Empire in a Bottle: Commodities, Culture, and the Consumption of Pilsner Beer in the
British Empire, c.1870-1914

A dissertation presented
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Abstract of Dissertation

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Abstract

The Pilsner-style beer is the most popular and widespread beer style in the world with local variants and global brands all competing in marketplaces from Asia to Africa to the Americas. Yet no one has ever examined why this beer and not another was able to capture the global market for malt beverages. This is important from the point of view of the study of beer as a commodity, but its greater importance is in the way the spread of the Pilsner style serves as a visible, traceable marker for the changes wrought by globalization in an age of empire. Its spread was dependent not only on technological innovations and faster transportation, but also on the increased connectedness of the world, and on the political structures like empires that dominated the world at the time. Drawing upon a wide range of archival sources from Great Britain, Germany, Ireland, and South Africa, this study traces the spread in consumption and production of the Pilsner in the British Empire between 1870 and 1914. Through an analysis of brewers, colonial consumers, and policies pursued by metropolitan and colonial governments, I explore the social and economic consequences of changing technology and consumptive tastes in the South African colonies through their integration in the global economy. Innovations in finance capital and the utilization of new technologies made it possible for brewers to meet the growing demand for this style of beer that linked colony and metropole, consumer and producer – ultimately leading to an imperial legacy of flavor. In addition, I argue that the history of empire needs to be expanded from a focus on colonial-metropolitan exchange to one that includes imperial and trade rivalries of other European powers to better understand colonial markets and colonial identities. This
project represents the first comprehensive study of this commodity from its origins in central and northern Europe to the British colonies in Africa during the era of High Imperialism, and its findings address important issues across several fields. It advances our knowledge of marketing and technology in the spread of new global commodities like Pilsner by illustrating both the benefits and costs of new business models and technology during the Second Industrial Revolution. By detailing the evolution of consumer tastes through changing hierarchical relationships between the British metropole and colonies, as well as the evolution of business organizations and practices, this study contributes to ongoing debates in the fields of the history of empire and global commodity studies.
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Table of Contents

Abstract.................................................................................................................................2
Acknowledgements................................................................................................................5
Table of Contents..................................................................................................................7
Introduction.........................................................................................................................8

Chapter
1. Ales for Everyone: English and Continental Brewing Industries, 1750-1870............25
2. Modern Methods: European Brewing Technology and Sciences.........................65
3. Making the Investments Count: Business Strategies of Brewing Industries..............91
4. Good Hope for the Pilsner: South Africa Case Study................................................121
5. It Tasted Better: Why the People chose the Pilsner.....................................................144

Conclusion..............................................................................................................................177

Bibliography..........................................................................................................................180
Introduction: The Taste of Modernity

In 1885, the British Brewer’s Journal exclaimed, “Nothing more strikingly exemplifies the wide influence of England all over the world than the way in which our national beverage, beer, finds its way to all quarters of the globe.”¹ This boast, however, proved short-lived: within fifteen years, consumers worldwide had turned overwhelmingly to drinking Continental pilsner beer. Pilsner-style beer today constitutes around three-quarters of all beer consumed and produced in the world, with the top four pilsner-style brewers—Anheuser-Bush InBev, SABMiller, Heineken, and Carlsberg—accounting for over half the global market for beer.² The pilsner became the first global beer style due to changing tastes in Europe that encouraged Continental lager brewers to use the latest scientific methods, technological advances, and business strategies to both meet the growing demand for pilsner and expand its influence via European imperial trade routes to growing overseas markets including South Africa where British settlers went against their national taste for ale to produce golden lager.

Much has been written about beer and the history of brewing, but most of these works have been – and continue to be – uncritical popular accounts rather than academic histories. Moreover, most of what has been written has focused on national or local traditions in the United States and the United Kingdom, and has disregarded larger global trends and connections.³ These laudatory accounts have spilled over into television, as in

³To name only a couple published with academic audiences in mind, see Peter Mathias, The Brewing Industry in England, 1700-1830 (Cambridge [Eng.] University Press, 1959); T.R. Gourvish and R.G. Wilson, The British Brewing Industry, 1830-1980 (Cambridge [England]; New York: Cambridge
the Discovery Channel’s 2011 production of *How Beer Saved the World*. This documentary combined cartoons and snippets of interviews with academics and popular writers to promote the value of beer as being the reason for everything from the founding of human civilization, to the building of the Egyptian pyramids, to the development of germ theory.⁴ Even the *Oxford Companion to Beer*, which includes over 1,100 entries, was edited by a brewer and includes contributors who lack academic training and do little more than repeat old myths and stories instead of factual historical information.⁵ Indeed, the persistence of beer myths and legends supported by beer writers and journalists serve as potent reminders of the need for critical scholarship of this important commodity.

In the past decade the surge of smaller independent craft breweries, first in the United States and now growing across the world, has created a credible threat to the large industrial macro-breweries that have held sway over the global beer markets for over a century. One of the most important aspects of these smaller breweries is that the styles of beer they produce set them consciously apart from the larger macro-breweries. Craft breweries almost entirely concentrate on producing beer styles reminiscent of those produced in the United Kingdom between the late eighteenth century and the middle of the nineteenth century following the industrialization of the British brewing industry. Craft breweries produce British ale styles including pale ales, stouts, porters, and the wildly popular India Pale Ales self-consciously as a stylistic rejection of the golden lagers of the world’s largest brewing companies. These smaller, usually independently

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owned breweries market themselves against the much older, larger, and wealthier breweries by promoting themselves as being more careful with their brewing processes and more innovative in their use of ingredients, which in turn allows them to produce beer with stronger flavors and, in many cases, higher alcohol content. Ironically, less than one hundred and fifty years ago these same styles of beer were being pushed out of global beer markets precisely because of these characteristics in order to make room for the lighter and lower alcohol golden lagers.

The production of beer has been critical to health, consumption patterns, and trade in many areas around the world for millennia. However, until the nineteenth century beer production and trade were constrained to regional networks and limited imperial connections. Over the second half of the nineteenth century, beer quickly became a global commodity. Not only that, but one particular style of beer that had been limited to one specific region suddenly became the most widely traded and consumed beer in the world. Up until now, no one has examined this sudden global domination of the Pilsner style beer.

This study is not only important as a study of beer as a commodity but its greater importance is in the way the spread of the Pilsner style serves as a visible, traceable marker for the changes wrought by globalization in an age of empire. Its spread was dependent on not only technological innovations and faster transportation, but on the increased connectedness of the world including the political structures such as empires that dominated the world at the time.

The reasons for the spread of Continental golden lager beers over British beers are what interest me here. This dissertation argues that the rise to prominence of pilsners both
in the British colonies and elsewhere across the world was due to a unique combination
of elements that were exploited successfully by Continental pilsner brewers to develop a
consistent, high quality product that reflected the changing tastes of beer consumers for a
light, low alcohol, highly carbonated beer. These include the development of new
technologies for the brewing industry, decisions to use scientific methods in beer
production, and business strategies regarding management and investment capital
accumulation. Continental brewing companies used the latest science and technologies to
develop and popularize pilsner beers as the style that most reflected progress and
modernity in the late nineteenth century. Through these adoptions, the popularity of
pilsner beer was able to spread far outside Europe, and Continental brewers soon sought
control over export markets. This led to foreign markets copying the Continental pilsner
style and producing their own golden lagers for local consumption instead of choosing to
produce British-style ales. In order to explain the ready acceptance of pilsner in foreign
markets, I examine British South Africa as a case study where British settlers chose to
produce and consume Continental lager beer by the end of the nineteenth century instead
of their own national beer styles. By choosing South Africa, I follow the recent path of
other empire historians who have observed that studies of imperialism and colonialism
must be viewed in a global context that includes colonies and metropoles but, in addition,
examines the inter-colonial connections as well as other metropoles and extra-colonial
locations such as China, the United States, the Ottoman Empire, and Germany.6 Without
the inclusion of these broader connections, studies of colonialism and imperialism are

6 See especially Heather Streets-Salter, Beyond Empire: Southeast Asia and the World During the Great
War (Cambridge University Press, 2016).
missing vital information regarding how and why colonial consumers acted against their own nation’s interests with their choices.

Quality of product is a key characteristic of taste used in the marketing of beer in the past and the present regardless of the style of beer, mode of production, or size of the brewing company. Today, craft breweries market their smaller size as proof of better quality (i.e. taste), arguing they can lavish more care on smaller batches of beer. In reality, however, craft breweries use the same technologies and scientific knowledge in their beer production as AB-InBev does to produce its vast quantities of Budweiser. In the latter half of the nineteenth century, little overt marketing was needed to promote golden lagers produced in Germany and the rest of Continental Europe. The perceived high quality of golden lagers was instead promoted through ideas and notions of modernity and progress.

It is important to note that the general idea marking some beer styles as more “modern” than others was not new to the last half of the nineteenth century. However, it was novel to talk about Continental beer in such a way. Indeed, stereotypes of industrial might placed the British brewing industry, and Ireland, at the apex of global beer manufacturing—both in terms of quantity and quality—from the mid-eighteenth to the mid-nineteenth centuries. Because Britain was the first nation to industrialize and use new technologies like steam power in the brewing process, British brewers consistently produced the highest quality of beer, in the largest amounts, until around 1850. It was due
to this reputation that Continental brewers sought out British technologies and utensils for their own use during the 1830s.\(^7\)

Yet between 1870 and 1914, Continental beers, in the form of golden lagers, took the place of British “modern” beers. Indeed, what consumers understood as modern beer came to its most coherent expression in the globalization of a singular unique style in the spread of the golden lager and its related scientific and technological innovations. In this period, the idea that some styles of beer are inherently better, both in taste and for health, was at its most influential in terms of actual global reach due to the number of new markets opening up through the development of global trade networks and European imperialism.\(^8\)

The pilsner held several key attributes that made it appealing to a wide range of consumers. These attributes can all be included under the label of taste, including health benefits. As I detail in chapter five, taste played an essential role in the dissemination and acceptance of a singular global style of beer. The pilsner offered the consumer an item whose essence was wrapped in ideals of modern, rational thought via the inclusion of natural sciences in its very creation. Continental brewers were known for their early and rapid adoption of the latest scientific and technological breakthroughs in their brewing processes and within their breweries. In terms of taste, this appealed to consumers who sought an item that represented progress and a rational future inclusive of scientific and

\(^7\) As discussed in Chapter 1 with the travels of Anton Dreher and Gabriel Sedlmayr Jr. in 1834.

technological advance in comparison with traditional approaches and older styles of beer like those of the British.

In addition to the appeal of rationalization, the physical qualities of pilsner came to be reminders of the purity of scientific innovation and the healthy qualities of the beer style. Through the adoption of science and technology, the brewers of golden lagers were able to produce a consistent beer that was of a light and golden color with high levels of carbon dioxide and low percentages of alcohol. When consumers ordered a pilsner, they could be sure they would receive the same clear beverage every time, unlike when ordering a British beer that would be of higher alcohol, very hoppy, and likely full of sediment due to the lack of extended aging of the beer. Of these qualities, the low ABV (alcohol-by-weight) percentage was most important because it allowed people to drink more without the inebriating effects that were felt with the stronger British ales. This led to the promotion of pilsner drinking by several temperance organizations in Europe and the United States who felt that the golden lagers were safer, and therefore healthier, than spirits and strong ales. ⁹

News of the pilsner style, as well as the actual product, travelled widely due to broader and faster transportation and communication during this period. ¹⁰ The development of global trading systems and the spread of Western European dominance through imperialism and colonization helped to promote the products of imperial powers,

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including the pilsner. One argument for the motivation of imperialism by the British is individual wealth by gentleman capitalists through the exportation of manufactured goods from metropoles in Europe to colonies around the world and the control of foreign markets.\textsuperscript{11} However, though arguments promoting Gentlemanly capitalism concentrate on British interests Germany was more successful than Great Britain at promoting and selling its products. This was true even in British colonies, as my example of South Africa will show in Chapter 4.\textsuperscript{12}

Similarly, the export growth of Continental breweries was much more systematic than that of British breweries. Though the industry literature in the UK during the late nineteenth century promoted the idea that the British still produced the highest quality beer and controlled the most market percentage worldwide, the fact of the matter was that Continental brewers, especially Germans, were coming to dominate export markets from the early 1880s onward. Indeed, German brewing literature from the late nineteenth century consistently highlighted where German lager beer had been seen, whether it was in Paris or in Buenos Aires. This is symptomatic of the fact that while the British export trade existed for centuries and continued during the nineteenth century, British brewers expended significantly less energy in promoting and selling their products when compared with the Continental lager brewers.

In focusing primarily on the spread of pilsner beer, I am purposely differentiating between Continental and British brewing industries. Both had brewing traditions going


\textsuperscript{12} William S.H. Gasthell to Viscount Gough, 19 April 1897, No. 28 Confidential Commerce, TNA: DO 119/128.
back centuries, yet they differed in important ways and industrialized at different times. In this project, I examine the specific styles of beer produced in both regions and how choices in the adoption of science, technology, education, and business management led to drastically different outcomes less than fifty years after the creation of the first pilsner in 1842. By focusing on domestic traditions of brewing as well as refusing to adapt to changing tastes in export markets, the British brewing industry lost its status as the global front-runner. In contrast, Continental brewers readily adopted the latest science, technology, and business strategies in their production of golden lagers for domestic and foreign consumption. Through these adoptions, the popularity of pilsner beer was able to spread far outside Europe, and Continental brewers soon sought control over export markets. This led to foreign markets copying the Continental pilsner style and producing their own golden lagers for local consumption instead of choosing to produce British-style ales.

I contend that the spread and domination of the pilsner style of beer cannot be fully understood without attention to both the industrialization of Continental brewing industries and the decline in British influence as an industrial power in the last third of the nineteenth century, even as British imperial might was at its highest point. At this point, however, we have more information on the actions of British and Continental brewing industries in isolation than on the connections and competitions between them over export markets. Historians including Peter Mathias, T.R. Gourvish and R.G. Wilson have focused on the business tactics and domestic market control of the British brewing
industry. Mikuláš Teich has devoted most of his attention to the industrialization of the German brewing industry over the course of the nineteenth century. This project takes a wider view of the industrialization of these brewing industries, seeking to understand not just the development and spread of lager beers on the Continent in comparison with ale production in Great Britain, but most importantly how complex networks of trade embedded in European imperialism affected the control of British colonial beer markets.

The spread of pilsner beer did not happen in isolation on the European Continent but included trade networks and European migration across the world. European imperialism played a key role in the spread of golden lagers to many different locations including colonies in southern Africa. Imperial trade networks, fueled by colonial settlement and metropolitan economies, were essential to the foundation of British and German breweries in southern Africa and the spread of specific styles of beer and production methods as evidenced by my project and case study of South Africa.

Central to this approach is my argument that the pilsner represents the first modern, industrial, global beer style. The acceptance and desire for this beer in diverse global markets cannot be understood without comprehending how transnational and transcolonial ideas of progress and modernity influenced perceptions of taste and aided in the promotion of a style regardless of the strength of any singular brand or brewery.

I argue that taste triumphed over nationalism in the British colonies. The conceptions underpinning taste for golden lagers were fueled and nourished by the

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scientific and technological innovations promoted by Continental brewers. And it was the lack of attention by British brewers to the growing colonial beer markets that led me to consider the implications of taste over nationalism within British imperial culture regarding consumptive choices of settlers. For the adoption of pilsner beer to succeed in British settlement colonies, taste had to triumph over colonists’ loyalty to their empire’s own breweries and beer styles. While many settlers went to great lengths to retain a high level of “Britishness” through the purchase of imperial commodities such as cotton and foodstuffs, they did not do so in their choices of beer.\textsuperscript{15} Ties to the metropole included the use of English as the official language, British-style education, and trade relations. Indeed, with regard to business opportunities, the brewing industry of the metropole was an outlier in its lack of colonial market interest and influence considering South Africa needed most of its manufactured goods imported. The break between British settlers and their country of origin in terms of beer consumption is a unique element of the colonial experience that my research explains with an examination of the South African brewing industry.

My case study of the British South African brewing industry shows how preferences of taste overcame nationalistic ties to the metropole in the consumption of pilsner beer among British settlers. The transition from British style ales to German style lagers brings together each element of change seen in Europe, including the adoption of new technology and science through education and the establishment of European

business practices for capital investment. This case study is also emblematic of other British settlement colonies including Australia and India where lager production and consumption developed around the turn of the twentieth century.¹⁶

Until now, European and colonial histories of beer, brewing, and alcohol have overwhelmingly focused either on colonial or metropolitan contexts, but rarely on both. This is certainly true of histories relating to Southern African colonies. Though there is an established historiography regarding alcohol consumption in South Africa after the Anglo-Boer War that ended in 1902, these works have focused on issues of racial control during the interwar years via beer halls, or in terms of Apartheid control of production and consumption.¹⁷ Eric Rosenthal’s *Tankards and Tradition* is one of the only books to deal with local white South African alcohol consumption, but his focus is only on the colonies and does not consider larger imperial trade networks and relationships.¹⁸ This project seeks to fill a lacuna within the history of South Africa by weaving imperial trade networks in and among the history of local consumption and production of alcohol by white settlers of European origin. By concentrating on the introduction and spread of golden lager beer in Southern Africa, my project ties the history of South Africa and the choices of settlers there to the projects of European empires and the globalization of a specific commodity in an age of technological and scientific revolution that affected the whole world.

Linking British South Africa to the spread of pilsner beer requires some justification, for historians have not examined aspects of beer or product choice with regards to settler colonialism in this way. In this project, the consumption and production of beer in the South African colonies is used to examine the broad trade networks and consumptive choices outside of the strict colony-metropole relationships that have dominated imperial scholarship since the late 1990s. It is not enough to include the metropole and colony in the same frame of reference in a study of empire. Studies of empire and imperialism must include relationships with other empires while including global, not only imperial, trade networks. As mentioned above, I follow the recent path of other empire historians who have observed that studies of imperialism and colonialism must be viewed in a global context that includes the inter-colonial connections as well as other metropoles and extra-colonial locations. In my case, I include Continental, mostly German, imperialism and business history with the colonial relationship between South Africa and Great Britain in order to examine the choices of beer consumers regarding how and why colonial consumers acted against their own nation’s interests with their choices.

The crux of my argument lies in the idea that empire and imperial connections were not only colonial or metropolitan phenomena but were developed and influenced by networks of trade and diplomatic relationships. For much of the period between 1884 and


20 See especially Heather Streets-Salter, Beyond Empire: Southeast Asia and the World During the Great War (Cambridge University Press, 2016).
1914, metropolitan influence from European nations included direct investment through infrastructure development and formalized institutions of political and cultural control over subject populations. However, the consumptive choices made by both colonized and settler populations were influenced by other nations through trade. These consumptive choices had important effects on colonial and metropolitan economies as well as on identities. This is especially important when rival nations or empires benefited from the control of markets assumed by the colony’s metropole to be their own as the German brewing industry benefitted from the spread of pilsner to the loss of the British.

This project shows that consumptive choices in South Africa were deeply connected to the choices of brewers and the brewing industries in Great Britain and on the Continent, especially Germany. Decisions by brewers and consumers in South Africa highlight the connections between colonial markets and those in Europe and explain how and why European settlers in a British colony would choose the pilsner beer over British ales. By focusing on white settler consumption, I examine populations tied by birth and heritage to Europe. Their choices are indicative of the growing international trend towards golden lagers. The mix of European, primarily British, settlers makes South Africa an important case study. My arguments regarding why some settlers remained tied to their national taste for lagers, while others rejected their national beer styles in favor of a product produced and disseminated by rival imperial nations, are suggestive for why other nations and colonies also chose to produce and consume pilsner beer.

Although the rise to dominance of golden lager beers was at its height in the 1880s, this study begins with the rise of the British brewing industry in the latter half of the eighteenth century in order to establish the dominance of the British brewing industry
prior to the introduction of the pilsner. Until the 1860s, I argue, British brewers were the
best in the world with their utilization of the latest technology, science, and capital
accumulation and investment when compared with brewing in Germany during the same
period. As Teich, Mathias, Gourvish and Wilson have shown, the stark contrast between
the British and German brewing industries during the first half of the nineteenth century
make the later global dominance of the German brewers and the pilsner style surprising.
The reasons for the ascendance of the pilsner style can only be understood in reference to
the decisions made by the British brewing firms. In chapter two, I identify the importance
of science and technology in the spread of the pilsner style from 1870 to the end of the
century. As a result of the push for the acceptance of the latest scientific breakthroughs
and the development and use of the latest technologies in brewing, German and other
Continental brewing industries were able to produce consistent golden lagers that spread
in popularity across the region and abroad. In comparison, the British brewing industry
retained a traditional focus on its own methods of brewing without taking into account
the use of these same innovative developments so popular in Continental breweries, even
though brewers were aware of their existence.

The incorporation of the latest science and technology, however, was costly. In
order to build and outfit new lager breweries across Europe, brewers and brewing
companies needed educated workers and a lot of investment capital. Chapter three shows
that it was only through forming Limited Liability Companies (Atkienbrauerei) with
large amounts of capital that lager breweries were able to build breweries that could
maximize economies of scale to produce quality lager sold at low prices for local and
foreign consumption. In addition, the formalized education of brewers in Germany was
supported through federal and private investment so that brewery employees understood and knew of the latest in brewing science and technology. British breweries, however, were run by family firms and worked by apprentices who learned through hands-on experience without the support of courses in science or new technological equipment.

Chapter 4 examines how brewing companies in British South Africa converted from British-style ales to Continental lagers between 1870-1914. The consequence of British versus Continental influence over beer brewing in Cape Town and other major cities in South Africa provides an example of how one British settler colony accepted and rejected different parts of the changing modern brewing industries of Europe. In this chapter, I expose the ways in which brewers in Cape Town, who had majority control over the beer markets of the South African colonies, lost these markets. The establishment of South African Breweries, Ltd. (SAB) in Johannesburg during the 1890s marked the transition point between ale and lager in South Africa. Through investment capital from British investors, SAB was able to flourish in Johannesburg and start the first successful lager brewery in South Africa at tremendous loss to Cape Town ale brewers. By the turn of the century, lager had become the most popular style of beer in South Africa.

The final chapter brings together Europe and South Africa in an analysis of taste. Science, technology, investment, and education point to reasons how the pilsner spread so quickly and completely in the second half of the nineteenth century, but this chapter explains why. The qualities of the pilsner beer helped the popularity of lagers reach new audiences and consumers of beer. Aesthetically, the golden lager has several key points that drew new consumers and pulled them away from the British ales. Pilsner beer is light
in body, has a clear and golden color, high levels of carbonation and, perhaps most importantly, a much lower alcohol percentage compared with nineteenth century British beer. These physical qualities were not possible to attain without the use of new science and technology and act as telling reminders of how the pilsner was the first modern beer. Pilsner represented both progress and modernity through its production process and the methods employed by Continental brewers while British beer represented the past and old-fashioned traditions.

With the final chapter explaining the differing preferences for beer styles in the distinctive nations and regions, my work ties together the connections between taste, technology, science, education, and business strategy. For too long historians of empire and food have ignored the connections between imperialism, trade, and taste in how particular industries and consumers interacted with both their own nations and others. Through an examination of the development and spread of the pilsner beer style, this work explains the complexity of taste and consumptive choices in an age of globalization and empire.
Chapter 1: Ales for Everyone: English and Continental Brewing Industries, 1750-1870

Introduction

Before the global reign of the golden lager by Continental brewing industries, the British brewing industry was the best in the world. From the late eighteenth century and through the middle of the nineteenth century the British brewing industry led beer production in the world through technological innovation, innovative production methods, and the adoption of new business strategies. This chapter argues that up through the 1860s the British brewing industry was at the forefront of producing consistent, high quality beer. In a world where beer consistency was difficult, even impossible in many cases, producing a reliable product is what made the British brewers the best. In addition, without the inventions and innovations brought about by the industrialization of British brewers, the Continental brewers would not have gained the knowledge, experience, or technology to produce the golden lagers that came to dominate the world by the turn of the twentieth century. Without understanding the nature of the European brewing industries up to the 1870s, the reasons for the spread of the pilsner style does not make sense. The pilsner did not suddenly appear in the city of Pilsen in 1842 and spread of its own accord: rather, its creation was only possible through the earlier work of British brewers and the adoption and further innovation by Continental brewers through the early and mid-nineteenth century. As this chapter shows, the British brewing industry
was the most innovative in terms of production methods by utilizing new technology and new business tactics that incorporated inventive investment strategies. These production methods and business strategies propelled British brewers to the highest level of quality beer production in the world and influenced the Continental brewing industries, who would eventually eclipse the British by the end of the nineteenth century.

Without the innovations developed through the industrial production of the porter style in the United Kingdom, the pilsner—which came to be known for its quality and consistency—would not have been possible. In several ways, the stories of the porter and pilsner are comparable. Both styles arose and gained in popularity at a time of national industrialization – Britain for the porter and Germany for pilsner. Both became popular across class lines, and both gained regional prominence above all other available styles due to newly possible economies of scale that made for a cheaper and better quality product than most other options. However, while the porter’s popularity waned rather quickly in the nineteenth century, the golden lagers continue to hold sway worldwide into the twenty-first century. While porter was one of the first industrial beer styles, pilsner is the first modern beer style due to pilsner brewers’ use of the latest scientific knowledge and technology through the late nineteenth century. The pilsner style’s continued legacy as a global style is a traceable marker of globalization which this chapter explains, was not a foregone conclusion at the beginning of the nineteenth century due to the state of brewing industrialization on the Continent.

This chapter begins with a brief overview of what beer is and how it is produced, in order for the reader to understand the difference between ale and lager and their differing systems of production in the nineteen century. It then moves to a history of the
British brewing industry as it developed up to the 1870s through an examination of its technologies, business structures, and export trading. The next section deals with an examination of the German/Continental brewing industry and explains who the major brewers were and how they acquired the knowledge necessary for the production of the first pilsner. By looking at the British and Central European brewing industries side-by-side, I both show the strengths of the British brewing industry at this time as well as the establishment of necessary prerequisites for the spread of golden lagers later in the nineteenth century.

**How to Brew Beer: A basic description**

The basic steps of beer production and brewing have remained relatively constant over time. However, the industrialization of brewing beginning in the mid-eighteenth century and the introduction of scientific knowledge and new technologies have made the brewing process more efficient and less labor intensive while producing a more consistent and higher quality product. What follows is a simplified description of the beer brewing process at the turn of the nineteenth century in Great Britain.

While there are many ingredients that go into the creation of standard beer, a basic recipe includes the four simple ingredients that make up the *Reinheitsgebot*, or German Beer Purity Law: water, malted grain, hops, and yeast. When combined in a specific way and over a certain amount of time, the result is beer. The brewing process begins with the malting of grain, usually barley.\(^{21}\) This started with barley steeped in

\(^{21}\) Barley became the main grain for beer production both because it proved to be a good grain for malting and for providing the right kind of sugars for fermentation into alcohol and because it was seen as a lesser grade grain for bread and as food for humans compared with wheat and rye. This was because barley was seen as an animal feed. Mikuláš Teich, *Bier, Wissenschaft und Wirtschaft in Deutschland 1800-1914: ein Beitrag zur deutschen Industrialisierungsgeschichte* (Wien: Böhlau, 2000), 16.
warm water to begin germination. Lighter grains floated to the top and were skimmed off for animal feed. After about three days, the water would be drained off and the grain was left for a half day to dry out. The grain would then be placed in square wooden receptacles known as the “couch” and left for 20-30 hours, during which time excise officers would measure the volume of grain for taxing purposes. After this, the grain would be evenly spread, at a depth less than one foot, across the malting floor and allowed to germinate. Maltsters would regularly turn the grain with wide shovels for 12 to 15 days to make sure the grain received the right amount of air, heat, and light to encourage germination and avoid the growth of mold. Oftentimes the grain was sprinkled with water to maintain the right level of moisture.

The malting of the grain was complete when germination was arrested and the grains were dried upon a kiln over heat. Higher temperatures would dry the grains more quickly, but usually led to darker malt that produced darker beer with burnt or roasted flavors. The use of a high percentage of dark malt would also produce beer of lower alcohol than a beer that used lighter-colored pale malt because lighter malts had more fermentable sugar available. Before the industrial efficiency of coal and steam power in the breweries the grains would be dried over a fire. Fires, however, were difficult to control and resulted in the grains averaging out to a dull brown color. However, by using coal and steam, the maltsters had better control over the temperature levels and the malt would not lose as much sugar as over a hot and uneven fire.

