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Tricks

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Best Beers in America

Another year, another opportunity for expanding my knowledge of beer. Asking *Zymurgy* readers to list their 20 favorite beers available commercially in the United States is always an eye-opener. The beers range from the usual suspects (for the second straight year, the same beer has checked in at number one) to beers I've never heard of.

For example, have you tried Oompah Loompah Chocolate Beer from America's Brewing Co. in Aurora, Ill.? I'm assuming the Sexual Chocolate Imperial Stout from Foothills Brewing Co. in Winston-Salem, N.C. is in reference to the movie "Coming to America." Does anyone know for sure? Also, I'm guessing the McGuire's I'll Have What the Gentleman on the Floor is Having doesn't really fit on the label, if this is a bottled beer.

American and foreign craft brewers are making great beer as well as coming up with great names for their beers. Among the most noteworthy in the list: Arcadia Cereal Killer Barleywine, Alpine Pure Hoppiness, Astoria Bitter Bitch, Abita TurboDog, and Avery Collaboration Not Litigation. And that's just in the A's.

Avery's Collaboration Not Litigation is a collaboration between Avery, based in Boulder, Colo., and Russian River in Santa Rosa, Calif. Since both brew Belgian ales named Salvation, Adam Avery and Vinnie Cilurzo decided to do a blend of the two. No one asked me to put together my own top 20 list, but if I did, that one would be on it.

The name Collaboration Not Litigation is also somewhat in reference to the brew-ha-ha that Avery found itself in years ago when *Elle* magazine took umbrage at Avery's Elle's Brown Ale (named after

Adam Avery's dog), which was since renamed Ellie's Brown.

In general, this joint effort between "competing" breweries portrays the unique camaraderie of American craft brewers. Earlier this year, Boston Beer founder Jim Koch made an unthinkable offer to his fellow craft brewers—the opportunity to buy, at his cost, 20,000 pounds of East Kent Goldings and Tettnanger hops. Many brewers desperately needed them in light of the recent hops shortages, with almost 400 brewers entering a lottery for the hops. Ken Grossman of Sierra Nevada and Tomme Arthur of Port Brewing have also offered hops to those in need.

"Sharing has always been one of the great things about this industry," said Koch.

And it's not just the small, newer craft brewers who are scrambling for hops. Boston Beer had to delay one of its 2007 Samuel Adams LongShot beers, a double IPA, because it could not secure five of the seven varieties of hops needed to produce it.

Craft brewers are facing challenges like never before in the form of hops and malt shortages and rising costs, and increasing energy, production and packaging costs, yet they are still thriving. For the second straight year, American craft brewers posted 12-percent growth in production in 2007, meaning there is an even greater variety of flavorful brews for you to try in 2008 (for a look at who's currently brewing the best beer in the world, see the World Beer Cup results on page 49). Start doing your research for the 2009 Best Beers in America poll now!

Jill Redding is editor-in-chief of *Zymurgy*.



zymurgy®

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Amahl Turczyn Scheppach

The results are in! Find out what *Zymurgy* readers think are the best beers—and the best breweries—in America in our sixth annual survey, then try your hand at clone recipes.**28 | Water: The Role of Residual Alkalinity**

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Most homebrewers know the basic water quality issues and solutions for tweaking their water for optimal brewing. The final frontier in brewing is residual alkalinity.

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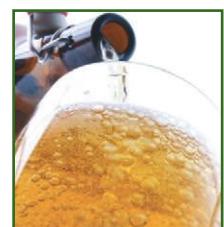
By Ted Hausegger

Have you ever made the perfect beer your friends raved about—and then remade it and it was not nearly the same? This happened with a tripel, for surprising reasons.

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By Chris P. Frey

This great hobby combines compressed gas, boiling fluids, glass, electricity, alcohol and flame—whatever could go wrong? Just about everything, it seems.

Plus: World Beer Cup® Results on page 49!

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>> GET THERE!

13th Annual Indiana Microbrewers Festival

More than 35 brewers, including 20 from Indiana, will serve 200 different beers during this outdoor afternoon of tasting, games, bands and food. A 16-firkin cask-conditioned table is included, along with the Indiana Replicale project.

The event takes place July 19 from 3-7 p.m. at Opti Park in the Broad Ripple area of Indianapolis. The \$30/\$35 tickets include a commemorative tasting glass, program guide, food and unlimited sampling.

The event is hosted by the Brewers Guild of Indiana to benefit the Leukemia and Lymphoma Society. For more information call 317-856-6092, e-mail bob@brewersofindianaguild.com, or go to <http://www.brewersofindianaguild.com/festival.html>.



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Seattle International Beerfest 2008 Seattle, WA.

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July 18-19

Vermont Brewers Festival Burlington, VT. Phone:

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July 24-27

21st Annual Oregon Brewers Festival Portland, OR.

Phone: 503-778-5917, Web: www.oregonbrewfest.com

July 25-26

Michigan Brewers Guild 11th Annual Summer Beer

Festival Ypsilanti, MI.

Web: www.michiganbrewersguild.org/events.asp

August 9

Great Taste of the Midwest Madison, WI.

Web: www.mhtg.org

August 30

Savannah Craft Brew Fest Savannah, GA.

Web: www.savannahcraftbeerfest.com

October 9-11

Great American Beer Festival® Denver, CO.

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BREW News: First Cicerones Named



Brewing Co.; Andrew Waer (unaffiliated); and Neil Witte, Boulevard Brewing Co.

The Cicerone Certification Program traveled to sunny San Diego on April 18 to conduct the first exam for Certified Cicerone status, reports Cicerone Program founder Ray Daniels, the former editor of *Zymurgy*. Daniels said it was a tough exam, but five candidates passed to become the first holders of the title "Certified Cicerone." The five are: Rob Gerrity, Sierra Nevada Brewing Co.; Scott Kerkmans, Four Points by Sheraton; Ron Kloth, Papago

The exam took three-and-a-half hours and included 200 fill-in-the blank and short-answer questions followed by three essay questions, a demonstration and 12 beer samples presented in the tasting portion of the exam. Each successful candidate scored 70 percent or better on the tasting portion and 80 percent or better overall. More information on the exam, including sample questions, can be found on www.cicerone.org.

Since January, 115 people have passed the Certified Beer Server exam and are now qualified to take the Certified Cicerone exam.

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"It's contagiously fun to use," said Rick Uglum, founder and president of deCapper, Inc.

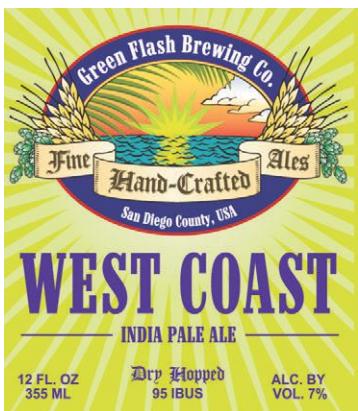
Specialty deCappers are available for the outdoor enthusiast, sports fan and animal lover, with several sports- and outdoor-themed designs.

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YOU'VE GOTTA DRINK THIS

Green Flash West Coast IPA



A "green flash" is a special phenomenon that occurs when the sun sets. Another special phenomenon occurs when drinking Green Flash West Coast IPA. This beer is a hophead's dream, with truckloads of hop aromas and flavors from start to finish, which linger well into the aftertaste. Bready malts are tasty and tame, as they should be. Wafting notes of citrus, grass and pine are complemented by a snappy bitterness. Even though the beer has a burly 7 percent abv, it's fairly easy to drink. After sampling hundreds of IPAs over the past 15 years, this one definitely stands out, and it's my current go-to beer for everyday drinking.

Reviewed by Aubrey Laurence, Frederick, Colo.

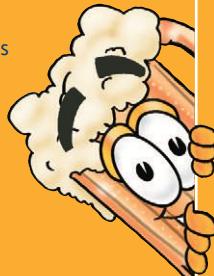
If you've had a beer you just have to tell the world about, send your description, in 150 words or fewer, to jill@brewersassociation.org.

THE LIST

15 Italian Beer Ingredients

Brewers in Italy are known for their creative use of local and unique ingredients. Here are 15 ingredients that some of the top Italian craft brewers are using in their beers.

1. Chestnuts
2. Chinotto (a local citrus fruit)
3. Lavender
4. Myrrh
5. Roses
6. Violets
7. Elderberries
8. Fermented tobacco leaves
9. Gentian root
10. Shuj Shsien tea leaves
11. Blackcurrant juice
12. Grapefruit
13. White mulberries
14. Pomegranate
15. Tandoori spices



BREW News: Update from the States

In Alabama, SB355 to legalize homebrewing did not pass this year, reports AHA director Gary Glass. A bill dealing with bingo took up several days of the Senate's legislative session, and the homebrew bill never got on the schedule for a vote in the full Senate. Earlier, the bill was passed by the Senate Tourism and Marketing Committee largely due to all of the calls the committee members received from Alabama homebrewers. The AHA will be working with Alabama homebrewers in support of homebrew legalization in next year's legislative session. We have made real progress this year, and we feel that there is a good chance homebrewing will be legalized in Alabama in 2009.

In April, the AHA sent an Action Alert to AHA members in Vermont in support of a bill to increase the allowable alcohol by volume from 8 percent to 16 percent. All of the calls and e-mails to legislators made a difference and the bill passed!



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by Ray Daniels



Pink Boots and Oyster Stout

As I write this I'm just back from the Craft Brewers Conference in San Diego and judging at the 7th biennial World Beer Cup. It was quite a week for brewing—and homebrewing. I can't get my mind to focus on just one topic, so here are two cool things that connected homebrew to pro brew during the week.

Pink Boots Rock

Long a presence in homebrewing, women are becoming more visible in professional brewing these days as well. Mind you, there have been women brewers from very early on, but this year they took center stage. Teri Fahrendorf, who brewed and managed brewers at the Steelhead pubs in Oregon for 17 years, led the formation of the Pink Boots Society and chaired its first meeting during the CBC. They attracted nearly two dozen participants to create membership rules and even set up a Web site at www.pinkbootssociety.com with a ton of information for and about women in brewing.

The evening of that same day, one of their own, Tonya Cornett from Bend Brewing Company in Bend, Ore. grabbed worldwide honors as the Champion Brewer in the Small Brewpub category of the World Beer Cup. The Brewers Association has been giving these "Champion" honors at the last three World Beer Cups and for nine years at the annual Great American Beer Festival, and Cornett is the first woman ever to win one.

Best of all, Tonya started out homebrewing. She and her husband brewed a few batches together while living in Fort Collins, Colo. Then she read the advanced section of *The Complete Joy of Homebrewing* and set up an all-grain homebrew system to start brewing on her own. Soon she was working at near-



Inaugural meeting of the Pink Boots Society.

by H.C. Berger on the packaging line and pestering the head brewer to show her how to brew on their system. But Berger was too busy making beer to train another brewer, so it was local brewpubber Jim Parker who showed her how to do the job on a commercial scale.

Following a stint at Oaken Barrel in Indiana, she landed the job at Bend Brewing after attending the World Brewing Academy's Diploma Course in Brewing in Chicago in 2001. Shortly after that she started perfecting both the recipes she inherited and some of her own as well. As part of that effort, she attended the Master of Beer Styles course at Siebel in 2005. In 2006, she won her first GABF medal and it was a big one: gold in the IPA category—the biggest and most competitive category in the competition. After winning another medal at GABF 2007, she came to the World Beer Cup hoping to win her first medal in world competition, but lo and behold she smoked a

bunch of great brewers (read "men") to take two gold medals and the big prize.

So, ladies, dare to dream! Cornett turned this hobby into a profession and became a rock star of the brewing world. So can you!

Oyster Stout

You don't have to study beer for long before you come across the concept of oyster stout. Some say it is just a stout to drink with oysters; others say that nothing but shells should ever touch a beer. But of course we homebrewers can't tolerate such mundane explanations when the prospect of putting actual oysters in a beer is at hand.

While I've never been tempted myself, many brewers have given oyster stout a try over the years. The results ranged from undetectable to downright weird, but they were nearly always unique. I don't think I've ever met anyone who cared to repeat their oyster stout once brewed. Until recently.

During a break from judging at the World Beer Cup, I happened to hear Chuck Skypeck from Boscos in Tennessee ask Grant Johnston—an iconic craft brewer recently of Black Diamond Brewing in the San Francisco Bay area—about oyster stout. Most of what I've heard on this subject in the past—especially from professional brewers—has been pretty speculative, but Johnston has won enough gold medals to merit envy at Fort Knox, so I figured I'd see what he had to say.

What followed was a 10-minute recitation of testing and brewing focused on the goal of perfecting a stout made with fresh oysters—all done as homebrews even though he was brewing commercially at the time. In total, he brewed about a dozen batches in order to dial in the quantity and process that gave the results he wanted.

The first thing Johnston did was to decide on the variety of oyster he wanted to use.

Since he was then at Marin Brewing Company near San Francisco, choices abounded. He tasted several dozen and settled on the Sweetwater oyster from Hog Island at the mouth of Tomales Bay. He describes it as “plump and full flavored with sweetness and nice briny character.” He also said it was one of the cleanest he’d seen. For those in other geographic areas, Johnston recommends any really assertive, full-flavored oyster.

During the first four or five batches, he gently rinsed the shucked oysters with cold water and then steeped them in the wort for 30 minutes at the end of the boil. He started with 60 oysters in 5 gallons and kept adding more until he could taste the effect. And no—he didn’t eat the oysters afterwards: they were too bitter!

Fortunately for Johnston, he had become friendly with the oyster supplier after a few batches, so the oysters were donated to him in exchange for a supply of the fin-

ished product. In the end, he used about 100 oysters in 5 gallons of beer. Man, that’s a lot of shucking—and a lot of dough if you are paying for them!

But despite all those oysters, he still wasn’t getting quite the aroma and flavor that he wanted. What’s a brewer to do when he wants more aroma in a beer? Dry oyster, of course!

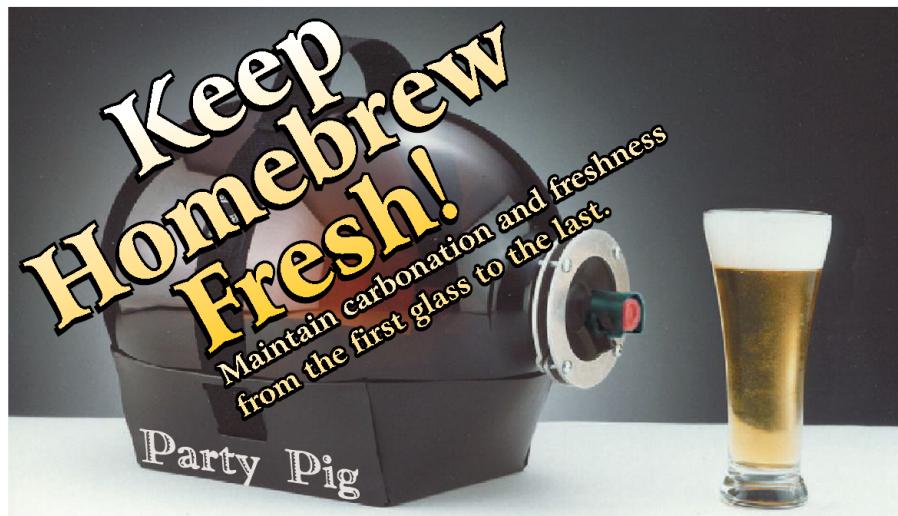
Well, not quite. He did produce an oyster liquor using smaller “cocktail” size beasts that he used for priming, and that seems to have done the trick. Here’s how he made the liquor: He shucked, didn’t rinse the oysters and put them in a bowl with eight cups of water. He boiled the mixture for 30 minutes with a lid on the pot to keep the flavors. After that he added his priming sugar, reboiled it to sanitize, and then used that for priming in a classic bottle-conditioned beer.

That effort yielded the touch of briny aroma he was looking for and he was very happy with the beer at that point. There is one question that still hasn’t been answered: might the oyster priming liquor alone provide enough flavor to do the job? He doesn’t think so, stating that the steeping adds a richness that he doesn’t think can be achieved with just the liquor. But he’s willing to do the experiment to find out!

One final note on the flavor of the successful beer: it tended to be short-lived, showing itself for just two to three weeks, starting about two weeks after bottling. Due both to the expense and the fleeting flavor, oyster stouts might best be made in very small batches!

All of this makes one final point all the more impressive: a Japanese brewer won silver in the Experimental category at the World Beer Cup with an oyster stout (see page 49 for the complete list of World Beer Cup awards). I’ll bet Grant Johnston will be looking to find that brewer and compare notes!

Ray Daniels is the author of *Designing Great Beers* and director of Brewers Publications for the Brewers Association.



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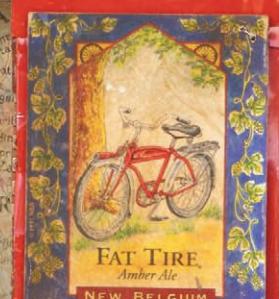
It's true. Life started for us on a bike. As Jeff pedaled his way through Europe one brewery at a time, he brainstormed a beer where biscuit-like malt flavors would coast in equilibrium with hoppy freshness. He named the beer Fat Tire Amber Ale.

We still craft Fat Tire following the original home brew recipe, and our company, New Belgium Brewing, still believes in the inspirational power of the bicycle.

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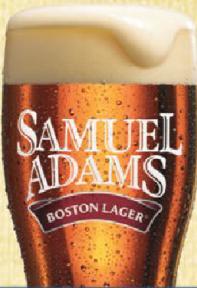


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by Our Readers

More Information for Recipes

Dear *Zymurgy*,

I've brewed about 10 or so recipes from the magazine over the past few years, and always wonder "Um, is this how it should be?" I love the recipes, and follow them closely. But along with the ingredients and

directions, how about a brief description of the expected color, head, aroma and flavor?

Thanks,
Karl Jung

The clones are easy for me to judge, and it's fun to sample mine and theirs, side by side. But the original brews leave me wondering. The Beer Flavor Wheel tells me what I brewed, but a taste/appearance summary with the recipes would help me judge which ones I got right, and which ones I'd like to try next. Thanks.

Saison article author Drew Beechum responds: I'm glad I could intrigue you! OK, so secondary time...I tend to let them ride until I "feel" they're right. Sometimes it's two weeks, sometimes it's three months. The Infernal needs as much time as you can give it since it rides in at 11+! Generally, though, I give them a month in secondary if the yeast has done its job and really driven the gravity down.

Jim Mitchell, Portland, Ore.

More Info, Part II

Dear *Zymurgy*,

I just received the latest edition of *Zymurgy* (May/June 2008), and have a question. I love Belgian beers, and the recipes for the Saisons intrigue me. However, as a basically new homebrewer (I just finished my seventh batch, in nine months of brewing), I find these recipes don't have quite enough info. Basically, how long are the beers supposed to be in secondary fermentation?

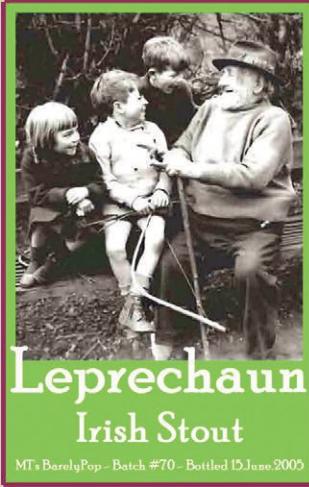
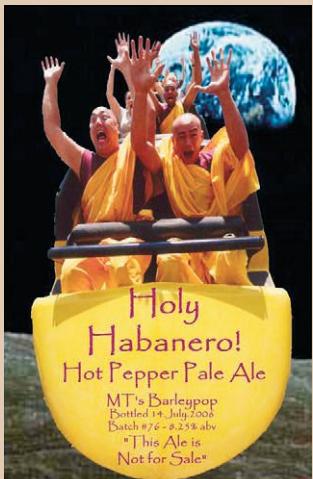
More About Kegerators

Dear *Zymurgy*,

Most brewers choose to buy an old fridge when they make a kegerator (March/April 2008). This is usually much cheaper than buying a new fridge or freezer, but they may end up paying for the old klunker every month in their utility bill. The government has changed the mandates on how much energy a fridge can use several times and the average pre-1993 fridge uses twice the energy as the average modern one (source EnergyStar.gov).

I love your magazine, but sometimes you need to give us rookies a little more info.

It's often hard to tell how old a fridge is or how much energy it will use, but the



*Zymurgy reader David Evans submitted this photo at the urging of a friend, who called it "centerfold quality." If nothing else, it proves there is no bad place to read *Zymurgy*. Evans admits, "It would have been slightly better had I taken along a few homebrews."*

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Energy Star program has a Web site that allows you to enter your electricity cost and the model of the fridge or freezer, and it will show you the annual operating costs. The site is at www.energystar.gov/index.cfm?fuseaction=refrig.calculator.

Matt Fischer
Fort Collins, Colo.

Setting the Numbers Straight

Dear *Zymurgy*,

There was a small column in the May/June issue of *Zymurgy* (Beeroscope) regarding my recent win of Wynkoop's Beer Drinker of the Year title (thanks!). Unfortunately there was an error.

On page 5, it reads that I visited 454 breweries in 69 nations and 47 states. For the record, it should read 454 breweries in 16 nations and 39 states, the numbers in my resume submission (I'm up to 465 now).

The mix-up may originate from my resume comment that I've tasted beers from 69 countries, coincidentally in 69 styles, but that shouldn't be confused with actual brewery visits. I'm sure some will look at the printed numbers dubiously, so just want to make sure the facts are straight.

Thanks,
Matt Venzke



Chesapeake Real Ale Brewers Society members don't let anything stand in their way. Back row: L-R Joel Gallihue, Mark Welsh, Grover Sauter III, Dan Klinglesmith, Jeff Adelsberger, Don Zwach. Middle Row L-R Brandon Miller, Ben Schwalb, Les White. Front Row - Frosty with his mug of beer.

BDOY 2008
Yorktown, Va.

Bosmo's Imperial Cream Ale

Dear *Zymurgy*,

The final gravity in the recipe for Bosmo's Imperial Cream Ale (2008 National Homebrewers Conference Commemorative Beer, May/June *Zymurgy*) was incorrectly listed as 1.014. The correct figure should be

1.008, or lower. The reason behind the multi-step mash sequence, as well as the use of corn sugar, is to get the beer to finish as dry and crisp as possible. (This is similar to what one might expect of many Belgian styles.) Apparently, in using homebrewer's software to scale the recipe down from commercial quantities, the program changed the final gravity, and we failed to catch the error. Sorry for any confusion.

