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Germany's Extensive History of Brewing with Malt Substitutes: Birthplace of America's Adjunct Lager Beer

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ABSTRACT

The second in a series of three *Technical Quarterly* papers examining the origins and history of adjunct lager beer in the United States, the focus of this paper is a review of Germany's extensive pre-1906 history employing malt substitutes in the brewing of lager beer for domestic consumption. The picture which emerges is, first, that Germany's brewing of adjunct lager beer preceded America's by one to two decades, and, second, that the start of America's journey in the style in the late 1870s was profoundly influenced by Germany's journey. The story consists of the voices of 19th century German-American brewers as they share how their first experiences in brewing with substitutes took place in Germany and how German taxation laws from the 1870s to 1906 included rates for both malt and malt substitutes, including detailed annual reports issued by the Reichstag listing the quantities of every brewing material used during these years. While the style has flourished in the United States and around the world ever since, it was only because of the Reichstag's passage of the National Reinheitsgebot on June 3, 1906, that its production ceased throughout all of the German Empire—but not, as will be discussed, without controversy or some rather startling surprises.

Keywords: adjunct lager beer, American beer history, German beer history, beer standards, corn, malt substitutes, Reinheitsgebot, rice

Introduction

When I embarked on this research in 2007 into the history of the American adjunct lager brewing industry, I never imagined that by 2020 I would have written a 550 page draft manuscript specific to *Germany's* history regarding the style. That manuscript is but the third of an envisioned nine-volume series on the history of the American lager brewing industry. This article represents only snippets regarding Germany's history using malt substitutes—the use of which is widely considered to be specific to America's brewing history. While it may seem odd that a Canadian-born brewing scientist trained and employed by adjunct lager brewers in Canada, Denmark, and the United States has conducted a review of Germany's history with malt substitutes, there is one compelling reason why I have chosen to do so. And it is this: the voices, accomplishments, and legacies of America's first generation of German-American lager brewers left me with no other choice. For with regard to the origins of adjunct lager beer in America, *Germany's* history is so intertwined with *America's* history that it is impossible to fully appreciate the latter without fully exploring the former.

Fundamentally, if adjunct lager beer is viewed strictly through the prism of the four milestones of new product development (i.e., concept, feasibility, development, and implementation), this paper shows how *all* of these were clearly met and fulfilled in Germany *before* American consumers ever enjoyed an adjunct lager beer brewed in America. Chronologically critiquing the history of adjunct lager beer style against these measures, I have come to believe: (1) that the stages of concept, feasibility, and development took place in Germany (and elsewhere in Central Europe) during the 1850s; (2) that *domestic* implementation in Germany occurred by the 1860s; (3) that in the United States the timelines for these phases were essentially one to two decades *behind* Germany's, with implementation only being realized by the late 1870s; (4) that throughout the 1880s, 1890s, and 1900–1906 the style was brewed in the brewing industries of *both* nations (except within Bavaria, of course) before being extinguished across all of Germany in 1906 by the passage of a National Reinheitsgebot; and (5) that brewers in America during this period only narrowly escaped this fate. Thus, in the century since, lager beer drinkers outside of the United States and Germany have had two very different styles of lager to choose from. History has taught us their preference.

Before proceeding further, it is important for readers to appreciate that the word "Reinheitsgebot" was not coined until 1918 (more on that to follow). Accordingly, you will not find mention of the term in literature until after then. But one word that is readily searchable from 1906 is "Reichstag." Equivalent to the English word "Parliament," it was in this national legislative assembly that the National Reinheitsgebot was passed on June 3, 1906 (80). My paradigm prior to researching this period was that it was enacted as a measure to improve beer quality on a national basis, to make Bavaria's Reinheitsgebot to be Germany's Reinheitsgebot. Surely its passage would have been widely reported by the media of the era, right? Being a heck of a lot more contemporary than 1516, it should be pretty straightforward to use period media coverage to connect the dots as to why it was passed, right? Well, it is in the answers to these two questions that much is revealed. But first, let's get a better feel for the world of beer leading up its passage.

This article has been updated to reflect that there are two different men named Hans Rauch.

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Historical Vignettes

Brooklyn, Manhattan, Staten Island, and New Jersey: 1881

In the August 20, 1881, edition of the *New York Times* is an article of profound historical significance to the American brewing industry (63). Entitled "How Lager Beer Is Made," included in the subcaption was the statement "Corn-Meal, Corn Starch, Rice and Grape Sugar Used in Varying Proportions" (Fig. 1). Penned by the Association of the United Lager Beer Brewers of New York City and Vicinity at a time when New York was the largest beer-producing state in the Union, it was written in response to a questionnaire sent to every brewer in the region by the Business Men's Society for the Encouragement of Moderation. Seeking to endorse lager beer as a beverage of moderation for its membership, the questionnaire's central question was meant to determine "whether anything besides malt and hops was used in the manufacture of lager beer." Given the still widely held paradigm that American-style lager (containing 20–50% of the total extract originating from rice and corn-based malt substitutes [53]) traces its origins to events surrounding World War II, it may come as a surprise to many readers that such a question was posed 60 years *prior* to Pearl Harbor. The questionnaire was most certainly not drafted out of the blue, as the public's first awareness that rice and corn were extensively used to brew lager beer in the United States began in 1877. Newspapers carried sensational reports regarding their use, first in Cincinnati and then Saint Louis and Milwaukee. In Milwaukee's case, the coverage was triggered by a local reporter simply asking the local Internal Revenue Service office for copies of the records generated by the federally mandated requirement since 1862 that each brewery in the nation provide monthly reports of the materials used within their brewery. Reporting specific figures for pounds of rice and/or corn used in the breweries of Frederick Miller, Valentine Blatz, The Phillip Best Brewing Company, Phillip Altpeter, and The Milwaukee Brewing Company, the headlines "Crooked Beer" (31) and "The Hand of Fraud" (32) by the *Daily Milwaukee News* leave little doubt as to how the American media of the era felt regarding the brewing of lager beer with malt substitutes. Phillip Best's assertion to the reporter that he first used rice, then corn, to improve his lager to make a better, more stable lager beer only fell on deaf ears (33). So it was then, in the summer of 1881, that the time had arrived for the lager brewers of Brooklyn, Manhattan, Staten Island, Union City, and Newark to address this controversial subject in the newspapers of America's largest city, New York.

In what I have respectfully come to view as America's "Beer Manifesto," the detailed and carefully crafted brewers' response focused on informing area beer drinkers about the all-important *what* and *why* questions behind the use of malt substitutes:

> The substances discussed in the foregoing paragraph (cornmeal, prepared corn, corn starch, rice, grape sugar, and glucose) and which it is admitted are used by a proportion of brewers, are not employed for the purpose of cheapening the beer produced, but for making desirable variations in color and flavor—the addition of any of these substances are making a lighter colored beer than malt alone, and each one varying the flavor. Those brewers who use them believe they thus make a better beer, and know that it suits the taste of their customers—an object of all successful manufacturers. None of these substances are cheaper than malt, unless it be the corn-meal or prepared corn.

HOW LAGER BEER IS MADE

THE BREWERS' ANSWER TO THE BUSINESS MEN'S SOCIETY.

CORN-MEAL, CORN-STARCH, RICE AND GRAPE SUGAR USED IN VARYING PROPORTIONS —THE BREWERS WILLING TO HAVE THEIR BEER TESTED CHEMICALLY—OLD AND NEW BEER SELDOM BLENDED.

The Business Men's Society for the Encouragement of Moderation determined recently to commend to the palates of the people the drinking of light wines, beer, ale, &c. They addressed a series of inquiries to the beer brewers of this City and vicinity, the purport of which was to obtain information for publication showing how the beer and ales are made, the ingredients used, and similar facts. The principal inquiry was directed toward ascertaining whether anything besides malt and hops was used in the manufacture of lager beer, and the questions prepared with that end in view were framed apparently to still the apprehensions which publications in some newspapers as to the use of glucose, hops essence, &c., were well calculated to arouse.

The signers include the representatives of the following breweries:

New-York.—Jacob Ahles, Bernheimer & Schmid, Baur & Betz, H. Clausen & Sons, Peter Doelger, Joseph Doelger, De la Vergne & Burr, Eckert & Winter, George Ehret, John Eichler, Henry Elias, Philip & W. Ebling, A. Finck & Son, Jacob Hoffmann, A. Hüpfel's Sons, Mrs. S. Kress, Valentine Loewer, Oppermann & Müller, Jacob Ruppert, George Ringler & Co., Charles Rivinius, the F. & M. Schaefer Brewing Company, Conrad Stein, Charles Seitz, Schmitt & Schwansenfluegel, Hermann Schalk, Smith & Brothers, D. G. Yuengling, Jr., Henry Zeltner.

Staten Island, N. Y.—George Bechtel, Charles Bischoff, Monroe Eckstein, Mayer & Bachmann, Rübsam & Hormann.

Long Island, N. Y.—Warren G. Abbott, Joseph Burger, Boulevard Garden Brewery, Dahlbender & Breiner, Joseph Fallert, Glück & Scharmann, C. A. Goetz, Otto Huber, S. Liebmann's Sons, Claus Lipsius, Mrs. H. Marquardt, Meltzer Brothers, William Maupai, F. Münch, Ochs & Lehnert, N. Seitz Son, William Ulmer, Williamsburg Brewing Company, Weber & Amthor, John Welz.

Newark, N. J.—Ballantine & Co., C. Feigenspan, Joseph Hensler, Hill & Piez, Peter Hauck, F. J. Kastner, Gottfried Krueger, John Neu, Mrs. C. Trefz, Weiss & Mander, Ferd. Ziehr.

Town of Union, N. J.—Daniel Bermes, Louis Linnewerth, William Peter, Marion Brewery, Marion, N. J.; New-Rochelle Brewery, Hudson River Brewery, Dobbs Ferry, N. Y.

Figure 1. August 20, 1881, article published in the *New York Times* entitled "How Lager Beer Is Made." Left: headline and first paragraph; right: list of brewers signing their names to the "manifesto" (63).

Note in the preceding quotation that "glucose" refers to a liquid high-glucose syrup, while "grape sugar" describes powdered sugar. Both were prepared via acid hydrolysis of corn starch, with acid subsequently removed by washing. The extent of the following dehydration determined whether a solid or liquid product resulted.

But as with the courage and boldness demonstrated by the signers of the American Declaration of Independence, it is the brewers who attached their proverbial John Hancock's to the "Manifesto" who I believe warrant—and deserve—the attention and gratitude of today's brewing industry (both craft and macro alike). While not putting their lives and livelihoods on the line as did those who signed the ultimate American manifesto on that hot day in Philadelphia on July 4, 1776, by their bold and highly public defense of their professional rights to brew with the materials of *their* choice, the brewers of August 20, 1881, were most definitely placing their livelihoods at risk. What makes their courage even more remarkable, and considerably ironic, is that the vast majority of these men represented breweries founded by men born in Germany. Many came from multigenerational families of brewers, with others having served their apprenticeship in the craft prior to emigrating. Typically, they left the land of their birth during the tumultuous period between Germany's "First Reich" (i.e., the Holy Roman Empire of 962–1806) and its "Second Reich" (i.e., the German Empire of 1871–1918). Based on 19th century United States Census Records, especially those from 1880, we know many were born in the Kingdom of Württemberg, the Electorate of Hesse, the Free Hanseatic City of Bremen, the Duchy of Hohenzollern-Hechingen, the Grand Duchy of Hesse, and the Kingdom of Prussia.

But mostly it was the sons of the Kingdom of Bavaria who were defending the *rights* and *practice* of American brewers to use rice and corn-based substitutes to brew lager beer. Men such as Jacob Ahles, John Eichler, Andrew Finck, Mathias Haffen, Anton Hüpfel, Valentine Löwer, John Müller, Franz Ruppert, George Adam Schmitt, Henry Zeltner, Peter Biegen, William Eckelmann, Joseph Burger, Henry Claus, Charles Adolph Goetz, Peter Greiner, John Lehnert, Samuel Bar Liebmann, William Maupai, the brothers Gottfried and John Meltzer, the brothers Joseph and Peter Doelger, David Obermeyer, Nicholas Seitz, Peter Hauck, John Neu, Jacob Piez, and Charles Weiss. However, while collectively these brewers comprising the Association of the United Lager Beer Brewers of New York City and Vicinity thoroughly and wonderfully explained *what* forms of malt substitutes were used—and most importantly *why*—what the manifesto did not address were the remaining "w" questions regarding the origins of adjunct lager beer in the United States: the *who*, *when*, and *where* associated with the style's birth.

