperial / Double New England

BJCP doesn't recognize NE IPA as a separate style.

## The Three Whales of the Craft Revolution

The best choice: try something new!

# BIBLIOGRAPHY

A Hymn to Ninkasi

[https://etcsl.orinst.ox.ac.uk/cgi-bin/etcsl.cgi?text=t.4.23.1&display=Crit&charenc=gcirc&lineid=t4231.pi#t4\\_231.pi](https://etcsl.orinst.ox.ac.uk/cgi-bin/etcsl.cgi?text=t.4.23.1&display=Crit&charenc=gcirc&lineid=t4231.pi#t4_231.pi)

Acitelli, T. (2013) *The Audacity of Hops: the History of America's Craft Beer Revolution*. ISBN 9781613743881

Bailey, P. *Paul's Beer & Travel Blog*

<https://baileysbeerblog.blogspot.com>

Bennett, J. M. (1996) *Ale, Beer, and Brewsters in England: Women's Work in a Changing World, 1300-1600*. ISBN 9780195126501

Boak & Bailey's Beer Blog

<https://boakandbailey.com/>

Cornell, M. *Zythophile*

<https://zythophile.co.uk/>

Cornell, M. (2010) *Amber, Gold & Black. The History of Britain's Great Beers*. ISBN 9780752475943

Damerow, P. (2001) *Sumerian Beer: The Origins of Brewing Technology in Ancient Mesopotamia*. Cuneiform Digital Library Journal, 2012:002

[https://cdli.ucla.edu/pubs/cdlj/2012/cdlj2012\\_002.html](https://cdli.ucla.edu/pubs/cdlj/2012/cdlj2012_002.html)

Dietler, M. (2006) *Alcohol: Anthropological/Archaeological Perspectives*. Annual Review of Anthropology, 2006. 35:229–49:230

[https://www.academia.edu/272118/Alcohol\\_Archaeological\\_Perspectives](https://www.academia.edu/272118/Alcohol_Archaeological_Perspectives)

Gallone, B., Mertens, S., Gordon, J. L., Maere, S., Verstrepen, K., Steensels, J. (2017) *Origins, evolution, domestication and diversity of *Saccharomyces* beer yeasts*. Current Opinion in Biotechnology, Volume 49

<https://www.sciencedirect.com/journal/current-opinion-in-biotechnology/vol/49/suppl/C>

*Garshol, L. M. Larsblog*

<https://www.garshol.priv.no>

*George, A. (1999) *The Epic of Gilgamesh. A new Translation. Translated with an Introduction by Andrew George.* ISBN 0140447210*

[https://www.academia.edu/16568346/Epic\\_of\\_Gilgamesh\\_The\\_George\\_trans\\_Penguin\\_1999\\_](https://www.academia.edu/16568346/Epic_of_Gilgamesh_The_George_trans_Penguin_1999_)

*Gillman, G. Gary Gillman's Beer et seq.*

<https://www.beeretseq.com/>

*Guinard, J. (1990) *Lambic.* ISBN 0937381225*

*Hallen, van der P. (2007) *Concentration in the Belgian brewing Industry and the Breakthrough of Lager in the interwar years.* Center for Economic Studies Discussions Paper Series (DPS) 07.28*

*Hieronymus, S. (2005) *Brew Like a Monk: Trappist, Abbey, and Strong Belgian Ales and How to Brew Them.* ISBN 093738187X*

*Hindy, S. (2014) *The Craft Beer Revolution. How a Band of Microbrewers Is Transforming the World's Favorite Drink.* ISBN 9781137278760*

*Hornsey, I. S. (2008) *A History of Beer and Brewing.* ISBN 0854046305*

*Howard, P.H. (2013) *Too big to ale? Globalization and consolidation in the beer industry**

[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2268705](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2268705)

*Jackson, M. *The Beer Hunter**

<http://www.beerhunter.com/index.html>

*Jackson, M. (1997) *The New World Guide to Beer.* ISBN 0894712926*

*Janssen, D. *Hors Catégorie Brewing**

<http://www.horscategoriebrewing.com>

*Johns, C. H. W. (1904) *Babylonian and Assyrian Laws, Contracts and Letters**

<https://www.gutenberg.org/ebooks/28674>

Krenzke, J. R. (2014) *Change Is Brewing: The Industrialization of the London Beer-Brewing Trade, 1400-1750*. Dissertations. 1276

[https://ecommons.luc.edu/luc\\_diss/1276/](https://ecommons.luc.edu/luc_diss/1276/)

Lacambre, G. (1851) *Traité complet de la fabrication des bières et de la distillation des grains, pommes de terre, vins, betteraves, mélasses, etc.*