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22 Today the accepted temperature for this process is between 150-155°F Fahrenheit (F).
In the brewhouse, the next stage was mashing. British brewers, who used the infusion method, took the malted grain and let it steep in hot water in order to extract the fermentable sugar (maltose) from the grains. Mashing was usually done multiple times to extract as much sugar as possible. Each ‘run’ of liquid was used for a different beer. The first extraction was the strongest because the most maltose was available. This produced the strongest, highest alcohol beer. The second mash would either be added to the first run or be used for a middle-strength beer. The third and final mash would be used to create a ‘small’ or ‘mild’ beer that would be very low in alcohol.25

Once mashing was complete, the liquid, known as the liquor, was brought to a boil in a boiling kettle and hops were added. Usually the boil continued for at least sixty minutes or up to a few hours. Hops were added several times throughout the boil depending on how bitter, or ‘hoppy’ the brewers intended the beer to taste. Normally, hops were added three times at the beginning of the boil, in the middle or around twenty minutes before the end, and at the end or immediately after the boil was stopped. The liquid was now called ‘wort’ and was rapidly cooled to 68-72°F. In early nineteenth century Britain, this was done by pumping the wort to the top of the brewery to big, open containers for cooling. This process was much more difficult in summer before mechanized refrigeration. Steam often condensed on dusty beams above the cooling containers, which could lead to acidic and irregular fermentation if the dust fell into the cooling wort. Once cooled, brewers added yeast to the wort, and fermentation was allowed to begin.26

26 Gourvish and Wilson, 54.
Fermentation can take anywhere from a few days to a few weeks depending upon the style of beer being made. Yeast is a single celled living organism that ingests available fermentable sugars and excretes carbon dioxide and ethanol. Depending on how much fermentable material was in the wort, the resulting beer could contain various strengths of alcohol. Once the brewer decided that the fermentation was complete using a hydrometer to measure lower specific gravity caused by the conversion of sugar to ethanol, the beer was transferred, or “racked,” to another vessel to age and clarify. This process could take days, weeks, or months depending upon the style of beer produced. Many brewers used metal vessels, but some also used wooden casks. When the beer was ready, it was either bottled or put into casks for distribution.

Ale vs. Lager

Though the process of beer brewing is very similar regardless of style, there is a necessary distinction that must be made between ales and lagers. The differences are what separated the brewing industries of Britain and the Continent, which makes the popularity and spread of the golden lager that much more extraordinary considering the greater difficulty in its production when compared with British ales.

Though there are many styles of beer, nearly all can be divided into two categories based upon the kind of yeast that is used during fermentation. These are ales and lagers. The beers produced by the majority of the British brewing industry were ales while the Continental beers, including the pilsner, were lager beers. These distinctions had important ramifications for the brewing processes in these two regions and for any brewery that decided to produce lagers in other parts of the world.
Ales have been the most prominent category of beer throughout much of human history because that was how yeast was found in nature, which made them easier to make and require less temperature control to produce a decent product. Ale yeasts rise to the surface of fermenting wort and ferment at a higher temperatures than lager yeasts, between 59 and 72°F (15-22°C). Fermentation would take only three to seven days to be complete and then the beer could either be aged or sold right away depending on the style. Due to the top fermentation, the wort needed to be covered and watched carefully so that airborne yeasts and bacteria would not spoil the beer. The British breweries focused on producing styles of ale including brown ales, porters, stouts, pale ales and India pale ales, many of which were developed between 1750 and 1830. Except in Bavaria, top-fermenting brewing systems were in universal use until about the 1840s.\textsuperscript{27}

In contrast, lager yeasts ferment at the bottom of the fermentation vessels, which makes it easier to avoid contamination by airborne bacteria and wild yeasts during fermentation. Lager yeast was hybridized during the early modern era in Bavaria due to laws against brewing beer in warm weather to prevent what came to be understood as bacterial contamination.\textsuperscript{28} Brewers stored the beer in caves filled with ice where fermentation occurred slowly over the winter. The lager yeast fermented at the lower temperatures, between 43 and 54°F (6-12°C), which required some level of temperature control whether by only brewing during the coldest months of the year, utilizing ice caves, or after the 1870s using mechanized refrigeration. Due to the lower temperature,

the lager yeasts also fermented at a slower speed, taking up to three weeks for a single batch of beer. Once fermentation was complete, the beer would then have to be lagered (stored) for many months until it reached the desired level of clarity and flavor for consumption.

Much of this project looks at the differing strategies in beer production and distribution of the British and the German brewers in order to explain why Continental brewers chose to produce and promote the spread of golden lager beers. Considering the greater needs of lager brewing both in equipment and quality/temperature control in comparison to ales, the spread of lagers does not seem obvious at first. However, the choices and strategies taken by investors and brewers of lagers explain how and why this was possible. These are covered in Chapters 2 and 3.

One more distinction must be made in terms of British ales. Brewing at the beginning of the eighteenth century included a number of different types of malt liquor. The terms beer and ale were used then, as they are today, as generic words for malt liquor. However, each term implied a different commodity to brewers and merchants of the eighteenth and nineteenth century. After the development of the London Porter and stout in the mid eighteenth century, beer came to represent this “new city drink…which was thick, black, and stored for several months.” In contrast, the word ale was attached to “clearer, lighter coloured ‘ales’ of the provinces which were drunk much ‘younger’ than porter.”

**Part I: Industrialization of Brewing in Great Britain**

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The industrialization of the British brewing industry eventually helped in the industrialization of the Continental brewing industries. Without the innovations in beer production in Britain the development of the pilsner would likely have taken much longer. This section deals with the earlier British industrialization and the innovations in technology utilized by porter beer brewers in London that were able to be utilized by Continental brewers in the nineteenth century as they developed lager brewing.

The industrialization of beer brewing in the UK began in the eighteenth century and led to fundamental changes in its structure. With the rise in production and consumption of the porter style there was also a complete shift in the center of economic activity from small-scale, independent brewers to large brewing firms based primarily in London. Porter brewing led to changes in the scale of production while also providing new opportunities for brewers and entrepreneurs. Two important features of porter made these changes possible: first, the greater stability of the product and, second, higher levels of urbanization and industrial organization in towns around England.  

Though there were several styles of beer being produced in the United Kingdom during this time, only porter brewers rose to high levels of production in the eighteenth century and led to the establishment of a modern brewing industry. One of the principle reasons for this is that porter was the first beer technically suited for mass-production at then-contemporary standards of control.  

British beer drinkers had a preference for beer higher in alcohol that was the product of traditional tastes, which developed over centuries through combinations of

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30 Mathias, The Brewing Industry in England, 1700-1830, 11.
local malts, water, yeasts, and preferences in brewing production methods. The strong English beers were a reaction to consumer demands that involved heavy and irregular drinking bouts during the pre-industrial calendar. Beers that were stronger in alcohol helped consumers feel warmer in colder weather before the arrival of railroads and regular coal deliveries. In addition, the strength of the beer made up for the overall low quality of the product.32

The benefit of large-scale porter brewing was that it was not delicate in color or taste, which made it more manageable in brewing with primitive industrial machinery and easier to hide the use of cheaper ingredients. The brewing materials – grains, hops, etc. – were also utilized more rigorously than lighter ale brewing and included less fine barley and lower grade hops. Porter was thicker, blacker, more bitter, and stronger than any similarly priced beer.33 This metropolitan specialty used malted grains roasted at high temperature, which made the beer dark and cloudy. The porter would be aged in large vats for nine or more months before sale because consumers enjoyed the flavor of aged, ‘stale’ beer.34

As production facilities became larger over the course of the Industrial Revolution, the brewing vessels also grew in size. With a greater volume of wort, the porter could withstand a greater quantity of heat as well, which allowed porter brewers in London to extend their brewing season from early September to mid-June in comparison with the early October to mid-May season of the Burton-on-Trent brewers further north. In addition, higher levels of hops and grain also helped the porter tolerate more heat.

32 Gourvish and Wilson, The British Brewing Industry, 1830-1980, 42.
33 Mathias, The Brewing Industry in England, 1700-1830, 413.
34 Gourvish and Wilson, The British Brewing Industry, 1830-1980, 79.
without deterioration compared to ale. Another technical advantage for the porter was that once fermentation had begun the brewers allowed the yeast enough time to ferment all of the available sugars, which left the finished beer drier to the taste and with less possibility of attracting wild yeasts that could turn the beer bad. In comparison, ale brewers would arrest the fermentation before all of the fermentable sugars had been consumed. This left the ale tasting sweeter, but made it less stable as it aged.\textsuperscript{35} Yet, one of the most important aspects of porter was its stability in comparison with ales, a factor that may have played a determining role in the rise of mass-production in the brewing industry. The robustness of porter both in the brewing and fermentation processes and in its shelf life helped it to be the beer of choice for British consumers through the beginning of the nineteenth century.\textsuperscript{36}

This robustness proved important as the scale of production increased. More wort meant more heat and a much slower process when lowering the temperature from the boiling. Without any devices to regulate the temperature within fermentation vessels, the increased temperature could have very detrimental effects on the fermentation itself. This was similar to difficulties with brewing beer in the summer when the higher temperatures could lead to both poor fermentation but also off-flavors of the final product. Porter beer was able to tolerate a greater amount of heat than ale without deterioration, even allowing porter brewers to continue production into warmer months of the year compared with ale brewers. However, in the beginning of the nineteenth century, once brewers were able to take better control of fermentation with ales using new equipment like thermometers,

\textsuperscript{35} Mathias, \textit{The Brewing Industry in England, 1700-1830}, 17–18.  
\textsuperscript{36} Mathias, \textit{The Brewing Industry in England, 1700-1830}, 18–19.
saccharometers, and attemperation coils, the technical advantage of porter was mostly removed.\(^{37}\)

In addition to the role of porter in supporting the growth of brewing facilities and the size of production and consumption of a specific style of beer, the later eighteenth century also witnessed important changes in the structure of the brewing industry in London. While there were modest changes in the total quantities and the number of brewers in London, there were great changes in the distribution of the amounts of beer brewed in individual breweries. Due to new efficiencies of large-scale production, the relative change in relation to modest aggregate expansion of production distinguished the revolution of the brewing industry from other industries like cotton and iron.\(^{38}\) What this means is that while the beginning of the eighteenth century saw many smaller brewers producing modest amounts of beer and ale for local consumers, by the end of the century there were only a few brewers producing very large amounts of beer. Between 1800 and 1830, only five brewers produced three-quarters of all the porter, compared to the twelve largest brewers together producing 383,000 out of 915,000 barrels of strong beer and ale in 1748.\(^{39}\)

Between 1750 and 1830, brewing was technically more suited than many other manufacturing processes for the development of mass-production methods due to the methods of handling and the forms of power available at the time. Two central aspects promoted the expansion of this industry. The first was a strong local market in London that supported large production through mass distribution and mass consumption. The


second was the porter style itself, being a stable product that was able to withstand expansion of production and distribution. These key elements led to a greater profit for porter brewers through their changing methods of brewing and expanding brewing capacities. The success brought about through the brewing of porter allowed the brewing entrepreneurs to reach levels of size and ambition that had never before been seen in Great Britain or the world.  

One of the new efficiencies that occurred in brewing at this time was the design and positioning of vessels within the brewhouse. Though most breweries today are designed horizontally with the different brewing vessels next to each other at the same level of brewery, it was more efficient to build a brewery in a vertical design before the advent of efficient pumping systems that we have today. As mentioned above, once the mashing was complete, the grain removed, and the boiling complete, the finished wort would be moved to the top of the brewery so that it could cool as quickly as possible. The rest of the brewing process would then use gravity to move the beer from fermentation to the eventual packaging in bottles or wooden barrels. Through the efficiency of design, brewers were able to increase the size and scale of their brewing from the 1760s onward. An important effect of this was that accuracy became visible with better control of temperature and specific gravity. In addition, through design efficiency in the handling of the product, labor expenses and time were cut down while increasing the rate of production with the added benefit of better quality beer. Porter was the only beer able to be produced under these new conditions and only a small group of brewers were able to

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41 Specific Gravity refers to the change in density between the wort and finished beer that tallies the amount of maltose converted into ethanol. Control over the gravity allows the brewer to make sure of the strength of the finished product leading to a more consistent beer.
do it successfully. The critical minimum barrelage to produce at the most economical scale rose quickly during the later half of the eighteenth century and the initial capital needed to break into the porter market at efficient levels of production became much greater.\(^{42}\) This meant that fewer brewers were making much larger quantities of beer and were able to keep out most new porter competition, a trend Continental lager brewers would copy later in the nineteenth century.\(^{43}\)

*Science and Technology*

With new technology, British brewers were able to surpass the brewing efforts of all other nations. The new technologies developed during the Industrial Revolution from the mid-eighteenth through the mid-nineteenth century put British ales at a level of precision and consistency that no other brewing nation could match. New inventions brought to the brewing process helped the brewers produce beers that could be reliably regular in their flavor profiles and alcoholic strength. Beer consumers and producers around the world recognized the British for being at the forefront of modern brewing. This was due to the invention and acceptance of thermometers, saccharometers, and attemperation by British brewers that made consistency of product possible. In a world where beer consistency was difficult, even impossible in many cases, producing a reliable product is what made the British brewers the best.

With increased scale, the first generation of industrialists exploited their commercial success of porters to organize their breweries in such a way to capitalize on


large-scale production and distribution. However, there were certain problems with increasing the scale, especially in terms of accurate measurement of materials including grain, water, hops, etc. Considering that beer had never before been brewed in such quantities for such a large population of consumers, it was essential that the brewers keep their position in the markets through the production of a product of consistent high-quality through accurate measurements and systematic processing because it would also mean a much bigger loss if a batch went bad.\footnote{Mathias, \textit{The Brewing Industry in England, 1700-1830}, 63-64.}

British brewers between 1750 and 1850 were at the forefront of brewing technology with their implementation of scientific instruments to industrial brewing including the thermometer and saccharometer. Thermometers came into general use by the 1780s. Before their use brewers used a steam test to determine when the mash had reached the correct temperature. This meant that the brewer would boil the water and once the steam settled to a point that the brewer could see his face in the liquid they would add the grain. However, even with the wider acceptance of thermometers in the United Kingdom brewers could not agree on the best temperature for mashing, even seventy years later. In the 1830s, English brewers usually kept the mashing temperature at $168^\circ-170^\circ$F while in 1840, Scottish brewers would still keep their grains in water for four hours at $178^\circ-190^\circ$F.\footnote{We know now that the fermentable sugar, diastase, begins to be destroyed above $170^\circ$F. Gourvish and Wilson, \textit{The British Brewing Industry, 1830-1980}, 51.}

Even with these disparities, the thermometer was the first to be adopted because it allowed a new regularity to the process of brewing that did not change or violate any
traditional process. The saccharometer, however, caused a bigger stir. Saccharometers measure the concentration of sugar in a solution, which in the brewing process meant that the specific gravity (S.G.), or density and strength of the wort and beer could be accurately measured, both by brewers and by the excise authorities who made sure the brewers paid the correct amount of taxes on their malt and beer. In spite of significant distrust in innovations, most brewers in England had adopted saccharometers by 1805. However, in Ireland in 1812 no one had even heard of them, let alone begun including them as part of the brewing process. Technical writings, including John Richardson’s *Statistical estimates of the materials of brewing etc.*, helped spread the use and understanding of saccharometers as a means for determining consistent strength of beer. He argued that brewers had long neglected the progressive decrease of the S.G. in beer during fermentation and called this decrease “attenuation,” meaning dilution. Decades before Pasteur published *Études sur la bière*, Richardson was arguing that through use of saccharometers brewers could understand the transformation of fermentables in the transition from wort to beer and thus understand fermentation itself. He then explained that the strength of each beer is proportionate to the dilution of wort – or decrease of the S.G. - during fermentation.

With the inclusion of temperature control and the ability to know how much fermentable material was in the wort and beer English brewing reached a level of industrial progress that no other national brewing industry could match or replicate. The saccharometer made possible several important innovations in the brewing process for

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49 Teich, *Bier, Wissenschaft und Wirtschaft in Deutschland 1800-1914*, 61.
the English. It allowed the meticulous pricing on cost quality through knowing the
amount of fermentable matter in parcels of malt and worts, which could not be adjusted
to maintain a regularity of strength in the beer. In addition, excise commissioners could
exact manipulation of the cost of duty according to the specific gravity of the wort, the
standards of which would not be introduced until 1880 by Prime Minister Gladstone. 50

The next development with thermometers and saccharometers involved a
scientific commission of professors from the University of Edinburgh, who were invited
by the Scottish Financial Authority to establish values for barley malts and average duties
for taxation. The commission included Thomas Thomson, a chemistry professor whose
saccharometer design was widely accepted by British brewers. The professors developed
a differentiated tax rate based upon barley quality and presented their work in 1806 to the
British Parliament. This event solidified the use of saccharometers in the British brewing
industry, and the eventual German translation in 1822 of the commission’s presentation
would have a big impact in the adoption of scientific methods by the German brewing
industry. 51

With the knowledge that thermometers were able to give to brewers, it was not
long before other temperature-related innovations developed by British brewers including
the ability to control fermentation through temperature control with attemperators. This
began with a proposal from John Long to the Commissioners of Victualing at the naval
breweries in February 1791 suggesting a more efficient method of brewing. Long’s
innovation of temperature control included using lengths of copper tubing to run water at

50 Mathias, The Brewing Industry in England, 1700-1830, 73.
51 Teich, Bier, Wissenschaft und Wirtschaft in Deutschland 1800-1914, 61–62.
a set temperature within the mash-tun and fermentation vessels made it possible to brew higher quality and more consistent beer in the summer months. In addition, he argued for covering the mash-tun to limit evaporation, a simple suggestion but one that had not been done before. By 1805, most breweries in England had adopted both attemperators and mash-tun coverage. The use of piping was also utilized to cool the wort quickly by passing the hot wort through pipes surrounded by circulating cold water using a patented ‘refrigerator’ developed in 1801 by a brewer named Henry Tickell. Tickell’s refrigerators were adopted by many major breweries by 1823.

Initially, heat-exchange systems were very expensive so many British brewers continued to use cooling squares like those discussed earlier that would sit at the top of the brewery. The purpose for rapid cooling of the wort was to avoid oxidation and contamination. Quickly cooling the wort inhibits these problems that lead to off-flavors and quicker spoilage in the finished beer. Brewing during the summer months using attemperators and refrigerators was finally accepted and done by the larger brewers by the 1830s.

The adoption of these new technologies into the brewing process occurred during a change in the public taste for porter beginning in 1790. Through the mid to late eighteenth century porters produced in London would go through about nine months of storage in large vats before being sent to publicans for sale to consumers. This timing would be even longer in country trade outside the metropolitan center, or for export because those beers would be stronger and require more time to mellow in flavor for

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consumers. However, with the introduction of the new technologies and processes the brewers were able to cut this time down to a four to six week process by mixing younger beer with the vatted ‘stale’ porter to mimic the old beer taste while retaining a longer shelf life due to their higher alcohol percentage.\textsuperscript{55}

New technology was not limited to new efficiencies in the brewing process but also to labor saving mechanizations. While large dray-horses were still needed to transport beer to pubs the use of horses within the breweries declined as the use of steam power became more efficient. For instance, mill horses for grinding down malted grain were no longer necessary with the introduction of steam-powered mills. The first two steam engines installed in London breweries in 1784 paved the way for nearly all of the operations of brewing to become mechanized by 1800.\textsuperscript{56} By 1830, nearly all commercial breweries had turned to power mashing, which was more efficient and effective in producing good wort for beer. While the old methods of mashing required two to five successive mashes of the same grain, the new power mashing techniques made it possible to only do one mash with the help of mechanical mashing rakes powered by steam. While the rakes were put into use by the 1790s, sparging machines that effectively mixed the malt and wort thoroughly became popular in the 1830s, first in Scotland and then in England. By the 1860s, mashing had become completely mechanized across the United Kingdom.\textsuperscript{57}

These new technologies changed many aspects of the brewing process in Britain, though not the overall sequence of production. For instance, porter beers began with the

\textsuperscript{55} Mathias, \textit{The Brewing Industry in England, 1700-1830}, 76–77.
\textsuperscript{56} Mathias, \textit{The Brewing Industry in England, 1700-1830}, 82.
\textsuperscript{57} Gourvish and Wilson, \textit{The British Brewing Industry, 1830-1980}, 51–52.
use of cheaper brown malts that would create the dark color and roasted flavor desired by customers. This worked well prior to the use of steam heat and tools of measurement like the saccharometer and thermometer. As breweries became more mechanized and the brewing procedures became more effective, porter brewers began using paler malts of better quality. More skilled malting techniques and better barley allowed the porter brewers to use pale malts that would add more fermentable sugars with less actual grain, which would save the brewers money both in grain purchases as well as taxation that was based upon the amount of malt used. Instead of using only a single grade of cheap dark brown malt, the brewers used smaller amounts of brown malts that had been highly scorched mixed in with the pale malts to bring the desired color and taste of standard porters.\(^{58}\)

The industrialization of British brewing not only included the use of new scientific apparatuses in the breweries but also the support of trained scientists. After decades of consumer fears over the adulteration of beer, breweries began to employ chemists by 1845 to test their beer and to theorize new techniques for the brewing process. The scientists would work with head brewers to examine and work on barley, starches, different brewing sugars, and maltose in order to produce superior products. Brewers, many of them chemists themselves including Cornelius O’Sullivan at Bass and Peter Griess at Allsopp in Burton-on-Trent, were at the forefront of this incorporation of scientific knowledge.\(^{59}\)

\(^{58}\) Burnt sugars or drugs would also be used to mimic the original porter flavors. Mathias, *The Brewing Industry in England, 1700-1830*, 415–420.

Business

Beer production was not only important to the producers and consumers of beer but also to the financial stability of the government. In the early nineteenth century, eighteen percent of Britain’s total national revenue came from malt and beer taxes. By 1879-1880, this grew to forty-three and a half percent. Brewers developed many strategies between 1750 and 1870 to maintain and grow market shares locally and nationally. However, because British brewers concentrated on their regional markets, they gave little attention to export markets. This choice would have negative effects for the British brewing industry once other nations’ brewers began industrializing, and in fact led its decline in foreign and colonial markets by the early 1890s.

One of the most important developments in the late eighteenth century that had deleterious effects for the British brewing industry a hundred years later was the growth of the tied house trade. The tied trade, as it became known, was when a brewery purchased or controlled pubs wherein only its beers were sold. Through either out-right ownership or via loans to the publicans the breweries would then have a guaranteed location in which to sell their beers. From the beginning, this investment was not for the purpose of profits in real estate but only to further the interests of brewers in gaining market percentage in (mostly) urban areas.60 In the late eighteenth- and early nineteenth centuries there was a race for tied houses in London between three major breweries: Barclay Perkins, Truman, and Whitbread. Between 1790 and 1830, the amount of money invested in tied houses went from less than £27,000 to over £300,000.61

60 Mathias, *The Brewing Industry in England, 1700-1830*, 120.
The rush towards tied houses developed out of a need for control over distribution due to some of the peculiar qualities of porter. Considering the need for a year of storage for the porter prior to being sold, the brewers had to be sure they had a stable consumer base once the beer was ready. Also, because of the amount of space needed for production and storage – storage being necessary to reach the right level of ‘quality’ – porter brewing had to be done on a scale large enough for the brewers to derive the full technical advantages from its production, separate from the economic benefits.\(^{62}\) The growth of the tied houses intensified the home market for British brewers. Porter consumption concentrated in this market and it was here that industrial and commercial reorganization occurred.

Funding for breweries and brewery expansion was difficult through the early nineteenth century. In order for any joint-stock flotation or incorporation to occur, brewers needed either a private act of Parliament or Letters Patent from the Crown, neither of which were likely to happen due to a lack of influence within the government and monarchy. Brewers often opted for partnerships with bankers or financiers in order to compete through increasing production and buying into the tied trade.\(^{63}\) While most brewing firms began as family enterprises or smaller partnerships in the middle of the eighteenth century, by the early nineteenth century these firms were led by partnerships of businessmen who generated capital through family and personal business connections unlike later investment through incorporation as the Continental brewers would do later in the century. Partnerships that relied on investment through personal and familial


connections had several problems that incorporation and professional management would later avoid. For instance, partner successions could be difficult with leadership amounting to something of a lottery depending who inherited the role of partner. A capacity for business was not an inheritable trait and ensuring continuity of the brewery’s direction across generations was not easy.\(^{64}\) Reputations were paramount to profit strategies as seen by the comment made by the head of the Truman Brewery that it was “better to acquire now by good beer, than to have to seek it then by gifts, and loans and purchases of leases” for tied houses.\(^{65}\)

The importance of reputations in the British brewing industry made brewers obsessed with secrecy. Unlike later collaborations that occurred on the Continent, as discussed in chapters 2 and 3, the British used many techniques to prevent possible corporate espionage in their breweries. Many breweries used coded thermometer scales, faked parts of entries in their brewing books, and only let the partners of the brewing firm actually see the accounts. One of the key results of this level of secrecy, however, was that it made innovation difficult.\(^{66}\) Without collaboration, brewers were unable to learn from each other’s mistakes or successes that could enhance their products and efficiencies. In comparison to the home trade, the export trade was relatively unimportant which later led to the domination of the global beer markets by other nations with export-minded brewing firms including Germany and the United States by the end of the nineteenth century. The British brewers focused on tightening their grips on local markets, seeing them as assured profits while foreign markets were less secure. The

\(^{64}\) Gourvish and Wilson, *The British Brewing Industry, 1830-1980*, 234.


uncertainty of export markets revolved around the needs of investing in future profits from beer that had to travel extensive distances and may spoil or never arrive.

Export Trade

Beer was one of the accepted parts of life in England. Because of this, travelers and colonists brought it with them to “whatever parts of the globe the call of profit and empire had drawn them.” Due to its great bulk and low value, beer was only carried under conditions of water-travel because it was cheaper than travel by land. Open-sea travel presented specific difficulties. Export beer needed to be higher in alcohol than beer for local markets in order to survive the constant motion of ship travel. Agitation was nearly as bad as heat as a threat to beer quality. While beer exports from England increased between 1750 and 1830, their economic significance declined sharply as the costs to export made it unappealing to most British brewers.67

There were three reasons for the decline of beer exports at the beginning of the nineteenth century including international events, the beer preferences of foreign consumers, and the keeping quality of the beer itself. The first was the Napoleonic Wars and the blockade that closed the Baltic Sea trade to brewers in London and England’s other major hub, Burton-on-Trent. The Burton-on-Trent brewing industry was primarily dependent upon the export of dark, sweet, very strong beer to Baltic ports including Prussia, Poland, Sweden, Russia, and the German Confederation.68 Unlike the porter brewers who were concentrated around London, Burton-on-Trent did not have a strong local consumer population so when the export trade to the Baltics effectively collapsed in

67 Mathias, The Brewing Industry in England, 1700-1830, 139.
1822, brewers including Bass and Allsopp switched to producing pale and bright (clear) beers for East Indies consumers in competition with the large brewers of London.\textsuperscript{69} However, there was consistent criticism of the export beers sent from Great Britain, specifically that the beers had “too much alcohol, too much sediment, too much hops and too little gas according to an article in the British Brewers’ Journal in 1850.”\textsuperscript{70} These critiques continued through the end of the nineteenth century.

Foreign trade to India was difficult, with only the strongest beers able to survive the journey to Calcutta, Bombay, and Madras. Not only was it hard for the beer itself to arrive in a palatable state, but the amount of time between placing and receiving orders of ale was very long. The chance of loss was very high and in the intervening time between the order and fulfillment of it, commercial conditions and pricing sometimes changed for the worse. This meant limited shipments for commercial sale.\textsuperscript{71} Yet even though beer exports were modest, they were unceasing. With the official naval ration of a gallon of beer a day per man, “afloat, as ashore, beer was the national drink.”\textsuperscript{72}

Another reason for the decline of exports was the diffusion of the brewing skills in the British brewing industry. When British brewers moved to breweries in export destinations, beer trade with the metropole often closed as soon as local breweries produced enough beer for the area. This was true of locations around the Baltic Sea, including St. Petersburg and Gothenburg, Sweden. When porter breweries were established in 1822 and 1826, respectively, it meant the end of English imports.\textsuperscript{73}

\textsuperscript{69} Gourvish and Wilson, \textit{The British Brewing Industry, 1830-1980}, 90.
\textsuperscript{70} Gourvish and Wilson, \textit{The British Brewing Industry, 1830-1980}, 44.
\textsuperscript{71} Mathias, \textit{The Brewing Industry in England, 1700-1830}, 189.
\textsuperscript{72} Mathias, \textit{The Brewing Industry in England, 1700-1830}, 196.
\textsuperscript{73} Mathias, \textit{The Brewing Industry in England, 1700-1830}, 186.
Closer to home, the Irish beer trade throughout the eighteenth century was made up of English imports. This changed in the early nineteenth century as the Irish brewing industry grew around the production of Guinness. Unlike in England, there was no push toward a tied house trade in Ireland, and instead Irish brewers focused on export. By 1840, over half of Guinness’ annual production of 80,000 barrels were sold in England.\footnote{Mathias, \textit{The Brewing Industry in England, 1700-1830}, 167.} Guinness was very similar to Burton-on-Trent’s brewing firms, including Bass, in that it concentrated much of its production for export not to colonies but to English urban centers like London. This lack of interest in building new foreign markets would continue through the nineteenth century. Thus even though Britain and Ireland were known for the quality of their beer, the business strategies of the brewing firms remained focused on domestic markets and the competition with other national breweries.

