

LIQUID BREAD: AN EXAMINATION OF THE AMERICAN BREWING INDUSTRY, 1865 TO 1940. PART II

MARTIN STACK

Chapter 3: The construction of America's modern brewing industry, 1865-1920

This chapter begins my alternative interpretation of the American brewing industry from 1865-1940. I use the data table presented in Chapter Two to address and interpret the four themes that have dominated standard writings on the brewing industry: the ascendancy of large-scale brewing, the tremendous increase in national output, the rise in per capita consumption, and the transformation of the product. This chapter examines the period from 1865-1920. Chapter Four covers the Prohibition era, 1920-1933. Chapter Five covers the years between the repeal of Prohibition and the onset of World War Two, 1933-1940.

The standard story, outlined in Chapter Two, attributes the brewing industry's transformation to the growing number of consumers and to changing consumer preferences. Yet, its authors choose to focus not on the consumers, but on the breweries themselves, and on the steps the breweries took to most efficiently meet consumer demand. What emerges is an industry that passively responds to external developments such as new technologies and scientific practices. According to the story, larger firms were better positioned to adopt these innovations, and they reaped a disproportionate share of the benefits. When free from negative external shocks such as the government, the industry naturally evolved from one made up of many small breweries to one led by fewer and fewer nationally oriented firms.

In this chapter I begin my attempt to show that industry and firm processes may not unfold naturally or even beneficially. My emphasis is on how firms and indus-

tries actively interact with their social and economic environment. The standard story has shown that some innovative breweries distinguished themselves in the decades before and after Prohibition through extensive investments in technology, science, and transportation. However, in this Quadrant IV story, we go beyond the documentation of these steps, and evaluate why these (and other) steps were taken and whether consumers automatically benefited from them.

Section 3.1 re-examines industry structure and firm and industry output levels: did shipping breweries propel the brewing industry forward during these pivotal decades? (Did packaged, pasteurized, shipped beer dominate the market?) Section 3.2 considers the issue of efficiency: (Were the largest, shipping breweries the most efficient firms?) Section 3.3 reviews the issue of vertical integration: (Were the national shippers the only breweries to vertically integrate, and did their upstream and downstream investments secure them competitive advantages?) Section 3.4 discusses the rise of bottled beer: (Was it a natural response to changing consumer preferences?) Section 3.5 examines the link between the rise of lager and the influx of German immigrants: (Do immigration patterns fully account for the ascendancy of lager beer?) Section 3.6 reviews changes in how beer was brewed: (Were these developments driven by consumer preferences?) Section 3.7 looks at the relationship between product quality and standardization: (Have these two concepts become synonyms?)

Section 3.1: Another view of industry structure

The standard story's assumption is that the national shippers propelled the industry to its great heights dur-

ing the years 1865 to 1920. Baron claims that while the pre-Prohibition brewing industry supported many small, local breweries, ‘it was the few large, highly mechanized factories, with merchandising extending beyond their own neighborhoods or towns, that controlled the major part of the market’.¹ This view corresponds with Chandler’s: a small number of national shippers dominated the brewing industry, supplying the majority of the annual beer production.

Shippers, according to the story, controlled the market and propelled the industry’s growth. This impression is based largely on two tables Cochran uses to show how important the leading breweries were and how quickly they grew from 1877 to 1895.² During this period, the growth rates for the ten largest breweries greatly outpaced the industry overall. The standard narrative mistakenly assumes that this trend, once set in motion, continued unabated until Prohibition.³ A more detailed review of the data show this view to be incorrect.

While the two largest breweries, Pabst and Anheuser-Bush, outpaced industry growth from 1877-1895, they grew more slowly between 1895-1915 than did the industry overall. Indeed, it seems that all six of the leading shippers grew at a slower rate than the industry, whose total output rose from 33.6 million barrels to 54.8 million barrels.

At the very least, these data cast doubt on the presumption that the shipping breweries were continually leading the industry forward, and they raise an intriguing question: If the national shippers were not behind the momentous increases in industry output from 1895-1915, who was?

A preliminary answer comes from the 1905 *Census of Manufactures* data that can be used to divide the industry into breweries of five levels of annual production: less than 800 barrels; 800-3,000 barrels; 3,300-15,000 barrels; 15,000-170,000; and greater than 170,000 barrels. One obvious drawback of this approach is the open end of the last category: it does not distinguish between breweries making 200,000 barrels, say, and the top producers who put out more than a million barrels. This makes it difficult to highlight the performance of the national shippers.

Given the orthodox narrative’s emphasis on the shippers, we might expect that the shippers alone would dominate national production. If the top category of producers includes not only the shippers, but all breweries producing over 170,000 barrels, we would clearly expect this group to dominate overall production.

Data in Table 3.2 show an industry markedly different from that of the orthodox narrative. In the last column we see that the most pivotal group of breweries were those that produced between 15,000 to 170,000 barrels. They accounted for 62.3% of total output, and they also dominated production in five of the top seven brewing states. In the two largest beer-producing states, New York and Pennsylvania, these medium-sized breweries manufactured over 70% of the total output. Only in the states dominated by the national shipping breweries, Wisconsin and Missouri, did the largest breweries contribute more than 50% of their state’s output.

Together, Tables 3.1 and 3.2 suggest that the largest breweries were not the driving force in the brewing industry. The orthodox narrative makes an additional

Period	Anheuser-Busch	Pabst	Industry
1877-1895	1,106%	689%	242%
1895-1915	58%	-23%	78%

Table 3.1. Percentage change in output by the two largest breweries, 1877-1915.

Source. Cochran, T. (1948) *Pabst Brewing Company: The History of an American Business*. New York: New York University Press. pp.73-74; Krebs, R. and Orthwein, P. (1953) *Making Friends is Our Business: 100 Years of Anheuser-Busch*. St. Louis, MO: self published book, *Anheuser-Busch*. pp.242-243; & *United States Brewers Foundation (1956) Brewers Almanac*.p.10.

Estimated Annual Production Levels	New York	Pennsylvania	New Jersey	Ohio	Illinois	Wisconsin	Missouri	US
<880 bls	9 0.0%	3 0.0%		6 0.1%	6 0.1%	15 0.2%		128 0.1%
800-3,000 bls	20 0.3%	20 0.7%	5 0.2%	10 0.6%	13 0.7%	49 2.0%	7 0.3%	258 1.0%
3,000-15,000 bls	50 4.7%	97 15.9%	9 3.2%	43 10.3%	32 6.9%	52 8.6%	15 2.8%	479 8.5%
15,000-170,000 bls	121 71.2%	102 72.3%	19 50.3%	52 65.4%	63 84.0%	19 16.6%	16 29.2%	620 62.3%
>170,000 bls	9 23.8%	3 11.2%	4 46.3%	3 23.7%	2 8.0%	4 72.6%	12 67.7%	46 28.2%

Table 3.2. Number of breweries and share of output by brewery size, 1905.*

Source. Census of Manufactures, 1905.

* Production levels are estimated by dividing the value of output by the average price. For Illinois, the two breweries with production levels exceeding 170,000 barrels (or value of output >\$1 million) were collapsed with the category of breweries making 16,600-170,000 bls. I have estimated these two breweries to have produced 8% of Illinois' total production.

error in its categorization of the breweries that made up the industry during these years: it contrasts large, shipping breweries with small, local operations. This characterization over simplifies the brewing industry's structure. From the 1870s to the 1910s, the industry was comprised of four distinct types of breweries: large-scale shippers, large-scale local breweries, medium-sized shippers, and small-to-medium sized local breweries.

The large nationally oriented shippers studied by Cochran and Plavchan operated in Milwaukee, St. Louis, and Cincinnati, cities that were too small to absorb all their output, and so they systematically set out to ship their product to other regions. By combining mass production and mass distribution, they came closest to fitting Chandler's conception of modern business enterprises.

The large local breweries rivaled the national shippers in size, but concentrated on local markets. Many of these firms were based in such Eastern cities as New York, Philadelphia, and Newark; with sizable local markets, they did not need to ship beer. (New York City's Ehert brewery, for example, was the nation's largest in 1877; by the 1910s, its annual production topped one

million barrels, placing it alongside the largest of the shipping brewers.) The achievements of these firms impugn Chandler's argument that success required large-scale breweries to combine mass production and mass distribution.⁴ A more detailed understanding of the brewing industry shows that there was not just one preordained path to market victory: factors such as legal arrangements and retail practices mattered greatly. As we shall see later in this chapter, by concentrating on nearby markets in which they secured their own retail outlets, locally oriented breweries frequently outperformed the national shippers.

Most of the medium-sized shippers had annual production levels of at least 30,000 barrels.⁵ Representative of this group was Heileman, the second-largest brewery in LaCrosse, Wisconsin (across town, the Gund brewery had a capacity of 400,000-500,000 barrels). Heileman distinguished itself from its local rival by aggressively shipping large percentages of its beer. The number of regional brewers who actively shipped beer probably did not number more than 150-300.⁶

The small-to-medium sized local breweries had annual production levels ranging from 500-170,000 barrels.

These locally oriented breweries sold their beer on tap in saloons that they usually controlled or influenced. They made up the majority of the nation's breweries, and their achievements belie both Chandler's thesis and the more traditional arguments that rising minimum-efficient scales inexorably drove small breweries from the industry. In fact, many of these small, local breweries thrived in the backyards of the national shippers in Cincinnati, Milwaukee, and St. Louis. Some of these breweries were: Schaller Brewing, Fairmount Brewing, and Jung Brewing in Cincinnati; John Graf Brewing, Eugene Husting Brewing, and the Independent Milwaukee Brewery in Milwaukee; and Empire Brewing, Columbia Brewing, and Forest Park Brewing in St. Louis.⁷

The brewing industry was, then, quite different from the picture presented in the standard story. It did not consist only of large, shipping breweries and small, local breweries. In fact, the important categorization is not large vs. small breweries, but shipping vs. local breweries. Large and small local breweries had more in common than did the large shippers and large local breweries.

There were two categories of breweries propelling the brewing industry forward during this period: the hundreds of small and mid-sized local breweries, and the large, locally oriented breweries such as Ehert, Berneimer & Schmid, Ruppert, and Peter Doelger in New York City, Conrad Seipp in Chicago, the Massachusetts Breweries Company and the New England Breweries Company in Boston, Peter Ballantine and Sons in Newark, the Gottlieb-Bauernschmidt-Strauss Brewing Company in Baltimore, Frank Jones Brewing in Portsmouth, New Hampshire, the Pittsburgh Brewing Company, and Duquesne Brewing in Pittsburgh, and Bergner & Engel in Philadelphia.⁸

Section 3.2: Efficiency and brewery size

Defenders of the standard narrative might object that even if the national shipping breweries were not pacing the industry's growth during these years, their eventual ascendancy was a natural reflection of their greater productive efficiencies. We can use two proxy variables to evaluate relative levels of efficiency: brewery profitability and price per barrel of beer. McGahan, Chandler, and

others argue that the largest breweries were the most profitable, and had the lowest prices. We can use 1905 *Census of Manufacturing* data to test this commonly held belief about the relationship between brewery size and profitability. Following Lamoreaux's work with census data, profitability has been calculated as: [Annual value of output - (Annual wage bill + Annual miscellaneous expenses)] / [Value of Capital Invested].⁹ Column One presents categories of the value of brewery production, and Column Two provides estimated production levels (see Table 3.3).

The standard story presumes that the largest breweries were the most efficient, and, therefore, enjoyed the highest profit rates. In this view, small breweries continued to operate only to the extent that they were insulated from their larger rivals by distance. While national profit data are unavailable, we can compare profit rates for the seven leading brewing states. Table 3.3 clearly indicates that profit rates and brewery size are not directly correlated. The largest breweries were not the most profitable in any of these seven key brewing states. This was true even for Wisconsin, which had only four breweries with output levels above 170,000 barrels: the national shippers Pabst, Schlitz, and Blatz, all based in Milwaukee, and Gund, located in LaCrosse. These four breweries, among the largest in the nation, did not generate the highest profit rates in Wisconsin. Missouri, which according to Table 3.2 had the greatest concentration of large breweries of any state, also saw lower profit rates for its largest firms.

Table 3.3 shows that the most profitable breweries were the mid-sized firms. This reinforces our earlier finding that it was these firms that were driving industry growth.¹⁰

These data also reveal that by the early 1900s the shipping brewers had high profit rates, though not the highest rates in the industry. However, the figures do not address the degree to which the continued high profit rates by smaller brewers reflected their insulation from the shippers. Were these firms local monopolies that extorted high prices from consumers? Passel and Attack argue that for a variety of industries, including brewing, smaller firms continued to operate longer than was economically efficient because they were sheltered from the full brunt of their larger rivals' price competitiveness.¹¹ According to McGahan:

Value of Brewery Output	Estimated Annual Production Levels	New York	Ohio	New Jersey	Illinois	Penn	Missouri	Wisconsin
Less than \$5,000	<800 bls	6.1%	-1.6%		16.9%	-6.2%	n.a.	11.1%
\$5,000-20,000	800-3,300 bls	10.3%	9.9%	16.8%	-5.0%	9.5%	19.8%	19.4%
\$20,000-100.00	3,300-16,600 bls	9.8%	14.9%	13.6%	11.3%	10.2%	15.9%	18.9%
\$100,000-1 million	16,600-170,000 bls	12.2%	15.9%	15.0%	11.0%	12.1%	14.4%	15.0%
>\$1 million	>170,000	9.6%	9.3%	11.0%		8.6%	8.5%	18.2%
Total	Total	11.4%	13.8%	13.1%	10.8%	11.3%	10.0%	17.8%

Table 3.3. Profit margin by brewery size, 1905*

Source. Census of Manufactures, 1905.

*The Census report notes that for Illinois, two breweries which had sales of over \$1,000,000 were grouped with the breweries in the category \$100,000-\$1,000,000. One of the breweries was the Chicago-based Conrad Seipp, which at the turn of the century was producing 350,000 bls of beer, for an estimated value of approximately \$1.7 million dollars.

The shipping brewers exploited economies of scale in production to produce better quality beer more cheaply at the brewery, but at a higher price once transportation costs entered into the calculus. The shipper's distribution range radiated serially outward along railroad routes as transportation costs fell and as production scale economies mounted. Increments in economical distribution range forced out marginal brewers in towns along the routes and caused the total number of brewers gradually to decline.¹²

The propensity of smaller breweries to exit the industry during the 1930s followed a trend established in the 1890s. A series of increases in economies of scale and scope accounts for the steady decline.¹³

This understanding of the role of transportation costs is incomplete. Smaller breweries did not have to rely on distance to safeguard their operations, and in fact many small and medium breweries operated alongside the largest shipping firms in the same city. St. Louis in 1905 was home to two national shippers, Anheuser-Busch and Lemp, but it also supported 20 locally oriented

breweries. Among the successful local St. Louis breweries were Missouri Weiss Beer Brewing, Columbia Brewing, Empire Brewing, Charles G. Stifel's Brewery, Forest Park Brewing, Gast Brewing, H. Grone Brewery, American Brewing, Hyde Park Brewery, National Brewery, Green Tree Brewery, Schorr-Kolkschneider Brewing, Schroeder's Berliner Weiss Beer Brewing, and Louis Obert Brewing.¹⁴ Consumers in Cincinnati patronized the national shipper Christian Morelin, as well as 22 other breweries. Downard, in his study of the Cincinnati brewing industry, notes that 'there were many smaller breweries in business at the turn of the century whose products were just as popular as those of the larger establishments'.¹⁵ Even Milwaukee, home to three national shippers (Pabst, Blatz, and Schlitz), could support ten local breweries.¹⁶ Clearly, these firms did not owe their continued existence to distance and transportation costs.

The experiences of the medium-sized Heileman of LaCrosse, Wisconsin, also challenges the transportation-cost argument. LaCrosse is much farther from

Chicago than Milwaukee, but this did not prove to be an obstacle for Heileman. In the 1900s and 1910s, it shipped beer from LaCrosse to the more than 50 saloons it owned in Chicago, successfully contesting national shippers, including those based in Milwaukee.¹⁷ Heileman's annual production during these years was never more than 10% of the output of national shippers such as Anheuser-Busch or Pabst.¹⁸

While Table 3.3 addresses the relationship between profitability and size, we can also consider the connection between size and efficiency. Plavchan, in his discussion of Anheuser-Busch, writes approvingly of its fixed-capital investments in the 1890s: 'Further enlargement of the physical plant enabled the Anheuser-Busch brewery to become not only the largest brewing works in St. Louis, but also the largest in the world'.¹⁹ Interestingly, though Anheuser-Busch owned the world's largest brewery, it was not the world's leading beer producer. Comparative data indicate that from 1895 to 1915 Anheuser-Busch's annual output levels remained between 36 to 54% of that produced by the leading UK brewery.²⁰ This finding further weakens claims that the dominant American shipping breweries were characterized by their unparalleled productive efficiencies..

We can also challenge the presumption that shipping breweries, through their greater efficiencies, charged lower prices for their beer. According to McGahan, 'The shipping brewers exploited economies of scale in production to produce better quality beer more cheaply at the brewery'.²¹ Chandler makes a similar argument, stressing the shippers' innovative coordination of production and distribution. Baron also believes that shippers' beer was less expensive.

But, Cochran and Plavchan provide compelling evidence that the shippers did not try to compete on price. According to Cochran, the shippers 'tried to sell at a uniform price above that of the local competitors' in Eastern cities.²² Sales for the shippers, he argues, 'depended more on quality than on price. Where local demand could be built up for extra quality, Milwaukee beer obviously could stand a price differential of \$1.00 to \$1.50'.²³ He provides data showing that local New York breweries would charge \$6.00 to \$7.00 per barrel, while national shippers charged around \$9.00 a barrel. He argues, then, that the shippers tried to sell a higher

quality but more costly beer. Plavchan makes a similar point for Anheuser-Busch, arguing that it charged a higher price because it made a superior product.²⁴

We can compare the average price per barrel of beer across the leading brewing states. We know that Wisconsin's three shipping breweries and Missouri's two shippers accounted for over 50% of the total beer output in these states.²⁵ If the standard narrative were correct, we would expect Wisconsin and Missouri to have significantly lower average prices per barrel of beer compared to the other leading brewing states in which medium-sized breweries accounted for between 60 and 80% of the total output. Using U. S. Census of Manufactures and U.S. Brewers Association data, Table 3.4 estimates the price per barrel of beer in the twelve leading beer producing states:

The table shows that Illinois had one of the lowest per barrel prices of any of the top brewing states, 41% below Wisconsin's and 39% below Missouri's. Chicago, though home to Conrad Seipp, a brewery making 300,00-350,000 barrels annually by the early 1900s, did not boast any nationally prominent shipping brewers, as did St. Louis and Milwaukee, or any dominant local mass producers like Ebert of New York City. Illinois's production was concentrated in smaller, local firms. Thus, there was great local competition in Chicago and in the rest of the state. Reflecting their local orientation, these breweries produced cheaper draught beer, not the more expensive bottled beer increasingly favored by shippers. We examine the differences between draught and bottled beer in Section 3.4.