Rob Westendorf
Chairman, local organizing committee
2008 AHA National Homebrewers Conference

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CONVERTING TO EXTRACT

Most all-grain recipes can be converted to extract recipes by substituting the base malt (e.g. pale malt or pilsner malt) with light malt extract. Multiply the pounds of base grain by 0.73 for liquid malt extract or by 0.60 for dry malt extract. Specialty grains can be steeped in water at 150° F (65° C) for 30 minutes or so and rinsed with hot water. If you are doing a partial wort boil (as opposed to boiling the entire 5 gallons of a 5-gallon batch), you will want to increase your bittering hops slightly to make up for the increased concentration of the wort, which decreases hop utilization.

You can always ask your local homebrew supply shop owner to help you convert a recipe.

Correction

The recipe for Spike's Porter in the March/April *Zymurgy* (Dear *Zymurgy*, page 15) had an incorrect amount listed for the 60 minute hops (Willamette Hop Pellets). The correct amount, according to recipe creator Stephen Magill, should be 2.0 to 2.5 ounces rather than 6.0 ounces.

Send your letters to Dear Zymurgy, PO Box 1679, Boulder, CO 80306 or e-mail jill@brewersassociation.org. Hey homebrewers! If you have a homebrew label that you would like to see in our magazine, send it to Kelli Gomez, Magazine Art Director, at the above address or e-mail it to kelli@brewersassociation.org.



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By Amahl Turczyn Scheppach

Identifying Your Mead

It takes a lot of time and effort to produce a good mead, so before you enter your hard-earned creation to be evaluated by competition judges, make sure you spend the extra time necessary to correctly identify it. It may seem obvious, but sometimes the lines between "sweet" and "semi-sweet" or "sparkling" and "petillant" aren't always as sharp as we may think. Sample your entry objectively and ask yourself some questions as you fill out the competition entry form—you may save yourself the embarrassment of having a mead judge mark you down for not entering your mead with the correct attributes.

All meads entered for competition in a BJCP-sanctioned event must have three attributes identified on the entry form: carbonation, strength and sweetness. Carbonation may be described as: still, meaning totally flat to just a hint of carbonation; petillant, meaning light but noticeable to moderate carbonation; and sparkling, meaning mouth filling to heavy (champagne-like) carbonation. Sparkling does not mean gushing, however!

Mead strengths are categorized into three levels: hydromel on the low end, with a percentage alcohol by volume of 3.5 to 7.5; standard in the middle, with 7.5 to 14 percent abv; and sack on the high end, with 14 to 18 percent abv. Strength, as an indication of alcohol content, usually means more honey character comes through as well; however it doesn't necessarily mean hydromel-strength meads will always be dry and sack-strength meads will always be sweet. Strength levels do correspond to a range of *original* gravities: hydromel starts at 1.035 to 1.080; standard ranges from 1.080 to 1.120; and sack ranges from 1.120 to 1.170.

Sweetness levels are in turn defined by fin-ishing gravity, and provide the distinctions between Traditional Mead (Category 24) subcategories. Dry meads, 24a, end up with a specific gravity of 0.990 to 1.010; Semi-sweet meads, 24b, finish from 1.010 to 1.025; and Sweet meads, 24c, finish from 1.025 to 1.050. So it is entirely pos-sible to have a dry sack or a sweet hydromel. It all depends on the attenuation of the mead yeast you are using.

While carbonation, strength and sweet-ness are mandatory attributes, meadmak-ers entering their meads have the option to further describe the entry for the judges. For example, honey variety may be specified if that variety plays a distinct



The Irish Braggot (Dry Stout Braggot)

Ingredients for 5.0 U.S. gallons (19 L)

I can	Coopers Irish Stout Extract (3.3 lb, or 1.5 kg) (pre-hopped)
I can	Coopers Light Malt Extract (3.3 lb, or 1.5 kg)
0.5 lb	(227 g) Malto-Dextrine
7 lb	(3.2 kg) Wildflower Honey
2.0 tsp	(9.9 mL) Yeast Energizer
2.0 tsp	(9.9 mL) Yeast Nutrient
1.0 tsp	(4.9 mL) Irish Moss
2 packages	Wyeast 1084 Irish Ale yeast, or 2 vials White Labs WLP004 Irish Ale yeast, or 10 g Fermentis Safale US-05 yeast Coopers Brewery Carbonation Drops for bottling

Original Specific Gravity: 1.108

Final Specific Gravity: 1.011

IBU: 56

ABV: 10%



Directions

Mix the malto-dextrin, yeast nutrient, and yeast energizer with 2-2.5 gallons (7.6 to 9.5 L) of water. Stir all of the malt extract into the water and bring it to a boil. Add the Irish moss and boil for 15 minutes. Remove from heat and stir in the honey. Cool the must in an ice bath or similar method, then add the must to the fermenter. Add enough pre-boiled and cooled water to make a little over 5 gallons. When the temperature has cooled to 65-68° F (18-20° C), aerate well and pitch the yeast. Rack to secondary fermenter after 2-4 weeks. When fermentation is complete, prime with Coopers Brewery carbonation drops and bottle (at room temperature).



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21st Amendment Brewery Café San Francisco	Breckenridge Brewery Denver	Wynkoop Brewing Co. Denver	ILLINOIS
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IOWA	Court Avenue Brewing Co. Des Moines		
Granite City Food and Brewery Cedar Rapids, Clive, Davenport	Millstream Brewing Co. Amana		
Old Chicago Bettendorf	Raccoon River Brewing Co. Des Moines		
Rock Bottom Restaurant & Brewery Des Moines	Sherwood Brewing Co. Shelby Twp		
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NEW JERSEY Ale Street News Maywood	NORTH CAROLINA	Rogue Ales Public House Newport		
	Barleys Taproom Asheville	Rogue Distillery and Public House Portland		
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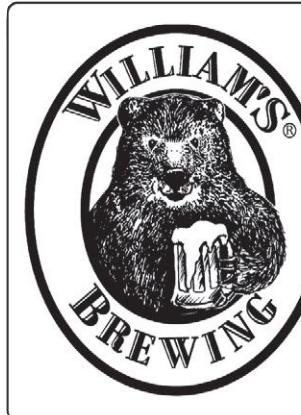
role in the mead's sensory profile. The judges will look for the specific nuances of, say, Tupelo or basswood honey if those varieties make up enough of the mead's fermentables to be recognizable in the finished product. That means that if several varieties of honey are used, or if the honey source is not known (in which case the variety is simply called "wildflower honey,") naming a honey variety probably won't be of any advantage.

Another optional description the mead-maker may include with the entry is for specific added ingredients. For Category 25, Melomel or fruit mead, naming the fruit used in the recipe is obviously a good idea. For the Cyser subcategory, 25a, the apple variety can be named, and likewise for Pyment, 25b, grape variety. Of course

in the case of the third Melomel subcategory, 25c or Other Fruit Mead, the entrant is required to specify the fruit used.

Category 26, or Other Mead, covers any remaining mead types, including hip-

pocras and metheglin; here again, specifying the herbs or spices used is optional but recommended. Likewise, if an obscure method is used that has some bearing on the finished mead's profile, that would be another optional descriptor.



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Subcategories for mead include 26a, Metheglin, or spiced mead, 26b Braggot, and 26c Open Category. Metheglin may include herbs, flowers, chocolate, coffee, nuts or chile peppers instead of, or in addition to, spices. Braggot is simply a malted mead, though generally it has more than 50 percent of its fermentable content provided by honey; less puts the beverage closer to honey beer than malt mead. Braggots may be hopped or smoked, but the overall impression should be a harmonious blend of malt and honey, with characteristics of both showing through. Malt

type and amount may be specified.

Finally, "Open Category" meads are honey-based beverages that combine ingredients from two other subcategories, are made using a traditional or historical mead style (e.g. tej or Polish mead), use an additional fermentable source not specified in any other subcategory, or use an experimental ingredient or process (e.g. agave nectar or freeze distillation). Because this is a sort of catch-all subcategory, entrants *must* specify the special nature of the mead, and *may* specify any special or unusual ingredient

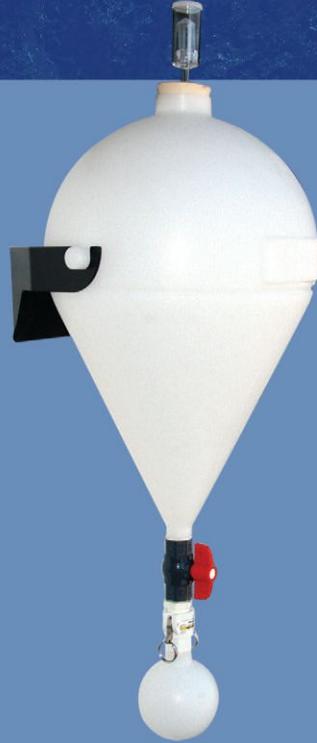
that imparts an identifiable character.

Amahl Turczyn Scheppach is a former craft brewer and associate editor for Zymurgy.



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AMERICAN HOMEBREWERS ASSOCIATION CLUB ONLY COMPETITION

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Mead

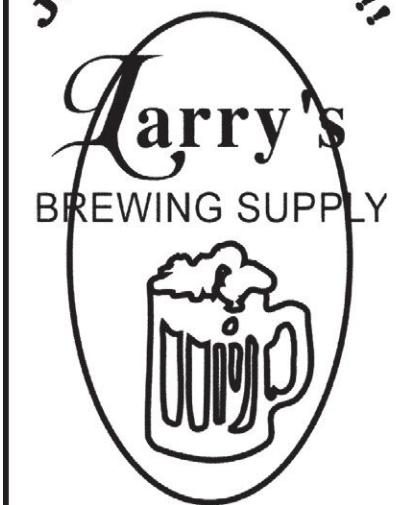
Entries are due by July 25 and judging will be held August 2. Entry fee is \$7. Make checks payable to American Homebrewers Association.

Entry Shipping:

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Hosted by Al Boyce and the Minnesota Homebrewers Association of Edina, Minn., this competition covers BJCP Categories 24, 25 and 26 mead styles. For more information, contact Al Boyce at alboyce@bigfoot.com.

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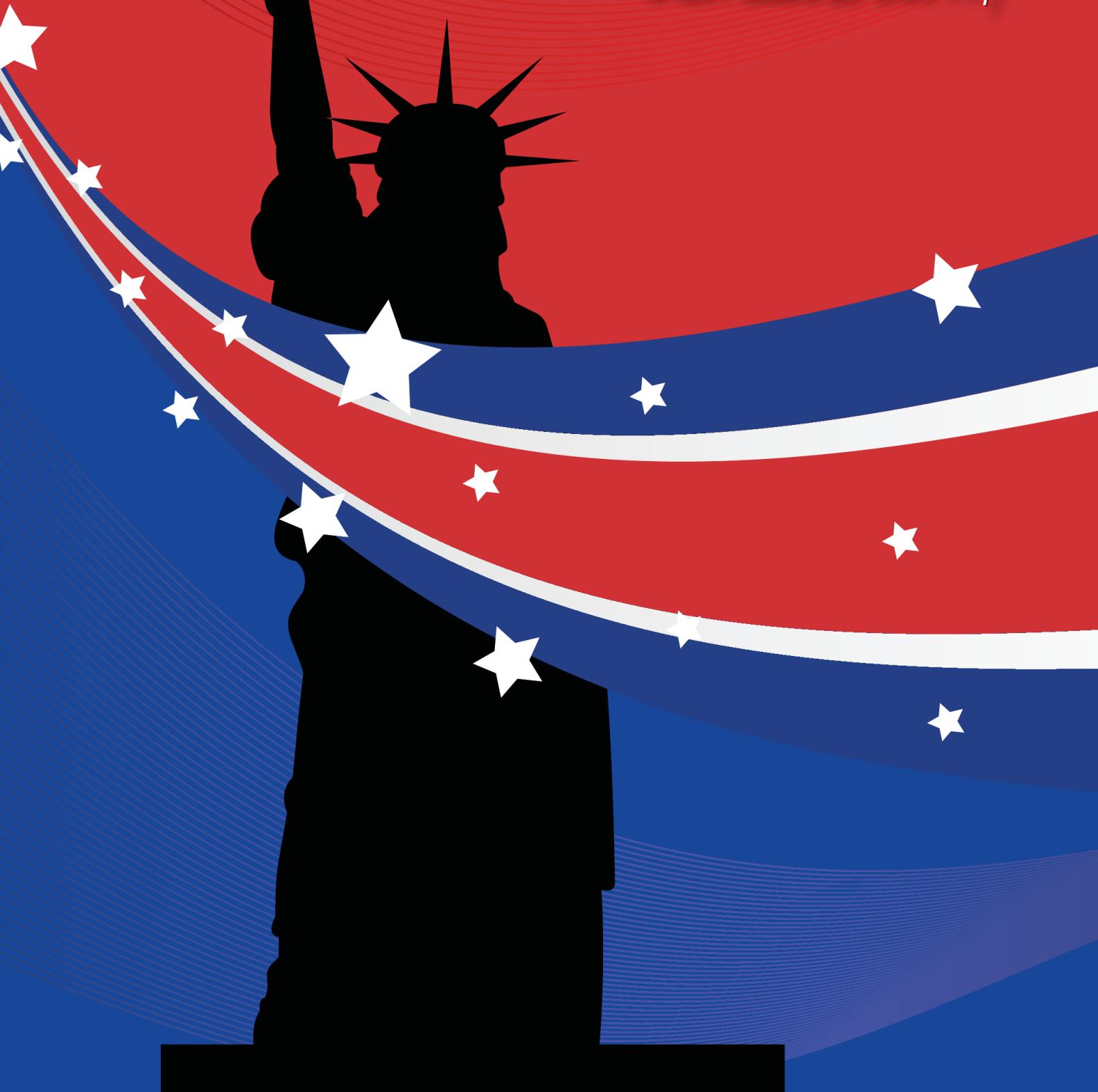
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The Results Are In!

6th Annual Survey



The results are in! Each of the past six years, we've asked *Zymurgy* readers to send us a list of their 20 favorite beers. The only rule is that the beer has to be commercially available somewhere in the United States.

We received more than 1,600 votes for 822 different beers from 343 different brewers across the United States and beyond.

ZYMURGY'S Best Commercial Beers in America

by Jill Redding

It may be a different year, but your number one beer is the same for 2008: Dogfish Head 90 Minute IPA won for the second straight year.

"90 million thanks!" exclaimed Dogfish Head founder Sam Calagione when told about the repeat honor. "*Zymurgy* was the first magazine I bought, along with Charlie's book, when I started homebrewing 15 years ago."

Calagione added that Dogfish Head lead brewer Bryan Selders and brewmaster Andy Tveekrem are both homebrewers as well.

"It says a lot about the momentum of the craft brewing renaissance that a 9-percent abv, 90 IBU, \$10 four-pack of beer brewed with 94 pounds of barley and 2.25 pounds of hops per barrel can garner so many votes," said Calagione. "In this age of sky-rocketing raw material costs, this is not a cheap beer to make for sure. We're glad to know our efforts are appreciated."

Craft brewers are going to have to keep securing massive amounts of hops if *Zymurgy*'s poll is any indication. Six of the top 10 beers in the survey were IPAs.

Bell's Two Hearted Ale, an IPA brewed by Bell's Brewery in Kalamazoo, Mich., claimed the number two spot. Two Hearted Ale is 7 percent abv, brewed with 100 percent Centennial hops.

"I think the combination of our yeast and that hop results in a situation where one plus one equals three," said Bell's founder Larry Bell of the appeal of Two Hearted Ale.

In third place was Sierra Nevada Celebration Ale, a dry-hopped holiday IPA offering from Sierra Nevada Brewing Co. in Chico, Calif.

Zymurgy reader Kyle Costello of Williamsville, N.Y. described Celebration Ale as "a perfect holiday treat for hop lovers. Eggnog has nothing on this."

Three beers tied for fourth place, including Sierra Nevada Pale Ale, Stone Arrogant Bastard and Stone Ruination IPA.

Top Ranked Beer (T indicates tie)

1.Dogfish Head 90 Minute IPA	T15..Chimay Grand Reserve Lager	T33...Avery Maharaja
2.Bell's Two Hearted Ale	T15...Samuel Adams Boston Lager	T33...Duvel
3.Sierra Nevada Celebration Ale	T15...Three Floyds Alpha King	T33...Great Divide Yeti
T4....Sierra Nevada Pale Ale	T15...Victory Hop Devil	T33...Three Floyds Dreadnaught
T4....Stone Arrogant Bastard	T20..Brooklyn Black Chocolate Stout	T33...Ommegang Abbey
T4....Stone Ruination IPA	T20..Guinness	T33...Oskar Blues Dale's Pale Ale
7.New Glarus Belgian Red	T20..New Belgium 1554 Black Ale	T33...Paulaner Salvator
T8....Russian River Pliny the Elder	T20..Troegs Nugget Nectar	T33...Victory Hop Wallop
T8....Sierra Nevada Bigfoot Barleywine	T20...Bell's Hop Slam	T33...Young's Double Chocolate Stout
10....Dogfish Head 60 Minute IPA	T25...Alaskan Smoked Porter	T42...Lindeman's Framboise
T11...Founders Kentucky Breakfast Stout	T25..Anchor Steam	T42...Ommegang Hennepin
T11...North Coast Old Rasputin	T25..New Belgium La Folie	T42...Oskar Blues Gordon
T13...Great Lakes Edmund Fitzgerald Porter	T25..New Glarus Raspberry Tart	T42...Rodenbach Grand Cru
T13...Orval	T25..Rogue Dead Guy Ale	T42...Rogue Shakespeare Stout
T15...Bell's Expedition Stout	T25..Rogue Hazelnut Brown Nectar	T42...Unibroue La Fin du Monde
	T25..Stone IPA	T42...Unibroue Trois Pistoles
		T42...Victory Prima Pils
		T42...Victory Storm King

Many of the same beers are perennial favorites in the *Zymurgy* poll, but there are also several newcomers, including Dale's Pale Ale and Gordon from Oskar Blues in Lyons, Colo.

"I love Colorado beers and I'm incredibly proud of Denver's designation of Beer Town USA," said *Zymurgy* reader Stephanie Smedley, a former resident of Colorado Springs who now resides in Germany. "The Snake Dog IPA from Flying Dog makes me smile just thinking about it. It is well worth the 12 Euros (about \$16 U.S.) per six-pack that we pay at a beverage market in Darmstadt, Germany."

As is often the case, many *Zymurgy* readers had a hard time narrowing their list to just 20.

"There are about 375 or so other beers in my top 20 as well," said reader Mark Reynolds. "Ask me tomorrow and you'll get a completely different list. Here's to beer!"

Best Portfolio (T indicates tie)

Ranked by number of beer brands named in the poll.

1.....Bell's Brewery (18 beers)
2.....Boston Beer (17 beers)
3.....Dogfish Head (14 beers)
4.....Rogue Ales (13 beers)
T5.Goose Island (12 beers)
T5.Avery Brewing Co. (12 beers)
T7.New Belgium Brewing Co. (11 beers)
T7.Russian River Brewing Co. (11 beers)
T9.New Glarus Brewing Co. (10 beers)
T9.Stone Brewing Co. (10 beers)
T9.Victory Brewing Co. (10 beers)
T12.Brooklyn Brewery (9 beers)
T12.Rahr & Sons Brewing Co. (9 beers)
T12.Sierra Nevada Brewing Co. (9 beers)
T15.Deschutes Brewery (8 beers)
T15.Flying Dog Brewery (8 beers)
T15.Great Divide Brewing Co. (8 beers)
T15.Midnight Sun Brewing Co. (8 beers)
T15.North Coast Brewing Co. (8 beers)
T15.Three Floyds Brewing Co. (8 beers)

Brewery Rankings (T indicates Tie)

These rankings are based on total votes received by each brewery's beers.

- 1.....Bell's Brewery, Kalamazoo, Mich.
- 2.....Dogfish Head Craft Brewery, Milton, Del.
- 3.....Sierra Nevada Brewing Co., Chico, Calif.
- 4.....Stone Brewing Co., Escondido, Calif.
- 5.....Boston Beer Co., Boston, Mass.
- 6.....Rogue Ales, Newport, Ore.
- 7.....Victory Brewing Co., Downingtown, Pa.
- 8.....Russian River Brewing Co., Santa Rosa, Calif.
- 9.....New Glarus Brewing Co., New Glarus, Wis.
10.New Belgium Brewing Co., Fort Collins, Colo.
11.Three Floyds Brewing Co., Munster, Ind.
12.Avery Brewing Co., Boulder, Colo.
- T13. ..Great Divide Brewing Co., Denver, Colo.
- T13. ..North Coast Brewing Co., Fort Bragg, Calif.
15.Founders Brewing Co., Grand Rapids, Mich.
- T16. ..Anchor Brewing Co., San Francisco, Calif.
- T16. ..Brooklyn Brewery, Brooklyn, N.Y.
- T16. ..Great Lakes Brewing Co., Cleveland, Ohio
- T16. ..Oskar Blues Brewery, Lyons, Colo.
- T16. ..Unibroue, Chamby, Quebec
21.Goose Island Beer Co., Chicago, Ill.
22.Brewery Ommegang, Cooperstown, N.Y.
- T23. ..Deschutes Brewery, Bend, Ore.
- T23. ..Southern Tier Brewing Co., Lakewood, N.Y.
25.Jolly Pumpkin Artisan Ales, Dexter, Mich.

Foreign Affairs

Responses again this year showed that *Zymurgy* readers love the beers brewed by their local brewpubs and microbreweries—but also those from overseas. Of the top 50 beers in the poll, 12 are imports, led by Orval, a Trappist beer from Belgium. Orval, which finished in a tie for 13th among the top-ranked beers, unseated Guinness, the top-ranked import the last two years. Another Belgian Trappist ale, Chimay Grande Reserve (otherwise known as Chimay Blue), fin-

ished second among imports, while Guinness was third.

Zymurgy reader (and contributor) David Houseman calls Orval “a true representative example of Belgian creative brewing,” praising it for its “unique use of Brettanomyces yeast to provide complex yeast character featuring horsiness that accompanies crystal malt and Styrian Goldings hops.”

Six of the top 10 imports are from Belgium, two from Canada, and one each from Ireland, Germany and the U.K.

Zymurgy readers appreciate classic import styles as well as foreign brewers who are now emulating American styles. Reader Ken Carman listed Urthel Hop-It among his top 20, saying, “I hate to admit it, even though there are so many excellent beers brewed in the U.S., I am

Russian River Pliny the Elder Imperial IPA Clone

Recipe by Amahl Turczyn Scheppach

Taking a sip of this beer is somewhat akin to doing a high-speed face plant into a bale of freshly-picked hops. The roundhouse kick of alcohol numbs your brain only after your senses have been assaulted by sticky green Pacific Northwest aroma, flavor and IBUs. What possessed brewer Vinnie Cilurzo to create this hop colossus? Maybe we'll never know, but we're sure glad he did.