Towards the end of the 1860s, in spite of a decline in export trade, the commentators for the British \textit{Brewers’ Journal} were very optimistic in the future of beer exports from Great Britain. They noted that trade would likely “extend in scale,” and that “brewing is being conducted on an increasing basis annually.”\footnote{“Board of Trade Returns,” \textit{Brewers’ Journal}, 1/15/1868.} Furthermore, they claimed that British beer was being introduced in new locations all over the world and that “England will always hold her own in that in which she has achieved such great results for ages past, and that in every part of the habitable globe English beer is, and will be, drunk in preference to the brewing of any other country.”\footnote{“Board of Trade Returns,” \textit{Brewers’ Journal}, 1/15/1868.} The commentators optimism, however, would not halt the rapid spread in the popularity of pilsner over the coming years.
Between 1830-1870, British brewers were united in their insular focus on domestic markets. However, opinions over how to brew varied considerably between the thousands of brewers in the United Kingdom. What would occur in brewing industries across the world began in England with a divide between operative/traditional brewers and practical/scientific brewers. Debates over how to brew beer continued throughout the nineteenth century over whether to brew beer based upon traditional tried-and-true methods or to change procedures based on new scientific evidence and using new technologies. The British brewing industry was, to its detriment, consistently slow to incorporate new science and technology over the course of the nineteenth century after the initial push of industrialization of British brewing between 1750-1830. By the 1830s, the industry had settled on a uniformity of practice based on scientific explanations but changed little over the next sixty years.\(^77\)

**Part II: Germany and pilsner**

Brewing in the German lands for most of the last millennium consisted of top-fermented beer produced in a similar way to beers in Great Britain.\(^78\) However, by the eighteenth century brown lager beers were popular enough in Bavaria to push top-fermented wheat beer out of most of the market. The popularity of lager beers was slow until the 1830s when brewers in Bavaria and then other German regions began producing them regularly. Their popularity then began to spread abroad in the 1840s.\(^79\) When compared with the British brewing industry in the early nineteenth century, the Northern and Southern German brewers were far behind in terms of science, technology, and

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\(^77\) Gourvish and Wilson, *The British Brewing Industry, 1830-1980*, 47.

\(^78\) Teich, *Bier, Wissenschaft und Wirtschaft in Deutschland 1800-1914*, 24.

business acumen. However, by the end of the century German brewers and the styles of beer they produced were positioned to dominate brewing markets around the globe.

Foundation of Lager Brewing

Benno Scharl was arguably the founder of modern lager brewing techniques. *Beschreibung der Braunbier-Brauery im Koenigreiche Batern* (Description of a Brown Beer Brewery in the Kingdom of Bavaria), published in Munich in 1814, introduced the cold aging of beer in Bavaria, emphasizing the need for temperature control during lagering. Scharl wrote that “Warmth is of greater harm for lager beer (*Lagerbier*) than coldness…If one cannot remain at a temperature of only eight degrees above the freezing-point…the bottom ferment (*Unterzeug-Gaehrungsmittel*) cannot be used anymore. Contrary to the top ferment (*Spund-Gaehrung*) - used for brewing barley and wheat beer – [that] still can be used due to its greater durability during warmth.”

While the pilsner style itself originated in Plzen, Bohemia, it was German brewers and businessmen who catapulted the golden lager and bottom fermented beer in general to a place of global recognition and domination through the adoption of technology, scientific knowledge, and federal and private investment. However, the brewing industry did not reach a place of competition with the British until the last quarter of the nineteenth century. The following section explores the state of the German brewing industry between 1750 and 1870 in order to highlight the connections between the Continental industrialization of the brewing industry and the industrialized British brewing industry.

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The Sedlmayrs and the Spaten Brewery, Munich, Bavaria

While the British brewing industry was industrializing and innovating through the late eighteenth century, the brewing industries in Denmark, Northern and Central Germany had all “greatly retrograded” through ruinous trade and harmful tariffs. Imported wines and schnapps had caught the public’s attention as their perception of the quality of beer had declined. However, in Southern Germany, extra care was given to storing beer in ice cellars (felsen kellern). The methods of brewing in Bavaria were “perpetuated and improved upon” and by the 1880s were “adopted in the best breweries in most countries in Europe and elsewhere, as throughout North America.” According to J.C. Jacobsen of Carlsberg Brewery in 1884, the Continental brewing industries were defective through the 1830s. This was because the work was entirely “rule-of-thumb” without a trace of theoretical knowledge and “guided by tradition handed down from generation to generation,” in same manner as the British brewing industry, instead of through formal education.

Breweries on the Continent in the early nineteenth century were usually located in small crowded neighborhoods that made it impossible to maintain cleanliness. Brewery production was imperfect with all the work done by hand, making it expensive, hard work that could lead to poor beer quality. However, brewing took a positive turn due to the travels of Gabriel Sedlmayr of Munich and Anton Dreher of Vienna in the mid-1830s.

The Spaten Brewery, founded in 1397, was bought by Gabriel Sedlmayr (Elder) in 1807 and was the smallest of Munich’s 52 breweries (440HL/year) at the beginning of

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81 J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” Brewers’ Journal, 1/15/1885, 30.
82 J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” Brewers’ Journal, 1/15/1885, 30.
83 J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” Brewers’ Journal, 1/15/1885, 30.
84 J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” Brewers’ Journal, 1/15/1885, 30.
the nineteenth century. Gabriel’s two sons, Josef and Gabriel (Younger) apprenticed in the brewery beginning in 1825. The apprenticeship for Bavarian brewers, however, not only included instruction about brewing in their own brewery and running the business but also included “wandering years” in and outside of Bavaria to learn different brewing techniques and approaches. Josef and Gabriel (Younger), as well as their companion Anton Dreher of the Schwechat Brewery located just outside Vienna, set out on an extensive journey through other parts of Germany, Austria, Bohemia, Belgium, Holland, and, most importantly, Scotland and England.  

Between July 25 and December 31, 1833, the two Sedlmayrs and Dreher visited breweries in Scotland and England including those in Birmingham, Manchester, Liverpool, Glasgow, Alloa, Dundee, Montrose, Edinburgh, Newcastle, Sheffield, and Burton-upon-Trent. In these locations, they met with maltsters and brewers to learn the newest malting and brewing techniques and bring them back to the Continent. The British brewers proved to be civil but secretive when dealing with the visitors and only provided them with broad insight into the methods they used rather than the practical understanding of technical and economic skills desired. The visitors resorted to industrial espionage to gain the knowledge they desired and used secret thermometers and saccharometers, which they had only just learned the existence of, while also secretly looking at their hosts’ brewery notes. They created hollow metal poles with valves on the bottom, which they painted to look like wooden walking canes, in order to procure samples of wort and beer to test later with saccharometers. In this way the wandering

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87 Brock, *Dreihundert Jarhre Brauhaus*, 71-72.
apprentices were able to gain the knowledge and skills of the British brewers and transport the information home to Austria and Bavaria.

As we know, British brewers at this point were far ahead of Continental brewers in terms of brewing knowledge and technology. Sedlmayr and the others soon learned about the use of a thermometer to determine temperature during seeping, germination, kilning, brewing, wort cooling and fermentation. In addition, they learned of the benefits of the saccharometer in figuring out the actual and potential strength of their beer. Though Sedlmayr went on to confirm for Continental brewers the advantages of bottom-fermentation versus top-fermentation due to the latter being more prone to “beer vermins” like wild yeast and bacteria, the process of malting in England was very different in comparison with Central Europe and provided an excellent method to create lightly colored, quality malt. Part of this process, also known in England, allowed for the retention of enzyme strength in the malt through the pre-drying of green malt in kilns.88

Technology on the Continent

Prior to the apprentices’ journeys to the UK, scientific knowledge in brewing on the Continent was limited. However, some work had been done that would have important consequences for brewing industries there. In 1833, Anselme Payen and Jean-François Persoz discovered the enzyme diastase that converted starch into sugar for fermentation. The original belief had been that the conversion of starch to sugar and dextrin took place in malting and the mashing that followed only brought them into the solution of liquid. Their pioneering work showed that the preparation for this transformation took place during mashing when the “diastatic ferment” developed during

germination. This meant that proper mashing was perhaps the most important process for brewers and needed special care for precise temperature controls.\textsuperscript{89}

The discovery of diastase and the importance of mashing in the brewing process created a need for precision that Continental brewers had not realized. For instance, the use of a thermometer, brought from Britain by the Sedlemayrs and Dreher, was rare until the discoveries about the necessity for temperature precision were understood in regards to malting, mashing, and fermentation. Precision to tenths of a degree meant that brewers needed the tools introduced from Britain to produce better quality beer. In addition, prior to the travels of the apprentices, the saccharometer only existed in the British Isles and the strength of beer was estimated by the volume brewed from a certain quantity of malt. Brewers used “beer-tasters” to decide if the beer was “ein ehrlicher trunk” or “pfenning vergültig” (an “honest drink” or “only worth a penny”).\textsuperscript{90} The problem with this was that malt quality and sugar content varied considerably, which led to broad variations in beer strength and a lack of quality assurance. When Sedlmayr and Dreher returned, they brought with them the knowledge of how to use saccharometers to determine the strength and yield of their malted grain. They were able to purchase their own saccharometer in Berlin and were the first to use one for brewing in Munich - and all of the Germany - on May 6, 1834.\textsuperscript{91,92}

In addition to scientific tools, Sedlmayr and Dreher brought back knowledge about the value of suitable brewing machinery, which resulted in the introduction of

\textsuperscript{89} J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” \textit{Brewers' Journal}, 3/15/1885, 108.
\textsuperscript{90} J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” \textit{Brewers' Journal}, 3/15/1885, 108. German translation by Jennifer Roesch.
\textsuperscript{91} Brock, \textit{Dreihundert Jahrre Brauhaus}, 71.
\textsuperscript{92} In 1839, Gabriel and Josef took over the Spaten Brewery after their father died. In 1842, however, Gabriel took over after Josef sold him his shares of the brewery in order to buy his own, Leistbrauerau.
steam power and machinery in South Germany and Austrian breweries.\textsuperscript{93} They also brought back new methods for treating grain during malting, including the benefits of slower germination for a higher sugar concentration for the wort and how to malt barley for lighter-colored beers.

It took time for other brewers to start incorporating the skills brought back by the Sedlmayr and Dreher. This was partially due to the fact that at first they were not willing to share with others until they established themselves as central figures in the Munich and Vienna brewing scenes. In addition, most other brewers were not interested in the use of saccharometers during the brewing process, only caring about the finished beer’s strength and quality, though they usually did not even try to brew beers of consistent strength.\textsuperscript{94}

The introduction of the saccharometer via the British represents the beginning of the scientific brewing in Germany but even though there was widespread interest in reliable testing of beer early in the nineteenth century, it did not happen until after 1845 outside of Spaten and a few other breweries.\textsuperscript{95}

In addition to Sedlmayr and Dreher’s contributions, another important event occurred in German brewing with the publishing of the German translation of the British Parliamentary Report from 1806 regarding tax rates related to malted grain using saccharometers. This led to the development of the Balling saccharometer by Carl Joseph Napoleon Balling, a professor of general and applied technical chemistry at the polytechnic school in Prague. Through the British report, Balling learned of attenuation and specific gravities in the brewing process and started a series of over a hundred

\textsuperscript{93} J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” \textit{Brewers’ Journal}, 1/15/1885, 30.
\textsuperscript{94} Brock, \textit{Dreihundert Jarre Brauhaus}, 69–70.
\textsuperscript{95} Brock, \textit{Dreihundert Jarre Brauhaus}, 58.
experiments in fermentation that helped him develop his own saccharometer and to publish *Die sacharometrische Probe* in 1845. While only 50 pages long, this piece was a milestone in the development of the scientific treatment of fermentation in Continental Europe.\(^96\)

*Anton Dreher and Schwechat Brewery*

It took some time for bottom-fermented beer to rise in popularity in Central Europe. Though Scharl’s work influenced brewers in Bavaria, in Vienna Anton Dreher continued to brew top fermented beer through the 1830s. His most popular style was “Kaiserbier,” a top-fermented, mild, and ‘drinkable’ (*seuffiges*) beer.\(^97\)

In the 1840s, while most beer drinkers in Austria were accustomed to inferior quality ales, Bavarian-produced lagers were gaining traction in the region via shipping networks. In 1841, only Dreher’s rival, the Huetteldorfer Brewery, had introduced domestic lager production of “Maerzen” beer in small quantities at high prices, which he attempted to compete with through his “Kaiserbier.” In the winter of 1840 Dreher’s master brewer, Johann Goetz, began brewing his own bottom-fermented beer and, after fermentation, delivered it immediately to proprietors who had to store the beer before it could be sold to the public. However, after Dreher’s “Klein Schwachater Lagerbier” was introduced to the public it was enthusiastically welcomed in Vienna.\(^98\)

*pilsner: The first golden lager*

In February 1838, a representative of the Austrian Empire arrived from Vienna to test the drinkability of the local beer in the Bohemian city of Pilsen. Unfortunately, the

\(^{96}\) Brock, *Dreihundert Jarhre Brauhaus*, 83–84.


testing showed that the beer produced at the time was not fit to be consumed and so all thirty-six barrels of beer on hand were poured into the sewer in front of the town hall, much to the consternation of the local burghers. In response, the town Burghers petitioned the city to produce quality beer for the local population. As Vaclav Mirwald, the holder and publican of “U zlateho oral” said, “This is necessary to us in Pilsen – good and cheap [sic] beer!”

On January 2, 1839, the town burghers who held brewing privileges set out a declaration to construct a city-owned brewery and malthouse called the Citizens’ Brewery (or Burghers’ Brewery). To this end, they hired an architect, Martin Stelzer, to tour Europe in order to learn of the latest and best technology and methods for producing beer. Stelzer returned in spring 1842 with knowledge, a building plan, and a brewer named Josef Groll from Bavaria to begin production of a new state-of-the-art brewery in Pilsen. Groll was known as a simple man without any proper manners and, according to his father, was the rudest man in Bavaria. However, he had an excellent reputation as a brewer and supervised the building of the new brewery that was completed in September 1842. The first batch of beer, using local barley grain and Saaz hops, began brewing October 5, 1842 and was completed November 11 with the first pilsner lager poured at the St. Martin’s Market.

Groll’s beer combined lager brewing techniques developed by Sedlmayr at Spaten in Munich with the malting technology from England and brought to Bavaria by the

Sedlmayr brothers and Dreher to create the pilsner. Within the first year of production the Citizens’ Brewery produced 6,326 hogsheads of beer (12,652 Barrels) and shipped a good part of it to Prague. The popularity of the new pilsner style caught on quickly, and by 1852 there were already controversies over the name of “pilsner,” enough so that the Citizens’ Brewery published in Prague newspapers to combat the theft of the name and style. The brewery owners beseeched pilsner consumers by asking:

“In the effort to put an end to practicing on non-resident consumers and perverting the sale of fake beer, we inform everybody who would like to buy genuine pilsner beer made by bottom-fermentation that the sale of this beer in transport barrels is exclusively provided by the administration of the Citizens’ Brewery in Pilsen, who include the certificate of delivery with each supply. Therefore we beg you to turn to them only.”\(^{102}\)

Unfortunately for the Citizens’ Brewery, even as they expanded their production and modernized over the coming decades, the golden lager style known as pilsner spread beyond their control.

Business

On October 1, 1866 the growing popularity of the beer trade led to the abolishment of all restrictions to the sale of beer in the kingdom of Bavaria. Brewers decided together to sell beer at the same moderate price in summer and winter with a standardized serving measure that was stamped by the authorities.\(^{103}\) The reasons for this were to benefit both the brewers and the government. The government was now able to

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\(^{102}\) Jalowetz, et. al., *pilsner Beer in the Light of Practice and Science*.

regulate beer sales easier through standardized measures and was able to do so without dealing with local differences. The brewers benefited by no longer having any restrictions on selling their products across a broader region with unfettered access to more markets.

Brewery companies around Germany began producing lager beers quickly during the 1860s as the popularity of pilsners/Bavarian beers spread rapidly. In 1866, the Brewery Company at Bergedorf began selling its own “Bavarian imitation beer” and immediately enjoyed “great popularity among the beer-drinkers at Hamburg, in spite of great competition” in the city.104 Breweries founded in Berlin also utilized the popular name of Bavaria. New breweries like the “Bavaria” brewery company held little risk for investors according to brewing industry literature. “Beer – and especially good beer – is always in demand, being no longer an article of luxury, but of imperative necessity in every large city.”105 Except in a few cases the market for lager continued to grow with new breweries and brewing companies becoming regularly established in Germany and abroad.

Though British breweries did not begin incorporating until the late 1880s, Continental breweries were quick to utilize this business tactic decades earlier in order to raise investment for expensive lager breweries. Sale of the popular pilsner lagers, also known as Bavarian lagers, was rapidly increasing through the 1860s with lager breweries established outside of Germany in cities like St. Petersburg where the “Bavaria Joint Stock Brewery” was selling over 230,000 gallons of lager in its first six months.106 The growing popularity did not go unnoticed by the British government either.

In a series of reports before Parliament in 1866, British foreign ministers noted that the manufacture and consumption of beer in Bavaria had nearly doubled in the previous fifteen years with demand continuing to increase. In Munich, breweries continued to grow in scale with the trade accumulating in the “hands of a few considerable capitalists.” While the number of breweries had declined, the amount of beer produced continued to grow due to public and private investment through incorporation.\(^{107}\)

The consolidation of breweries was not limited to Bavaria and Germany. In Austria, there was a “great revolution in beer production” between 1846 and 1866. While there was a decrease of about two hundred breweries, there was a “large increase in their aggregate production.”\(^{108}\) Smaller breweries gave up and larger establishments “with more extensive capital, the most modern improvements in the machinery and art of brewing, and a greater degree of energy and intelligence,” absorbed their business.\(^{109}\)

Exports

Early on, lager brewers in Germany looked to export markets. The Hamburg Joint-Stock Company had its first general meeting of shareholders in 1866. At this meeting the new directors proposed to increase the capital in order to extend to foreign countries. Though the shareholders did not support this proposal, it does show that brewery company managers were immediately looking to expand their reach beyond local markets.\(^{110}\) This included the brewery of Anton Dreher as well. By 1868, Dreher sent weekly railway ice-wagons to Amsterdam for immediate consumption. However, by

\(^{107}\) “Foreign Hops, Beer, Wine, &c.,” *Brewers’ Journal*, 5/19/1866, 54.
that time Dreher’s lager beer had a “formidable competitor in the ‘Nederlandsch Beyersch Bierbrouwery’” that had recently completed construction. Austrian beer also made it to London by the following year though it was met with derision by the local press.

Though the British press continued to point out a steady progression of British beer exports to the “open markets of the world,” the focus of the brewers themselves was on their domestic markets and maintaining assured profits through tied houses. German companies, on the other hand, were already looking beyond their local markets towards foreign opportunities for sales.

Conclusion

The British brewing industry through the 1860s was ahead of the rest of the world in technology and business acumen in comparison to Continental brewing industries. Yet, it also had latent flaws that would come back to haunt the industry after the rise of global competition. Through corporate espionage and the diffusion of technology in the 1830s, brewers in Bavaria and the surrounding regions were able to begin the process of transitioning from decidedly pre-industrial brewing production processes to industrial brewing that would incorporate the latest scientific and technological innovations. The beer that would help this transition through its popularity at home and abroad was the pilsner, the first golden lager.

Without the scientific and technological advances made by the British brewing industry, Continental brewing would not have been able to develop as quickly as it did.

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during the middle of the nineteenth century. By adopting the production methods of the British and then adding their own innovations, the Continental brewers were able to establish their own competitive breweries across Europe. However, the differences in their approaches to education, science, and financial investment diverged dramatically from the British as the century continued on.

By 1889, the popularity of pilsner was even evident to a British court. The Imperial and Royal Austro-Hungarian Consulate-General in London brought the matter of the term “Pilsener Bier” to the attention of the General Customs Office in London due to a disagreement regarding lager beer imported to England from Germany (mainly Hamburg and Bremen) under the name of Pilsener. The Consulate-General sought changes in this labeling on the basis of the provisions of the Merchandise Marks Act of 1887 in which descriptions of goods, under which all incorrect and misleading designations of goods in relation to type, quantity, place of manufacture and the like are strictly prohibited. However, the Customs Office ruled that the name pilsner was understood in London to be a particular type of beer outside of a “particular place of production, so that the use of that designation is not contrary to English law, at least in cases in which it is appears supplemented by an additional statement referring to the actual provenance, such as "made in Bremen." The pilsner had officially lost its connection to its geographic origin as the beer’s popularity transformed global beer production and consumption.

Chapter 2: Modern Methods: European Brewing Technology and Science

Introduction

Between 1870 and 1914, technological and scientific advances changed many of the processes of brewing beer. These innovations included the expanded use of steam power in the brewery and in transportation, the development and incorporation of mechanized refrigeration, and the use of scientific knowledge including the biology of fermentation and the chemistry of malt conversion in the brewing process. However, the responses and acceptance of these changes varied depending on where one was a brewer. The German and other Continental brewers accepted these changes quickly and readily for the most part. The British brewers, on the other hand, were slow to make use of these innovations, which led to their decline as the premier beer brewing power in the world by the late 1880s. By examining the different approaches to the adoption of the latest science and technology, this chapter shows how and why Continental brewers were able to surpass British breweries in the quality and distribution of their beer by the end of the nineteenth century.

Science and technology are very important for brewing good quality beer. The basic processes of making beer (malting, boiling, cooling, and fermentation) have remained largely unchanged throughout history. However, the industrialization of the brewing process in Europe made these processes faster, more efficient, and more cost effective. These advances allowed brewers to produce beers that were consistent in strength and taste and could last longer before consumption. Just as the use of hops in the twelfth and thirteenth centuries led to the development of beer export trades in northern Europe due to the preservative qualities of the hop flowers, the development of
temperature controls, pasteurization, and better modes of transportation led to another revolution in the possibilities of beer exportation both within and outside of Europe.

The inclusion of the natural sciences to the brewing industry created sharp divides between “scientific” brewers who used the scientific knowledge to their advantage and “practical” brewers who used traditional brewing methods with little understanding of microbiology and chemistry. For the most part, scientific brewing was a Continental choice while the British brewers followed tradition. While some brewers, especially the British, sought to maintain what they saw as traditional brewing practices, many other brewers were quick to include scientists and scientific knowledge in their breweries with the goal of consistent, high quality beer. Between 1870 and 1914, the beer—mostly lagers—produced by scientific brewers came to dominate the beer markets due to their more consistent products, longer shelf lives, and the public perception of quality in regards to the product.

Compared with lager production in Germany, the British ale fermentation systems were idiosyncratic and varied considerably between breweries. Due to a general lack of interest in scientific advances as well as a lack of collaboration between brewers, the production of British beer occurred at temperatures barely within the safety margin for decent quality during mashing and fermentation through the 1880s in both the large urban breweries and the smaller country brewers. Continental brewers brewed their beer utilizing specific temperature controls based upon exact specifications developed through scientific methods.

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The British brewers were not eager for new technology and scientific advances because they lacked an economic need to do so due to strong domestic markets for the beers they produced using traditional methods. They produced the styles of beer the British consumer wanted, which by the 1880s were full-flavored, strong, and pale.\textsuperscript{116} The production of strong ales, porters, and stouts had few problems outside of production during the hottest months of the year when temperature control was difficult and could lead to poor quality beer. The production of light ales remained a constant problem even after the 1880s when scientific advances such as “pure yeast” would have made it much easier.

Overall, ale brewing in Great Britain was much cheaper than lager brewing. Lager brewing required large quantities of ice in summer, large cellars for aging the beer in cold temperatures, and entailed a much slower turnover of capital.\textsuperscript{117} The lager brewers required an enormous investment in education and the purchase of equipment for bottom-fermentation, ice for temperature control, and storage systems for ice and aging beer (\textit{lagering}). In addition, even with the introduction of ice machines in the 1870s, brewing took about four months for a finished batch of lager, in comparison with about four weeks for the popular ‘running ales’ in Great Britain.\textsuperscript{118}

This chapter examines the different scientific and technological approaches taken by British and Continental brewers. I argue that the spread and popularity of pilsners, in comparison to British beer styles, occurred in part because the British did not adopt a modern scientific approach to brewing while the Continental brewers did. Through their

\textsuperscript{116} Gourvish and Wilson, \textit{British Brewing Industry}, 58.
\textsuperscript{117} Gourvish and Wilson, \textit{British Brewing Industry}, 58.
\textsuperscript{118} Gourvish and Wilson, \textit{British Brewing Industry}, 176.
continued attempts to improve their brewing methods through scientific collaboration using the latest technology, Continental brewers produced beer that was superior to that of the British. Though British brewers eventually adopted many of the advances that made pilsner popular and of higher quality, they did so slowly and unevenly across the industry while continuing to produce beers that few outside the United Kingdom wanted to drink.

Part I: Technology

Transportation

Steam technology significantly affected the transportation of beer as it did for many consumer goods. First railroads and then steam ships came to be used in the transportation of beer both to domestic markets and then international and colonial markets. The greater speed with which beer could be sent around the world made for a better quality of product in export markets regardless of beer style. However, the rapid transportation also made it possible for those with better access and motivation to take over markets that others may have controlled. In Bavaria, small-time brewers were barely making ends meet until opportunities for export arrived with railroads and steamers. Though Bavarian brewers initially exported to other German states, they soon found markets for their lagers all over Europe. The great exhibitions of the middle and late nineteenth century provided occasions for introducing their beer to new consumers in markets all over Europe that helped promote the spread of golden lagers over ales in markets within the continent.119

The transportation of beer via steam ships had several obstacles to overcome. In comparison to spirits, beer takes up more space for less profit. Though shipping companies knew that the product would sell, it also took up a lot of space that could be used for items that were more expensive. Also, before the development and utilization of pasteurization many kinds of beer would spoil during the journey abroad. The continuous jostling and temperature changes that could occur with overseas travel would frequently lead to spoiled beer, or at the very least, an inconsistent article upon arrival. The changes of the later nineteenth century, including faster and more stable steam ships, made it possible for beer to arrive in better and more consistent shape than ever before.

**Railroads**

Railroads were an important part of transporting beer both in Great Britain and on the Continent. In England, the expansion of railroads was slow through the early nineteenth century but occurred rapidly through the 1840s and 1850s. Beer distribution nationwide became cheap and fast with reduced freight charges that changed the market strategy for brewers in Burton and London, especially after 1839 when Burton linked to London. With the journey time from Burton to London dropping from three weeks to only twelve hours, new domestic markets become more viable for trade.\(^{120}\)

Railroads also allowed for the creation of agencies and stores that became the central distribution network of beer for breweries such as Bass, from Burton, after 1840. In the 1850s, there was even a limited push for beer exports due to the popularity of Burton pale ales, early expansion of railroads, and the Great Exhibition.\(^ {121}\)

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\(^{120}\) Gourvish and Wilson, *British Brewing Industry*, 150.

\(^{121}\) Gourvish and Wilson, *British Brewing Industry*, 172-3.
Exhibition, like later national exhibitions brought people and exhibits from all over Europe and showcased national goods including locally-produced beers.122

Steamships

While railroads had a great impact from the early nineteenth century, with freight rates declining from 1815 onward, the impact of steam ships was not felt until the last third of the century.123 In 1880, three times as much waterborne freight was transported by sailing ships than by steam. However, with the help of coal mining, steam power spread quickly over the course of the decade. Steel ships, the compound engine, and the surface condenser all supported the transition from sail to steam between 1880 and 1914 with the British merchant marine securing almost half of the world’s carrying power by 1888.124 Through these technological inventions as well institutional innovations, commodity freight rates dropped for the busiest oceanic routes due to fierce competition between shipping companies. Governments subsidized many of these companies so they could transport mail, colonial officials and supplies, and maintain merchant marine fleets.125 For instance, the German shipping lines that served East Africa were heavily subsidized by the German government, which would offer rebates to shippers who fulfilled their annual tonnage quota. In order to be sure they received their rebate and met the required tonnage, many would top up their tonnage with whiskey and beer for colonists.126

124 Topik and Wells, “Commodity Chains,” in A World Connecting, 634.
Through steamships the nature of freight changed due to the amount of goods the large ships could carry. Sailing freights usually carried luxury items that would be cost effective and take up as little space as possible. With the advent of large steamships, bulk commodities that had a high volume-to-value ratio, such as coal, meat, grains, and tropical goods, all became the most important. Since travel times were more certain with steam, easily spoiled goods could be transported successfully across the oceans.\textsuperscript{127}

The primary motivations for the shipping revolution in steam were imperial and commercial. The domination of the seas was a continuing goal for Great Britain and then for the United States and Germany. The rivalry between Germany and Britain accelerated naval building by both countries through the turn of the twentieth century.\textsuperscript{128}

As railroads in Britain cut down domestic transport times significantly, steamships did the same across the world. For instance, in 1840 it took six weeks to sail from England to Calcutta, but by 1914 it only took twelve days. The journey to Australia dropped from 125 days in the early nineteenth century to a month by 1900 and a steamship voyage from the US to Europe went from nine or ten days to five or six days.\textsuperscript{129}

\textit{Steam powered machines}

Brewers in the late eighteenth century were already utilizing the power of steam engines for several processes in their breweries, especially in pumping water, wort, and beer around the breweries at different stages of the brewing process through the use of Watts steam engine, which made complicated, steam-operated machinery possible for use.

\textsuperscript{127} Topik and Wells, “Commodity Chains,” in \textit{A World Connecting}, 633.
\textsuperscript{128} Topik and Wells, “Commodity Chains,” in \textit{A World Connecting}, 635.
\textsuperscript{129} Topik and Wells, “Commodity Chains,” in \textit{A World Connecting}, 637-8.
during the brewing process while also reducing transportation costs.\(^{130}\) Steam power was also quickly utilized in other stages including the crushing of malted grains before mashing. Over the course of the nineteenth century steam power came to be used for many more parts of beer production.