The nearby shipping breweries in Wisconsin and Missouri produced more beer than their local markets could absorb. They looked to Illinois, and particularly Chicago, as a potential market for their surplus beer. Cochran discusses in several places the importance of the Illinois market. From 1909-1913, Pabst's average beer sales in Illinois were 244,092 barrels, higher even than its home state sales of 180,961 barrels.²⁶

The shippers, however, were not uniformly successful in Chicago. According to a table constructed by Cochran, Pabst lost more than \$850,000 on its Chicago business between 1904 and 1912.²⁷ Such losses reflect the competitive nature of the beer market in Chicago

State	Production (Barrels)	Value of Output	Average Price per Barrel
New York	11,060,000	\$61,958,142	\$5.60
Pennsylvania	6,114,000	\$34,863,823	\$5.70
Illinois	4,777,000	\$23,787,036	\$4.98
wisconsin	4,078,000	\$28,692,340	\$7.04
Ohio	3,907,000	\$21,620,794	\$5.53
Missouri	3,502,000	\$24,154,264	\$6.90
New Jersey	2,684,000	\$17,446,447	\$6.50
Massachusetts	1,832,000	\$11,080,944	\$6.05
Maryland	1,310,000	\$4,967,063	\$3.79
Michigan	1,217,000	\$6,999,251	\$5.75
Minnesota	986,000	\$6,177,528	\$6.27
Connecticut & Rhode Island	937,000	\$5,666,332	\$6.05
Top twelve States	42,404,000	\$247,413,964	\$5.83
Total for industry	49,459,000	\$298,358,732	\$6.03

Table 3.4. Production and price data in the twelve leading brewing States, 1905*

Source. US Brewers Association Year Book, 1911; Census of Manufactures, 1905

* Production data are taken from US Brewers Association Year Book, 1911, and Value data are from 1905 US Census of Manufactures. Price per barrel is calculated by dividing production levels by the value of the output. These price calculations correspond with historical data, see *Cochran, T. (1948) Pabst Brewing Company: The History of an American Business. New York: New York University Press. pp.160-179*; Downard, W. (1973) *The Cincinnati Brewing Industry: A Social and Economic History. Athens: Ohio University Press. p.85.*

and Illinois. The concentration of a large number of medium-sized breweries in the state, along with the need for nearby shipping breweries to find outlets for their excess product, resulted in low beer prices for Illinois.

Table 3.4 also shows that prices per barrel in the top three producing states - New York, Pennsylvania, and Illinois - were below the national average.²⁸ The two states with the highest price per barrel were Wisconsin (\$7.04 per barrel) and Missouri (\$6.90 per barrel). If the

shippers rose to the fore because of their inherent efficiencies, why was the average price of beer so high in these two great shipping states? Chandler's modern business enterprises (and he cited as an example the national beer shippers) supposedly drove their competitors out of business through greater productive and distributive efficiencies. He claims that the national shipping breweries combined 'high quality at low prices'.²⁹ Cochran provides one possible explanation: the national shippers offered a higher-quality beer, thus the higher cost.

I agree with Cochran that the shippers charged much more for their beer but I find different reasons: they spent very large sums of money on advertising and marketing campaigns to construct demand for their beers, and they began to emphasize bottled beer, which was much more costly to brew, package, and sell than the traditional draught beer produced by local firms.

Looking back to our matrix from Chapter One, we see that Cochran's view belongs in Row One: the success of a firm is simply a reflection of its greater productive efficiency or higher product quality. In contrast, my Quadrant IV interpretation can attribute the achievements of the shippers to historically contingent processes.

We may now examine why the factors adduced in Chapter Two did not enable the shippers to control the pre-Prohibition market, and what factors allowed the local breweries to increase their hold on the market. We turn our attention away from industry structure and toward the steps taken by local and shipping breweries to shape and construct their economic environments. In Section 3.3 we see how different types of breweries chose to vertically integrate, and we evaluate how successful these efforts were. In Sections 3.4, 3.5, and 3.6 we review changes in how beer was sold, and changes in the product itself. These four sections demonstrate that all breweries interacted with their social and economic environment: they did not passively respond to changing consumer preferences, new market demands, and government policies, but actively worked to shape these factors.

Section 3.3: Vertical integration and brewery success

The standard story follows Chandler's work in arguing that the national shippers reached greater productive and distributive efficiencies through their innovative investments in vertical integration. According to Lazonick, the innovative firm will be more vertically integrated than its adaptive counterparts, and he defends Pabst's backward integration into timber and barrel making as an 'economically rational' investment to secure necessary supplies.³⁰ Chandler attributes much of the successes of modern business enterprises to their ability to internalize production processes. Though writing several decades before Chandler, Cochran, too,

highlights several steps taken by Pabst that lessened its dependence on external suppliers.

Perhaps the most prominent example of backward integration concerns malting. Cochran discusses Pabst's internalization of malting, and Chandler cites this example as representative of the efforts taken by the national shippers to gain greater control over their inputs: 'In the 1880s a new pneumatic malting process increased speed and improved control in the process of brewing beer'.³¹ By replacing market-purchased malt with internal malt, the shippers brewed better beer, and they speeded up the brewing process.

Leaving aside the effect pneumatic malting has on the quality of malt,³² Chandler and others overvalue the gains from internalizing malting, which did not give the national shipping brewers a competitive advantage. Independent maltsters met the demands of breweries which chose not to integrate upstream into malting. In a 1909 book sponsored by the United States Brewers Association, Gallus Thomann argued:

The business of malting has kept pace with the development of brewing, and one of the inevitable results of the suddenly large demands was the establishment of many separate malt-houses, fitted up with all modern improvements. This progress, in turn, led, in a very large measure, to the discontinuation of malting by brewers. As the present time, a comparatively small number of brewers malt their own barley, it being more profitable and, usually, more satisfactory to draw on the maltster for the requisite supplies.³³

Breweries that relied on the market had ready supplies of efficiently produced malt. For example, Ehert, one of the nation's largest pre-Prohibition brewers, bought all of his barley already malted. This was a common practice; *Census of Manufacturing* data for 1900 indicate there were 146 independent maltsters in the US. They pioneered many of the changing technologies and processes of this period, and were able to pass their savings on to their customers.³⁴

A more important example of integration in the standard story is the shippers' forward integration in bottling, pasteurizing, and transportation. These investments, it has been argued, enabled the shippers to transport efficiently their draught and bottled beer. Yet, these strategic forward integrations were not effective. As we

have seen in Section 3.1, the shippers saw their relative share of the industry market fall after the mid-1890s. In addition, the shippers were unable to foster a wide market for pasteurized, packaged, shipped beer: prior to Prohibition, bottled beer only accounted for 5 to 15% of total beer sales. Local producers selling draught beer dominated the pre-Prohibition beer market, accounting for approximately 85 to 95% of all beer sales. Downard notes that in Cincinnati in 1894, 'more than 95 percent of the local consumption of about 852,000 barrels of beer was locally brewed'.³⁵ This was also true for the nation in general. There may have been pockets where the shippers enjoyed a greater penetration, but the overall industry was characterized by local producers brewing for local consumers.

The next step is to ask why the shippers were unable to take fuller advantage of their extensive forward investments: In other words, why were they unable to expand their sales of both draught and bottled beer? Part of the answer lies in a competing example of forward integration. Prior to Prohibition, the American brewing industry was characterized by the tied-house system, in which breweries owned or controlled their principal retail outlets, saloons.³⁶ Duis dates the breweries' gradual takeover of the retail trade to the late 19th century:

First came rental of bars, mirrors, sideboards and other fixtures to saloonkeepers. By January 1884, the Daily News counted over 200 such arrangements, but its survey was incomplete. Less than a decade later the brewers were renting \$210,565 worth of fixtures to several thousand saloons. Finally, by 1916 the companies [breweries] owned the equipment of 4,679 of the 7,000 bars in Chicago.³⁷

Local breweries began to expand their control of saloons in the 1890s, and then extended this control during the 1900s and 1910s, precisely the same period in which shippers began to see their production levels beginning to stagnate: as local breweries took fuller advantage of this integration, they limited the ability of the shippers to expand their sales - and in some cases, even to maintain their output levels.

There were two major forces which led to this control. First, many state and local authorities began imposing expensive license requirements on saloons, forcing them to turn to breweries for financial support.³⁸ Second, breweries realized that it was costly and cum-

bersome for saloons to stock a variety of draught beers. It was far easier for barkeepers to contract with only one brewery. In return, breweries rewarded these saloons with financial incentives.

Local breweries only needed to own or control saloons in their immediate area. National shippers were at a great disadvantage: to become national brands, they would have to secure access to saloons throughout the country. The expense of controlling thousands of saloons was daunting, and, in a political environment that gave rise to many local and state prohibition movements, quite risky. National shippers, more attuned to these developments than local brewers based in brewing strongholds, had good reasons for limiting their saloon investments in many parts of the country. Clearly, a better strategy for them would be to promote a legal system that formally separated the selling and producing of beer. Pabst's rather dismal efforts in the important Chicago market suggest some of the difficulties the national shippers encountered. Despite substantial investments in packaging, pasteurizing, and shipping beer, they slowly realized they would not reap the benefits of these efforts if they couldn't place their beer in the dominant retail outlets.

The expansion of breweries forward into the retail market is best understood using a Quadrant IV understanding of how and why economic processes unfold. Local breweries of all sizes found they could compete with the national shippers by securing retail outlets. This was an innovative and highly effective use of *forward integration*, but this example of *vertical integration* has less to do with productive and distributive efficiency than market power. By monopolizing access to saloons, the local breweries severely limited the shippers' retail options.

What is remarkable, however, is that some orthodox commentators have argued that forward integration into saloons was a waste of time and money. According to Williamson:

Pabst Brewing, Schlitz and other large brewers purchased saloons in the late 1800s and rented them to operators as outlets for their brands of beer. Whatever the merits it might have had at the time-which, except as a short-run expedient, appear to be doubtful-the shift from kegs to bottled beer rendered it nonviable.³⁹

This passage reflects a poor understanding of the workings of the pre-Prohibition beer industry. The ownership and control of saloons during these years cannot be dismissed as a short-run expedient. In a market in which draught beer constituted 85-95% of all sales, breweries needed continual access to retail outlets. In addition, Williamson does not realize that as local brewers steadily increased their control of saloons, shippers were left with fewer and fewer retail outlets for their draught beer. Shippers found themselves in the dubious position of trying to secure outlets for their draught beer, while simultaneously promoting bottled beer, which could be sold in other venues. The prominence of draught beer served in saloons is, in fact, only part of a broader story, that of saloon culture. Burnham discusses the interrelationship of several 'Bad Habits', drinking, smoking, gambling, taking drugs, and swearing, which were directly shaped by pre-Prohibition saloon culture.⁴⁰ It was the importance of the saloon that led the most successful anti-Prohibitionists to name their organization the Anti-Saloon League.⁴¹

What was emerging was a situation in which the local breweries were becoming increasingly tied to saloons, while the shippers were becoming, for several reasons, wary of saloons. In a sense, the saloon becomes a crucial point of intersection between producer and consumer. There emerges out of these two brewery reactions towards saloons alternative consumption patterns which cut across political, cultural, and technological lines. Local breweries focus on working class drinkers who prefer the more affordable draught beer provided at the local saloon—a site which offers far more than beer. Shippers, in contrast, could begin to think about targeting more affluent drinkers who could afford bottled beer, and who preferred to avoid the saloon—and that was associated with visits to it.

Williamson ignores not only how beer was sold during these years, but the environment in which saloons, breweries, and consumers interacted. To maintain that the ultimate decline of keg beer rendered nonviable a key pre-Prohibition distribution tactic is to blithely presume that the ascendancy of bottled beer was a natural market process. The legal relationship that allowed breweries to control or greatly influence the most important retail outlet for beer was one of the integral features of the pre-Prohibition brewing industry. As we shall see in the next chapter, shippers actively lobbied to

change the law allowing ownership of retail outlets by breweries. Williamson's projection of a 1930s retail pattern on pre-Prohibition years manifests a blatant misunderstanding of how, and why, legal relationships in these periods evolved.

The picture now taking form is quite distinct from the one that is sketched out in the standard narrative. The national shippers were not the driving force behind the industry's dramatic increase in overall production, and their 'greater efficiencies' did not translate into a growing market share.

Consistent with a Quadrant IV interpretation, power emerges as an integral explanatory factor. However, the achievements of local breweries can be attributed to more than their power over retail outlets. Consumers had good reasons for supporting local breweries - their unpasteurized draught lagers were usually cheaper, fresher, and of high quality. The shippers, in contrast, were trying to increase bottled beer sales, and to lengthen the shelf life of their draught and bottled beer.

The next several sections detail differences in the types of beer local and shipping breweries made. Section 3.4 examines whether the rise of bottled beer reflected changes in exogenous consumer preferences, or whether its growing popularity was a result of steps taken by the shippers to shape a demand for it? In Sections 3.5 through 3.7, I review changes to the nature of the product itself, and I ask the same question: were these changes driven by the exogenous force of consumer demand, or did the breweries play key roles in these developments?

Section 3.4: The introduction of bottled beer and pasteurization

Cochran, Plavchan, and others presumed that consumers had a natural preference for bottled beer. By positing the exogenous demand, their objective was to explicate the developments that facilitated its supply. They attribute the growth of bottled beer to advances in technology and science, and to a more fully articulated railroad system, which lowered transportation costs. This portrayal highlights a recurring tension in the standard work. The authors focus almost entirely on factors that simplified the production of bottled beer, and then

mention only parenthetically that breweries, in making bottled beer, were responding to consumer demand. By arguing that consumer demand drives producer behavior, the standard story maintains that bottled beer was a quality product. If it were otherwise, rational consumers would not buy it.

Cochran makes it clear in his chapter 'Brewing Becomes More Scientific' that advances in the technology and science of bottling beer were crucial. Writing about the pre-Prohibition market, he states 'In the long view of the history of brewing, the introduction of large-scale bottling for shipping purposes may well have been the most important development in the industry'.⁴² Large-scale shipping of bottled beer depended upon Pasteur's work in biochemistry, as well as innovations in bottling and bottle washing.

Even with these advances, there were enormous obstacles. It was difficult to maintain consistency, flavor, and stability. Furthermore, brewers were subject to an archaic method of taxation not designed for bottled beer. In this environment, it would appear that the only reason for expanding into bottled beer - and this is what the orthodox narrative argues - was to meet a clamorous consumer demand.

There are two problems with this interpretation. First, it ignores the possibility that shippers had underlying motives for constructing the demand. Second, it moves the debate away from the quality differences between local draught beer and bottled beer and concentrates on the much narrower question of quality variations among bottled beers.

I argue that bottled beer held five great attractions for the shippers: 1) it allowed them to decrease their reliance on saloons, 2) it could be more readily shipped to dry counties and states,⁴³ 3) it facilitated efforts to construct brand loyalty, 4) it could be directly targeted to affluent, middle-class consumers, and 5) it offered higher profit rates. I will expand on each of these points.

First, the shipping breweries desperately needed alternatives to locally controlled saloons, and bottled beer offered them access to new venues, such as restaurants and nightclubs, which were not contractually tied to local producers. Pabst sought to expand into New York City in the 1890s, but it faced nearly insurmountable

obstacles. Ebert Brewery alone controlled between 800 to 1,000 saloons; combined with the scores of other locally oriented firms, national shippers did not have ready access to the dominant retail outlet. Pabst responded in New York by selling its beer in 'outlets of real distinction', prominent hotels and restaurants.⁴⁴ These upscale venues gave Pabst access to the New York market, and access to a more upscale clientele that could afford the more expensive bottled beer.

Second, bottled beer enabled shippers to more easily penetrate dry counties and states where draught beer's bulkiness was a liability. Prior to national prohibition, several state and local prohibition laws allowed beer to be imported into the state and sold legally there. Cochran notes that the prohibition movement 'did not stop the consumption of beer, even in the dry states ... but it continually added to the number of drinking voters who had no interest in saving the saloon'.⁴⁵ In communities that were becoming progressively anti-saloon, bottled beer clearly offered shippers strategic advantages.

Third, breweries used beer bottles, or more specifically beer bottle labels, in their efforts to construct brand loyalty. Strasser⁴⁶ discusses the growing importance of branding as more and more products were sold in packaged form, rather than out of bins or, as in the case of draught beer, on tap. Bottled beer helped the shippers to more readily differentiate their products.⁴⁷

Fourth, bottled beer helped shippers to target affluent, middle-class drinkers. Bottled beer's greater flexibility in the retail market appealed to many middle-class drinkers who were less inclined to drink draught beer in saloons.⁴⁸

Fifth, and perhaps most important, bottled beer offered much greater profit potential. Data for Blatz and Pabst in Table 3.5 show that bottled beer was much more profitable than the more popular draught beer.⁴⁹

The comparative data for Pabst are particularly suggestive. From 1881 to 1890, the company earned approximately the same rate of profit from keg and bottled beer; however, bottled beer began to return consistently higher profit rates in 1891. For the years 1904 to 1918, Pabst enjoyed returns on their bottled beer that were 300 to 1,000% higher than their keg profit rates.⁵⁰

Year	Pabst			Blatz		Year	Pabst			Blatz	
	Total profits per barrel of beer	Profits per barrel of keg beer	Profits per barrel of bottled beer	Profits per barrel of bottled beer	Total profits per barrel of beer		Profits per barrel of keg beer	Profits per barrel of bottled beer	Profits per barrel of bottled beer		
1873	\$1.88	n.a.	n.a.	n.a.	1896	n.a.	n.a.	\$0.75	\$1.83		
1874	\$0.16	n.a.	n.a.	n.a.	1897	n.a.	n.a.	\$2.64	\$1.89		
1875	\$0.34	n.a.	n.a.	n.a.	1898	n.a.	n.a.	\$2.54	\$2.12		
1876	\$1.53	n.a.	n.a.	n.a.	1899	n.a.	n.a.	n.a.	\$2.25		
1877	\$1.21	n.a.	n.a.	n.a.	1900	n.a.	n.a.	n.a.	\$1.90		
1878	\$0.37	n.a.	n.a.	n.a.	1901	n.a.	n.a.	n.a.	\$1.70		
1879	\$0.83	n.a.	n.a.	n.a.	1902	n.a.	n.a.	n.a.	\$1.87		
1880	\$0.69	n.a.	n.a.	n.a.	1903	n.a.	n.a.	n.a.	n.a.		
1881	\$0.97	\$0.96	\$1.25	n.a.	1904	\$0.77	\$0.39	\$3.53	n.a.		
1882	\$0.84	\$0.88	\$0.13	n.a.	1905	\$0.67	\$0.27	\$3.62	n.a.		
1883	\$1.03	n.a.	loss	n.a.	1906	\$0.99	\$0.41		n.a.		
1884	\$1.05	\$1.10	\$0.33	n.a.	1907	\$0.77	\$0.34	\$3.90	n.a.		
1885	\$1.42	\$1.51	\$0.52	n.a.	1908	\$0.47	\$0.06	\$3.50	n.a.		
1886	\$1.14	\$1.22	\$0.62	n.a.	1909	\$0.89	\$0.49	\$3.80	n.a.		
1887	\$1.32	\$1.45	\$0.47	n.a.	1910	\$0.97	\$0.55	\$4.05	n.a.		
1888	\$1.14	\$1.06	\$1.67	\$2.06	1911	\$0.89	\$0.44	\$4.22	n.a.		
1889	\$1.61	\$1.58	\$1.81	\$2.27	1912	\$0.41	\$0.04	\$3.13	n.a.		
1890	\$2.23	\$2.23	\$2.21	n.a.	1913	\$0.59	\$0.40	\$2.91	n.a.		
1891	\$1.50	\$1.38	\$2.37	\$2.70	1914	\$0.44	\$0.20	\$2.42	n.a.		
1892	\$1.25	\$1.06	\$2.64	\$2.01	1915	\$0.36	\$0.05	\$1.76	n.a.		
1893	\$1.34	\$1.29	\$1.83	\$2.20	1916	\$0.46	\$0.46	\$1.93	n.a.		
1894	n.a.	n.a.	n.a.	\$1.88	1917	\$0.38	\$0.12	\$1.20	n.a.		
1895	n.a.	n.a.	n.a.	\$1.73	1918	\$0.60	\$0.79	\$2.54	n.a.		

