CHAPTER 3

The Rationalization of Craft Beer from Medieval Monks to Modern Microbrewers

A Weberian Analysis

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Introduction

The craft beer "revolution" is often depicted as a triumphant tale of American ingenuity and entrepreneurial success, where grassroots enthusiasts bucked the trend of bland, mass-produced beer and created a unique and authentic product and transformed modern brewing culture in the process (Hindy 2014; Rao 2009). Traditionally, beer is seen as an everyman's drink in the United States. In other words, it is an inexpensive beverage consumed by "regular" people in casual settings like the local bar, baseball games, or the backyard after mowing the lawn. Major commercial brands like Budweiser, Coors, and Miller tend to specialize in a product that suits this image and is easy on the palate—light-bodied in taste, pale in color, and sold in bulk. Wine, on the other hand, is practiced like a kind of haute couture—consumed (nay, discriminately appreciated) by more "sophisticated" people in more formal settings who have access to a wide variety of styles (some of them very rare) that can be many times more expensive than beer.

The explosion of craft beer in recent decades, however, has transformed the image of the beer drinker. For starters, craft breweries are much smaller, more numerous, and tend to appeal to localized and specialized markets (Carroll and Swaminathan 2000), compared to the handful of "commercial" breweries that produce in mass quantities for a nationwide market.[1] What is more, the craft

beer industry produces a vast array of styles reflecting Old World traditions and New World innovations that, much like wine, appeal to various palates and can be appreciated in rather discriminating ways (see Bernstein 2013, Jackson 2000, Mosher 2009, Oliver 2003). As a result, craft beer is often recognized as a hip, sophisticated alternative to its mass-produced competition.

What is less recognized by the average consumer, or by scholars for that matter, is that many aspects of the production of craft beer are exceedingly sophisticated. From the recent creation of degrees in the science of brewing and the ever-expanding number of beer styles to the widespread use of specialized ingredients, quantitative metrics, and various quality control techniques, craft brewing exhibits what sociologist Max Weber would characterize as a high degree of *rationalization*. While Weber never precisely defined this term, it became a central component of his argument in *The Protestant Ethic and the Spirit of Capitalism* (1904/2009) and referred to an unusually disciplined and methodical organization of life conduct that sought to tame and redirect spontaneous human desires (the *status naturae*) based on a set of values (116–117). Here, Weber famously argued that doctrinal changes during the Protestant Reformation encouraged this kind of "rational asceticism" that, when applied to economics, set loose a new spirit of capitalism oriented toward frugality, reliable/mass production, steady profits, and continual reinvestment (Collins 1998). Later, Weber associated rationalization with increasing formalization, standardization, systematization, calculation, and the like, which permeated Western culture and transformed key institutions such as science, law, education, and music, as well as religion and capitalism (Weber 1978; 1920/2009).

In this chapter, I explore how the production of craft beer is thoroughly rationalized and involves a surprising amount of technical expertise and scientific standardization that have become hallmarks of the industry. Borrowing Weber's insights, I argue that the widespread application of sophisticated brewing techniques is not merely about selling a commodity and making money, per se, but rather reflects an abiding desire to systematically perfect this "craft" and signal to others that one is a legitimate brewer with the necessary expertise. At the same time, I highlight how the rational organization of craft brewing can also have some irrational consequences, such as consumer confusion and intimidation, as well as disenchantment among professionalized taste testers. Finally, building on *The Protestant Ethic*, I describe how, in small but significant ways, the rationalization of modern brewing can be traced all the way back to the Middle Ages and the religious organization of monastic communities, qualifying medieval monks as the first "revolutionaries" of modern beer brewing.

The Rationalization of Craft Beer

If you look closely at the label on a bottle of craft beer, or its packaging, it contains a surprising amount of information. In general, a beer label is required by federal regulations to include only brand name, class and type designation (e.g., beer, ale, or lager), name and address of brewer or bottler, net contents (e.g., ounces), and a health warning statement about alcohol consumption.[2] However, it is not uncommon for a craft beer label to also specify how bitter the beer is (in number of international bittering units [IBUs]), how dense it is (via an original gravity [OG] value), how strong it is (as percent alcohol by volume [ABV]), how fresh it is (depending on the bottling or expiration dates), what ingredients were used (i.e., the specific kind of malt, hops, or yeast), more specific type or style designations (e.g., amber ale, brown ale, black ale, pale ale, India pale ale), and any accolades or awards that have been garnered. No doubt, a dedicated craft beer drinker is used to seeing this kind of information, but, unless you have sufficient knowledge of the brewing process itself, some of it is rather cryptic. What does an OG value indicate, for example? Why do brewers highlight the use of a Belgian-style yeast strain? What's the difference between a German pils and a Czech pilsner? One wonders whether the average craft beer consumer is expected to understand all this!

Given that big commercial brands like Budweiser, Heineken, and Corona exclude much of this information, it probably is not required to sell beer. Indeed, I argue that all this technical information is more than just a marketing scheme. If beer was merely an everyman's drink, it would be odd to target this demographic by specifying quantitative metrics, specialized ingredients, and obscure categorical styles. But, like any modern endeavor that seeks to improve and progress, the surest and most legitimate means are those that involve the application of rationalized techniques (Ellul 1980; Meyer et al. 1987); to make the best beer, you should employ systematic, formalized, and efficient methods, calculate and measure your progress, and produce a product that is consistent and predictable (Ritzer 2013). Thus, technical information on a craft beer label looks impressive because it signals to the consumer a particular kind of brewing expertise that is perceived as more authentic and sophisticated than big commercial brewing. Craft beer fans expect to see what kind of hops are used in an Imperial pale ale, for example, and how many IBUs are registered as a result. In addition, this information may also signal to fellow brewers that the requisite degree of technical sophistication has been applied to the craft. Below, I describe some of this technical information and how it represents an effort to progressively master the art of beer brewing, above and beyond purely profit-making concerns.