In 1865, German brewers were only using steam power very modestly and usually all a brewery really needed was a stationary engine of around 12hp for pumping liquid. This continued through the 1870s and early 1880s because most of their work was done by hand, aside from pumping and driving elevators.\(^{131}\) But even this was notable at the Exhibition of Vienna in 1873 where the great strides of Germany were highlighted. Steam power was shown to be in more general use, especially with machinery in the new brewery buildings. In contrast to Continental progress, ale production in Britain saw very little improvement.\(^{132}\) However, over the course of the 1880s there came a reduction in the number of breweries as the preference for smaller breweries shifted in favor of medium and large enterprises. Even as the number of smaller breweries dwindled, the number of employees in each German brewery doubled. Small breweries typically had around two people working while medium ones had about sixteen people. Large breweries, however, grew to include an average of 111.\(^{133}\)

In J.C. Jacobsen’s address to the Technical Association of Copenhagen in 1884, the owner of the Carlsberg Brewery emphasized how important the introduction of

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\(^{133}\) Teich, “The Industrialization of Brewing in Germany (1800-1914),” in "Production, Marketing, and Consumption of Alcoholic Beverages since the Late Middle Ages," 107-108.
machine power and improved apparatus was to the brewing industry. Not only did it improve the quality of the beer itself but it had already increased the productive capabilities of the brewery from one to four brewings a day due to more efficient cooling apparatus that saved a lot of time. In terms of malting the barley there was also important change. By using a steam powered pneumatic malting apparatus to keep the malting grains in motion as well as powerful ventilating machines, the maltsters were able to increase the depth of grain on the malting floor from a four inch depth to two feet while using the same floor space. In addition, with cooling instruments, the malting season had increased from eight to ten months a year by 1884. Machine labor, as Jacobsen explains, was extensively introduced in the drying of the malt by providing the mechanical means to replace hand labor in turning the malt for even drying.134

The economic and technical aspects of steam power mechanization were two sides of the same process. Breweries without efficient steam power could not progress and compete. As large breweries flourished, they were the only ones that could afford to purchase and run the new steam powered machines.135 For instance, by 1878, the Schwechat Brewery of Anton Dreher near Vienna produced about 500,000 barrels of beer that combined water and steam engines of one hundred horsepower, with added production support from 250 draught oxen.136

Temperature Control in the Brewery

Temperature control has always been important in brewing beer. While the boiling portion of the process is the most simplistic once you have adequate fuel to raise

135Teich, “The Industrialization of Brewing in Germany (1800-1914),” in "Production, Marketing, and Consumption of Alcoholic Beverages since the Late Middle Ages," 108.
the brewing liquor to the boiling point, temperature levels during malting and sparging, fermentation, and aging are very important to the finished product for ales and lagers. The following sections deal with changes in refrigeration technology that made it easier to produce lager beer by Continental brewers, helping them produce beer in greater quantities year round, and at a higher quality, to the detriment of British ale brewers.

*Temperature Control Background: Great Britain*

With the invention and adoption of the thermometer at the end of the eighteenth century, British brewers were able to produce beer of a quality that no other brewers in the world could compete. While there were many different opinions about what temperatures were best for the different processes of brewing, within a few years nearly all the largest and most well-known brewers of Great Britain were using thermometers to regulate the temperature of all of the brewing processes. With the added knowledge that came from use of saccharometers to establish the correct density of the wort and strength of the finished beer the British brewers were producing more consistent beer than any other nation.

Used in tandem, thermometers and saccharometers allowed the brewers to produce wort with the most consistent amounts of fermentable sugars from the malted barley and control the fermentation of the wort into beer with consistency. As mentioned in Chapter 1, they also developed techniques for cooling the wort quickly from boiling to fermentation temperatures, which helped produce better and more consistent quality beer as well. These early temperature regulators made it possible for British brewers to do away with previous traditions that did not allow for beer brewing during the warmer months from April to October. However, the ales produced by the British needed less
temperature regulation than the lagers produced on the Continent. To produce lager of a higher quality the brewers needed more space and different tools than British ale brewers.

*Temperature Control Background: Germany*

With the needs for cold fermentation temperatures and an even colder lagering temperature to produce quality pilsner beer, Continental lager brewers were at a severe disadvantage in comparison to the British. While the early processes of malting and mashing were similar to ale production, the lower fermentation temperatures needed for bottom-fermenting yeasts as well as the extended 3-6 month lagering time made lager beer production much more difficult. In addition, brewing was limited to cold months even with the use of the moderate temperature controls developed by the British.

Lager brewers needed more space for their beer production. While the London porter brewers utilized large vats for the aging of their beers, they did not need to focus on much temperature control outside of the earthen temperatures available under the main brewery production sites.¹³⁷ Lager brewers, however, needed freezing temperatures for the extended aging of their beers. Thus, brewery sites usually were located next to hillsides where breweries dug large caves packed with ice to keep the beer cold. In addition, the beer needed to stay cold through to consumption to keep it from going bad, especially before the incorporation of pasteurization in the brewing and distributing processes. As noted by the *Brewers’ Journal* from 1872 regarding the Great Exhibition, Viennese lagers had to be brewed, aged, and transported at cold temperatures before they were served to English drinkers at the Exhibition.¹³⁸

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Ice Machines and Mechanized Refrigeration

There were several refrigeration systems invented during the third-quarter of the nineteenth century, but brewers both in Britain and on the Continent were slow to incorporate them into their breweries. Brewers were worried that the chemicals used in mechanized refrigeration would spoil their product and lead to economic loss. For many years, refrigeration was experimental as inventors attempted systems that involved different kinds of gas and designs to produce cold temperatures, regulate those temperatures, and produce ice regardless of the location and season.

One of the early attempts in the 1870s involved the use of ether, but it was short lived as the potential for ammonia-based ice machines took over. The introduction of machines like those produced by Reece’s Patent Ice Company (Limited) in London were impressive events. For instance, in October 1877 a demonstration of Reece’s ammonia-based ice machine was attended by around eighty of the leading scientific men of the country as well as the Chinese ambassador who came to witness how Reece’s machine was able to make seven times as much ice with a single ton of coal as an early ether machine.139 The ether machine in question worked well but proved to be very costly.140 The brewery of Meux and Co. had recently installed a machine with the cooling power equivalent to twenty tons of ice per day. The correspondent of the Country Brewers’ Gazette who attended the event himself noted that "it was evident to all present that the necessity no longer exists for importing Norwegian ice, and there can be no doubt

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139 “Ice Making By Machinery,” Country Brewers’ Gazette, 10/29/1877, 94.
140 J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” Brewers’ Journal, 1/15/1885, 30.
that at the cheap rate at which these machines produce the ice, the manufacture much supersede the import, with all its costs of storing, waste, and heavy expense.”

The use of steam power scaled up quickly with the introduction of artificial refrigeration to the brewing process during the second half of the 1880s. Prior to this, as discussed, breweries were dependent upon natural ice for cooling that required the equivalent of one horsepower per kilogram of malt. After the introduction and installation of artificial refrigeration only 3-4 horsepower was needed per fifty kilograms of malt.

This was an important change considering the growing needs of Continental lager breweries like Spaten in Munich. Between 1846 and 1869 the ice required by Spaten Brewery rose from 10kg to 73kg per hectoliter of sold beer due to the expanding production of lager beer at this time. This expanding market for Spaten’s lager led to the lifting of seasonal restrictions on brewing and, after 1865, bottom-fermented beer was brewed year-round which meant the needs for controlled, cold temperatures were that much greater.

A British visitor to Germany in the fall of 1877 noted that in most German towns there were no ice-machines and natural ice arrived by carriage from the north. The visitor noted correctly that natural ice was an enormous expense for the large breweries and that “ice-making machines have in Germany a great chance of success.”

In Jacobsen’s 1884 address about the changes in brewing over the previous fifty years, he noted the importance of ice cellars in the soundness and freshness of his lagers at Carlsberg and across the Continent. The later use of ice with the wort and beer both

141 “Ice Making By Machinery,” Country Brewers’ Gazette, 10/29/1877, 94.
142 Teich, “The Industrialization of Brewing in Germany (1800-1914),” in "Production, Marketing, and Consumption of Alcoholic Beverages since the Late Middle Ages," 109.
143 Teich, “The Industrialization of Brewing in Germany (1800-1914),” in "Production, Marketing, and Consumption of Alcoholic Beverages since the Late Middle Ages," 110.
144 “Miscellaneous – Ice,” Country Brewers’ Gazette, 11/12/1877, 118.
before and during fermentation allowed for further temperature regulation even in hot weather and extended the normal brewing season from seven months to ten or twelve months a year. The additional introduction of refrigerated ice cars on railroads in the 1870s “enabled beer to be sent long distances, irrespectively of the time of year, with the result that the export of the best South German breweries to other countries, as to France, has been greatly increased.”

Jacobsen then referenced the “recent important improvement” of ice machinery. The previous decade had seen several mild winters that prevented the collection of natural ice in enough quantity to satisfy the brewers and came at a great expense, inconvenience, and risk from Norway and the Alps. Ice machines went through many failed experiments before the von Linde system with ammonia came to be the most accepted. Other ice machines used the “compression of atmospheric air,” distillation of ammonia, or the expansion of sulphurous acid but none were as successful or produced ice as cheaply as Carl von Linde’s machines that made ice nearly as inexpensive as the purchase of natural ice.

Between 1880 and 1884, Linde’s machines came to be used in Germany, England, France, Italy, and Denmark. Between 1883 and 1884 over one hundred Linde machines were sold to brewers. The Old Carlsberg brewery owned four itself, which collectively produced cold equivalent to the daily consumption of 200,000 lbs. of natural ice. Jacobsen foresaw in 1884 that ice machines were soon to be indispensable for every brewery.

146 J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” *Brewers’ Journal*, 1/15/1885, 30.
147 J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” *Brewers’ Journal*, 1/15/1885, 30.
Jacobsen noted that ice machines allowed for the regulation and control of fermentation all year, and kept fermentation rooms clear of “smuts and mold spores, which natural ice contains,” and enabled the surrounding air to be maintained in conditions of perfect purity. In addition, ice machines allowed for the “considerable geographic extension of the brewing industry” to warmer climates including the south of France, Italy, “and even hotter climates in other parts of the world.” Even in 1884, Jacobsen foresaw the importance of refrigeration technology in the spread of lager brewing across the world.\(^{148}\)

However, even with the need for regulated, controlled, dependable cold temperatures for fermentation and storage, most Continental brewers were initially hesitant to install artificial refrigeration systems into rooms containing vats of beer due to a fear of financial loss if they system failed. Yet, the shortage of space for ice storage forced large breweries like Spaten, Carlsberg in Denmark, and Heineken in Holland to try certain artificial refrigeration systems. The success of these breweries in the late 1870s and early 1880s in turn led to the spread of the system developed by Carl von Linde.\(^ {149}\)

Lager brewers were much quicker than British ale producers to adopt mechanized refrigeration. This was due to the colder temperature needs of lager brewing as well as the attitude that pervaded the German brewing industry that included a devotion to modern technological upgrades and the adoption of current scientific research about all pieces of the brewing process.

\(^{148}\) J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” *Brewers’ Journal*, 1/15/1885, 30.

Responses to the spread of ice machines were not wholly positive, however. In 1876, the French brewing journal *Moniteur de la Brasserie* reported that German beer was becoming more popular in Great Britain and that establishments for lager were growing. In response, the British *Brewers' Journal* refuted their information by saying that:

German beer will be drunk to a certain extent in London, as it is in Brussels, but to infer from this fact that it will invade the country is an illusion. England need not be alarmed. Its greatest enemy is the ice or artificial cold, which permits the fabrication of beer in its islands or in the Indies.  

This fear about the spread of artificial cold continued in the early 1880s as the *Brewers Journal* noted the success of transporting meat from hot climates via ice machinery on a steamship and that as the machines come into more use, “it will have a considerable effect on brewing in hot climates.”

By the middle of the 1890s, the use of ice machines was widespread both in Britain and on the Continent. Dr. W. Stanley Smith noted that they were so prevalent among the large ale producers in England that they were likely to become used even among the small country brewers due to the enormous savings of liquor and time. Bringing together the “combined genius of modern engineering and modern chemistry” Smith described the popular ammonia compression machines of von Linde’s invention as “some of the most perfect types of machine the world has ever witnessed.”

*Bottling Beer*

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150*English vs. German Beer,* *Brewers’ Journal,* 11/15/1876, 245.
151*Ice Machines,* *Brewers’ Journal,* 4/15/1882, 110.
152*Modern Methods of Refrigeration,* *Brewers’ Journal,* 10/15/1896, 642.
Beer bottling went through a revolution in the 1890s and early 1900s due to new techniques from lager breweries in the United States that built upon the Continental scientific knowledge and technology. By chilling, filtering, carbonating, and pasteurizing their beers, these breweries were able to sell beer that was always bottled fresh, star-bright, and without any sediment. In addition to the new bottling process, these American companies were able to mass-produce cheap glass bottles, bottle washers, and corking and labeling machines to further increase the efficiency and speed of bottling beer.¹⁵³

**Part II: Science in Brewing**

Between the 1870s and the 1890s, a divide developed between what became known as scientific brewers and practical brewers. Practical brewers were the more traditional brewers who primarily had learned the basics of the brewing trade through experiential learning and apprenticeship instead of via formalized education about the biology, chemistry, and engineering that went into brewing beer. Scientific brewers were those who adopted the most up-to-date technology and incorporated the latest scientific knowledge of brewing processes into their own work. By the turn of the twentieth century, only scientific brewers were successful brewers, as breweries that did not make science a part of their work produced less consistent and less desirable beer for the consumers.

In Britain, a few forward-thinking breweries employed chemists fairly early on. Large brewers in Burton had employed chemists since 1845 when they were hired to combat the charges of adulteration of their beer from consumers. These were chemists of national distinction and who notably became head brewers themselves while working on

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¹⁵³ Gourvish and Wilson, *The British Brewing Industry*, 299.
learning more about the chemistry of barley, starches, brewing sugars, and maltose.\textsuperscript{154}

Through the early 1880s, brewers in Burton were nearly the only ones to have brewing laboratories but, by the end of the decade, nearly every large British brewery had one but they were very small with only one or two chemists.\textsuperscript{155}

The British brewing industry was unusual in its use of scientific procedures because although tertiary acceptance of scientific methods led to better products, brewers could produce beer that would sell without fully understanding the new scientific advances. In fact, many brewers overstressed their adherence to tradition and only grudgingly accepted scientific advances in spite of their skepticism.\textsuperscript{156} However, for the most part this did not affect beer sales. The quality of the end product was more about taste than precision of process. Through reading brewing industry literature, modernizing brewing facilities and focusing more on cleanliness the British brewers produced beer the domestic markets thoroughly enjoyed.\textsuperscript{157}

Though there had been some research regarding yeast and their life cycle in fermentation, the beginning of what become known as scientific brewing began with Louis Pasteur and his publication of \textit{Études sur la Bière} (Studies on Beer) in 1876, with the English translation following in 1879.\textsuperscript{158} Within this publication, Pasteur examined yeast, used in the fermentation of beer, and explained what yeast are and what they do in terms of beer production. He explains that yeast are single-celled living organisms and

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\textsuperscript{154} Gourvish and Wilson, \textit{The British Brewing Industry}, 59.  \\
\textsuperscript{155} C.C. Owen, \textit{The Greatest Brewery in the World: A History of Bass, Ratcliff & Gretton} (Chesterfield: Derbyshire Record Society, 1992), 86; Gourvish and Wilson, \textit{The British Brewing Industry}, 60.  \\
\textsuperscript{156} Gourvish and Wilson, \textit{The British Brewing Industry}, 63.  \\
\textsuperscript{157} Gourvish and Wilson, \textit{The British Brewing Industry}, 63.  \\
\end{flushright}
then goes onto explain the life cycle of this organism in reference to beer and fermentation. A basic synopsis is that the yeast ingests the fermentable sugars available in the wort – mostly from the malted grain but also from any additional sugars including honey, corn, cane sugar – and then converts the sugars into carbon dioxide and ethanol to transform the wort into beer.

Understanding this process made it possible for brewers to then learn more about yeast and their life processes as well as to learn that there were many kinds of yeast, some that were better for certain beers than others. However, control of the yeast and fermentation was still a few years away and needed the help of a botanist at the Carlsberg Brewery Laboratory in Copenhagen, Denmark.

**Mashing Methods**

Key to the brewing of quality beer is the amount of fermentable sugars that can be extracted from the malted grain during the mashing process. British and Continental brewers used two different methods for mashing, and while both produced enough liquor for the boil and sugars for the different kinds of fermentation, there were differing opinions about which produced better beer. The British, and most ale brewers, used an infusion mash while the Continental brewers, led by the Germans who had refined the technique, used a decoction method.

The infusion process is simpler and faster than decoction and continues to be a dominant method for mashing. The infusion method, as explained in Chapter 1, involves the steeping of the malted grains in hot water to extract the fermentable sugars for later

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fermentation. While today brewers use a standard temperature of around 150-155°F, British brewers of the eighteenth and nineteenth centuries tried several temperature levels to gain the most from their grains.

The second method of mashing, as developed and used by German and then other Continental brewers, is the decoction method. Decoction mashing involves several more steps in an effort to extract the maltose from the grains. It was preferred to infusion by the Continental brewers because they believed that it made beer less intoxicating and more nutritious.\(^{160}\) During decoction, a portion of the malt mash is boiled to gelatinize the starch from the gain completely and then added to the rest of the mash. This raises the temperature to the desired level of about 65°C. This method has some specific benefits compared with the infusion method preferred by the British even though it was more labor intensive. The most important benefit of decoction is the high yield of fermentable sugars that can be obtained because of the higher susceptibility of gelatinized starch to the amylases enzymes present in the malt, which leads to a more complete fermentation as well as a clearer beer due to the coagulation of part of the proteins during mashing.\(^{161}\)

*The Keeping Qualities of Beer*

The keeping qualities of beer are very important in the commercial viability of any export trade, whether out of the region of a brewery or out of the country. There are few techniques to help with the keeping qualities of beer regardless of style or production methods, but over the nineteenth century brewers were able to develop different strategies to enhance the longevity of their products.

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\(^{160}\) J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” *Brewers’ Journal*, 1/15/1885, 30.

The British brewers depended upon two ingredients for keeping their ales palatable on a longer term for their consumers. The keeping qualities of higher alcohol content and an abundance of hops were well known. For decades before the nineteenth century, the British brewing industry consistently depended upon these qualities in their beer for their products’ longevity.\(^ {162}\)

In spite of the positive influence of higher alcohol percentage for beer longevity, Continental lagers tended to have a long shelf life with a lower alcohol by volume (ABV) on average. This was due to the brewing and aging process. Due to the quick turnaround of British ales and the brewers’ ambivalent interest in scientific precision, British beers were sold with a fair amount of sediment made up of living and dead yeast cells as well as small particles of hops, malt, and other organic matter left over from the brewing process. These organic particulates had the potential to be infected by airborne bacteria and wild yeasts if the barrels or bottles were not sealed correctly, or if they were left in direct sunlight which could cause what is known as “light strike”—a process that spoils beer.\(^ {163}\)

In comparison, Continental pilsners were aged for several months in cold temperatures, which allowed all sediment to settle to the bottom of the aging vessels. This allowed the brewers to bottle and cask the finished Pilsner as a light and clear lager beer that had little-to-no sediment. Not only was this aesthetically attractive,\(^ {164}\) but it also left little in the way of particulates that could be affected through further aging during travel.


\(^{164}\) See Chapter 5 for more on this.
or before sale. In spite of the lower ABV and fewer hops used, the lager was able to have a long shelf life that was equal to or longer than the British ales.¹⁶⁵

In addition to the lagering process and the benefits of bottom fermentation, the higher carbonation of lager also helped its longevity. The gradual secondary fermentation at one to two degrees above freezing for several months produced lager beers that had a very high level of carbonation compared with British beers that were aged very quickly. Carbonation made the beer “refreshing” and also acted as a preservative in its own right. With a high level of carbon dioxide in the beer there was less room for free oxygen and by eliminating most of the oxygen, the carbonation inhibited bacterial growth that would turn the beer sour and unmarketable. This made it unnecessary for the beer to be as high in alcohol or brewed with as many hops as British ales were.¹⁶⁶

*Pasteurization*

In addition to his contribution to the knowledge of the microbial origin of fermentation and explanation of its anaerobic nature, Louis Pasteur also introduced a method for increasing the shelf life and stability of beer and other beverages.¹⁶⁷ Pasteur’s technique, known as pasteurization, became popular both on the Continent and in the United States by the end of the 1870s. The first step was to carefully seal the beer “in bottles, corked with good sound cords, and securely fastened…The bottles thus fastened should be placed up to the head in a trough of cold water.” The water would then be gradually heated with a steam jacket or coil to about 6³⁵ to 7¹°C and kept there for and hour and a half. The water and the bottles would then gradually cool down to room

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¹⁶⁶ J.C. Jacobsen, “Brewing Progress During the Last Fifty Years,” Brewers’ Journal, 1/15/1885, 30.
temperature. “Some brewers affirm, that for export it will be found advantageous to employ a higher degree of heat.”

Modern brewers utilize pasteurization as well. Many use a tunnel pasteurizer through which bottled and canned beer passes through heating and cooling zones on a moving platform. The beer is heated to pasteurization temperature of approximately 60° over the course of about twenty minutes, kept there for ten minutes, and then cooled to 30°C in approximately twenty more minutes. The total time it takes today for pasteurization is only about one hour but the process and temperatures remain very similar.

*Pure Yeast*

In 1871, JC Jacobsen established the Carlsberg Laboratory at the Carlsberg brewery in Copenhagen to study the science of malting, brewing, and fermentation. Emil Christian Hansen, a botanist, was hired in 1874 to head the laboratory’s Physiological Department and to study the science of fermentation. The Carlsberg Laboratory set out to build on the work done by Louis Pasteur, who as we know had demonstrated that the yeast used for brewing were actually living single-celled organism responsible for the fermentation of sugars into alcohol and carbon dioxide.

While bottom-fermented Bavarian-style beers had been produced at Carlsberg since 1846, there were still problems with the spoilage of beers. In 1882, Carlsberg began brewing beer all year round instead of only during the colder months between October to June. However, though it was now producing much more volume, large amounts of beer

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169 Nagodawithana, *Yeast Technology*, 121.
were becoming spoilt for unknown reasons in spite of the new refrigeration technology. Emil Christian Hansen, the head of the Physiology Department, was asked by J.C. Jacobsen figure out a solution to the problem.\footnote{Teich, “The Industrialization of Brewing in Germany (1800-1914),” in “Production, Marketing, and Consumption of Alcoholic Beverages since the Late Middle Ages,” 112.}

Hansen’s background in botany led him to go against the favored bacteriological-chemical approach of Pasteur who believed diseases in lager beers were from bacterial infection. Hansen adopted a botanical approach that identified the culprit in species of airborne and insect-born “wild yeasts.” His work demonstrated that yeast cells could be infected, which would cause the beer to be spoilt, thus resulting in losses for the brewery. He also showed that there are many different types of yeast and that pure versions of these yeasts could be isolated and then propagated under controlled situations.\footnote{Gourvish and Wilson, The British Brewing Industry, 59.}

In 1883, Hansen became the first person to isolate and propagate a single yeast cell using yeast from the Carlsberg brewery’s strain, which he named Saccharomyces Carlsbergensis (though now known as S. pastorianus), after the brewery. Hansen’s process transformed the brewing industry and is seen today as a landmark moment in the history of brewing and the science of fermentation.\footnote{Nagodawithana, Yeast Technology, 112} Through the adoption of a “pure yeast” approach to beer fermentation, brewers are able to gain more precise consistency with their finished products. The ability to use the same yeast every time increased the control over the bottom-fermentation process.\footnote{Teich, “The Industrialization of Brewing in Germany (1800-1914),” in “Production, Marketing, and Consumption of Alcoholic Beverages since the Late Middle Ages,” 112.}

Instead of keeping these findings secret for the brewery, JC Jacobsen insisted that the results be published publically in scientific journals and that descriptions of Hansen’s
process were shared with the brewing world. This way anyone could build equipment for
the isolation and propagation of their own brewery’s yeast and use Hansen’s methods. In
addition, samples of the Carlsberg yeast were sent on request to breweries around the
world, including Heineken – now one of the top four beer producers in the world — and
brewers were allowed to visit at Carlsberg to learn the new methods. 175

While many brewers on the Continent took this new information and used it for
their own brewing purposes, most British brewers were not as keen on utilizing this
scientific approach to brewing. British brewers, in the face of the productivity and quality
of scientific brewers on the Continent, still considered their older, traditional methods to
be the way to produce the best beer. 176 However, at least one English journalist noted that
“it would be impossible to produce in England a stable beer [like those of Bavaria]
without adopting scientific means for determining stability.” 177

Conclusion

As Sigsworth notes, the Pasteurian revolution in beer brewing, had little effect on
brewing practices in Britain. 178 “In no case can scientific discovery be said to have had
revolutionary effects upon the brewing industry.” 179 While Continental lager brewers
adopted the latest in technological and scientific innovations to produce a beer style that

179 T.G. Parsons, “Science and the Victorian Brewing Industry, 1870-1900” in "Production, Marketing, and Consumption of Alcoholic Beverages since the Late Middle Ages (Leuven, Belgium, 1990), 114.
appealed to consumers the world over, British breweries continued to hold onto their traditional practices and styles.

Through the use of steam engines, mechanized refrigeration, and scientific knowledge about yeast and pasteurization, the Continental brewers were able to produce a consistent and palatable product. Their lager beers were able to keep for long periods of time and over great distances without their producers worrying about spoilage or their consumers worrying about what the finished product would taste like when it arrived in their hands.

The best beer of the nineteenth century, and up the present, is a consistent beer. Consumers, once they find a product they like, do not want it to change, they want to receive what they expect. In the pilsner beers produced by Continental brewers, they found a beer that they could depend upon and trust through the use of scientific processes and the adoption of the latest technology. By ignoring the technological and Pasteurian revolutions in brewing, —due to the cost of conversion to lager brewing and lucrative regional market—the British fell far behind the Continental brewers when it came to gaining new consumers.
Chapter 3: Making the Investments Count: Business Strategies of Brewing Industries

Introduction

By the end of the nineteenth century the Bavarian style of lager beer produced by German and other Continental brewing industries had overtaken ales produced by the British in just about every beer market in the world outside the British Isles. An important part of the explanation for why this occurred was Continental brewers’ adoption of new business strategies to raise investment capital and gain new markets for their products. In addition, the insistence of Continental brewers on educating their employees in the latest science and technology helped Continental brewers succeed in relation to British brewers.

Greater investment capital meant that Continental lager breweries were able to expand and upgrade their brewing facilities to be more competitive. Expansion meant that the continental brewers could capitalize on economies of scale and sell their products more cheaply than their competitors. Economies of scale meant that the greater the volume of beer produced, the lower the cost of each beer. Thus, large breweries had a significant cost advantage over smaller ones.\(^\text{180}\) It was expensive to invest in newer technologies and machines, but the increases in production were well worth the costs. Lager beer prices dropped towards the end of the nineteenth century because economies of scale increased demand. Alcoholic beverages, including beer, tend to have a high rate of substitution and are particularly responsive to changes in price. This means that less expensive alcoholic beverages will sell in greater quantities regardless of consumers’

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personal drink preferences. Thus, I argue here that producers of lager benefited greatly from changes in technology that resulted in greater economies of scale.\textsuperscript{181}

From the 1870s through the early 1890s many technical and business innovations helped propel Continental lagers outward from their production centers, to the detriment of the British brewing industry. While British brewers were producing more product than ever before and Guinness and Bass were the largest and most productive breweries in the world, respectively, their influence and impact on the markets outside of home consumption declined considerably. The reasons for this were that their market strategies and goals remained focused on retaining local markets without realizing or attempting to control the vast foreign markets available to them via their imperial territories and trade networks. The brewing industry remained highly traditional in production and very conservative in its business leadership.\textsuperscript{182}

There have been two key studies looking at the industrialization of Germany vis-à-vis Great Britain, but these have focused on industries other than brewing. Alfred Chandler and Takashi Hikino’s \textit{Scale and Scope} examines the evolution of modern industrial enterprise in the United States, Germany, and Great Britain. They argue that the decline of Britain as an industrial force, when compared with the other two nations, was because of its failure to make a three-pronged investment in production, distribution, and management to exploit economies of scale and scope within the window of opportunity.