Table 3.5. Pabst and Blatz profit data, 1873-1918.

Source. Cochran, T. (1948) Pabst Brewing Company: The History of an American Business. New York: New York University Press; Blatz Archives, University of Wyoming.

Data for Blatz from 1888-1901 indicate that it too earned high rates of return on its bottled beer. In his study of Anheuser-Busch, Plavchan states, ‘There could be no denial that it was sometimes difficult to sell keg beer and still make a profit, but there was less local competition with bottled beer so that profitable prices could be kept’.⁵¹ The shippers, facing much greater competition in the draught beer market, actively promoted the more profitable bottled beer which they were better positioned to provide.

Bottled beer’s greater profits reflected not lower costs but higher retail prices. Cochran provides 1880s data which show that the labor cost per barrel of bottled beer was more than twice that for keg beer.⁵² Heileman data for the early 1900s provide a detailed comparison (see Table 3.6).

A further comparison between Heileman’s and Pabst’s keg and bottled beer profit rates, shows that both firms had great financial incentives for promoting bottled beer (see Table 3.7).

Heileman was a mid-sized regional brewer; Pabst the second largest national brewer. Again it seems clear that the proper distinction is not between large and small

	Keg beer	Bottled beer
Cost Brewing/Barrel	\$2.26	\$12.54
Cost Selling/Barrel	\$1.80	\$3.31
General Expenses/ Barrel	\$0.97	\$1.79
Total Cost/Barrel	\$6.03*	\$17.64
Average Selling Price/Barrel	\$6.55	\$20.80
Profit/Barrel	\$0.52	\$3.17

Table 3.6. Heileman keg and bottled beer cost data, 1902.

Source. Heileman Annual Report, 1902.

*The Total Cost/Bl for Keg Beer also includes \$1.00 for federal tax; this amount is included for bottled beer in the Cost brewing/Bl.

	Keg Profit Rate Per Barrel	Bottled Beer Profit Rate Per Barrel	Bottled Profit Rate/Keg Profit Rate
Heileman (1902)	\$0.52	\$3.17	610%
Pabst (1904)	\$0.39	\$3.53	905%

Table 3.7. Heileman and Pabst per barrel profit rates, 1902 and 1904.

Source. Heileman Annual Report, 1902; Cochran, T. (1948) Pabst Brewing Company: The History of an American Business. New York: New York University Press.

breweries, but between local and shipping breweries. Many large, local breweries did not bottle their beer, while many regional brewers followed the national shippers into packaging. Heileman’s performance shows that a smaller firm could be quite successful in bottling and shipping.

Having argued that the shippers had strong motives for promoting bottled beer, the next step is to prove they acted on these motives. Whereas the standard story focuses primarily on investments the shippers made to more efficiently produce bottled beer, I argue that the shippers developed a more comprehensive strategy involving the production, distribution, and consumption of bottled beer.

As discussed in Chapter Two, shippers made a series of investments in technology, science, and transportation that contributed to more efficient bottled beer production and distribution. They also worked to change legal arrangements that impeded their attempts to bottle beer. The most prominent example concerned taxation. The federal government first imposed excise taxes on beer in 1862 to help fund its Civil War expenditures. At this time, practically all beer was sold through kegs; there was no bottled production. Consequently, the tax law was written specifically for keg beer, and it specified that a tax stamp had to be placed on the beer barrel after production to indicate payment of the excise.

In the 1870s and 1880s, as the leading shippers began to produce more and more bottled beer, these regulations forced brewers to keg the beer, pay the appropriate

taxes, and then transfer the beer to bottles. Captain Pabst, president of the Pabst brewery, set out to change this system. In 1889, two Pabst employees, head brewer J. Theurer, and mechanical engineer Richard Birkholz 'invented a pipe line and bottling system that would guarantee the government against loss or fraud, and would greatly improve the mechanics of bottling'.⁵³ Captain Pabst went before Congress in 1890 and recommended that this pipe line system would ensure the government of its revenue, while enabling breweries to bottle beer much more efficiently. On 8 June 1890, Congress agreed and modified the Internal Revenue Act.

While the standard story treats this as an example of government inhibiting the natural working of the market, I see here an example of the steps entrepreneurial firms take in reconfiguring their market. Captain Pabst realized that he could greatly increase his profits through a more direct bottling procedure, and he set about to change the law that prevented such operations. In 1890, the year Pabst lobbied to change the tax law, Pabst earned approximately equal profit rates on its draught and bottled beer, \$2.23/bl of keg beer vs. \$2.21/bl of bottled beer. Presaging future developments, bottled beer yielded a much greater rate of return in 1891: \$2.37/bl for bottled beer vs. \$1.38/bl for keg beer.

Paralleling these efforts, breweries also set about to shape consumer demand. Led by the national shippers, breweries developed extensive advertising and marketing campaigns. From 1897 to 1914, Pabst spent \$3,764,000 on advertising, much of it to promote its bottled beer. This averages to \$209,111 on advertising per year; for perspective, Coca-Cola spent \$102,000 on advertising in 1902, a level that it is estimated placed it in the top 30 advertisers.⁵⁴

These advertising campaigns promoted bottled beer sales and helped contribute to broader efforts concerning branding.⁵⁵ One series of Anheuser-Busch print advertisements showed the product in wholesome family settings - even mother is holding a bottle of Budweiser.⁵⁶ Another group of ads made the case more explicitly, in text that proclaimed the purity and wholesomeness of Budweiser.

Other breweries made similar appeals. In an early Blatz ad, a well-dressed group of people are sitting in a fine

restaurant enjoying bottled Blatz. A Pabst ad from this period shows two bottles of Pabst beer, corked and looking much like Champagne, next to a platter of oysters.⁵⁷ In a masterful complement to its advertising campaigns, Pabst in 1882 began to tie a piece of blue ribbon around the neck of each bottle of beer. This was the birth of the very successful brand known as Pabst Blue Ribbon. By 1892, 'the company was buying over 300,000 yards of silk annually to tie by hand around the necks of the sloping-shouldered, white bottles'.⁵⁸ Cochran is correct when he notes that 'with Pabst's Blue Ribbon, bottled beer had arrived'.

Heileman's advertisements used German heritage as a motif. In 1902, Heileman changed the name of its premier brand from Golden Leaf Beer to Old Style Lager. Old Style meant Old World, Old World meant German, and German meant quality.⁵⁹ A turn-of-the-century label stated that Heileman didn't 'aim to make the most beer, only the best'.⁶⁰

Thus, shippers promoted bottled beer through innovative measures in production, distribution, and advertising. They contributed to developments in biochemistry (through pasteurization) and technology that allowed bottled beer to be transported greater and greater distances. They lobbied to change the tax code that had unnecessarily encumbered bottled beer. They spent large sums of money to promote bottled beer, hoping to convince consumers that its higher cost was well worth it. They highlighted the greater flexibility of bottled beer, emphasizing in particular how it could be enjoyed at home or in more respectable venues such as restaurants and nightclubs. All of these steps are best viewed as pieces of a comprehensive strategic policy to improve bottled beer sales.

The next step is to examine how effective these efforts were. By traditional criteria, they do not appear to have accomplished much: bottled beer sales remained a small percentage of total pre-Prohibition production, never exceeding about 15% of industry output. It is likely, however, that this share probably rose during the 1900s and 1910s, though by exactly how much is uncertain.

Despite the limited success of bottled beer during the pre-Prohibition period, the shippers' efforts were not in vain. From 1901 to 1905 Pabst's bottled beer sales rose by 50%, even while its total production fell slightly

Year	Total Production (Bls)	Keg (Bls)	Bottled (Bls)	% of beer bottled
1900	30,601	25,484	5,117	16.7%
1901	34,864	28,230	6,634	19.0%
1902	37,462	28,262	9,200	24.6%
1903	38,057	27,781	10,276	27.0%
1904	43,933	29,831	14,082	32.1%
1905	52,833	35,245	17,588	33.3%
1906	63,989	41,632	22,537	34.9%
1907	69,490	44,806	24,684	35.5%
1908	76,736	46,370	30,366	39.6%
1909	92,841	47,795	45,046	48.5%
1910	98,165	53,909	44,256	45.1%
1911	102,201	59,152	43,049	42.1%

Table 3.8. Heilman beer production, 1900-1911

Source. Heileman Annual Reports, 1902,1911.

from 898,000 to 875,000 barrels.⁶¹ Bottled beer accounted for at least half of Pabst's profits from 1904 to 1915: while volume was important, profits were a better gauge of how effective bottled beer was for the shippers.⁶² In 1911, Anheuser-Busch bottled 34% of its output. While a significant level of bottling, even more important were the great profits generated by the higher-priced bottled beer.⁶³

Heileman, a regional shipper, was also successful in increasing demand for its bottled beers (see Table 3.8).

In eleven years, its total output grew over 300%. These data indicate that even at modest production levels of 30,000 barrels, Heileman was bottling nearly one-fifth of its output. As its total production during the 1900s steadily increased, so too did its proportion of bottled to keg beer rise: by 1909, bottled beer accounted for nearly 50% of its production. A company report claims that Heileman had become the country's largest shipper of

bottled beer by 1917, a remarkable achievement for a brewery whose total output never exceeded 10% of the industry's leading firms.⁶⁴

We stated above that the share of bottled beer was probably increasing in the years leading up to Prohibition. Much of this was driven by shippers such as Pabst, Anheuser-Busch, and Heileman. However, there was also a growing trend for more regional shippers. One indication of this development was the increase in the number of firms that took advantage of the change in tax laws allowing breweries to link their storage cellars to bottling houses through pipelines. We can presume that the only breweries going to the expense and effort of installing pipelines were those looking to increase their sales of bottled beer.

While the number of breweries that made the change represented a minority of all breweries, this number doubled in the six years from 1911-1917 (see Table 3.9).

We must now evaluate the consequences of this concentrated effort to promote bottled beer: Did consumers benefit from a higher quality, if more costly, product?

Year	Total US Breweries	Breweries with Pipelines	% of Breweries with Pipelines
1911	1,524	223	15%
1912	1,506	226	15%
1913	1,462	296	20%
1914	1,392	n.a.	-
1915	1,345	362	27%
1916	1,313	374	28%
1917	1,247	367	29%

Table 3.9. Breweries using pipelines to bottling houses, 1911 to 1917.

Source. Brewers Almanac, 1956, 90; US Treasury Department Annual Report, 1911-1917.

Section 3.4A: The arrival of pasteurization

Shipping breweries needed a product with a long shelf life. This need went unmet until the introduction of pasteurization, which Plavchan calls ‘the most important contribution to practical brewing’ in modern times. Yet, in its discussion of pasteurization, the orthodox narrative has not examined the effects this process had on the product and, by extension, the consumer.

There are several ways to pasteurize bottled beer, but the most common during the late 19th century was to place bottled beers on a type of conveyor belt and run them through the pasteurizer, a mechanism that would heat the bottles to a temperature of 140°F, for about 20 minutes.⁶⁵ Today, this process is called tunnel pasteurization.⁶⁶ Another technique - flash pasteurization - consists of passing beer through two heat exchangers. Beer is pumped through the first exchange and heated very quickly to 160°F. Since this temperature is much higher than that used in tunnel pasteurization, the beer needs to be heated for a much shorter time, approximately 20 seconds, before passing into the second exchange where it is cooled.⁶⁷

By killing all active fermentables, this process stabilizes the beer and extends its shelf life. Yet, these results come at a heavy price. Brewing chemists and brewers alike agree that all methods of pasteurization affect the flavor and nature of beer:

Pasteurization damages beer by greatly accelerating oxidation. Obviously, the degree of damage depends on both the time and temperature of the pasteurization cycle and the on the oxidation potential of the beer itself. Beer oxidizes in the bottle because of oxygen dissolved in the finished beer (mostly during filling) and because oxidized tannins and melanoidins that are created by hot-side wort aeration. Clearly, the lower the dissolved oxygen in the bottle and the better the hot wort was handled, the less pasteurization will damage it. Nonetheless, pasteurization always does some damage ... Flash pasteurization is less damaging, in terms of oxidation, than an equivalent degree of tunnel pasteurization.⁶⁸

The very nature of the pasteurization process damages beer, and the tunnel technique used prior to Prohibition for bottled beer was especially harmful. As noted in the discussion at the beginning of Chapter Two, beer is a

fragile product, one that is usually best served fresh. The very act of changing the nature of the product for commercial goals leads to an inferior product. The question of course is how much flavor will breweries be willing to trade-off for pasteurization’s greater convenience?

The standard story focuses on innovations in science and technology which made pasteurization possible, but it ignores the effect on beer. Typical is Elzinga’s summary:

Pasteurization, a process originally devised to preserve wine and beer, was adopted during this period. This meant that beer did not have to be kept cold, could be shipped into hot areas, and could be stored for a longer period of time with refermenting. Once the stability of beer was secured through pasteurization, the way was opened for wide-scale bottling and off-premise consumption of beer.⁶⁹

For Elzinga, beer is a neutral substance, which can and should be heated, cooled, filtered, and pasteurized if these steps will improve its shelf-life or transportability. The commercial convenience of shipping breweries reign supreme in this view. McGahan does consider briefly the effects of this procedure. She writes that ‘pasteurization (which was not applied to draught beer) slightly damaged the taste of the bottled lager, leading brewers to hesitate to distribute it for fear of hurting their reputations’.⁷⁰ She claims that the leading shippers, aware that pasteurization might compromise the flavor of their beer, viewed this new process with some ambivalence..

In fact, it was these very firms that introduced pasteurization. A 7 July 1892 Anheuser-Busch advertisement states in bold letters that it was the first brewery to introduce ‘PASTEURIZED BOTTLED BEER IN AMERICA’.⁷¹ Clearly, it was anything but discreet about its pioneering use of pasteurization. Pabst and the other national shippers quickly followed Anheuser-Busch’s lead, and by the 1890s they too were pasteurizing their bottled beer.

McGahan’s ‘slightly damaged’ taste seems a remarkable understatement when compared with the assertions of most writers on the subject of beer quality. Roger Protz of the British consumer movement Campaign for Real

Ale (CAMRA) goes so far as to say that pasteurization ruins the flavor of beer.⁷² Several large international breweries, like Coors in the US and Grolsch in Holland have never pasteurized their beer. Protz quotes the head brewer of Brand, another Dutch firm, as saying that ‘pasteurization is for the cow shed, not the brew house’.⁷³ Protz, along with the majority of contemporary beer experts, is a vocal advocate for fresh, unpasteurized draught beer.⁷⁴

Brewing chemists have also written about the deleterious effects of pasteurization. In 1945 and 1950, the British-based *Journal of the Institute of Brewing* published review articles on pasteurization. Even at these relatively late dates, the authors discuss many problems that plagued pasteurized beer. Cosbie states, ‘The increasing use of pasteurization is to be regretted’, as ‘it is difficult to believe beer, qua beer, is improved by this process’.⁷⁵ Pasteurization, Cosbie notes, is designed to ensure beer stability and shelf life, and it realizes these ends at the expense of intrinsic product characteristics. Mendlik notes that some of the problems associated with pasteurization can be tempered if brewers modify their brewing process to better withstand the debilitating effects of pasteurization.⁷⁶ Implicit in both of these articles is the fact that if technical problems persisted into the 1950s, then the effects of pasteurization on beer during the years of this study were even greater.

This presumption is borne out, interestingly enough, in a story relating to Anheuser-Busch. Several years after its pioneering use of pasteurization, it introduced a premium brand of beer, Michelob. In contrast to its Budweiser brand, which was America’s best-selling bottled beer, Michelob was served only on draught: ‘The nature of Michelob was such that it could not be bottled because pasteurization would work to the disadvantage of its elusive fragrance and taste’.⁷⁷ That is, Anheuser-Busch knew in 1896 that pasteurization altered and lowered the quality of beer. It did not begin pasteurizing and bottling Michelob until 1961.⁷⁸

Pasteurization’s provision of greater shelf-life necessitated a tradeoff of freshness, flavor, fullness of palate, and head retention.⁷⁹ Thus, it is not surprising that most consumers continued to prefer locally produced, unpasteurized, draught beer.⁸⁰ By seeking to increase their bottled beer sales, shippers were willing to sacrifice beer quality for high profit rates.

Having examined how beer was sold in the pre-Prohibition market, we turn next to the changes in beer itself that took place during these years. Were these moves, as the standard story asserts, passive responses by breweries to exogenous consumer demand? We examine first the rise of lager beer, and then consider changes in how beer was brewed.

Section 3.5: The ascendancy of lager beer

In Chapter Two we showed that lager quickly supplanted ale as the beer of choice in America: by 1900, lager accounted for approximately 90% of industry output. The prevailing story holds that breweries switched to lager because German-American consumers demanded it over ale. Cochran’s demographic argument attributes lager’s popularity and the tremendous increases in per capita consumption detailed in Table 2.1 to the large 19th century influx of German immigrants who demanded the beer they had been drinking in Germany. Thus, German immigrants provided a direct link between the change in product and rising per capita consumption levels. In this view, breweries passively responded to changing consumers and consumer preferences by replacing ale with lager beer.

But, is this picture complete? A closer review of the data calls this into question. During this period there were other important beer-drinking immigrant groups, most notably those from England and Ireland. Consumers in these countries continued to drink only ales and stouts throughout this period, so we would expect that immigrants from these lands would favor ales just as German-Americans preferred lager.

Table 3.10 details the Irish, English, and German immigrant populations in 1870 for the 22 largest cities; all but three of them (New Orleans, San Francisco, and Louisville) are in the twelve most important beer-producing and beer-consuming states.

German immigrants dominated in several cities which came to support substantial brewing centers, notably Milwaukee, St. Louis, and Cincinnati. Overall, however, Anglo and Irish immigrants outnumbered German-Americans by 37% in these top 22 cities combined.⁸¹ If the key factor was the immigrant’s old world beer culture, why didn’t they demand their traditional ales and stouts?