Interestingly, the standard numerical indicators (or metrics) on a craft beer label were not invented by craft brewers, nor were they intended for the craft beer consumer; they were designed as "quality control" measures by scientific experts in a laboratory environment. In addition, I also highlight how these metrics and other idiosyncratic information on a beer label are just the tip of the iceberg, and point to a highly rationalized industry that is thoroughly scientific and standardized.

Quality Control Metrics

If you're a craft beer fan, you probably have enjoyed (or at least tasted) a pale ale. This has become a standard style in the American craft beer repertoire. One of the defining characteristics of this style is a distinct bitterness or tanginess, derived from the copious addition of hops to the brew. If you enjoy a stronger and bitterer version, you are probably well acquainted with India pale ales (IPAs), or the even stronger and bitterer double India pale ale (DIPA). Regardless, you may have noticed that the label often includes an IBU value, which indicates the level of bitterness in your beer; the higher the number, the bitterer the beer. IBU is a universal standard for measuring bitterness in beer (see Glossary). High-IBU or "hoppy" styles of beer have become increasingly popular in the United States in recent years. Economist Bart Watson of the Brewer's Association reports that IPAs, for example, accounted for less than 8% of craft beer sales in 2008 but that rose to 27.4% by August 2015. Moreover, given that the total volume of craft beer sales has grown considerably during this period, the size of the IPA category actually grew 10 times from 2008 to 2015. "If anything, these numbers probably underestimate the effect IPAs have had on growth, since in addition to IPAs, we've seen a trend toward the IPA-ification of everything: hoppy wheats, hoppy browns, SMASH (single malt and single hop) beers, and more. American brewers seem determined to continually put hops where no hops have gone before" (Watson 2015).

The IBU was developed by brewing scientists in the 1950s and 1960s to systematically monitor bitterness levels during the brewing process and to help maintain a consistent product across beer styles. Thus, a typical American pale ale should range from 35 to 40 IBUs (Oliver 2012, 490). While it has become a "hip" reference of potency and bitterness for particular styles (especially for IPAs and DIPAs), the IBU was never intended as a guide for the general public; it is a measure of particular chemical properties produced under controlled laboratory conditions and does not accurately indicate (by itself) how bitter the beer will taste to the average consumer. "The usefulness of the IBU to the beer

consumer is highly debatable. Once the beer leaves the laboratory context, many non-iso alpha acid factors, including other hop components, roast character, carbonation, water chemistry, and residual sugar, may exert such influence as to make the IBU an entirely unreliable indicator of actual perceived bitterness" (Oliver 2012, 490–491).

Perhaps the most familiar number on a beer label (craft or otherwise) refers to the alcohol content. This is typically reported as a percentage of the total volume of beer (percent ABV), although in the United States it was predominantly reported as a percentage of the total weight (percent ABW) until recently (see Glossary). The actual process of calculating the alcoholic strength of beer is quite complicated but, once again, it is done primarily for quality control purposes to ensure consistency of style, as well as to comply with federal regulations. According to the Brewers Association's *Beer Style Guidelines* (2014), an American-style barley wine ale is one of the more potent styles and should range from 8.5% to 12.2% ABV. Whereas, an American-style lager is on the lower end, and should range from 4.1% to 5.1% ABV.

An important measurement for determining the *future* alcohol content of a batch of beer is original gravity (OG), which is one of the more obscure numbers appearing on a craft beer label (see Glossary). An American-style barley wine ale, for example, should have an OG between 1.090 and 1.120, while an American-style lager should range between 1.040 and 1.048 (Brewers Association 2014). Alternatively, this value can be expressed in terms of degrees Plato and is equal to roughly one-fourth of the original gravity (Oliver 2012, 630) (see Glossary). Thus, barley wine should range between 21.6 and 28° Plato, and the lager between 10 and 11.9° Plato (Brewers Association 2014). For the brewer, measuring and maintaining a consistent original gravity or degrees Plato from batch to batch is another way to exert systematic control over the quality and consistency of the beer. How these particular metrics are useful, or even comprehensible, to the average craft beer consumer is unclear. I would argue that their inclusion on the label is not intended to be directly useful or comprehensible to the consumer. Rather, they highlight a technical sophistication that accords value and authenticity to the brewer and the product.

Progressive Experimentation

No doubt, one of the allures of craft beer is the number of different styles that are produced by this industry. Big commercial beers, especially in the United States, tend to be variations around a single style—the pale lager or pilsner. By contrast, the array of styles in a typical craft beer aisle is dizzying. The latest

edition of the Brewers Association's *Beer Style Guidelines* (2014), for example, summarizes the details of 141 styles of beer. To name just a few, there are strong ales, old ales, Scotch ales, and sour ales. There are doppelbocks, eisbocks, and gose beers. The Belgians make a dubble, a tripel, and a quadrupel. There are beers with fruit, coffee, chocolate, pumpkin, or spices and some that are gluten-free. Even pilsners are known for several distinct styles.