Relative to the all-important "who" question, it is Anton Schwarz (Fig. 2) who is universally recognized as deserving of the credit (or blame, depending on one's opinion of the style!) for being the "father" of adjunct lager brewing in the United States—and by extension America's "national beverage." One of the earliest references indicating this connection is found in the iconic *American Handy Book of the Brewing, Malting, and Auxiliary Trades*. In the publication's third edition of 1908, its two editors, Drs. Robert Wahl and Max Henius (brewing scientists whose careers overlapped with that of Anton Schwarz), wrote the following about Anton Schwarz's impact on establishing adjunct lager beer as America's national beverage during the last three decades of the 19th century: "It was Anton Schwarz who first advised the employment of rice and subsequently of Indian corn, which is so abundant in this country. The stubborn perseverance with which he sought to convert the conservative brewers to his ideas and finally succeeded in so doing and, last, not least, the discovery of suitable methods for scientifically applying them, entitle him to be called the founder of raw cereal brewing in the United States" (105).

Based on his biography and United States passport application of August 2, 1894, we know that Anton Schwarz was born in Polna, Bohemia, on February 2, 1836, and that this five foot, seven inch tall immigrant with gray eyes and brown hair, possessing a full complexion and a "normal" face, arrived in the United States on December 26, 1868 (87,91). Evidently, given the above, he wasted little time in making his influence felt, in essence being to the American brewing industry what the nurseryman John Chapman (a.k.a. "Johnny Appleseed") was to the American apple industry in terms of planting a bounty of fruit-bearing seeds across the land.

But this begs critical "which came first—the chicken or the egg?" questions vis-à-vis the tidal wave of German-born brewers then brewing and defending adjunct lager beer across the United States. Were they simply disciples of an "Adjunct Anton" or "Substitute Schwarz," who in less than a decade after arrival had convinced the nation's brewers to readily adopt his recommendations, converting them from brewing only all-malt lagers to predominantly adjunct lagers? Likewise, did their *first* experiences in brewing adjunct lager beer take place in the United States—or had they already brewed this way in Germany before emigrating? But perhaps the most pertinent question of all rests with Anton Schwarz himself: specifically, with regard to the use of corn and rice to brew a lighter and much more chill-proof lager beer, did he first conceive of the idea *after* he arrived in the United States, or was he already well-versed in the practice *before* first setting foot on American soil? Said another way, relative to the adage "Americans drink beer with their eyes and Germans with their tongue," did he *first* realize the opportunity presented by the use of rice and corn to improve American lager only *after* his arrival—or was he simply applying what he had *already* learned in Europe? Given the global dominance today of adjunct lager beer, I do not consider these questions to be esoteric, but rather ones possessing profound historical significance and implications. The following essay is a review of the historical evidence, which I believe provides unambiguous answers to each of these key questions.

Figure 2. Photograph from 1895 of Anton Schwarz (1836–1895). Image sourced from brookstonbeerbulletin.com with support of the site owner, brewing historian Jay Brooks (14).

Anton Schwarz: February 2, 1836–December 26, 1868

The journey of the man Julius Liebmann, President of the U.S. Brewers' Association in 1908, described as providing the first "Blüthezeit" (flowering time) in raising the art of brewing in the United States to "the dignity of a science" started well before he arrived in the United States (2). Professionally, it began with 2 years of study at the University of Vienna before transferring to Prague to train for 3 years with one of Bohemia's greatest brewing scientists, Karl Balling, at the Polytechnic School of Prague (14). After this, he ventured off to Pest (i.e., the Pest of Budapest on the eastern side of the Danube) to put into practice his training as a brewer, first as an industry adviser then as a brewery manager (4). Collectively these academic and professional experiences produced both a brewer *and* a brewing scientist; Schwarz was "closely connected with the first authorities on brewing while still in the old world, and was well acquainted with such men as Professors Balling, Thausing and others" (2). However, it is because of his relationship with the aforementioned Professor Thausing that we know a great deal concerning Schwarz's extensive exposure to, and practice with, brewing with malt substitutes *prior* to his arrival in the United States.

In 1882 Schwarz was approached by a Philadelphia publisher to co-author, edit, and update an English translation of a brewing-related book originally published in German in 1877. Written by Julius Thausing, professor at both the School for Brewers and the Agricultural Institute "Francisco-Josephum" located in Mödling just outside of Vienna, the *Theory and Practice of the Preparation of Malt and the Fabrication of Beer with Especial Reference to the Vienna Process of Brewing* was the first textbook published in English in the United States specific to the lager brewing industry (97). While the original 1877 publication was strictly European in scope, the subtitle of the 1882 book left no doubt that America's lager industry was well represented: *Thoroughly and Elaborately Edited, According to the Most Scientific Practice, Including all the New Improvements in the Brewing of Lager Beer, Introduced into the United States, by Anton Schwarz, Graduate of the Polytechnic School of Prague, Director of the First Scientific Station for Brewing in the United States, Publisher of "The American Brewer".*

It is the use of the word "new" that merits highlighting, for when it came to innovations in brewery design, processes, and brewing materials to produce a lighter lager beer with remarkable long-term physical stability, it was America that was then mentoring the global lager-brewing industry. It was for these reasons, not charity or providing a platform for an old student, that Schwarz was asked by Thausing to collaborate in writing the English-language edition. Contained within was an extensive review of starch-containing brewing materials, with Thausing sharing his European perspectives on malt substitutes, while Schwarz did the same for the United States. In Thausing's case, the bulk of his writing dealt with his personal opinion of corn as a substitute, his research at Mödling that led him to hold those views, and its commercial use for brewing lager in the Austro-Hungarian Empire between the 1850s and1870s: "No one who is at all familiar with the preparation of malt will hold the foolish opinion that the use of malt substitutes (cereals) constitutes beer adulteration. … The quality of maize beer is no way inferior to that of beer made from pure malt. We therefore hail the use of maize, not because we stick blindly to the principle, 'raw grain at any price,' but because we are convinced that, properly used, it is by far the best substitute for barley-malt." Thausing continued: "Next to barley, maize deserves the greatest consideration from the brewer of all known brewing materials. … The late brewer Häcker worked for twenty years for the use of maize in brewing and has used it in the brewery of Altenburg, Hungary with the greatest success."

But corn was not the only malt substitute Thausing endorsed. He also wrote on the use of rice, potatoes ("under some conditions the importance of potatoes as a brewing material cannot be denied"), potato starch (noting how Professor Karl Balling of Prague in Bohemia reported commercial dry potato starch as being "more convenient as an addition to kiln-dried barley malt" with "100 parts by weight of potato starch considered as equally productive as 150 parts by weight of kiln-dried barley malt"), potato flour, potato- or beet-based sugars and syrups, cane sugar, molasses, and others as alternatives to barley malt. In addition, he referenced a German brewing scientist advocating the use of the lowly spud in the 1860s. It was the "Hohenheim malt potato beer" of one Professor Carl Siemens at the University of Hohenheim near Stuttgart in the Kingdom of Württemberg that Thausing noted in comparison to traditional all-malt lager "clarifies well … has a light color … keeps better"—attributes that Schwarz undoubtedly appreciated as being profoundly more relevant and important to lager beer drinkers in the United States than those in Europe.

Schwarz's contributions were split between his American experiences and those while still in Europe. With regard to the latter, he addressed studies using brewing sugars and syrups prepared from either sugar beets or potato starch conducted at both Weihenstephan (by *Assistenten für Chemie* Joseph Gschwändler) and the Agricultural Experimental Station at Lobositz (by Professor Joseph Hanamann) in northern Bohemia (then within the Austro-Hungarian empire). Thus it can be safely concluded from his experiences—first, as a brewery manager in Hungary during the late 1860s (where the brewer Häcker used corn as a substitute from the 1850s right up to his death sometime in the early 1870s); second, from his earlier training, under Professor Balling in Prague (where rice had likewise found widespread use); third, from the mentoring provided by Professor Thausing in Vienna specific to corn; and finally, from his familiarity with Gschwändler's studies at Weihenstephan and Hanamann's at Lobositz in Bohemia—that by the time Anton Schwarz first set foot in America he was *fully* versed in the use of malt substitutes to produce lager beer.

But there are several puzzling aspects surrounding the universal proclamation of Anton Schwarz as the "father" of adjunct lager brewing in the United States. The first of these is that, to the best of my knowledge, Schwarz never submitted and was thus never awarded any U.S. patents regarding the use of rice or corn to brew lager beer. Indeed, to my surprise, before Schwarz wrote his landmark 1869 paper entitled "Brewing with Raw Cereals, Especially Rice" in the second volume of *The American Brewer* (88), U.S. patents along these lines had *already* been granted to both a Hungarian and a *Bavarian*.

Let's begin with the Hungarian, who was the same Häcker as mentioned earlier by Thausing, namely, a brewer by the name of Ludwig Häcker from Altenburg, Hungary. On July 1, 1862, U.S. patent number 35,752 (49) entitled "Improvement in Brewing When Indian Corn Is Used" (Fig. 3) was awarded to him. Quite simple in description, the patent, while recommending the use of 60% malt to 40% corn, stated: "The object of this invention is to employ Indian corn mixed with barley in certain proportions for the purpose of brewing beer by a simple process, which requires no expensive machinery, and which can be easily introduced into any brewery old or new."

Overall the patent had a decidedly German feel to it, primarily recommending a decoction-based mashing process whereby

a watery paste of raw corn was simply added directly into the first cycle thick-mash boil (and, if multiple thick-mash cycles were employed, to later cycles if needed). But there is tantalizing evidence that Häcker may have actually spent time in the United States between his 1862 patent and his death sometime prior to 1877 (perhaps even collaborating with Schwarz to brew America's first batch of adjunct lager beer?) and that during this time Häcker converted from being a devotee of decoction to America's *traditional* way of mashing: the double-mash system. I find the following quote by Schwarz most intriguing (emphasis mine). He wrote:

> Häcker, who has used large quantities of corn for a number of years in the brewery of Altenburg, Hungary, *and who has had an opportunity of studying its use in North America*, recommends the following process:—
>
> Some malt is added to the quantity of corn, and then kept for some time at a temperature of 50° to 60° R. (62.5° to 75° C., 144.5° to 167° F.), and the further disaggregation of the corn-starch is then accomplished by boiling water or steam; finally, the corn-mash is brought to the proper temperature and added to the malt-mash.

While decidedly referencing a double-mash process, it was, however, the patent issued in 1869 to the Bavarian-born Nicholas Baumann from Kalamazoo, Michigan (of all places, eh!) that best provided an early description of its use in America. But first, who the heck was Nicholas Baumann? Based on information contained in both the 1860 and 1870 U.S. Census, we know he was born in Bavaria "circa 1828" and that he emigrated to the United States at least 7 years prior to the 1860 census (6). We also know he worked as a "saloon keeper" in 1860 but identified as a brewer in 1870—along with his younger brother John Baumann (7)—before dying from gangrene in 1895 (36). But 26 years prior to what must have been a horrible way die, he left behind a somewhat surprising legacy in the form of U.S. patent number 90,066 for an "Improved Process of Using Unmashed Indian Corn in Brewing Beer, &c" (8). Issued to Baumann in 1869, in it is what I consider to be one of the earliest and purest drawings of America's *traditional* way of mashing. Not reflecting the infusion process of the United Kingdom or the decoction process of Germany (as Häcker emphasized in his 1862 patent), Baumann's drawings wonderfully reflected *America's* way of mashing—the double-mash process (Fig. 4). Depicting mash vessels constructed from *wood*, the simplicity, purity, and clarity with which these drawings capture the central method of mashing dominating the U.S. brewing industry over the past 131 years to today is something I find incredibly moving and powerful. Baumann's drawings were also beautifully aligned with Anton Schwarz's thoughts regarding the double-mash process, as indicated by this excerpt from Schwarz's landmark paper on raw cereal brewing published in *The American Brewer* in 1881 (89):

> It is a great mistake to attempt to mash the raw fruit, corn, or rice with the entire quantity of materials used for one brewing in the mash-tun, even if certain temperatures are kept up never so carefully, and mashing is continued for never so long, yet the starch cannot be brought into that condition in which it is most accessible to the action of the diastase for a complete saccharization. … But when corn and rice are constantly used, or at least during the greater part, of the time, we prefer that mashing should be done in a separate tun, without a false bottom, with a good stirring apparatus, and heated directly by steam.