Ingredients for 5 U.S. gallons (19 liters)

12.0 lb	(5.44 kg) pale malt (two-row)
1.0 lb	(0.45 kg) corn sugar
0.75 lb	(340 g) dextrin malt
0.3 lb	(136 g) 40°L crystal malt
1.5 oz	(42 g) whole Chinook hops, 13% a.a. (mash hop)
2.75 oz	(78 g) whole Warrior hops, 15.6% a.a. (90 min.)
0.5 oz	(14 g) whole Chinook hops, 13% a.a. (90 min.)
1.0 oz	(28 g) whole Simcoe hops, 12% a.a. (45 min.)
1.0 oz	(28 g) whole Columbus hops, 14.3% a.a. (30 min)
2.25 oz	(64 g) whole Centennial hops, 9.1% a.a. (0 min.)
1.0 oz	(28 g) whole Simcoe hops, 12% a.a. (0 min.)
3.25 oz	(92 g) whole Columbus hops (dry hop)
1.75 oz	(49 g) whole Centennial hops (dry hop)
1.75 oz	(49 g) whole Simcoe hops (dry hop) California or American ale yeast
0.75 cup	corn sugar to prime

Original Gravity: 1.079

Final Gravity: 1.014

IBUs: 100+

SRM: 8-9

Directions

Mash grains at 150° F (66° C) for 60 minutes. Boil, adding hops as above. Add sugar to kettle 5 minutes before flameout. Chill to 68° F (20° C), aerate, pitch and ferment at 68° F. Dry hop two weeks.

Extract Version

Substitute 9.25 lb (4.2 kg) light malt extract syrup for pale malt. Steep crushed dextrin and crystal malt in 160° F (71° C) brewing water for 30 minutes; remove, add extract and proceed with boil.

Great Lakes Edmund Fitzgerald Porter Clone

Recipe by Amahl Turczyn Schepach

About as robust as a Robust Porter gets. Strong, coffee-like roast character and bittersweet chocolate dominate both aroma and flavor. Bittering hops are also in abundance at the finish. Chewy, roasty, with an almost stout-like dryness, along with spicy black licorice and touch of alcohol warmth, this is a bold beer for cold, dark nights.

Ingredients for 5 U.S. gallons (19 liters)

9.5 lb	(4.3 kg) pale malt
0.75 lb	(340 g) 55°L crystal malt
0.5 lb	(226 g) black patent malt
0.5 lb	(226 g) roast barley
0.75 oz	(21 g) whole Northern Brewer hops, 8% a.a. (60 min.)
0.25 oz	(7 g) whole E.K. Golding hops, 4.75% a.a. (60 min.)
0.5 oz	(14 g) whole E.K. Golding hops, 4.75% a.a. (35 min.)
0.5 oz	(14 g) whole E.K. Golding hops, 4.75% a.a. (10 min.)
	Irish or American ale yeast

Original Gravity: 1.062

Final Gravity: 1.014

IBUs: 38.6

SRM: 41

Directions

Mash grains at 152° F (67° C) for 60 minutes. Boil, adding hops as above. Chill to 68° F (20° C), aerate, pitch and ferment at 68° F.

Extract Version

Substitute 7.75 lb (3.52 kg) light malt extract syrup for pale malt. Steep dark grains and crystal malt in 160° F (71° C) brewing water for 30 minutes; remove, add extract and proceed with boil.

Top Imports (T indicates tie)

1.Orval
2.Chimay Grande Reserve
3.Guinness
4.Rochefort 10
- T5.Duvel
- T5.Paulaner Salvator
- T5.Young's Double Chocolate Stout
- T8.Lindeman's Framboise
- T8.Roddenbach Grand Cru
- T8.Unibroue La Fin du Monde
- T8.Unibroue Trois Pistolets

impressed by this excellent and unique example of a mild IPA and a Belgian farmhouse ale. It's absolutely perfect."

Hildegard van Ostdaten of the Brouwerij de Leyser in West Flanders, Belgium, which brews Urthel Hop-It, has called the beer a tribute to American craft brewers.

"American brewers are very innovative, and Belgian brewers are getting scared of them," she said at the Big Beers, Belgians and Barleywines Festival in 2007.

Ahead of the Pack

As in years past, we also kept track of which breweries received the most votes. This year's top brewery, by a photo finish, is Bell's Brewery of Kalamazoo, Mich., which narrowly beat Dogfish Head.

Bell's, which was founded in 1983 by Bell as a homebrew supply shop, had three beers in the top 50, including Two Hearted Ale, Expedition Stout and Hop Slam.

"It is really special to be honored in such a way by homebrewers," said Bell. "It kind of speaks to our homebrewing soul."

"I had tried nearly 20 of Bell's beers before I was able to get my hands on some Hop Slam that I had heard so much about," said reader Jeremy Kness of Duluth, Minn. "It's a shame it took me so long. This beer is worth buying for the hop aroma alone."

Sierra Nevada Brewing Co. in Chico, Calif., placed third in the voting.

Stone Ruination IPA Clone

Recipe by Amahl Turczyn Schepach

This double IPA from Stone is a hop lover's dream, but there is an underlying malt profile as well that provides some balance to the lupulin onslaught. While you may be tempted to age this powerfully alcoholic brew, the hop freshness you'll get from the lengthy dry hopping will begin to mellow after a few months, so you may consider drinking it sooner rather than later. Make sure you have a healthy and plentiful yeast starter for this beer, and aerate or oxygenate well.

Ingredients for 5 U.S. gallons (19 liters)

14.0 lb	(6.35 kg) pale malt (two-row)
1.0 lb	(0.45 kg) 40° L crystal malt
1.0 lb	(0.45 kg) Munich malt
1.0 lb	(0.45 kg) dextrin malt
1.75 oz	(49 g) Magnum pellet hops, 13% a.a. (60 min.)
1.0 oz	(28 g) Centennial pellet hops, 9.1% a.a. (30 min.)
1.0 oz	(28 g) Centennial pellet hops, 9.1% a.a. (10 min.)
1.0 oz	(28 g) Centennial pellet hops, 9.1% a.a. (1 min.)
2.0 oz	(56 g) Centennial pellet hops, 9.1% a.a. (dry hop)
	California or American ale yeast

Original Gravity: 1.091

IBUs: 100+

SRM: 9.5

Directions

Mash grains at 150° F (66° C) for 60 minutes. Boil, adding hops as above. Chill to 66° F (19° C), aerate, pitch and ferment at 66° F (19° C). Chill to 50° F (10° C) and dry hop two weeks.

Extract Version

Substitute 11 lb. (4.99 kg) light malt extract syrup for pale malt. Steep crushed dextrin, crystal and Munich malt in 150° F (66° C) brewing water for 30 minutes; remove, add extract and proceed with boil.

Spirit of Homebrew

This ranking is based on total number of votes received divided by annual production in barrels.

- 1.....Jolly Pumpkin Artisan Ales, Dexter, Mich.
- 2.....Hair of the Dog Brewing Co., Portland, Ore.
- 3.....Three Floyds Brewing Co., Munster, Ind.
- T4.Port Brewing/The Lost Abbey, San Marcos, Calif.
- T4.Rahr & Sons Brewing Co., Fort Worth, Texas

We also tabulated which breweries had the most brands in the voting. Bell's was number one in that category as well, with 18 of its beers receiving votes in the poll.

Bell's brews about 20 different bottled beers a year, with an additional portfolio available onsite. "We're able to do that because we have a couple of smaller systems to make it fun and interesting," said Bell. "After all, in a homebrewery, you don't sit around and make the same beer every week. Variety is the spice of life."

Boston Beer placed second with 17 beers.

"[Boston Beer founder] Jim Koch not only provides us with exceptional brews, but also demonstrates his support of our hobby in a consistent manner," said Gary Hammack of Greensburg, Pa. "My favorites are Cream Stout, Pale Ale and of course the flagship Boston Lager. We have a clone lagering in the converted freezer right now."

Great Beers, Small Breweries

Once again, we raise a glass to those breweries that, though small in production, score high with beer lovers. We determine the Spirit of Homebrew Award by taking a brewery's total number of votes and dividing it by the brewery's production in number of barrels.

Jolly Pumpkin Artisan Ales in Dexter, Mich. is this year's Spirit of Homebrew winner. The brewery, which produced

776 barrels of beer in 2007, is known for its innovative Belgian-style beers, pirate theme and unusual name, which founder

and brewmaster Ron Jeffries said came about when he and his wife were brainstorming potential brewery names while

"It is really special to be honored in such a way by homebrewers," said Bell. "It kind of speaks to our homebrewing soul."

Tröegs Nugget Nectar Imperial Amber Clone

Recipe by Amahl Turczyn Scheppach

Dry hopping and kettle hop additions add different hop dimension to this immensely hoppy beer from Tröegs Brewing, but the core hop component, according to John Trogner, comes from adding fresh hops to a device called a hop back. "Hop back hopping imparts a huge aroma without adding bitterness. I like bitterness (which this beer has plenty of) but I want that to come from kettle hops. The dry hopping adds the green leafy flavor of the hops to the beer. I like the fresh intensity but we don't want the main taste to be green leaf." (If you don't happen to have a hop back in your homebrewery, the hop back additions may be steeped for 5-10 minutes after flameout.) And all this hop character needs a strong malt base to balance it. "The huge amount of Munich malt creates the canvas and base flavor to support the huge hop quantities," Trogner explains.

Ingredients for 5 U.S. gallons (19 liters)

6.5 lb	(2.95 kg) Continental European Pils Malt (2-row)
7.0 lb	(3.18 kg) Munich malt
5.0 oz	(142 g) 120L crystal malt
1.0 oz	(28 g) whole Nugget hops, 13% a.a. (60 min.)
0.5 oz	(14 g) whole Simcoe hops, 13% a.a. (30 min.)
1.0 oz	(28 g) whole Warrior hops, 16% a.a. (20 min.)
1.25 oz	(35 g) whole Tomahawk hops, 16% a.a. (0 min. or hopback)
1.0 oz	(28 g) whole Palisade hops, 8% a.a. (0 min. or hopback)
1.0 oz	(28 g) whole Simcoe hops, 13% a.a. (dry hop)
1.0 oz	(28 g) whole Palisade hops, 8% a.a. (dry hop)
	American or California ale yeast

* Note that this is slightly lower than the published 93 IBU rating, but this is the recipe that was provided by Tröegs Brewing.

Directions

Mash grains at 152° F (67° C) for 60 min. After sparge, add hops during boil at specified intervals. Shut off burner and add steep additions; stir into hot wort and cover. Begin chill after 10 minutes. Ferment at 68° F (20° C) for one week or until finished. Chill to 50° F (10° C) and dry hop for one week.

Extract Version

Substitute 10 lbs, 2 oz (4.59 kg) amber malt extract syrup for Munich and pils malts. Steep crushed crystal malt in 160° F (71° C) brewing water for 30 minutes. Remove grains, add extract and proceed with boil. Note that malt profile will be slightly different substituting amber malt extract for Munich malt.

Original Gravity 1.075

IBU: 86.5*

SRM: 11.4

Boil Time: 90 min



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sitting on their patio one day. "Jolly Pumpkin always made us laugh every time we said it and it's the one we kept coming back to," said Jeffries at the recent Craft Brewers Conference.

Second place went to Hair of the Dog Brewing Co. in Portland, Ore. (499 barrels), followed by Three Floyds Brewing Co. in Munster, Ind. (6,000 barrels).

Recipes

As usual, we're providing clone recipes for some of the top vote-getters. The recipe for 90 Minute IPA can be found in the July/August 2005 *Zymurgy*, while we've also run clone recipes in the past for most of the top 10 beers including Sierra

Nevada Pale Ale, Bell's Two Hearted Ale, New Glarus Belgian Red and Stone Arrogant Bastard. However, *Zymurgy* contributor Amahl Turczyn Scheppach still had plenty of great beers to choose from, so we've provided clone recipes for five more favorites. Give them a try and let us know what you think.

Thanks for voting, and thanks to those of you who provided comments and reviews of your favorite beers. We'll include information about participating in the 2009 poll in future issues and on the AHA TechTalk forum.

Jill Redding is editor-in-chief of *Zymurgy*.

Ommegang Abbey Clone

Recipe by Amahl Turczyn Scheppach

A deliciously complex dark Belgian ale, Ommegang Abbey bursts with dark fruit and malt aromas, gingerbread spice, a pineapple fruitiness, and a subtle but powerful alcohol warmth. Culturing the house yeast strain will give you the most authentic results, especially at the temperature specified, but a pure culture strain also works well. The caramel red malt, Special B, Belgian chocolate and dark candi sugar all conspire to produce the deep reddish tint and velvety beige head of this luxurious ale. It takes several weeks of conditioning to attain the proper level of carbonation and dryness in the beer, so be patient—it is well worth it.

Ingredients for 5 U.S. gallons (19 liters)

10.5 lb	(4.76 lb) Belgian pale malt (two-row)
1.5 lb	(0.68 kg) aromatic malt
1.25 lb	(0.57 kg) dark candi sugar
0.5 lb	(227 g) caramel-Munich malt (60° L)
4.0 oz	(113 g) caramel-red malt
3.5 oz	(99 g) Special B malt
2.0 oz	(57 g) Belgian chocolate malt
0.75 oz	(21 g) Magnum pellet hops, 13% a.a. (First Wort Hop)
0.5 oz	(14 g) Hersbrucker pellet hops, 4.75% a.a. (10 min)
0.5 oz	(14 g) Hersbrucker pellet hops, 4.75% a.a. (0 min)
	Yeast cultured from a bottle of Ommegang, or Belgian Abbey yeast

Directions

Mash grains using a decoction mash schedule if possible, with main mash rests at 145° F (63° C) for 45 min., 155° F (68° C) for 30 min. and mash out at 160° F (86° C) for 10 min. Otherwise, do a step mash with the same rests. Add candi sugar and boil, adding hops as above. Chill to 75° F (24° C), aerate, pitch and ferment at 77° F (25° C). Bottle with 6 oz (170 g) dark candi sugar.

Extract Version

Substitute 8.25 lb (3.74 kg) light malt extract syrup for pale malt. Steep remaining malts in 150° F (66° C) brewing water for 30 minutes; remove, add extract and sugar and proceed with boil.

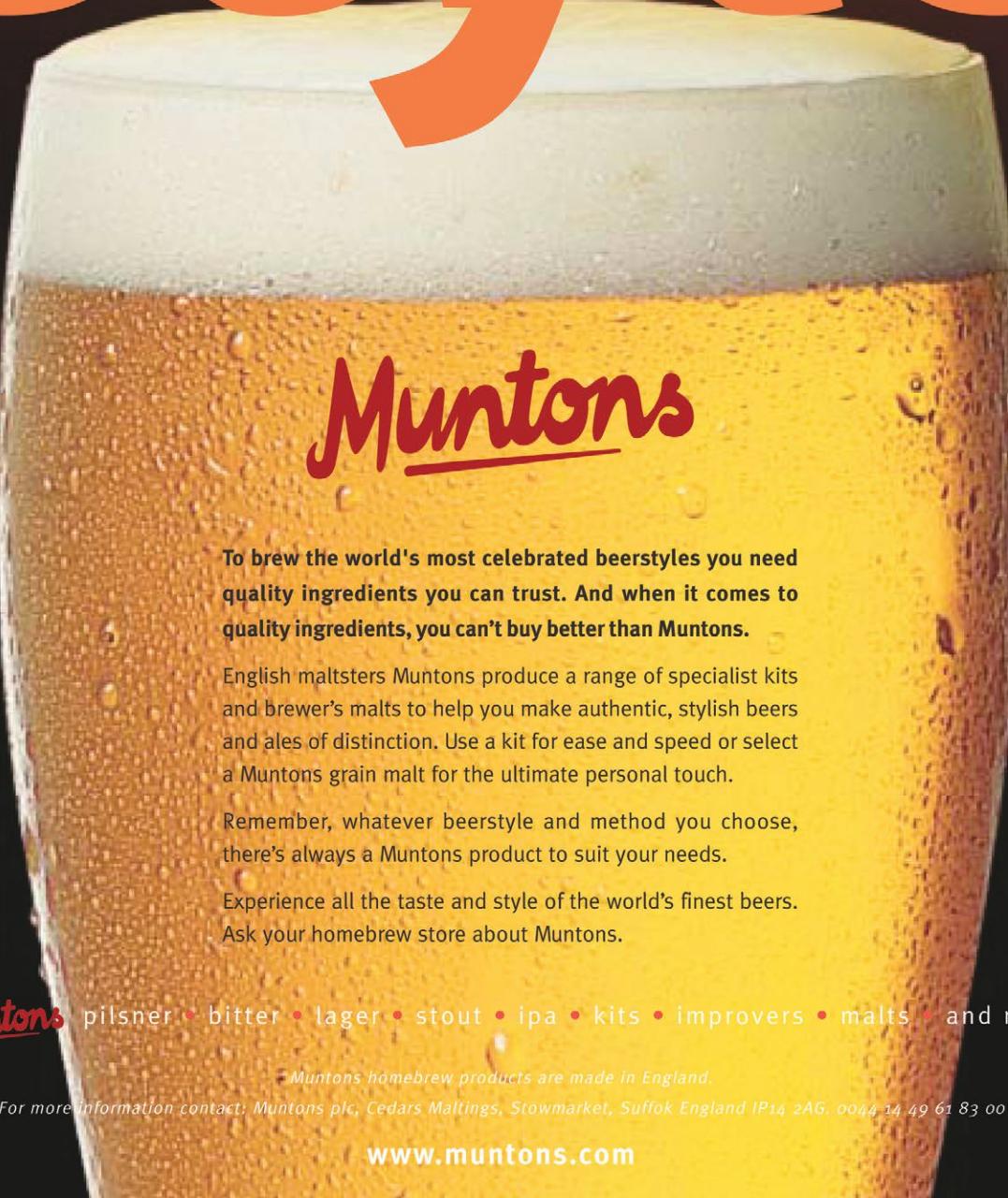
Original Gravity: 1.083

Final Gravity: 1.014

IBUs: 39

SRM: 38

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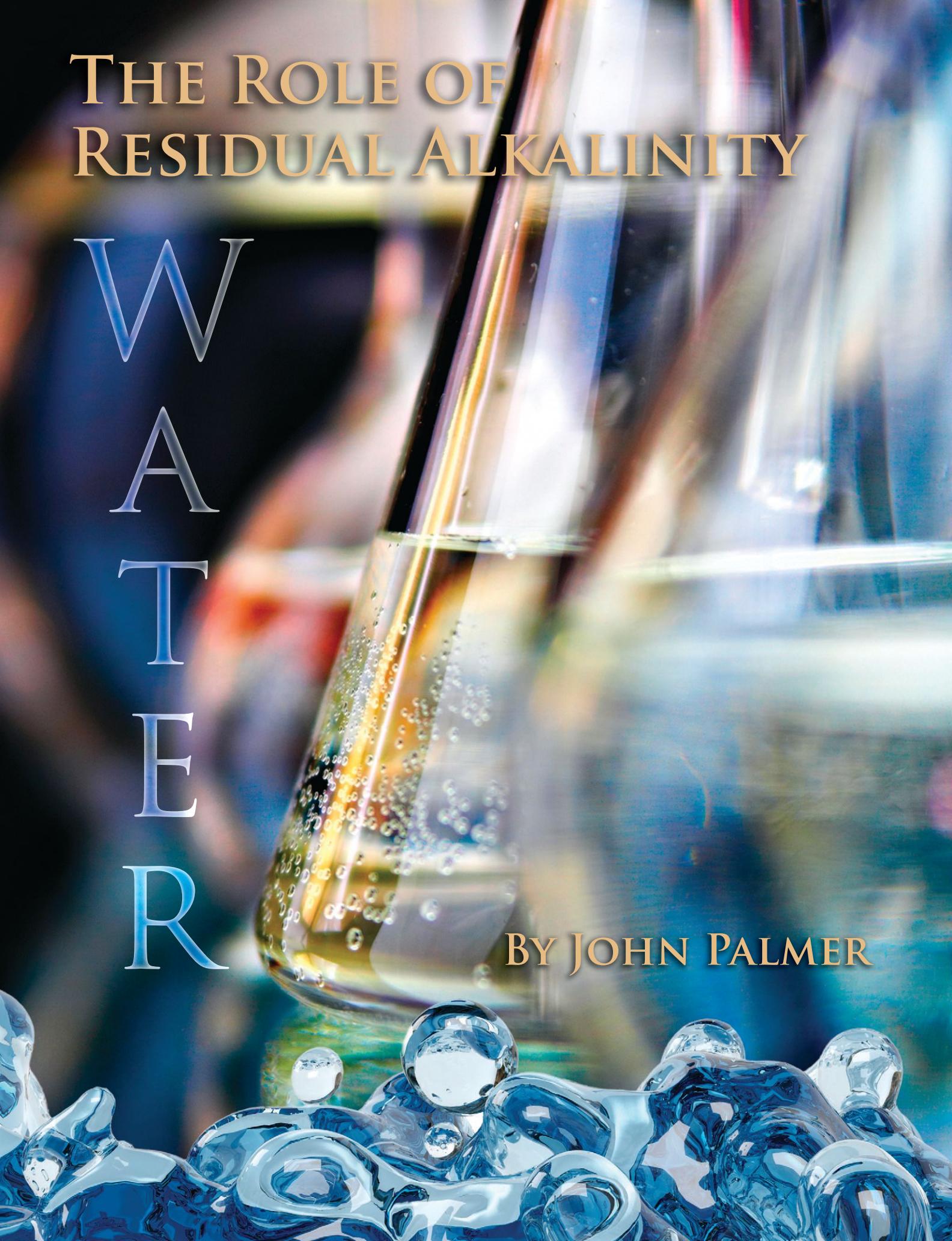
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THE ROLE OF RESIDUAL ALKALINITY

W
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R

BY JOHN PALMER



UNDERSTANDING THE ROLE OF WATER CAN BE A CONFUSING ASPECT OF BREWING A GREAT BEER. SHOULD YOU CATEGORICALLY ADD GYPSUM TO PALE ALE? SHOULD YOU ACIDIFY YOUR SPARGE WATER? SHOULD YOU TRY TO MATCH THE WATER PROFILE OF A FAMOUS BREWING CITY?

IN GENERAL, THERE ARE THREE ASPECTS OF GOOD BREWING WATER:

- **QUALITY:** CLARITY AND FREEDOM FROM CONTAMINANTS
- **PH AND MINERAL CONTENT:** THE ROLE OF WATER PH, CALCIUM, MAGNESIUM, SODIUM, CHLORIDE, SULFATE AND BICARBONATE
- **RESIDUAL ALKALINITY:** THE BALANCE OF HARDNESS TO ALKALINITY

BEFORE YOU CAN MAKE ANY DECISIONS ON THESE ASPECTS, IT IS HELPFUL TO KNOW HOW TO READ A MUNICIPAL WATER REPORT.