In general, a pilsner is clear, crisp, and pale gold in color with a more pronounced hop bitterness than pale lagers. Since their introduction in the mid-nineteenth century, they have become the dominant style of beer around the world. Czech (or Bohemian) pilsners are considered the original style and were introduced in 1842 in Pilsen, Czech Republic—hence the name "pilsner." They tend to be slightly darker in color (i.e., more golden) with a distinct floral bitterness from the use of indigenous saaz hops, have malty overtones, and are well carbonated, producing a dense head of white foam. The German pilsner (or "pils" for short) is a very close relative but tends to be lighter in color (more straw-like than golden), slightly more bitter, utilizes indigenous "noble" hops (e.g., spalt, tettnang, hallertau), and has a drier, less malty character than Czech pilsners (Oliver 2012, 651–652; Papazian 2003, 143–144). Aside from the brewers themselves or consumers with a particularly fine-tuned palette, the differences between the two may be imperceptible. Nonetheless, they are recognized by craft brewers as qualitatively distinct styles and are proudly produced and labeled as such.

In the end, whether all the different craft beer styles were invented merely for marketing and profit-making purposes is highly debatable. Clearly, the top-selling commercial brands are very successful at specializing in just one style or a couple of styles. In contrast, a hallmark of the U.S. craft beer industry is a relentless experimentation with styles; American craft brewers are endlessly modifying or resurrecting old styles or inventing new styles and categorizations (Hindy 2014). To be sure, this implies a good deal of skill and creativity. But it also implies an understanding that this skill should be applied in a continuously progressive manner, developing more and varied beers that, *in toto*, are virtually impossible for the average consumer to keep up with, let alone consume. While this provides the consumer with lots of choices, it can also be a little intimidating and overwhelming for the uninitiated. A simple Internet search of "craft beer for beginners" reveals many user guides for how to dive in and navigate the increasingly complex maze of craft beer styles. Ironically, a similar search also reveals extensive commentary on the so-called beer snob that bears little resemblance to the everyman image that is traditionally associated with beer drinkers.[3]

Scientization and Professionalization

In the world of modern beer brewing, what the average consumer sees on a craft beer label is just the tip of the iceberg. Today, the production of craft beer involves a surprising amount of scientific and technical information that, in many ways, requires very specialized knowledge and training. For starters, to produce and distribute beer in relatively large quantities, a craft brewer will likely need to acquire and operate large, industrial equipment, such as mash tuns (to mix hot water with malted grain to produce beer wort), lauter tuns (to filter out the grains from the wort), kettles (to boil the beer wort with hops), heat exchangers (to cool the wort), and tanks (to ferment and store the beer), as well as bottling, labeling, and kegging equipment. Thus, some mechanical or engineering skill is rather important, in addition to the beer-making skill required to manage the ingredients and produce a good-tasting product.

Beer does not have to be a high-tech product, however. People have brewed beer for thousands of years. It requires only three basic ingredients—water, grain, and yeast (though different spices, aromatics, and sweeteners can also be added)—and some basic equipment, such as kilns, kettles, and storage vessels of differing materials.[4] But by the ninth century, monastic communities in Europe had organized this craft in a notably rational manner and produced beer in large quantities (described below). In the Late Middle Ages and the Renaissance, the center of beer production had shifted to urban centers, where brewing became increasingly commercialized and regulated (Unger 2004). By the nineteenth century, the application of science and industrial techniques began to transform beer making into a highly specialized endeavor. For example, the Research and Teaching Institute for Brewing in Berlin (VLB) was founded in 1883 to combine the resources of the brewing industry, the scientific community, and the German state to further research, teaching, and practical brewery training (Oliver 2012, 169, 817–818). Today, in cooperation with the Technical University in Berlin, VLB offers a three-year Graduate Brewmaster degree, a Bachelor and Master of Science in Brewing and Beverage Technology, and a doctorate in Engineering Sciences.[5] Similarly, the German brewery at Weihenstephan began to offer formal academic training even earlier in the nineteenth century and now offers similar degrees in brewing and beverage technology in cooperation with the School of Life Sciences at the Technical University in Munich.[6] In the United States, aspiring craft brewers can also pursue university training in the field of brewing science and technology, as well as business operations tailored to this particular industry, in an increasing number of institutions around the country.[7] Oregon State's four-year degree in fermentation

science, for example, includes courses on fermentation microbiology, food chemistry, and sensory evaluation.[8]

Outside the university setting, national associations "professionalize" the work of brewers and brewing scientists in various ways, not unlike the American Sociological Association (ASA) does for the work of sociologists. The Master Brewers Association of the Americas (MBAA), for example, was founded in 1887 and describes itself as a "non-profit (501 C3) professional, scientific organization dedicated to advance, support, and encourage scientific research into brewing malt beverages and related industries and to make that research available to the public through conventions, discussion groups, journals, publications and seminars."[9] Thus, like the ASA, they have an annual conference that is preceded by a call for papers, abstract submissions, and formal registration, while the conference itself is organized into topical sessions with associated presenters. In addition to the annual conference, members can access job listings, continuing education courses, a peer-reviewed journal (the *Technical Quarterly*), and a vast library of manuals on the scientific and technical aspects of brewing.[10]

Similarly, the American Society of Brewing Chemists (ASBC) also provides scientific support to the beer industry; it was founded in 1934 "to improve and bring uniformity to the brewing industry on a technical level."[11] Thus, in addition to their own peer-reviewed journal, technical manuals, and teaching resources, the ASBC provides standardized methods of analysis to measure and evaluate specific aspects of the brewing process. For example, members can purchase their physical tests on barley, which are designed to assist brewers in "characterization and the evaluation of quality" and include scientific methods for determining variety, test weight per bushel, assortment, 1,000-kernel weight, texture of endosperm, skinned or broken kernels, weathering and kernel damage, and injury by sprout.[12]