But these observations simply add to the mystery as to why the patents issued to Häcker and Baumann did not provide them with at least a partial share of the credit for bringing adjunct lager brewing to the United States. They are essentially forgotten figures in the history of the American brewing industry, and the reason for their anonymity remains unknown. Hopefully, their rightful place in our nation's brewing history will be restored through papers such as this.

Germany's History with Malt Substitutes: 19th Century American-Sourced Vignettes

Before examining German-sourced records demonstrating its long and rich history of brewing with malt substitutes, two of the many surprises I encountered during the course of my research are encapsulated in the following two-word expressions: "you Americans" and "in Germany." Generally associated with 19th century transcripts from U.S. state and federal hearings seeking to ban the use of corn and rice, their utterance was typically triggered by committee chairmen questioning testifying German-American brewers as to their background as brewers specific to *when* they first started to brew lager using rice or corn, *where* they did so, and *why* they did so.

The first of the two expressions was typically elicited in conjunction with replies to questions probing the *why* question. As part of their reply these brewers would patiently explain how trade experience had taught them "you Americans" had a clear preference for lighter style adjunct lager beer, dramatically outselling all-malt lagers. But with regards to the second expression, it was the *where* and *when* questions which triggered the utterances of "in Germany." So before examining German-sourced archives, let's take a look at examples drawn from American hearings held during the period—supplemented with examples drawn from American newspapers, trade journals, and popular magazines—to illustrate why German-born brewers employed the term "in Germany" with such frequency.

1871 and 1872: Newspapers and Popular Monthly Journals

Somewhat ironically, the first reports by the American media of rice being used in the brewing of lager beer referenced brew-

UNITED STATES PATENT OFFICE.

LUDWIG HAECKER, OF ALTENBURG, HUNGARY.

IMPROVEMENT IN BREWING WHEN INDIAN CORN IS USED.

Specification forming part of Letters Patent No. **35,752**, dated July 1, 1862.

Figure 3. U.S. patent number 35,752 isssued to Ludwig Haecker on July 1, 1862, for the "Improvement in Brewing When Indian Corn Is Used" (49).

United States Patent Office.

NICHOLAS BAUMANN, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO HIMSELF AND W. B. CLARK, OF SAME PLACE.

Letters Patent No. 90,066, *dated May* 18, 1869.

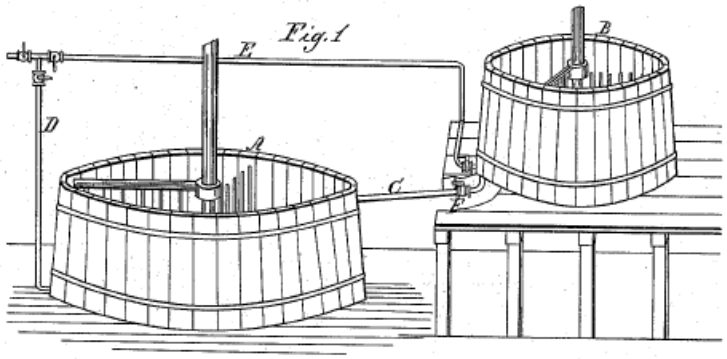
IMPROVED PROCESS OF USING UNMASHED INDIAN CORN IN BREWING BEER, &c.

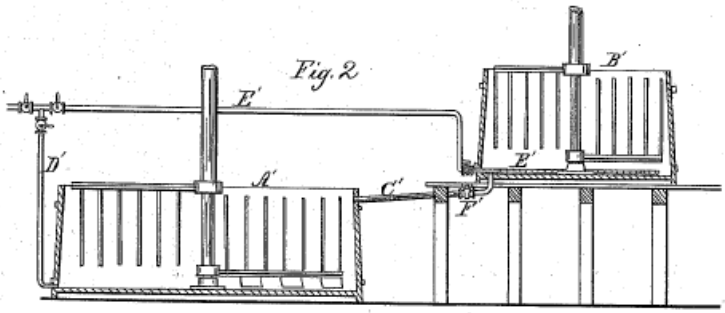
The Schedule referred to in these Letters Patent and making part of the same.

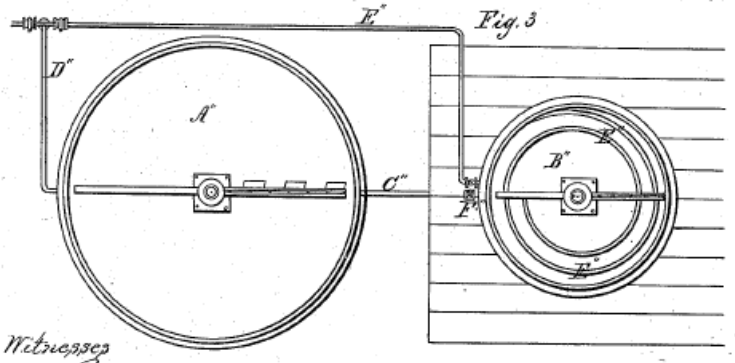
N. Baumann.

Process of Using Unmashed Corn for Beer.

No. 90,066. Patented May 18, 1869.







Witnesses
J. H. Bliss
R. F. Gaither

Inventor
Nicholas Baumann

Figure 4. U.S. patent number 90,066 isssued to Nicholas Baumann May 18, 1869, for the "Improved Process of Using Unmashed Indian Corn in Brewing Beer, &c." Top: patent title; bottom: attached drawings (8).

ers in *Germany*, not the United States. Pre-dating by 6–7 years the first mention in American publications of *American* brewers using malt substitutes, the availability of "rice beer" in Germany must have come as a surprise to most readers (Fig. 5). However, unlike the animus later expressed in the first coverage of the practice in the United States, the tone in these first reports involving German brewers was both positive and complimentary. Typical of the newspaper accounts were those in the *Pittsburgh Daily Post* (78) and the *Brooklyn Daily Eagle* (10) of July 20 and August 5, 1871, respectively, with the *Post* describing "the practice of brewing beer from rice" by what the *Eagle* referred to as "ingenious German brewers." Other newspapers, such as *Our Fireside Guard* of Centralia, Missouri, even claimed the brewing of beer with rice in Germany (73) had overtaken the production of Weiss beer (Fig. 5). In addition to newspapers, popular American home magazines such as New Orleans's *Our Home Journal* (74) informed readers how the use of rice enabled German brewers to brew a beer with attributes sounding remarkably similar to the modern light lager (i.e. "very clear, pale color, extremely pleasant, mild taste") (Fig. 5).

However, it is the scientific journals of the period that provide the greatest level of detail regarding the brewing of German rice beer. One example is found in the June 1871 issue of the monthly trade journal *The American Chemist* (98). Included within is an article describing the brewing of lager beer with 17% rice and 83% malt in Weisenau, outside the German city of Mainz. In addition to including extensive chemical analyses comparing the rice lager to all-malt lager brewed in Munich (not shown), the article also provided the following description of the resultant "extremely pleasant, very mild" rice beer: "It appears that the brewing of beer from rice has already assumed large proportions in some parts of Germany. The author has analyzed a variety of this beer brewed at Weisenau, near Mayence [N.B.: Mainz in French is Mayence] from a mixture of 5/6 of malt and 1/6 of rice. The beer thus produced is very clear, of a pale color. The taste of the rice beer is extremely pleasant, very mild." Yet another professional assessment of the Mainz beer was made in *The Food Journal* (44), this time in terms that also resonate with the light lager beers of today: "This rice beer is exceedingly clear and light: it effervesces, and has a peculiarly mild taste."

NEWS IN BRIEF.

AT HOME.

Rice-beer is supplanting weiss-beer in Germany.

OUR HOME JOURNAL

AGRICULTURE COMMERCE NEWS ILLUSTRATED SCIENCE ART MANUFACTURES LITERATURE

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RICE BEER.—It is stated that the practice of brewing beer from rice is rapidly coming into use in Germany. This beer is said to be of a very clear, pale color, of an extremely pleasant, mild taste, foaming strongly, and yet retaining well its carbonic acid.

Figure 5. Articles from 1871 in the American popular press describing the use of rice to brew lager beer in Germany. Top: *Our Fireside Guard* of Centralia, MO (73); bottom: *Our Home Journal* of New Orleans, LA (74).

Great Falls Montana, October 20, 1895

In the October 20, 1895 issue of the *American Brewers' Review* trade journal an interview with a German-American brewer by the name of Joseph Trimborn was published (3). Based on his 1898 application for a U.S. passport (103) and a June 5, 1983, article published in the *Great Falls Tribune* (46), we know a great deal about Trimborn. Born in Cologne on January 17, 1852 (then part of the Kingdom of Prussia), as a teenager he apprenticed as a brewer in his father's brewery before graduating as a master brewer from the Brewers Academy in Worms on the Rhine. Subsequent to this he worked in breweries in Stuttgart, Heidelberg, and Munich before accepting a position at the Royal Brew House in Würzburg, Kingdom of Bavaria—his last in Germany before immigrating to the United States in 1878. Seventeen years later, then co-owner of the Montana Brewing Company, he was interviewed by Dr. Robert Wahl, editor of the *American Brewers' Review*. In the relatively short summation of this interview, Trimborn revealed not just that brewers were brewing lager with rice for domestic consumption in the Germany of 1875 but also that consumers were charged *more* for this beer compared to traditional all-malt lager beer. Wahl wrote (3): "Mr. Joseph Trimborn, of the Montana Brewing Company, Great Falls, Montana states that twenty years ago, when he was a brewmaster of the Dittmey brewery at Heidelberg, Germany, he brewed for the first time beer in the production of which rice was employed. The beer was advertised as 'Rice Beer' and sold at a price two pfennige higher."

While it may seem counterintuitive today, charging retailers and consumers *more* for adjunct lager beer was also the case in the United States during this period (as will be reviewed in a volume of the forthcoming book series). This is but one of the many "surprises" in the nine-volume series!

Imperial Hotel, New York City, November 14, 1899

In the summer and fall of 1899 federal hearings were held in Chicago and New York to seek input from the public, medical authorities, and the brewing industry as to whether prescriptive national standards should be established for the materials that could be used to brew lager beer. In a hearing chaired by Senator William Mason of Illinois, one of the brewers interviewed was a master brewer by the name of John Bauer. Based on information provided in the 1900 U.S. Census we know he was born in the Kingdom of Prussia in June of 1849 and that he left Germany for the United States in late 1869 (5). Thirty years later he was the brewing superintendent at one of America's largest breweries, New York's F. & M. Schaefer Brewing Company. In addition to providing context, the meeting transcript includes the following exchange between Bauer and Chairman Mason wonderfully capturing the moment Bauer used the expression "in Germany" (94):

The Chairman: What is your business?

Mr. Bauer: I am a brewer.

The Chairman: Where is your place of business?

Mr. Bauer: I am with F. & M. Schaefer Brewing Company, in this city.
The Chairman: What position do you hold with them?
Mr. Bauer: I am the brew master with that concern.
The Chairman: How long have you been in that business?
Mr. Bauer: You mean how long I have been with my present firm, or how long I have been in the trade?
The Chairman: How long have you been in the beer-making business?
Mr. Bauer: About thirty-six years.
The Chairman: Do you use any substitute for malt here?
Mr. Bauer: I use some cerealine and rice. [N. B.: cerealine was the period's most common product of pre-gelatinized corn flakes.]
The Chairman: Did you ever brew beer in any other country besides this?
Mr. Bauer: Yes; I learned my trade in Germany as an apprentice. I was a brewer there before I came to this country.
The Chairman: What did they use in Germany in the manufacture of beer?
Mr. Bauer: In my time we were using hops, malt, and water, and a little rice.
The Chairman: Whereabouts in Germany did you use these?
Mr. Bauer: I spent my apprenticeship years in Mannheim, on the Rhine, in Germany.
The Chairman: When did you come to this country?
Mr. Bauer: In 1870.