	Total population	Irish	English	Irish + England	Germans	(Irish+English) / Germans
NYC	942,292	202,000	24,408	226,408	151,203	1.50
Philadelphia	674,022	96,698	22,034	118,732	50,746	2.34
Brooklyn	376,099	73,985	18,832	92,817	36,769	2.52
St. Louis	310,864	32,239	5,366	37,605	59,040	0.64
Chicago	298,977	40,000	10,026	50,026	52,316	0.96
Baltimore	267,354	15,223	2,138	17,361	35,276	0.49
Boston	250,526	56,900	6,000	62,900	5,606	11.22
Cincinnati	216,239	18,624	3,524	22,148	49,446	0.45
New Orleans	191,418	14,693	2,005	19,698	15,224	1.10
San Francisco	149,473	25,864	5,166	31,030	13,602	2.28
Buffalo	117,714	11,264	3,558	14,822	22,8220.67	0.67
Washington DC	109,200	6,948	1,231	8,179	4,131	1.98
Newark	105,059	12,481	4,040	16,521	15,873	1.04
Louisville	100,753	7,626	930	8,556	14,380	0.59
Cleveland	92,829	9,964	4,530	14,494	15,855	0.91
Pittsburgh	86,076	13,119	2,838	15,957	8,703	1.83
Jersey City	82,546	17,665	4,005	21,670	7,151	3.03
Detroit	79,577	6,970	3,282	10,252	12,647	0.81
Milwaukee	71,440	3,784	1,395	5,179	22,600	0.23
Albany	69,422	13,276	1,572	14,848	5,168	2.87
Providence	68,904	12,085	2,426	14,511	596	24.35
Rochester	62,386	6,078	2,530	8,608	7,730	1.11
Total		697,486	131,836	829,322	606,311	1.37

Table 3.10. Urban immigrants, 1870.

Source. Dinnerstein, L. and Reimers, D. (1988) *Ethnic Americans: A History of Immigration*. New York: HarperCollins. p.28.

	Per Capita Beer Consumption (Gallons)
Belgium	49
United Kingdom	27
Germany	24
United States	17

Table 3.11. Comparative per capita beer consumption, 1905-1909.

Source. United States Brewers Association Year Book (1911) p.129.

Second, an examination of per capita consumption data shows that Germany did not have the highest per capita beer drinking levels.

Year	United Kingdom (gallons)	United States (gallons)	US consumption as a % of UK consumption
1830	40.4	1.0	2.5%
1840	47.4	1.0	2.1%
1850	33.9	1.0	3.0%
1860	39.2	1.0	2.6%
1870	42.4	5.3	12.5%
1875	49.1	6.6	13.4%
1880	45.6	8.2	18.0%
1885	39.0	10.5	26.9%
1890	40.7	13.6	33.4%
1895	39.4	15.0	38.1%
1900	41.6	16.0	38.5%
1905	36.2	18.3	50.6%
1910	33.3	20.0	60.1%
1915	34.5	18.7	54.3%

Table 3.12. Comparative per capita consumption data, 1830-1910.

Source. Brewers Almanac (1956); Gourvish, T.R. and Wilson. R.G. (1994) The British Brewing Industry: 1830-1980. Cambridge: Cambridge University Press.

In fact, German per capita consumption levels trailed those in Belgium and the United Kingdom (Table 3.11).

Despite the German immigrants, the US never approached Great Britain's levels of per capita beer consumption (Table 3.12). This challenges the assumption that large numbers of Germans were necessary for the rapid rise in US per capita consumption, as well as the broader assumption that consumers were responsible for the replacement of ale by lager. If breweries had passively responded to the market, they would have capitalized on the opportunity to meet this demand for ales and stouts.

I argue that the move from ale to lager was not a natural, consumer-led process, but was instead driven by the producers. German-Americans owned most America's breweries during this period, and they shared a common interest in brewing lager. In general, German-Americans were highly skilled and highly educated, and so were better positioned to set up new breweries than many Anglo-Irish immigrants.⁸² These new owners (and their head brewers) trained or apprenticed in Germany in a lager brewery, or they enrolled in one of the brewing schools that Germans had established in America.⁸³ German-Americans were both producers and consumers of beer, while the poorer, lower skilled, Anglo and Irish immigrants were only consumers, not producers.

Lager was a more predictable and stable product than ale, and better withstood the rigors of bottling, shipping, and storage.⁸⁴ Pasteur himself, in accounting for the tremendous successes of lager beer in late 19th century continental Europe, concluded that the brewing industry required 'more stability and uniformity, both in production and the sale of its good' than ale afforded.⁸⁵ He recognized that breweries valued lager's commercial attributes despite its greater production difficulties.

Local and shipping breweries helped transform the American beer market from ale to lager. However, there were key differences between these two types of breweries. Local breweries produced unpasteurized draught lager, while the shippers were seeking to promote a uniform, standardized lager, one capable of being shipped and stored for long periods of time.

The next step is to consider one of the fundamental assertions of the prevailing narrative, that the shippers made a higher-quality beer.

Section 3.6: The changing nature of beer

In the standard story, the local breweries had, as it were, captive consumers, who had to make do with an inferior product. The shippers, Cochran maintains, charged higher prices because 'they offered a higher quality product'. Chandler makes the same statement: the rise of modern business enterprises such as the national breweries can be attributed to their ability to offer 'high quality at low prices'.⁸⁶ Another echo is found in McGahan: 'The larger shipping brewers produced better beer less expensively (before transportation costs) than local draft producers'.⁸⁷ These authors equate the shipping brewers with quality and value, arguing in essence that what was good for Pabst and Anheuser-Busch was good for the consumer. This interpretation raises two questions: How can beer quality be measured or evaluated, and, using these criteria, did the shippers make better beer? Though many factors affect beer quality, three pre-Prohibition developments were of crucial importance: changes in the types of raw materials used in brewing, the amount and mix of raw materials used per barrel of beer, and the length of time the beer was lagered.

According to Cochran: 'Careful selection of the finest materials and the adoption of the newest brewing processes made Pabst beer generally superior to that produced by some two thousand smaller brewers'.⁸⁸ To evaluate such an assertion, we need to look at what those materials were. I wish to show that the leading shippers used inferior barley, low grade hops and hops extract, and cheap adjuncts such as corn and rice. There is no evidence that the shippers used higher-quality inputs than local breweries; in fact, one can argue that some local breweries brewed more consistently with traditional and arguably better inputs.

The issue of what constitutes 'quality' in brewing inputs is highly contentious, but a few general statements can be made. First, of the two types of barley, six-row and two-row, it is generally accepted that six-row barley yields a sharper, husky flavor.⁸⁹ According to Protz,

The particular type of six-row barley that grows in the United States is rich in enzymes and allowed brewers to use large amounts of unmalted cereals, such as rice and corn, in their beers to cheapen production costs. The result has been the rise of bland ... uninteresting interpretations of ... lager.⁹⁰

Second, turn-of-the-century American hops are not believed to have been of the highest quality. Jackson notes that 'many Europeans are often critical of American hops',⁹¹ and Fix, in his work on pre-Prohibition American beers, contrasts noble European hops with cruder American hops.⁹² Indeed, Anheuser-Busch has historically touted its use of 'the finest imported hops'.⁹³

Third, though adjuncts have a long history in beermaking, this does not imply that their use has always been beneficial or desirable. Brewing experts argue that though 'rice provides simple sugars for conversion during fermentation, it lends nothing in the way of flavor to the finished beer'.⁹⁴ Renner states that rice is a 'flavor/body diluent'.⁹⁵ Fix and Renner, while critical of the use of rice, defend the use of a small amount of corn in pre-Prohibition beer. Other commentators are critical of both rice and corn, claiming they are used only to lower production costs and to lighten the flavor and color of the beer.⁹⁶

Cochran notes that Pabst used six-row barley, and he defends this usage, claiming that it yielded higher-quality beer. However, Frederick Bock, Pabst's head-brewer from 1902 to about 1915,⁹⁷ states openly that he preferred two-row barley. In a 1911/12 article in *Letters on Brewing*, he argued that 'it will be absolutely in the interest of the American brewing industry to encourage the raising of pedigreed two-rowed barley in preference to the six-rowed barley in this country'.⁹⁸ Pabst did not follow Bock's recommendation, and it appears that one key reason was the higher cost of two-row barley.⁹⁹

Archival data for Blatz show that it did not brew extensively with high-grade hops. For example, ledger accounts show that in April 1891 Blatz spent nearly \$29,000 on hops. Of this amount, \$2,100 was spent on imported, premium Bavarian Saaz hops, \$14,800 on domestic hops, and \$12,100 on hops extract.¹⁰⁰ Like Anheuser-Busch, Blatz and the other shippers proclaimed the superior quality of imported hops in their advertising while using mostly American hops and hops extract.¹⁰¹ Anheuser-Busch advertised that its 'premium' Michelob brand contained only imported hops, which gave it 'a flavor that captivated people capable of judging an unusual beer'.¹⁰² From such a statement itself, an astute consumer could conclude

that the American hops in the company's other beers were inferior.

Finally, the national shippers willingly substituted cheap adjuncts such as corn and rice for malted barley.¹⁰³ While some local breweries followed suit, many did not. George Ehert, a large local New York City brewer shunned adjuncts and emphasized the importance of quality inputs. He used only malted barley and hops in his famous and quite popular beer.¹⁰⁴

Pabst brewed all malt beers until 1877 when it made the rather modest compromise of brewing at a ratio of 16/17 malt, 1/17 rice. It switched to corn as the cereal adjunct in 1878, but did not alter the ratio. Beginning in 1879, however, Pabst began to increase its use of adjuncts, raising its ratio of corn to malt from 1/17 to 1/11. By 1893, the beer was two-thirds malted barley, one-third corn.¹⁰⁵ This was a rise from less than 6% of the fermentable base to 33%.

Blatz and Anheuser-Busch were also brewing with adjuncts by the 1880s. In advertisements in the 1890s, Anheuser-Busch sought to set itself apart by its disdain for one type of adjunct: 'Of materials we use only the most excellent, regardless of cost. Corn, the one important substitute, which, on account of its cheapness, has been extensively adopted, never enters our brewery'.¹⁰⁶

Krebs and Orthwein, in their company-sponsored history, note that Anheuser-Busch's motto was 'Not how cheap but how good'. They summarize the development in the 1870s of Budweiser, Anheuser-Busch's most successful brand, and indeed the most successful in the world.

It was to be brewed from premium-priced ingredients. The barley was to be carefully graded and the smaller grains discarded because their ratio of husk to carbohydrate and protein was too great. Since American barley contains more protein in proportion to carbohydrates than European barleys, the supplemental carbohydrates would come from costly brewers' rice, not corn grits. The choice of rice over corn was a fateful one. Rice contains much less oil than grits and that little oil is so bland as to make rancidity no problem. Moreover, brewers' rice contributes to the quality of the beer's foam, its brilliance

and its stability. Through the years, brewers' rice has been considerably more costly than brewers' corn grits.¹⁰⁷

This passage is revealing on two accounts. First, it asserts that Budweiser only used 'premium' ingredients, yet it does not detail the types or proportions of barley and hops that were used. Second, by trumpeting the value of rice over corn, it seeks to move the debate from all malt vs. adjunct to adjunct vs. adjunct. Moreover, most beer experts regard rice as the most inferior adjunct.

The ratio of adjuncts used by Pabst and the other shippers in their popular brands greatly exceeds what most beer experts take to be the maximum that may be used without impairing the flavor, color, and body of beer. As Protz argues, if rice and corn are to be used (and he argues strongly against them) then they must be used sparingly.¹⁰⁸

Krebs and Orthwein make mention of the fact that Michelob was an all-malt beer: 'the barley malt was very carefully chosen for its protein-to-carbohydrate ratio so that it was not necessary to add a supplemental carbohydrate such as rice'.¹⁰⁹ Pabst too viewed its turn-of-the-century all-malt beer Doppel Brau as a premium product, but did not promote it very aggressively.¹¹⁰ The all-malt beers were more expensive to produce, and the shippers preferred to concentrate their energies on popular brands such as Pabst Blue Ribbon and Budweiser, which made extensive use of cheap adjuncts.

Just as the quality of the input affects the character of the beer, so too does the proportion of raw materials: using high-grade hops will not offset a brewery's decision to economize on its overall use of hops. Cochran was aware of the importance of this issue, writing that 'the question confronting brewmasters was how much [corn and rice] could be used without substantially lessening the fine flavor produced by the barley malt'.¹¹¹ How, then, did breweries change their input proportions during these years?

Table 3.13 details 20th century trends in raw materials usage. Unfortunately, there are few pre-Prohibition data points.

Year	Malt	Corn	Rice	Hops
1900	n.a.	12.0	n.a.	1.0
1915	35.8	10.1	2.8	0.65
1917	45.6	10.9	2.1	0.68
1934	38.1	6.8	2.7	0.7
1940	35.7	8.0	3.4	0.58
1950	30.5	9.6	3.6	0.43
1960	28.5	11.2	3.7	0.33
1970	27.6	10.8	3.8	0.23
1980	26.7	8.0	4.3	0.22

Table 3.13. Pounds of raw materials per barrel of beer, 1900-1991

Source. Brewers Almanac, 1956; Brewers Almanac, 1985; Census of Manufactures, 1900.

These data clearly show that the use of beer's fundamental ingredients, malt and hops, has fallen throughout the century. By the 1980s, hops rates were only one-fifth of the level in 1900; malt usage was about two-thirds of the level in the 1910s. However, it must be pointed out that national data can obscure firm-specific trends, and that a few breweries continued to produce highly hopped, malty beers.

But the overriding trend toward lower amounts of malt and hops coincides with the general though gradual trend of national shippers replacing local breweries. Brewing historians George Fix and Jeff Renner have published pre-Prohibition recipes from local breweries which called for 60-75 pounds of malt and 1-1.5 pounds of hops per barrel of beer. These findings indicate that many local breweries, despite the assertions of the orthodox narrative, made very well balanced, full-flavored, quality beers. Perhaps the shippers did so as well, but evidence suggests that they were progressively lowering their use of key brewing inputs.

One of the key differences between lager and ale is that lager requires a longer time to reach its flavor potential. Lisheron states that pre-Prohibition recipes for full-flavored, high-quality American pilsners called for five to eight weeks of lagering,¹¹² which raises the question of whether there was a tradeoff of quality for efficiency? Many local breweries, it appears, continued to opt for quality, and in the pre-Prohibition market they were rewarded for their commitment.

Section 3.6a: The role of the government in regulating changes in beer

As the shipping breweries were modifying their beer, a potential threat came from the government. On 30 June 1906, President Theodore Roosevelt signed into law the Pure Food and Drug Act, which was intended to 'prevent the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors'.

This broadly worded legislation left much room for interpretation, and the group assigned to interpret its meaning for the brewing industry was a committee headed by Dr Harvey Wiley, head of the Department of Agriculture's Bureau of Chemistry. Under his direction, a Joint Committee on Food Standards came up with criteria that American beers would have to meet. This group considered a wide range of topics, including which ingredients brewers could use and how long lager beer should be stored.

Wiley's work drew attention not only for the contentious topics he proposed to review, but for his particular view on the role of this new legislation. The motivating force for many in government was to ensure the elimination of dangerous additives or unhealthy production practices, goals that industries could not publicly oppose. Wiley, however, had a more ambitious agenda. A biographer notes that his

principal objection of much adulteration...was that it injured not so much the health of the consumer as his pocketbook. Glucose, for example, was mixed extensively with honey. Though wholesome enough, it was cheaper than the natural product of the bee. To add it without notice was to defraud the consumer and to take unfair advantage of the honest producer.¹¹³

These views had serious implications for the brewing industry. Corn and rice were not harmful additives, but they were cheap adjuncts. Was Wiley going to argue that their use 'defrauded the consumer' and took advantage of local breweries who eschewed adjuncts?

Shippers were not encouraged by Wiley's initial steps. The Joint Committee on Food Standards proposed to discriminate between all-malt beer and beer brewed from adjuncts. The reaction of the industry was as furious as this passage from a trade journal indicates:

To restrict American beers to the all-malt type and require that beers made otherwise be called something else, or labeled 'imitation' is not only evil - it is unprogressive and un-American. The Board of Food and Drug Inspection has a chance to do justice to all brewers by refusing to do an injustice to a majority of them.¹¹⁴

What has gone largely unnoticed is that this legislation applied only to interstate commerce and exports - that is, to the shipping breweries. In the locally oriented pre-Prohibition market, the vast majority of the industry would be exempt from the law. It is a testimony to the organizational abilities of the shippers that they were able to marshal many important forces in the brewing industry in their assault on Wiley and his committee.

The Department of Agriculture backed down from its most ambitious proposals after much lobbying by a coalition of the leading shippers, the United States Brewers Association, and several technical institutes. The committee decided not to differentiate between all malt and adjunct beers: as all the leading shippers were using adjuncts in their beers by the 1900s, this was a huge victory. As noted above, Wiley took a broad view of adulteration, and he had an important precedent on his side. For centuries, German breweries had operated in accordance with the *Reinheitsgebot*, the Bavarian pure-beer law of 1516. This legislation specified that brewers could use only malted grain, hops, yeast, and water in brewing beer.¹¹⁵ Most of the American brewers were trained either in Germany or in German-founded beer institutes in America, and would have been familiar with this legislation. Local brewers, brewing draught beer for local consumers, continued to honor the spirit if not the letter of the *Reinheitsgebot*, and many of them had hoped for legislation that would recognize the quality of their more traditional beer. Wiley bent to industry pressure, however, and choose not to implement a similar purity law regulating ingredient usage.

The committee also considered the issue of lagering time. It set forth the proposal that 'Lager beer, stored beer, is beer which has been stored in casks for a period of at least three months'.¹¹⁶ Members of the Hantke brewing school complained that 'This time for storage is excessive and few European and American beer are stored for this length of time'.¹¹⁷

In retrospect, it can be seen that the committee was too ambitious: if it had specified a lagering time of four to eight weeks, the shippers and their allies might have still complained, but they would have been unable to argue that the requirements were excessive. The committee drew such criticism for what was perhaps an unreasonable requirement that it ended up not legislating at all on lagering time. As a result, mass-produced American beers are insufficiently lagered; most are now produced in 15 to 18 days.¹¹⁸ A British chemist, writing about post-Prohibition mass market American beers, argues 'In the United States, higher temperatures are used, both during fermentation and storage, to speed up production, but in Europe, such methods are considered detrimental to the final flavor of the lager'.¹¹⁹ The federal government had the opportunity to legislate longer lagering periods, and thus better quality, but it declined to do so in the pre-Prohibition market. It has never again taken up the issue.

Just as firms and industries do not take consumer preferences as givens, neither do they passively react to government legislation and regulation. The shipping brewers actively led the fight against government regulations that directly affected interstate sales, and they sought to use government legislation to further their own goals and aims. While not always successful in these efforts, they were certainly able to mold the 1906 Food and Drug Act.

Section 3.7: Quality, standardization and the consumer

The standard story makes the consumer the underlying agent of change in the brewing industry. Exogenous consumer preferences led inexorably to a new industry structure dominated by breweries best-suited to produce the new style of beer that was now in demand. In this picture, firms passively respond to consumers, and the market responds with efficiently produced, high-quality beer.