Since the mid-twentieth century, the Brewers Association (originally the Brewers Association of the Americas) has grown to represent virtually everyone associated with the craft beer industry, from breweries themselves to wholesalers, retailers, homebrewers, and other brewing enthusiasts.[13] Functioning like a steward of the industry, they offer an array of professional services and information to protect and promote the culture of craft beer—the latest industry standards and statistics, relevant legislation and government regulation, educational resources and opportunities, tools for business operations, and information on how to form or join regional guilds. They also organize the Craft Brewers Conference and BrewExpo America every year, which claims to involve over 10,000 brewing industry professionals.[14]

Also of note is the American Homebrewers Association (AHA), which professionalizes the craft of homebrewing. Following Prohibition in 1920, homebrewing was illegal for almost 60 years before the U.S. Congress and President Carter legalized it again in the late 1970s. Since then, the AHA has become one of the leading advocates for homebrewers' rights and of noncommercial beer making. Their website, for example, provides detailed recipes and instructions for beginning, intermediate, and advanced homebrewing, information about where to find homebrew clubs and supply shops worldwide, as well as how to participate in their homebrewers conference and homebrew competitions.[15] These competitions are particularly noteworthy not only because they award exceptional skill and brewing virtuosity (*cf.* Boli 2006) but also because they involve a highly rationalized evaluation process, as discussed below. In the end, despite the incredibly technical and specialized nature of modern brewing, it has now become standardized to such a degree that virtually anyone can brew their own beer by purchasing a homebrew kit, which comes complete with all the essential instructions, ingredients, and equipment.

Beer Judge Certification

In addition to promoting homebrew competitions around the country, the AHA formally sanctions hundreds of them every year.[16] As part of this sanctioning, organizers are provided with "established competition standards and procedures," including access to judges who have been certified by the Beer Judge Certification Program (BJCP). The BJCP is a separate entity and an integral part of these sanctioned competitions. Founded in 1985, it administers a formal examination process to certify judges; it also monitors and awards advancements in rank (e.g., recognized, certified, national, master, grand master).[17] Of course, the BJCP also offers guidelines for learning how to formally evaluate beer, which is no small undertaking. In order to be certified as a beer judge according to BJCP standards, one must demonstrate an understanding of the technical aspects of how to make beer as well as of the specific characteristics associated with particular beer styles, such that one can taste the difference based on very specific descriptors. All of these details can be found in the BJCP's *Beer Style Guidelines*,[18] which is not to be confused with the Brewers Association's *Beer Style Guidelines* mentioned above. The former is meant for homebrew competitions and focuses more on evaluation criteria, while the latter is more of a comprehensive list and summary of beer styles.

The latest BJCP guide is a 79-page document that describes the general character of various beer styles and delineates four standard descriptors for each

style—aroma, appearance, flavor, and mouthfeel. For example, the aroma of a Czech premium pale lager (or pilsner) is described as follows: "Medium to medium-high bready-rich malt and medium-low to medium-high spicy, floral, or herbal hop bouquet. . . . Light diacetyl, or very low fruity hop-derived esters are acceptable, but need not be present." By comparison, the aroma of a German pils is described as "medium-low to low grainy-sweet-rich malt character (often with a light honey and slightly toasted cracker quality) and distinctive flowery, spicy, or herbal hops. Clean fermentation profile. May optionally have a very light sulfury note that comes from water as much as yeast . . ." (BJCP 2015, 5, 9).[19] Clearly, this conveys a very high level of specificity about beer that, as the BJCP states, is not intended as a guide for the general public. Indeed, much of this would be nonsensical to the average consumer. But, for a beer judge engaged in a formal, rational competition, it represents standardized criteria by which to systematically (rather than subjectively) evaluate whether a homebrewed beer is true to form and has been executed skillfully.

A similar kind of technique and training is employed by craft breweries, but not to competitively judge beer. At the Deschutes Brewery in Bend, Oregon, for example, roughly 25 "beer tasters" work on the brewery's sensory analysis panel (Kehoe 2014). Essentially, their job is to regularly taste and evaluate the quality of Deschutes beer by identifying the presence of desired flavors in each style as well as less desired, or "off flavors," that may indicate a bad batch or faulty technique. While different instruments can be used for this analysis, a standard reference is the Beer Flavor Wheel (see figure 3.1). The original wheel was developed in the 1970s by representatives from the MBAA, ASBC, and the European Brewers Association and identified 44 separate beer flavors (represented in the outer ring of figure 3.1), separated into 14 classes of odor and taste (represented in the inner rings of figure 3.1) (Oliver 2012, 362–363). Today, Beer Flavor Wheels are more elaborate than ever in their use of standardized flavor terminology and are widely available as (yet another) rationalized instrument of quality control. Given the complexity of this language, it is not surprising that each participant in the Deschutes sensory analysis panel has to undergo three to nine months of training before becoming an official "beer taster" (Kehoe 2014). Once this training is complete, it would seem like the ideal nine-to-five job for someone who loves beer. But, as Weber lamented long ago, extensive rationalization can also lead to disenchantment, robbing the world of innocent wonder and mystery. Case in point, a quality assurance supervisor on the *Deschutes* panel admits, "[s]ometimes it's not always fun. . . . It can ruin drinking beer for you because you're always trying to pick out those off flavors in other beer" (Kehoe 2014).