Complementing Bauer's testimony that day was that of the secretary of the United States Brewers' Association, the German-American Gallus Thomann. He was widely recognized by the general public and media of the era as a prominent voice and face of the American brewing industry in both the State of New York and on the national stage. On this day, however, in addition to speaking at length defending the industry's use of malt substitutes, he also shared with the committee something he had personally observed outside multiple German breweries and beer halls during his frequent trips abroad in the 1880s and 1890s. Telling the panel that the use of rice was not limited to brewers in the United States—and that therefore the American government was placing itself in the peculiar position of potentially banning in America a practice that was both legal and commonplace at the time in Germany (outside of Bavaria)—he noted: "In Germany they have very fancy gilt signs showing that they make or sell, as the case may be, rice beer" (93).

Although but a single sentence, the author believes it was Thomann's provision of such a powerful visual specific to *Germany's* production of "rice beer" for *domestic* consumption that played an important role in Chairman Mason ultimately concluding, at least for the time being, that brewers were free to use corn and rice, saying (92): "The committee, then, is of the opinion that the present system in America is fairest and more nearly just to the manufacturer and consumer to permit the brewer to be the judge himself of what wholesome and healthy products he desires to put into his beer."

While but a single sentence, I encourage every brewer in the United States, whether craft or "macro," to re-read this quote and reflect on the consequences had Mason ruled to the contrary.

November 11, 1890, Issue of the *Democrat and Chronicle* (Rochester, New York)

Historically, and continuing up to this day, every American consul general submits an annual report to the U.S. Senate reporting vital statistics and observations regarding the customs, industries, and industrial capabilities of the nations they are stationed in. During the 19th century, highlights of these reports often made their way into American newspapers—especially if the topic under discussion overlapped with a contemporary American issue. Such was the case in 1890 when the federal government made its first serious attempt to impose an American Reinheitsgebot (26). By then, America's press had already had 10–15 years touting the "purity" and "superiority" of all-malt German lager beer over American adjunct lager beer. Thus, the following assessment of the German brewing industry offered in 1888–1889 by Berlin-based Consul General William Hayden Edwards likely surprised an editor or two (34):

> Large quantities of ready-made brewing malt were also imported from Austria. The use of malt surrogates increased particularly, the use of rice, sugar and others not mentioned by name. In consequence of the price of sugar, maltose syrup was more generally used. Rice in the form of flour or broken grains, the waste from the Bremen rice mills, is used only in the manufacture of the under fermented beers, light in color. The higher price of this in comparison with barley is offset by the fact that in the malt process the latter loses 30 per cent, in weight, while the former in grinding suffers no loss. The addition of beer colors serves to give the proper color to the beer instead of malt. For the same purpose color beers are manufactured in special breweries, which beers are not classified as malt surrogates but are taxed as finished beers of malt and hops.
>
> It would thus appear that the beer drinkers of the fatherland are now given a colored ferment of sweetened rice water in some of the great cities … highly fermented beers are still made in small rural breweries and consumed by the country population. We understand that the rural breweries still adhere to the use of barley, malt and hops, instead of syrups, beer colors and rice water.

63rd Convention of the Master Brewers Association of America, Philadelphia, October 4 to 6, 1950

In the course of the second technical session, during an open-floor discussion on the question of "what chemical constituents of rice make it a superior product for brewing, especially as compared to corn products?" an "old brewmaster" by the name of William Graf shared with the audience his early experiences regarding rice. He was born on November 1, 1879, as the son of a brewer in Allmannsdorf, Landkreis Konstanz, in the Kingdom of Württemberg. Before immigrating to the United States in 1902 Graf was already a highly experienced brewer (45). Relative to his experiences during the 1890s and first 2 years of the 20th century within Germany, Graf made an intriguing reference to the "catechism" of a highly prominent *Bavarian* brewer/brewery of the era *promoting* the use of rice. He made it abundantly clear how, based on his own personal experiences during this period, rice was a popular material to brew lager beer in pre-1906 Germany, stating (96):

> As you all know, I came from Germany where nothing else but malt has been used for the last 50 years. But previous to that, I came from the State of Prague where we had the privilege to use adjuncts. And what did we use? We used rice. Now at that time, Germany was at liberty to buy corn, rice, potatoes, etc., but we used 15 per cent rice sixty years ago. I believe what material is best to be used is really dependent on where the breweries are located. But I can tell you from my own experience when I was a little boy in my father's brew-

ery, we used nothing else but rice at that time. If you read the catechism of Mr. Laesung, the brewmaster of the Feldschloss Braueri in Munich, he recommends if anybody wants to make a better beer, use rice. He doesn't speak about corn. So I leave you just where you were before, but that is what we did and that is the opinion of an old brewmaster.

Germany's History with Malt Substitutes: 19th & 20th Century German-Sourced Highlights

While the above American-sourced vignettes have both anecdotal and empirical elements, those drawn from German sources are almost all empirical. Widely recognized as a nation with a long history of keeping meticulous records, this is especially understandable given that Germany's brewing industry has always been taxed on the basis of the materials used, not the volume of beer produced (as is the case in the United States). Accordingly, the already inherently detailed records kept by any government when it comes to sources of taxation and revenue were in Germany's case intertwined with those for the materials used to brew each year. One important archival source is found in references describing tax laws within the different regions of the German Empire. When taxes were collected in these regions the Reichstag was crystal clear as to which materials could be used as well as the tax rates assigned to each. Other Reichstag-sourced documents show similar details, namely the annual summaries describing in great detail the types and quantities of each material used in each free city, duchy, grand duchy, state, and kingdom within the German Empire. Collectively, in the decades prior to the enactment of the National Reinheitsgebot on June 3, 1906 (80), these references provide a bounty of insights regarding the use of malt substitutes in brewing lager beer.

First however, we need a quick lesson on 19th and early 20th century taxation in the German Empire. Basically, it boiled down to two buckets: one for the regions of Bavaria, Baden, Württemberg and Alsace-Lorraine, and a second for the remaining areas of Germany. For our purposes, it is the latter that is the most relevant: the North German Brewing Union (the *Reichssteuergebiet* or *Brausteuergebiete* depending on the era). While the use of barley-malt substitutes in Bavaria had famously been banned since 1516, for German brewers located in the regions composing the North German Brewing Union this did not become a reality for another *four centuries*. Up until then, they were legally free to use malt substitutes without restrictions, regardless if used for lagers or top-fermented styles. Historically speaking, then, for the past 504 years *legislatively* mandated all-malt brewing in Germany was much more of an *anomaly* than the norm for the majority of Germany's population and geography. Indeed, during much of this half-millennium, brewers in northern Germany brewed an incredibly rich array of top-fermented herb beers, sour beers, and fruit beers. While it is beyond the scope of this paper to review these historic German non-lager styles of beer, readers are referred to Ron Pattinson's work for highly insightful and revealing in-depth analyses (75,76).

So, let's begin with an examination of period documents demonstrating how right up to the early years of the *20th* century, both malt *and* malt substitutes were part of the taxation laws of northern Germany.

First, from the German Empire (May 31, 1872): "**Beer Tariff Union** — The beer tariff union includes all States with the exception of Bavaria, Württemberg, Baden, and Alsace-Lorraine. The levying of the tax may be done by declaration, fixation, or by the ground malt (*Vermahlungssteuer*)."

The principal regulations of the law in force since May 31, 1872, are as follows (97):

For every 100 pounds net weight is levied —

	Marks
Grain and malt	2
Rice	2
Starch, with 30 per cent, water	2
Starch and dextrine	3
Sugar of all kinds	4
Syrup of all kinds	4
Other malt substitutes (surrogates)	4

Second, from the German Empire (1880), as summarized in the *Western Brewer* trade journal:

> The following rates of excise on various articles used in brewing have been decided upon by the German Parliament: The rates are per 100 kilograms, but do not apply to the following parts of the empire, which are excepted—namely, the kingdoms of Bavaria and Württemberg, and the Grand Duchies of Baden, Alsace-Lorraine, and Saxe Coburg Gotha, as well as the jurisdiction of Königsberg: On grain, malt, &c., 8 marks; on rice (ground or un-ground), 8 marks; on green starches—that is, those containing at least 30 per cent water—8 marks; on starches, starch-flours, and dextrine, 12 marks; on syrup of all descriptions, 12 marks; on sugar of all descriptions, 16 marks; on all other malt substitutes, 16 marks. The abstract of the law contains forty-four paragraphs, and will come into operation on July 1, 1880. (106)

Third, from the Kingdom of Württemberg (1880), as summarized in another issue of the *Western Brewer*:

> In Württemberg a malt tax is levied, the regulations for which are similar to those in Bavaria, but with the difference that the weight (and not the bulk) is taken into calculation, and also that the use of malt substitutes is permitted. For the varying raw materials a different rate of duty is demanded. The rate is, for malt, 3.6 mk. Per 100 lbs. = 1 zollcentner = 50 kilos.; for syrup, 3.6 mk. Per 87 lbs.; for starch sugar, 3.6 mk. Per 75 lbs.; for rice meal, 3.6 mk. Per 87 lbs. The main points to be observed are: The tax is put on when the malt passes into the mill and the substitutes in the brewery. (107)

Fourth, from the North German Brewing Union (1884), as described in a U.S. consular report:

> In the North German states, where malt surrogates are allowed in the manufacture of beer, the tax is —
>
> 1. On malt, $1.50 per double centner (220 pounds).
> 2. On rice, $1.50 per double centner.
> 3. On starch, $1 per double centner.
> 4. On sugar of all kinds, $1.50 per double centner.
> 5. On syrups, $1.90 per double centner. (104)

Fifth, prior to the "Imperial Financial Reform Bill" of 1906:

> Until the year 1906 the imperial law of May 31, 1872, prevailed in the Beer Tax Union, which contained the following provisions: The charge was for each 100 kilos:
>
> 1. Of grain of any description, rice, maize, malt and green starch: 4 marks
> 2. Of starch flour, potato starch, syrup, starch gum (dextrine): 6 marks,
> 3. Of sugar of all kinds, sugar solutions, malt surrogates: 8 marks. (79)

But what do period references reveal in terms of the *quantities* of each material used, especially with regard to malt substitutes? In a nutshell, yearly statistics released by the Reichstag for materials used in the North German Brewing Union (Tables 1 and 2) reflect the consistent use of rice, sugar, syrups, and

"other" malt substitutes (42,43,85) (N.B.: unlike the U.S. use of corn, in Germany potatoes and sugar beets were the most common sources of starch in the production of brewing sugars and syrups). These two tables were selected because they provide both a long-term perspective on the overall use of malt substitutes in the North German Brewing Union (i.e., from 1880 to 1912, Table 1) and a highly detailed "deep dive" by region for a specific tax year (i.e., 1890–1891, Table 2). The significance of the year chosen is that it overlaps with the same period of time an "American Reinheitsgebot" came so very, very, *very* close to passing (26).

Examination of these tables illustrates how in the decades leading to 1906 the use of malt substitutes in Germany was *not* an unusual occurrence given that when it came to presenting data for "taxable brewing materials" the documents were structured by two categories—"malted grain" and "malt substitutes"—with the latter further delineated into "rice," "all types of sugars," "all types of syrups," and "other malt substitutes." These also reveal that the use of malt substitutes varied *enormously* depending on the locale within the North German Brewing Union, ranging in 1890–1891 from as little as 0.9% of the 234 breweries in Hohenzollern to as high as 75.0, 80.6, and 83.3% of the combined 81 breweries in Hamburg, Lübeck, and Bremen, respectively (overwhelmingly for domestic production, not export, as will shortly be discussed). This variability explains that while *individual* breweries used malt substitutes at rates comparable to American breweries (e.g., the Mainz and Graf references to the use of 16–17% rice and 15% rice in the 1870s and 1890s, respectively), *regional* statistics during this era could vary anywhere from two to 20 times *lower* than American rates. Viewed holistically, these statistics illustrate three things: first, that adjunct lager beer as a *style* was much more popular in the United States than it was Germany; second, when brewed it was remarkably similar in adjunct content to American adjunct lager beers of the era; and third, right up to June 3, 1906, *both* all-malt and adjunct lager beers were available to consumers throughout United States *and* the German Empire (sans Bavaria), with the people of the latter preferring the former style and vice versa.