Yet, no attempt is made to explain why, for example, German-American beer drinkers changed their taste for all-malt beer brewed according to the *Reinheitsgebot* to the adulterated beer produced by the national shippers. In addition, no effort is made to explain why the sizable population of immigrants from the United Kingdom did

not continue to demand the ales and stouts that dominated their homeland.

The orthodox narrative, consistent with Row One interpretations, presumes that changes in market structure and in the product are natural, efficient, and beneficial responses to new consumer demands. The new market structure must be more efficient than its predecessor, or there would not have been any reason for change. The new beer supplied by the shippers must be a better product, or consumers would not buy it.

I propose an alternative interpretation, one which highlights the steps firms take to shape their social and economic environment. In the pre-Prohibition market two groups of breweries jockeyed for control, local firms and shippers. They had different motivations and goals.

Local breweries took full advantage of a legal system that allowed them to purchase or indirectly control saloons, the dominant retail outlet of the day. By gaining control over these most important retail outlets, local breweries checked the ability of their rivals to expand. But, were consumers disadvantaged through this process which curbed competition? While the number of beers some consumers had access to was limited, they benefited from locally-produced beer that was high-quality, fresh, unpasteurized, and inexpensive. Here was an instance of a group of firms acting in their own self-interest - to limit outside competition by monopolizing retail outlets - that did not harm the consumers.

The shippers, too, sought to shape their economic and social environment. Initially concentrating on draught production, they saw tremendous increases in output from the 1870s to the 1890s. A number of factors contributed to these achievements, including significant investments on plant and equipment, and aggressive advertising, marketing, and distribution strategies. However, as local breweries extended their control over saloons, shippers saw their draught sales begin to stagnate. To counter the growing successes of local breweries in the saloon-based draught market, shippers began to emphasize packaged beer which could be consumed at home, or in other retail establishments.

In this light, bottled beer appears, not as a response to

exogenous consumer demand, but as a result of shippers' trying to construct an alternative to the increasingly competitive draught beer market. Shippers had several strong reasons for seeking to promote bottled beer, yet it was more expensive than draught beer, and certainly not of higher quality. Consumers did not necessarily profit from efforts to expand sales of bottled beer.

Shippers also began to modify the product itself. Beginning in the 1870s, they moved away from all-malt beer to beer brewed with increasing amounts of adjuncts such as rice and corn. With the money they saved by economizing on raw materials, they invested in extensive and costly marketing and advertising campaigns.

Through these campaigns, they sought to differentiate their beers, not on the basis of inherent product attributes, but through constructed images. This claim builds on the work of Casson, who criticizes the neoclassical view of rational consumers who 'cannot be misled by branding' and who 'will only buy branded products (particularly for a second time) only if it is in their interests to do so'.¹²⁰ Arguing that 'advertisers derive their professional expertise not from economic models but from psychological theories of cognition and motivation', Casson supports the view that branding and advertising have long been important strategies for manufacturers.

Many pre-Prohibition firms, including, but certainly not limited to breweries, used advertising and marketing to differentiate their products, and to construct demand for their particular brands. But, were these campaigns effective? In Chapter One, we reviewed Chandler's discussion of how Henry Crowell, the founder of Quaker Oats, used advertising to increase its market share. Quaker Oats' accomplishments reflect the growing popularity of branded, packaged goods. Bulk oatmeal sold from bins was certainly cheaper, but Quaker Oats was able to convince consumers to pay more for it in a package. Fully aware of these developments, shipping breweries had good reasons for believing that their efforts to replace draught beer with packaged beer would, eventually, be successful.

Breakfast cereal provides another lesson: it shows how entrepreneurs can shape, indeed, invent markets. Levenstein¹²¹ shows that the replacement of meat by

breakfast cereals in the late 19th century is the only time in recent food history in which an affluent society willingly substituted grain for meat at a major meal. Cereal makers such as Crowell constructed a new market for their product, and in the process, defied history. Such findings help explain how the shippers were able to sell more-expensive yet lower-quality beer: innovative promotional campaigns combined with entrepreneurial zeal could construct new markets and redefine existing ones.

Strasser¹²² details the turn-of-the-century rise of branded, packaged goods, and shows that this development was integral to the successes of many large manufacturing firms. The shippers benefited from - and contributed to - these broader trends favoring branding and packaging. There was, however, an additional part of this process that has garnered less attention, the rise in standardization. The shipping breweries played a role in this development: in their efforts to create national brands, they worked to develop standardized beers that would be the same any where, any time of the year. At a time when beer often varied from batch to batch, the ability of the shippers' to standardize their beer was quite a technical feat.

However, this does not mean that consumers necessarily benefited from this introduction of more rigorous biochemistry into the brewing process. The standard story comes to equate standardization and consistency with quality. McGahan states that: 'Quality was associated with consistency in flavor over each produced batch. The shipping brewers produced lighter lager with greater consistency, so lightness also tended to be associated with quality'.¹²³ However, she does not identify who came to associate quality with consistency and lightness. Was it the consumer, or was it the shipping breweries, the group who most stood to gain from this redefinition of quality?

McGahan argues that consumers came to prefer standardized products, and that they were the driving force behind the move to product uniformity. This view is not convincing. Standardization did not just emerge as a result of new consumer preferences, but was constructed by powerful economic and industry forces in the late 19th century. It was neither natural nor necessarily beneficial: consumers did not profit as a wide range of product styles gave way to an increasingly uniform good.¹²⁴ Standardization was not led by consumers, but

by a small number of nationally oriented producers looking to unify distinct local markets into a more homogenous national market. The national shippers capitalized on these developments. One of the appeals of mass produced products was that consumers could rely on a certain label or brand over time: for shippers, this meant making beer that always tasted, looked, and smelled the same. They worked to develop beers that were consistent, that promised consumers reliability. By promoting their mass produced, homogenous lager, they participated in the broad transformation of American consumer tastes and preferences during these decades.¹²⁵

Shippers and local breweries competed against each other during a period of fundamental change. Economy-wide forces were coming to favor homogenized and branded goods in many industries, yet the pre-Prohibition beer market, though seemingly ripe for national beer brands, was still dominated by local breweries making draught beer for sale in saloons. Shippers had found some success in creating demand for their brands and their bottled beers, but as late as 1915, the top national shippers controlled less than 15% of the national market.

In their efforts to create national brands and to eliminate their local rivals, they received an inadvertent boost - national Prohibition. While at the time this was a favor that they most certainly would rather have done without, as we will argue in the next chapter, it provided the shippers with a golden opportunity.

Chapter 4

Prohibition, oppression or opportunity?

In 1914, American breweries reached a peak output of 66.1 million barrels.¹ By the decade's end, this vibrant and seemingly powerful industry was shut down by the federal government. The Eighteenth Amendment to the United States Constitution, signed into law in January 1920, prohibited the production, distribution, and sale of alcoholic beverages. It remained in effect until December 1933.

The standard story has treated Prohibition as an exogenous event, and has portrayed the industry as

unsuspecting of its advent and ineffectual in its own defense. According to Elzinga, breweries were ‘blissfully ignorant’ of the collection of temperance forces that succeeded in putting them out of business.² According to Baron, they were ‘surprisingly maladroit in their public relations’ during the 1900s-1910s.³ McGahan⁴ simply elides the Prohibition years. Handler, Lazonick, and Williamson seem interested only in explaining why large, vertically integrated firms arose at the turn of the century. When economists discuss Prohibition in any detail, they tend to focus on two important but very narrow issues: the production of ‘near beer’ and the decision to retain or sell the brewery’s plant, equipment, and other assets. Thus, the standard story has largely ignored why Prohibition was introduced, and then why, very abruptly, it was repealed only 13 years after it became national law. Beyond this superficial handling of motive, it has also neglected what forces were behind the introduction and repeal of Prohibition.

Prohibition impulses in America date at least to 1850, when Maine passed the first state prohibition law. Soon after, twelve other states passed similar legislation. Most of these laws were repealed during the Civil War. From the late 1860s to the 1880s, prohibitionists launched their second effort. Organizers founded the Prohibition party in 1869 and the Women’s Christian Temperance Union (WCTU) in 1874. Though these two groups enjoyed some successes, they were unable to secure any wide-ranging national legislation. Alcohol production continued to increase, as did per capita consumption. Reacting to the continued growth of the alcohol industry and to the modest achievements of the Prohibition party and the WCTU, prohibitionists in 1893 established the Anti-Saloon League (ASL).⁵ The ASL had two primary goals: to achieve prohibition and to build support for temperance legislation.⁶ From the 1890s to the 1920s, the ASL built a powerful organization that successfully navigated interest group politics at the local, state, and, eventually, national levels.

Though the ASL ultimately prevailed in its goal of national prohibition, it is not correct to assume that during these years breweries and distilleries sat idly by, ‘blissfully ignorant’ of these developments. I will argue that the brewing industry and key firms were not unalarmed by, nor unprepared for, the measures taken by temperance advocates and their friends in govern-

ment. They were not only opposed to Prohibition, they strategically worked to mold any legal changes in their favor. Breweries could even argue that they were for prohibition, if it meant that society could rid itself of destructive intoxicating liquors, while allowing consumers to enjoy non-intoxicating beer. Ultimately, breweries and distilleries were unable to prevent national prohibition. The reasons for this are far more complicated than the standard story’s line that breweries were unaware of the threat the ASL posed, and that they fumbled all of their opportunities to respond.

After passage of the very strict national Prohibition law of 1920, breweries continued to work in their own self-interest. After 1920 they moved from defense to offense. There were many groups who were opposed to Prohibition. A repeal alliance quickly came into being composed not only of alcohol manufacturers but others who opposed Prohibition for a variety of reasons. In 1920, just as the Eighteenth Amendment was being signed into law, opponents formed the Association Against the Prohibition Amendment (AAPA). Initially, the AAPA and other like-minded groups stumbled in their efforts to overturn the Eighteenth Amendment. Their early miscues reflected in large part their poor organization, an ironic parallel to the unsuccessful efforts of prohibitionists prior to the ASL. However, just as the ASL eventually provided the needed organizational acumen for effecting a national temperance agenda, so too did the AAPA ultimately form the nucleus around which the repeal movement coalesced. Initially, the early opponents of Prohibition consisted of the alcohol manufacturers and prominent individuals such as William Stayton and Pierre DuPont, who opposed Prohibition as ‘a new example of the federal government’s growing threat to private property, individual liberty, and personal choice’.⁷ As the 1920s wore on, however, they were joined by those disillusioned by the lawlessness engendered by this unpopular act. One of the more notable defections from the prohibitionist to the repeal camp was John D. Rockefeller Jr., who came to believe that only through a regulated system could true alcohol reform be accomplished.

The large shipping breweries remained active during Prohibition. They worked with an emerging alliance of forces who (though for varying reasons) favored repeal or modification of the Eighteenth Amendment. The shippers saw in Prohibition an opportunity to disad-

vantage the local breweries who had presented quite a formidable challenge in the decades leading up to Prohibition. Local breweries had used adeptly their control of saloons to prevent shippers from competing in their markets. The ASL and their sympathizers strongly complained about the abuses they attributed to saloons, most of which were owned or controlled by breweries. The shippers, then, in a remarkable move, began to advocate that the post-repeal brewing industry would have to be different, and that one of the key differences would be a strict separation in the manufacturing and retailing of beer. Former supporters of the ASL like Rockefeller could now join the cause for repeal. The alliance for repeal continued to grow in strength through the late 1920s and early 1930s, and with the Democratic landslide in 1932, the question became not whether Prohibition would be repealed, but under what conditions.

This chapter begins with the rise to power of the temperance movement, and the brewing industry's varying responses to this threat. Section 4.2 looks at the role of the government during the First World War in aiding prohibition forces. Section 4.3 reviews the commercial operations of breweries from 1920 to 1933. Section 4.4 considers the relationship between breweries and the leading anti-Prohibition forces. Section 4.5 considers several developments that affected consumer behavior during this period and had important repercussions for the post-repeal market for beer.

One of my central concerns is with firm agency. Because there was no legal beer production, we cannot evaluate brewery efficiency or product quality. These evaluations, crucial to my overall story, reappear in Chapter Five.

4.1: The temperance movement and the brewing industry

The industry had for years battled anti-drink forces on the local and state levels. These battles had begun in the 1850s, and hostilities flared up periodically through the 1890s. With the formation of the ASL in 1893, the brewing industry realized that their foe had graduated to a higher degree of threat. From 1909 to 1920, the *United States Brewers Association Year Books* devote more pages to local, state, and national prohibition forces than to any other topic. In a book sponsored by the brewing

industry and published in 1880, Salem addresses prohibition laws in several chapters, a clear indication that the industry was paying close attention as early as the late 19th century.⁸ The only issue of any complexity is not whether breweries were aware of the threat, but whether they answered it appropriately.

After decades of waxing and waning influence, opponents of alcohol began to gain momentum in the early 1900s. The most significant of the many organizations leading the fight against 'demon rum' was the ASL. Kerr provides an excellent history of this group, in which he describes efforts by certain brewers to ally themselves with the temperance movement in order to fight a common foe, the distilleries. These men, he argues, completely misunderstood the objectives of the movement, and their ascension to positions of power in the United States Brewing Association (USBA) facilitated the prohibition of both beer and spirits.⁹ One of these men was Christian Feinspagn. In 1916, Feinspagn, a vocal advocate of separating beer from spirits, was elected president of the USBA.¹⁰ Jacob Ruppert, president of a large, local New York brewery, and Chairman of the USBA's Finance Committee, was another. He too supported differentiating beer from liquor, and he believed that wartime policies in 1917 (discussed in Section 4.2) affirmed the wisdom of this position.¹¹ As men such as these came to positions of power in the USBA, the brewing industry continued to splinter, with some firmly supportive of an alliance with distillers, but with the new power structure of the USBA adamantly opposed to extending an olive branch to the distillers.

I believe that the industry had good reasons for seeking to differentiate itself from distillers, but that this strategy was overwhelmed by external events. American brewers were well aware of a long-standing government partiality for beer, in America and abroad. In 18th century England, Parliament responded to a 'gin epidemic' by promoting beer consumption. The painter William Hogarth contributed to this campaign two allegorical pictures: *Gin Lane*, which shows a dissolute populace, laid waste by the destructive powers of hard alcohol, and *Beer Street*, which shows in contrast a prosperous people enjoying the more temperate beverage.¹²

Of more immediate bearing were the compromises effected by governments and anti-drink forces in the early 20th century. Belgium introduced the Vandervelde

Law in 1919, which severely restricted the retailing of spirits and imposed a much higher tax on spirits than on beer.¹³ In the 1910s, Canada imposed laws that, at their most restrictive, allowed 2.5% beer while completely forbidding wine and spirits.¹⁴

In America, there had been a strong government bias toward beer since the Civil War era. From 1864 to 1917, the Treasury Department taxed beer at the rate of \$1/bl, or approximately \$.03/gallon; the excise on spirits was \$.70/gallon in 1872 and \$1.10/gallon in 1917.¹⁵ Adjusting for levels of alcohol, the tax on liquor was two to three times higher than for beer. Breweries enjoyed constant nominal rates for nearly the entire period 1864-1917;¹⁶ distillers saw their rates increase three times from 1872 to 1894.

Kerr points out the brewing industry's inability to match the ASL's organizational acumen: 'In the end, the downfall of the brewers involved a failure to pursue a managerial and bureaucratic procedure countervailing to that of the Anti-Saloon League'.¹⁷ Be that as it may, I see this long history of preferential treatment as a triumph of the industry's well-established lobbying power.

The brewing industry had worked for decades to distinguish its product from spirits - this was *not* a desperate ploy on the eve of Prohibition. Salem ended his 1880 book with this passage: 'We close as we began, with the words which seem to us to indicate the only practical road to real temperance, and record again our motto BEER AGAINST WHISKY'.¹⁸ Gustave Pabst, in a statement printed in the *United States Brewers Associations Year Book*, argued that

Beer instead of being a destroyer of efficiency is a great, the great, temperance drink-a true conservator of health, if used in moderation. And the brewers of this country stand for temperance, in the true sense of the word.¹⁹

Pabst's distinction between temperate beer and excessive spirits is echoed in countless trade journal articles and USBA publications.

Breweries realized that if even if Prohibition was to be enacted, legislators would then have to define what constituted 'intoxicating alcohol'. Societies continually define and redefine what are acceptable levels of alcohol: for example, during World War II the federal

government permitted the sale of 3.2% beer (by weight) on army bases, ruling that it was non-intoxicating. While Prohibition forces ultimately were ultimately successful in securing a quite restrictive definition - alcohol in excess of ½% by weight - the issue was hotly debated through the 1910s.

This definition was based not on rigorous scientific testing but on a standard put forth rather by the Treasury Department for taxation purposes. In 1864, when the federal government first began to tax beer, Treasury officials selected this level in order to maximize tax revenues from malt beverages.²⁰ Yet, the brewing industry knew that it did not automatically follow that the rate used by the Treasury Department for taxation purposes would necessarily be the same level used by Congress.

The United States Brewing Association made public the many different alcohol levels which were defined as 'non-intoxicating' in other countries. In 1909, Iceland passed 'total prohibition', yet permitted the production of 2.25% beer.²¹ Great Britain, Ireland, and Germany defined beer 'as a liquor ... contain[ing] more than 2 per cent of proof spirit'. In Norway, Sweden, and Denmark, beer was either exempted below 2.25% or taxed it at very low rates.²² Canada prohibited all alcohol above 2.5%. Clearly, there were many precedents for American brewers to use in support of their position that beer, at some low level of alcohol, should be exempt from prohibitory legislation.

Finally, the brewing industry, perhaps overly confident from its recent legislative triumphs regarding the 1906 Food and Drug Act, saw the temperance movement as a means to eliminate one of its chief competitors: the distillers. Some brewers believed that they could profit at the expense of the distillers seemingly until the day Prohibition was enacted. We have already discussed how Charles Feinspagn, who was elected President of the USBA in 1916 and J. Ruppert, who also had a high ranking position in USBA hierarchy, reflected the feeling of those brewers who were anti-spirit and who felt that the brewing industry should continue to disassociate itself from the liquor industry. Another example concerns the National Association of Commerce and Labor (NACL). The NACL was founded by brewers in 1913 to promote pro-alcohol policies. The head of the NACL, Percy Andrae, convinced the liquor industry to support his efforts financially. After some important

losses regarding state prohibition policies in 1913 and 1914, the spirits industry asked for joint control of the NACL so that they and the brewers could put forth a coordinated program. In late 1914, Hugh Fox, the Secretary of the USBA, told them that there would never be a formal, coordinated policy between the brewers and the distillers. As Kerr notes: ‘The apparent national strength of the prohibition movement was not sufficient ... to allow some brewers to overlook their market rivalry with the distillers in a defense of their common interests’.²³

Breweries had good reasons for being willing to gamble and rid themselves of the distilleries. Per capita liquor consumption peaked in the 1820s and 1830s, but always remained high, despite steadily rising excise taxes.

Brewers continued to view distillers as a threat, and they believed that they could redirect much of the anger of the prohibition forces to the liquor industry. The question now is why they failed.