READING A WATER REPORT

Depending on where you live, an annual water report will typically list the average test results for primary drinking water standards like toxic metals and bacteria, organic contaminants, and some secondary non-regulated contaminants that may be of more local concern like hexavalent chromium, phosphates, or bromodichloromethane (whatever that is). Unfortunately, the important items from a brewer's point of view are often not listed, specifically calcium or calcium hardness, magnesium or magnesium hardness, total alkalinity or bicarbonate, and sodium, chloride, sulfate and pH.

The other contaminant information may help you diagnose an off-taste in your water, like iron, but brewer's ions are most important because they drive the chemistry of the brewing process. If your water report does not list these items, call your local water department. The information should be readily available, but if not, you can send a water sample to a test lab, such as Ward Labs in Nebraska, for a small fee.

PREPARING YOUR WATER FOR BREWING

The easiest way to prepare your water for brewing is to run it through a carbon filter, available at hardware stores. Carbon filters remove organics that can spoil the taste of the water and beer, like nitrates, chlorine, chloramines, and trace herbicides and pesticides. Campden tablets are also effective at removing chlorine and chloramine (standard water disinfectants). One tablet will treat up to 20 gallons; crush it and stir it into the water to help it dissolve. The chlorine and chloramines will be reduced to insignificant levels of chloride and sulfate ions within minutes.

Standard carbon filters will not affect mineral levels—for that you need a more advanced ion exchange or reduction system. Several areas in the U.S. have very hard water that causes carbonate scaling on pipes, or high levels of iron or manganese that make the water taste bad. Green sand systems can be used to remove iron and manganese, and salt-based water softeners can eliminate scale, but they are a double-edged sword



when it comes to brewing. In many cases you want the calcium and magnesium hardness that water softening strips away. Compare the mineral levels of the water before and after softening to determine which water is better for brewing. Let's first take a look at what each of the minerals does.

WATER PH AND MINERAL CONTENT

The balance of anions to cations is what determines the pH of the water. Water pH is not very useful in itself except as an indicator of the balance of hardness to alkalinity. Because it is a balance, it does not tell you how much of either you have—a handful or a ton. Hardness and alkalinity of water are often expressed “as-CaCO₃” in order to compare their chemical activity under a single unit. The total hardness-as-CaCO₃ is the sum of the cation concentrations, and the total alkalinity-as-CaCO₃ is the sum of the anions. In the real world, the dominant ions are calcium, magnesium and bicarbonate, accounting for 98 percent of the respective totals. If the water pH is above 8.4, carbonate will play a greater role, but bicarbonate is still 95 percent of the total alkalinity at a water pH of 9.

Sodium, chloride and sulfate influence the taste of the water and beer, but do not affect the brewing chemistry like the others. Ion concentrations in water are usually discussed as parts per million (ppm), which is equivalent to a milligram of a substance per liter of water (mg/l). See Table 2 for recommended brewing ranges.

CALCIUM

Calcium is the most important mineral constituent in brewing. It is instrumental to many yeast, enzyme and protein reactions, both in the mash and in the boil. It promotes clarity, flavor and stability in the finished beer. Calcium additions may be necessary to assure sufficient enzyme activity in mashes with water that is low in calcium. Low calcium will promote haze.

WATER TEST REPORT

TABLE 1—LOS ANGELES METROPOLITAN WATER DISTRICT QUALITY REPORT,
EDITED FOR LENGTH (2006 DATA)

Parameter	State Maximum Level (mg/L)	Delivered Average (mg/L)
Primary Standards		
Aluminum	0.05	<0.05
Arsenic	0.01	0.002
Copper	(zero goal)	ND
Lead	(zero goal)	ND
Fluoride	2	0.57
Nitrate	45	7.1
Tetrachloroethylene	0.005	<0.0005
Total Coliform	(detection)	0
Turbidity	5	0.38
Secondary Standards—Aesthetic		
Chloride	*500	50
Color	15	3
Foaming Agents	0.5	<0.05
Manganese	0.05	<0.02
pH	NS	7.9
Sulfate	*250	244
Total Dissolved Solids	451	611
Zinc	5	<0.05
Additional Parameters		
Alkalinity as CaCO ₃	NS	103
Calcium	NS	40
Hardness as CaCO ₃	NS	156
Magnesium	NS	12.5
Potassium	NS	4
Sodium	NS	49

* = Recommended Level

NS = No Standard

ND = Not Detected

Calcium that is matched by bicarbonates in water is referred to as “temporary hardness.” Temporary hardness can be removed by aeration and boiling. Calcium that is left behind after the temporary hardness has been removed is called “permanent hardness.” At least 50 ppm of calcium is recommended for best fermentation performance, regardless of style. Better to have plenty than not enough.

MAGNESIUM

Magnesium also contributes to water hardness. It is an important yeast nutrient in small amounts (10–30 ppm), but

amounts greater than 50 ppm tend to give a sour-bitter taste to the beer. If you are building water from reverse osmosis or distilled, keep the magnesium addition to less than 30 ppm.

TOTAL ALKALINITY OR BICARBONATE

Total alkalinity as CaCO₃ is more commonly listed on water reports than the bicarbonate concentration, and it's the big player in determining brewing water chemistry. Alkalinity is typically in the medium to high range for most waters in the U.S., and will cause flavor problems in pale beers due to a rise in both the mash

pH and beer pH. High mash pH will lead to more tannin extraction, and high beer pH causes a dullness of flavor. The end result is a beer that can range from lifeless to harshly bitter.

Dilution is the easiest method of producing low alkalinity water. Dilute your tap water in a 1:1 ratio with distilled water from the grocery store (often referred to as “purified” water for use in steam irons), and you will effectively cut the alkalinity levels in half.

It is important for malt extract brewers to understand that their wort has already been brewed and the minerals have been concentrated during the malt extract production process. If a malt extract brewer uses high alkalinity water to dilute the extract, they can end up with a high pH beer and harsh flavors. Malt extract brewers should review their water report and determine if they have high alkalinity water. If so, it would be better to brew using low alkalinity bottled water or distilled. Remember, the minerals necessary for good fermentation are already present; they just need to be diluted to normal levels.

SULFATE

The sulfate ion accentuates hop bitterness, making it seem drier and crisper. At concentrations greater than 400 ppm, however, the resulting bitterness can become astringent and unpleasant, and at concentrations greater than 750 ppm, it can cause diarrhea. Sulfate is only weakly alkaline and does not contribute to the overall alkalinity of water.

SODIUM

Sodium can occur in very high levels, particularly if you use a salt-based (i.e. ion exchange) water softener. In general, you should never use softened water for mashing—it is lacking calcium and is too high in sodium. At levels of 70-150 ppm, sodium rounds out the beer flavors, accentuating the sweetness of the malt. But above 200 ppm the beer will start to taste salty.

TABLE 2 – BREWING ION RANGES

Ion	Atomic Weight	Equivalent Weight	Brewing Range (ppm)
Calcium	40.0	20.0	50-150
Magnesium	24.3	12.1	10-30
Total Alkalinity or (Bicarbonate)	100 (61)	50 (61)	0-50 – Pale 50-150 – Amber 150-250 – Dark
Sodium	22.9	22.9	0-150
Chloride	35.4	35.4	0-250
Sulfate	96	48	50-150+

TABLE 3 – EXPERIMENTAL WATER COMPOSITIONS

Water	Ca	Mg	Alk	Na	Cl	SO4	RA*
A: Low Alkalinity	132	25	63	29	128	250	-50
B: High Alkalinity	106	25	287	72	0	103	200

*Calculated

CHLORIDE

The chloride ion also accentuates the flavor and fullness of beer. Calcium chloride additions are a good way to add calcium to a mash for lagers without increasing the sulfate. Chloride and sulfate counterbalance one another in terms of beer flavor. If the chloride to sulfate ratio favors chloride, the beer will be smoother and sweeter. If the ratio favors sulfate, the beer will be drier and more bitter. Chloride will not produce the hypochlorite ion that sanitizes and can lead to medicinal off-flavors.

RESIDUAL ALKALINITY

Residual alkalinity is a powerful tool that every homebrewer can use whether brewing with malt extract or all-grain. It describes the relationship between water mineral content, mash and beer pH. Understanding residual alkalinity is the key to brewing great beers in any style.

The concept of residual alkalinity was first published in 1953 by Paulas Kohlbach, who determined that the pH of a distilled water mash was about 5.75, and that calcium and magnesium in brewing water react with malt phytin to neutralize alkalinity.

Alkalinity that is not neutralized by calcium and magnesium is termed “residual” alkalinity, and residual alkalinity will drive the pH of the mash, and subsequently the beer, upwards. As mentioned before, this changes the beer’s flavor, dulling it or even causing it to be harshly bitter.

The equation for residual alkalinity is:

$$RA = \text{Alkalinity} - ((\text{Calcium}/3.5) + (\text{Magnesium}/7))$$

where the values are all in the same unit, either milliequivalents/liter or ppm as CaCO3.

Residual alkalinity is not the balance of hardness to the alkalinity; it is the balance of alkalinity to the calcium and magnesium levels and the malts. For this reason, it is important to know the individual calcium and magnesium levels in the water, not just the total hardness as CaCO_3 . It is the residual alkalinity and the natural acidity of the malts in the grain bill that determine the mash pH.

For best results for all beer styles, the mash pH should be 5.1–5.5 when measured at mash temperature, and 5.4–5.8 when measured at room temperature. (At mash temperature the pH will measure about 0.3 lower due to greater dissociation of hydrogen ions.) Darker malts have more natural acidity, and therefore require more residual alkalinity to arrive at the optimum pH. However, the relationship is a general one—different malts of the same Lovibond color value can have different amounts of acidity. The calculated color of a beer recipe can be used loosely as a guide for residual alkalinity.

To illustrate the usefulness of this concept, Rick Bobbitt, Scott Jackson and I brewed a total of four beers using two different recipes and two different waters. We brewed an American pale ale and a sweet stout, each with a high RA water and a low RA water. The water profiles and results are summarized in Tables 3 and 4.

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TABLE 4 – EXPERIMENTAL BEER SUMMARY

Beer	OG	FG	IBU*	Color*	RA*	Mash pH**	Beer pH**
Pale Ale/brewed with low alkalinity water	1.046	1.009	41	6	-50	5.5	4.5
Pale Ale/brewed with high alkalinity water	1.046	1.010	41	6	200	6.1	4.7
Stout/brewed with low alkalinity water	1.055	1.018	36	40	-50	4.9	4.2
Stout/brewed with high alkalinity water	1.054	1.016	36	40	200	5.4	4.6

*Calculated

**@ room temperature

TABLE 5 – GENERAL RELATIONSHIP BETWEEN FINAL BEER COLOR AND RA

Beer Color (SRM)	Beer Color (EBC)	Residual Alkalinity as CaCO_3
2–5	4–10	(-)110*–0
5–10	10–20	(-)60–60
10–15	20–30	0–120
15–20	30–40	60–180
20–25	40–50	120–240
25–30	50–60	180–300
30–35	60–70	240–360*

*Use with caution—avoid the extreme ends of the scale for all but the most extreme beers.

The results showed that the pale ale brewed with the low alkalinity water, and the stout brewed with high alkalinity water, both achieved the mash pH target range of 5.4–5.8. The other two beers

brewed with the opposite water had mash pHs that were either too high or too low.

Subsequent tasting of the beers showed that the beers made with the appropriate water had a nice complexity of flavors from both malt and hops. The pale ale had a nice balance between the malt and hop character, and the malt, esters and hops were all evident in the aroma. The stout had a wonderful complexity of malt flavors and aroma: dark caramel, chocolate and coffee. The mouthfeel was smooth and creamy without astringency. On the other hand, the beers brewed with the incorrect waters had a more one-dimensional character—a harsh hop bitterness dominated the pale ale, and an acrid roast character dominated the stout. The flavor and mouthfeel of both incorrect-water beers were short-lived and thin compared to the others. Achieving the proper pH in the mash drives the proper pH in the beer and brings out the flavors of the malts and hops.

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WATER: CLASSIC CITIES AND THEIR BEER STYLES

TABLE 6 – EXAMPLE WATER PROFILES FROM NOTABLE BREWING CITIES

City	Calcium (ppm)	Magnesium (ppm)	Bicarbonate (ppm)	Na (ppm)	Cl (ppm)	SO ₄ (ppm)	RA (ppm as CaCO ₃)	Beer Style	BJCP Color Range
Pilsen	10	3	3	3	4	4	-6	Pilsener	3-6
Dortmund	225	40	220	60	60	120	-3	Export Lager	4-6
Burton	352	24	320	54	16	820	-3	India Pale Ale	8-14
London	52	32	104	86	34	32	30	Bitter	5-16
Vienna	163	68	243	8	12	125	40	Vienna Lager	10-16
Edinburgh	100	18	160	55	65	140	50	Scottish Ale	9-17
Munich	76	18	125*	N/A	2	10	60	Dunkel	14-28
Dublin	118	4	319	12	19	54	175	Dry Stout	20-40

Note: The amount of bicarbonate for Munich has been converted to total alkalinity as CaCO₃.

Pilsen, Czech Republic—A Pilsener lager is a crisp yet well-rounded beer with a rich malt character to balance the hop bitterness. The bitterness is relatively high, but it is softer than a German Pils, which has a sharper, more assertive bitterness. Pilsen water has very low hardness and alkalinity. The lack of sulfate provides for a mellow hop bitterness that does not overpower the soft maltiness. The residual alkalinity (RA) for this style should be near zero, resulting in a mash pH toward the high end of the target range. I recommend a small calcium addition to ensure good fermentation and clarity. A German Pils by comparison should have a lower RA, approaching (-) 60, with a low to moderate amount of sulfate to make the hop bitterness brighter and more assertive.

Dortmund, Germany—Another city famous for pale lagers, Dortmund Export has less hop character than a Pilsner, with a more assertive malt character due to the higher levels of all minerals. The RA is near zero despite the high mineral content. The sodium and chloride bring out a rich roundness to the malt character, and the moderate sulfate levels assert the hop character. The result is a robust yet very balanced and smooth-drinking lager.

Burton-on-Trent, England—The ground water of Burton is famous for its remarkably high calcium sulfate (gypsum) content, but the hardness and alkalinity are balanced to near zero RA. The high level of sulfate and low level of sodium produce an assertive, clean hop bitterness that is balanced by a firm malt body. Compared to the bitters of London, Burton ales are more assertively bitter, maintaining a dry finish despite the higher finishing gravity.

London, England—The bitters and pale ales of London are renowned for their drinkability. The malt profile is complex but not assertive and is balanced by the smooth hop bitterness. London water is moderate in hardness and alkalinity, with an RA on the plus side of about 30. British pale ale spans a rather large range of color from 5-16 SRM, which means that the beer pH character probably varies depending on the types of malts used. RA levels of up to 120 would be appropriate for the darker variants.

Vienna, Austria—The water of this city was similar to Dortmund, but with less calcium to balance the carbonates, and lower levels of sodium and chloride for flavor. Vienna lager is dark copper in color, and has a rich bread crust and toasty malt character from the highly kilned Vienna and Munich malts. The suggested RA range for beers of 10-15 SRM is 0-120, and in the case of Vienna, 0-60 is probably most appropriate because the color and flavor of the beer do not come from the more acidic roast malts.

Edinburgh, Scotland—The color of Scottish ale is similar to Vienna lager and the waters are similar too. The main difference in the waters is the higher sodium and chloride levels, which help to accentuate the slightly more roast and sweet malt character of Scottish ales. The target for residual alkalinity for Scottish ales is similar to Vienna as well, and should be around 60.

Munich, Germany—Although moderate in most minerals, alkalinity from carbonates is relatively high. The smooth flavors of the dunkels, bocks and Oktoberfests of the region show the success of using dark malts to balance the carbonates and acidify the mash. The relatively low sulfate content provides for a mellow hop bitterness that lets the malt flavor dominate. Munich Dunkel ranges from 14-28 SRM, but like Vienna lager, the color comes entirely from the use of toasted and melanoidin malts like Munich, not roasted malts. The RA of 60 of this water is appropriate to the style, even though the table indicates an RA as high as 240, based on color alone.

Dublin, Ireland—Famous for its stout, Dublin has the highest alkalinity of the notable brewing cities, and Ireland embraces it with one of the darkest beer styles in the world (20-40 SRM). Stouts are roasty with overtones of coffee and chocolate from the use of highly roasted malts. Higher levels of RA are necessary to soften these flavors and balance the high acidity of the malts. The low levels of sodium, chloride and sulfate create a soft hop bitterness that complements the mellow roast character. A residual alkalinity range of 120-360 is certainly appropriate for the range of the style, but brewers should be careful not to overbalance and create a beer that goes beyond mellow to tannic and astringent. Only the blackest of stouts should use RAs of greater than 300.

TIPS FOR TWEAKING YOUR WATER

When brewers first learn about the relationship of brewing water and beer style, they commonly look up the water profile for their city or that of a famous brewing city (See Table 6 above) and use various spreadsheets and computer programs to

calculate salt additions for the style they want to emulate. The problem with this approach is that water reports on the internet are usually annual averages, and the combination of those averages often does not exist in the real world; similar salts may have mutually exclusive solubility—if one is high, the other has to be low,

and the water report will not tell you that. The result is that the combination of minerals or salts from the water profile will probably not dissolve into the water you are trying to brew with, even if it is distilled water. The salts will usually dissolve into the lower pH of the mash, however, so I recommend dissolving the salts into

the mash, in the appropriate proportion for the water volume in the mash, and save the rest to add to the boil. In this way, you will achieve the overall water profile in the boil and in the final beer.

Secondly, I recommend calculating the salt additions based on the necessary

residual alkalinity for the style first, and worry about the flavor ions second. You may think you have come up with the perfect combination of salts to match the water profile you found, but the residual alkalinity for that combination may calculate out to the wrong RA and result in an unpleasant beer.

Third, make sure that your brewing water has at least 50 ppm of calcium, regardless of style. Just because Pilsen water is practically distilled doesn't mean you have to brew Pilsner that way. Calcium is a very important enzyme co-factor for both the mash and the boil. A lack of calcium can lead to haze and impair yeast performance and flocculation. Your fermentation will be better for it.

Finally, remember that the acidity of malts is only generally associated with their color. There is a range of beer color that, when combined with a particular water profile and residual alkalinity, should achieve a mash pH of 5.4-5.8. I have drawn the relationship between final beer color and residual alkalinity as listed in Table 5. Note that there is a lot of overlap between the ranges of RA that are appropriate for the color range. The reason for this is that several different styles share the same color range, and some styles are better with a lower beer pH and some are better with a higher beer pH. In general, lower beer pH (more acidic) makes the flavors brighter and more assertive, and higher pH makes the flavors softer and more rounded.

This is where brewing art meets brewing science; you as the brewer need to make the decision on what the flavor balance should be. More tools for calculating and manipulating residual alkalinity and matching it to beer color are in Chapter 15 of my book, *How to Brew*, and on my Web site at howtobrew.com.

SUMMARY

Most brewers know the basic water quality issues and solutions like chloramine and carbon filtration, and many understand the need of minimum mineral levels to promote consistent high quality fermentations. The final frontier in brewing is residual alkalinity.

Understanding residual alkalinity allows the brewer to see how ingredient selection and brewing science come together to create a beer that is greater than the sum of its parts. And that is the art of brewing.

John Palmer is the author of *How to Brew* and the co-author of *Brewing Classic Styles*.

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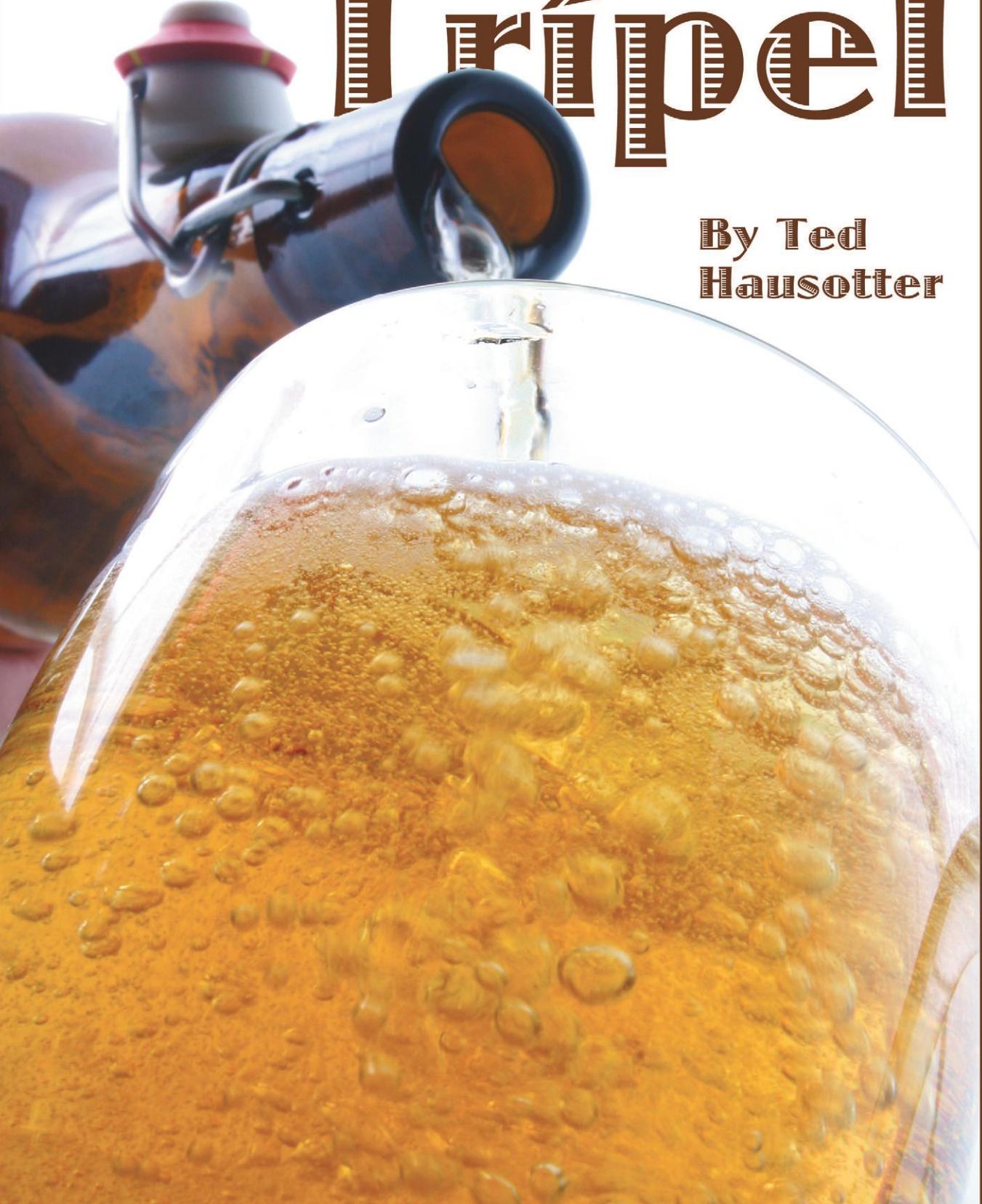
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The Sugars of Trípel



By Ted
Hausotter



**Have you ever
made the perfect beer
that all your friends raved about—
and then remade it
and it was not nearly the same?**

I brewed the most beautiful tripel, with bold, spicy alcohol notes supported by phenols and malt, creating an enjoyable, complex brew. The next batch was just OK and slightly boring. Why were they different, when I used the same hops, malt and yeast?