June 3, 1906: German Empire's National Reinheitsgebot

You may be wondering why, after all the preceding, that adjunct lager beer is so intimately linked with the United States

Table 1. Table of taxable brewing materials used and beer production in the North German Brewing Union (i.e. the *Brausteuergebiete*) from 1880 to 1912 (compilation of refs. 43 and 85)

	Use of taxable brewing materials										
	Malted grain		Malt substitutes				Quantity of beer brewed		In 1 hL of beer		
Tax year 1 April–31 March	In total (hk)	Barley malt (hk)	In total (hk)	Rice (hk)	All types of sugars (hk)	All types of syrups (hk)	Top (hL)	Bottom (hL)	Grain and rice (k)	Malt substitutes (k)	Percent adjuncts[a] (%)
1880	4,307,944	4,154,597	21,387	3,037	13,795	1,669	7,931,107	13,204,924	20.40	0.09	0.49
1881	4,300,995	4,156,045	22,823	3,080	14,972	1,695	7,813,817	13,502,165	20.19	0.09	0.52
1882	4,469,280	4,328,286	22,611	3,755	13,591	1,598	7,901,207	14,211,978	20.23	0.09	0.50
1883	4,725,731	4,578,015	24,659	4,924	14,136	1,584	8,071,496	15,320,423	20.22	0.08	0.52
1884	4,932,808	4,794,675	28,429	6,224	15,554	1,951	8,384,185	16,229,242	20.07	0.09	0.57
1885	4,875,006	4,733,616	30,450	6,547	16,175	2,319	8,081,157	16,209,532	20.09	0.10	0.62
1886	5,329,643	5,173,669	36,350	6,808	21,195	2,613	8,715,599	17,849,947	20.09	0.11	0.68
1887	5,503,903	5,354,779	43,312	9,684	25,484	2,358	8,503,919	20,259,009	20.07	0.12	0.78
1888	5,733,498	5,592,625	49,528	12,735	27,887	1,855	8,396,666	23,190,944	20.05	0.13	0.86
1889	6,326,405	6,155,345	71,170	20,648	38,827	1,648	8,989,271	23,190,944	19.72	0.16	1.11
1890	6,306,244	6,127,897	93,653	32,592	46,654	2,077	7,577,754	21,788,175	21.59	0.21	1.46
1893	6,553,787	6,356,370	91,535	51,074	27,468	1,641	6,845,299	24,438,049	21.05	0.13	1.38
1894	6,435,636	6,246,062	109,090	67,805	27,922	1,651	6,471,287	24,439,004	21.04	0.13	1.67
1895	7,029,267	6,824,308	119,382	75,782	28,551	1,757	7,174,544	27,155,766	20.70	0.13	1.67
1896	7,118,439	6,914,923	121,055	75,957	29,576	1,558	6,865,704	28,031,286	20.62	0.13	1.67
1897	7,590,880	7,380,322	142,067	93,669	31,732	1,474	7,077,115	30,625,252	20.38	0.13	2.03
1898	7,644,366	7,444,983	157,596	102,254	36,720	1,606	6,885,761	31,575,753	20.14	0.14	2.02
1899	7,810,734	7,619,275	157,663	98,090	42,123	1,515	6,625,574	32,691,997	20.12	0.15	1.98
1900	8,007,273	7,811,851	149,809	89,573	42,112	2,009	6,760,372	33,943,751	19.89	0.15	1.84
1901	7,964,681	7,782,839	149,620	87,371	42,571	3,013	6,663,929	34,318,826	19.65	0.15	1.84
1902	7,458,086	7,297,168	134,435	76,139	39,492	2,842	5,885,452	32,537,017	19.61	0.15	1.77
1903	7,711,694	7,551,471	136,646	75,376	36,976	3,472	5,708,875	33,749,266	19.74	0.16	1.74
1904	7,755,633	7,593,532	142,000	72,942	47,725	2,445	5,865,564	34,344,571	19.47	0.17	1.80
1905	8,128,114	7,972,723	154,661	79,243	52,787	1,881	5,657,331	36,439,556	19.50	0.18	1.87
1906	8,019,172	7,880,550	48,045	21,849	20,849 55,052[b]	415	5,440,619	36,298,167	19.27	—	0.60
1907	7,971,422	7,821,048	—	175	105,667	—	5,366,872	38,816,525	18.90	—	1.31[c]
1908	7,481,555	7,383,898	—	367	117,343	—	5,287,569	34,902,192	18.62	—	1.55[c]
1909	6,733,752	6,649,541	—	218	130,546	—	4,935,676	32,357,662	18.06	—	1.90[c]
1910	6,863,393	6,777,196	—	270	114,362	—	4,811,610	33,219,487	18.05	—	1.64[c]
1911	7,488,246	7,396,829	—	587	133,806	—	5,363,078	35,940,044	18.13	—	1.76[c]
1912	7,224,573	7,155,383	—	496	160,782	—	4,521,373	34,972,999	18.29	—	2.18[c]

[a] Percent adjuncts = total malt substitutes/(total malted grain + total malt substitutes) × 100.
[b] From July 1, 1906 to March 31, 1907.
[c] Percent adjuncts for 1907-1912 = (rice + all types sugar)/(total malted grains + rice + all types sugar) × 100.

instead of Germany. The torch was passed on because of what took place in Berlin on June 3, 1906. It is certain in the period prior to this date that brewers in both nations were *constantly* under pressure from the same special interest groups seeking to benefit financially by banning the use of malt substitutes (i.e., the malting industry and barley farmers of Germany and the United States). However, while the United States of 1906 was but a fledgling global superpower content to expand its navy and consolidate territories gained as a result of the Spanish-American War of 1898 (e.g., the Philippines, Puerto Rico, and Guam), the German Empire of 1906 was anything but content. Just 8 years removed from the outbreak of World War I, geopolitical tension between Germany and the empires of France, Great Britain, Russia, and Japan was palpable as Germany massively expanded its military capabilities.

But what does any of this have to do with June 3, 1906, you ask? Well, pretty much everything, for in my opinion it is impossible not to assess the passage of the National Reinheitsgebot without critiquing the context of time in which it was enacted. It most certainly did not occur in a vacuum. Why, for example, was it bundled within the flurry of items covered in the scope of the "Imperial Financial Reform Bill" of 1906"? Why was it passed as part of taxation legislation and not in conjunction with food safety or beer quality initiatives? Why, after its passage, did malt consumption by the German brewing industry *decline* in the years that followed? Conversely, why did German brewers *increase* their use of sugar by 100–150% post-June 3, 1906? Likewise, why did beer production and per capita consumption of beer both *decline*—and significantly so—in the years immediately following the implementation of the National Reinheitsgebot? But most of all, why did its passage trigger beer *boycotts* throughout Germany and not celebration? Well, the common denominator flowing through all of these questions, indeed the thread that connects each with the other, boils down to a single word: money.

Relative to historical context, history teaches us this was a time the German Empire was actively "acquiring" foreign lands, just as the British and French had "acquired" theirs in centuries prior and the United States in the decade prior. In Africa this manifested itself in the form of new colonies and German-led, but locally manned, armed forces in locations that today are included in the nations of Burundi, Cameron, Namibia, Rwanda, Tanzania, and Togo. Strategically located harbors throughout Africa supported the rapidly expanding German fleet and prototype U-boat submarines, enabling projection of the German Empire's power throughout the southern Atlantic Ocean and Indian Ocean. Moving to the Pacific Ocean, German "treaty ports" were established in the Chinese cities of Tsingtao, Jiaozuo, and Chefoo, while numerous territories and "protectorates" were also established to service Germany's growing fleet of battleships. Breathtaking in scope, these included many islands and archipelagos that over a million yet-unborn American marines, sailors, aviators, and GIs would later become so intimately familiar with during World War II. From the Marshall Islands, to the Mariana Islands, to the Caroline Islands, to Palau, to Nauru, to Papua New Guinea and others, places such as "Kaiser-Wilhelmsland" and the "Bismarck Archipelago" represented the same strategic importance then as they do today in a world that has "advanced" to warfare being global in scope. On top of all of this, the Prussian-led army of the German Empire was likewise rapidly expanding both in numbers and capabilities, as was also the case with the birth of the Luftstreikräfte and

Table 2. Brewing materials used, by region, in the North German Brewing Union (i.e. the *Reichssteuergebiet*) in 1890–1891 (42)

	Breweries		Taxable brewing materials									
			Malted grain (100 kg)				Malt substitutes (100 kg)					
Region	Breweries in tax year 1890–1891	Breweries using malt substitutes (% of total)	Ground barley malt	Ground wheat malt	Other grains	Total grains	Rice	All types of sugars	All types of syrups	Other malt substitutes	Total substitutes	Percent adjuncts[a] (%)
East Prussia	239	73 (30.5%)	234.199	483	—	234.682	877	183	15	389	1.464	0.62
West Prussia	101	53 (52.5%)	137,461	53	—	137,514	681	242	12	148	1,083	0.78
Brandenburg	573	332 (57.9%)	804,724	160,332	500	965,556	341	28,486	1,621	799	31,247	3.13
Pomerania	321	153 (47.7%)	129,532	612	—	130,144	194	276	28	462	960	0.73
Posen	161	76 (47.2%)	76,913	9,054	—	85,967	50	153	18	327	548	0.63
Silesia	837	288 (34.4%)	455,119	34	—	455,153	90	432	17	1,274	1,813	0.40
Province of Saxony	624	305 (48.9%)	444,788	4,319	—	449,107	360	3,172	77	1,134	4,743	1.05
Schleswig-Holstein	676	181 (26.8%)	224,122	10	3	224,135	1,059	1,787	16	1,867	4,729	2.07
Hannover	465	132 (28.4%)	227,981	1,965	—	229,946	1,485	426	10	239	2,160	0.93
Westphalia	690	31 (4.5%)	487,004	18	—	487,022	1,395	22	—	22	1,439	0.29
Hessen-Nassau	374	30 (8.0%)	360,429	—	21	360,450	267	272	3	25	567	0.16
Rhineland	1,071	221 (20.6%)	756,707	21	—	756,728	18,530	1,356	—	457	20,343	2.62
Hohenzollern	234	2 (0.9%)	27,702	—	—	27,702	79	—	—	—	79	0.28
Kingdom of Prussia	6,366	1,877 (29.5%)	4,366,681	176,901	524	4,544,106	25,408	36,807	1,817	7,143	71,175	1.54
Saxony	749	383 (51.1%)	675,501	304	360	676,165	1,497	2,534	21	1,594	5,646	0.83
Hessen	214	26 (12.1%)	231,493	—	—	231,493	1,887	34	—	—	1,921	0.82
Mecklenburg	392	142 (36.2%)	65,142	1	1	65,144	1,733	557	17	217	2,524	3.73
Thuringia	935	301 (32.2%)	439,475	33	—	439,508	2	170	—	351	523	0.19
Oldenburg	83	14 (16.9%)	28,683	18	—	28,701	171	159	—	25	355	1.22
Brauschweig	75	37 (49.3%)	90,018	12	—	90,030	198	91	12	117	418	0.46
Duchy of Anhalt	74	44 (59.5%)	61,575	139	—	61,714	—	718	6	226	950	1.52
Lübeck	31	25 (80.6%)	20,792	—	—	20,792	—	613	—	206	819	3.79
Bremen	18	15 (83.3%)	36,340	—	—	36,340	1,272	1,369	—	293	2,934	7.47
Hamburg	32	24 (75.0%)	112,197	54	—	122,251	424	3,602	204	2,158	6,388	4.97
Total	8,969	2,888 (32.2%)	6,127,897	177,462	885	6,306,244	32,592	46,654	2,077	12,330	93,653	1.46

[a] Percent adjuncts = total malt substitutes/(total malted grain + total malt substitutes) × 100.

the construction of zeppelins and first-generation aircraft specifically designed and built for military purposes.