[https://www.google.com/books/edition/Trait%C3%A9\\_complet\\_de\\_la\\_fabrication\\_des\\_bi/yBQTAAAAQAAJ](https://www.google.com/books/edition/Trait%C3%A9_complet_de_la_fabrication_des_bi/yBQTAAAAQAAJ)

Lambic.Info

<https://www.lambic.info/>

Meussdoerffer, F. G. (2009) *A Comprehensive History of Beer Brewing. Handbook of Brewing: Processes, Technology, Markets*. Edited by H. M. Eßlinger (2009). ISBN 9783527316748

[https://www.academia.edu/4421107/1\\_A\\_Comprehensive\\_History\\_of\\_Beer\\_Brewing\\_1](https://www.academia.edu/4421107/1_A_Comprehensive_History_of_Beer_Brewing_1)

Mulder, R. *Lost Beers. Historic beers by Roel Mulder*

<https://lostbeers.com>

Nelson, M. (2001) *Beer in Greco-Roman Antiquity*

[https://www.academia.edu/6156225/Beer\\_in\\_Greco-Roman\\_Antiquity](https://www.academia.edu/6156225/Beer_in_Greco-Roman_Antiquity)

Nelson, M. (2005) *The Barbarian's Beverage. A History of Beer in Ancient Europe*. ISBN 020330912X

Oevelen, D. van, Spaepen M., Timmermans P., Verachtert H. (1977) *Microbiological Aspects of Spontaneous Wort Fermentation in the Production of Lambic and Gueuze*

<https://onlinelibrary.wiley.com/doi/abs/10.1002/j.2050-0416.1977.tb03825.x>

Pattinson, R. *Shut up about Barclay Perkins*

<http://barclayperkins.blogspot.com/>

Persyn, D., Swinnen, J.F.M., Vanormelingen, S. (2010) *Belgian Beers: Where History meets Globalization*. LICOS Discussion Paper No. 271

<https://www.econstor.eu/handle/10419/74982>

Poelmans, E., Swinnen, J.F.M. (2012) *From Monasteries to Multinationals (and Back): A Historical Review of the Beer Economy*. Journal of Wine Economics, Volume 6, Issue 2

Poelmans, E., Swinnen, J.F.M. (2016) *A Brief Economic History of Beer*

[https://www.researchgate.net/publication/268043355\\_A\\_Brief\\_Economic\\_History\\_of\\_Beer](https://www.researchgate.net/publication/268043355_A_Brief_Economic_History_of_Beer)

Poelmans, E., Taylor, J.E. (2009) *Belgium's historic beer diversity: should we raise a pint to institutions?* Journal of Institutional Economics. Accepted Manuscript (January 24, 2019)

<https://www.cambridge.org/core/journals/journal-of-institutional-economics/article/abs/belgiums-historic-beer-diversity-should-we-raise-a-pint-to-institutions/13EAB773C968405AEE9D95C6780A39EB>

Rail, E. *Beer Culture*. Stories about great beer from the countries that invented it.

<http://www.beerculture.org/>

Spitaels, F., Wieme, A.D., Janssens, M., Aerts, M., Daniel, H.-M., Van Landschoot, A., De Vuyst, L., Vandamme, P. (2014) *The Microbial Diversity of Traditional Spontaneously Fermented Lambic Beer*. PLOS ONE, April 2014 | Volume 9 | Issue 4 | e95384

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0095384>

Steele, M. (2012) *IPA: Brewing Techniques, Recipes, and the Evolution of India Pale Ale*

Swinnen, J., Briski, D. (2017) *Beeronomics. How Beer Explains the World*. ISBN 9780198808305

The Oxford Companion to Beer (2012) Edited by Garrett Oliver. ISBN 9780195367138

Unger, R. W. (2001) *A History of Brewing in Holland: 900-1900. Economy, Technology and the State*. ISBN 97804120378

Unger, R. W. (2004) *Beer in the Middle Ages and the Renaissance*. ISBN 9780192219996

Van den Steen, J. (2016) *Ale Speciale Belge*. ISBN 9401405867

Verberg, S. *Medieval Mead and Beer. Experimental brewing with Medieval flair*

<https://medievalmeadandbeer.wordpress.com/>

Verberg, S. (2018) *The Rise and Fall of Gruit*. Brewery History, 174

<http://www.breweryhistory.com/journal/archive/174/index.html>

Webster, I. (2018) *Brewing in Burton upon Trent*. ISBN 9781445670553

Дуров, И.Г. (2014) *Производство и обеспечение пивом кораблей Балтийского флота при Петре Великом*. Военно-исторический журнал

<http://history.milportal.ru/proizvodstvo-i-obespechenie-pivom-korabley-baltijskogo-flota-pri-petre-velikom/>