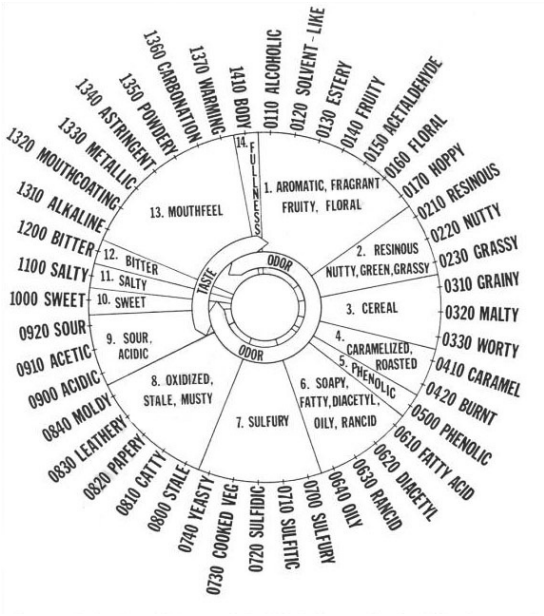

Figure 3.1. Beer Flavor Wheel. Source: http://kotmf.com/articles/flavorwheel.php.

The Original Revolutionaries

If you open a book on the popular history of beer, you are likely to see a reference to the pioneering efforts of European monks during the Middle Ages (Bostwick 2014, 52–60; Cornell 2003, 33; Glover 1997, 14–15; Jackson 2008, 260–266; Smith 2014, 14–17; Smith 1995, 19). As Bostwick (2014, 54) humorously relates:

> Benedictine monks made some damn fine beer. Tithes from farmers on church land stocked the granaries. The money [raised from] church ales . . . bought top-notch equipment such as copper kettles, large fermentation casks, and kilns to dry out malted grain for storage. . . . But most of all the beers were safe. . . . The monks kept their brew houses clean, passing laws that, to take one example, made it illegal to drink a beer in which a mouse had died.

Popular references like these have become standard lore, even though they lack scholarly rigor. Elsewhere, I have explored this phenomenon of monastic

brewing in more detail (Elliott 2012) and theorized why medieval monks were proficient at making beer and what effect this may have had on modern capitalism. I employ a similar line of argument here to make a loose, yet important, connection between the practice of monastic brewing in the Middle Ages and the rationalized nature of craft brewing, described above.

Scholarly studies on brewing in the Middle Ages are rare, and systematic data from this time period are hard to come by.[20] Nonetheless, from what we know, it seems fairly clear that monasteries played a prominent role. As Unger (2004, 26) reports, the first large-scale production of beer in medieval Europe took place in the monasteries of the eighth and ninth centuries. "Large monasteries were institutions typical of the Carolingian Empire, and they were nearly always centers of brewing." Likewise, Horn and Born (1979, 261) surmise that "[b]efore the twelfth and thirteenth centuries when brewing first emerged as a commercial venture, the monastery was probably the only institution where beer was manufactured on anything like a commercial scale." Their famous study of the ideal Benedictine community in the Plan of St. Gall (discussed below) strongly suggests that monks of this era not only produced beer on a large scale but seem to have done so with considerable technique and organizational skill.

This raises an important question: why would a monk, living in a monastic enclave in the early Middle Ages, be particularly good at making beer? Once again, we can draw on Weber's sociology of religion for guidance, particularly his central mechanism in *The Protestant Ethic*—the religious activation of "ascetic rationalism." In general, the asceticism of medieval monks was less consequential in Weber's scheme, since it was confined to the monastery and directed toward otherworldly pursuits (prayer, salvation), whereas Protestant asceticism was profoundly "this-worldly" and had wide-ranging implications for social organization in the West, including the development of modern capitalism. But, Weberian scholars have recently corrected this view and explored how monastic institutions and their ascetic lifestyle had important social consequences in Western history (Adair-Toteff 2010; Collins 1986; Kaelber 1996; Snyder 2013). Collins (1986), for example, highlights the industrious activities of the Cistercians in fostering an earlier capitalist boom in Western Europe during the High Middle Ages. In his view, the Protestant ethic represented the second wave of rational capitalism initiated by, and dependent upon, the institutional structure of the Catholic Church and the economic activity of monasteries. Extending Weber in this way, we could argue that monks were good at brewing beer because they led a highly ascetic, disciplined, and methodically organized lifestyle that was very effective in its application to work of various kinds.

Until the late eleventh century, many monasteries followed the Rule of St. Benedict, a book of precepts written by Benedict of Nursia (c. 480–547) that defined, quite specifically, how monks should ideally organize their lives (2011). Contrary to Weber's original conception, the Rule promoted a "this-worldly" form of religious asceticism that paved the way for other reform movements to come, from the Cistercians to the Calvinists. Indeed, the Rule of St. Benedict was *the* foundational document of Western monasticism that encouraged monks to move away from a life dedicated solely to contemplation, prayer, and solitary devotion (the *vita contemplativa*) and to emphasize work as well (the *vita activa*) (Adair-Toteff 2010, 14). Work was highly valued in Benedict's opinion, not for personal satisfaction but for the glory of God (chapter XLVIII). Benedict's Rule also specified that monks should live together within their own communities, be self-sufficient through their own labor, and offer hospitality to travelers. This emphasis on a more active life of work and engagement connected monks to the world, rather than having them flee from it (Adair-Toteff 2010, 115–116). While it did not foster the same kind of ascetic mind-set Weber observed after the Reformation that openly pursued material success, the Benedictine reform movement was a crucial precursor by institutionalizing (through monastic communities) a daily moral drive for discipline, proficiency, and progressive enhancement in both their laboring and spiritual activities.

This emphasis on a disciplined lifestyle of communal work, self-sufficiency, and hospitality was reflected in the famous Plan of St. Gall—a blueprint for the construction of a monastery in ninth-century Switzerland. As Horn and Born (1979) and others have concluded,[21] this Plan depicted the "ideal" monastery rather than a one-off construction. In fact, there is no evidence that a monastic community with these precise specifications was ever built on the designated grounds at St. Gall. Nonetheless, the Plan of St. Gall was more than just an architectural blueprint; "the Plan might be fairly characterized as a two-dimensional meditation on the ideal early medieval monastic community, an 'objective correlative' of the Rule of St. Benedict, created at a time when monasticism was one of the dominant forms of political, economic, and cultural power in Europe" (Various 2015).