Several factors mitigated the brewing industry’s ability to keep beer legal at some level of alcohol. First, the Anti-Saloon League (ASL), as its name makes clear, took particular aim at excesses associated with saloons.

Year	Liquor Per Capita Consumption	Beer Per Capita Consumption
1870	1.9	5.3
1880	1.5	8.2
1890	1.4	13.6
1900	1.2	16.0
1905	1.3	18.3
1910	1.4	20.0
1915	1.2	18.7

Table 4.1. *Liquor and beer per capita consumption (gallons), 1870-1915.*

Source. Rorbaugh, W. (1979) *The Alcoholic Republic*. New York: Oxford University Press; United States Brewers Foundation (1956) *Brewers Almanac*. p.10.

To fully appreciate the source of the ASL’s antipathy towards saloons, it is worth noting that even the USBA, in its 1909 *Year Book*, discussed the ‘Problem of the Saloon’. Competition between saloons in the 1890s and 1900s often led to a narrow profit margin in selling beer. To increase sales, saloon owners began to flout regulations concerning hours of operation and age requirements. In addition, many saloons also began to support illegal activities such as prostitution and gambling. To offer these illegal but profitable sidelines, saloon owners found it necessary to bribe police officials and politicians. A tangled web involving corrupt politicians, gambling, prostitution, and drunkenness was spun, and the saloon was at the center.²⁴ Though the ASL might not have compromised with the industry under any circumstances, it certainly would not consider promoting low-alcohol beer unless the issue of saloons was resolved.

Second, there was great discord between shipping and local breweries. If the brewing industry itself had been able to find a coherent strategy, it would have presented a much more formidable force. A perfect example of intra-industry tensions concerned reform of the saloon. Even though brewing industry officials conceded the difficulties that saloons were causing, many breweries, especially the local firms, made saloons an integral part of their operations, and they were unwilling to cede them. Ohio was the scene of one the great pre-Prohibition struggles between pro and anti-drink forces, and the skirmishes there showed the tensions not just between breweries and the ASL, but also between breweries themselves. In 1909, the state legislature passed a law designed to temper some of the excesses of the saloon. The Dean Character Law required that saloon keepers ‘be local residents with no other connection to the liquor industry’; this in turn required that retailing would be separated from brewing. Compromises like this might have benefited the brewing industry overall, but it specifically helped the shippers in their struggles against local firms.

Third, US entry into World War One brought with it a strong anti-German backlash in the United States. The brewing industry, dominated by German-Americans, came under the kind of suspicions exemplified by a three volume report titled *Brewing and Liquor Interests and German Propaganda*, published in 1919 by the House Sub-Committee on the Judiciary. Many people,

notably many legislators, came to associate prohibitionism with patriotism.

Fourth, the federal government introduced a national income tax in 1913, a measure that immediately lessened the importance of revenues collected from excise taxes on beer and liquor. Any arguments that emphasized this importance were considerably weakened.²⁵

Fifth, the ASL was a very focused organization, and they were more effective in their lobbying of government policy than was the brewing industry. I agree with Kerr on this finding, which is, indeed, consistent with a general theme of this work: organizations, be they industries, firms, or interest groups, do not passively wait for outcomes, but actively promote their own ends. The triumph of temperance forces means the brewing industry failed in its attempts to shape Prohibition legislation and to differentiate beer from liquor. That it was ultimately unsuccessful, however, does not imply that it did not actively seek to advance its own ends.

Section 4.2: World War One and the government's role in the brewing industry

The beer industry could bask in its 1906 legislative achievements for just a decade, until World War One presented a new set of legislative challenges. In 1916 and 1917, Prohibition forces began to lobby the government to 'ban the use of grains in distilling and brewing as a food conservation measure',²⁶ and to prohibit military personnel from using alcohol. Their allies in Congress eagerly responded to this as a call to action. According to Rubin, lawmakers

seeking to protect the health, morals, and proficiency of newly conscripted American troops, ... legislated rigid bans on military drinking. The Selective Services Act of May 1917 established dry zones around military camps throughout the United States and prohibited individuals from selling or serving alcoholic beverages to members of the armed forces - even in private houses.²⁷

The new law contrasted sharply with the government's alcohol policy during the Civil War, when it provided beer rations to Union troops, and World War Two, when it allowed military personal to drink beer. It does not appear that there were any specific incidents which trig-

gered this more restrictive alcohol policy by the military in World War One; their actions appear to have been a reflection of broader social currents: if the nation is moving towards prohibition, then so too should the armed forces.

President Wilson named Herbert Hoover to head the newly formed Food Administration Agency in 1917. Hoover immediately called for Wilson to require 'a reduction of the alcoholic content of beer to under 3 percent, and a halving of the use of grain from peacetime levels'.²⁸ The Levey Food and Fuel Control Act, passed in August 1917, prohibited the production of spirits, required brewers to cut (though not halve) their use of grains, and lowered the alcohol level of beer to 2.75%. Wilson had tempered Hoover's recommendations somewhat, but these restrictions were enough to greatly diminish the flavor, color, and body of beer.

Though enacted as a wartime exigency, the legislation had long-term ramifications: it reinforced the shipping brewers' moves toward homogenization. By *mandating* a light, bland beer, the federal government became an accomplice in the complicated process of redefining the nature of the product. This does not deny the primacy of firm action; it merely shows that there were accidental, unintentional factors working for the benefit of the shippers.

Temperance advocates in Congress passed the Eighteenth Amendment in December 1917. It was ratified by the necessary 36th state, Nebraska, on 16 January 1919.²⁹ To enforce its provisions, Congress, after much fierce debate, passed the Volstead Act. According to Kerr, 'The two biggest battles in the legislative history of the Volstead Act regarded the definition of intoxicating alcohol and the possession of alcoholic beverages'.³⁰ Temperance advocates fought off the brewing industry's efforts to define intoxicating alcohol as above 2.75%, but these efforts were not all in vain. Many federal and state officials reintroduced the idea of low alcohol beer (2.75% was a common recommendation) during the 13 years of official Prohibition.

Somewhat surprisingly, the ASL did not win the debate over possession. The Eighteenth Amendment and the Volstead Act prohibited the manufacture, distribution, and sale of alcohol, but not its possession. This distinction contributed to much of the turbulence of the Prohibition years.

Section 4.3: Brewery commercial operations during Prohibition

Cochran, Plavchan, and Baron have reviewed the business activities and investment decisions of the breweries during Prohibition. Of particular relevance here is a series of business moves that strengthened the shippers' ability to re-enter the market in 1933.

The most important decision all breweries had to make after 1920 was what to do with their plants and equipment. As they grappled with this question, they made implicit bets as to whether Prohibition would prove to be merely a temporary irritant. Pessimists immediately divested themselves of all their brewing equipment, often at substantial losses. Other firms decided to carry on with related products, and so stay prepared for any modifications to the Volstead Act which would allow for beer. Schlitz, Blatz, Pabst, and Anheuser-Busch, the leading pre-Prohibition shippers began producing near beer, a malt beverage with under ½% alcohol. While it was not a commercial success, its production allowed these firms to keep current their beer-making skills. According to Krebs and Orthwein, Anheuser-Busch called its near beer 'Budweiser'. It was, Krebs and Orthwein asserted, 'simply the old Budweiser lager beer, brewed according to the traditional method, and then de-alcoholized. ... August Busch took the same care in purchasing the costly materials as he had done during pre-prohibition days'.³¹ Anheuser-Busch and some of the other leading breweries were granted special licenses by the federal government for brewing alcohol greater than ½% for 'medicinal purposes'.³² Receiving these licenses gave these breweries a competitive advantage as they were able to keep their brewing staff active in beer-making; unfortunately, it does not appear that there are any records indicating which breweries received licenses.

The shippers, and some local breweries, also made malt syrup. While they officially advertised it as an ingredient for baking cookies, and while its production was left alone by the government, it was readily apparent to all that its primary use was for homemade beer.

Of perhaps equal importance to the day-to-day business activities of the breweries were their investment decisions. Here, as in so many other places, the shippers exhibited true entrepreneurial insight. Blatz, Pabst, and

Anheuser-Busch all expanded their inventories of automobiles and trucks, which became key assets after repeal. In the 1910s, Anheuser-Busch invested in motorized vehicles to deliver beer; by the 1920s, it was building its own trucks in great numbers. While it never sought to become a major producer of delivery vehicles, its forward expansion in this area reflected its appreciation of the growing importance of motorized delivery, an insight which they built on after repeal.

The leading shippers also furthered their investments in bottling equipment and machinery, which was used in the production of near beer, root beer, ginger ale, and soft drinks. These products were not the commercial successes beer had been, but they gave breweries important experience in bottling. While 85% of pre-Prohibition beer was kegged, during Prohibition over 80% of near beer and a smaller, though growing, percentage of soft drinks was sold in bottles.

Near Beer Keg	\$ 164,387
Root Beer Keg	\$ 42,209
Near Beer Bottle	\$ 1,291,808
Root Beer Bottle	\$ 279,067
Malt Syrup bulk	\$ 448,324
Malt Syrup canned	\$ 1,339,923
Tobacco	\$ 970,603

Table 4.2. Blatz commercial sales

Source: BAW, Supplemental List A, Volume 5.

In 1925, Blatz sold \$164,387 of near beer in kegs and more than \$1.2 million in bottles. Combined bottle sales of near beer and root beer were \$1,570,000, while total keg sales were only \$207,000.

This remarkable increase in packaged product impelled breweries to refine their packaging skills and modify their retailing practice. As they sold near beer and soft drinks to drugstores and drink stands, they encountered new marketing problems.³³ Experience gained during these years helped the shippers meet radically different distribution requirements of the post-repeal beer market.

They were learning about canning as well as bottling. In 1925, Blatz's canned malt syrup sales were more than \$1.3 million, significantly greater than its bulk sales. Anheuser-Busch used cans from the American Can Company for its malt syrup in the early 1920s, a firm which would gain national prominence in 1935 for helping to pioneer the beer can. Thus, the canning of malt syrup helped create the first contacts between the leading shipping brewers and American Can Company.³⁴

These expensive investments in automobiles and bottling equipment were paid for in part by selling off branch properties, namely saloons.³⁵ Some had equipped their saloons with furniture and bar fixtures, but as Prohibition wore on, they divested themselves of these assets. Blatz archival data detail the many properties it sold during these years.³⁶ Prohibition, in effect, *forced* breweries after repeal to go into bottled beer after they had disposed of their saloons in the 1920s.

In addition to providing much needed capital, this broad divestiture shaped the way beer would be retailed following repeal. Local breweries, which had skillfully used tied saloons to exclude or limit shipped beer, joined the selling trend during Prohibition. As I discuss in Chapter Five, many local firms found themselves ill-equipped to compete in the new market for beer after repeal.

Section 4.4 Breweries and anti-Prohibition forces

The next issue to address is the role breweries played (or did not play) in the repeal movement. Were they actively engaged in efforts to repeal or amend Prohibition, or did they simply make the best of these new business activities?

There were several organizations fighting for the overturn of the 18th Amendment, and the most prominent was the Association Against the Prohibition Amendment (AAPA). According to Kyvig, this group refused to accept the support of the brewing industry, and suffered some financial troubles as a result. 'Ironically', he says, 'the effort to remain untainted did not keep the impression from spreading that the AAPA was a front for liquor interests'.³⁷ While it may be true that the organization was not influenced by the industry, it is also true that many of its positions paralleled those articulated by the leading breweries.

For example, in 1924 the AAPA joined the American Federation of Labor and other groups in support of legalizing 2.75% beer.³⁸ Throughout the 1920s, in statements which could easily have been issued by breweries, leading members of the AAPA called for the government to distinguish between 'moderate beer' and 'hard spirits'. Though Kyvig seeks to minimize the brewing industry's influence on the AAPA, it is clear that it made strenuous efforts in support of this and similar organizations.

Dobyns quotes from a 1926 letter from the Gotfried Krueger Brewing Company:

Gentlemen: We are deeply interested in the Association Against the Prohibition Amendment and have been asked to solicit donations from our many creditors who would be benefited if the present prohibition laws were modified.

This money would be used for the continued support of the association, and we know of no way in which prohibition could be better combated. The association is one of the strongest of its kind in the country and we earnestly believe that it should be heartily supported by those who would be benefited if the Volstead Act were repealed. If you are interested in the work of this association, kindly return the enclosed card with your check to our office.³⁹

Apps reprints part of a letter from W. Gatz, president of the Oshkosh brewery to one of his suppliers:

In forwarding to you our check in settlement of attached invoice, less the amount of one percent represented by discount stamps of the National Association of Commerce and Labor, we desire to explain that these stamps, purchased by us from said Association, represent the contribution which members of the Association have offered to make towards the educational campaign now being carried on by it against nationwide prohibition.

We have been asked to aid in the collection of this contribution by deducting one percent from the invoices of all members of trades and industries allied with our own, who, realizing that their interests and ours in this campaign are identical, have consented to the same, and it is with this understanding that you are one of these that we have deducted said discount from your invoice.⁴⁰

As this passage indicates, breweries sought to complement their own efforts by strongly encouraging their

suppliers to participate in the campaign against prohibition.

Dobyns lists many of the brewers and maltsters who supported the AAPA financially, including Fred Pabst and W. Fred Anheuser, leaders of the two largest pre-Prohibition breweries.⁴¹ Cochran mentions that Pabst contributed funds to the AAPA in 1923, and Dobyns shows that Pabst and Anheuser-Busch sent checks in 1928 and 1929.⁴² In addition to money, there were other links between breweries and the AAPA. For instance, George Eads, the AAPA's secretary, had previously worked for Anheuser-Busch as a publicist.⁴³

From the beginning of Prohibition, the leading shippers continually emphasized the need to promote beer as a temperance beverage and to prohibit the return of the saloon (that is, the tied house). Anheuser-Busch saw in the uproar of Prohibition the opportunity to shape post-repeal legislation in order to emasculate both distillers and local brewers.

On 15 October 1923, August Busch wrote to President Coolidge to press for modification of the Prohibition legislation, which, he asserted

set back the cause of real temperance many years by driving the illicit manufacture of alcoholic beverages into the home; by flooding the country with all sorts of imported or smuggled beverages, and creating an army of manufacturers and purveyors of beverages of doubtful or harmful quality.⁴⁴

Busch sought to capitalize on the difficulties of enforcing Prohibition by arguing that beer, the moderate drink, would aid the cause of 'real temperance'. Coolidge did not act on this proposal, but some members of Congress did respond sympathetically, and in 1924 a bill was introduced to allow 2.75% beer.⁴⁵ Around the same time, Senator Walter Edge of New Jersey made a speech in which he firmly distinguished between intemperate spirits and temperate beer. He claimed that evidence presented during Senate Committee hearings on the Volstead Act showed that 'it was impossible to become intoxicated by a consumption of [2.75%] beer'.⁴⁶

Following Coolidge's rejection, Busch took his case to the public by publishing pamphlets. A 1923 publication included a translation of a report from the Quebec Liquor Commission.⁴⁷ The introduction hailed the suc-

cess that Quebec had in creating 'a system of liquor control [which completely divorced] beer from hard liquors'. It also argued that 'the objectionable saloon' should be eliminated, that hotels and restaurants should sell only bottled beer, and that a strict separation of manufacturing and retailing would end the policy of tied houses.

The Quebec campaign, it noted, cost Canadian breweries a million dollars. The message to other American breweries was clear: direct action, while costly, was effective.

By the late 1920s, the brewing industry could argue against Prohibition on the grounds of its economic costs to the U.S. economy. Opponents of alcohol had often argued that Prohibition would be economically beneficial; after the stock market crash, brewers and their allies provided copious amounts of data showing how many people would be put to work by repealing it. In 1931, August Busch wrote that 'the manufacture and sale of wholesome 4% beer would be a good thing, economically and socially, for the nation'.⁴⁸

The *Congressional Record* for these years is replete with financial data showing the potential value of the brewing industry. Anti-prohibitionists adduced data showing how expensive the 'Noble Experiment' had been. One estimate put the cost of Prohibition at \$5,610,000,000, or a third of the national debt.⁴⁹ This same entry argued that the total revenue from personal income taxes in 1931 might not have equaled what an excise tax on alcohol would have generated. Another entry in the *Congressional Record* showed how much other countries were relying on alcohol excise taxes. In 1930, excise revenue on beer, spirits, and wine generated 20% of the total tax revenue in England, and 33% of the revenue for the Canadian provinces.⁵⁰ Several 1931 entries focused on how many jobs would be created if the Volstead Act was repealed, or at least amended to allow for beer. One estimate claimed that legalizing beer would create two million jobs.⁵¹

Even before the decisive 1932 presidential election, the shippers and their legislative allies in Congress were already showing signs of great confidence. Busch began to push not just for the legalization of 2.75%, but stronger 4% beer. According to Cochran, Pabst 'started acquiring new storage tanks, kegs, and other equipment

necessary for brewing'.⁵² It spent nearly \$1 million on this modernization in 1930.⁵³

Fully three years ahead of the formal repeal, Fred Pabst, acting perhaps on knowledge gained from his relationships with AAPA and other organizations, began to prepare for full-scale brewing. Commenting on this investment, Pabst stated, 'It's a risk, I know, however, public opinion is a pretty good barometer. It is my own firm opinion that beer will return in the not distant future, and I am willing to take the chance'.⁵⁴ Plavchan notes that August Busch Jr. also readied his brewery for operation months in advance of repeal. In August 1932, he reported to the board of directors that '\$75,000 would be necessary to repair and improve plant facilities in order to put them into proper condition to produce approximately 800,000 barrels of beer annually'.⁵⁵

These activities by Pabst and Busch accord well with our Quadrant IV view of entrepreneurship. Rather than passively waiting for government legislation and public opinion to change, they advanced their own agenda. They worked with the leading anti-Prohibition organizations and they extended an olive branch to individuals who had been sympathetic to temperance, but who by the late 1920s were disillusioned with the lawlessness. Perhaps the most symbolic defection from the prohibition side was John D. Rockefeller Jr. His father had begun making contributions to the ASL in 1894, and he continued to support the league financially through the early years of national Prohibition.⁵⁶ By the mid 1920s, John D. Rockefeller and John D. Rockefeller Jr. had become increasingly dissatisfied with the workings of Prohibition, and in 1926 they stopped making donations to the ASL.⁵⁷ By the early 1930s, Rockefeller Jr. had come to the conclusion that Prohibition would need to be repealed, and he recognized, along with others including the shipping breweries, that the next big debate would concern how repeal would be implemented. A statement he had released to the *New York Herald Tribune* on 7 June 1932 was entered into the *Congressional Record* the same day. In it he stated that while the abolition of the saloon had been a great blessing, Prohibition had not been a success:

There are many who, feeling as I do, that the eighteenth amendment has not accomplished the object which its enactment sought to attain, would willingly favor its repeal

were some alternate method that gave promise of better results offered as a substitute.⁵⁸

Not willing to blindly accept the substitutes proposed by others, he sponsored a 1933 book (co-authored by Raymond Fosdick and Albert Scott) which laid out his views on 'liquor control'.