Impossible to ignore, the American press of 1906 was kept busy informing Americans of the German Empire's rapid expansion in both colonies and military capabilities. Headlines and accompanying articles made it clear the German Empire was focused on, and committed to, becoming a global superpower, an essential piece of which was having a navy on par with those of Great Britain, France, and the United States. To get a sense of the magnitude of these events and better appreciate the historical context surrounding the National Reinheitsgebot, the following (in chronological order) are sample headlines from American newspapers in 1906: "Germans Petition for Larger Navy" (*Buffalo Sunday Morning News*, February 4, 1906 [21]), "Kaiser's Naval Tables: Draws Huge Diagram for Presentation to the Reichstag for Comparison" (*Brooklyn Daily Eagle*, February 4, 1906 [11]), "Kaiser Interested in the U.S. Navy" (*Buffalo Enquirer*, February 5, 1906 [17]), "New German Warships: Six More Cruisers and Heavier Battleships Approved" (*New York Tribune*, March 7, 1906 [68]), "The Aerial German Navy" (*New York Times*, March 18, 1906 [66]), "Big Naval Bill for the Germans" (*Buffalo Enquirer*, March 28, 1906 [16]), "Kaiser's Little War Costs Him $150,000,000: Natives of Southwest Africa Proving Too Much for Germans in Guerilla Fighting" (*Buffalo Sunday Morning News*, April 2, 1906 [24]), "Germans Prepare for British Invasion: Strategic Railways Being Constructed at Place Where English Troops Could Land" (*Buffalo Evening News*, April 22, 1906 [22]), "German Naval Bill Passed" (*Buffalo Morning Express and Illustrated Buffalo Express*, May 20, 1906 [19]), "Kaiser May Be Submerged: Interest in Submarines May Induce Him to Imitate Roosevelt" (*New York Times*, May 23, 1906 [65]), "Must Pay to Be a Great Power: Germany Places a Tax on Almost Everything Within Her Domain—More Trouble for People" (*Buffalo Enquirer*, May 26, 1906 [18]), "Germany Plans a Greater Navy: Bill Intended for Reichstag in the Fall Will Be Bolder Than Last" (*Brooklyn Standard Union*, July 15, 1906 [12]), and "Germany to Buy Firearms: Reichstag Will Be Asked to Grant Increased Military Expenditure" (*Green Bay Press Gazette*, November 9, 1906 [48]).

Space constraints prevent me from delving into these in any detail, but one of note is the February 4 reference to the "Kaiser's Naval Tables." Personally drafted by the Kaiser himself and presented to the Reichstag "as a striking object lesson," each table was a "huge diagram" customized to depict the naval fleets of the British Empire, France, the United States, and of course the German Empire. Prominently displayed in "the large hall of the Reichstag," each included a sketch of every warship in the respective fleets along with a listing of every vessel's tonnage, speed, and armament (17). They served to provide powerful daily reminders to Reichstag legislators of the Kaiser's wishes each time they entered and exited during that historic session in which the National Reinheitsgebot was passed, with a *Brooklyn Daily Eagle* article commenting, "the new tables will doubtless have no little effect upon the German members of Parliament, especially as just now enthusiastic meetings in support of the German Navy League are being held in all the leading German towns" (11). Clearly, Reichstag legislators of 1906 had much on their plates as each of the strategic initiatives encompassed in the above headlines required *enormous* levels of funding. Enter the "Imperial Financial Reform Bill" of 1906 (100), the passage of the National Reinheitsgebot on June 3, 1906, and my personal opinion as to what motivated the German Reichstag to do so that day.

Beginning with a very brief review of the "Imperial Financial Reform Bill" of 1906, perhaps the most succinct summary of the motivation behind the "reform" is found in the following paraphrasing of the May 26 article in the *Buffalo Enquirer*, namely: "Germany's determination to be a great world power means extra taxation on the people. The new fiscal program, estimated to yield $50,000,000 a year, includes legacy duty, automobile duty, tax on director fees, tax on bills of lading, duty on railway tickets, a fee to be paid for every article carried in passenger baggage cars and a tax on beer" (18).

While seemingly an innocuous group of seven new taxes, it is worth putting in perspective what 50 million dollars of 1906 revenue translates to today. If adjusted using an annual inflation rate of just 2.99%, that 50 million converts to a whopping 1.432 *billion* dollars! As to where that money was being directed, under the July 30, 1906, headline "Unpopular Taxes," the *Wilkes-Barre Record* wrote: "The expenses of Germany have greatly increased. The ambitious naval program and the enormous annual cost of the standing army are big items to take out of the pockets of the people. The Kaiser is anxious to maintain the prestige of the Fatherland in this respect, and the nation has not yet come to the point where its protest is emphatic enough to be heeded. So, if the military and naval coterie can hold the upper hand the people will be compelled to pay a higher price for the luxuries that are taxed and for some of the necessaries of life as well" (108).

Such was the context then in these four little words of "a tax on beer" that the German Empire's National Reinheitsgebot was implemented. Then, as today, American and British correspondents were permanently based in cities throughout the German Empire, especially Berlin. Coverage of Reichstag legislation was thus both frequent and thorough and had been for decades. Indeed, in the case of the United States during this era, no other European nation was more reported on than Germany (not even Great Britain). A *Newspaper.com* search of the word "Reichstag" for the year 1906 generates 8,299 hits across the newspapers of the United States, the United Kingdom, Canada, and Australia. Being retired and curious, I took the time to scan all 8,299 of the newspaper articles. Every. Single. One. But here's the thing: in not one, *not one,* is there any indication that the motivation behind the passage of the legislation of June 3, 1906, had anything to do with beer quality. There is no mention of malt substitutes (or surrogates) in any context, no mention that henceforth all lager beer in Germany would be all-malt, no mention of rice, corn, or potato-based syrups being banned, and no reference to the Bavarian Reinheitsgebot being adopted by the entire German brewing industry. Not a whiff. Not a hint. Not an iota. Not even an oblique reference. Absolutely nothing, zero, nada. Comparable searches for the years 1905 and 1907 likewise come up completely empty. If the legislation had anything to do with quality, then every English-language newspaper in the Western World completely missed the story. However, I find it highly improbable this was the case, given the *intense* coverage provided in British and American newspapers since the 1870s over the debate of whether the use of malt substitutes constituted "beer adulteration." Indeed, nothing would have delighted American newspapers of the era more than to have the opportunity to rub its passage in the face of the American brewing industry, who were then actively warding off efforts to impose an American Reinheitsgebot.

But what *was* extremely easy to find in Western press reports was the association of the terms "malt tax" and "beer tax" with the passage of the legislation of June 3, 1906. For unlike the United States, where the debate over whether to impose a na-

tional Reinheitsgebot raged for five *decades*, in Germany the matter was essentially settled in a matter of *hours*. It was not the result of marathon hearings addressing whether the Bavarian way of brewing lager beer should become the German way, but merely one of a flurry of new taxes comprising the "Imperial Financial Reform Bill" 1906, all specifically requested by the Kaiser and his Prussian-led military. Collectively, all these taxes were passed during the hectic month of May 1906, the last prior to the session's conclusion and the start of the Reichstag's summer break. In a frenzied whirlwind of taxation, the "New German Tobacco Tax," the "Tax on Railroad Tickets," the "German Tax on Automobiles," new taxes on "royalties, bills of lading, unissued shares and death duties," and last but certainly not least, the "increased Malt Tax" all gained Reichstag approval (20,35, 41,71). However, before any could become law, final approval for the collective implementation of these new taxes required the Kaiser's personal signature and Imperial Seal. It is because of this final legislative milestone, taking place in the Berlin "New Palace" just days after the end of the session, that Germany's National Reinheitsgebot legally passed on June 3, 1906 (80). Entitled the "Act to Amend the Beer Brewing Tax Act," it can be found in the *Reich Law Gazette* containing legislation passed by the Reichstag from January 6 to December 21, 1906 (80). Despite its historical significance, it was but one of *four* taxes bundled together under the "Law Concerning the Order of the Reich Budget and Repayment of the Reich Debt" specifically enacted to fund military expenditures such as the construction of the new fleet of cruisers and heavy battleships (19,68). In this manner, then, so too did June 3, 1906, also represent the *exact* same date new taxes on cigarettes, inheritances, and the Reich Stamping Law for various services were enacted. Significantly, neither in the "Act to Amend the Beer Brewing Tax Act" nor in the much longer "Announcement" document accompanying it in the *Gazette* is there any mention it was passed for reasons related to beer quality or safety. *Not one word*. Its entire focus was on streamlining taxation and ensuring the brewers of Germany were well informed of the stiff financial penalties should they not adhere to its requirements.

Certainly, its passage likely made the barley farmers and malting companies of Germany happy, "benefiting" from national legislation that had eluded their counterparts in the United States since efforts first began here in 1890. But I do not believe for a moment that these were the primary stakeholders Reichstag legislators had in mind in May 1906 when they radically revised the Brewing Tax Act of May 31, 1872, because concurrent with the ban on *some* malt substitutes was a *massive* increase in the malt tax rate. It is *this* latter fact that I believe points to the identity of the ultimate stakeholder (and thus beneficiary) of this slice of the "Imperial Financial Reform Bill" of 1906—Kaiser Wilhelm II, head of the armed forces of the German Empire. While *we* today may view beer with a passion, in the eyes of the Kaiser of 1906 it is hard to imagine he viewed it as anything more than providing a significant source of revenue to fund his imperial ambitions during these critical years leading up to World War I. Like so many other aspects of life, "follow the money" seems as applicable here as any other, except in this case the context involves the Reinheitsgebot and the tragedy of World War I.

Continuing this line of thought, I also consider it no coincidence that *both* of the crucial elements of the National Reinheitsgebot (i.e., the redefinition of which malt substitutes were now banned concurrent with the dramatic increase in the malt tax) were financially favorable from the perspective of the Imperial Treasury. The legislation of June 3, 1906, completely transformed the way the Reich's treasury taxed brewing materials in the North German Brewing Union, essentially adopting the Bavarian system as the Empire's system. No longer, as reviewed earlier, was there the three-tiered system based on specific tax rates for malt and each type/category of malt substitutes; the new malt tax was based solely on the *total* weight of approved brewing materials. Under the headline of "Germany's New Taxes," the *New York Tribune* described the new taxation system: "Up to the first twenty-five tons of materials used (hops, malt, etc.) the rate is 50 cents a hundred-weight, and thereafter it increases to $1.25 a hundred-weight" (67).

Thus, while previously higher extract yielding malt substitutes such as rice, maize, and green starch were taxed (by weight, not extract) at the same rate as malt, the banning of these materials meant that to brew the same quantity of beer with comparable extract the industry simply needed to use greater quantities (and thus weight) of malt to do so. Take, for example, the situation of rice. Because the National Reinheitsgebot did not ban the use of malt substitutes in the brewing of beer destined for export, I believe that by comparing the pre-1906 data with post-1906 data shown in Table 1, it can be ascertained just what percentage of the malt substitutes were previously used in the production of beer destined for *domestic* production versus *export*. In the case of rice, comparing the figures for the full tax year immediately prior the national ban (i.e., 1905 at 79,243 hk) and after (i.e., 1907 at 175 hk) suggests that 99.78% of the rice used in 1905 was applied to brewing beer for domestic consumers. Assuming at this time malt and rice possessed total extract values of 60–65% versus 80%, respectively, requiring 100% of the extract in lager be sourced *only* from lower extract-yielding malt, an industry allowed only to brew all-malt lagers would therefore generate higher tax revenues compared with one in which the use of higher extract-yielding rice was still allowed. Beyond rice, the ban on maize products (several yielding even higher extract values compared with rice) and "green starch" would likewise also have driven a net positive increase in tax revenue raised.

So, while the passage of the National Reinheitsgebot was a hit with the Imperial Treasury, how did it go over with the German *people*, especially those in northern Germany? Presumably, if the intention was to improve the overall *quality* of German beer, were they euphoric to be finally able to enjoy beer the same way Bavarians had since 1516? Did it trigger celebration in the streets of Berlin? Were beer drinkers of the *Brausteuergebiete* filled with pride now that the gold standard for beer quality was now a national one? Did sales of beer, especially lager beer, rise in volume now that the stain of "rice beer" had been removed as a domestic tradition? Surely the answer to these questions must be "yes"—right? *But history teaches us that is not what happened*. For, rather than celebrate the historic milestone, the public's immediate response was to *boycott* German beer. And not just for a few days, weeks, or months, but for *years*.

To appreciate why this was the case, we once again need to defer to that single word: money. As described under the August 25, 1906, headline of "Raising the Price of Beer" in the *Boston Globe*, the legislation of June 3, 1906, resulted in a tax increase of 3 marks (75 cents at the time) per hectoliter. Rather than absorb this increase, "following the universal system in taxation by which always the consumer pays the brewers not only passed the burden on to the retailers, but by way of good measure added a little to the tax" (9). Consisting of an additional surcharge of 2 marks, "naturally the retailers, declining also to bear the burden, passed the tax on to the consumer, only with a little more added by themselves." Thus, "the final result was that, while the

government meant to impose a tax of about three-quarters of a cent a quart, the consumer was called on to pay one and one-quarter cents a pint more for his beer." While seemingly a minor price increase, it was anything but, given the per capita consumption of beer in Germany. As described by a reporter for the *New York Sun* stationed in Germany, "German patriotism might be counted upon to contribute the five pfennigs for the building of the Kaiser's navy or whatever the money was intended for, but what good German ever dreamed of stopping at one Seidel [N.B.: lidded beer stein], and how many incomes could stand the strain of that five pfennigs when multiplied daily by ten or twenty? The one alternative is to drink less beer, a thought intolerable, especially in this summer weather" (62).