As shown in figure 3.2, the Plan of St. Gall reflected a community that was rationally planned and intended to be very orderly and self-sufficient. There are roughly 40 structures, including an elaborate church complex (#1, middle left), a garden and gardener's quarters (#20, top right), medical facilities (#15, #16, top left), a school (#12, middle left), animal shelters (#35–40, bottom right), and numerous buildings associated with the specialized economic operations of a

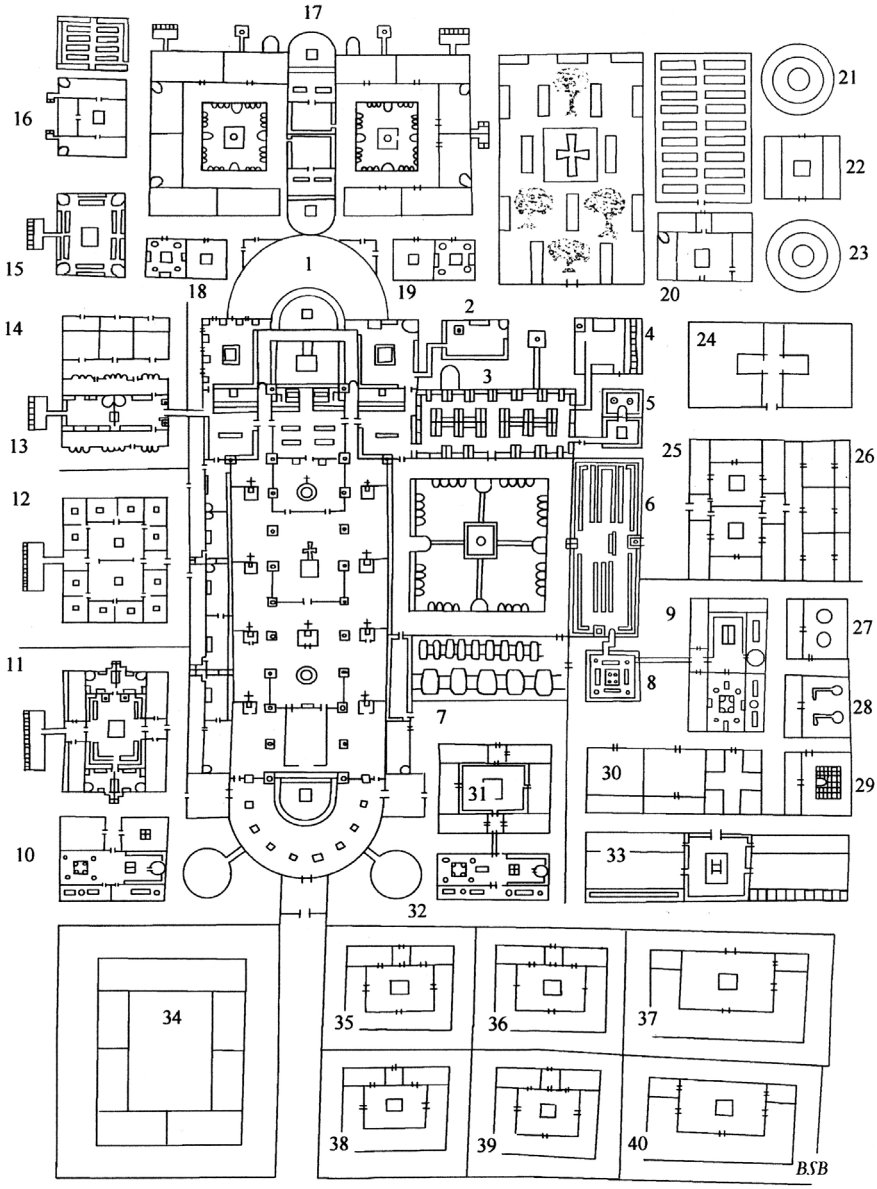

Figure 3.2. The Plan of St. Gall. Redrawn by B. S. Bowers. Numbering system from Horn and Born, 1979. Additional image editing by James Krehbiel. Used by permission.

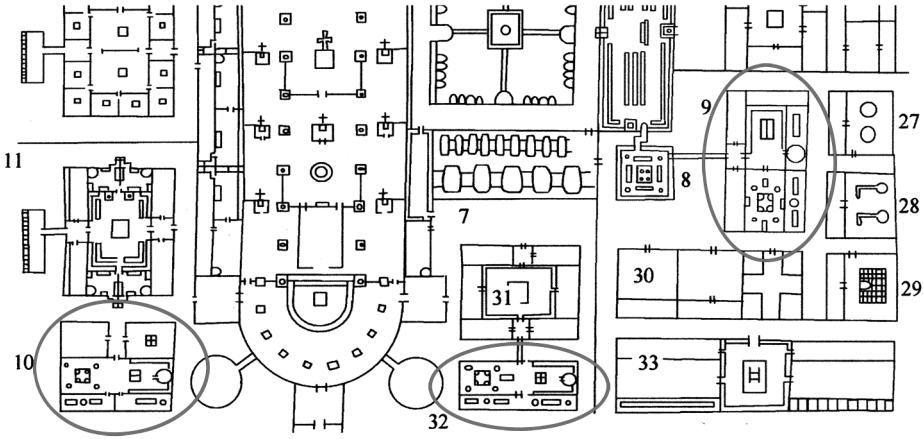

Figure 3.3. Cross Section of Brewing Complexes in the Plan of St. Gall. Redrawn by B.S. Bowers. Numbering system from Horn and Born, 1979. Additional image editing by James Krehbiel. Used by permission.

community of roughly 110 monks and between 130 and 150 servants and workers (Horn and Born 1979, vol. 1, 342).