\textsuperscript{181} John J. McCusker, “Distilling and Its Implications for the Atlantic World of the 17\textsuperscript{th} and 18\textsuperscript{th} Centuries,” in \textit{Production, Marketing, and Consumption of Alcoholic Beverages Since the Late Middle Ages: Proceedings of the Tenth International Economic History Cong (Studies in Social and Economic History)}, eds. Erik Aerts. L. Cullen, and R. Wilson (Ithaca, New York: Cornell University Press, 1990), 7-8.
\textsuperscript{182} Gourvish and Wilson, in \textit{Production, Marketing, and Consumption}, 122.
available to them at the end of the nineteenth century.\textsuperscript{183} While they briefly touch upon the brewing industries in Britain and Germany, they focus more on branded, packaged products, electrical equipment, and other industries. In addition, Johann Peter Murmann’s \textit{Knowledge and Competitive Advantage} builds upon Chandler and Hikino’s work with an examination of the synthetic dye industry in Germany, the United States, and Great Britain. Murmann’s work argues for a dynamic model of competitive advantage wherein successful synthetic dye firms all had close connections with national institutions, including universities and the government. Successful companies were able to cooperate through collective action to mold the social and institutional environment in which they operated, and German firms like Bayer were the best at this.\textsuperscript{184} This chapter builds on these approaches to the history of industry in order to explain the relative decline of the British brewing industry and the loss in popularity of its beer styles in comparison to the spread of pilsner as the Continental brewing firms surpassed the British.

While there have been histories of industry that compare Great Britain and Germany there has never been one that concentrated on the brewing industry. This work is unique in that no one has yet compared the different strategies of management and investment capital accumulation, export strategies, and processes of education in order to explain the divergence in the market share for pilsner by the turn of the twentieth century. Through this study I show the economic and educational reasons for the decline of the British brewing industry and the rise of Continental lager production between 1870 and 1914.

\textsuperscript{183} Chandler and Hikino, \textit{Scale and Scope}, 286.
In order to support my arguments I depend upon brewing industry journals as well as British brewing industry monographs by Peter Mathias and T.R. Gourvish and R.G. Wilson. The *Brewers’ Journal*, published in London beginning in 1864 and continuing through the twentieth century, provides in depth information about the contemporary issues of beer brewing in Great Britain and the world. Not only did its articles and editorials examine regional and national brewing trends and problems, it also examined the latest political, scientific, and technological debates of North America, the Continent, and foreign markets. Additionally, the *Brewers’ Journal* also offered foreign perspectives of the British brewing industry through its regular translations of articles in French, Belgian, and German brewing industry journals.

This chapter begins with the different approaches to business structures and investment by Continental and British breweries. While Continental lager breweries utilized a managerial hierarchical approach, British breweries were usually personally managed by founders or their families. These two approaches were not equal in raising capital or in defining the long-term goals of the brewing firms. Continental approaches led to better exploitation of economies of scale and in capturing overseas markets.

The following section deals with differing approaches to export markets. While the lager brewers of the Continent sought out and gained control of foreign markets, the British almost completely ignored overseas markets in order to concentrate on national market control. By neglecting foreign markets between 1880 and 1900, British brewers lost the opportunity to capitalize on the colonial markets of the British Empire as well as other potentially lucrative overseas profits.
The third and final section of the chapter examines the different educational approaches of Continental and British brewers. The brewing industries in Continental Europe responded quickly to the needs of lager breweries by establishing professional programs for training brewers and managers. These programs included detailed instruction in the latest science and technology as well as management strategies. These managers studied the latest strategies for marketing, production organization, and distribution. In comparison, British breweries relied upon familial connections and social connections in choosing managers for their firms. Without formal institutionalized brewing education available, brewers and managers learned on the job via apprenticeships or via clerking in finance departments. The lack of formal education meant that British brewers did not have the same opportunities as Continental brewers to learn how science and new technological innovations could benefit beer production and distribution.

During the last thirty years of the nineteenth century Continental lager beer production outperformed British brewing companies on a global scale. The reasons for this are that they formed Joint-Stock Companies and Limited Liability Companies before (and with greater success than) British brewing firms, they intentionally focused on their export trade as an area of growth, and they recognized the importance of professional education and employee training. These choices in investment and business strategy helped the pilsner gain control over foreign beer markets.

**Formation of LLCs and Joint-Stock Companies**

*Continental Brewing Industry*
Most breweries in Europe before the 1880s were privately held companies, and were usually run by families or small partnerships. Ownership and management tended to be hereditary regardless of the size of the brewery. However, beginning in the 1860s and 1870s, the incorporation of brewing firms gained traction and spread quickly in Germany and on the Continent. The popularity and benefits of incorporation as Limited Liability Companies (LLCs), also known as Joint-Stock Companies or Aktienbrauerei, only began in the UK after Guinness went public in 1886. UK brewers met with varying degrees of success. Some brewing firms (including Guinness) succeeded very well, while others floundered under poor management. German LLCs, however, were able to turn their investment capital into up-to-date breweries with the latest technology to produce high quality lagers in large quantities. Investment strategies through incorporation are an important mechanism by which the pilsner style was able to spread so far around the world and why the influence of British brewing declined.

The popularity of LLCs for the German brewing industry began very quickly in the late 1860s across the soon-to-be unified German Empire. In 1870, private individuals owned all of the breweries in the Bavarian capital of Munich until several banking houses in the city formed the First Munich Joint-Stock Company in order to “carry on business on an enlarged scale.”\textsuperscript{185} The bankers had incorporated and purchased the Zenker Brewery with all of its equipment, cellars, stock, and materials and opened the company shares for purchase around the region for public investment. Due to the good condition of the brewery and its close proximity to a railway station, the shareholders expected to receive a dividend from their shares during that first year. The railroad access would give

\textsuperscript{185} “Joint-Stock Company at Munich,” \textit{Brewers’ Journal}, 1/15/1870, 6.
the new company “great advantage, as it will enable the Company to send their produce at a very trifling charge to any part of the kingdom, or, indeed, of the Continent.”\textsuperscript{186} Not only did this early incorporation foreshadow a movement towards LLCs but it also shows the early intentions of the new owners to export their products using new funds and economies of scale.

The costs of lager production demanded large amounts of investment capital due to the needs of the brewing process. While British beer had a relatively quick turnaround of a few weeks, as we saw in chapters 1 and 2, lager brewers had to deal with an extended production time that required lagering in ice caves for several months. The need for extensive temperature control as well as the time commitment meant that brewing companies had to wait for a return on their investment. However, there were plenty of investors who saw the profit potential for lager breweries, and Munich was soon not alone in having an Aktienbrauerei.

Munich was not the only city where joint-stock companies were starting to form. The \textit{Brewers' Journal} reported that in 1870 Berlin there were 48 breweries, all owned and worked by private brewers, except for the recently incorporated Tivoli Brewery. In addition, eighteen of these breweries were brewing only “Bavarian Beer” (one of the names for lager), while nineteen made Weiss bier and nine brewed brown beer, showing the growing popularity of the pilsner style.\textsuperscript{187} Another joint-stock company received a concession by the Prussian Minister for Commerce and Public Works in Frankfort-on-the-Oder, known as the “Frankforter Actian-Brauerei” within the year.\textsuperscript{188} In 1871, three

\textsuperscript{186} “Joint-Stock Company at Munich,” \textit{Brewers' Journal}, 1/15/1870, 6.
\textsuperscript{188} “New Brewery Companies in Germany,” \textit{Brewers' Journal}, 9/15/1870, 188.
more joint-stock breweries formed in Bavaria with an emphasis on exportation of “Bavarian beer” and the need for incorporation because “its manufacture requires the use of enormous capital”\(^{189}\) as well as three more in Berlin, following Tivoli’s lead, and one in Saxony.\(^{190}\) The popularity of incorporation continued through 1871 in Germany. During the first six months “the rage for transforming private breweries of old standing into joint-stock companies” persisted with eleven new companies in Berlin. All their shares were bought up immediately, with many of them “already commanding considerable premium” within months.\(^{191}\)

The movement to incorporate continued through the 1870s, though it had both advocates and opponents. The trend to concentrate capital in large establishments led many small breweries to close up shop because of increased competition. While the concentration of capital and the “co-operative principle” were beneficial they lowered the cost of production, there were opponents who denounced the “monopolist” brewers and the movement to put the brewing trade into the “hands of a few large capitalists, who order things pretty much as they like.”\(^{192}\) While there was similar talk in England regarding the power of the larger brewers, it was “much more conspicuous in Germany,” according to the *Brewers’ Journal*. The benefits of incorporation, however, were in the numbers. While the number of breweries in Germany had declined by ten percent, the production average of each brewery was fifty percent greater in 1877 than in 1873.\(^{193}\)

\(^{189}\) “Brewing in Bavaria,” *Brewers’ Journal*, 9/15/1870, 189.
\(^{193}\) “Large v. Small Breweries,” 151.
The *Moniteur de la Brasserie*, a Belgian brewers’ journal, responded to this information with its own statistics in 1878, showing that the number of breweries continually declined, while production increased every year. The author argued that “from this fact the inference is drawn that the breweries of the future are the large breweries” because the fact that small breweries cannot successfully compete with the large ones is “undeniable.”\(^{194}\) The future proved this sentiment correct. By 1911, less than ten-percent of German breweries produced thirty-seven-percent of all the beer in the country.\(^{195}\)

Exploiting economies of scale was not the only way Continental breweries excelled. The cooperation between breweries had several benefits outside of the scientific and technological advances discussed in the previous chapter. Large brewing firms, like other large managerial firms in Germany, preferred to cooperate for market share and profit and shared a belief in industrial cooperation, unlike those in Britain.\(^{196}\) This cooperation did for the brewing industry the same that it did for the synthetic dye industry: it made the industry a united force that led to better institutional benefits from the government through effective lobbying.\(^{197}\) This did not go unnoticed by British brewers, who observed that the German Brewers’ Association was able to act “with authority as the representative of the interests of the trade” in comparison to a recent failed attempt to begin a British brewers club.\(^{198}\) The British did not cooperate due to the long standing traditions of secrecy in the industry. Unlike the German brewers who saw


\(^{195}\) Chandler and Hikino, *Scale and Scope*, 433.

\(^{196}\) Chandler and Hikino, *Scale and Scope*, 395.

\(^{197}\) Murmann, *Knowledge and Competitive Advantage*, 181. In regards to the success of the German Association for Patent Protection in getting patent law on a legislative agenda.

industrial cooperation as a benefit, British brewers only saw each other as competition due to the importance of regional markets. By seeking out export markets, the Germans avoided the national competition that hindered British cooperation.

J.C. Jacobsen, founder of the Carlsberg Brewery in Copenhagen, echoed these sentiments in 1884, in his retrospective address about the previous fifty years of brewing. Small breweries were indeed less numerous in the present, he conceded, and whereas fifty years earlier it was rare to find breweries producing 10,000 hectolitres annually, by 1884 there were several breweries producing as much as 100,000 to 500,000 hectolitres a year. He argued that small breweries were unable to compete with larger companies because they could not cover the higher taxation of beer in recent years, or indeed the rising prices of raw materials that came with increased competition.199

Jacobsen went on to point out the many benefits of large, mostly urban, breweries, including facilities to send beer “by railroad, in perfect condition, in ice-cars.” The transition from a large brewery to a huge manufacturer, like Carlsberg, offered numerous and important improvements that made beer production more cost effective though economies of scale. These included the opportunity to gain “superior knowledge, and so excel their fellows in intelligence and skill” as well as all the latest scientific apparatus in order to utilize the latest scientific advances.200

In spite of these sentiments, Jacobsen warned that the trend of incorporation into joint-stock companies was “a disadvantageous change, and one fraught with peril to the future of the brewing industry” even though privately held “breweries with a capital

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200 J.C. Jacobsen, “Brewing Progress,” 110.
reckoned in millions” would likely be bought up or incorporated.\textsuperscript{201} Jacobsen’s opposition came from his years as founder and owner of one of the largest and most forward-thinking breweries in Europe. His worries stemmed from the possible influence of shareholders who sought only large dividends to the detriment of improving the brewery. As he argued in 1884:

Many brewing companies have thus gone down, some so low that it will be difficult, if not impossible, for them to recover themselves. Bitter experience, learned in so many quarters, of the evils of this one-sided economy should open the eyes of shareholders, and as speculative swindles and the fantastic dreams, which see a gold mine in every brewery, vanish from the scene, a new race of shareholders, who have bought their shares at something like their real value, may be expected to prove more rational.\textsuperscript{202}

However, most of the brewing companies on the Continent and elsewhere ignored Jacobsen’s warnings. Within just two years of his address, the first UK brewery went public and started the trend among British breweries as well. Yet the economic benefits of incorporation on the Continent had already pushed its lager breweries ahead of those in the United Kingdom. Not only were the lager breweries able to consistently update their production facilities with the funds gained by going public, their focus on the exportation of their product, unlike UK breweries, ensured that regional beer markets did not become oversaturated.

\textsuperscript{201} J.C. Jacobsen, “Brewing Progress,” 110.
\textsuperscript{202} J.C. Jacobsen, “Brewing Progress,” 110.
The brewers in the UK were much slower in their adoption of incorporation and once they began, they had mixed results. Some brewing companies excelled while others became examples of what not to do. The UK brewing firms had already developed their own strategies of business organization over the previous century through close partnerships before the popularity and benefits of incorporation and outside investment became too tantalizing to ignore.

Concentration of the brewing industry in the UK was evident by the 1880s with about two thousand breweries centered in and around London, Dublin, and Edinburgh as well as growing development in Burton, Tadcaster, Alton, Wrexham, and Newark. However, the boom years for the industry between 1860 and 1880 were coming to an end as consumption declined and the temperance movement gained strength. Over the course of the 1880s, larger breweries in the UK acquired many of their smaller commercial competitors and focused on the purchase of pubs, beer-houses, and off-licenses. These strategies built up their tied trade, assuring themselves markets for selling their products by owning and controlling the locations which sold beer. However, in the middle of the 1880s an important change occurred that disrupted the brewing industry’s previous business strategy.

On October 25, 1886, Guinness incorporated into a public LLC and raised £6 million immediately. This was a big surprise for the rest of the UK brewing industry, and set off a rush of breweries to incorporate. The incorporation of Guinness transformed the

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203 Gourvish and Wilson, *The British Brewing Industry*, 126.
204 Gourvish and Wilson, 126.
structure and policies of the brewing industry in the UK, but did not affect brewery management.  

Prior to Guinness going public, UK brewers had used other strategies to promote and expand their businesses. The most popular way to do this was through partnerships, many of which had begun around the turn of the nineteenth century. A large British brewery would have 8-10 partners running the company who were usually family members or men with whom the founder had close social ties. The partners would all be shareholders in the brewing firm and control the profits and business strategies. Most large brewers, including those in London, focused on generating capital internally through these partnerships. Family connections and savings banks were the primary places for procuring loans. Partners in large breweries were both rich and influential and were usually among the only people who could see the brewery’s accounts and brewing books, limiting the possibility of innovation in the process. Without collaboration and discussion about brewing methods breweries and brewery workers would continue to use the same processes and methods as those before them had used, regardless of whether they were the most efficient ways to brew or not. Without new perspectives or input, British breweries stagnated in their secrecy. Most breweries were entrepreneurial at the start and founders, as well as their heirs, retained control of management through the nineteenth century. They viewed their businesses in personal instead of organizational terms, “as family estates to be nurtured and passed on to

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205 Gourvish and Wilson, 250.
206 Gourvish and Wilson, 86.
207 Gourvish and Wilson, 229, 232.
208 Gourvish and Wilson, 234.
heirs.\textsuperscript{209} Though partners usually had a basic education in how to brew beer, they usually focused on finance and business, as discussed later in this chapter.\textsuperscript{210} While the brewing companies of the Continent focused on expansion, the sharing of technology, and scientific innovation through organized brewing schools like those at the Carlsberg Laboratory, the British remained secretive and closed to outside influence as they continued to educate via apprenticeship programs alone.\textsuperscript{211} The British devotion to personal management slowed the development of the functional and administrative skills necessary to maintain a market share and to grow by exploiting competitive capabilities. In addition, British brewers moved overseas hesitantly and less successfully than foreign competitors.\textsuperscript{212}

This approach to management by the British is known as personal capitalism, and brewing firms were not the only ones to follow this strategy.\textsuperscript{213} As in other industries, British breweries tended to be closely managed by the founders and heirs. Even after they were incorporated and managerial hierarchies were recruited, the founding family or families continued to be influential stockholders and senior executives in their own companies. They would directly supervise middle and often lower level managers and, as mentioned earlier, promotions were usually due to personal ties and social position.\textsuperscript{214} This led to few salaried managers running British breweries in comparison to German brewing companies. Legacy managers took business decisions personally instead of

\textsuperscript{209} Chandler and Hikino, \textit{Scale and Scope}, 286.
\textsuperscript{210} Gourvish and Wilson, 244. See pages 20-21 below as well.
\textsuperscript{211} Mikuláš Teich, \textit{Bier, Wissenschaft und Wirtschaft in Deutschland 1800-1914: ein Beitrag zur deutschen Industrialisierungsgeschichte} (Wien: Böhlau, 2000), 104-105. Translation by Malcolm Purinton with support from Google Translate. And Gourvish and Wilson, \textit{The British Brewing Industry}, 61-63.
\textsuperscript{212} Chandler and Hikino, \textit{Scale and Scope}, 294.
\textsuperscript{213} Chandler and Hikino, \textit{Scale and Scope}, Chapter 7.
\textsuperscript{214} Chandler and Hikino, \textit{Scale and Scope}, 240, 242.
looking toward future investments in expansion and distribution. In general, British industrialists seemed to have a distrust of losing personal control over enterprises they had either created or inherited.  

Because managers came through hereditary successions within the firms, instead of promotion through merit, ensuring long-term continuity of the company’s direction was uncertain.  

Having a capacity for business that could turn a profit or loyalty to the firm was not hereditary. For example, after the heir to the Truman Brewery in London died in 1885, the family decided to withdraw and liquidate their shares, which led to the incorporation of the brewery in the late 1880s.  

By not turning to trained managers, the British brewers failed to realize the potential of economies of scale through investing in production, distribution, and management.  

Even with the move towards incorporation, the former partners and families were intent on retaining their control of the future of the breweries.  

Without investment in manufacturing, marketing, and management, the British brewing firms were unable to exploit the economies of scale as well as the Continental brewers.  

The British did have continuing opportunities for profit with a rich consumer market, but this led to fewer investments in growth outside of the region and a loss of overseas markets. Continental brewers who invested in research and management of their firms were able to succeed where the British failed.  

Due to their success in

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215 Chandler and Hikino, *Scale and Scope*, 286.  
217 Gourvish and Wilson, 86.  
218 Chandler and Hikino, *Scale and Scope*, 286.  
219 Chandler and Hikino, *Scale and Scope*, 393.  
221 Chandler and Hikino, *Scale and Scope*, 433-4.
exploiting economies of scale, the Continental brewers needed new markets to continue to make profits for their shareholders and it is to export strategies that we now turn.

**Exports**

Investment strategies were not the only differences between brewers on the Continent and those in the UK. They also differed in their geographic foci for their products. The domestic markets for Continental breweries—including Denmark, Germany, and Austria—were strong and consumption per head was among the highest in the world. Similarly, the domestic markets in Britain were also lucrative, with the brewing firms spending most of their time and money competing for control. The most important difference was that while the British and Irish brewers focused almost exclusively on domestic beer consumption and competition between each other, the Germans and other Continental brewers used their resources to target export markets in Europe, the European colonies, and other foreign markets.

The difference in priority given to export markets had substantial, though very different, consequences for ale and lager breweries. By the end of the nineteenth century, the British, who nearly had a monopoly over beer exported to ports around the world up to 1880, had lost strength in foreign beer markets, including those of their own colonies. The influence of the Continental brewing industries, however, promoted both the consumption of pilsner beers in export markets as well as the production of lagers by European settlers. The spread of German beers in particular, was an object of pride for the German brewing journals. For instance, the *Allegemeine Brauer&Hopfen-Zeitung*

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222 Gourvish and Wilson, 173-175.
223 As examined in Chapter 4 with South Africa.
went to great lengths to report the presence of German lagers in foreign ports including African ports, Hong Kong, Argentina, and British India throughout the 1880s and 1890s.\textsuperscript{224}

**German and Continental Beer Exportation**

The entrepreneurial motivations of German brewers, and those who liked their beer, led to more than the incorporation of breweries to gain investment capital for expansion and technological advancement. New brewery LLCs were motivated to seek new markets outside their regional or local locations due to high levels of competition with other German breweries, which pushed them to increase production while maintaining quality through science and technology.

An example from 1869 in Germany shows an early awareness of the potential for foreign markets. In 1869, beer purchased from the newly incorporated Tivoli brewery in Berlin arrived in Hakodadi, Japan for the German consul of the North German Confederation, who sold it locally, including to the Japanese Governor of the Island of Jesso. In spite of an eight-month voyage, the beer arrived in excellent condition and the Governor stated his preference for the lager beer of Tivoli over all others. Even more important, he wanted to buy more. In response, the Tivoli Brewery Company received several fresh orders for large quantities of their lager that shipped from Hamburg in 1870 and helped the brewery establish itself in Japan.\textsuperscript{225} Instead of viewing the Japanese market as too far away or of minimal importance, Tivoli increased their production to


meet demand that led to greater foreign sales as well as better returns for European
investors in the brewery. The British reported in the same year that 2,000,000 gallons of
beer were sent to China and Japan from England and Germany. While English porter, ale,
and stout were most popular, the Bavarian style was a close second. British brewers
feared that the Continental lagers would, as one brewer wrote, “form a serious rival to the
English beer in the Far East…We are so accustomed to grandiloquent reports from
Germany about the beer trade, that we make always a considerable mental reservation in
such cases.” The same article went on to argue that it “may be worth our brewers' while
to try lighter beers for certain warm countries than they at present export…[with] less
strength and cheapness.”226 The inference here is that the popularity of pilsner had spread
from Continental Europe to the markets of East Asia and British brewers would have to
develop new beer styles in order to compete internationally.

Although Germany exported a lot of beer, it still imported some from the UK. However, while there was an increase in imports into the port of Bremen in Germany in 1873, they were “eclipsed by the magnitude and importance of the export trade.” The quality of beer coming out of Bremen was noted in the increased competitiveness with British exports in “South America and other transatlantic and distant places.” The breweries that produced the lagers for export in 1872 “produced more than double what they brewed only five years ago,” with their principle markets in New York and other US ports.227 Production for export was a major motivation for the brewers in Bremen as well as those who shipped their own beer, from Bavaria for instance, to the port or for further

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export. In 1879, for instance, Bavaria exported a considerable 868,103 hectoliters, much of it to northern Germany. This was because northern German breweries were unable to keep up with demand having consumed 20,840,129 hectoliters in 1877-8.\footnote{228}{German Beer Statistics,” \textit{Country Brewers’ Gazette}, 2/5/1879, 55.}

Exportation grew so quickly that it became a point of frustration within Germany. The British Consul of the Grand Duchy of Baden reported that the years 1895-1899 were very successful years for brewers there. However, “the rage in Germany for exportation prevails to such an extent that every town exports its beer to other towns.”\footnote{229}{“Free Trade in Beer and its Results,” \textit{Brewers’ Journal}, 6/15/1899, 321.} This led to interregional competition between breweries, prompting many to seek out foreign markets instead. This was in stark contrast to British brewers who sought to only control local and regional beer markets via the tied trade without looking outside the UK.

However, 1898 was the beginning of a severe decline in exports from northern German ports. In Hamburg, which had fifteen large breweries that produced over 22 million gallons of beer a year—with the ability to increase that by another 9 million a year—there was a noted decline in pasteurized export beers.\footnote{230}{“The Production and Export of Beer at Hamburg,” \textit{Brewers’ Journal}, 12/15/1898, 891-2.} The decline of the export trade was unforeseen and due to a remarkable development in worldwide lager production between 1880 and 1890. Due to the popularity of the pilsner in overseas ports, the export trade now had competition with locally built lager breweries countries of their overseas markets. This was especially noticeable in the best markets for German beer including the US, British India, Australia, and South Africa.\footnote{231}{“The Production and Export of Beer at Hamburg,” 891-2.}

\textit{United Kingdom Beer Exports}

\footnote{228}{“German Beer Statistics,” \textit{Country Brewers’ Gazette}, 2/5/1879, 55.}
\footnote{229}{“Free Trade in Beer and its Results,” \textit{Brewers’ Journal}, 6/15/1899, 321.}
\footnote{230}{“The Production and Export of Beer at Hamburg,” \textit{Brewers’ Journal}, 12/15/1898, 891-2.}
\footnote{231}{“The Production and Export of Beer at Hamburg,” 891-2.}
While most of the wealth generated in Great Britain over the course of the nineteenth century came from the export performance of most of its key industries, the brewing industry was an outlier. Textiles, engineering, shipbuilding, and coal all thrived via export-oriented growth, while no more than three percent of the total output of the British brewing industry went for export.²³² Prior to 1911-1913 the peak of British beer exportation was in 1859, with only 614,000 barrels exported out of over 15 million barrels of beer produced by England and Wales.²³³ This was in spite of the fact that beer consumption and trade was part of British exploration and colonialism. As the British brewing historians T.R. Gourvish and R. Wilson argued: “Wherever British settlers colonized land, in the East and West Indies, in America, in Ireland, and eventually Australasia, a demand for the native drink of their homeland was established.” However, due to the warmer colonial climates, lack of good raw materials and technology (including refrigeration), it was impossible to produce even tolerable imitations of favorite British beer styles.²³⁴

In addition, shipping was very difficult. Beer is bulky and unstable, the price of exported beer was high, and brewers had to wait a long time for payment. Only a small number of brewers and bottling firms in the UK had the expertise, commitment, and capital needed to export beer. These included the Burton brewers Bass and Allsopp, some Scottish brewers in Edinburgh and Alloa, Guinness, and some bottlers in London and

²³² Gourvish and Wilson, *British Brewing Industry*, 169. In comparison, German exports in 1885 were 5% of total production. However, the three largest export breweries at Bremen were not included in this percentage. The fact that Germany had breweries built only for export markets shows the importance to the industry. “Beer in Germany, 1880-1890,” *Brewers’ Journal*, 6/15/1891, 314-315.
²³³ Gourvish and Wilson, 172, 600.
²³⁴ Gourvish and Wilson, 169.
Liverpool.\textsuperscript{235} Bass, the largest ale brewery in the world, exported a quarter of its production in the 1840s. In 1882, the \textit{Brewers’ Journal} noted that bottled Bass ale was “found in every country where Englishmen had yet put foot.”\textsuperscript{236} However, Bass exports dropped to only ten percent in the early 1890s with domestic trade through tied houses and the agency system of off-license and distribution continuing to take precedence.\textsuperscript{237} While the major beer producers concentrated on their domestic markets, it did not mean that there were no concerns over the loss of foreign markets. Trade journals attempted to take the major brewers to task for their low export numbers.

In fact, fear of German competition abroad was a recurring theme in the British brewing industry’s journals between 1870 and 1900. While there had been increasing exports of ale and beer for three decades before 1870, by 1874 the \textit{Brewers’ Journal} reported increased competition from other countries. Some “over-wise gentlemen” were predicting that the Germans would soon beat the British out of foreign markets due to Germans manufacturing “at a cheaper rate a better article,” which they sold “at terms with which the English brewer cannot compete.” The reasons for this, they argued, included the adoption of science, which the English “of course neglect, and is generally to be looked forward to as the beer supplier of the future.” While these arguments were proven correct within fifteen years, at this time the English commentator concluded, “such arguments are wholly false and unfounded. Our beer trade is shown to be increasingly largely[sic], and will increase largely, notwithstanding the well-intentioned

\textsuperscript{235} Gourvish and Wilson, 169, 171.
\textsuperscript{236} Gourvish and Wilson, 75.
\textsuperscript{237} Gourvish and Wilson, 92-94, 171.
efforts of our Teutonic friends." In an article in 1876, another columnist attempted to assuage fears of German encroachment into British beer markets. The author agreed with a correspondent that German brewers had made great strides in their production. But, he was amused to think that there was any threat to the British “national beverage,” saying “there is nothing to fear for the safety of English beer [because] it continues to be drunk in ever increasing quantities.” He then noted that “we will say nothing” about the export of British beer or “its consumption in foreign countries,” inferring that readers already knew the trade was excellent.

Commentators and writers for the *Brewers’ Journal* continued to support belief in UK brewing dominance. Reports often exclaimed that English beer was in universal demand, with exports doing so well that “it may be remarked of [English] beer – it has simply conquered the world.” Evidence of the universal popularity of British beer over other national brewing industries was in “the extensive exports of the article to all parts of the habitable globe.” Though it is true that British beer reached ports all over the world, the amounts themselves, as explained above, were negligible and statistics were not used to support the writers’ arguments.

As news of lager beer, its popularity, and its expansion reached the UK regularly, some British brewers even tried their hand at making their own lagers. However, this was a controversial and largely unsuccessful approach to the competition coming from the Continent. British lager brewers supported their attempts by arguing that “if…we wish to retain our hold of foreign markets, we must bear our rivals with their own weapons by

240 “Trop de Zele,” 224.
brewing their beer better than they themselves can brew it...[and] not allow our export
trade to become the property of any nation under the sun without at least an effort to
retain it.” Others brewers argued that copying the Pilsner style was not the correct
strategy by saying that there was “better beer in England than any other part of the world,
and it does not seem …advisable to go out of our way to copy those who brew beer not
so good or well suited to our national taste.” This second argument brought focus back
on the domestic trade and away from export markets. A lack of respect for lager brewers
and lager itself underscored most discussions about lager in Britain. Those who
commented upon the UK brewing industry’s place in the world frequently ignored the
very real threat posed by Continental brewers.