Chapter Five examines in more detail the alignment of forces in support of repeal and the different visions these groups had for the manufacturing and retailing of alcohol in a post-repeal America. Neither the shippers nor temperance forces wanted a return to pre-Prohibition conditions - both groups decried the excesses associated with hard liquor and saloons, though of course they had different motivations. Together, as the next chapter shows, this odd couple began to articulate their vision of what a new regulatory environment for beer would look like.

Section 4.5: Changes in the consumer market

Thus far, we have focused on how breweries sought to turn events to their own advantage. This section introduces a series of developments that were out of the breweries control; however, this does not mean that breweries - in particular the shippers - did not actively seek to turn these events to their advantage. The consumer market for beer emerged from Prohibition as something very different than what it had been before. One of the key issues, then, is how these shippers reacted to these to these changes: did they passively respond to events beyond their range of influence, or did they consciously search for ways in which they might capitalize on these broader developments?

4.5.A: The importance of time

Prohibition can be looked at as a gap - a period in which consumers had no access to brewery beer. I argue that this cessation helped the shippers succeed in institutionalizing a homogenous style of beer in America. 14 years is enough of a stretch for the consumer memory, but it is important to remember that the time in which consumers could not buy *real* beer was even longer: we must tack on the two and a half years of the World War One-era Levey Food and Fuel Control Act. For a total of

16 years, then, traditional beer was not available. One result was a slow but steady erosion of the ability of consumers to distinguish between types and styles of beer. Shippers were well aware that consumer memories of beer were fading, and that they would have opportunities to help fill in the missing pages upon repeal.

Section 4.5.B: Alternative beverages

The second important development was the rising popularity of non-alcoholic drinks.

Year	Soda (bottles)	Milk (gallons)	Coffee (lbs)	Canned Fruit Juice (lbs)
1909	16.2	n.a.	9.2	.5
1914	18.9	n.a.	9.2	.1
1919	38.4	34	11.8	.3
1921	42.1	n.a.	12.0	.3
1923	41.1	n.a.	12.6	.3
1925	44.1	n.a.	10.6	.2
1927	47.6	n.a.	12.2	.3
1928	50.5	n.a.	11.9	.1
1929	53.1	41	12.2	.3
1930	49.0	49	12.5	.3
1931	38.3	n.a.	13.0	.4
1932	27.1	n.a.	12.4	.4
1933	33.1	n.a.	12.8	.5
1934	31.9	n.a.	12.3	.5
1935	37.1	n.a.	13.4	2.0
1936	54.9	n.a.	13.7	2.4
1937	67.5	n.a.	13.3	4.5
1938	75.4	n.a.	14.9	4.6
1939	88.6	n.a.	14.9	5.9
1940	100.1	n.a.	15.5	7.2
1941	133.6	n.a.	15.9	8.5

Table 4.3. Non-alcoholic beverage per capita consumption, 1909-1941.

Source: Riley, J. (1958) *A History of the American Soft Drink Industry*. Washington D.C: *American Bottlers of Carbonated Beverages*. p.275; Lender, M. and Martin, J. (1987) *Drinking in America*. New York: *The Free Press*. pp.146-147; and *Historical Statistics of the United States, 1976*, pp.330-331.

As we can see in Table 4.3, there were particular consumption patterns for each of these beverages. As the third and fourth columns illustrate, the consumption of coffee and canned fruit juice was not greatly affected by Prohibition. The big increase was from the mid-1930s to World War Two, a development discussed in more detail in the next chapter.

Per capita sales of soft drinks doubled between 1909 to 1919, a gain that may have been related to the state and local prohibition measures of this period. As would be expected, per capita consumption continued to rise during the national Prohibition, peaking in 1929. It fell steadily during the early years of the Depression, 1929 to 1934, but then increased fourfold from 1934 to 1941, a remarkable showing for this still-lean time. The American love affair with soda proved to be enduring, and it stood as proof of a changing American taste. One way breweries responded was by altering their post-repeal beer to suit this taste: they used fewer hops (to make it less bitter) and less malt (to lighten the flavor, body, and color).⁵⁹

The data on per capita milk consumption present some problems. *Historical Statistics of the United States*, published by the Department of Commerce, puts milk and cream consumption in terms of pounds, and these numbers do not accord with other consumption data when converted into gallons.⁶⁰ The three data points provided in Table 4.3 appear to be the most accepted estimates for these years: while not a complete time series, they do show that milk consumption rose by 20 to 50% during Prohibition.

While milk production and distribution remained decentralized, prominent soft drink firms, most notably Coca-Cola, emerged during Prohibition. There are several interesting parallels between Coca-Cola and the national shipping breweries: 1) they operated in industries that traditionally had supported large numbers of locally oriented firms, but which were becoming more concentrated; 2) they were trying to foster national markets for their products; 3) they introduced intensive and expensive advertising and marketing campaigns in their efforts to win national markets; 4) they appreciated the value of trademarks and branding, key insights which aided them in their national efforts; and 5) they sought to replace draught or soda fountain sales with packaged sales. Coke did not become a national force until sever-

al decades after the large shipping breweries, but it incorporated and expanded upon several marketing and imaging techniques that the shippers had used to great effect. The shippers, in turn, could find many lessons in the rise of Coke.

Year	Unit Sales (millions of gallons)	Dollar Sales (millions)	Profit (millions)
1910	4.9	5.5	n.a.
1915	7.5	10.3	n.a.
1916	9.7	13.2	n.a.
1917	12.0	16.4	n.a.
1918	10.3	13.6	n.a.
1919	18.7	27.3	n.a.
1920	18.7	32.3	n.a.
1921	15.8	28.5	n.a.
1922	15.4	21.1	n.a.
1923	17.3	24.3	4.5
1924	17.5	25.4	5.7
1925	20.1	28.6	7.9
1926	21.2	30.1	8.4
1927	22.8	32.5	9.2
1928	24.2	34.7	10.2
1929	27.0	39.3	12.8
1930	27.8	41.3	13.5
1931	n.a.	40.3	14.0
1932	n.a.	33.6	10.7
1933	n.a.	32.3	10.8
1934	n.a.	39.8	14.3
1935	n.a.	45.5	15.8
1936	n.a.	58.0	20.4
1937	n.a.	70.4	24.7
1938	n.a.	78.1	25.6
1939	n.a.	90.5	29.0

Table 4.4. Coca Cola sales and profits, 1910-1939.

Source. Tedlow, R. (1990) *New and Improved: The Story of Mass Marketing in America*. New York: Basic Books. pp.29, 57, 63, 85.

Capitalizing on Prohibition, the nominal dollar value of Coca-Cola's sales increased by 202%, and its profits rose by 218% from 1916 to 1934. However, as Table 4.4 shows, Coca-Cola's achievements did not end with repeal in 1933: from 1934 to 1939, the dollar value of sales and profits more than doubled. Not lost on the shipping brewers was the importance of bottling in this tremendous expansion. In addition, the shippers paid special attention to the enormous successes that a carbonated, sugary drink had in their absence. If they failed to respond to this threat, they might not be able to regain their pre-Prohibition sales. But, if they modified their beers-made them a bit more carbonated, a bit less bitter (less hoppy), then they would have a product that better fit the changing tastes, especially if the local breweries remained true to their traditional brewing styles and did not make these product changes.

Section 4.5.C: The rising role of packaging

In 1928, Coca Cola saw its bottled sales surpass its fountain sales for the first time. This was indicative of the third key factor of the changing consumer market: the ever-increasing popularity of packaged goods,⁶¹ which was boosted along by the rise of home refrigeration.

By 1933, the year of repeal, one out of every four U.S. households wired with electricity had a refrigerator.⁶² This new appliance not only accommodated goods that needed to be kept cold, but increased demand for them. In the case of beverages, it helped shape these preferences: ice cold became the ideal temperature for beer and soda.

The colder a drink is served, the more difficult it becomes to evaluate specific flavors and aromas. The shipping breweries, looking to compete less on the nature of the product itself than on images of the product, helped to promote this preference.

Section 4.5.D: The continued roles of mass production and product homogenization

The fourth factor is the increased consumer regard for standardization and consistency over uniqueness and individuality. In the 1920s and 1930s, intrinsic product

Year	Number of Refrigerators sold in the US	Percentage of US wired households with a Refrigerator
1920	10,000	<1%
1921	5,000	<1%
1922	12,000	<1%
1923	18,000	<1%
1924	30,000	<1%
1925	75,000	1.0%
1926	210,000	2.4%
1927	390,000	4.3%
1928	560,000	6.4%
1929	800,000	9.4%
1930	848,508	12.8%
1931	986,680	17.1%
1932	853,784	21.6%
1933	1,082,302	24.7%
1934	1,388,450	29.3%
1935	1,732,347	34.2%
1936	2,211,751	41.1%
1937	2,567,836	49.4%
1938	1,423,437	51.7%
1939	2,118,823	56.0%
1940	2,828,690	63.0%
1941	3,783,551	72.0%

Table 4.5. *The development of refrigeration in the US, 1920-1941.*

Source. Tedlow, R. (1990) *New and Improved: The Story of Mass Marketing in America*. New York: Basic Books. pp.313-314, 321; Bowden, S. and Offer, A. (1994) 'Household appliances and the use of time: the United States and Britain since the 1920s', *Economic History Review*. 48. pp.725-748.

characteristics began to yield to marketing-inspired attributes. Hess and Hess discuss the negative effects mass production and product homogenization had on the quality of food and drink in America during the late 19th and 20th centuries. Scranton notes that some companies suppressed differences between commodities in

an effort to construct generic products; this process, he argues, benefited firms looking to minimize costs rather than to promote quality and diversity.⁶³

The rise of branded, packaged and homogenized goods was not a natural market response to changing consumer preferences. These products appeared as part of a concentrated strategy by many leading firms in a host of industries to move the debate away from inherent product attributes to socially constructed conceptions of the products. A broad consumer culture valuing branded, packaged goods does emerge, but it is not a natural, nor beneficial process. Breweries witnessed these changes in the 1920s, and the prescient among them understood that the post-repeal market would be radically different from the not-too-distant pre-Prohibition market.

Section 4.6: The impact of Prohibition

Economists and economic historians writing on the brewing industry have largely ignored the Prohibition period. Those who have commented on it have emphasized how unaware the brewing industry was of the temperance movement, and how flawed their response to this threat was. I do not accept this characterization. The brewing industry was well aware of the specter of prohibition. There were, as Kerr argues, differences in opinion between brewers as to how they should combat this menace. That the brewers were ultimately unsuccessful in winning for beer a dispensation from prohibitory legislation does not mean their efforts were inherently flawed or ill-conceived.

This review of the events leading up to Prohibition shows that the brewing industry and its leading firms did not passively wait for other forces to decide their fate. They continued to emphasize, as they had for decades, that beer was a temperance drink, and that prohibition should focus on spirits. Even after Congress passed the Eighteenth Amendment, brewers worked to exclude beer from the definition of 'intoxicating alcohol'. After losing this definitional battle, several of the national shippers and some local breweries immediately began to work with organizations seeking to repeal or modify Prohibition.

The leading pre-Prohibition shipping brewers distinguished themselves during these dark years: they kept

current with developments in commercial brewing, they invested in bottling and canning equipment, and they worked directly to repeal or modify the Volstead Act and the Eighteenth Amendment. Moreover, they used Prohibition as a vehicle to further their own objectives. Throughout these years, they spoke tirelessly of the need to promote real temperance through the promotion of beer over spirits, and to end the control of saloons by breweries themselves.

The Prohibition era witnessed many changes in consumer behavior that would greatly affect the post-repeal market for beer. These external developments - not addressed consistently, if at all, in the standard narrative - worked to the advantage of the shipping breweries who, even in the pre-Prohibition period were trying to promote bottled, branded beer.

The next chapter traces the post-repeal successes of the shipping brewers and the demise of the local firms.

The third and final part of this study will appear in the Autumn edition of Brewery History.

References

Chapter 3

1. Baron, S. (1962) *Brewed In America: A History of Beer and Ale in the United States*. Boston: Little, Brown, and Co. p.257.

2. Cochran, T. (1948) *Pabst Brewing Company: The History of an American Business*. New York: New York University Press. pp.73-74.

3. Cochran recognized that the shippers did not enjoy the same rate of success in the years from 1895-1920, but subsequent readers of his book seem to ignore his discussion on this subject (ibid. pp.180-182), extrapolating instead from trends in his 1877 and 1895 data tables (ibid. pp.73-74).

4. Chandler, A. (1977) *The Visible Hand*. Cambridge, MA: Harvard Press. pp.256-257, 300-301.

5. To place these annual production levels in perspective, during the current microbrewery revolution begun in the late 1970s, microbrewers were defined as producing under 10,000 barrels. Very few of the new breweries started in the last two decades produce over 25,000 barrels.

6. This estimate is based in part on the number of breweries

which registered with the IRS that they were using pipelines to bottle their beer. See Section 3.4's discussion of bottled beer.

7. Bull, D., Friedrich, M. and Gottschalk, R. (1984) *American Breweries*. Trumbull, CT: Bullworks.

8. Downard, W. (1980) *Dictionary of the History of the American Brewing and Distilling Industries*. Westport, CT: Greenward Press; & Bull, D. et. al. (1984) op. cit.

9. Lamoreaux, N. (1985) *The Great Merger Movement in American Business, 1895-1904*. New York: Cambridge Press introduced this definition of profitability in her work on the turn of the century merger movement which used extensively census of manufacturing data. This definition, however, is not without some problems. Its determination of total costs is imprecise, and the relationship between revenue and the value of output is vague. Yet, despite these limitations, it is the best measure of profit for these early Census of Manufactures data.

10. One of the assumptions we are making about the medium sized breweries is that they were able to increase their production levels fairly easily, that is, that they did not face (insurmountable) capacity constraints. Downard, W. (1973) *The Cincinnati Brewing Industry: A Social and Economic History*. Athens: Ohio University Press, shows how several Cincinnati breweries were able to expand without reaching their capacity constraints. The annual capacity at the Dayton Street brewery rose from 40,000 to barrels in 1869 to 300,000 in 1894, though they produced under 130,000 barrels in the 1890s (ibid. p.58). The Jackson brewery produced 40,000 to 50,000 barrels annually in the 1880s and 1890s, though it had a capacity of 100,000 barrels (ibid. p.59). In addition, refrigeration allowed all brewers to extend their brewing season, and thus to increase their production, without investing in new plants.

11. Passell, P. and Atack, J. (1994) *A New Economic View of American History, 2nd ed.* New York: Norton.

12. McGahan, A. (1991) 'The Emergence of the National Brewing Oligopoly: Competition in the American Market, 1933-58', *Business History Review*. 65. p.242.

13. ibid. p.239.

14. Bull, D. et. al. (1984) op. cit. pp.155-161. It is unlikely that any of these breweries had annual production levels of over 200,000 barrels.

15. Downard, W. (1973) op. cit. p.60.

16. These brewery counts are from Bull, D. et. al. (1984) op. cit.. While this is the most comprehensive listing of breweries, the author notes that it probably undercounts the actual number of smaller breweries.

17. *Annual Report* (1911) Heileman Brewery Archives.

Heilman Brewery, LaCrosse, WI.; & Cochran, T. (1948) op. cit. p.186.

18. *Annual Report* (1911) Heileman Brewery, op. cit.

19. Plavchan, R. (1969) *A History of Anheuser-Busch, 1852-1933*. Ph.D. St. Louis University. p.65.

20. Krebs, R. and Orthwein, P. (1953) *Making Friends is Our Business: 100 Years of Anheuser-Busch*. St. Louis, MO: self published book, Anheuser-Busch. pp.242-243; & Gourvish, T.R. and Wilson, R.G. (1994) *The British Brewing Industry: 1830-1980*. Cambridge: Cambridge University Press.p.99.

21. McGahan, A. (1991) op. cit. p.242.

22. Cochran, T. (1948) op. cit. p.147.

23. *ibid.* p.148.

24. Plavchan, R. (1969) op. cit. p.83.

25. In 1905, Missouri production was 3.5 million barrels; Anheuser-Busch produced 1.375 million barrels, and Lemp produced around 500,000 barrels. Wisconsin production in 1905 was 4,078,000 barrels; Pabst produced 875,000 barrels, Schlitz around 1 million barrel, and Blatz over 500,000 barrels (Cochran, T. (1948) op. cit. p.180; & Krebs, R. and Orthwein, P. (1953) op. cit. p.242).

26. Cochran, T. (1948) op. cit. p.243.

27. *ibid.* p.186.

28. Table 3.4 shows that the standard story's preoccupation with Missouri and Wisconsin - as home to the leading national shippers - is misplaced. Though these two states were important, it is clear that the dominant pre-Prohibition brewing states were New York and Pennsylvania, which as late as the 1910s, accounted for over 39% of the national beer production (*United States Brewers Association Year Book, 1909*). From 1878-1900, New York and Pennsylvania accounted for between 42 to 52% of all the beer produced in the US; See Appendix A for a detailed time series of the Industry and leading state beer production from 1878-1919. This time series was calculated with data from the *United States Brewers Association Year Books, 1909-1919*.

29. Chandler, A. (1977) op. cit. p.300.

30. Lazonick, W. (1991) *Business Organization and the Myth of the Market Economy*. New York: Cambridge Press. p.245.

31. Chandler, A. (1977) op. cit. p.301.

32. Some beer purists maintain that the best malt comes from the traditional style of floor malting, which pneumatic malting replaced, Protz, R. (1995b) *The Ale Trail*. Kent, UK: Eric Dobby Publishing. p.85.

33. Thomann, G. (1909) *American Beer: glimpses of its history and description of its manufacture*. New York: United States Brewing Association. p.102.

34. Anon (1903) [1974] *One Hundred Years of Brewing*. Chicago and New York: Arno Press Reprint.

35. Downard, W. (1973) op. cit. p.83.

36. England still has a tied-house system. Gutzke provides a brief historical overview of the development and evolution of this system in Great Britain, Gutzke, D. (1989) *Protecting The Pub: Brewers and Publicans against Temperance*. Woodbridge, Suffolk: The Boydell Press. pp.4-5.

37. Duis, P. (1983) *The Saloon: Public Drinking in Chicago and Boston, 1880-1920*. Urbana: University of Illinois Press. p.25.

38. *ibid.* pp.26-28. There were exceptions to this general pattern however. While breweries took advantage of license laws to gain control of Chicago's saloons, in Boston, wholesalers rather than breweries secured control of many of the city's saloons (*ibid.* p.32). The basic issue was the same: whoever controlled access to the saloons controlled the types of beer that would be made available.

39. Williamson, O. (1985) *The Economic Institutions of Capitalism*. New York: Free Press.p.111.

40. Burnham, J. (1993) *Bad Habits*. New York: New York University Press.

41. Kerr, K.A. (1985) *Organized for Prohibition*. New Haven: Yale Press.

42. Cochran, T. (1948) op. cit. p.123.

43. Though as all brewers learned during Prohibition, it was even easier and more profitable to sell liquor in dry areas.

44. Cochran, T. (1948) op. cit. pp.210-212.

45. *ibid.* p.310.