The Plan also includes provisions for three separate brewhouses (see figure 3.3, encircled)—one to produce beer for noble guests (#10, left circle), one for pilgrims and the poor (#32, middle circle), and one for the monks themselves (#9, right circle). With three brewing facilities and demand from monks, servants, and visitors alike, it has been estimated that an average of 350 to 400 liters of beer (around 700 U.S. pints) per day would need to be produced (Price 1982, 57; Unger 2004, 29). Given that monasteries were the only institutions in Europe at this time with large quantities of surplus grain, no other social units had enough resources to produce beer in these quantities (Unger 2004, 27).

Figure 3.4 shows a close up of the monks' brewery and bakery complex and exemplifies further the rationalized layout of the Plan. Here, notice that servant bedrooms, presumably for specialists in beer and bread making (9A) are located on site, while houses for the processing and storing of grain are situated immediately around the complex—the granary for storing threshed grain (#30), the kiln for drying or roasting the grain (#29), the mortar for crushing the grain (#28) to be used for beer, and the mill for grinding the grain into flour (#27) to be used for bread. The description of this layout by Horn and Born (1979, vol. 2, 254) perfectly summarizes the systematic planning of the Benedictines:

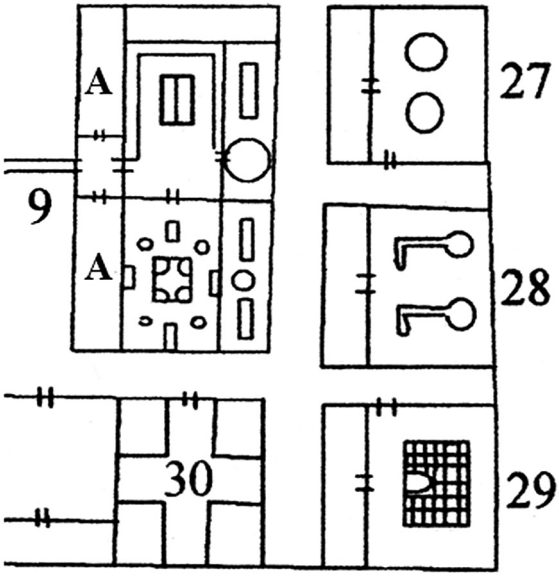

Figure 3.4. Monks' Brewery and Bakery Complex. Redrawn by B.S. Bowers. Numbering system from Horn and Born, 1979. Additional image editing by James Krehbiel. Used by permission.

> The efficiency internal to the Plan of St. Gall is nowhere better demonstrated than in the relationships among the Brewers' Granary, Mortars, Mills, Drying Kiln, and Monks' Bake and Brewhouse. The traffic patterns demonstrate with what economy of movement raw material, grain—bulky and heavy even after threshing—could be moved from the Brewer's Granary to facilities where it was further refined, and finally into the Brewhouse where the end product, beer, was produced.

Though wine was generally considered the "superior" drink within the Catholic Church, there is additional evidence of monastic brewing innovations. As Price (1982) observes, the potential use of water power for the processing of grain is also suggested in the Plan of St. Gall. "Alignment of mills and mortars on the Plan indicates that given a source and the correct land gradient, water power could have driven both. . . . [I]n the fifth through eighth [centuries], water-powered mills were recorded in Frankish monastic communities. The impetus to apply water power may have spread in the West with Benedictine monastic life" (Price 1982, 57, 60). Horn and Born (1979, vol. 1, 352) also discuss

improvements to the technique of storing and transporting beer via wooden casks, which were "large and ingeniously constructed" to withstand the internal pressure of fermentation as well as transportation over long distances. Monastic records in northern France indicate that hops became a regular beer additive by the early ninth century, perhaps for their preservative qualities more than for their flavor (Nelson 2005, 104–109; Unger 2004, 54). In his study of ale production and consumption in late medieval England, Slavin (2012) finds that monastic accounts clearly distinguish between different grades of ale: a first grade for monks and high-ranking guests and a second grade for servants and laborers, and (on occasion) some produced a third-grade ale that was likely the weakest version. Finally, there is evidence that monasteries engaged in the sale of surplus beer, some of it in commercial establishments like taverns (Unger 2004, 34–35; Williams 2001, 244, 262–263).

The organization of monastic brewing appears to reflect a distinctly rationalized orientation to the craft. This orientation, I believe, is rooted in the Rule of St. Benedict that directed the ascetic behavior of monks toward an active life of work. The layout of St. Gall, for example, while idealized, highlights the impressive scale and advanced technique that was intended, at the very least, with the institutionalization of Benedictine asceticism. These factors, combined with the specific innovations listed above, highlight how medieval monks could be viewed as the original revolutionaries of modern beer making. While commercial brewing operations developed in urban centers toward the end of the Middle Ages and became highly scientized and industrialized in the nineteenth century, this trajectory toward progressive rationalization (that continues apace today) owes a small but significant debt to the religious asceticism of monastic communities, well over a thousand years ago.