Until the mid-1880s, the best customers for UK beer exports were their own
colonies around the world. British India, New South Wales, and British possessions in
South Africa took the top four spots. In other foreign markets, British beer had to pay
heavy duties that made it too expensive for most consumers by the end of the 1870s. German beer exports soon surpassed those of the UK in 1881, with Germany exporting
608,003 barrels to the United Kingdom’s 458,319 barrels. Large shipments to India from
Germany increased as British exports to its colony declined. In addition, new breweries
in India were providing more British-style ales for local consumption. As M. Vogel
declared in his article about the world beer trade in 1884, “The Bavarian mode of
brewing…has cut the ground away from underneath the British beer trade.”

244 “Beer Exports from the United Kingdom,” Brewers’ Journal, 5/15/1878, 131.
One reason for this loss of foreign markets was the continued insular focus by both major and minor breweries in the UK. The energies of brewers in London and the countryside focused on retaining existing market share with their popular beer styles of porter, mild sweet ales, and stouts.\textsuperscript{247} Even as industry journals touted the strengths of the UK brewing industry or warned of the loss of foreign markets, UK brewers focused on building up their tied house systems to assure domestic consumption of their products without realizing the benefits of the export trade like the other major industries of the British Empire. By holding onto traditional national markets and business strategies including the tied trade, brewers of the United Kingdom lost out on the growing connections in the modern world of empire and trade.

**Education and Brewer Training**

There were many changes in education during the nineteenth century in both Britain and Germany, including the development of new curricula and ways of measuring learning in the natural sciences and humanities. These changes affected the brewing industries of the Continent where schools and laboratories worked together, developing a new scientific understanding of the brewing process as well as refining the methods and technologies in the production of beer. While the British breweries of Bass and Guinness established quality control laboratories earlier in the century, the training of new brewers continued to be done in the traditional way. Breweries in the United Kingdom utilized a pupillage system that relied upon apprenticeships and learning on the job and disregarded formal education in chemistry and microbiology. In comparison, brewing education in Germany and elsewhere on the Continent was a modern affair that included the latest in

\textsuperscript{247} Gourvish and Wilson, *British Brewing Industry*, 144.
scientific and technological knowledge as well the inclusion of cutting-edge approaches to business organization for efficiency.

*Continental Brewing Education*

Continental brewers benefited from several professional brewing programs that emphasized the use of scientific knowledge and technological innovation over previous traditional training that focused on only empirical knowledge passed down through generations.\(^{248}\) J.C. Jacobsen of Carlsberg emphasized that in the 1830s the Bavarian method of brewing was defective because work was entirely “rule-of-thumb” without any trace of theoretical knowledge and “guided by tradition handed down from generation to generation.”\(^{249}\) He argued in 1884 that one of the most important changes in brewing over the previous fifty years was a change in organization. He stated that large breweries needed managers to be in control and emphasized that the managers and assistants needed the proper education for running a brewery. To this end, he argued, managers and assistants should attend brewing schools to understand and produce an adequate staff of highly trained brewers and inspectors. Jacobsen argued there needed to be more access to proper brewing education, adding that “such further extension of brewing schools appears to be absolutely essential in countries like Bavaria and Austria, where the brewing of beer occupies a position of so great financial importance.”\(^{250}\)

As one of the few surviving early adaptors and supporters of Bavarian lager brewing, Jacobsen made clear that he had witnessed every improvement in the brewing industry as it occurred including the study of chemistry, vegetable physiology, and

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\(^{248}\) Chandler and Hikino, *Scale and Scope*, 434.


\(^{250}\) J.C. Jacobsen, “Brewing Progress,” 110.
physics. Brewing, as he saw it, could only be understood as a succession of chemical transformations through the study of chemistry and physics and that “all further brewing progress must rest on special scientific research.”

As an example, Jacobsen mentioned both his own Carlsberg Laboratory, where Emil Hansen developed the theory and application of pure yeast, and the recently established Scientific Research Station for Fermentative Industry in Berlin. Arguing the benefits of scientific brewing and cooperation, Jacobsen foretold that “with this combination and co-operation of theoretic specialism with practical observation and experience, we have before us the welcome prospect that the further progress of the brewing industry will conduce to the general advancement of science, to the welfare and prosperity of the craft, and to the benefit of the community at large.”

Being educated in the trade of scientific brewing was popular on the Continent, and students from all over the world traveled to institutes like the Copenhagen Laboratory, established in 1882. The Copenhagen Laboratory was devoted to furthering the study of pure yeast culture and alcoholic yeast as begun by Dr. Emil Hansen at the Carlsberg Laboratory. The institute had become world renowned for studying the physiology and technology of fermentation and continued to graduate students of the science and practice of brewing ten years later. Between 1889 and 1892 alone, the Laboratory graduated 132 students. Most of these students came from Denmark and Germany, but several arrived from Norway and Sweden as well as Japan, India, New Zealand, the Philippines, Brazil, and Chile. The students took four courses a year and

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instructors taught in English, German, French, and Danish. This was an international school of brewing and the students learned the latest in how to brew the best and most modern beers. This included the most sought after style in the world, the pilsner.

*Learning to Brew in the United Kingdom*

‘Tried and true’ remained the training method of British brewers. To understand this, ownership of the breweries must to be taken into account because even as British breweries incorporated, the power remained in the hands of the former partners and hereditary leadership. Sons of the partners would be trained through pupillage and apprenticeship, mostly focusing on skills “at the copper-side” that they learned through experience, without theoretical examinations.

The sons of partners needed to learn two essential skills: finance and business connections. They needed to pay scrupulous attention to the economics of production and sales to maximize profitability of the brewery, and they needed to be excellent judges of character and the credentials of personal contacts with publicans, dealers, and merchants. Without attention to modern science or technology, the sons assimilated into the family brewery and eventually into a partnership of their own either dealing with the malt and hop departments, brewing, or sales and distribution. There was almost no other way for a person to gain a brewing partnership other than through inheritance and connections.

The management of British breweries was divided between “gentlemen” who were the sons of founding fathers and “players” who were salaried and rose through their

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253 “Copenhagen Laboratory,” *Brewers’ Journal*, 1/15/1892, 8.
254 Gourvish and Wilson, *British Brewing Industry*, 244.
255 Gourvish and Wilson, 244-5.
256 Gourvish and Wilson, 244-5.
own ability. Players were usually educated through apprentices if they were involved with direct production or articled clerks if involved with accounting or finance and were not formally educated in management.\textsuperscript{257} Though gentlemen usually attended Oxford or Cambridge, the purpose of the university was “less to search for knowledge and more…to be ‘a nursery for gentlemen, statesmen, and administrators.”\textsuperscript{258} Overall, British brewing enterprises were slow in responding to the needs of the industry by not investing in the generation of scientific information or graduating trained managers, which allowed Continental brewers to get ahead in production quality and quantity.\textsuperscript{259}

Even though the notable brewing scholar Dr. Charles Graham declared British brewing methods to be as good as Pasteur’s new methods in 1874, he did call for a British “Brewers’ Society” or “Brewers’ Institute” that would have a chemistry laboratory and a library to study the science of brewing.\textsuperscript{260} His calls went unheeded and more than fifteen years later the brewing literature called for the modernization of brewers’ training by saying that British brewers needed to know more about science. In an article about “Brewers’ Continental Excursions,” the \textit{Brewers’ Journal} brought up the numerous institutions conducting research in connection with brewing including the Carlsberg Laboratory in Denmark, the Pasteur Institute in France, and mentions many brewing schools in Germany and Austria.\textsuperscript{261} However, as with more modern approaches to science and technology, the brewers of the United Kingdom were slow to change their training and management of the brewing industry.

\textsuperscript{257} Chandler and Hikino, \textit{Scale and Scope}, 291.
\textsuperscript{258} Chandler and Hikino, \textit{Scale and Scope}, 292.
\textsuperscript{259} Chandler and Hikino, \textit{Scale and Scope}, 292.
\textsuperscript{261} “Brewers’ Continental Excursions,” \textit{Brewers’ Journal}, 6/15/1890, 361.
Conclusion

As examined here, Continental breweries and those of the United Kingdom had different approaches to business management, exportation, and education. Similar to the choices regarding science and technology in the previous chapter, the breweries of the British Isles were not eager to make changes in how they did business or made their products. The strength of the domestic market and their focus on retaining market shares through the control of distribution remained the primary motivation for British brewing firms. Their failure to invest in distribution, production, and management slowed their growth to the point that when they finally desired the regain their overseas markets it was too late. In 1916, Allsopp and Sons Brewery out of Burton-on-Trent sent a letter to the Right Honorable Bonar Law, M.P. of the House of Commons regarding the German and Austrian’s “large and valuable” lager beer trade in the British colonies of India, Australia, and the Straits Settlements. They requested government intervention in helping them recapture “markets which rightfully belong to them.” However, the response from Cutler, Palmer and Co. of Bombay, Lahore, Calcutta, and London was that “light beer” had captured the whole Indian market and was sold cheaper than Allsopp’s beers. They note that while Allsopp’s British beer “will undoubtedly always secure a certain percentage of the Market [because it is British], it cannot stand against an item such as this at the price.”

262 “British Trade in Lager Beer,” PRO, CO 323/734/22.
brewers had lost their window of opportunity and were unable to correct their mistakes soon enough.

In contrast, Continental brewers sought out and utilized the investment opportunities of incorporation while pushing to gain new markets overseas. In order to produce an exceptional product and do so as efficiently as possible, they advocated and supported structured education for people in the brewing industry, from managers to brewing assistants. With their success in the three-pronged approach to invest in production facilities, distribution networks, and personnel they were able to overtake and surpass the British brewing firms and help spread the pilsner style across the globe, including to South Africa.

The following chapter examines the evolution of beer styles in South Africa from a heavy British influence to the establishment of lager brewing by the end of the nineteenth century. In spite of the long-term influence of the British Empire in the Cape Colony and the rest of southern Africa, the establishment of South African Breweries, Ltd. in the 1890s led to the domination of South African beer markets by pilsner.
Chapter 4: Good Hope for the Pilsner: South Africa Case Study

Introduction

Between 1870 and 1914, the pilsner style expanded from a Continental beer to one with global reach in nations and colonies that had no direct political or economic links to the major lager producers. While each new beer market necessarily has its own story regarding the arrival and acceptance of this beer style, this chapter uses British South Africa as a case study to highlight the consumer choices made in a British settler colony. In order for pilsner to dominate in South Africa (or any settler colony), it had to triumph over well-established British beer styles, British brewing methods, and British cultural opinions of the lager. For the adoption of pilsner beer to succeed in British settlement colonies like South Africa, in other words, taste had to triumph over colonists’ loyalty to their empire’s own breweries and beer styles. What we see in South Africa and the other settler colonies of Australia, New Zealand, and Canada is that while many settlers went to great lengths to retain a high level of “Britishness” through the purchase of imperial commodities such as cotton and foodstuffs, they did not do so in their choices of beer. The break between British settlers and their country of origin in terms of beer consumption is a unique element of the colonial experience. This chapter explores this phenomenon through the South African brewing industry, which went from an industry based on British beer styles to one dominated by the pilsner between the late nineteenth and early twentieth centuries. Although there were also unique aspects of the South

African brewing industry, here it is meant to serve as an example of the choices consumers and brewers made around the world regarding what beer they drank and how it was made.

South Africa is an ideal choice as a case study because of the surfeit of available sources regarding beer production and consumption at the end of the nineteenth century. The transition from British style ales to German style lagers in South Africa brings together each element of change seen in Europe, including the adoption of new technology and science through education and the establishment of European business practices for capital investment. This case study is also emblematic of other British settlement colonies including Australia where lager production and consumption developed around the turn of the twentieth century through the influence of Continental lager importation and changing tastes.264

Several books and articles have explored the history of alcohol in South Africa, but nearly all of these focus on the twentieth century and especially the Apartheid era.265 These works have mostly traced race relations without dealing with history before World War I. This chapter concentrates on the choices in what beer styles white European

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settlers and local white Afrikaner population chose to produce and their methods for doing so. I do not look at beer production by black South Africans because they had their own local varieties of beer using local grains and different indigenous techniques for brewing that were not influenced significantly by the spread of pilsner beer. In addition, their beer production and consumption did not affect the welfare of white South African brewers or beer importers who had European connections. This chapter fills a lacuna in the history of beer production and consumption in South Africa and explains how European brewing techniques and innovations affected colonial beer production. This chapter shows that even though South Africa was a British settler colony, its’ beer industry changed due to influence from Continental lager brewers and their use of new business strategies and use of scientific brewing methods and new technology.

Sources for this chapter include business, political, and popular sources from the time, including transcripts from 1883 and 1885 regarding a beer duty in the Cape Colony that cover the state of brewing and South African beer markets in the early and mid-1880s, local histories of brewers and breweries, and brewing company pamphlets from Ohlsson’s Cape Brewers, Ltd. and South African Breweries, Ltd.. Additionally, the British Brewers’ Journal and the German Allgemeine Brauer and Hopfen Zeitung and British colonial correspondence from The National Archives (UK) also frequently discussed brewing in South Africa.

This chapter is divided into four sections. The first is a brief background of beer and brewing in the Cape Colony. I then focus on British connections to the Cape Colony

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266 For more on the state of black South African liquor laws, consumption, and production see: The Report of the Liquor Laws Commission, 1889-1890, with minutes of proceedings, minutes of evidence, and appendices, (Cape Town: W.A. Richards and Sons, Government Printers, Castle Street, 1890.)
brewing industry and explain the local beer market before expanding my view into the rest of South Africa in order to describe the political and economic relationships within the colony. The final section examines the establishment of South African Breweries, Ltd. (SAB) and the beginning of lager production in Johannesburg and then Cape Town by the turn of the twentieth century.

**Brewing Background: South Africa**

South Africa has a long history of beer brewing that begins with the original European colonists in 1652. The Dutch established a makeshift brewery shortly after their arrival and declared the area around Table Mountain to be the Dutch Cape Colony, led by Jan van Reibeeck. The transition from amateur to professional brewing occurred soon after the establishment of the original Dutch colony. In 1694, the first professionally trained brewer for the colony, Rutgert Mensing, arrived from Amsterdam after being specially selected by the Vereenigde Oost-Indische Compagnie (VOC). Mensing received land and support from the colonial Governor and set up his brewery in Newlands on a piece of land called Papenboom.267 The Newlands area of Cape Town, around the eastern edge of Devil’s Peak and Table Mountain, has been the center of South Africa’s brewing industry from the first Dutch settlers in the 1650s. Reasons for this included abundant streams running from the mountain, good soil, and relief from the Southeast winds.268 Even though it was difficult to obtain good yeast and hops, the first settlers refused to give up trying to brew beer and were eventually successful in 1658. Jan Van Riebeeck, the colonial administrator, ordered the building of a special brewhouse in

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1659 just outside the fort’s walls. A few years later, the first private licenses for beer production were issued in 1664 and the sale of beer and liquor leases became an important source of revenue for the Dutch East India Company, in spite of the arrival of substantial beer imports from European ships.

*Early Settlers: Afrikaners*

The colony existed as a way station for European ships going between Europe and Southeast Asia and was called the “Tavern of the Sea.” There were few natural resources for trading due to a lack of forests, fertile fields, and enough rainfall for extensive agriculture. While the colony produced wine and meat, they were of such poor quality that European investment remained light. In spite of the lack of raw materials and investment, the Cape Colony maintained enough importance as a stopping point for traders that permanent settlements around Cape Town developed.

The early European settlers became known as Afrikaners, pejoratively known as Boers. When the British officially took control of the Cape Colony in 1806, the Afrikaner population resisted the enforced Anglicization of the colony. Throughout the nineteenth century, the British imposed their education, architecture, government, social and leisure activities, and economic networks. The Afrikaner rejection of British culture and society had consequences for the brewing industry in the Cape Colony and the rest of South Africa over the following century.

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273 Afrikaners originated as a mix of several European nationalities but their language closely relates to the first white settlers, the Dutch.
As the British expanded their influence via colonization, the Afrikaner community attempted to outdistance them by migrating east out of British control. They did this several times, first from the Cape Colony in 1830s-1840s (known as the Great Trek), and then later from Natal in 1843 when the British established the British Natal Colony. Due to these out-migrations, the colonial population in the British South African colonies was dominated by the British through the end of the nineteenth century, which meant that if the local brewers wanted to do well, they would produce beer preferred by their customers: British ales.

**Letterstedt**

The industrialization of the brewing industry in Southern Africa began in Cape Town in the Cape Colony. The first successful modern brewer in the Cape Colony was a Swedish businessman named Jacob Letterstedt who established the Mariendahl brewery and Josephine’s Mill in the Newlands area on the far side of Devil’s Peak from Cape Town. Letterstedt produced British-style ales and imported skilled Swedish laborers and modern brewing equipment from Europe in the late 1830s. As discussed in Chapter 1, in the 1830s the British produced the best quality beer and their brewing methods were considered the best in the world. Throughout the middle of the nineteenth century, Letterstedt took several voyages to Europe to visit his home country of Sweden and update his knowledge about current brewing technology and techniques. During his fourth trip between 1855-1858, he took care to visit Munich for a close study of the established lager breweries there. The results of this trip led to the building of a new

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brewery in 1859 that included freshly imported European equipment. In spite of his visit to the major breweries of Bavaria, where lager beer was very popular, Letterstedt continued to offer only British-style ales in Cape Town to cater to the local British population.\textsuperscript{277}

The brewery of J. Letterstedt and Company continued after its founder’s death in 1862 and continued to expand in 1880-1881. With the help of visiting British brewers who helped design and install English-made brewing equipment “on the most recent European models,” the expansion made it possible to produce 120 hogsheads per day. In addition, by 1886 the Letterstedt facility also housed the Albion Ice Factory.\textsuperscript{278} In 1888, all of the property owned by Jacob Letterstedt and Co. was leased to Anders Ohlsson including the Albion Ice Company, the Josephine Mill, and the Mariendahl Brewery. Eventually, in 1896, the now-incorporated Ohlsson’s Cape Breweries purchased the entire estate, ending the association between the Letterstedt family and brewing.\textsuperscript{279}

\textit{Anders Ohlsson}

The most prominent brewer in the Cape Colony from the early 1880s through the beginning of the twentieth century, and for some time in South Africa as a whole, was Anders Ohlsson. Ohlsson was born in 1841 to Swedish parents in Norway, which was part of the United Kingdom of Sweden and Norway at that time. When he was twenty-three he established himself as a merchant specializing in the importation of Swedish steel and timber and in 1869 began trading in Damaraland, South West Africa with another Scandinavian. Throughout the 1870s, their trading business did very well with

\textsuperscript{277} Walton, \textit{The Josephine Mill and Its Owners}, 58.
\textsuperscript{278} Walton, \textit{The Josephine Mill and Its Owners}, 63, 65.
\textsuperscript{279} Walton, \textit{The Josephine Mill and Its Owners}, 65.
Ohlsson using his schooner, the *Louis Alfred*, to move goods and people between Walvis Bay in Damaraland, Cape Town, and Europe. However, in 1880 war broke out between the Herero and Nama in Damaraland and ended the lucrative trade. Ohlsson then turned to the brewing industry in Cape Town.\(^{280}\)

In spite of his own lack of knowledge about brewing beer, Ohlsson bought land in Newlands that included a mill and some water rights and began building his brewery in 1880. Ohlsson contracted the design and building to Henry Pontifex & Sons of Albion Works from King’s Cross in London. The architects and engineers of Pontifex were well-known for designing English breweries and had recently worked on another brewery in Cape Town,\(^{281}\) probably Letterstedt’s Mariendahl Brewery, which had been completed on the “most recent European models.”\(^{282}\) They used an English brewery design, built with English oak, and installed English brewing equipment including a Steele mashing machine. Ohlsson’s devotion to the British system of brewing included sending his other brewer, Mr. H. Thompson, to England to train from Mr. W.J. Green of Cannon Brewery in Watford instead of to a Continental brewing school.\(^{283}\) He later hired a brewer from England in 1883 to continue producing British style ales for the colonies in South Africa because it was easier, cheaper, and there was a strong market for British beer.\(^{284}\)

Ohlsson foresaw an important future in brewing beer and continued to purchase properties around the Newlands area. These included the Newlands Brewery, purchased

in 1888, that was formerly owned by Daniel Cloete.\textsuperscript{285} Ohlsson’s Anneberg Brewery set out to brew British style ales and succeeded in producing high quality pale ales, porters, and stouts quite quickly. Within a year, they won first prize for the “best hogshead of Cape-made draught ale” and second prize for their Cape-made stout at the 1882 Cape Town “Grand Show” of crops, animals, and produce.\textsuperscript{286}

The brewing industry in the 1880s produced only British-style ales for export to other Southern African colonies and for local consumption by British colonists and Malays.\textsuperscript{287} The beer produced included porter, export ale, and a locally style known as tickey beer. Tickey was the most important beer for the brewers because it made them the most money and was consumed by more people due to its low cost and lighter flavor and color. For instance, in 1883 Ohlsson’s brewery produced five hogsheads of tickey to one of pale ale and the prosperity of the brewery was dependent upon this style of beer.\textsuperscript{288} The head brewer and manager of the technical part of Cloete’s brewery, R.V. Smith, said that they made thirty times more tickey beer than export ale and stout as well as about ten times more than pale ale or porter.\textsuperscript{289} In 1885, Ohlsson said that his brewery used to brew around thirty hogsheads of beer, a majority being tickey beer, a day before 1884, but after

\textsuperscript{285} Law, \textit{Papenboom in Newlands}, 13, 16.
\textsuperscript{286} Walton, \textit{The Josephine Mill and Its Owners}, 66.
\textsuperscript{287} Black South Africans were not among the consumers do to their own local production of traditional styles of beer as well as colonial prohibition against the sale of European alcohol and beer to the black populations.
\textsuperscript{288} “Report of the Select Committee of the Beer Excise Duty Bill” (Cape of Good Hope, Appendix II, To Votes and Proceedings of Parliament, 1883), lines 209-211; or two-thirds to three-fourths of all production according to Anders Ohlsson, line 465.
an excise act put a higher duty on the beer, it forced the tickey beer prices to rise and his brewery produced less than three hogsheads.  

Tickey beer was similar to running ales produced in Great Britain due to their lower alcohol by volume (ABV) and lighter color. They also had a short shelf life, were cheaper than other styles of beer, and had a quick turnaround for the brewers so that they could make more money by producing large quantities. Had they been brewing lagers the turnaround would have been months instead of days. The Inspector of Excise in Cape Town, Thomas Crowe, noted that “tickey beer would compare with the low-class ales in England” and the brewers mostly agreed. However, they did argue that while the low-class English beer corresponded in strength, the tickey beer was different due to the needs of the different climate and needed an addition of molasses for carbonation. As I argue in Chapter 5, because of its color and lower ABV, tickey beer turned out to be a precursor to the golden lagers that would dominate the South African beer markets by the twentieth century.

From Cape ales to Jo’burg lagers

Through the early 1890s, the major producers of beer in South Africa were from the Cape Colony and were located in Cape Town. Ander Ohlsson’s brewery held the top position for several years and continued to do well producing British ales and tickey beer. However, by the end of the 1890s he lost his lead to South African Breweries, an LLC based in Johannesburg, which quickly dominated the region with its Castle Lager beer. This transition in power and consumption occurred because of migration to the Transvaal

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290 Anders Ohlsson, “Report of the Select Committee of the Brewers’ Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 182.
gold fields, the adoption of scientific brewing and new brewing technologies from Europe, and the support of British investors in a business venture for lager brewing in Johannesburg. The following sections deal with each in turn.

Migration

While the Dutch were the first Europeans to settle and then to brew beer in southern Africa, large migrant influxes of French, Scandinavian, German, and British populated the South African colonies up through the early twentieth century. These migrations, especially those that occurred in the nineteenth century, are an important piece of the history of pilsner in South Africa because the migrations of European populations help to explain the migrations of their commodities and how certain groups influenced consumer tastes more than others. Several key moments in the history of South Africa are linked to migration and are especially important to the spread of golden lagers. These are the discovery of diamonds in the Transvaal (1867), the First Boer War (1880-1881), the annexation of Southwest Africa by Germany (1884), the discovery of gold in the Transvaal (1886), the Anglo-German Treaty (1890), and the 2nd Boer War (1899-1902). Each of these events led to large migrations (mostly of men) to southern Africa and led to the creation of large consumer markets for both locally produced and imported beer. Over the course of the late nineteenth century the options for consumers changed, influenced by the demographic makeup of the consumers. Between 1886 and 1914 South Africa went through a mass migration period due to the opening of gold fields in Witwatersrand that transformed the Transvaal through the creation of a large-scale gold mining industry and led to the foundation and growth of the city of Johannesburg. The new conditions made the region attractive to international migration.
on a scale that had not been seen before and led to a rush of immigrants from around the world to South Africa.  

Migration was a very important part of the arrival and dissemination of the German lager beer style. One of the most important events in this was the 1883-4 Berlin Conference, during which time the most powerful European nations effectively divided Africa into separate colonial regions of control. In southern Africa this meant that the colonies of Transvaal, Cape Colony, Orange Free State, and Natal were effectively under British control—though annexation of Transvaal and the Orange Free State from the Afrikaners involved much fighting during the first and second Boer Wars—and just north of them, Germans claimed German South-West Africa.

The German arrival to Southwest Africa included large amounts of German beer and other alcohol. In 1884, roughly 64% of the total weight of exports from Hamburg to Africa was alcohol, including beer. Settlers to German South-West Africa consumed large amounts of beer as evidenced by piles of beer bottles left at diamond mines. Indeed, of the 167 firms and companies licensed in South-West Africa in 1903, 53 were exclusively or primarily concerned with the alcohol trade.

In addition to the establishment of breweries, the German government supported the export of beer from the metropole through subsidizing full shipments to the colonies. For this support to succeed, the German government under Bismarck found it necessary to also support the German shipping companies who were supplying the recently founded

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294 Gordon, “Inside the Windhoek Lager,” 123.
colonies. Bismarck believed that without financial incentives for supplying the German colonies, businesses would lose interest in the colonial German markets. To help support this interest the German government subsidized only full ships that went to the colonies. Beer became an important way to fill space in the German ships because it took up a lot of space and was guaranteed to be sold upon arrival.

In addition to colonial migration to the German colonies, the discovery of diamonds in 1867 and then gold in 1886 in the Transvaal led to rushes of migrants from Germany and many other parts of the world. This created a strong and stable market for the golden lagers within the Afrikaner-controlled areas of Southern Africa. The mining operations grew very large, requiring many men to provide labor as well as to live in the camps and nearby towns. While in the early days most beer was imported to the mines, some people saw the potential profits to be made by starting their own breweries.

Science and Technology

Between 1870 and 1900, brewing in South Africa followed a similar trajectory to European brewing in the growing importance of science in beer production and in the various technological implements used in the brewing process. There are two important transitions we must consider when looking at science and technology in South African brewing. The first was the transition from practical to scientific brewing. This occurred at more or less the same time as it did in Europe, but after the 1890s became even more important in South Africa than in Europe. The second transition was the lowering status

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and importance of British ale brewing knowledge and equipment in favor of Continental lager brewing that occurred during the second half of the 1890s.

The development of a modern brewing industry in the South African colonies required modern brewing equipment like that bought and imported by Jacob Letterstedt during his tenure as owner of the Mariendahl Brewery in Cape Town. The equipment he chose to import and the consultants he hired to build his modernizing breweries were all British. This was because Cape Colony brewers were as adamant as British brewers were in their devotion to the British methods of brewing beer. Such methods included the training of brewers. As mentioned earlier, Ohlsson was dedicated to British training and brewing methods in his Cape breweries including in his decision to send his brewer to England for training and his choice to hire the English company Pontifex to design his Newlands brewery. Another brewery, Cloete’s, also held to the traditional British methods of brewing but started incorporating scientific methods similar to the Continental brewers in the early 1880s and saw positive results. In 1885, the Treasurer-General of the colony questioned Captain John Spence of Cloete’s Brewery about the training of his head brewer. The Treasurer-General went to lengths to question why Spence’s brewer was not a “scientific brewer,” and if they had attempted to get a scientific brewer to train him. Spence defended his “practical brewer” but said that while he was not better than one with a scientific background, he was just as good. Continued questioning revolved around the adoption of scientific and “systematic” brewing methods with the assumption by the Treasurer-General that brewing beer based upon scientific methods, like those used in Continental Europe, were the best. While Spence defended his current brewing methods and brewer, he admitted that since they began incorporating
a more scientific approach to brewing, their production had become much better and efficient.296 Within the next ten years, the transition from British to Continental—practical to scientific—brewing methods and the preferred styles of beer they produce was complete. The loyalty to traditional methods of brewing that we see here gave way to a market dominated by Continental lager beers produced by South African companies, including Ohlsson’s Cape Breweries by the beginning of the twentieth century. One way this occurred, was through better investment accumulation through incorporation.