In reviewing recipes, I noticed that the sugar types were different. That couldn't change the flavor that much, could it? After all, sugar is sugar—or so I thought.

On the premise that a different sugar could not make such a difference, my next batch was a 15-gallon experiment split on five different yeasts in search of the remembered flavor. Still, it did not match the desired greatness. This required another 15-gallon batch. This time, I split it after primary fermentation into five carboys, adding four different sugars and leaving one as a base. The results were astounding. How could four sugars all taste so different?

Style Spotlight

Tripels are a product of tax law and protection of market share from the Pilsner by Belgian brewers. At the time, Belgian law heavily taxed distilled spirits, leaving room for growth in strong beers. With Pilsners marching across the world, why not make strong blond beer? Tripels were probably first brewed in 1932 by the Drie Linden brewery. Shortly thereafter, Westmalle started to brew its tripel. The roots

of the style are strongly Belgian, with most Trappist breweries making one.

Many Belgian tripels can be found in America, including some of my favorites, Westmalle and Chimay White, both Trappist beers. A great Belgian Abbey tripel is Tripel Karmeliet, brewed with two grains that are both malted and unmalted. In fresh bottles you can find a touch of coriander. On the American West Coast, Pike Brewing in Seattle, Wash. makes a tripel worthy of its roots.

What sets tripels apart from other beer styles is that they are strong blond ales with Belgian-style yeast character, highlighting black pepper-like phenols and possible light clove. Bubblegum flavors are more restrained but can be found in most tripels. They have good malt presence and a light body. Tripels are strong beers with alcohol by volume of 7.5 to 9.5 percent. To get such high alcohol and yet a light body, sugar is used. It increases the original gravity yet fully ferments, leaving a beer that is drier with less body than a barleywine, yet with similar alcohol levels.

The yeast varieties used are highly attenuative—it is not uncommon to reach attenuation levels over 85 percent. This helps create a dry finish that is not filling, so you can drink another. Color is blond to golden, and malt, from Pilsner, is bready. Darker base malts tend

to add a bit too much toasted flavor, and domestic malts can leave the beers flabby. Tripels are stronger than helles bocks and maltier than Belgian strong golden ales. Bitterness can vary from balancing to a more bitter profile. Hop flavor is also light, playing a supporting role.

Sugar Experiment

The sugar experiment was meant to hold all things equal except the addition of sugar. I made a 15-gallon batch of wort and fermented it in five separate carboys, 3 gallons each. One was left as a base and the other four had 12.5-percent sugar added

after primary fermentation was complete. The sugars used were cane (C&H), corn, brown (C&H) and white Belgian candy in hard candy form from Brewer's Garden. All five beers were unique—it was impossible to tell they came from the same batch. The four with sugar had less hop and Belgian character in flavor and aroma, possibly due to additional CO₂ scrubbing from the secondary fermentation of sugar. The original gravity started at 1.079. I added sugar when fermentation was complete at 1.012. After the sugar was done fermenting, the finishing gravity was down to 1.008 for all four beers.

After tasting the results, they were so varied that if I were a professional brewer adding sugar, I would not substitute brands without making a test batch first!

Taste Tests

Last December, I gave an advanced judging class for Beer Judge Certification Program judges in Hood River, Ore. The beers were one month old at the time, and each judge filled out a profile grid on each of the beers without knowing which beer was which.

The most complex and favorite of the group was the beer brewed with Belgian candy sugar. Corn sugar was very close behind it in second place, just missing a few of those intangibles that take a beer to greatness. Cane sugar had the fruitiest esters, mainly apple. Brown sugar was a waste of perfectly good wort, the least favorite of the beers. The brown sugar gave the beer a harsh, murky flavor without any complexity (see Table 1).

I had two beer clubs in Oregon, Strange Brew and Good Libations, do another tasting of the same beers at four months old. The ranking of the beers did not change in our preferences. All the beers seemed a touch sweeter than I remembered. The Belgian candy sugar was again the best, followed by the corn sugar. The surprise came in the cane sugar and the brown sugar. Cane sugar tasted fruity, but we could not describe the fruit. The apple character had faded, leaving a generic fruit profile. The brown sugar also changed in profile. We now found touches of root beer, cream soda and molasses. It was unexciting.

But after five months, the world turned upside down. Belgian candy was still in first place, but brown sugar was very close behind. It improved from almost dumping the keg to needing to hire security to protect it! The corn sugar collapsed; an old hop flavor came out, leaving a harsh flavor that did not exist at four months. The cane sugar's fruity esters disappeared, but the complexity never improved.

Expect the beers to change over time in ways you will not imagine. All sugars

reduced the hop presence and changed the Belgian character, possibly due to additional CO₂ scrubbing. They all had the same type of phenols, with differences in intensity. As an example, bitterness levels at one month were similar among all sugar beers and Westmalle Tripel. At four months the sugar beers were sweeter and at five months the bitterness surpassed the Westmalle Tripel. All the beers were bottled at the same time and stored identically.

Tasting notes on the five beers are as follows:

1. Base Beer, no sugar: Big tangerine hop character from Summit hops. Beer was harsher in bitterness than all four sugar beers. The beer was edgy and distracting. It had less malt flavors than the sugar beers. Overall still drinkable.
2. Belgian Candy Sugar: The best of the lot, complex with spicy phenols and pleasant alcohols.
3. Corn Sugar: Second most complex of the group. It had fewer phenols than Belgian candy sugar. Esters were controlled but light, slightly sweeter than the rest. It fell apart at five months.
4. Cane Sugar: Most estery of the lot. Starts as apple and fades to generic fruit over time. At five months, fruit esters had to be looked for. Phenols were also less noticeable, competing with the esters. Complexity and balance of the beer was missing in all tastings.
5. Brown Sugar: The unique batch of the group. It went from bad to dang good. When young, the flavors were murky and the beer was edgy. As a five-month aged tripel, it was balanced and complex. It was very similar to the Belgian candy sugar with slightly fewer phenols.

Brewing Recommendations for Tripels

1. Always make a yeast starter, followed by a full-sized beer as a secondary starter. I usually make Belgian pale ale as a secondary starter and pitch my tripel right on the yeast cake. Your yeast has to be happy and in large quantity if you want to ferment completely, leaving a thinner bodied beer.

Table 1: Preference Ranking of Tripels

	1 Month	4 Months	5 Months
Base, no sugar	4	4	4
Belgian candy	1	1	1
Corn sugar	2	2	5
Cane sugar	3	3	3
Brown sugar	5	5	2



2. Use a highly attenuative Belgian yeast strain for proper attenuation.
3. Always add sugar. It cuts the body, making the beer less filling.
4. Lower your mash temperature. I like to mash in between 145° and 148° F (63-64° C). This gives me a drier, less filling finish due to the lower finish gravity. At lower temperatures, beta amylase is more active, so the wort will be less dextrinous.
5. Make your mash thinner by adding more strike water. I use 42 ounces per pound of malt for my strike water. With this much water, your strike water temperature will need to be a few degrees cooler. Have some ice ready to chill the wort if required. This will also help make wort with fewer dextrins, as beta amylase is more active in thinner mashes.
6. Use good Pilsner malt for the nice bready malt profile. No color malts are needed.
7. Go light on flavor and aroma hops. This style should have prominent fermentation flavors. Don't overpower them.
8. Yeast choices need to have Belgian character. I like to use Wyeast Trappist High Gravity 3787, Wyeast Belgian Witbier 3944 and Wyeast Belgian Ardennes 3522. If you want a Belgian strong golden style like Duvel, use

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9. Keep your boil rate low. There is no reason to boil off more than 10 percent of the volume of the wort. At this rate, I have been able to keep the DMS under control. The goal is to keep the kettle caramelization down to a minimum while removing precursors to DMS, which gives a sweet creamed corn flavor.

10. Lower your fermentation temperature. Fusel alcohols can take over as temperatures go up. Yes, some Belgian beers are fermented warmer, however Westmalle ferments its tripel in the mid-60s. I have fermented as low as 60° F (15° C). Try to keep temperatures under 70° F (21° C) as this keeps the fusel alcohols from overpowering the beer, leaving an easy-to-drink tripel.

11. If you add spice, go gentle.

12. Carbonation of most tripels is higher than standard beers. Westmalle is nearly twice as carbonated as the standard American beer. Make sure your bottles

can handle the high pressure. You will need to increase your priming sugar from the standard 3/4 cup per 5-gallon batch to 1 1/8 cup. This will still be less than Westmalle Tripel, but a safer pressure for your bottles that will still give a high carbonation level. For kegging, I like to use 14 PSI at 34° F, again

less than Westmalle Tripel but much more aggressively carbonated.

Ted Hausotter is an award-winning homebrewer from Baker City, Ore. and the Mountain/Northwest regional representative for the Beer Judge Certification Program.

Traditional Tripel

Ingredients for 5 U.S. gallons (19 liters)

12.0 lb	(5.4 kg) German Pilsner malt
0.5 lb	(226 g) Wheat malt
1.25 lb	(566 g) Corn sugar or Belgian candy sugar
0.9 oz	(25 g) East Kent Goldings 4.7% alpha whole hops, 90 min
0.9 oz	(25 g) East Kent Goldings 4.7% alpha whole hops, 30 min
0.7 oz	(19 g) East Kent Goldings 4.7% alpha whole hops, 5 min Wyeast 3522 Belgian Ardennes or Wyeast 3787 Trappist yeast

Original Gravity: 1.080

IBUs: 31

Directions

For extract beers replace malt with 9.5 lb. (4.3 kg) light malt extract. For all-grain brewing, mash in at 147° F (64° C) with 4.1 gallons (15.5 L) of water. Collect runnings until runoff drops to 1.010 and boil for 90 minutes. Chill to upper 68° F (20° C) and pitch yeast.

Northwest Inspired Tripel

Ingredients for 5 U.S. gallons (19 liters)

12.0 lb	(5.4 kg) German Pilsner malt
0.5 lb	(226 g) Wheat malt
1.25 lb	(566 g) Corn sugar or Belgian candy sugar
0.35 oz	(9.9 g) Cascade 6.2% alpha whole hops, 90 min
0.9 oz	(25 g) Cascade 6.2% alpha whole hops, 30 min
0.75 oz	(21 g) Summit 15% alpha whole hops, 5 min Wyeast 3522 Belgian Ardennes or Wyeast 3787 Trappist yeast

Directions

For extract beers replace malt with 9.5 lb. (4.3 kg) light malt extract. For all-grain brewing, mash in at 147° F (64° C) with 4.1 gallons (15.5 L) of water. Collect runnings till runoff drops to 1.010 and boil for 90 minutes. Chill to upper 68° F (20° C) and pitch yeast.

Original Gravity: 1.080

IBUs: 31

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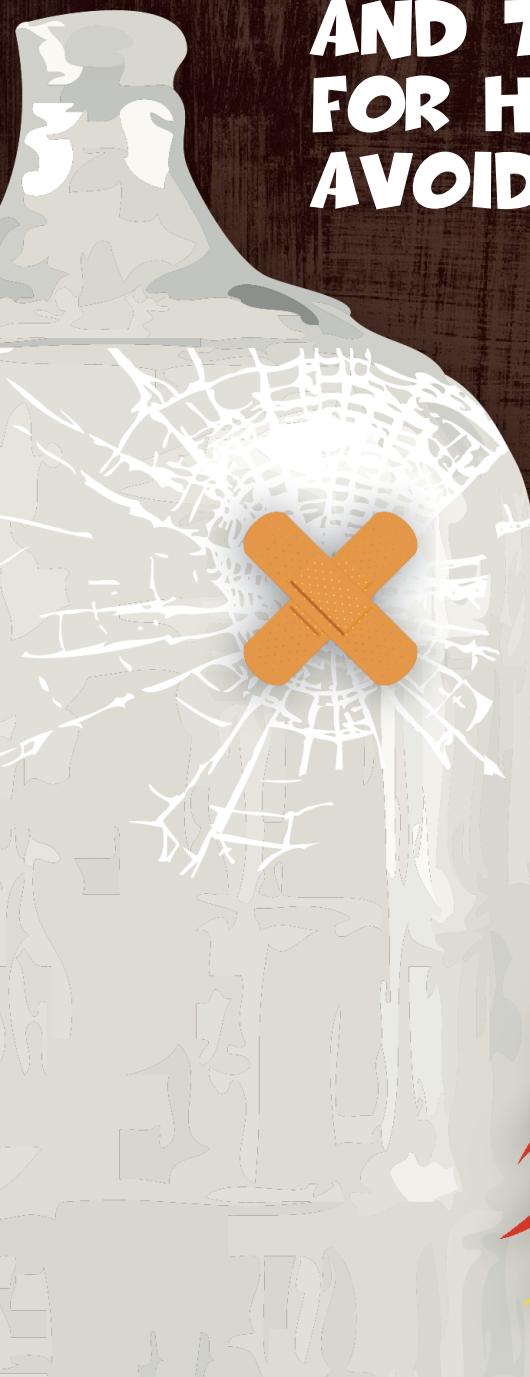
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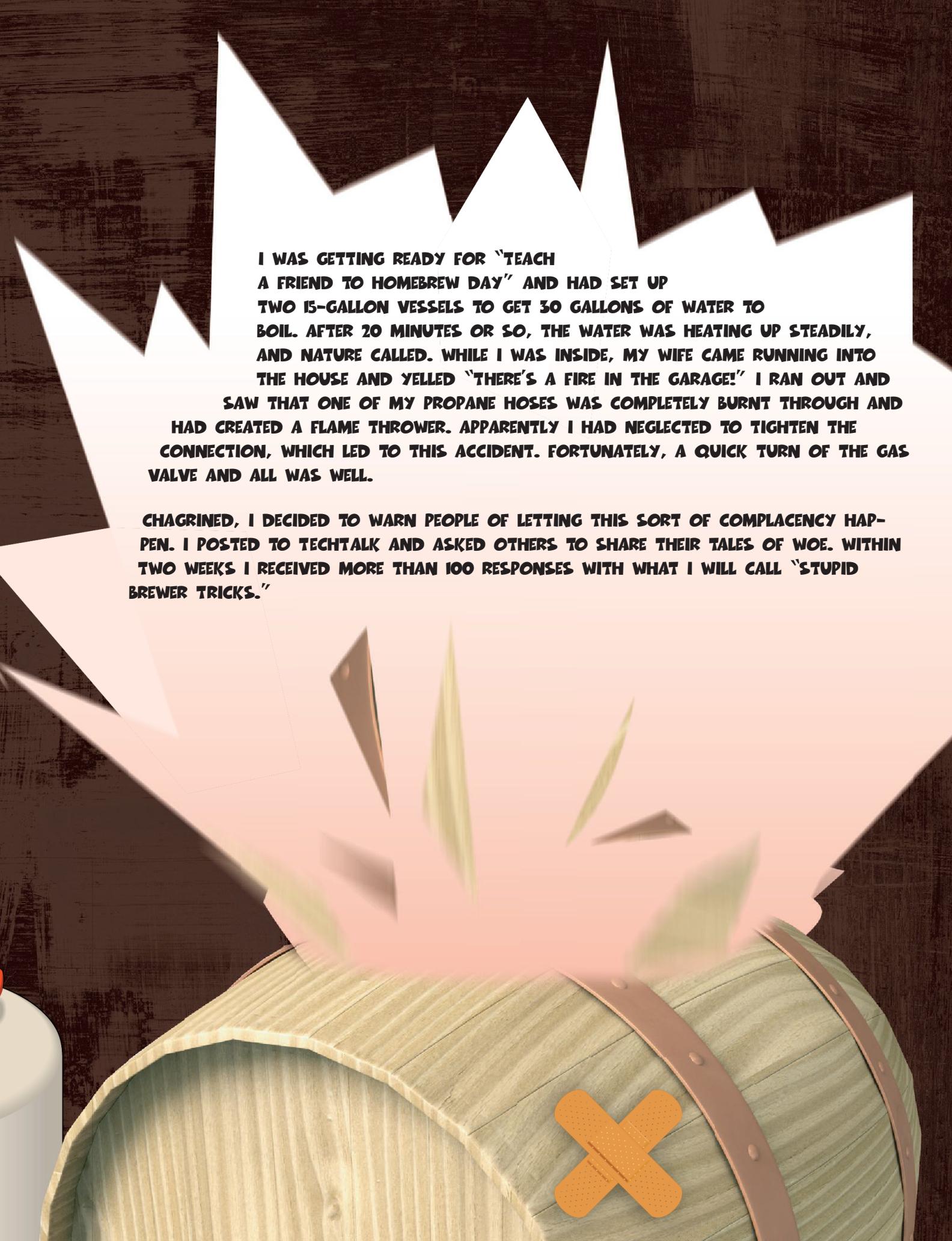
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STUPID HOMEBREWER TRICKS

AND TIPS
FOR HOW TO
AVOID THEM

BY CRISPY FREY





I WAS GETTING READY FOR "TEACH A FRIEND TO HOMEBREW DAY" AND HAD SET UP TWO 15-GALLON VESSELS TO GET 30 GALLONS OF WATER TO BOIL. AFTER 20 MINUTES OR SO, THE WATER WAS HEATING UP STEADILY, AND NATURE CALLED. WHILE I WAS INSIDE, MY WIFE CAME RUNNING INTO THE HOUSE AND YELLED "THERE'S A FIRE IN THE GARAGE!" I RAN OUT AND SAW THAT ONE OF MY PROPANE HOSES WAS COMPLETELY BURNT THROUGH AND HAD CREATED A FLAME THROWER. APPARENTLY I HAD NEGLECTED TO TIGHTEN THE CONNECTION, WHICH LED TO THIS ACCIDENT. FORTUNATELY, A QUICK TURN OF THE GAS VALVE AND ALL WAS WELL.

CHAGRINED, I DECIDED TO WARN PEOPLE OF LETTING THIS SORT OF COMPLACENCY HAPPEN. I POSTED TO TECHTALK AND ASKED OTHERS TO SHARE THEIR TALES OF WOE. WITHIN TWO WEEKS I RECEIVED MORE THAN 100 RESPONSES WITH WHAT I WILL CALL "STUPID BREWER TRICKS."



I frequently perform brewing demonstrations at a number of public venues and am fond of saying: "This great hobby combines compressed gas, boiling fluids, glass, electricity, alcohol and flame—whatever could go wrong?" Just about everything, it seems.

GLASS CARBOYS

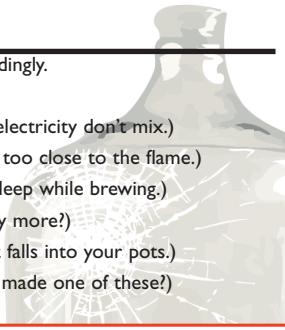
By far the most often mentioned brewing disasters centered on glass carboys, especially wet ones. Dozens of people related the resulting splintering-into-sharp-shards when their carboys touched, slipped and hit concrete.

I was topping up my wine in a 5-gallon carboy. As I pushed the stopper back into the neck, about a six-inch diameter piece of glass popped out of the side, and wine started spilling out everywhere! The break was about a quarter of the way from the top of the carboy, so a gallon or so was all over the floor instantly. Not thinking about safety, only to save the wine, I grabbed a 22-gallon plastic fermenter and lifted the broken carboy into it as quickly and gently as I could. I managed to save most of the wine, but only

APPLY NAMED BEERS

In many of the tales shared, the brew was saved and named accordingly.

Electro Shock Bitter (ESB)(Water and electricity don't mix.)
Flaming Shorts Australian Ale(Don't stand too close to the flame.)
Rip Van Winkle ALE(Don't fall asleep while brewing.)
Bloody Finger Porter(Need we say more?)
Tool Time Porter(Watch what falls into your pots.)
Scorched Hand Stout(Who hasn't made one of these?)



realized afterward what a stupid move that was. Had the carboy cracked or broken in another spot while I was lifting it, my hand that was supporting the bottom would have been hamburger."

While some people suffered no injuries, others reported lacerated fingers and other body parts. One poor fellow endured 42 stitches and to this day has issues buttoning his shirts.

The results of all of these unfortunate tales are the following tips for dealing with carboys.

- Rinse the outside of the carboy with warm water and dry it off before lifting/carrying/moving.
- Use milk crates to move carboys around.
- Put rubber restaurant kitchen mats in front of your sink.
- Put foam pipe insulation on the edges of your sink.
- Don't lift and flip full carboys. Fill them in the sink, tip them over and let them drain until half full. Then lift, flip and drain.

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This kettle made from a used keg did not have holes in the bottom rim. The result: an explosion from pressure.



Burner damaged by exploding keg.

- Look at the new plastic carboys suitable for fermenting and also carboy straps.
- Use basic safety gear: gloves, boots, and safety glasses or goggles.
- When using fruit in your fermenter, use a blow-off hose and not a regular airlock—fruit pieces can clog a regular airlock, creating intense pressure.
- Once you know that you are in a dangerous predicament, and if you have the presence of mind, use your body to nudge the carboy away from yourself.
- Hot water might clean better; but don't try reusing your immersion chiller outflow to clean a carboy. Temperature shock leads to cracked glass.
- Don't use a rubber stopper with an airlock when you pitch healthy yeast.
- Don't chill a carboy in the snow—bottoms tend to stay in place when you lift them.

Along with broken carboys, other glass items weighed in heavily, but usually had far less dire consequences. Hydrometers, thermometers, over-primed bottle grenades and other glassware breakage stories were rampant. One lesson learned: There is a big difference between 2/3 cup of priming sugar and 2/3 pound.

HEAT

The next most frequent “accident” reported was burns. Burns occurred throughout the brewing process. Some received burns from tipping over hot liquor containers that were set up high to support gravity-fed systems. Others grabbed the burners too soon after turning off the heat. Still others simply were focused on doing something else and grabbed a searing hot portion of their brew system.

One unfortunate brewer reported, “*Stuck mash, I figure that the hose in the bottom of the mash tun has come detached. So I pick up the mash tun, ready to pour it to another vessel, only to drop it straight to the ground. The 153° F mash splashes right up in my face and my glasses go flying. I can't see a thing, and my partner comes a runnin'. (Apparently there was a scream or two involved.) First thing on my mind is “mash-out, never mind the scalding face.” The beer wasn't bad, but for the rest of the brew night I looked like a red-faced, dreadlocked barley monster.*”

A couple of tips gleaned from the misfortune of others:

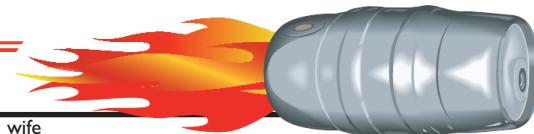
- Always turn off the heat prior to adding DME to the boil, and go slowly.
- Don't add hot rocks to an already boiling pot of wort. The result is a massive boilover. This ancient technique is meant to heat room temperature wort.