Well, as it turns out, the "thought intolerable" is exactly what transpired in the aftermath of the passage of the National Reinheitsgebot. It also can be described by a single word, one which beautifully incorporates both my lifelong passion of studying European history with my professional career. That word? "Bierkrieg." Not "Blitzkrieg" (i.e., lightening war as waged by Germany in the early years of World War II), but "Bierkrieg"—an internal war on German beer by the German people. In cities and towns across Germany including Leipzig, Halle, Erfurt, Cassel, Hanover, Kiel, and Frankfurt (even Munich as Bavarian beer drinkers likewise felt the sting of the increased malt tax!) the "beer war" manifested itself in the form of German beer drinkers boycotting German beer, with "thousands of Germans drinking mineral water and cider rather than touch beer at the enhanced price" (95). In Kiel, for example, the *San Francisco Examiner* reported in the fall of 1909 that the still active boycott staged by the 8,000 workers at the imperial dockyard had decreased daily bottled beer consumption from 12,000 bottles to a token 120 bottles (84)! A surreal juxtaposition given the German penchant for beer, the multiyear "beer war" triggered by the passage of the National Reinheitsgebot was widely covered in both American and Canadian newspaper articles: "Beer War on at Frankfort-on-Main" (*Nashville Banner*, July 23, 1906 [61]), "Grave Crisis Now Confronts Germany: Government Tax on the National Beverage Is the Cause of Trouble" (*Buffalo Courier,* August 20, 1906 [15]), "Beer War in Germany: Caused by Higher Tax—Brewers Don't Care as Consumers Have to Pay or Go Thirsty" (*Brooklyn Times Union*, August 23, 1906 [13]), "Bierkrieg on in Germany" (*New York Times*, August 26, 1906 [64]), "Germany Stirred Over Beer Tax: Brewers Shift Load to Publicans Who Place It on the Public" (*Buffalo Sunday Morning News*, September 2, 1906 [23]), "Beer Boycott" (*Nashville Banner*, September 8, 1906 [60]), "Won't Pay Beer Tax: Advance in Price by Brewers Resented by Saloon Men and Public Alike in Germany" (*Ottawa Journal*, October 14, 1906 [72]), "Huge Boycott on Beer" (*Herald Press*, October 26, 1907 [51]), "Beer Boycott in Munich: Sixty Thousand Germans Agree Not to Drink at Increased Price" (*Butte Daily Post*, October 26, 1907 [25]), "German Beer Boycott: Brewers' Attempt to Shift Tax Causes Change of Drinks" (*San Francisco Examiner*, September 19, 1909 [84]), "Bavarians Engage in Beer Boycott: National Beverage Tabooed Because of High Price" (*Pittsburgh Daily Post*, April 10, 1910 [77]), and "German People Have Beer War: Foamy Lager No Longer Served at Feasts and Funerals" (*Morning Echo*, April 14, 1910 [59]).

Empirical evidence revealing the magnitude of the impact these boycotts had on the German brewing and malting industries is found in the Reichstag-generated statistics covering 1905–1912 (Table 1). In the case of lager, where 36,439,556 hL had been brewed in 1905 (representing the last full April 1–March 31 fiscal year before the passage of the National Reinheitsgebot), by 1912 this figure had *dropped* to 34,972,999 hL, reaching a low of 32,357,662 hL in 1909 (lacking data for the years after 1912, I am unaware of when sales once again reached pre-Reinheitsgebot levels). Not surprisingly, during these same years malt consumption also mirrored this pattern, *declining* from 7,972,723 hk in 1905 to a low of 6,649,541 hk in 1909—and by 1912 was still 10% *lower* compared with 1905. However, one very "un-Reinheitsgebot-like" brewing material that did see a massive increase in consumption was "all types of sugar," tripling from 52,787 hk in 1905 to 160,782 hk by 1912 (Table 1). Compared with 1905, both top-fermented and bottom-fermented categories of beer during these years exhibited lower production volumes, so I am unclear as to the explanation behind the significant increase in the use of sugars except to say that within the June 3, 1906, law is contained the following passage: "The sugar added to top-fermented beer after the brewing process has been completed and outside the brewery is not subject to the brewing tax. The Federal Council is authorized to completely release sugar from the brewing tax" (80). It appears then this did not go unnoticed by the brewers of Germany!

Viewed collectively (and per the upcoming comments of Wilhelm Windisch) the multi-year decline in both malt and beer sales following the enactment of the National Reinheitsgebot inflicted painful financial blows to many bottom-line ledgers across Germany. For of the six intimately linked segments of German society composing the field-to-throat supply chain of barley to beer (i.e., barley growers, malting companies, breweries, publicans, consumers, and the Kaiser's Imperial Treasury) there were five clear losers and only one winner when it came to the metric of money. Once again, I do not view it as a coincidence that the single winner just happened to be Emperor Wilhelm II, the Reichstag's primary stakeholder in an Empire on the verge of a global conflict. For the rest, just classic examples of an old saying: "Be careful—you might get what you wish for."

1906–1932: National Reinheitsgebot Curveballs

While researching Germany's history in brewing with malt substitutes, I encountered two historical vignettes that, after more than a decade of near total immersion research, serve to illustrate how I have come to appreciate that history can serve up some pretty unexpected curveballs. Such is the case with these, all of which involve the very Reinheitsgebot itself. The first is how Germany's passage of the National Reinheitsgebot in 1906 was *not* without controversy. Indeed, its passage was actively *opposed* by the most prominent German brewer and brewing scientist within the North German Brewing Union at the time, an individual who literally lived and worked within walking distance of the Reichstag the day it passed: Professor Doctor Wilhelm Windisch, Chief of Berlin's Versuchs- und Lehranstalt für Brauerei (Fig. 6).

In the fall of 1912, as the personal envoy of Kaiser Wilhelm II, he travelled to Boston to serve as the keynote speaker for that year's meeting of the U.S. Brewers' Association. While it might come as a surprise to those who feel the United States has no brewing history or traditions of our own, early in his speech he stated "we were your apprentices and have taken over many a good thing from you" (110). However, as surprising as this public recognition of the multitude of innovations spearheaded by America's lager beer industry at the time may seem, it pales in comparison to his personal opinions vis-à-vis Germany's National Reinheitsgebot passed 6 years prior. Revealed shortly

after he arrived in New York on August 27, 1912, they were elicited via an interview with a reporter from the *New York Journal of Commerce* (111). Initially, he was asked about his opinions regarding the then highly publicized legislative efforts by Congress to pass an American Reinheitsgebot. After quickly indicating he strongly *opposed* such legislation, he went on to use the bulk of his interview to share his following thoughts regarding *Germany's* passage of the National Reinheitsgebot, ones that likely came as a complete shock to the American journalist:

> "It was a law passed, however, not because the other grains or sugar were harmful, but to prevent a diversity of products under the same name and in the interests of barley-farmers who wanted to shut out beers made by any other method or the use of ingredients—especially rice—which they did not grow. It was not because the grains were regarded as adulterants or injurious, but rather due to tradition and local and national jealousy."
>
> For myself," said Dr. Windisch, "I would favor even more liberal use of grains and sugar in beers, because it permits of greater variety of flavors, a better color, form and a sharper taste than with the old-type beer. There is absolutely nothing injurious about their use, and they should not be regarded as adulterants."

Essentially describing the dynamics of what had taken place in the United States during our first beer revolution, and amazingly predictive of what American craft brewers would drive in our second revolution, he was I believe in a way also warning that by losing their rights to brew with the materials of their choice, future generations of German brewers would be unable to apply the energy and creativity required to brew beers of a "greater variety" compared with the "old-type of beer." While modern EU regulations technically provide their right to do so, the overpowering cultural influence of the Reinheitsgebot effectively restricts the ability of German craft brewers to even explore their own nation's rich heritage of brewing with ingredients other than malt, hops, water, and yeast. Indeed, I was struck by the similarity between Windisch's words and those expressed to me by Sam Caligione 118 years later when, at the 2020 Big Beer Festival in Breckenridge, Colorado, he described the Reinheitsgebot as a type of artistic "censorship." A German and an American separated by a century of time, but kindred spirits regarding their perspective on the Reinheitsgebot!

But as fascinating as Windisch's interview was, this was the least surprising of the paradigm-challenging "Reinheitsgebot curveballs." The second took place just a short 3 years after the end of World War I during what is commonly referred to as "the chaos of the Weimar Republic." It likewise involved legislation passed by the Reichstag, but this time the outcome presumably brought a smile to Windisch's face. For according to the Associated Press, that is the day the German Empire *terminated* the National Reinheitsgebot. That's right—according to an Associated Press wire from November 1921, German brewers were once *again* free to use corn and rice to brew lager beer for domestic consumption.

I fully appreciate the startling implications of this observation. To the best of my knowledge, the Reinheitsgebot being reversed in 1921 has never been mentioned in brewing literature. Indeed, I am reluctant to even put this claim to pen given the cultural reverence the Reinheitsgebot holds within Germany and around the world, including my own personal respect for its heritage. However, given the clarity of the Associated Press report, it will be left to each reader to reach their own conclusions as to credibility. Certainly, I invite German brewing historians to assess the veracity of the Associated Press wire: surely archival materials exist in Germany that can shed light on this one way or the other. However, having early on made a personal commitment to report what history reveals—regardless of how disconcerting these findings may be—I feel compelled to provide the evidence leading to the claim, beginning with the Associated Press wire report itself.

Depicted in Figure 7, there is little doubt the reporter who filed it fully believed the Reichstag had indeed passed legisla-

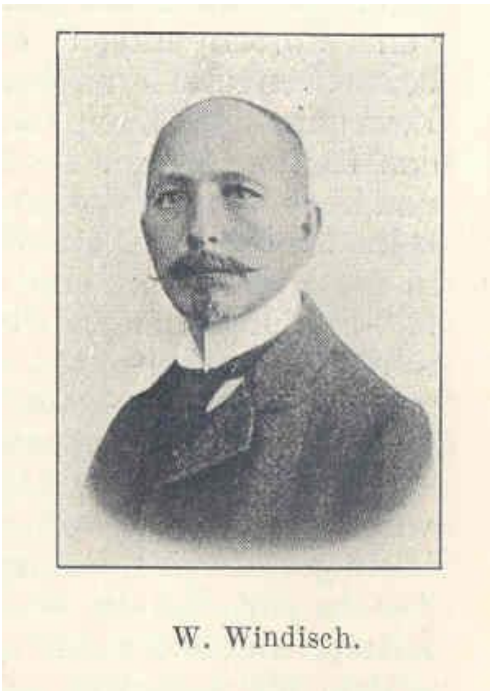
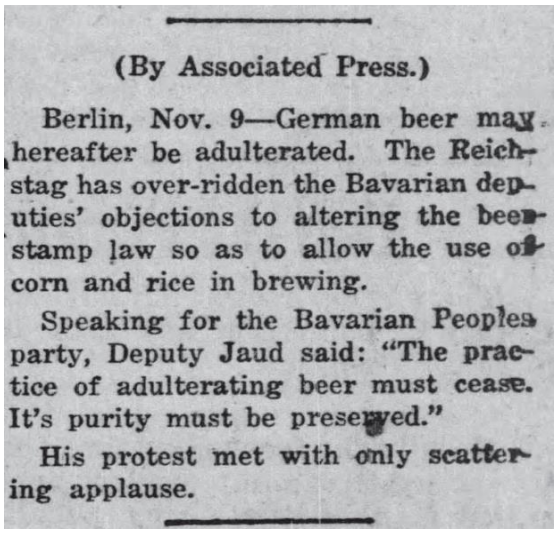


Figure 6. Image of VLB's Professor Doctor Wilhelm Windisch circa 1908. Image copyright resides with VLB Berlin, Berlin, Germany, and was kindly provided, along with permission to publish, by VLB archivist Michaela Knoer.



(By Associated Press.)