Business

During the 1880s, the South African brewing industry in Cape Colony was concentrated in the hands of a few privately owned companies. The strategies of these breweries in expanding their market control were the same as British breweries. Their management choices were also the same with the breweries managed by the founders and their heirs instead of by trained managers. In addition, Cape brewers also engaged in tied trade, purchasing and invested in retail outlets to maintain and expand market control like the British.297 After beginning his own brewery in 1880, Ohlsson succeeded in expanding his brewing production through purchasing other breweries in the area and eventually by becoming the largest beer producer in the South African colonies going into the 1890s. Ohlsson’s strategy in collecting the other small, personally run firms in the Cape Colony followed the British strategy of merger and acquisition discussed in chapter three.298

Ohlsson and other Cape brewers like Cloete’s utilized a tied house system to

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298 Chandler, Scale and Scope, 287.
control the local market. This worked so well through the middle of the 1880s that when a new brewery, Van Rhyn, entered into the local market, Ohlsson lost no trade because of the tied trade he had built up in Cape Town. Like the British, Cape Colony brewers were hesitant to exploit the opportunities of the Second Industrial Revolution. With their small geographical size, lack of local raw materials, and ability to be financially successful in their home market most of the Cape brewers were not attracted to investments in production, distribution, and management that could help them exploit economies of scale.

Yet at the same time the tied trade strategy was in use, some breweries attempted to raise capital via investment through becoming Limited Liability Companies (LLCs). While LLCs had been growing in popularity for several decades in Europe, they did not become popular in the South Africa brewing industry until the late 1880s. LLCs offered many benefits to investors by limiting their risks if a business did not succeed and/or went bankrupt. If an LLC failed, the investors would only be responsible for their original investment and no other costs that may have accrued. Two South African brewery firms, Cloete’s and Van Rhyn’s, attempted to float their breweries as LLCs around 1885. In spite of high hopes for investment capital from England and glowing prospectuses, neither brewery was able to succeed with becoming an LLC due to local economic downturn and poor markets.

301 Chandler, Scale and Scope, 284, 286.
However, by the late 1880s Ohlsson found himself in the same predicament as the leading British brewers who wished to continue to expand their production and distribution but who required more investment to do so. To this end, Ohlsson established his brewery as a Limited Liability Company in 1889. Ohlsson’s Cape Breweries Ltd. registered in London with overseas capital of £350,000 to support expansion and updating of the Newlands brewery.\textsuperscript{303} Ohlsson’s incorporation was quickly profitable for its shareholders, according to their annual general meetings in London.\textsuperscript{304} In the early 1890s, the firm continued to buy more tied houses to maintain control of the local beer market in South Africa. By following the incorporation trends of Europe and the United States, Ohlsson was able to compete successfully with European imported beers as well as all South African breweries at the time. However, the formation of South African Breweries, Ltd. (SAB) represented a new threat to Ohlsson’s market control. The history of SAB shows how successful Continental business strategies aimed at lager production could be in a colonial market.

\textit{South African Breweries, Ltd.}

The story of South African Breweries, Ltd. begins with two Englishmen, Fredrick Mead and George Henry Raw, in the British colony of Natal in 1889 with the foundation of the Natal Brewery Syndicate. They came to South Africa because of the gold rush, but decided to start a beer brewery when they realized the potential profits.\textsuperscript{305} After raising funds in England for the new brewery in Pietermaritzburg (Natal), Mead and Raw started

\textsuperscript{304} “Ohlsson’s Cape Breweries, Limited,” \textit{Brewers’ Journal}, 7/15/1892, 300-1.
\textsuperscript{305} Rosenthal, \textit{Tankards and Tradition}, 123-4.
producing British ales and stouts in July 1891. The pair soon looked toward the growing center of the gold rush, Johannesburg. In 1892, they met Charles Glass, co-founder of Castle Brewery with his wife and bought his brewery for the future site of South African Breweries, Ltd.

There are some myths about the early beginnings of SAB. One of the most popular is that Charles Glass set out to make the best (lager) beer the miners of the Transvaal and that is how Castle beer became famous. He worked very hard trying different lager beer recipes and then brought out the beer via a wheelbarrow to the miners and listened to their impressions of each beer until he had a perfect recipe. This recipe became the now-famous Castle Lager. In another version, told by SAB itself in a 1961 brochure about the company, is that instead of lager, it was ale and stout that Mr. Glass “hawked” from a horse-drawn trolley. However, none of these stories are true.

Charles Glass and his wife founded Castle Brewing around 1890 in a small brewery in Johannesburg. With his wife doing the brewing, they sold beer for miners for about two years before Fred Meade arrived from Pietermaritzburg and offered to buy them out. While Meade and Raw decided to keep the name of Castle for their beers, the Natal Brewery Syndicate could not afford to expand the brewery as much as they desired. Hence, as many Continental breweries had done, Meade and Raw set about

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raising money through further incorporation and founded the South African United Breweries, Ltd.

In 1892, South African United Breweries, Ltd. registered in London with a capital of £100,000 but just a few years later it was restructured as South African Breweries, Ltd. (SAB) and registered with a capital of £350,000 to acquire and expand the property and production of the previous brewery. In London, the officers of the SAB board reported in 1894 that the brewing trade was already successful and increasing business in Johannesburg due to their production of lager. Correspondents at the British Brewers’ Journal reported in 1895 that “they had obtained the concession of the rights for special machinery for South Africa for the manufacture of lager beer,” and that the trade was steadily increasing. SAB’s lager was able to compete with imported beers, even though the company had to use locally grown barley malt. The lager brewing equipment they obtained came from the United States and used new technology to speed up the lagering process considerably.

The decision by Meade and Raw to brew lager beer in the Transvaal was due to an awareness of the local demand for pilsner. Advertisements for Castle Lager went out in both English and German due to the “large and beer-loving Teutonic section of the Rand (Transvaal) populace.” By the end of the 1890s, the popularity of SAB’s lager threatened the importation of German beer from Bremen and Hamburg according to the

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315 Rosenthal, Tankards and Tradition, 128.
British *Brewers’ Journal.* SAB effectively utilized Continental brewing methods and business strategies to take over the South African beer markets by producing the pilsner.

Without the business connections and funding possibilities of incorporation, the latest scientific technology developed in Europe and the United States, or the large population of light beer drinkers, Mead and Raw would not have been able to establish a lager brewery in South Africa. SAB quickly dominated the Transvaal and Natal regions of South Africa and soon looked west to the Cape Colony.

*Lager Comes to Cape Town*

In 1899, Ohlsson’s Cape Town brewery felt the increased competition from Johannesburg’s South African Breweries, Ltd. Instead of brewing their own pilsner, Ohlsson attempted to retain market share as the British brewers did, by purchasing tied houses. However, control over the local Cape markets was not enough, and Ohlsson soon switched his strategy and decided to build another brewery to begin brewing lager. The building of the new plant began in 1900 and opened in 1901 to brew both “English and lager beers.” The purpose was to capitalize on the popularity of the golden lager and the influx of soldiers and refugees from the Second Boer War that had begun in 1899. Ohlsson needed the new lager brewery to compete with SAB, which had recently purchased property for a new brewery in Cape Town.

The setting of the foundation stone for Ohlsson’s new lager brewery occurred in 1900 with a large ceremony. The brewery site was between the Letterstedt’s old brewery

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319 “Ohlsson’s Cape Breweries, Limited,” *Brewers’ Journal,* 7/15/1900, 408.
and a railway adjoining the Newlands Station near the main road in that section of Cape Town. Ohlsson’s wife had the honor of placing the foundation stone in the ground with a silver trowel. A correspondent from the British Brewers’ Journal compared the event to the sale of a large London brewery over a hundred years before saying that both were moments of possibility. The correspondent emphasized the special nature of the ceremony because it was not the foundation of “an ordinary brewery, such as has existed in Cape Town for years, but that of an entirely new departure.” In fact, this was the first lager brewery in the Cape Colony.\footnote{Ohlsson’s New Lager Beer Brewery, “Brewers’ Journal, 8/15/1900, 457.}

This was the culmination of the Cape Colony’s transition from British-style brewery through the 1880s to an incorporated, scientific brewery by the turn of the century. Ohlsson’s new lager brewery was built through shareholder investment to have the latest design and machinery for brewing quality pilsner in which “all the requirements of science [had] been adopted regardless of the question of cost.” Ohlsson himself noted in 1900 that “there was no comparison between the beer which he found [when he first came to the colony] and that of the present day.” Ohlsson went on to say:

He thought it only right for the benefit of the colony that lager beer should be brewed in that country, and that they should not be dependent on Germany and other countries for the imported article. The very best of skill and scientific help had been called in to make the undertaking a success by securing a lager beer equal in all respects to the best brands now being imported into the colony.\footnote{Ohlsson’s New Lager Beer Brewery, “Brewers’ Journal, 8/15/1900, 457.}
Within ten years, the Cape Colony had transitioned from British to Continental beer styles. Ohlsson’s devotion to British brewery design and ale slowly diminished when faced with direct competition from SAB’s South African lager. The changing markets and tastes had brought about an entirely different beer market in the Cape Colony.

**Conclusion**

This chapter has been about how the pilsner came to South Africa, the history of brewing in South Africa, and how consumption and production changed through migration, the introduction of new scientific/systematic approaches to brewing, and the quick transition to lager brewing once SAB established itself in Johannesburg. South Africa offers an example of a region formerly devoted to British beer and brewing methods that quickly adopted Continental lager and brewing methods.

This study of pilsner in South Africa shows how imperial trade networks helped spread commodities and technology. Unlike most histories of empire that focus only on the metropole and colony, this case study shows that is not enough. Imperial trade networks, fueled by colonial settlement and metropolitan economics, were essential to the foundation of ale and lager breweries in South Africa and the spread of European production methods as this study shows.

This chapter has explained how the pilsner came to dominate South Africa but the following chapter explains why the golden lager was able to reach so many people across the world and the reasons beer consumers chose this style of beer over all others. Though the migration of many European nationalities to South Africa helped the changing tastes for certain beer styles, it was the awareness of a market that led to the foundation of South African Breweries, Ltd. with investment from businessmen in Great Britain.
Regardless of the choices made by the British brewing industry in regards to style and what they thought the world wanted to drink, unique qualities of the pilsner style, both with the investment strategies and the choices in production methods, made the golden lager a beer that most of the world wanted to drink by the turn of the twentieth century.
Chapter 5: It Tasted Better: Why the People chose the Pilsner.

Introduction

Scholars in a variety of fields, including history, sociology, and anthropology, have demonstrated that the choices people make in terms of food and drink are quite complex. Choosing what to eat and drink is the result of many factors including the consumer’s identity, matters of convenience including price, and concern over the consequences of what consumers take into their bodies. Among the most important factors influencing such choices, however, is taste. This chapter explains the reasons for why pilsner became the first global beer style in terms of taste. While the previous chapters have examined how the pilsner developed and spread through science, technology, education, and business strategies, this chapter explores the reasons people chose (or did not choose) to purchase and drink this style of beer over all others. I argue that the physical attributes of the pilsner—its color, clarity, alcoholic strength, and level of carbonation—combined with a perceived status as the beer of modernity to elevate this style above the other beer choices, especially British ales.

The pilsner became the first global beer style because it was cheaper and tasted better. I have covered why it was cheaper in chapters two and three, in this chapter I explain why it tasted better. It tasted better because it was new, it was clear and golden, it was fizzy, and consumers felt safe from being too inebriated. The pilsner was imbued

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with the taste of purity and modernity that I prove through contemporary accounts of its spread support through their metaphors and repetition of metaphors and adjectives.\textsuperscript{325}

This chapter is divided into three sections. The first section examines the physical attributes of the Pilsner that were most attractive to consumers. These attributes include its lower alcohol by volume (ABV) compared to British ales, wines, and spirits, its golden yellow color and clarity, and its high level of carbonation. Part two discusses the reasons consumers in the United Kingdom generally refused to conform to Continental attitudes regarding ‘good’ beer. Part two also surveys changing British tastes for lighter pale ales and the development of cheaper, low alcohol running ales as a strategy to compete with pilsner. The last section of this chapter brings to light changing tastes in the South African colonies and why brewers and consumers there transitioned from British ales of the metropole to Continental and German golden lagers. Instead of running ales, the Cape Colony brewers had tickey beer, which was also cheap and low ABV. The difference between the effects of tickey beer consumption in South Africa and the running ales of Great Britain was the influence in South Africa of Continental migration and a lack of metropolitan nationalism that focused on specific beer styles. South African consumers, who were not devoted to ale brewing like their counterparts in Great Britain, switched from tickey beer to pilsner as soon as pilsner was affordable.

According to Priscilla Ferguson, “taste is notoriously untrustworthy.”\textsuperscript{326} Taste, in Ferguson’s view, consists of the most private personal connections with the material world and, in its strictest sense, cannot be shared. In practice, however, many taste

experiences can be shared socially, as they are when friends dine together or colleagues have drinks with one another. And in fact, scholars have demonstrated that the social context of tasting can decisively shape the taste experience.\textsuperscript{327} As a force in history, taste has distinctive methodological and archival problems as Jeffrey Pilcher explains.\textsuperscript{328} Each individual perceives identical sensory stimulants differently. In order to describe them, one must translate them into shared language. Usually narratives of taste inevitably draw on metaphors but these must be set in historical and cultural contexts.\textsuperscript{329} These narratives, made up of metaphors and adjectives are the taste archive that a historian must use when researching and explaining how taste changes over time.

This discussion about taste as it relates to pilsner incorporates Jeffrey Pilcher’s recent concept of “embodied imagination.” In a recent essay, Pilcher explained embodied imagination as a “means for conceptualizing the connections between sensory perceptions of food such as flavor, warmth and satiety; the material work of preparing and consuming food; and cultural and social abstractions.”\textsuperscript{330} For this chapter I concentrate on the sensory perceptions of pilsner in regards to its flavor and mouthfeel, color, and intoxicating affect.\textsuperscript{331} While the physical sensations of flavor may pass quickly, the vocabularies used to express them are found in the archival sources including adjectives and phrasing or metaphors to explain impressions of taste.\textsuperscript{332} The archived

\begin{itemize}
\item \textsuperscript{327} Priscilla Parkhurst Ferguson, “The Senses of Taste” in AHR Forum in \textit{The American Historical Review} 116 (2), April 2011, 371, 373.
\item \textsuperscript{328} Pilcher, “Tastes Like Horse Piss,” 29.
\item \textsuperscript{329} See Pilcher, “Tastes Like Horse Piss,” 29 and Pilcher, "The Embodied Imagination in Recent Writings on Food History," 862.
\item \textsuperscript{330} Jeffrey M. Pilcher, "The Embodied Imagination in Recent Writings on Food History" in \textit{The American Historical Review} 121 (3), June 2016: 862.
\item \textsuperscript{331} Mouthfeel is a term to describe the physical feeling of a beer in one’s mouth regarding the body or viscosity of the liquid, the amount of carbonation, the possible heat that can come from higher ABV beers.
\item \textsuperscript{332} Pilcher, “Embodyed Imagination,” 868.
\end{itemize}
descriptions of Continental lagers and British ales discussed below point to clear impressions of a positive association with pilsner versus negative associations with British ales—especially in export markets.

Intoxication is inextricably linked to taste when it comes to alcoholic beverages. Intoxication transcends historical eras and cultures, and in many societies imbibing alcohol is a key practice in the expression of identity.\textsuperscript{333} Choices in drinking alcohol are important in the production and reproduction of ethnic, class, gender, and local and international community identities. Regardless of location, —Great Britain, Germany, or South Africa—beer drinkers sought out lightly colored, lower alcohol, cheaper beer at the end of the nineteenth century. The British had running ales, Germans had pilsner, and South Africa had tickey and then pilsner. The reasons for this include begin with the environment. A chilled, sparkling lager is more refreshing in tropical locations than in a foggy pub in London but this did not stop the Germans and Danes from seeking it out or from the British preferences changing to running ales from porters.

A number of changes occurred between 1870 and 1914 that had an effect on people’s drinking habits. As the Technological Revolution moved forward, people spent more money on leisure pursuits and other forms of consumer spending and beer began losing its central role in working-class existence.\textsuperscript{334} After 1880 in Britain, as wages increased, consumption lowered, likely due to working-class males looking outside of the


pub for leisure activities including music halls, cheap manufactured goods, and sports.\textsuperscript{335} Improved bottling of beer had a large affect on where people consumed beer as well, making it easier to imbibe away from pubs. Instead of retiring to the pub, people purchased bottles of beer for consumption outside or in the home, changing the dynamic of alcohol consumption. The Continental lager brewers were the most successful in this regard which helped in the expansion of the pilsner style.\textsuperscript{336}

Those in power became increasingly concerned over social evils that the temperance reformers blamed on the consumption of alcohol, making lower alcohol beer an attractive compromise instead of prohibition.\textsuperscript{337} After 1870, temperance propaganda was constantly in front of the public in Europe.\textsuperscript{338} In Britain, this had an effect on changing the perception of traditional strong beer from the old idea that it induced strength and health to that it was better to drink low alcohol running ales because they were of “light ‘family’ character.”\textsuperscript{339}

Regardless of the style of beer, mode of production, or size of the brewing company, quality of product was a key characteristic of taste used in the marketing of beer in the past. The perceived high quality of golden lagers was promoted through ideas and notions of modernity and progress, but was physically reflected in the consist qualities of the beer. Consumers of pilsner knew that the beer would be of a golden color, that it would have a low alcohol by volume (ABV), that it would be very clear with

\textsuperscript{337}“British v. Continental Beer,” \textit{Brewers’ Journal}, 2/15/1877, 32.
\textsuperscript{338}Gourvish and Wilson, \textit{British Brewing Industry}, 38.
\textsuperscript{339}Gourvish and Wilson, \textit{British Brewing Industry}, 38, 46.
minimal sediment, and that it would have a high level of carbonation. In comparison, British beers came to be known for their lack of consistency.\textsuperscript{340}

Consistency is what classified the best beer in the world at the end of the nineteenth century. Commentators frequently criticized the physical attributes of British beer in overseas ports including its alcoholic strength, the amount of sediment at the bottom of the bottles, and the lack of carbonation. For instance, in 1885 the British 

*Brewwers’ Journal* reported that British beer exports contained “too much alcohol, too much sediment, too much hops and too little gas.”\textsuperscript{341} This could not have been more different from the consistent golden pilsners of the Continent at the very same time.

**Part I: See the Difference, Feel the Difference: Physical Attributes of Pilsner**

Remarkably consistent in discussions within the brewing industry journals in Great Britain about the new lagers of the Continent was the listing of its physical attributes that set it apart from the strong, bitter beers of the UK. While the pilsner’s light golden hue came up frequently, it was the lower alcohol content that received the most attention. Under the title of “Odd Items,” one article in 1866 reported that the keeper of a lager beer-saloon in New York City was arrested for selling intoxicating liquors without a

\textsuperscript{340} The Belize Advertiser, "The Beer Trade in Central America," December 29, 1888, BNL: MC536. The British consul at San Salvador comments in his report that the beer trade in Central America has now become the dominion of the United States and Germany even though the British used to have a monopoly. “He attributes this decline to the obstinate persistence of the British brewers in attempting to force an article upon the public there which is not appreciated any longer… A little time ago an experiment was tried with a light beer, somewhat resembling "lager," which was imported from England, and the first arrival gave evident satisfaction, but, when shipments were repeated, the quality proved to be much inferior; the bottles, moreover, were badly corked; no wires being used, and therefore the beer fell into disrepute and the brand became discredited.”

license. In his defense he brought several witness who had tested his lagers. The
witnesses included an old German man who, when asked "Do you consider lager-beer
intoxicating?" replied, "Vell, ash for dat, I gant zay. I drinkish feefty or seexty glasshes a
day and it never hurtsh me, but I don't know how it would be if a man was to make a hog
of himsel[sic]."342 In other words, according to the old immigrant, one could drink lager
beer all day without getting drunk. Beer that could be consumed in large quantities
without high levels of inebriation were rare prior to the introduction of the lower ABV
golden lagers, and this became one of its strongest selling points.

*Low Alcohol Content*

The lower alcohol percentage made lagers a ready ally to the temperance
movements that swept through the western world over the course of the nineteenth
century and, as J.C. Jacobsen commented, “good cheap lager appears to be the surest and
most reliable means of combating the evils of alcoholism.”343 According to a nineteenth
century medical text on alcoholism (and referenced by Jacobsen in his 1884 address to
the Technical Association in Copenhagen), people drank fewer distilled liquors in places
where the largest amount of beer was consumed. Thus, in Bavaria and Württemberg,
where people drank the most beer per capita, distilled liquors were going out of style as
beverages of choice.344 In Bavaria, he argued, “very few drunken people are seen in the
streets, and drunkenness is much less common there than in many other countries.”345

The Austrian Temperance Association (*Verein gegen Trunksucht*) noted that the
consumption of spirits was on the rise in Austria in 1884 because the recently increased

taxes on “good lager beer” made it too expensive for the poorer classes. Those with little
money chose to drink spirits instead. In order for the lager to succeed in its’ “its mission
of an antidote to dram drinking,” the Austrian Temperance Association argued that it had
to be cheaper.346

British visitors to Germany also noted the lower alcohol percentage of lager beers,
and the amounts that one could consume without becoming drunk. One correspondent of
the Brewers’ Journal who visited the Börsch & Hahn Brewery in Niedermendig
commented that:

here we are in the region of those light beers – light both in colour[sic] and
strength…You might take a good skin full of that stuff without any fear of
being “run in,” for although, strange to say, you feel as if you had taken a
glass of beer, yet the stimulating effect is very slight and you may refresh
again and again without any evil effects. In fact, it is an excellent
temperance drink (I use the word advisedly), cheering without
inebriating.347

Being used to the much higher ABV British beers, this reporter made sure to note both
the temperance angle but also the amount that he could imbibe without losing control.
Both the Continental and British brewers and consumers, such as Carlsberg’s Jacobsen
and the Brewers’ Journal reporter, were well aware of the marketing possibilities of a
temperance product and the potential popularity such beer styles could have.

Export issues regarding the high ABV of British beer were also a recurring theme in the brewing industry literature. Trade of English beer in Brazil the mid-1880s was in decline compared to German and Danish lager beers due to the strength of English beer, possible due to the strength of regional temperance movements and the tastes of German settlers. The advice that was given was that:

English brewing firms, indeed, would do well to look to this matter, since we are convinced that year by year the demand for English beer abroad will grow less and less solely on account of its alcoholic strength, and tendency to deposit a copious precipitate; while the importance of this note will be seen in the statement that in a great measure it simply owes its stability to the large excess of alcohol that it contains.

The higher alcohol percentage was seen as one of the only things keeping British beer from going bad in long transit, unlike lager beer that kept well with low ABV because of the fermentation and aging process.

As the British press reported on lagers in 1876, “it may be mentioned that, though pleasant enough beverages, they are light beers, low in alcoholic strength. Of course they are not so strong as our beer. The result in the way of increased consumption must be obvious.” Furthermore, "owing to its exceeding lightness, quadruple the quantity can be consumed as could be partaken of in England without the risk of getting

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intoxicated.” Unlike British beers that were higher in alcohol and bitterness due to the belief that these were the only characteristics that would allow their beer to keep for long periods of time, the lagers were much less intoxicating and could be drunk in large quantities without heavy inebriation. British beer writers explained that Continental beers, like those in Germany or Austria, do “not keep well, its consumption…chiefly confined to places on the Continent where ice is plentiful, and where it is not the custom for families to have beer in cask at home, for a beverage of this light character can be kept on draught merely for a day or two after it has once been tapped.” The author was apparently unaware of the growing popularity of mechanized refrigeration in the 1870s, as discussed in Chapter 2.

**Beer Clarity vs. Sediment**

Another aspect of golden lagers that consumers focused on was the clarity of the beer. Due to the long aging process, bottom fermentation, and decoction mashing, golden lagers had very little sediment in both draught and bottled beer. This clarity was a very big selling point and an aspect of taste that appealed to beer consumers the world over. Beer from the UK, whether pale ales from Burton or stout from Guinness, tended to have a lot of sediment in their beer, a fact brought up constantly by consumers.

The large amount of sediment in bottles of British ales was a regular complaint by 1885, even in British brewing journals. One article complained that when the cork is removed from a bottle of British beer, it upsets the whole bottle because the pressure of the carbon dioxide makes it all “more or less turbid.” The author suggests “we may as

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well take a leaf out of the journal of the Continental brewer...[and] store beer in cask for lengthy periods till no further deposit is likely to result.”\textsuperscript{353} The inference is that Continental brewers were producing a better product through their lagering process and that the British should do the same.

British brewing journalists even used the lack of clarity in British beer, especially when compared to Continental lagers, to point out the lack of formal scientific education in the UK brewing industry. Lager brewers were particularly careful about clarity and made sure that no beer was taken from primary fermentation “that is not glass-bright.” One British commentator said that the “ignorance of English brewers” is evident in the “supposition that turbidity of beer is due to the suspension of yeast” instead of the use of infusion instead of decoction mashing, because decoction sorts out inferior material that causes sediment.\textsuperscript{354}

The British were even worried about the possibility of lager beer encroaching into UK markets. Some warned that “only by the manufacture of a really satisfactorily light bottled beer that the brewer can hope to stem the invasion of this country by foreign lager beer.”\textsuperscript{355} According to a writer for the \textit{Brewers’ Journal}, it was common knowledge that lager beer production (in 1896) was not profitable for British brewers. The lager brewer, however, had the advantage that the conditions of lager “brewing enable him to produce a beer that will not throw any deposit in the bottle and will pour out brilliant to the last

drop,” and in his view the English would do well to take up decoction mashing in order to have brighter beer as well.\(^{356}\)

Two years later another article appeared in the British *Brewers’ Journal* titled “Brilliant Beers” that exclaimed:

> a careful and impartial student would not have far to seek in order to explain the universal popularity of modern beers. It is their quality, brilliancy, wholesomeness, and pleasant refreshing flavours that have made the beer-trade what it now is. A vast, discriminating public would not tolerate anything in the shape of thick, muddy, foxy, and unwholesome beers, and the rise and progress of certain centres of this great industry prove the appreciation in which the ales there produced are held.\(^{357}\)

According to this author, beer with copious sediment was unhealthy and a relic of the pre-modern brewing age. In comparison, the modern beer was brilliant and clear. As a result, the author urged that “brilliancy is at all events to be attained, and that is a matter sufficient to test the quality of a beer [and] no cloudy or fretful ales find favour among the modern public.”\(^{358}\)

*Carbonation*

Along with clarity, a high level of carbonation was increasingly understood as a signifier of quality by both beer consumers and writers alike. High levels of carbonation,
however, was a quality of golden lagers and not of ales produced in the UK.\textsuperscript{359} The higher level of carbonation came to the awareness of the British population after the Paris Exhibition of 1867 via the presentation of Viennese lagers from Anton Dreher’s Schwechat brewery. It was promoted by the British brewing industry’s brewing literature as being “both sustaining and refreshing.” With the introduction of the Viennese lager also came an apparatus known as the “Automatic Generator,” which produced extra carbonation at bars for the serving of this new beer. There was no doubt, according to the British writer, “that the provision of cool cellars and these carbonizing [sic] apparatus will help to solve the difficulty, which hitherto attended the introduction of the Lager bier(sic) to Londoners.”\textsuperscript{360} However, nationalist sentiments over beer styles were what was really keeping the lager from Londoners and the UK, not a lack of artificial carbonization and mechanized refrigeration keeping the lager.

In spite of the benefits regarding the health and refreshment of modern lager beer as promoted by the brewing literature, the British brewers and consumers remained firm in their desire for British style ales. In addition to the strong preference for traditional technology and education as examined in chapters two and three, there was a strong nationalist reaction against Continental beers in the United Kingdom. As explored below in Part III, many British were afraid for their ales in the face of the encroachment of lagers. Many more sought to ease these fears by touting the strength of the British brewing industry. At the same time, tastes were changing even in the UK and brewers began producing new lighter ‘running’ ales in response to the pilsner threat.

\textsuperscript{359} While artificial carbonation had been around for around a hundred years, brewers in the UK and on the Continent continued to usually use the natural carbonation that comes from yeast while undergoing fermentation.

Part II: Lager and the UK

Gourvish and Wilson note that it is very difficult to reconstruct changing tastes in Great Britain during the nineteenth century even though those living at the time noted significant shifts in the types of beer consumed in Victorian Britain. Gourvish and Wilson note that it is very difficult to reconstruct changing tastes in Great Britain during the nineteenth century even though those living at the time noted significant shifts in the types of beer consumed in Victorian Britain. These contemporaries observed a distinct turn from the darker porters of London toward lighter (but still strong) pale ales between the 1840s and 1860s. There were several reasons for these shifts in consumption, including changes in social habits and work practices, the impact of temperance reforms, higher taxation, fashions for particular beer, and small amounts of imports of lagers from the Continent. These shifts were slow to gain traction in Britain because British consumers still preferred the traditional strong, dark ales.

Some British scholars at the beginning of the 1880s pushed for brewers to begin producing “beer that by its colour, flavor, condition, and deficient alcoholic strength, would certainly captivate a large section of the beer-drinking public.” After spending time in several Continental cafés and beer saloons, Frank Faulkner, a British brewing scientist, frequent contributor to The Brewers’ Journal, and author of The Art of Brewing (1876) noted that people there drank large quantities of beer but it was all golden lagers. The volume of consumption did not surprise beer industry writers because they saw “its unvarying brilliancy and condition…a respect in which it differs so widely from even the best English brands.” He explained that if British beers were to be produced with low alcohol content, it would be “washy, flat, unpalatable fluid, of no character that could be

361 Gourvish and Wilson, British Brewing Industry, 40.
362 Gourvish and Wilson, 82.
363 Gourvish and Wilson, 40.
termed desirable.” This was because British brewers allowed for cask conditioning that was “slow and incipient,” which made it very difficult to control stability, especially with variable temperatures and climates. Faulkner argued for the British to produce their own lagers like those on the Continent but thought that “the system will not, I think, ever find a footing in England” due to the higher cost of lager production on top of the heavy duties they already paid. Even if cost was not an obstacle, “the majority of English consumers are so fond of the beer that improves by age, so proud of the fluid that will remain sound under trying climatic changes, that the weak, brilliant, and frothy Continental production would not captivate, excepting as a novelty, their critical taste.”365

And indeed it would be another two decades before any of the large British brewers attempted to produce Continental lagers, with no great success.