Conclusion

The craft beer movement in the United States has been transformative, not just from an economic or industrial point of view but culturally as well. Compared to the everyman image traditionally associated with beer drinking, "craft" beer drinking involves a technical, erudite sophistication that has become a celebrated aspect of contemporary beer culture. With its quality control metrics, stylistic experimentation, academic degrees, professionalized associations, formal competitions, and judging certifications, I have aimed to show how the production and consumption of craft beer are highly rationalized. While it may be tempting to view these developments as functionally necessary for economic success or as part of a clever marketing strategy, I believe they also highlight a much broader

sociological process—the rationalization of society. As Max Weber and others have argued, scientific and technical rationalization is the primary means of pursuing progress in the modern world. Therefore, employing all these sophisticated brewing techniques not only fosters mass production in efficient, calculable, predictable, and controlled ways, but also reflects a progressive enhancement that seeks to continuously perfect the craft.

This rationalized approach has conferred a high degree of legitimacy on craft brewers, valorizing their skill and the product they produce, but it is not entirely new. The scientific and industrial revolutions transformed many industries in a progressively rationalized manner, in addition to beer brewing. Following Weber's lead in *The Protestant Ethic*, I believe the rationalization of beer has religious origins that date back even further, to the ascetic organization of monastic communities in the early Middle Ages, as highlighted by the famous Plan of St. Gall and recent historical scholarship on medieval brewing. Nonetheless, further research in this area needs to uncover more evidence of monastic brewing operations and how they were organized and explore how their techniques potentially shaped the rise of secular brewing institutions that followed. Regarding the craft beer movement, this particular study could be complemented by interviews or surveys with different craft brewers to obtain more fine-grained information about how and why they brew in particular ways and to what degree they perceive their "craft" as different from big, commercial brewing. Similar methods could be used to ask consumers what they find appealing about craft beer (as compared to commercial beer) and how the various technical aspects of craft beer are meaningful and relevant.

NOTES

1. See the Brewers Association (https://www.brewersassociation.org/statistics/market-segments) for specific information about the size and scope of different craft beer producers.

2. These regulations are governed by the Alcohol and Tobacco Tax and Trade Bureau (TTB) of the U.S. Department of the Treasury. For more details, see https://www.ttb.gov/beer/beer-labeling.shtml. Beer label requirements can also vary from state to state.

3. This is not to say that commercial brands have ignored the success of the craft beer movement. For example, some have co-opted the technical sophistication of craft beer with slogans such as "triple hops brewed" (Miller Lite), "beech-wood aged" (Budweiser), "frost-brewed" (Coors Light), or "cold filtered" (Miller Genuine Draft). They have also created faux craft brands such as Blue Moon and Leinenkugel (both by MillerCoors), and Shock Top (by Anheuser-Busch) or have acquired craft breweries themselves, such as 10 Barrel in Bend, Oregon, Blue Point in Patchogue, New York, Elysian in Seattle, Washington, and Goose Island in Chicago, Illinois (all now owned by Anheuser-Busch). On the other hand, a 2015 advertisement by Budweiser called "Brewed the Hard Way" suggests a renewed focus on the everyman image of beer drinking that mocks the snobby, discriminating aspects of craft beer culture.

4. See Unger (2004, chapter 2) for a discussion of brewing in ancient Mesopotamia and Egypt.

5. "University Courses at TU Berlin," Research and Teaching Institute for Brewing in Berlin (VLB), accessed October 20, 2016, https://www.vlb-berlin.org/en/university-courses.

6. "Courses and Programs at the TUM School of Life Sciences Weihenstephan," Technical University in Munich, accessed October 20, 2016, http://www.wzw.tum.de/index.php?id=46&L=1.

7. "Brewing Schools & Organizations," Brewers Association, accessed October 20, 2016, http://www.brewersassociation.org/education/schools-organizations.

8. "Fermentation Science Option," Oregon State University, College of Agricultural Sciences: Food Science and Technology, accessed October 20, 2016, http://oregonstate.edu/foodsci/fermentation-science-option.

9. "Vision & Mission," Master Brewers Association of the Americas, accessed October 20, 2016, http://www.mbaa.com/about/vision/Pages/default.aspx.

10. "Title List A to Z," Master Brewers Association of the Americas, accessed October 20, 2016, http://www.mbaa.com/store/Pages/atoz.aspx.

11. "About ASBC," American Society of Brewing Chemists, accessed October 20, 2016, http://www.asbcnet.org/membership/about/Pages/default.aspx.

12. "Methods of Analysis," American Society of Brewing Chemists, accessed October 20, 2016, http://methods.asbcnet.org/toc.aspx.

13. "Purpose," Brewers Association, accessed October 20, 2016, http://www.brewersassociation.org/brewers-association/purpose.

14. "About CBC," Craft Brewers Conference and BrewExpo America, accessed October 20, 2016, http://www.craftbrewersconference.com/conference/about-the-craft-brewers-conference.

15. American Homebrewers Association, accessed October 20, 2016, http://www.homebrewersassociation.org.

16. "Events Calendar," American Homebrewers Association, accessed October 20, 2016, https://www.homebrewersassociation.org/aha-events/calendar/?event_id=16.

17. "Rank," Beer Judge Certification Program, accessed October 20, 2016, http://www.bjcp.org/membergd.php#rank.

18. "Style Guidelines," Beer Judge Certification Program, accessed October 20, 2016. http://www.bjcp.org/stylecenter.php.

19. Both aroma descriptions are longer in the original and are used in abridged form here.

20. See Nelson (2005), Unger (2004), and the 2012 issue of *AVISTA Forum Journal* on medieval brewing.

21. See "Bibliography on the Plan of St. Gall," Carolingian Culture at Reichenau & St. Gall, UCLA Digital Library, http://www.stgallplan.org/en/bibliography.html, for a summary of historical research.

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