One interesting thread was woven throughout: many people wrote to tell me that their

first reactions were to salvage their brew, even if a trip to the ER was imminent.

The very heavy gauge pressure cooker blew the lid out, waking up most of the locals including my wife. It was now about 1:30 a.m. Welcome to brewing hell. I actually was able to regain my composure and transfer the wort by siphoning and pitching the next a.m. The beer turned out fine and I ended up with a new respect for my kettle (I was able to salvage it) and my high school math teacher.

LET 'ER RIP



My foray into kegging came when my wife bought me a 5-liter mini keg set. Generally, it was unsatisfactory, perhaps because of the cheap plastic tap. The beer tended to be pretty flat and never tasted right. In desperation, I boosted the priming sugar about 20 percent on a batch of brown Belgian ale. A few weeks later I walked into my cellar and saw that three of the kegs had developed a few new angles, bulging and rippled. Fortunately, none had popped.

I went upstairs and donned a motorcycle helmet, goggles, over-mittens on top of two pairs of winter gloves, and two coats, all covered by a rain poncho. In my amateur bomb disposal outfit, I gingerly picked up each bulging keg and placed it on its side in the laundry sink. Nothing happened. I heaved a sigh of relief, stripped off all the duds, wiped the sweat off and draped a shower curtain over the sink. I cobbled together a rod-and-pliers contraption to push the bung in and let her rip. Beer gushed out, but it was less aggressive than I expected, and the next one was about the same. On the third one, I decided to try and tap it. It went in with minimal fuss, so I hit the lever to dispense the crud on the bottom, planning to draw a pint for tasting before I disposed of it. The blast hit the lower third of my face, went up my nose, soaked my shirt, etc. I couldn't get the lever to release and beer was going everywhere.

I took the last, normal-looking keg out to the woods on a squirrel hunting trip, along with a .22 rifle. I was fed up with mini kegs. I was expecting it to make a big splash when I popped it with the .22, but it was very uneventful. And the beer tasted great.

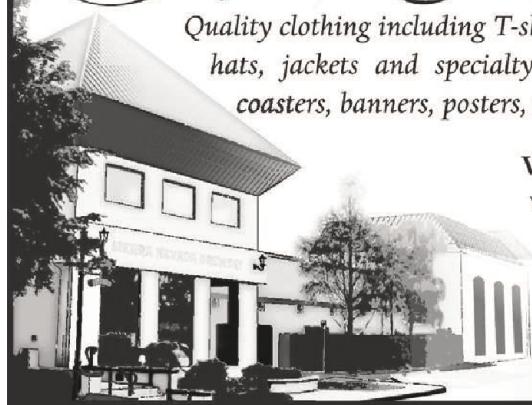
—Ben Bock

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One brewer reported that he fell down a slick stairway carrying his carboy. "When my foot hit that first outside step I knew this was going to end badly. The steps were a little slick from rain and my foot shot out forward and I went down on my butt to the second step still cradling the carboy, which hit me full force in the solar plexus. I remember thinking the carboy was going to shatter on my chest. But after five seconds that still hadn't happened. I sat up, set the carboy on the walk and spent the next few minutes trying to teach myself how to breathe again. I then spent the next half hour trying to straighten out my lower back. But not a drop was spilled!"

DRINKING AND BREWING

Not surprisingly, many stories involved too much alcohol consumption. While brewing guru Charlie Papazian likes to repeat his mantra, "Relax, don't worry, have a homebrew," I would like to suggest that during the brewing ses-

sion, we modify this to "Be vigilant, stay sober until the wort is chilling, then have a homebrew."

**"OFTEN I TRY TO THINK
OF THE QUICKER OR
EASIER WAY TO DO
SOMETHING. INSTEAD I
CAN PERSONALLY ATTEST
TO THE VALUE OF
PUTTING SAFETY FIRST."**

this mash. I had collected about 8 gallons of wort between the first runnings and the sparge and was feeling pretty good.

I don't know what exactly I was thinking at the time, but I do know I was in the process of converting from 3/8" brass to 1/2" stainless on as much as possible. Apparently I thought it a good idea to switch the ball valve from the boil kettle DURING THE BOIL, and realized I had made the wrong decision about the time the boiling wort started flowing from the unencumbered spout. Realizing I had only two choices (amazing how quickly one sobers up in these instances), either sacrifice the beer or risk burns, I chose the burns. I was somehow able to get the ball valve back on the pot and save a good majority of the batch. The result? Second-degree burns on my hand, a conscious effort to limit imbibing while brewing, and a fabulous Scorched Hand Stout.

KEGGING

Simply put, check your fittings. The number one stupid brewers trick relating to kegging is poor connections. Stories of kegs pouring themselves out in chest freezers and refrigerators were numerous, and this also typically resulted in an empty CO₂ tank.

CHEMICALS

One brewer told a tale of using Proxitane (peracetic acid) to clean his kegs. One time he grew complacent and forgot to bleed the pressure from the keg he was hooking up, resulting in the Proxitane concentrate blowing out of the hose and directly into his eye and nostril, leading to partial loss of vision in one eye and forming scar tissue that had to be removed from his sinuses several times.

Complacency with chemicals, bleach or other caustic materials has no place in our brew houses. Just like the pros, use safety goggles and pay close attention when handling these materials.

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PURE YEAST AND FERMENTATION

MODIFYING KEGS INTO BREWING VESSELS

While I only heard of one instance, the results were serious enough to share. Be sure to check your kegs to make sure the bottom ring has the vent holes—otherwise an explosion can occur.

When using beer kegs for brewing vessels, only use kegs legally obtained with permission from the brewery for conversion to brewing vessels. Keg theft is a serious issue—replacement costs for kegs can be \$150 or more.

MAKING BELGIAN CANDY

Quite unexpectedly, I received three or four e-mails regarding accidents that occurred in the process of making Belgian candy sugar. It can result in some rather nasty cleanups. When making Belgian candy sugar, sprinkle some powdered sugar on the wax paper first. If it gets stuck on the kitchen counter, heat some water, pour it on and then peel it off. Hammer and screwdriver won't chip it off!

BOURBON BARRELS

When using a freshly emptied bourbon barrel, don't toss a sulfur stick into it to sanitize the barrel. The residual bourbon will likely ensure the bugs and critters are dead and the gas left inside has been known to create a significant explosion—see the frightening sidebar from AHA Governing Committee member and BJCP Board President Gordon Strong.

SAFETY FIRST

Over the years I have had people pour boiling wort in my shoe, gotten carbon monoxide poisoning brewing indoors, broken several carboys, hydrometers and melted digital thermometers, burned through gas lines, and even ran over one of my own pumps. While accidents happen, most can be avoided by maintaining focus on the tasks at hand.

I will end this by sharing the following quote from Art, whose carboy explosion (posted on TechTalk) resulted in three cut fingers on each hand requiring 48 stitches. Art underwent three hours of surgery to reattach four tendons, requiring 30 more stitches and rehab. He still cannot use his left hand.

Why share my story? I'm not on a mission to save my fellow brewers. I am not advocating the elimination of glass. Partly it is a good story. But mostly I hope it does help some guys to "THINK." I thought I could do it in a way that was not really safe. As my wife says, I think like a man. Often I try to think of the quicker or easier way to do something. Instead I can personally attest to

the value of putting safety first.

Chris P. "Crispy" Frey is a member of the American Homebrewers Association Governing Committee, an active AHA Liaison and a member of the Ann Arbor Brewers Guild and Fermental Order of Renaissance Draughtsmen.



FIREWATER, INDEED

Have you ever seen those fake motivational posters from Despair.com? There's one titled "Mistakes" that shows a sinking ship and says "It could be that the purpose of your life is only to serve as a warning to others." Last June, I came dangerously close to just such a moment when a 53-gallon oak bourbon barrel exploded next to me and a friend.

If you were at the AHA Conference in Denver, I was the guy walking around with a cane. In case you didn't hear the story then, let me tell it to you now.

My local homebrew club made 50 gallons of English Barleywine on National Homebrew Day to put in a bourbon barrel for the National Homebrewers Conference in Cincinnati. The beer was fermented, tasted great, and was ready to transfer. I had done this before successfully, so I thought I knew what I was doing.

My process included using a smoldering sulfur stick to kill any mold in the barrel, a common technique in winemaking. I thought this was important since I remembered the sour Imperial Stout made in a bourbon barrel for the Chicago NHC, and didn't want to waste our beer.

The Cincinnati clubs obtained bourbon barrels for other clubs to use, but picked them up weeks in advance so they had to be stored before we could fill them. We thought the barrels were clean. This was our first mistake—we should have picked up a fresh, cleaned barrel from a reliable source right before we needed it.

We planned to transfer the beer after work, so we stored the barrel in a friend's backyard the previous night. This was our second mistake, since it was a hot June day and the barrel probably sat in the sun, which volatilized whatever bourbon was still in the barrel.

We intended to sanitize the barrel, install a spigot, place it on a frame in the cellar, and rack our beer into it. We didn't get past the first step. When my friend lowered a smoldering sulfur stick on a coat-hanger into the bunghole of the barrel (our third and final mistake), I heard a loud, echoing BOOM. I remember flipping through the air and landing in a heap about 15 feet from the barrel, which was now burning on the deck.

Flames shot out the bunghole, causing severe second-degree burns on my friend's hand. The pressure inside the barrel was too great to vent through the bunghole, and the head of the barrel blew out. It split into several pieces, four of which hit my leg. Flames scorched my left side. Pieces of the barrel were found a hundred feet away. The emergency room doctor kept questioning me about how it happened, because it looked like I had been hit with an IED.

It took each of us about eight weeks to recover, but we both still have scars and after effects. Nevertheless, both of us consider ourselves very lucky. It could have been much worse, considering the power of the explosion.

Not that I'm going to try this again, but what I learned from my two experiences using barrels is:

- It's a lot harder to get beer out of a barrel than it is to fill it.
- Build a stand to hold the barrel; the stand should be above the height of a carboy.
- Plan to install a spigot in the barrel; racking from the barrel is very difficult.
- Pick up your barrel right before you want to fill it.
- Get the barrel from a place that has rinsed them, or rinse it yourself with boiling water.
- Place the fully prepped barrel in its final cellar location before filling it; you won't be able to move it after it's full.
- Keep any fire or heat source well away from your barrel.
- Follow these safety tips and maybe you can avoid being a warning to others.

—Gordon Strong

**Stay away
from my
beer...**

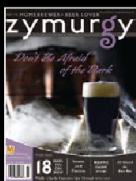
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- Silver: Hefeweizen alkoholfrei, A lpirsbacher Klosterbrau Gläumer GmbH & Co. KG, Alpirsbach, Germany
- Bronze: Organic Saps-It Sparkling Malt Drink, Neumarkter Lammsbräu Gebr. Ehrlsperger e.K., Neumarkt, Germany

Category 2: American-Style Cream Ale or Lager, 23 entries

- Gold: Special Export, Pabst Brewing Co., Woodridge, IL
- Silver: Lone Star, Pabst Brewing Co., Woodridge, IL
- Bronze: Nide Beer - The Ale, Baird Brewing Co., Numazu, Japan

Category 3: American-Style Wheat Beer, 14 entries

- Gold: Crystal Wheat Ale, Pyramid Breweries Inc., Seattle, WA
- Silver: Shiner Dunkelweizen, Spoetzl Brewery, Shiner, TX
- Bronze: Spanish Peaks Crystal Weiss, Spanish Peaks Brewing Co., Polson, MT

Category 4: American-Style Hefeweizen, 34 entries

- Gold: Widmer Hefeweizen, Widmer Brothers Brewing Co., Portland, OR
- Silver: UFO Hefeweizen, Harpoon Brewery, Boston, MA
- Bronze: La Bianca, Apostel Bräu, Hauzenberg, Germany

Category 5: Rye Beer, 17 entries

- Gold: Rockchuck Rye, Snake River Brewing Lander, Jackson, WY
- Silver: Schremser Roggenbier, Bierbrauerei Schrems, Schrems, Austria
- Bronze: Frog Rye IPA, Issaquah Brewhouse, Issaquah, WA

Category 6: Fruit and Vegetable Beer, 70 entries

- Gold: Redoak Framboise Froment, Redoak, Sydney, Australia
- Silver: Blue Moon Chardonnay Blonde, Blue Moon Brewing Co., Golden, CO
- Bronze: Alaskan Jalapeno Imperial IPA, Alaskan Brewing Co., Juneau, AK

Category 7: Herb and Spice Beer, 67 entries

- Gold: Avatar Jasmine IPA, Elysian Brewing Co., Seattle, WA
- Silver: CoCoNut Porter, Maui Brewing Co., Lahaina, HI
- Bronze: Stillwater Rye, Montana Brewing Co., Billings, MT

Category 8: Coffee Flavored Beer, 24 entries

- Gold: Java The Hut, CB & Potts Restaurant & Brewery - Flatirons, Broomfield, CO
- Silver: Meantime Coffee Porter, Meantime Brewing Co. Limited, London, UK
- Bronze: Hitachino Nest Beer Espresso Stout, Kiuchi Brewery, Naka-City, Japan

Category 9: Specialty Beer, 20 entries

- Gold: Morimoto Soba Ale, Rogue Ales, Newport, OR
- Silver: 1: Orig. Dinkel Bier (Spelt Beer), Apostel Bräu, Hauzenberg, Germany
- Bronze: Morimoto Black Obi Soba Ale, Rogue Ales, Newport, OR

Category 10: Specialty Honey Lager or Ale, 29 entries

- Gold: Blue Moon Honey Moon, Blue Moon Brewing Co., Golden, CO
- Silver: Michelob Honey Lager, Anheuser-Busch Inc., St. Louis, MO
- Bronze: Midas Touch, Dogfish Head Craft Brewery, Milton, DE

Category 11: Other Low Strength Ale or Lager, 15 entries

- Gold: Firestone Extra Pale Ale, Firestone Walker Brewing Co., Paso Robles, CA
- Silver: Polygamy Porter, Utah Brewers Cooperative, Salt Lake City, UT
- Bronze: Provo Girl Pilsner, Utah Brewers Cooperative, Salt Lake City, UT

Category 12: Other Strong Ale or Lager, 28 entries

- Gold: Dark Horizon, Nogne Ø, Grimstad, Norway
- Silver: Double Pilsner, Odell Brewing Co., Fort Collins, CO
- Bronze: Dragonstooth Stout, Elysian Brewing Co., Seattle, WA

Category 13: Experimental Beer (Lager or Ale), 27 entries

- Gold: Ichabod, Alpine Beer Co., Alpine, CA
- Silver: Iwate Kura Beer Oyster Stout - B, Sekinoichi Shuzo Co. Ltd., Iwate, Japan
- Bronze: Veritas 002: Port Brewing Co. and The Lost Abbey, San Marcos, CA

Category 14: Gluten Free Beer, 12 entries

- Gold: Deschutes Brewery Sorghum Beer, Deschutes Brewery, Bend, OR
- Silver: Sinebrychoff Light Beer, Oy Sinebrychoff Ab, Kerava, Finland

Category 15: Wood- and Barrel-aged Beer, 21 entries

- Gold: Red Brick Barrel Select, Atlanta Brewing Co., Atlanta, GA
- Silver: Brown's Whiskey Porter, Brown's Brewing Co., Troy, NY
- Bronze: Bourbon Barrel Stout, Rockyard Brewing Co., Castle Rock, CO

Category 16: Wood- and Barrel-aged Strong Beer, 54 entries

- Gold: Paradox Grain, BrewDog, Fraserburgh, UK
- Silver: Elmer's Reserve, Newport Beach Brewing Co., Newport Beach, CA
- Bronze: Allagash Curieux, Allagash Brewing Co., Portland, ME

Category 17: Wood- and Barrel-aged Sour Beer, 14 entries

- Gold: Cuvee de Tomme, Port Brewing Co. and The Lost Abbey, San Marcos, CA
- Silver: Temptation, Russian River Brewing Co., Santa Rosa, CA
- Bronze: Stevens CCC, Nørrebro Bryghus, Copenhagen, Denmark

Category 18: Aged Beer (Ale or Lager), 25 entries

- Gold: Vintage AleSmith Old Numbskull, AleSmith Brewing Co., San Diego, CA
- Silver: Hopsquatch '06: Four Peaks Brewing Co., Tempe, AZ
- Bronze: Little Korkny Ale, Nørrebro Bryghus, Copenhagen, Denmark

Category 19: Cellar or Unfiltered Beer, 34 entries

- Gold: Hoepfner Krausen, Privatbrauerei Hoepfner GmbH, Karlsruhe, Germany
- Silver: Bikini Blonde Lager, Maui Brewing Co., Lahaina, HI
- Bronze: Big Red Machine Fall Classic Ale, Baird Brewing Co., Numazu, Japan

Category 20: Smoke-Flavored Beer, 27 entries

- Gold: Alaskan Smoked Porter 2007: Alaskan Brewing Co., Juneau, AK
- Silver: Smoked Imperial Porter, Four Peaks Brewing Co., Tempe, AZ
- Bronze: Nils Oscar Röklporter, Nils Oscar Co. AB, The, Nyköping, Sweden

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Darron R.S. Welch
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Small Brewpub Category

Bend Brewing Company
Tonya Cornett
www.bendbrewingco.com

Category 21: European-Style Low-Alcohol Lager/German-Style Leicht(bier), 18 entries

- Gold: Waldhaus Light Line, Privatbrauerei Waldhaus Joh. Schmid GmbH, Weilheim/Waldhaus, Germany
- Silver: Hahn Premium Light Lager, Hahn Brewing Co. Pty Limited, The, Camperdown, Australia
- Bronze: Gage Roads Pils, Gage Roads Brewing Co. Ltd, Perth, Australia

Category 22: German-Style Pilsener, 72 entries

- Gold: Trumer Pils, Trumer Brauerei Berkeley, Berkeley, CA
- Silver: Waldhaus Diplom Pils, Privatbrauerei Waldhaus Joh. Schmid GmbH, Weilheim/Waldhaus, Germany
- Bronze: Troegs Sunshine Pils, Troegs Brewing Co., Harrisburg, PA

Category 23: Bohemian-Style Pilsener, 41 entries

- Gold: James Squire Pilsener, Malt Shovel Brewery Pty Limited, The, Camperdown, Australia
- Silver: HUB Organic Lager, Hopworks Urban Brewery, Portland, OR
- Bronze: Gambrinus Premium, Plze Prazdroj a.s., Pilsen, Czech Republic

Category 24: Munchner (Munich)-Style Helles, 53 entries

- Gold: Urtyp Hell, Engelbräu Rettenberg, Rettenberg, Germany
- Silver: Hoepfner Export, Privatbrauerei Hoepfner GmbH, Karlsruhe, Germany
- Bronze: Chiemgau Hell, Schlossbrauerei Stein Wiskott GmbH & Co KG, Stein an der Traun, Germany

Category 25: Dortmunder/European Style Export German-Style Oktoberfest/Wiesen (Meadow), 48 entries

- Gold: Luksus, JSC Aldaris, Riga, Latvia
- Silver: Mariestads Export, Spendrups Brewery, Varby, Sweden
- Bronze: Llano Lager, SandLot Brewery, Denver, CO

Category 26: Vienna-Style Lager, 25 entries

- Gold: Vienna Lager, Covey Restaurant & Brewery, The, Fort Worth, TX
- Silver: Vienna Red Lager, Iron Hill Brewery & Restaurant, Wilmington, DE
- Bronze: Lochsa Lager, Ram Restaurant & Brewery - Boise, Boise, ID



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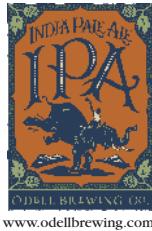
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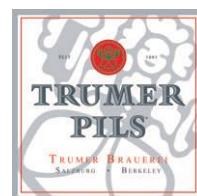
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www.oggies.com and
www.leftcoastbrewing.com



www.noerrebrobryghus.dk



www.trumerinternational.com



www.spendrups.se

Category 27: German-Style Märzen, 28 entries

Gold: Goss Märzen, Brauerei Goss, Deuerling, Germany
Silver: Weltenburger Kloster Anno 1050, Klosterbrauerei Weltenburg GmbH, Kelheim, Germany

Bronze: Latvijas Sevikais, JSC Aldaris, Riga, Latvia

Category 28: European-Style Dark/Munchner Dunkel, 38 entries

Gold: Weltenburger Kloster Barock Dunkel, Klosterbrauerei Weltenburg GmbH, Kelheim, Germany
Silver: Munich Dunkel, C.H. Evans Brewing/Albany Pump Station, Albany, NY
Bronze: Ottenbräu 1348 Dunkles Lager, Ottenbräu, Abensberg, Germany

Category 29: German-Style Schwarzbier, 30 entries

Gold: Shounan Liebe, Kumazawa Brewing Co., Kanagawa, Japan
Silver: Samuel Adams Black Lager, Boston Beer Co., Boston, MA
Bronze: Eisenbahn Dunkel, Cervejaria Sudbrack Ltda., Blumenau, Brazil

Category 30: Traditional German-Style Bock, 21 entries

Gold: Bock Lager, Elk Grove Brewery and Restaurant, Elk Grove, CA
Silver: Lakefront Bock, Lakefront Brewery, Inc., Milwaukee, WI
Bronze: Troegsator, Troegs Brewing Co., Harrisburg, PA

Category 31: German-Style Heller Bock/Maibock, 31 entries

Gold: Hoepfner Maibock, Privatbrauerei Hoepfner GmbH, Karlsruhe, Germany
Silver: Maibock, Blind Tiger Brewery & Restaurant, Topeka, KS
Bronze: Rahrs Bucking Bock, Rahr & Sons Brewing LP, Fort Worth, TX

Category 32: German-Style Strong Bock, 38 entries

Gold: Freudenberger Märkator, Brauerei Märkl, Freudenberg, Germany
Silver: Doppelbock Dunkel, Brauerei Schloss Eggenberg, Vorchidorf, Austria
Bronze: JW Dundee's Doppelbock, High Falls Brewing Co., Rochester, NY

Category 33: American-Style Light Lager, 34 entries

Gold: Old Milwaukee Light, Pabst Brewing Co., Woodridge, IL
Silver: Lone Star Light, Pabst Brewing Co., Woodridge, IL
Bronze: Natural Light, Anheuser-Busch Inc., St. Louis, MO

Category 34: American-Style Lager, 48 entries

Gold: Tooheys Extra Dry, Tooheys Pty Limited, Lidcombe, Australia
Silver: Michelob Lager, Anheuser-Busch Inc., St. Louis, MO
Bronze: Narragansett Lager, Narragansett Brewing Co., Providence, RI