Faulkner pointed out the key attributes that Continental lager drinkers sought and enjoyed included carbonation, low ABV, and “brilliance.” All of these features set Pilsners clearly apart from the British beers which were much stronger, darker with more sediment, and less carbonated. However, these distinctions of British beers were what made them so clearly British and what British beer consumers wanted and thought made their beer the best.366

By the mid-1870s, some British brewers began to express concern about the encroaching popularity of lager beers. One *Brewers’ Journal* correspondent was “absolutely alarmed for the safety of the national beverage.” In response to this alarmist, another correspondent wrote that while they “agree with his remarks as to the progress of

366 “German Beer,” *Country Brewers’ Gazette*, 9/2/1878, 414; Gourvish and Wilson, 42.
the brewing industry in Germany and other countries” and are “appreciative of the efforts of foreigners” in the improvement of brewing processes, “we have no fear for the safety of the brewing industry in this country.” Even though this correspondent admitted to a growth of German and French cafés in London, he argued that the consumption of Continental beers “is almost exclusively confined to foreigners…[and] chiefly in demand during hot weather, when its light character renders it an appropriate and wholesome drink.” The second correspondent finished by reiterating that the original correspondent “has an exaggerated notion of the whole matter” and that the only reason he responded was due to the amount of “lively communication directed to us, in which apprehensions of the most unfounded character are expressed.”\(^{367}\)

This article brought several key perceptions to the forefront at a time of considerable expansion for pilsners on the Continent. The fears expressed by the first correspondent were mirrored by enough readers of the *Brewers’ Journal* that the journal editors felt they must respond and assuage fears that British ales were still the most popular in Great Britain and that the national industry was in no way threatened by foreign brewers. The taste for lagers, they surmised, was a taste favored by foreigners rather than the British. Foreign brewers’ presses, including the *Montieur de la Brasserie*, supported these ideas. The French brewers’ journal pointed out that German emigration was the cause for the growth of lager consumption in Britain. The French writer explained that “these beers are consumed almost exclusively by foreigners, that they are drunk especially in the summer, when they are very refreshing, that in England, for the most part, they are only to be purchased at the foreign cafés, and that, so far, English beer

\(^{367}\)“*Trop de Zele,*” *Brewers’ Journal*, 10/15/1876, 224.
has nothing to fear from this competition.”

Local and foreign beer writers both tried to be clear that the taste for golden lagers was a Continental choice and one no English beer drinkers would make on their home soil.

The discussion surrounding the encroachment of foreign lagers in the Brewers’ Journal continued over several more issues under varied titles. Each new installment, however, focused on the strength of British beer consumption over foreign lagers in the home markets. One of the reasons given for this came after a temperance advocate named Mr. Walker complained at a temperance event that “the English brewers did not brew a beer of the light Continental description,” to which the journal responded that “it is not a question of supply, but of demand.” The journal continued on to say that “the majority of English beer-drinkers, for whom the brewers have to cater, would not drink German beer, it does not suit their taste, and, for well-grounded reasons, they prefer the native product.” These reasons included “climate, temperament, and even physical condition which render it improbable that English beer-drinkers will be satisfied with the same kind of beer that is popular on the Continent.”

Mr. Bass of the Bass Brewery supported the idea that the British population wanted specific British styles, not that the British brewing industry was unable to produce quality lagers.

When asked by Mr. Walter, the temperance advocate, “why don’t you brew a beer which will be pleasant to drink without making people drunk?” Mr. Bass replied that it was simple to do so and that he did regularly brew thousands of gallons of light beer at harvest time. Bass went on to say that “to day the brewers have no objection to producing

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the kind of beer [Mr. Walter] praises – perhaps a little unduly – but if people would not
drink it, the experiment in these days of excessive competition would be very likely to
have disastrous results for the brewer if not the consumer.”\(^{371}\) Bass’ opinions were
supported by a British pub owner, who wrote in to say that:

"we brew, according to my thinking, better beer in England than any other part of
the world, and it does not seem to me advisable to go out of our way to copy those
who brew beer not so good or \textit{well suited to our national taste} [my emphasis]. My
tenants would not thank me to send them a weak, washy beer, nor would they get
people to drink it, just because it was brewed after a fashion of the German
beer."\(^{372}\)

Furthermore, as a correspondent bluntly explained in 1877, “most English beer-drinkers
object to the palate flavor of German beers.”\(^{373}\) As this exchange indicates, the opinions
at the close of the 1870s were that British beer was best and could not be substituted by
any German/Continental lagers because differences of taste would leave the British
consumers very disappointed.\(^{374}\) However, British brewers did not ignore these calls for a
lighter, lower alcohol beer completely. Instead, they turned to a strategy of producing
their own response to German lagers: running ales.

The British response to changing consumer tastes for lighter, low ABV beer was
running ales. Running ales were pale and mild ales produced after 1875 in response to the

\(^{373}\) “German beers,” \textit{Brewers’ Journal}, 5/15/1877, 133.
growing presence of pilsner. British brewers produced running ales using the same methods as other ale but the end result was lower in alcohol, lighter in flavor and color, and could be produced quickly for a fast turnover in profit. However, unlike the Continental lagers, these beers would not keep long and were never stored. Running ales allowed the British brewers to retain their traditional methods and avoid expensive investment in lager brewing facilities while still producing a product similar to German lagers. In addition, running ales allowed the British brewers to remain loyal to their national styles and methods.

The loyalty to British traditions of taste and brewing was supported in the brewing literature in the early 1880s. In response to the promotion of lager in 1879 by an editor of the British society journal, Truth, the Brewers’ Journal argued that the editor must not have known anything about British beer or its consumers. The British brewers, he argued, must continue to “produce a fluid that will keep their plant in full work, a beer that will satisfy the wants of the working classes as a whole…the lager beer is mere wash that would refuse to remain sound for many hours together, and would in no wise tempt by its virtues the English consumer.” Several years later these arguments were taken up by a different correspondent, who explained that English brewers were typically conservative and would oppose any future introduction of bottom fermentation systems in England. The brewers’ “favourite can’t [sic] has been that the alcoholic thirst of the

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377 Gourvish and Wilson, British Brewing Industry, 45.
British working public could not satiate itself with watery “lager beers”… To the Englishman drinking lager beer for the first time, the taste is decidedly objectionable.”

However, in the coming decades British tastes did slowly change toward lighter running ales for national consumption. As early as 1882 an article about the difficulties regarding different kinds of malt reminded the readers that the “modern palate likings are for weak as opposed to strong beers.” At the same time Professor Graham, a noted agricultural chemist and later a brewers’ consultant, explained the British palate was used to specific flavors and that “English ales will hold their position for a long time to come since we have become accustomed to the alcohol and hops, and a change in the public taste must ever be a slow process.” The running ales could not compete against pilsner outside of the United Kingdom. While the production of these light and cheap ales satiated changing British tastes towards light and mild beers, they could not be transported long distances to reach foreign markets. It was a strategy for maintaining national markets only. Though the British brewers recognized the trend towards lighter, low ABV beers, their reticence against Continental beer and brewing methods continued because of their loyalty to nationalist ideals and the belief that their ways were the best.

As the contemporary literature shows, British brewers continued to believe that their beers and methods were the best in the world. Even as fears were expressed openly about lagers coming to Britain there were many more voices supporting the idea of the strength of the British brewing industry and its beer. However, this was not the case in British

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South Africa where metropolitan loyalty was not as strong and the beer consumers readily adopted lager once it was available and affordable in the late 1890s.

**Part III: A Colonial Change: Why South Africans Chose Pilsner**

While there are a few mentions of lager beer in South Africa prior to the large-scale production by South African Breweries in the late 1890s, there was a style of ale that acted as a precursor that was produced by local, Cape Colony brewers: the tickey beer. Tickey beer was cheap, low alcohol beer named after a silver three penny piece, equivalent to 1p.\(^{383}\) Tickey beer was a beer style native to South Africa, and produced by Cape Colony brewers in large amounts. The brewers made it from the second mash of malt, which had much less fermentable sugar, and which in turn produced a beer with much lower ABV.\(^{384}\) This beer was essential to the well-being of the Cape brewers because while they produced standard British beers like stout, porter, pale ale, and export ale, these were much more expensive and most of the working class could not afford them. Also, as the keeper of a high-end hotel in Cape Town explained in 1885, when imported British ales were available and affordable, consumers preferred them. When asked whether customers preferred local or imported beer, he said they like “the English ale, although I have seen some colonial ale equally as good. As a rule, English people prefer English ale.”\(^{385}\)

In 1883, the Cape Colony Parliament began proceedings to increase duties on beer in the colony. The excise bill, which was passed that year, to raised the price of both

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\(^{384}\) John Spence, “Report of the Select Committee of the Brewers' Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 50.

\(^{385}\) James Cavanagh, “Report of the Select Committee of the Brewers' Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 430.
imports and Cape ales. The Select Committee on the Beer Excise Duty Bill (1883) brought in representatives of all of the local breweries as well as proprietors of local canteens, beer importers, and the Inspector of Excise, Thomas Crowe, to hear their objections or agreements to the bill. Fortunately for us, the ensuing discussions outlined the structure of the beer markets of the Cape Colony and showed that while every brewery produced pale ales, stouts, and export ales, the most important beer that they produced in the most bulk was tickey beer. Tickey beer was the cheapest and lightest of all of the beers that were produced by the brewers and made the most profit for most of them. Due to the low cost, the primary consumers of tickey beer were Malays and poor whites. 

Cape Town brewers depended upon the sale of tickey beer. For instance, over the course of 1883, Ohlsson’s brewery produced five hogsheads of tickey to one of pale ale. The head brewer and manager of the technical part of Cloete’s brewery, R.V. Smith, said that they made thirty times more tickey beer than export ale and stout as well as about ten times more than pale ale or porter.

According to Thomas Crowe, the Inspector of Excise in the Cape Colony, “tickey beer would compare with the low-class [running] ales in England.” He said this

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386 Black South Africans were not a significant market for European style beer. They had their own local variety of beer production that did not impact the welfare of white South African brewers or beer importers. For more on the state of black South African liquor laws, consumption, and production see: The Report of the Liquor Laws Commission, 1889-1890, with minutes of proceedings, minutes of evidence, and appendices, (Cape Town: W.A. Richards and Sons, Government Printers, Castle Street, 1890.)

387 “Report of the Select Committee of the Beer Excise Duty Bill” (Cape of Good Hope, Appendix II, To Votes and Proceedings of Parliament, 1883), lines 209-211; or two-thirds to three-fourths of all production according to Anders Ohlsson, line 465.


because they were both lower in alcohol, lighter in color and had a short shelf life. They were also cheaper than other styles of beer and had a quick turnaround, which made them popular with consumers and brewers. Cape brewers agreed to an extent but some argued that while the English beer corresponded in strength, the tickey beer was different by its condition due to the difference in climate that made bottling more difficult. In Anders Ohlsson’s testimony against the passage of the Beer Excise Duty Bill (1883), he noted that colonial brewers needed to have greater liberties than those accorded to the English brewers. This was due to the difficulties of the climate “because it is hotter and the fermentation is greater…We have to start very early in the mornings. At home, in the cold weather they can start at any time.”

One of the key attributes of tickey that set it apart from the English running ales, according to David Thompson, the manager of the Letterstedt’s brewery, was that it must be sent to customers “in an effervescent state. In England, [the clarity of beer] is all they care about, but here the Malays like it fizzing.”

In support of the increased beer duty, Thomas Crowe argued that higher prices would lead to better beer. The brewers, he argued, would have to recoup costs by using less malt and sugar, “making weaker beer which will be less intoxicating.” This would not alter the flavor, in his opinion. Crowe used Continental lagering methods as an example of how one could produce tasty low ABV beers in the Cape. He argued that:

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the brewer would not only produce a weaker beer but would take steps at once to store his beer and sent out a better finished article. The beer now sent into consumption is not a thoroughly finished article. To finish beer you must keep it in the store for six months. It is in evidence that it is intended to put up stores to keep the beer, and when it comes into consumption it will be a better and more palatable article than we now get; and I think it will be a lighter article than now.\textsuperscript{394}

Crowe’s description of a better beer mimics the metropolitan descriptions of Continental lager including its clarity, strength, and use of modern brewing techniques. Though he did not advocate directly for lager beer production, his descriptions and vocabulary were the same.

At the end of the committee’s hearings, the Cape Parliament passed the Beer Excise Duty Bill (1883), which led to increased duties on both imported beers from Europe as well as locally produced beers. The most important and disastrous effect of the bill was the increase in price-per-bottle of tickey beer. Tickey beer went from its namesake 3p up to 4p. This price increase decimated the South African brewing industry, especially since a depression hit the colony at the same time. In 1885, South African brewers petitioned the Cape Parliament to rescind the excise duty so that they could affordably lower the price of tickey beer back to 3p.\textsuperscript{395} Anders Ohlsson gave evidence for how impoverished the brewing industry had become by 1885. According to his

\begin{footnotesize}
\begin{enumerate}
\item D. Cloete, J. Spence, and others, “Petition of the Undersigned Brewers trading in Cape Town and the Vicinity” (Cape of Good Hope, 1885).
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\end{footnotesize}
testimony, his brewery used to brew around thirty hogsheads of beer a day prior to the passage of the Act. With its passage, his brewery produced less than three hogsheads.396

The 1885 Brewers’ Petition to the Cape Colony House of Assembly eventually led to the repeal of the Excise on Cape Colony-produced light beers, or those known as “tickey” beer. The Select Committee on the Brewers’ Petition reached this decision after several weeks of interviews with beer importers, canteen owners, and representatives of several breweries around the Cape Colony. The Select Committee agreed that “a good business in the light beers is absolutely necessary to make the manufacture of the heavier or export ales pay” and that the “present Excise is inequitable, both to the brewers and to the consumers who prefer light beers to heavier drinks.” All other duties, including those on imported foreign beer and any stronger beers would remain in effect.397 This allowed the brewers to regain much of their tickey beer business with the return to 3p. per bottle for their light, lower ABV, more carbonated ales.

In addition, the proceedings of the 1885 Brewers’ Petition shed further light on the state of beer consumption and production in South Africa up to 1885. The interviews lay out important information regarding the different beer markets, especially in Port Elizabeth and Cape Town. While the focus was primarily on the price of tickey beer, the prices of imported foreign beer, Cape beer of different styles, and the consumptive choices of different segments of the South African population were all covered. They show a reticence toward change and a loyalty to British brewing methods and styles of

396 Anders Ohlsson, “Report of the Select Committee of the Brewers' Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 182.
beer that mirror to those in the metropole. While there are references to modern scientific approaches to brewing, the brewers themselves strongly supported their “practical” training via British methods. The most important beer style to Cape brewers was tickey beer, their own response to the growing trend towards light, low ABV beer that we saw in British running ales and Continental pilsner.

An important aspect of tickey beer, as argued by the colonial brewers, was that it was a necessary style to brew in order to make a profit because it was the most popular and best selling beer they produced. Even though the Select Committee suggested that increased production of the stronger export ale would help to off-set the loss of tickey beer consumption, the brewers argued that the “two must go together. There is not sufficient consumption of the better class [of beer] to keep the establishment going. The light beer is the principal thing.”

This was because the first mash of the malt extracted most of the sugar, which was used in the production of stronger export ales. The later mashings of the malt would then extract whatever maltose was left in order to produce a much larger quantity of lower ABV tickey beer. Tickey beer allowed brewers to maximize economies of scale in their beer production and turn a much greater profit in comparison to their higher alcohol beer styles.

Cape brewers were not in competition with imported lager beers in the middle of the 1880s. The competition for beer consumers, as the 1885 Brewers’ Petition highlighted, was between British imports and colonial brewers and not between colonial ale and German lagers. While the Cape brewers had control in Cape Town, they had

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398 Anders Ohlsson, “Report of the Select Committee of the Brewers' Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), lines 187-188.
stronger competition from English beer imports in Port Elizabeth.\textsuperscript{399} Due to the Excise Act of 1883, Ohlsson’s production of porter, pale ale, and export ale was in direct competition with English imports in Port Elizabeth “owing to the English beer being sold at the same rates [he charged] for all beers.”\textsuperscript{400} The breweries that they were in competition with were all from Great Britain and the metropolitan brewers had authorized their agents to sell their beer cheaply rather than be cut out of the colonial market by competition with Cape beer. In 1885, this was working well.\textsuperscript{401} Competition from Continental lagers, however, soon threatened the brewers of the Cape Colony and the British-style ales they produced.

Indeed, circumstances changed drastically in the next ten years. Joseph Chamberlain, the British Colonial Secretary, sent a dispatch to all of the British colonies at the end of November 1895 requesting information about the colonial markets.\textsuperscript{402} The information returned from the South African Assistant Treasurer in July 1896 made it clear that the only beer imported into South Africa was from Germany. He explained that “it is cheaper and much lighter than the English, and the large German population in the Colony insist on drinking German brewed beer.” Even though some English lagers had been put on the market, none of it was actually sold.\textsuperscript{403}

\textsuperscript{399} Anders Ohlsson, “Report of the Select Committee of the Brewers’ Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 237-250.
\textsuperscript{400} Anders Ohlsson, “Report of the Select Committee of the Brewers’ Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 251.
\textsuperscript{401} John Spence, “Report of the Select Committee of the Brewers’ Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 304.
\textsuperscript{402} Joseph Chamberlain, “Despatch to the Governors of Colonies on the Question of Trade with the United Kingdom,” PRO DO 119/128/Misc. 103.
\textsuperscript{403} Cape Town Chamber of Commerce, July 7, 1896, “Return showing the reasons why certain articles are imported into this Colony from Foreign Countries, in preference to being imported from Great Britain, No. 6 Beer and Ale” PRO DO 119/128.
As early as 1881, one fourth of the beer imported into South Africa was German. By 1883, the imports from both countries were equal. Yet while the increase in German lager imports was great, it did not have much effect on most of the brewers in Cape Town. The reasoning given by one of Cape Town’s beer importers, J.G. Steytler, was that “the people who drink German ales will drink Cape ale, for there is a great similarity. There are numbers of people who can afford to by English ales [but] drink Cape ales in preference.”\(^\text{404}\) However, there was one exception: the brewer of a short-lived lager brewery.

Adolf Krawehl worked at the Van Rhyn’s brewery until disagreements with the owners over his management style in 1885 forced him to leave.\(^\text{405}\) Prior to working for them, however, he had his own brewery that went bankrupt “mostly through the imported beer” brought into Cape Town.\(^\text{406}\) Yet what was unique about his brewery was that it was a lager brewery, the first and only one in South Africa until SAB began their own lager brewing in 1897. He said in 1885 that:

\begin{quote}
when I started brewing, I started on the German style of brewing laager [sic] beer, with the use of ice. I bought a consignment of ice, about a ton, to the value of £5. When I had the brew ready, it was just at the time of the beginning of the importation of German laager beer, which my beer, on account of the low temperature at which it was brewed, fully equaled. It went to the Hansa Hotel, one of Cloete’s houses, where the first imported
\end{quote}

\(^{404}\)“Report of the Select Committee of the Beer Excise Duty Bill” (Cape of Good Hope, Appendix II, To Votes and Proceedings of Parliament, 1883), line 495.

\(^{405}\)Adolf Krawehl, “Report of the Select Committee of the Brewers' Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 668.

\(^{406}\)Adolf Krawehl, “Report of the Select Committee of the Brewers' Petition” (Cape of Good Hope, To Votes and Proceedings of Parliament, 1885), line 643.
laager beer went too, and it was imported in a large case, covered with sawdust. Of course, when I saw that I thought it would never pay to import beer like that, but afterwards they left the cases and simply imported in the cask. Then, of course, I could not compete... although at that time I had a brew ready of 300 gallons, which cost about £20. If it had not been for the imported beer, I should have been a well-to-do man to-day [sic].

Years before South African Breweries, Ltd. began producing Castle Lager in Johannesburg; Krawehl had started the first lager brewery of South Africa. However, due to a lack of investment capital he was unable to exploit the potential economies of scale that Continental breweries used to keep their prices low.

Krawehl explained more about the process of lager brewing, showing the lack of knowledge about this style of beer by the Select Committee. He explained that it had to be brewed at a lower temperature than the Cape Colony ales produced by the other brewers and that the ABV was lower as well, aside from tickey beer. His pricing, however, would keep his beer far out of the reach of tickey beer consumers with a price of 6p. versus the sought-after return to 3p for tickey beer. He argued for keeping all imports out of the Cape market so that he could start his lager brewery again without competition. When asked what would stop him from raising prices if he had no foreign competition, he replied that it was quantity that paid. His also clarified the difference between lager and Colonial ales.

Krawehl explained that his German system of brewing did not need the tickey ale to pay for the higher ABV beers as the other brewers needed. His “way of brewing [was] different altogether…[and he would] simply depend upon those who prefer better quality,” intimating that his lagers were worth the much higher price compared to tickey beer and British ale styles. Krawehl was an exception to the rule of British methods and beer styles in South Africa. Though he argued for the quality of lagers over Cape ales, he lacked the connections and investment that would have made his lager brewery successful in the early 1880s. Due to its low price the tickey beer, though similar in several respects to pilsner, remained the most popular style for the local populations of the colony. Once lagers were affordable with the establishment of South African breweries and their Castle Lager, the British-style ales of the Cape, including tickey, could not compete.

In the middle of the 1890s, the Cape Town Chamber of Commerce was only interested in reporting beer and ale imports and the brewers of the Cape continued to focus on British brewing methods and beer styles. However, the recent founders of SAB quickly expanded their beer production to include lager beer in Johannesburg. One of the founders of the company, Frederick Mead, set to the task of organizing the necessary equipment for lager brewing in 1896. The Castle Brewery of SAB in Johannesburg soon acquired an entire lager beer plant from “the Pfaudler Vacuum Company of America who undertook not to supply their equipment to any other firm of brewers in South Africa and Castle Lager went on market in 1898.” The popularity of Castle lager was so great that

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all of the other breweries in South Africa followed suit and installed lager plants of their own. Thus, the pilsner became the most popular style of beer in a British settler colony by the end of the nineteenth century.

**Conclusion**

The difference between the effects of tickey beer consumption in South Africa and the running ales of Great Britain was the influence of Continental migration and a lack of metropolitan nationalism that focused on specific beer styles. While the tickey beers were precursors to a transition to Continental-style pilsners in South Africa, the light running ales did not lead to widespread lager consumption in the UK due to the strong nationalist view of British ales in the face of Continental rivalries, especially with Germany, at the end of the nineteenth century and the early twentieth century. The British brewers lacked the motivation to retain control over colonial beer markets. Even their running ales that developed in response to changing tastes for lighter beer were produced for domestic consumption and not to compete with pilsner elsewhere. In comparison, there were many breweries in Bremen and Hamburg built for the purpose of producing beer solely for foreign markets. By the 1890s, there really wasn’t much competition between the British and Continental brewers.

When British settlers in Johannesburg, South Africa began drinking and producing pilsner beer, they chose to identify more with the local community than with the one they left behind in Great Britain. Beer and alcohol are unique forms of consumables, and very often the desire for community and intoxication can overcome those of loyalty or nationalism. This, in fact, was precisely what happened with pilsner

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beer in South Africa. Miners and other imbibers of pilsner were already sharing an experience of working together every day to earn a living in the gold mines of the Transvaal, and drinking alcohol together afterwards was a natural consequence. With the most popular and cheapest beer being SAB lagers due to the economies of scale that the brewery was able to exploit, the miners chose to drink pilsner.

This is similar to the lessons learned in the Cape Colony during the 1880s when tickey beer, the most popular and cheapest style of beer, became too expensive for most of the working population of the colony. This hurt the brewers enough that they called for the removal of the beer excise tax that had been put in place in 1883. Though Malays were the largest consumers, the working classes (like the Johannesburg miners) were the next largest group of tickey beer drinkers. When these groups could not afford tickey beer, the brewers suffered. When SAB lager arrived in Cape Town in the late 1890s, beer drinkers turned to pilsner—a better quality beer than tickey ever was—and forced Ohlsson’s Cape Breweries to make lager as well in order to compete in the changing beer market.412

This chapter, and the one before it, demonstrate that it was a combination of changing tastes, technologies, and investment that propelled the pilsner to its place as the global beer. South Africa is one example of the transition from British ales to Continental lagers but the vocabularies of taste may be used when looking at any national example where pilsner became the local style of beer. By following scientific and technological exchanges across imperial networks at the end of the nineteenth century we can also follow the changing tastes of European imperialists and local adoption of pilsner.

Conclusion

On the eve of the likely merger between the two largest beer producers in the world, this project about the history of pilsner is even more relevant that it was when I began. When the likely merger goes through between AB-InBev and SABMiller on October 10, 2016 the resulting company will control nearly one-third of the world’s beer supply and what beers are they mostly known for: golden lagers including America’s Budweiser and South Africa’s Castle Lager. It will not only make them the largest brewing company in the world but one of the largest companies, period. The pilsner has come a long way since 1842.

This project has followed the rise and fall of the British brewing industry’s dominance as the world’s leading beer producer. In its wake came the Continental brewers with their golden lagers. As the British held onto their national markets and traditional brewing methods, the Continental brewers sought to expand through the incorporation of companies and the adoption of scientific knowledge and technological innovation. By working together, Continental brewers were able to learn from each others mistakes and carefully craft their breweries and brewing methods for efficiency that helped them spread their ideas, tastes, and products across the world. In comparison, British brewing languished with only British expats seeking its inconsistent products. The pilsner became the first global beer style due to changing tastes in Europe that encouraged Continental lager brewers to use the latest scientific methods, technological

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advances, and business strategies to both meet the growing demand for pilsner and expand its influence via European imperial trade routes. By utilizing the imperials networks, the pilsner reached growing overseas markets including South Africa where British settlers went against their national taste for ale to produce golden lager.

The networks that developed out of European imperialism were key to the spread of pilsner and the associated industrial technology and production methods that came with it. Unlike most histories of empire, this one goes beyond the colony-metropole paradigm and includes other extra-colonial players that as much of an impact on colonial space as the metropole, in some ways even more. South Africa’s best selling beer today remains the Castle Lager produced by SABMiller (soon to be ABInBev-SAB). Though the founders of SAB were Englishmen, their methods and choice of product reflected the needs of the market and global connects outside of their nation of origin. The changing tastes of a quickly connecting world at the end of the nineteenth century carried a single style of beer via imperial trade networks across nations and empires.

Over the proceeding century, every former European colony, and every other nation that exists and has a brewing industry produces at least one golden lager. In many cases they are the national brand of beer. Nearly all of the beer produced in the world are pilsners. However, tastes are changing once again with the craft beer revolution that has swept the United States in the past forty years and in many ways, craft brewers are seeking out the styles of beer that pilsner replaced.

The craft beer movement began by setting itself up against the large industrial lager breweries. Beginning in the United States in the late 1960s and slowly spreading in the late 1970s and early 1980s, these brewers saw themselves as trying to find flavors that
had been lost. The golden, low alcohol, fizzy pilsner had spread so well that it was hard for anyone in the United States to find anything else. When several young men took trips to Europe in the late ‘70s and early ‘80s they returned with a taste for ales.

The very attributes that made the pilsner the global style are the ones that many craft brewers are seeking to ignore in their own beer. Dark, heavy porters, imperial stouts, and super bitter double India Pale Ales have become what many discerning beer drinkers seek. The rush to industrial uniformity that represented the modern progress of science and technology of the late nineteenth century pilsner brewers no longer holds any appeal for the craft beer crowds. Even one of the primary complaints about British ales in the late nineteenth century—that they were cloudy and had too much sediment—is now a sign of artisanal choice and status. 414

Craft beer is the new wave across international borders. Unlike previous American cultural exports of commodification known as “Cocacolonization” or “McDonalization” that spread uniformity of flavor similar to the pilsner a hundred years before, this new cultural export is one of the choice for luxury artisanal beer. Brewers seek to push new flavors and use interesting (or weird) ingredients. Craft breweries have been growing in Ireland, South Africa, Italy, Central America, and East Asia as well. The consumers of craft beer rebel against the uniformity of flavor and consistency that brought the pilsner to fame and dominance and instead revel in the one-off small batches of inconsistent flavor from that small brewery down the road.

414 People have dubbed the cloudy IPA style with bold citrus notes as the “Vermont IPA” style. I not agree that it is a definitive style.
However, without the work of the late nineteenth century lager brewers the craft brewers of today would not be able to make beer as well as they do. For them it is a choice to make a sour beer or make it cloudy instead of clear. This is because they use the scientific processes and technology developed by the pilsner brewers in Continental Europe who spent decades working together to consistently make the same beer.

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