Berlin, Nov. 9—German beer may hereafter be adulterated. The Reichstag has over-ridden the Bavarian deputies' objections to altering the beer stamp law so as to allow the use of corn and rice in brewing.

Speaking for the Bavarian Peoples party, Deputy Jaud said: "The practice of adulterating beer must cease. It's purity must be preserved."

His protest met with only scattering applause.

Figure 7. Example of the Associated Press wire informing American readers of Germany's decision to end the National Reinheitsgebot in November 1921. *Marshfield News Herald*, Marshfield, WI, November 9, 1921 (55).

tion allowing the use of rice and corn for domestic brewing purposes in Germany. It is important to appreciate this took place during the 1921–1923 window of hyperinflation in Germany, when the nation was essentially printing money to pay debts owed from funding World War I as well as the enormous compensation payments required by the victorious allies. Putting into perspective what hyperinflation looked like at the time in terms of beer, as reported by the *Harrisburg Telegraph*, in November, 1923 (50), a single *glass* of beer cost a German beer drinker half a *billion* paper marks (that's $275,714,334.23 using today's exchange rate!). Further compounding the pricing situation was a chronic shortage in malt supplies at the time, with a prominent German-American maltster and brewer, Dr. Theodore Sedlmayr, reporting: "In 1921 I visited Munich, Germany. The brewers there were short of malt. The government allotted the brewers only a certain quantity of grain. Most of the brewers decided to produce a weaker beer. The importation of malt or barley was not permitted" (30).

While speculation on my part, perhaps it was a matter of the brewers in northern Germany being less willing than their compatriots in Bavaria to restrict themselves to only brewing an all-malt "weaker beer" that drove the Reichstag to return to pre-1906 conditions. Given the extensive experience and familiarity with malt substitutes still possessed by countless northern German brewers in 1921, perhaps it is not so shocking that under such circumstances the right to brew with malt substitutes was simply a *restoration* of a German tradition that had but recently been lost? Likewise, the reporter's observation that the vocal protests of Deputy Jaud of the Bavarian Peoples Party generated only an anemic "scattering applause" is suggestive the legislation reversing the Reinheitsgebot enjoyed broad support among those in the chamber that day.

But what *is* clear is that a legion of American newspapers in 1921 believed lager was now being brewed using corn and rice in Germany. Recalling that in 1921 the United States was several years into Prohibition, both newspapers and their readers were likely starved for reports on having anything to do with beer. It is perhaps because of this that literally hundreds of different American newspapers picked up the Associated Press wire. While most simply did a cut-and-paste of the content of the wire itself, many an editor across the United States took advantage of the opportunity to customize the headlines and once again take advantage of a favorite media pastime from the 1870s until the start of Prohibition—the bashing of the American brewing industry over its use of rice and corn. Typical of these was "Permit Adulteration of Beer in Germany" headline in the November 20 edition of the *Times Dispatch* of Richmond, Virginia (101). Several years into being deprived of this half-century-long pleasure, countless headlines creatively revealed this prejudice, liberated once again to be openly expressed (Fig. 8). Illustrative of this animus and bias against adjunct lager beer brewed with corn and rice, claims of "adulterated," "impure," "fake beer," and "water" leave absolutely *zero* doubt as to their opinions.

But what of Germany's National Reinheitsgebot, post November 1921? Clearly, it is in effect today and has been for quite some time. Assuming the Associated Press wire was accurate, when was it restored? One clue may rest in Horst Dornbusch's 2018 paper in the Master Brewers Association of the Americas *Technical Quarterly* discussing the German Purity Law (39). In it he makes several references to a 1927 version of the law. Being just 4 years after hyperinflation ended in Germany, did 1927 mark the year rights to brew with malt substitutes were once again taken away? Certainly, based on a paper published in the June 1939 edition of the *American Brewer* entitled "Official Definition of Beer in Germany," we

Figure 8. Examples of headlines from American newspapers reporting the end of Germany's National Reinheitsgebot in November 1921. Left column, top to bottom: *The Republic*, Columbus, IN, November 9, 1921 (99); *Ironwood Daily Globe*, MI, November 9, 1921(52); *Manitowoc Herald Times,* November 9, 1921 (54); and *Rock Island Argus and Daily Union*, November 12, 1921 (81). Center column: *Miami News*, November 14, 1921 (58); *Marysville Journal Tribune*, OH, January 5, 1922 (56); *Chanute Daily Tribune*, November 14, 1921 (27); and *Times Herald*, Port Huron, MI, November 9, 1921 (102). Right column: *Salt Lake Telegram*, November 11, 1921 (83); *Medford Mail Tribune*, November 25, 1921 (57); *Marshfield News Herald*, WI, November 9, 1921 (55); *Green Bay Press Gazette*, November 22, 1921 (47); *Detroit Free Press*, November 13, 1921 (38); and *Durham Morning Herald*, November 11, 1921 (40).

know the ban on their use was once again in place prior to the start of World War II (1). But even this reference contained a surprise, for while stating lagers were only produced "from barley malt, hops, yeast and water" it also stated how for ales having a gravity of not more than 4% the use of the artificial sweetener saccharine was allowed. While perhaps odd that a chemically synthesized compound would be included in the scope of the National Reinheitsgebot, that the on-again, off-again love affair with saccharine was an integral part of 19th century German brewing history was also something I had not expected to find.

But there was almost a third curveball with regard to the Bavarian who personally first coined the term "Reinheitsgebot," Hans Rauch. It was he who on March 4, 1918, first uttered the term "Reinheitsgebot" (70). Spoken on the floor of the Bavarian Parliament's Chamber of Deputies in his capacity as an elected representative of the Bavarian People's Party, the context in which this 1906 Weihenstephan graduate spoke the term was the same as in 1516 and 1906 (i.e., taxation legislation). The "almost" curveball in this case was there was another member of the Bavarian People's Party also named Hans Rauch, but in this case the Hans Rauch in question served in the Weimar Republic's Reichstag in Berlin. The Bavarian People's Party was a more conservative and Bavarian-centric splinter group of the German Center Party (also referred to as the Catholic Center Party), which as the largest political party in the Reichstag during 1906 provided the critical block of votes needed to support the Kaiser in passing the Imperial Financial Bill back in 1906.

In September 1932, the Hans Rauch of the Weimar Republic's Reichstag directly played an unintentional, but pivotal role, in the founding of one of history's most notorious regimes: Adolf Hitler's Third Reich. For as leader of the Bavarian People's Party it was he who, along with the leaders of the Nationalist Socialist Party, the Nationalist Party, and the Catholic Party, formed the coalition responsible for the vote of no confidence that led to the dissolution of the Von Papen government. In this case, the Bavarian People's Party's motivation in "never letting a crisis go to waste" was to exploit the political chaos it created to restore to power the cousin of England's then-reigning monarch (King George V) and Queen Victoria's oldest grandson, Friedrich Wilhelm Viktor Albert. More commonly known as the King of Prussia and Kaiser Wilhelm II (who abdicated just days prior to the end of World War I), it was he who was also the primary beneficiary of the "Imperial Financial Reform Bill" of 1906 that led to the passage of the National Reinheitsgebot ("Kaiser" in English is "Emperor"). As we know today, the end of the Weimar Republic was not marked by Rauch's vision, but rather by the competing vision of the leader of another coalition partner, Adolf Hitler, and sadly the birth of Germany's Third Reich. Further insights into the "other" Bavarian Peoples Party's Hans Rauch are found in American newspaper articles from the period (30,37,69,81).

Conclusions

With the above in hand, what conclusions can be made from this short review of Germany's history with malt substitutes, especially with regard to the title's premise of Germany being the birthplace of America's national beverage—adjunct lager beer? While each reader will be left to reach their own conclusion on this admittedly controversial proposal, the reason the title of this article does not end with a question mark is that I have reached the simple conclusion that *our* beer began as one of *their* beers. And not only that, I also believe it serves as a wonderful example of "history repeats itself" vis-à-vis our beer being their beer. For just as historic styles of German beer such as Berliner Weissbier, Dunkelweizen, Gose, Kölsch, Bock and Doppelbock, Dortmunder Export Lager, Maibock, Pils, Märzen, Munich Dunkel, Munich Helles, Schwarz Bier, Rauchbier (the only beer style in the world I simply cannot enjoy), and Altbier are today profoundly influencing America's second beer revolution (i.e., the craft brewing industry), so too did Germany's "rice beer" profoundly influence America's first beer revolution—one that ultimately led to adjunct lager beer becoming America's beer. That the German Empire in 1906 decided to ban adjunct lager beer from its historic portfolio of beer styles does not in any way negate the power its influence had on the American brewing industry in the half-century preceding the enactment of the National Reinheitsgebot. While after 1906 the two nations went their separate ways relative to the style, the past century has been incredibly revealing as to the voice of the consumer both in the United States and around the globe. For despite the advantage provided by America's self-inflicted closure of its brewing industry from 1919 to 1933, it is not Germany's all-malt lagers that dominate global sales today. No, by that metric the crown's title unequivocally falls within the realm of America's national beverage, adjunct lager beer.

This leads to the eternal debate over what defines "quality" in a beer? It is complicated, of course, by being an attribute that is both subjective and objective at the same time. Relative to the latter, whether craft or macro, being able to provide consumers with brands meeting design specifications for sensory, microbiological, and analytical parameters is one objective measure of quality. But so too, and certainly of even greater importance, is one's *personal* subjective opinion as to whether a beer possesses "quality" or not. Both nationally and globally, perhaps the ultimate measure of quality is found in the relative purchasing decisions made by consumers specific to each style. But even this metric is highly debatable given the passion found (in both brewers and consumers alike) for products as diverse as American light lagers and those of the craft brewing industry. While a universal consensus will *never* be reached as to what defines "quality" in a beer (nor should it be!), perhaps it is as simple as the counsel Anton Schwarz provided to Congress in 1890, namely: "It is a true proverb which says that there should be no dispute about tastes (*De gustibus non est disputandum*). One drinker may prefer what the other dislikes, and vice versa" (57).

Like peeling an onion, a plethora of layers exist attempting to answer the "why" behind the passage of the Bavarian Reinheitsgebot in 1516. Was it, as is generally assumed, motivated by a desire to improve beer quality? Or was it one of the numerous other alternatives that have been proposed (e.g., food safety, taxation, to provide both crop and beer-style monopoly rights to the "Dukes of Bavaria," or to mitigate the risk of social unrest by assuring barley and not the grains preferred in the human diet [especially wheat] were used in brewing)? Lost in the fog of time, a universal consensus will never be reached on this subject—it is part of the mystique of the world's oldest food law.

But when it comes to the National Reinheitsgebot, well now, that is a whole other kettle of fish. Enacted when my grandfather was alive (in 1906), then both revoked (1921) and re-enacted (in 1927?) when my father was a child, to me this historic milestone in beer history is much, much, *much* more contemporary in nature. Accordingly, I believe that the passage of the National Reinheitsgebot on June 3, 1906, signifies another example of "history repeats itself" relative to the Bavarian Reinheitsgebot of April 23, 1516. And it is this—that regarding the motivation

of the Duke behind the latter, the answer is found in the Kaiser responsible for the former.

So, what's next in this ongoing review of the history of the American lager brewing industry? The first *TQ* article in this series provided a glimpse into legislative struggles American brewers faced from the 1880s to 1910s (to protect their rights to brew with the materials of their choice), while this article addressed Germany's rich history of brewing with malt substitutes, including the role this played in the birth of adjunct lager beer in the United States. The third (and last) in the *TQ* articles will provide readers with insights into the upcoming publication from the Master Brewers entitled *The Inspiring History and Legacy of American Lager Beer: 1941–1948*. It will provide a critique of 29 when/where/why/who myths associated with the birth of adjunct lager beer in the United States as well as a historical review of the turbulent years of World War II (1941–1945) and global famine (1946–1948), when American brewers brewed with barley grits, pregelatinized barley flakes, tapioca, cassava, sorghum grains, and even potatoes due to acute *shortages* in corn and rice adjuncts.

Remarkably, the American brewing industry that entered this prolonged period of national crisis emerged in a much stronger position than it had entering—and dramatically so. I hope readers find the industry's resiliency from this era as inspiring as I did. May the same prove ultimately true for the men and women of today's brewing industry dealing with the COVID-19 international pandemic crisis—especially the more vulnerable and hard-hit craft brewers of the nations comprising the Master Brewers membership.

Gesundheit (to your health)!

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