46. Strasser, S. (1989) *Satisfaction Guaranteed: The Making of the American Mass Market*. New York: Pantheon.

47. In Britain, breweries were able to construct brand loyalty for draught beer, but these efforts were intricately related to the tied-house arrangement discussed in Section 3.3.

48. More research needs to be done on these middle class, affluent drinkers. Draught beer bought in a saloon certainly had a stigma attached to it, but it is unclear how fully middle class drinkers could avoid this stigma by more discreetly drinking bottled beer. It does not appear that the middle class drank much wine during this period. Wine production in the United States was limited, and imported wines were heavily taxed, and, subsequently, were primarily enjoyed by the wealthy. Finally, it is interesting to note that water starts getting bottled in Europe around this time, but not in the US: it would be interesting to study the reasons for this, and to determine what, if any, implications this holds for the brewing industry.

49. Cochran did not calculate all of these profit per barrel data, but he did provide enough raw data for these calculations to be made. He gave Net profit and total number

of barrels produced for 1873-1893 (Cochran, T. (1948) op. cit. p.84), from which I calculated overall profit/barrel of beer. He provided the number of barrels of bottled beer, and profit/barrel of bottled beer for 1881-1893; I used these data to calculate profits/keg barrel for 1881-1893. He provided keg and bottled total profit data for 1904-1918 (ibid. p.186), from which I calculated keg and bottled beer/barrel.

50. Cochran also provides profit data for bottled and draught beer for its branch business. From 1913 to 1917, bottled beer earned net profits, while the net return for draught beer was negative every year (ibid. p.242).

51. Plavchan, R. (1969) op. cit. p.107.

52. ochran, T. (1948) op. cit. pp.98-101, 123-128.

53. ibid. p.127.

54. Tedlow, R. (1990) *New and Improved: The Story of Mass Marketing in America*. New York: Basic Books. p.50.

55. For detailed accounts of the implications of branding and labeling in the market for beer, see Jones, G. and Morgan, N. (eds.) (1994) *Adding Value: Brands and Marketing in Food and Drink*. London: Routledg, especially the essay by Casson, M., 'Brands: economic ideology and consumer society'.

56. Krebs, R. and Orthwein, P. (1953) op. cit. pp.327-340.

57. Apps, J. (1992) *Breweries of Wisconsin*. Madison, WI: University of Wisconsin Press. p.126.

58. Cochran, T. (1948) op. cit. p.177.

59. Apps, J. (1992) op. cit. p.133.

60. ibid. p.87.

61. Cochran, T. (1948) op. cit. p.219. I have calculated the percent of bottled beer production, and the growth in bottled beer production from data Cochran provides on the number of pints of bottled beer Pabst produced in 1901 and 1905.

62. ibid. p.186.

63. Plavchan, R. (1969) op. cit. p.107.

64. Heileman Annual Report, 1918. I have not found independent verification of this claim.

65. Vogel, E., Schwaiger, F., Leonhardt, H. and Merten, J.A. (1946) *The Practical Brewer: A Manual for the Brewing Industry*. St. Louis, MO: Von Hoffman Press. pp.130-137; & Cochran, T. (1948) op. cit. p.216.

66. Miller, D. (1995) 'Haze Problems, Bottling Blues, High-Gravity Fermentations, and Microbiological Stability for Micros', *Brewing Techniques*. 3, March/April. pp.23-26.

67. ibid.

68. ibid. pp.25-26.

69. Elzinga, K. (1990) 'The Beer Industry', in W. Adams (ed.) *The Structure of American Industry*. 8th ed. New York: Macmillan.

70. McGahan, A. (1991) op. cit. p.241. McGahan is

incorrect when she writes that Pasteurization was not applied to draught beer; both bottled and draught beer were Pasteurized. Pasteurization is often used if the beer is to be transported great significant distances, or if the beer may not be consumed fairly quickly. It is, however, unclear how much pre-Prohibition draught beer was pasteurized.

71. Krebs, R. and Orthwein, P. (1953) op. cit. p.336.

72. Protz, R. (1995b) op. cit. p.23.

73. ibid.

74. One of the primary goals of CAMRA is to promote the superior flavor of unpasteurized draught beer in England, Protz, P. (1995b) op. cit. p.116-128.

75. Cosbie, A. (1945) 'Pasteurization', *Journal of the Institute of Brewing*. 51. pp.233-240.

76. Mendlik, F. (1950) 'Pasteurization', *Journal of the Institute of Brewing*. 56. pp.134-140.

77. Krebs, R. and Orthwein, P. (1953) op. cit. p.287.

78. Ellis, N. (1963) 'The Development of Bottled Michelob', *American Brewer*. 96 (July). pp.20-21, 34.

79. Mendlik, F. (1950) op. cit. p.140.

80. This is still true today. To understand the effect pasteurization has on beer, a recent trade journal article suggests the following: 'Try to get hold of [some] bottled beer of various ages-one month, two months, three months-and compare them with freshly bottled and fresh draught beer examples of the same brands. That should give you some idea of how much damage pasteurization will do to your beer' (Miller, D. (1995) op. cit. p.26). If this is still true in the 1990s, then pasteurization's effect on beer was certainly an even greater problem in the 1890s.

81. English and Irish immigrants outnumbered German immigrants over the next four decades.

	Germany	England and Ireland
1881-1890	1,452,970	1,462,839
1891-1900	505,152	659,954
1901-1910	341,498	865,015
1911-1920	143,945	487,589

(data compiled from Dinnerstein, L. and Reimers, D. (1988) *Ethnic Americans: A History of Immigration*. New York: HarperCollins. p.208).

82. ibid.

83. The role of the brewing institutes has not been discussed in most accounts. The first schools were founded in New York, Chicago, and Milwaukee by German immigrants such as Seibel & Schwartz (Chicago), Hantke (Milwaukee), and Wallerstein (New York).

84. Protz, R. (1995a) *The Ultimate Encyclopedia of Beer*. London: Carleton. p.17.

85. Pasteur, L. (1879) *Studies on Fermentation: The*

Diseases of Beer, Their Causes, and the Means of Preventing Them. London: Macmillan. p.13.

86. Chandler, A. (1977) op. cit. p.300.
87. McGahan, A. (1991) op. cit. p.244.
88. Cochran, T. (1948) op. cit. p.129.
89. Jackson, M. (1993) *Beer Companion*. Philadelphia: Running Press. p.16. Krebs and Orthwein also state that 'Western two-row barley malt because it makes for a milder and more pleasant beer', Krebs, R. and Orthwein, P. (1953) op. cit. p.284.
90. Protz, R. (1995a) op. cit. p.217.
91. Jackson, M. (1993) op. cit. p.23.
92. Fix, G. (1994) 'Explorations in Pre-Prohibition American Lagers', *Brewing Techniques*. 2 (May/June). pp.22-26.
93. Ellis, N. (1963) op. cit.
94. Lisher, M. (1997) 'Capture The Past-The Rebirth Of Pre-Prohibition Lager', *Zymurgy*. 20 :20-23. pp.82-86.
95. Renner, J. (1995) 'Reviving the Classic American Pilsner-A Shamefully Neglected Style', *Brewing Techniques*. 5 (September/October). p.25.
96. Mine is not a comprehensive discussion of 'quality'. Several beer writers have examined the effects that new technologies had on malt quality at the turn of the century. Protz notes that some brewers continue to use the process of floor malting, claiming that pneumatic malting yields an inferior product; Protz, R. (1995b) p.85.
97. Cochran does not provide the exact date for when Bock stepped down as headbrewer.
98. Bock, F. (1912/13) 'Is it in the Interest of the American Brewing Industry to Encourage the Raising of Pedigreed Two-Rowed or Six-Rowed Barley?' *Letters on Brewing*. 12. pp.5-8.
99. Archival data for Blatz suggest, but do not categorically prove, that Blatz brewed only with lower grade, six row barley. Data for other shippers are unavailable, but recipes for some local breweries indicate that they used high proportions of two row barley.
100. Volume 95: General Ledger, May 1, 1891. Blatz Archives, University of Wyoming (BAW).
101. There continues to be a degree of uncertainty about the quality of pre-Prohibition American hops. Fix notes that Clusters, a favorite domestic hop during these years, was very crude, and did not offer the attributes of fine European hops such as Hallertauer, Mittelfruh and Saaz; Fix, G. (1994) op. cit.
102. Krebs, R. and Orthwein, P. (1953) op. cit. p.286.
103. Archival data for the regional shipper Heileman indicate that it was using corn and rice adjuncts by the early 1900s; Heileman (1902) Annual Report.

104. Ehert, G. (1891) *Twenty Five Years of Brewing*. New York: Gast Lithograph and Engraving.

105. Cochran, T. (1948) op. cit. p.119-122. Cochran does not discuss if the brewery continued to modify its input mix after this date. It is likely that it did, as national malt and hops per barrel usage fell steadily from 1900-1990.
106. Krebs, R. and Orthwein, P. (1953) op. cit. p.339.
107. *ibid.* p.30.
108. Protz, R. (1995b) op. cit. p.19.
109. Krebs, R. and Orthwein, P. (1953) op. cit. p.286.
110. Cochran, T. (1948) op. cit. p.215-217.
111. *ibid.* p.119.
112. Lisher, M. (1997) op. cit. p.245.
113. Anderson, O. (1958) *The Health Of A Nation: Harvey W. Wiley and the Fight for Pure Food*. Chicago: University of Chicago Press.
114. 'The Ingredients of Beer' (1912) *Letters on Brewing*. 12. pp.51-53.
115. Protz, R. (1995a) op. cit. p.219.
116. Hantke's Brewers School & Laboratories (1908) 'Do the Milwaukee Bottled Beers Conform with the Standards for Fermented Beverages', *Letters on Brewing*. 8. pp.1-7.
117. *ibid.* p.4
118. Eckhardt, F. (1995) *The Essentials of Beer Style*. Portland, OR: Fred Eckhardt Communications. p.22.
119. Kloss, C. (1949) *The Art and Science of Brewing*. London: Stuart and Richards. p.64.
120. Casson, M. (1994) op. cit.
121. Levenstein, H. (1988) *Revolution at the Table: The Transformation of the American Diet*. New York: Oxford Press.
122. Strasser, S. (1989) op. cit.
123. McGahan, A. (1991) op. cit. p.241.
124. Scranton, P. (1995) 'Determinism and Indeterminacy in the History of Technology', *Technology and Culture*. 36 supp., S47.
125. Hess, J. and Hess, K. (1977) *The Taste of America*. New York: Viking Press discuss the changing nature of *The Taste of America*; & Levenstein, H. (1988) op. cit. examines *The Revolution at the Table*.

Chapter 4

1. United States Brewers Foundation (1956) *Brewers Almanac*. p.10.
2. Elzinga, K. (1990) op. cit. p.224.
3. Baron, S. (1962) op.cit. p.312.
4. McGahan, A. (1991) op. cit.; & McGahan, A. (1995)

‘Cooperation In Prices and Capacities: Trade Associations in Brewing After Repeal’, *Journal of Law and Economics*. 38. pp.521-559.

5. Kerr, K.A. (1985) op. cit. pp.35-89.

6. *ibid.* p.90.

7. Burk, R.F. (1990) *The Corporate State and the Broker State: The DuPonts and American National Politics, 1925-1940*. Cambridge, MA: Harvard University Press. p.30.

8. This treatment of Prohibition by economists and some economic historians is a striking example of how they have ignored many important primary materials and contemporary studies by social and political historians.

9. Kerr, K.A. (1985) op. cit. p.161.

10. Feinspagn replaced Gustav Pabst as President of the USBA, whose term expired in 1917; *United States Brewing Association Year Book* (1915) pp.vii-viii. Pabst, along with executives of Anheuser-Busch, seem to have favored an alliance with distillers, or at least they were willing to use money provided by the distillers in their fights against prohibition forces; Kerr, K.A. (1985) op. cit. pp.182-183.

11. *ibid.* p.182-184; & *United States Brewing Association Year Book* (1915) p.viii.

12. Mathias, P. (1959) *The Brewing Industry In England: 1700-1830*. Cambridge: Cambridge University Press. p.242.

13. Finch, C. and Griffiths, W.S. (1994) *America's Best Beers*. Boston: Little, Brown and Company. p.22; See also, for example, the *United States Brewers Association Year Book* (1911) pp.108-110; the *United States Brewers Association Year Book* (1913) pp.129-142; & the *United States Brewers Association Year Book* (1915) pp.158-164, 181-202.

14. Brewers Association of Canada (1965) *Brewing In Canada*. Montreal: Ronalds-Federated. pp.48-49, 98-110.

15. The excise rate was \$.70/gallon from 1872 to 1875, \$.90/gallon from 1875 to 1894, and \$1.10 from 1894 to 1917; & Downard, W. (1980) op.cit. p.237.

16. Revenue pressure during the Spanish-American War led to temporarily higher tax rates of \$2.00/bl from 14 June 1898 - 30 June 1901 and \$1.60/bl from 1 July 1901 - 30 June 1902. For the rest of the period 1864 - 4 October 1917, the tax rate remained at \$1/bl; *Brewers Almanac* (1956) op. cit. p.86.

17. Kerr, K.A. (1985) op. cit. p.177.

18. Salem, F. (1880) *Beer: Its History and Its Economic Value as a National Beverage*. New York: Arno Press Reprint 1972. p.165.

19. *United States Brewers Association Year Book* (1915) p.117.

20. Arnold, J. and Penman, F. (1933) *The History of the Brewing Industry and Brewing Science in America*. Chicago: privately printed. pp.175-176, 234.

21. *United States Brewers Association Year Book* (1915) p.199.

22. *United States Brewers Association Year Book* (1914) p.17.

23. Kerr, K.A. (1985) op. cit. p.182.

24. *ibid.* pp.22-25.

25. The relationship between beer excise tax revenues and the national income tax is discussed not in histories of the brewing industry, but in histories of the repeal of Prohibition. The DuPonts favored the repeal of Prohibition, and one of the factors they cited was that if beer was legalized, the government could eliminate the income tax. Burk quotes Irene DuPont: ‘If workers were willing to pay but a three-cent levy per glass on “mild, wholesome beer”, [it would] enable the federal government to get rid of burdensome corporation taxes and income taxes’; Burk, R.F. (1990) op. cit. p.39. Interestingly, it does not appear that prohibitionists tried to argue that the passage of the federal income tax lessened the nation’s dependence on excise revenue from alcohol. For example, Kerr does not discuss the topic in his history of the Anti-Saloon League.

26. Kerr, K.A. (1985) op. cit. p.200.

27. Rubin, J. (1979) ‘The Wet War: American Liquor, 1941-1945’, in Blocker, J. (ed.) *Alcohol, Reform, and Society*. Westport, CT: Greenwood Press. p.236.

28. Kerr, K.A. (1985) op. cit. p.204.

29. *ibid.* p.207.

30. *ibid.* p.224.

31. Krebs, R. and Orthwein, P. (1953) op. cit. p.165.

32. Plavchan, R. (1969) *A History of Anheuser-Busch, 1852-1933*. Ph.D. St. Louis University. p.168.

33. Cochran, T. (1948) op. cit. p.340.

34. Plavchan, R. (1969) op. cit. p.178; Conny, B. (1990) *A Catalyst for Change: The Pioneering of the Aluminum Can*. Golden CO: self published pamphlet, Adolph Coors Company. pp.35-36; & American Can Company (1969) *A History of Packaged Beer and Its Market in the United States*. self published pamphlet. pp.7-9.

35. See Cochran, T. (1948) op. cit.; Plavchan, R. (1969) op. cit.; Krebs, R. and Orthwein, P. (1953) op. cit.; & BAW, Supplemental List A, Volume 5.

36. BAW, Supplemental List A, Volume 5.

37. Kyvig, D. (1979) *Repealing National Prohibition*. Chicago: University of Chicago Press. p.47.

38. *ibid.* p.58.

39. Dobyns, F. (1940) *The Amazing Story of Repeal: An Expose of the Power of Propaganda*. Chicago: Willett, Clark & Co. p.7.

40. Apps, J. (1992) op. cit. p.68.

41. Dobyns, F. (1940) op. cit. p.6.

42. Cochran, T. (1948) op. cit. p.361; Dobyns, F. (1940) op.

cit. pp.6-10; & Kyvig, D. (1979) op. cit. pp.46-47.

43. Anheuser-Busch Brewery (1923) *Herein is proof that beer and light wines disassociated from hard liquors and spirits produce real temperance*. St. Louis, MO: self published pamphlet. pp.10, 18; & Burnham, J. (1993) op. cit. p.31. Eads translated documents and articles for Anheuser-Busch detailing the workings of the Quebec Beer and Wine System. In 1921, Quebec repealed its 1919 Provincial Prohibition Law. The 1921 legislation advanced several points that the American shipping brewers hoped to introduce into America. These included a differentiation between beer and spirits, a policy encouraging packaged beer, and a separation between manufacturers and retailers; Anheuser-Busch Brewery (1923) op. cit. pp.3-16; & Brewers Association of Canada (1965) op. cit. p.104. After his stint with the AAPA, Eads rejoined Anheuser-Busch; by the early 1940s, Eads had become a Vice President for Anheuser Busch; Hernon, P. and Ganey, T. (1991) *Under the Influence: The Unauthorized Story of the Anheuser-Busch Dynasty*. New York: Simon and Schuster., pp.164, 181.

44. Quoted in Plavchan, R. (1969) op. cit. p.2006.

45. Kyvig, D. (1979) op. cit. p.59.

46. Quoted in Anheuser-Busch Brewery (1923) op. cit. p.19.

47. *ibid.* George Eads translated the Quebec report; it is also possible that he authored the introduction of this unsigned pamphlet.

48. Krebs, R. and Orthwein, P. (1953) op. cit. p.164.

49. *Congressional Record*, 72nd Congress, 1st Session (1932) pp.2699-2701.

50. *ibid.* p.5907.

51. *ibid.* p.2495.

52. Cochran, T. (1948) op. cit. p.364.

53. Lender, M. and Martin, J. (1987) *Drinking in America*. New York: The Free Press. p.165.

54. Cochran, T. (1948) op. cit. p.364.

55. Plavchan, R. (1969) op. cit. p.214.

56. Kerr, K.A. (1985) op. cit. p.96.

57. *ibid.* p.248.

58. *Congressional Record* (1932) op. cit. pp.12143-12144.

59. From 1934 to 1940, hops and malt usage per barrel of beer declined by 15%. See Table 3.13 in Chapter Three.

60. Compare the Department of Commerce estimates in *Historical Statistics of the United States* (1976) pp.330-331, to the more accepted estimates from Lender, M. and Martin, J. (1987) op. cit. pp.146-147, and Cassels, J. (1937) *A Study of Fluid Milk Prices*. Cambridge: Harvard University Press. pp.94-95.

61. Hess, J. and Hess, K. (1977) op. cit. Chapters 7-9.

62. This contrasts sharply with England, which in 1933 had refrigerators in fewer than 1% of its wired households, Bowden, S. and Offer, A. (1994) 'Household appliances and the use of time: the United States and Britain since the 1920s', *Economic History Review*. 48. pp.745.

63. Scranton, P. (1995) op. cit. S46.