Category 35: American-Style Specialty Lager, 28 entries

Gold: Steel Reserve, Miller Brewing Co., Milwaukee, WI
Silver: Busch Ice, Anheuser-Busch Inc., St. Louis, MO
Bronze: Mickey's Ice, Miller Brewing Co., Milwaukee, WI

Category 36: American-Style Amber Lager, 33 entries

Gold: Orlio Organic Common Ale, Orlio Organic Beer Co., South Burlington, VT
Silver: Old Scratch Amber Lager, Flying Dog Brewery, Denver, CO
Bronze: Brooklyn Lager, Brooklyn Brewery, The, Brooklyn, NY

Category 37: American-Style Dark Lager, 18 entries

Gold: Black Diamond Lager, Bend Brewing Co., Bend, OR
Silver: Canterbury, Pacific Western Brewing, Prince George, Canada
Bronze: Waterloo Dark, Brick Brewing Co. Ltd., Waterloo, Canada

Category 38: Australasian, Latin American or Tropical-Style Light Lager, 33 entries

Gold: Anchor Ice, Asia Pacific Breweries Limited, Singapore
Silver: Imperial, Cervecería Hondureña, S.A. de C.V., San Pedro Sula, Honduras
Bronze: Pacana Tropical Extra, Cervecería Boliviana Nacional S.A., La Paz, Bolivia

Category 39: International-Style Lager, 51 entries

Gold: Ursus Premium, Ursus Breweries, Cluj-Napoca, Romania
Silver: Egils Gull, Brewery Egill Skallagrímsson, The, Reykjavík, Iceland
Bronze: Knappstein Enterprise Reserve Lager, Knappstein Enterprise Brewery, The, Clare, Australia

Category 40: Baltic-Style Porter, 15 entries

Gold: Amnesia, The Grumpy Troll Restaurant & Brewery, Mount Horeb, WI
Silver: 3 Dog Night, Chama River Brewing Co., Albuquerque, NM
Bronze: Baltika N6 Porter, Baltika Breweries, St. Petersburg, Russia

Category 41: Belgian-Style White (or Wit)/Belgian-Style Wheat, 35 entries

Gold: Hoegaarden, InBev Belgium N.V./S.A., Jupille-sur-Meuse, Belgium
Silver: Ommegang Witte, Brewery Ommegang, Cooperstown, NY
Bronze: Mill Street Belgian-Style Wit, Mill Street Brewery, Toronto, Canada

Category 42: Belgian- and French-Style Ale, 37 entries

Gold: Brugge Zot Blond, Brouwerij De Halve Maan, Brugge, Belgium
Silver: Matilda, Goose Island Beer Co., Chicago, IL
Bronze: Tiburon Blonde, Marin Brewing Co., Larkspur, CA

Category 43: Belgian-Style Pale Ale, 8 entries

Gold: Belgian Blonde, Black Diamond Brewing Co., Concord, CA
Silver: Special, Brewery De Ryck, Herzele, Belgium

Category 44: Belgian-Style Sour Ale, 28 entries

Gold: Geuze Boon, Boon Brouwerij N.V., Lembeek, Belgium
Silver: Oude Geuze Ale Oud Beersel, Oud Beersel, Brussels, Belgium
Bronze: Framboise, Allentown & Bethlehem Brew Works, Allentown, PA

Category 45: Belgian-Style Flanders/Oud Bruin or Oud Red Ale, 5 entries

Gold: Red Poppy, Port Brewing Co. and The Lost Abbey, San Marcos, CA
Silver: Phat Phlemish Red, Upstream Brewing Co., Omaha, NE

Category 46: Belgian-Style Dubbel, 26 entries

Gold: Allagash Dubbel, Allagash Brewing Co., Portland, ME
Silver: Emmett's Belgian-style Dubbel, Emmett's Ale House/
Emmett's Tavern & Brewing Co., West Dundee, IL
Bronze: Urthel Parlus Magnificum - Vlaemse Bock, De Leyser, Ruiselede, Belgium

Category 47: Belgian-Style Tripel, 42 entries

Gold: Affligem Tripel, Affligem Brewery, Opwijk, Belgium
Silver: Allagash Tripel, Allagash Brewing Co., Portland, ME
Bronze: Westmalle Trappist Tripel, Westmalle Trappist Brewery, Malle, Belgium

Category 48: Belgian-Style Pale Strong Ale, 24 entries

Gold: La Fin du Monde, La Brasserie Unibroue, Chamby, Canada
Silver: Mont-Saint Aubert, Brasserie De Bruneau, Bruneau, Belgium
Bronze: Baron's Strong Brew, Asia Pacific Breweries Limited, Singapore

Category 49: Belgian-Style Dark Strong Ale, 28 entries

Gold: Salvation, Russian River Brewing Co., Santa Rosa, CA
Silver: Malheur 12°, Brewery Malheur, Buggenhout, Belgium
Bronze: Brother David's Double, Anderson Valley Brewing Co., Boonville, CA

Category 50: Other Belgian-Style Ale, 59 entries

Gold: Upstream Grand Cru, Upstream Brewing Co., Omaha, NE
Silver: Malheur Brut Reserve, Brewery Malheur, Buggenhout, Belgium
Bronze: Pride, Midnight Sun Brewing Co., Anchorage, AK

Category 51: English-Style Summer Ale, 20 entries

Gold: Rooster's Y.P.A. (Yorkshire Pale Ale), Rooster's Brewing Co. Ltd, Knaresborough, UK
Silver: "312," Goose Island Beer Co., Chicago, IL
Bronze: Sandbagger Gold, Montana Brewing Co., Billings, MT

Category 52: Classic English-Style Pale Ale, 35 entries

Gold: MacTarnahan's Amber Ale, Pyramid Breweries Inc., Seattle, WA

Silver: Saranac Pale Ale, E.X. Matt Brewing Co., Utica, NY
Bronze: Bass, Samlesbury Brewery, Preston, UK

Category 53: English-Style India Pale Ale, 32 entries

Gold: Wild Goose IPA, Wild Goose Brewery, Frederick, MD
Silver: On Belay IPA, Snake River Brewing Lander, Jackson, WY
Bronze: Vapor Cave, Glenwood Canyon Brewing Co., Glenwood Springs, CO

Category 54: Ordinary Bitter, 10 entries

Gold: Cutthroat, Uinta Brewing Co., Salt Lake City, UT
Silver: BridgePort Blue Heron Pale Ale, BridgePort Brewery, Portland, OR

Category 55: Special Bitter or Best Bitter, 23 entries

Gold: Snake River Pale Ale, Snake River Brewing, Jackson, WY

Silver: 1065 Raccoon Red, Rock Bottom Brewery - Bethesda, Bethesda, MD

Bronze: Numbers Ale, Atlanta Brewing Co., Atlanta, GA

Category 56: Extra Special Bitter or Strong Bitter, 39 entries

Gold: Standing Wave Pale Ale, Kannah Creek Brewing Co., Grand Junction, CO

Silver: The Wise ESB, Elysian Brewing Co., Seattle, WA

Bronze: Stone Pale Ale, Stone Brewing Co., Escondido, CA

Category 57: Scottish-Style Ale, 24 entries

Gold: McGarvey's Scottish Ale, Oggie's Left Coast Brewing Co., San Clemente, CA

Silver: Beltaine Scottish Ale, Shoreline Brewery, Michigan City, IN

Bronze: Scottish Ale, Nasu Kohgen Beer, Ltd., Nasugup, Japan

Category 58: English-Style Mild Ale, 19 entries

Gold: Crusader Dark Mild Ale, Dragonmead Microbrewery, Warren, MI

Silver: Barnstormer Brown Ale, Flyers Restaurant and Brewery, Oak Harbor, WA

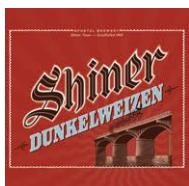
Bronze: The Mild One, Redwood Brewing Co., Flint, MI

Category 59: English-Style Brown Ale, 47 entries

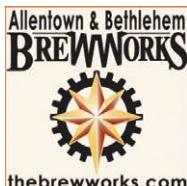
Gold: BridgePort Beertown Brown, BridgePort Brewery, Portland, OR

Silver: Sweet George's Brown, Dillon DAM Brewery, Dillon, CO

Bronze: Big Ben Brown Ale, Bull & Bush Brewery, Denver, CO



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www.squatters.com



www.redrockbrewery.com



www.alesmith.com



www.bridgeportbrewing.com



www.flintfood.com/rw.htm



www.uplandbeer.com

Category 60: Brown Porter, 28 entries

- Gold: Porter, Bell's Brewery, Inc., Galesburg, MI
Silver: Cutthroat Porter, Odell Brewing Co., Fort Collins, CO
Bronze: St. Charles Porter, Blackstone Restaurant and Brewery, Nashville, TN

Category 61: Robust Porter, 49 entries

- Gold: People's Porter, Foothills Brewing, Winston-Salem, NC
Silver: Porter, Nogne Ø, Grimstad, Norway
Bronze: Swan Lake Beer Porter, Hyokoyashikinomori Brewery Tentyokaku Co., Inc., Aganocti, Japan

Category 62: Sweet Stout, 15 entries

- Gold: Left Hand Brewing Company Milk Stout, Left Hand Brewing Co., Longmont, CO
Silver: Outlaw Stout, Great Basin Brewing Co., Sparks, NV

Category 63: Oatmeal Stout, 35 entries

- Gold: Sless' Stimulating Stout, Iron Springs Pub & Brewery, Fairfax, CA
Silver: Sleeping Dog Oatmeal Stout, Chama River Brewing Co., Albuquerque, NM
Bronze: Velvet Merkin, Firestone Walker Brewing Co., Paso Robles, CA

Category 64: Strong Scotch Ale, 43 entries

- Gold: Saint Arnold Divine Reserve No. 4: Saint Arnold Brewing Co., Houston, TX
Silver: Wee Heavy, Iron Hill Brewery & Restaurant, Wilmington, DE
Bronze: Caribou Kilt Strong Scotch, Kassik's Kenai Brew Stop, LLC, Kenai, AK

Category 65: British-Style Imperial Stout, 16 entries

- Gold: Brooklyn Black Chocolate Stout, Brooklyn Brewery, The Brooklyn, NY
Silver: High Desert Imperial Stout, Great American Restaurants, Centreville, VA
Bronze: Blackout Stout, Great Lakes Brewing Co., Cleveland, OH

Category 66: Old Ale, 17 entries

- Gold: AleSmith Decadence, AleSmith Brewing Co., San Diego, CA
Silver: Upland Winter Warmer, Upland Brewing Co., Bloomington, IN
Bronze: HMS Bount Old Ale, Dry Dock Brewing Co., Aurora, CO

Category 67: Strong Ale, 21 entries

- Gold: Outback X, Bend Brewing Co., Bend, OR
Silver: Cabin Fever, Boundary Bay Brewery, Bellingham, WA
Bronze: Sopris, Glenwood Canyon Brewing Co., Glenwood Springs, CO

Category 68: Barley Wine-Style Ale, 61 entries

- Gold: Old Diablo, Schooner's Grille & Brewery, Antioch, CA
Silver: Hopsquatch '07: Four Peaks Brewing Co., Tempe, AZ
Bronze: Alaskan Barley Wine, Alaskan Brewing Co., Juneau, AK

Category 69: German-Style Kölsch/Köln-Style Kölsch, 36 entries

- Gold: Wind Blown Blonde, Stewarts Brewing Co., Bear, DE
Silver: Colorado Kölsch, Steamworks Brewing Co., Durango, CO
Bronze: Kaorino Nama, Shimono Co., LTD, Chiba, Japan

Category 70: German-Style Brown Ale/Dusseldorf-Style Altbier, 22 entries

- Gold: Alt and in the Way, Squatters Pub Brewery, Salt Lake City, UT
Silver: Bobsled Brown, Utah Brewers Cooperative, Salt Lake City, UT
Bronze: 1065 Fire Chief Alt, Rock Bottom Brewery - Bethesda, Bethesda, MD

Category 71: South German-Style Hefeweizen/Hefeweissbier, 71 entries

- Gold: Freudenberger Hefe Weizen, Brauerei Märkl, Freudenberg, Germany
Silver: Fujizakura kogen Beer "Weizen", Fujikanko Kaihatsu Co., LTD, Minamitsuru, Japan
Bronze: Plank Hefeweizen, Brauerei Michael Plank, Laaber, Germany

Category 72: German-Style Pale Wheat Ale, 20 entries

- Gold: Distelhäuser Kristallweizen, Distelhäuser Brauerei Ernst Bauer GmbH, Tauberbischofsheim, Germany
Silver: I'm Half the Beer I used to be (Harvest Light), BJ's Restaurant and Brewery - Chandler, Chandler, AZ
Bronze: Weihenstephan Kristall-Weissbier, Bayerische Staatsbrauerei Weihenstephan, Freising, Germany

Category 73: German-Style Dark Wheat Ale, 29 entries

- Gold: Schneider Weisse Original, Schneider Weisse, Kelheim, Germany
Silver: Original Plank Hefeweizen, Brauerei Michael Plank, Laaber, Germany
Bronze: Fendi Vario-Weizen, Aktienbrauerei Kaufbeuren AG, Kaufbeuren, Germany

Category 74: South German-Style Weizenbock/Weissbock, 19 entries

- Gold: Plank Heller Weizenbock, Brauerei Michael Plank, Laaber, Germany
Silver: Penn Weizen Bock, Pennsylvania Brewing Co., Pittsburgh, PA

Category 75: Irish-Style Red Ale, 31 entries

- Gold: Samuel Adams Irish Red, Boston Beer Co., Boston, MA
Silver: McIlhenney's Irish Red, Alpine Beer Co., Alpine, CA
Bronze: Red Rocks, Rock Bottom Brewery - Denver, Denver, CO

Category 76: Classic Irish-Style Dry Stout, 20 entries

- Gold: Blarney Sisters Dry Irish Stout, Third Street AleWorks, Santa Rosa, CA
Silver: Dark Starr Stout, Starr Hill Brewery, Crozet, VA

Category 77: Foreign (Export)-Style Stout, 26 entries

- Gold: Zonker Stout, Snake River Brewing, Jackson, WY
Silver: San Quentin's Breakout Stout, Marin Brewing Co., Larkspur, CA
Bronze: Tsunami Stout, Pelican Pub & Brewery, Pacific City, OR

Category 78: Golden or Blonde Ale, 39 entries

- Gold: Alaskan Summer Ale, Alaskan Brewing Co., Juneau, AK
Silver: Kiwanda Cream Ale, Pelican Pub & Brewery, Pacific City, OR
Bronze: Red Cap, Brick Brewing Co. Ltd., Waterloo, Canada

Category 79: American-Style Pale Ale, 66 entries

- Gold: Widmer Pale Ale, Widmer Brothers Brewing Co., Portland, OR
Silver: Sharpail Pale Ale, Montana Brewing Co., Billings, MT
Bronze: Maui Pale Ale, Maui Brewing Co., Lahaina, HI

Category 80: American-Style Strong Pale Ale, 52 entries

- Gold: Organic IPA, Hopworks Urban Brewery, Portland, OR
Silver: Nectar IPA, Firestone Walker Brewing Co., Paso Robles, CA
Bronze: Peg Leg Pale Ale, Ham's Brewhouse, Greenville, NC

Category 81: American-Style India Pale Ale, 77 entries

- Gold: IPA, Odell Brewing Co., Fort Collins, CO
Silver: Union Jack IPA, Firestone Walker Brewing Co., Paso Robles, CA
Bronze: India Pelican Ale, Pelican Pub & Brewery, Pacific City, OR

Category 82: Imperial or Double India Pale Ale, 39 entries

- Gold: Hopnotic IPA, San Diego Brewing Co., San Diego, CA
Silver: Poor Man's IPA, Pizza Port - Carlsbad, Carlsbad, CA
Bronze: Dreadnaught, Three Floyds Brewing Co., Munster, IN

Category 83: American-Style Amber/Red Ale, 53 entries

- Gold: Hop Head Red, Green Flash Brewing Co., Vista, CA
Silver: Swan Lake Beer Amber Swan Ale, Hyokoyashiki-nomori Brewery Tentyokaku Co., Inc., Agano-city, Japan
Bronze: Red Horse Ale, Sacramento Brewing Co., Sacramento, CA

Category 84: Imperial or Double Red Ale, 22 entries

- Gold: Behemoth, Three Floyds Brewing Co., Munster, IN
Silver: Organic Deranger, Laurelwood Brewing Co., Portland, OR
Bronze: Gordon, Oskar Blues Brewery, Lyons, CO

Category 85: American-Style Brown Ale, 30 entries

- Gold: Doryman's Dark Ale, Pelican Pub & Brewery, Pacific City, OR
Silver: Redrock Nut Brown Ale, Redrock Brewing Co., Salt Lake City, UT

Category 86: American-Style Sour Ale, 4 entries

- Gold: Eric's Ale, New Belgium Brewing Co., Fort Collins, CO
Silver: Le Terroir, New Belgium Brewing Co., Fort Collins, CO

Category 87: American-Style Stout, 20 entries

- Gold: Terminal Stout, Rock Bottom Brewery - Chicago, Chicago, IL
Silver: Total Eclipse Stout, Foothills Brewing, Winston-Salem, NC
Bronze: Sticky Stout, Pizza Port - Carlsbad, Carlsbad, CA

Category 88: American-Style Wheat Wine Ale, 4 entries

- Gold: Winter Wheatwine, Rubicon Brewing Co., Sacramento, CA
Silver: Wheat Wine, Great Adirondack Brewing Co., Lake Placid, NY
Bronze: Star Brew, Marin Brewing Co., Larkspur, CA

Category 89: American-Style Imperial Stout, 30 entries

- Gold: Gonzo Imperial Porter, Flying Dog Brewery, Denver, CO
Silver: Happy Ending, Sweetwater Brewing Co., Atlanta, GA
Bronze: Night Rider Imperial Stout, Pizza Port - Carlsbad, Carlsbad, CA

Category 90: International Pale Ale, 20 entries

- Gold: Winter Storm, Clipper City Brewing Co., Baltimore, MD
Silver: Saint Arnold Elissa IPA, Saint Arnold Brewing Co., Houston, TX
Bronze: Punk IPA, BrewDog, Fraserburgh, UK

Category 91: Other International Ale, 29 entries

- Gold: State Pen Porter, Santa Fe Brewing Co., Santa Fe, NM
Silver: Old Dundee, Upstream Brewing Co., Omaha, NE
Bronze: Brouwer's Imagination Series Saison, Port Brewing Co. and The Lost Abbey, San Marcos, CA



www.ironhillbrewery.com



www.sandiegobrewing.com



www.MauiBrewingCo.com



www.troegs.com



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www.harpoonbrewery.com



COMMERCIAL CALIBRATION

One way beer judges check their palates is by using commercial "calibration beers"—classic versions of the style they represent. Zymurgy has assembled a panel of four judges who have attained the rank of Grand Master in the Beer Judge Certification Program. Each issue they score two widely available commercial beers (or meads or ciders) using the BJCP score-sheet. We invite you to download your own scoresheets at www.bjcp.org, pick up a bottle of each of the beverages and judge along with them in our Commercial Calibration.



Jim Koch and the Boston Beer Co. have long been champions of homebrewers. Koch, after all, first brewed Samuel Adams Boston Lager in his home-brewery.

Each year, the brewers at Samuel Adams fulfill the dreams of two aspiring homebrewers by making their original recipes available to beer drinkers across the country in the Samuel Adams® American Homebrew Contest™. A panel of judges, including Koch and AHA director Gary Glass among others, selected two winning homebrews from more than 2,000 entries for the 2007 LongShot variety six-pack. A separate Samuel Adams employee homebrew competition was also held, judged by Koch and the other Samuel Adams brewers.

The 2007 winners in the American Homebrew Contest were Rodney Kibzey from Illinois, with a weizenbock; and Mike McDole from California, with a double IPA. McDole's entry will be included in the 2008 six-pack, as five of the seven hop varieties in McDole's original recipe were unavailable for the brew to be included in the 2007 version.

Lili Hess, from Hawaii, won the employee homebrew contest with her Grape Pale Ale. The six-packs including Kibzey's and Hess's creations hit the shelves this past February.

"The quality of entries we received this year shows the passion beer enthusiasts have for full-flavored beer," said Koch. "Rodney's Weizenbock and Lili's Grape Pale Ale are outstanding brews that showcase the huge flavor and variety spectrum available to today's craft beer drinker. These beers can stand proudly next to other great American craft beers."

Kibzey's complex weizenbock, a traditional Bavarian-style beer, is a hybrid of a rich and malty bock balanced by the fruity and spicy notes of weiss beers. Underlying flavors include raisins, molasses, figs and sherry.

Hess created a clean ale with fruity and dry notes by adding a special combination of ingredients including juice from grapes and maple syrup. She describes it as "drinking a pale ale after biting into a fresh seedless grape."

Our expert panel includes David Houseman, a Grand Master III judge and competition director for the BJCP from Chester Springs, Pa.; Beth Zangari, a Grand Master level judge from Placerville, Calif. and founding member of Hangtown Association of Zymurgy Enthusiasts (H.A.Z.E.); Scott Bickham, a Grand Master II judge from Corning, N.Y., who has been exam director or associate exam director for the BJCP since 1995; and Gordon Strong, a Grand Master IV judge and principal author of the 2004 BJCP Style Guidelines and president of the BJCP board who lives in Beavercreek, Ohio.



ON THE WEB

BJCP Style Guidelines
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Samuel Adams
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THE JUDGES' SCORES FOR LONGSHOT GRAPE PALE ALE



Aroma: Caramel and toasted malt character with light floral hop aroma. Clean fruity yeast-produced esters; somewhat in the English style. However I don't perceive the expected grape or maple syrup aromas. Some alcohols are evident. No DMS. Very light diacetyl. A very nice pale ale aroma, missing the key fruit presentation as required of a fruit beer. (7/12)

Appearance: Light amber/copper color. Clear to bright clarity. Thin, tight head with good retention. (3/3)

Flavor: Toasted, caramel maltiness dominates with noticeable maple flavor in the finish. Well-balanced with moderate hop bitterness. No appreciable hop flavor. No DMS. Light diacetyl. I don't perceive grape (green or red) in the flavor although it likely adds a bit of acidity to a winey, dry finish. Comes across as a very nice English Pale ale; the diacetyl and noticeable maple syrup meld nicely to create a rich finish. (11/20)

Mouthfeel: Medium bodied with a dry, slightly astringent finish. Moderate carbonation. No perceived alcohol warmth. (4/5)

Overall Impression: A very nice pale ale that presents the maple syrup well but misses the boat as a fruit beer since the grape component seems to be missing. Certainly very drinkable as an English Pale Ale. A dry beer that goes very well with spicy foods. Just doesn't come across as advertised as a fruit beer where the specific fruit needs to be exemplified in aroma and flavor. (6/10)

Total Score: (31/50)

Aroma: Initial bready malt hint to very fruity aroma, and hint of yeast, no hop aroma. Sugary malt character comes forward, with notes of very ripe plums or gold table grapes. (7/12)

Appearance: Deep golden color, very clear. Dense, large cream-colored persistent head with some large bubbles. (3/3)

Flavor: Sugary sweet malt with hints of caramel as a light English pale. Mid-palate alcohol flavors are floral and wine-grape-like, as opposed to Thompson-seedless-table-grape-like. No hop flavor, though a low hop bitterness lingers in the finish, along with a very ripe white grape flavor, like fruit that has been on the vine in the sun a long time. Well balanced between fruit and English pale characteristics. (17/20)

Mouthfeel: Spritzy carbonation, with medium body. No alcoholic heat. Soft astringency, more of grape skins, provides dryish finish and accentuates the low hop bitterness of the pale ale. (5/5)

Overall Impression: In this beer, grape flavor comes across to me more wine-like than grape-like, and sugary, similar to an antique golden table grape often found in the gardens of northern California foothill mining towns. This product comes across to me like a beer poured into the same glass that contained just a bit of viognier, where I was expecting something closer to grape soda. Not being a fan of grape soda (I prefer orange), this was a pleasant surprise. Excellent balance in a unique blend. An elegant lawnmower beer. (6/10)

Total Score: (38/50)

Aroma: The initial aroma is earthy, with some mustiness that could be from either oxidation or the grapes (my guess is the latter based on the source of the sample). The hops are low, but it makes sense to tone them down with such a subtle fruit. A little Chardonnay character emerges as it warms. There are some caramel notes, but these could be due to the maple. (7/12)

Appearance: Crystal clear, polished copper color with a surprisingly light colored head. Good head retention. (3/3)

Flavor: The overall balance is on the sweet side for a pale ale. The supporting malt is there, with toasted malt and a hint of caramel. The hop flavor never emerges, so while it may fall short as a classic pale ale, it could pass as an Irish Red. The hop bitterness is low, which makes the finish a little sweet; a little more bitterness or acidity would help attenuate the malt. Any grape or wine character is well hidden. (10/20)

Mouthfeel: The creaminess is good, with some residual sweetness from the malt. There is some alcoholic warmth, and just a hint of mouth-coating astringency. (4/5)

Overall Impression: This is an interesting beer, but I would not have guessed there were any specialty ingredients had I not read the label. The earthy character in the aroma could be from the grapes, but they come across as musty rather than bright. The concept is intriguing, but it may be tough to get the grape aroma and flavor to overcome such an assertive malt base. (5/10)

Total Score: (29/50)

Aroma: Mild hops and malty sweetness, equally balanced with some yeast character. Moderate esters. Toasty/caramelly malt, possibly with a touch of diacetyl. The malt and yeast profile reminds me more of an Irish Red Ale. The fruity notes would fit an English-style beer, as would the malt complexity. (7/12)

Appearance: Medium amber color. Clear but not brilliant. Tall, frothy, ivory-colored head, settled slowly to just a coating on the surface. (3/3)

Flavor: Toasty, caramelly malt with moderate bitterness and a full finish with a little residual sweetness. Bready, crackery malt underneath—English-type. Moderately estery but not grape-flavored. About the only grape quality I get is a slightly winey finish. Perhaps a hint of diacetyl, which accentuates the complexity of the malty palate. The aftertaste has a slightly smoky maple flavor and thickness, maybe a touch metallic. Technically, the beer is well made with a clean fermentation. (10/20)

Mouthfeel: Medium-full body; quite thick and chewy—way too big for the style. Medium to medium-high carbonation. No astringency or alcohol warmth, but it does have a little acidity that helps the finish. (3/5)

Overall Impression: Seems like an Irish Red Ale with a slightly elevated bitterness level. The grape quality is not readily recognizable, and the pale ale flavors don't seem to be there. The beer seems to feature English-like flavors, but it isn't crisp, dry and hoppy like an English Pale Ale. The whole beer is rather thick and heavy, which detracts from the drinkability. (6/10)

Total Score: (29/50)

THE SCORES



Longshot Weizenbock—Boston Beer Co., Boston, Mass.
BJCP Category: 15C Weizenbock

THE JUDGES' SCORES FOR LONGSHOT WEIZENBOCK



DAVE HOUSEMAN



BETH ZANGARI



SCOTT BICKHAM



GORDON STRONG

Aroma: Rich, Munich-like maltiness with noticeable clove phenols. No DMS. No hop aroma. No diacetyl. Alcohol is quite noticeable; more in the range of the doppelbock than the bock style. Some fruity yeast-produced esters with the faintest banana notes. Very pleasant and well-balanced aroma. (10/12)

Appearance: Huge, thick, moussey, long-lasting head. Hazy to cloudy clarity OK for style. Brown to dark amber color. (3/3)

Flavor: Chewy, rich maltiness with Munich malt melanoidins and breadiness. No hop flavor. Nearly balanced hop bitterness; just a little high for the style. Fruity character of prunes and raisins. Clove phenols are quite nice but a bit too spicy; could cut back somewhat to better balance. Some chocolate malt notes in aftertaste and a soft palate. Bit of dryness balances sweetness so that this big beer isn't cloying. High alcohol is more like that of a doppelbock than a bock, OK for this style which can span the range. (16/20)

Mouthfeel: Medium-full bodied beer. Highly carbonated. Pleasant alcohol warming. Creamy with a bit of dryness, but not astringent. Soft, smooth palate. (4/5)

Overall Impression: Richness and balance along with all the hallmark characteristics of the style leave this an excellent example of a Weizenbock. I've sat in Schneider's in Munich and had a Weizenbock as drinkable. There it was enjoyed with a selection of sausages. My only suggestions are to moderate the clove spiciness and let this age to mellow out the alcohols. (8/10)

Total Score: (41/50)

Aroma: Lots of banana esters up front and a bit of clove phenols dominate bready, chocolately and spicy wheaty malt aroma. No hop aroma or off aromas. (10/12)

Appearance: Cloudy, light brown-copper color, with thick, creamy, biscuity off-white head. (3/3)

Flavor: Fruity flavors of very ripe banana with a bit of clove spice follow the aroma, with a more pronounced wheat malt character and hints of toast, nuts and chocolate. Some alcohol flavors are evident, as well as a balancing hop bitterness in the finish. No hop flavor detected. Clean finish, though mid-palate some toasted raisin flavors typical of the darker bocks (or even doppelbocks) add complexity. Malt flavors become more bready as the beer warms. (16/20)

Mouthfeel: Creamy, medium full body with firm carbonation. No astringency. Finishes with a lingering alcoholic warmth. (4/5)

Overall Impression: The bready, nutty and spice characters along with the banana esters blend to create the impression of fresh baked banana bread with walnuts. The deep, rich chocolaty malt has the characteristics of a bock, but the banana and clove of the Bavarian yeast reflect the uniqueness of this brew. This could be a dessert all on its own, even better than warm cookies. It feels cuddly. (7/10)

Total Score: (40/50)

Aroma: Good complexity, has the signature banana, bubblegum and cloves from the yeast, but there are also bread crust notes from the malt. Alcohol is noticeable and contributes mango, papaya and tropical fruit esters. The only negative is a slight solvent aroma. (9/12)

Appearance: Quite hazy, but similar to commercial examples. Deep brown in color with a creamy white head that lasts and lasts. (3/3)

Flavor: Malty up front, with toasted bread and some caramel. A little on the sweet side, but not cloying. The key fermentation by-products are present, but the isoamyl acetate drives the balance toward bananas foster and gives a bit of solvent character. The finish is appropriately soft, with a touch of dark Munich malt to help dry things out. (16/20)

Mouthfeel: Good creaminess, but a little more CO₂ would give it some zip and make it more refreshing. There is some alcoholic warmth and astringency, but both are at appropriate levels for this style. (4/5)

Overall Impression: This is a nice interpretation of the style that brought back memories of drinking Schneider Aventinus at Weisses Brauhaus in Munich. It could use a little more neutrality between the banana esters and clove phenols, perhaps by dropping the fermentation temperature a degree or two. The creaminess is good, but a little more carbonation would be welcome. (8/10)

Total Score: (40/50)

Aroma: Fruity, spicy, wheat aromatics with a deep caramel edge and prominent alcohol. Complex and enticing malt profile, particularly the deep caramel notes. The alcohol is rather sharp. There is a light banana note, but I also get a bitter orange quality. At times, the yeast notes reminded me more of a witbier than a weizenbock. Slightly tart. (9/12)

Appearance: Huge tan head, rocky and long-lasting. Muddy, light-brown color. Somewhat opaque from the haze (OK for style). (3/3)

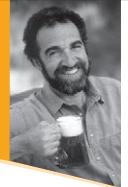
Flavor: Rich caramel malt with alcohol and wheat flavor. The bitterness level is moderate, and seems higher due to the contribution of bitterness from the alcohol. Spicy, but not necessarily the clean clove phenolic common in these beers. Sharp alcohol flavor lasts into the finish. Toasty, Matzo-like bready flavor. Medium-low to medium hop flavor (too much). Light banana and bitter orange esters. Hints of chocolate, which are a little high. (13/20)

Mouthfeel: Medium-full body—very nice. Sharp alcohol heat—too hot. Moderate carbonation. (3/5)

Overall Impression: This needs to age longer to allow the flavors to meld properly and tame the alcohol level. The complex malt flavors are tasty (especially the caramel and toast), but it has too much chocolate character. The bitterness is too high in the balance, but this might improve a bit with age. The ester profile is really odd; it seems like bitter orange is featured more than banana. I'd check the yeast selection and perhaps the hop choice. (6/10)

Total Score: (34/50)

by Charlie Papazian



Righteous Leicht Bier

There are thousands of small brewers either struggling to survive or thriving. Being a successful professional small brewer is about making excellent, flavorful beer that differentiates from the international light lager style. It's also about having enough business sense to navigate a world that continues to consolidate while another consumer-driven world demands flavor and diversity. Why, then, are American craft brewers thriving and elsewhere some brewers are not?

Radical innovations in this day and age are arising from individuals and not from large companies. The seeds that will grow the world's future emerge when individuals passionately pursue radical, crazy and eccentric ideas in the pursuit of quality and pleasure; money is important, but it is



Braumeister Robert Schlagbauer (right) proudly shows off the World Beer Cup® entrance at Distelhaeuser Brauerei Ernst Bauer.

Righteous Leicht Bier

Brewing Righteous Leicht Bier requires blending two different beers. A German style Pilsener with an original gravity of 1.048 (12 B) and a BU of about 35 should be brewed the week before, fermented and lagered at 35° F (1° C). A portion of this lagered Pilsener will be blended with the brewed, fermented and lagered Leichtes Bier.

All-Grain Recipe

Ingredients for 5 U.S. gallons (19 liters)

5.0 lb	(2.3 kg) German Pils malt
8.0 oz	(196 g) Cara Hell (or cara dextrin type malt)
3.0 oz	(84 g) CaraMunich malt (60 L)
0.5 oz	(14 g) German Tradition hops 6.7% alpha (3.4 HBU/95 MBU) 60 min
0.5 oz	(14 g) German Hallertauer hops, 2 min
0.25 oz	(7 g) Hallertauer hop pellets, dry hop
0.25 tsp	(1 g) powdered Irish moss German or other Pilsener type lager yeast
0.75 cup	(175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for kegging

Target Original Gravity: 1.028 (7.1 B);
blended equivalent 1.031 (7.8 B)

Approximate Final Gravity: 1.008 (2 B)

IBU's: Leichtes wort 22; final blend 24

Approximate Color: 3 SRM (6 EBC)

Alcohol: 2.9% by volume

Directions

A step infusion mash is employed to mash the grains. Add 7 quarts (6.7 liters) of 140° F (60° C) water to the crushed grain, stir, stabilize and hold the temperature at 132° F (53° C) for 30 minutes. Add 3.5 quarts (3.3 liters) of boiling water and bring temperature up to 155° F (68° C) and hold for about 30 minutes. Raise temperature to 167° F (75° C), lauter and sparge with 3.5 gallons (13.5 liters) of 170° F (77° C) water. Collect about 5.5 gallons (21 liters) of runoff. Add 60-minute hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes. When 10 minutes remain add the Irish moss. When 2 minutes remain add the 2-minute hops. After a total wort boil of 60 minutes turn off the heat and place the pot (with cover on) in a running cold-water bath for 30 minutes. Continue to chill in the immersion or use other methods to chill your wort. Strain and sparge the wort into a sanitized fermenter. Bring the total volume to 5.5 gallons (21 liters) with additional cold water if necessary. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident ferment at temperatures of about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the hop pellets for dry hopping. "Lager" the beer at temperatures between 35- 40° F (1.5-4° C) for 3-6 weeks.

Rack and transfer 3 quarts (3 l) of lagering Pilsener to your 5 gallon (21 l) keg or pre-bottling vessel. Then add your brewed Leichtes, which amounts to about 4.5 gallons at this stage of the process. The blend is your finished Righteous Leicht Bier. Prime with sugar and bottle or keg.

Braumeister Robert Schlagbauer (left) celebrates with members of the Distelhaeuser Brauerei Ernst Bauer team.



Righteous Leicht Bier

Brewing Righteous Leicht Bier requires blending two different beers. A German style Pilsener with an original gravity of 1.048 (12 B) and a BU of about 35 should be brewed the week before, fermented and lagered at 35° F (1° C). A portion of this lagered Pilsener will be blended with the brewed, fermented and lagered Leichtes Bier.

Malt Extract Recipe

Ingredients for 5 U.S. gallons (19 liters)

3.5 lb	(1.6 kg) very light malt extract syrup or 2.8 lb (1.3 kg) very light DRIED malt extract
3.0 oz	(84 g) CaraMunich malt (60 L)
0.5 oz	(14 g) German Tradition hops 6.7% alpha (3.4 HBU/95 MBU) 60 min
0.5 oz	(14 g) German Hallertauer hops, 2 min
0.25 oz	(7 g) German Hallertauer hop pellets, dry hop
0.25 tsp	(1 g) powdered Irish moss German or other Pilsener type lager yeast
0.75 cup	(175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for kegging

Target Original Gravity: 1.028 (7.1 B);
blended equivalent 1.031 (7.8 B)

Approximate Final Gravity: 1.008 (2 B)

IBU's: Leichtes wort 22; final blend 24

Approximate Color: 3 SRM (6 EBC)

Alcohol: 2.9% by volume

Directions

Place crushed grains in 1 gallon (3.8 l) of 150° F (68° C) water and let steep for 30 minutes. Strain out, discard the crushed grains and add 1.5 gallons (5.7 l) of water. Add malt extract and 60 minute hops. Bring to a boil. The total boil time will be 60 minutes. When 10 minutes remain add Irish moss. When 2 minutes remain add the 2-minute hops. After total wort boil of 60 minutes turn off the heat. Immerse the covered pot of wort in a cold water bath and let sit for 15-30 minutes or the time it takes to have a couple of homebrews.

Strain out and sparge hops and direct the hot wort into a sanitized fermenter to which 2.5 gallons (9.5 l) of cold water has been added. If necessary add cold water to achieve a 5 gallon (19 l) batch size. Aerate the wort very well. Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident ferment at temperatures of about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the hop pellets for dry hopping. "Lager" the beer at temperatures between 35- 40° F (1.5-4° C) for 3-6 weeks.

Rack and transfer 3 quarts (3 l) of lagering Pilsener to your 5 gallon (21 l) keg or pre-bottling vessel. Then add your brewed Leichtes, which amounts to about 4.5 gallons at this stage of the process. The blend is your finished Righteous Leicht Bier. Prime with sugar and bottle or keg.

not the end game. Creating value and a sense of pleasure is.

Examine current beer culture. Thirty years ago there were only a few individuals championing better beer. Their ideas did not emerge from the highly financed "Innovations Department" of some large corporation. When first brewed in the U.S., American pale ale, stout and porter markets did not exist. I cannot imagine a large corporation coming out with a bold, expensive product for a market that does not exist.

Amateur/consumer innovation is a driving force of what I will refer to as the *democratization of process*. Some say that communication technology is a driving force. I observe that accelerating communication only enhances a fundamental process. Thirty years ago the word "micro" first prefixed the word "computer." Simultaneously the "Beer Revolution" was in the hands of the individual homebrewer and beer enthusiast as it continues to be now.

The past 30 years of the "Beer Revolution" is a phenomenon attributable to one of the first "open source" collaborative experiences in this age of consumer driven innovation. Before personal computers, before Internet, before paper copying machines, before faxes, before mobile telephones, consumers were fashioning the beer revolution.

What is extraordinary to me is how the professional and homebrewing craft brewing communities continue to fuel their

creative destiny. The last 30-year history of American beer culture is a mirror image of how the rest of the world has embraced choice, diversity, information, education, grassroots activism, quality, personality, passion, pleasure and flavor (both in the real and metaphoric sense). These terms are contemporary to most, but they are the foundation of craft beer's flavor and diversity—beginning 30 years ago!

There are some parts of the world where beer cultures have not embraced the interests, change, activism and passion of the individual. Beer is controlled by an "elite." Sadly, some of these beer cultures are languishing in their past success. Strong words? Yes, though I do not condemn. I observe.

As Americans we live in a country whereby beer is celebrated and enjoyed in all its diversity like it has never been enjoyed before. Elsewhere beer cultures that celebrate flavor and diversity emerge and/or continue to thrive for one reason—they have established and nurtured brewing communities that support each other. To succeed and innovate they recognize that it is far better to associate with each other and share in their efforts. As in any revolution, the competition is not amongst the revolutionaries. Their quest is to elevate the value of beer for the beer drinker. Creating a variety of beers of exceptional qualities, they cooperatively grow beer drinker interest through education.

Singapore, Japan, Argentina, Chile, Italy, Denmark, Sweden, Colombia, Brazil, Mexico and Canada are but a few countries impregnated with the seeds of change and "open sourcing" and harnessing the enthusiasm between brewer and beer drinker. The process of democratizing beer and creating added value for the beer drinker is in progress and will need continued nurturing.

Leicht Bier

On one of my recent journeys to Germany I visited the Distelhaeuser Brauerei Ernst Bauer in Distelhaeusen, a regional award-winning brewery east of Frankfurt. I was impressed with their wheat beers, dunkels and maerzens. But



Distelhaeuser beers lined up in the tasting room.

what really caught me by surprise was their Distelhaeuser Leichtes. Leichtes is a style of beer totally absent in America, yet available everywhere in beer-loving Germany. It's a light version of German-style Pilsener with a character of Pilsener malt and hops that impresses. At less than 3-percent alcohol it is a beer that is absent from most homebrewers' repertoires. It is a challenge to

brew, but the rewards can be truly satisfying. Braumeister Robert Schlagbauer kindly shared some of the techniques that his brewery employs to brew an award-winning version of this style, so let's cut the shuck and jive and get on with the recipes.

Charlie Papazian is founder of the American Homebrewers Association. ■

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19th Annual Reggale and Dredhop



The 19th Annual Reggale and Dredhop Homebrew Competition took place March 1 at the Falling Rock Tap House in Denver. We talked to organizer Bob Kauffman to get the scoop on this year's event.

Zymurgy: Nineteen years is a long history for a homebrew competition. How long have you been involved in organizing this event, and how have things changed over the years?

Bob Kauffman: I have been the organizer or co-organizer since the 8th annual competition. Mike Knutson and I were co-organizers for the 8th and 9th. The most obvious change is the number of entries (340 entries in 2008). We didn't get over 200 entries until 2001. Another is the continuing improvement in the overall quality of the entries. Every year the beers are better.

Zymurgy: How was the Falling Rock for the competition this year?

BK: We'll continue to hold the competition at the Falling Rock as long as they'll have us. They allow us to use the walk-in cooler in their basement. The beers are dropped off two days ahead of the judging. The judging is held in the basement as well. They give us the space and feed the judges and staff for no cost. Chris Black (owner) also donated a huge Dogfish Head sign that we designated for the Best of Show beer winner. We pay for chair and table rental.

Zymurgy: You got 340 entries this year. Is this typical for your competition? Any from exotic locales?

BK: It was a huge jump for us and a record by far. Our previous best total was 273 in 2003. Last year's total was 241. No exotic locales this year, but we got entries from eight other states besides Colorado and Wyoming. That was another surprising thing about the big jump in entries, in that we had only 37 entries from those eight other states. We've had as many as 30-40 percent of the entry total from out of state.

Zymurgy: What sort of mead entry numbers do you typically see?

BK: Mead entries have been all over the place the last few years. No doubt the International Mead Fest Homemead competition has had a significant impact. We had 35 entries this year. We've had as many as 40 or so out of just over 200 total entries. So the percentage of mead entries has gone down, even as the numbers have gone back up.

Zymurgy: Did you get a good judging pool this year? Where do the majority of your judges come from?

BK: We got an excellent pool of judges, the most we've ever had—over 50. The majority of our judges come from the Front Range homebrew clubs: our own Hop

“Goes to Eleven” German Pilsener Best of Show recipe by Michael Bade

Ingredients for 10 U.S. gallons (37.8 liters)

22.0 lb	(10 kg) German Pilsner malt
1.0 oz	(28 g) Hallertauer Mittelfruh pellet hops (3.7% a.a.) 60 min
1.0 oz	(28 g) Taurus pellet hops (17.4% a.a.) 60 min
3.0 oz	(85 g) Hallertauer Mittelfruh pellet hops (3.7% a.a.) 20 min
	White Labs WLP 830 German lager yeast, 1L
0.25 tsp	Super-Moss, boil (11 minutes) Use 1/3 HR filtered tap water and 2/3 distilled water

Directions

Use a decoction mash. Mash in at 142° F (61° C) for 30 minutes. Raise temp with boiling water to 148° F (64° C) for 30 minutes. Decoction 1 at 151° F (66° C) for 20 minutes. Decoction 2 at 158° F (70° C) for 20 minutes. Decoction 3 at 165° F (74° C) for 20 minutes. Ferment in primary for 11 days at 52° F (11° C), then condition 5 days in secondary at 36° F (2° C), and 10 days in tertiary at 36° F (2° C).

Original Gravity: 1.044

Final Gravity: 1.008

IBUs: 44

SRM: 2



AHA SPECIAL EVENTS

For Information on 2008 AHA Rallies, please see www.AHArally.org

July 31

AHA Rally—Boston Beer Co. Boston, MA.
Contact: Kathryn Porter, E-mail: kathryn@brewersassociation.org, Web: www.AHArally.org

August 2

AHA Mead Day Contact: Janis Gross, Phone: 888-822-6273 x 134, E-mail: Janis@brewersassociation.org Web: www.beertown.org/events/meadday/index.html

August 17

AHA Rally—Madison River Brewing Co. Belgrade, MT. Contact: Kathryn Porter, E-mail: kathryn@brewersassociation.org, Web: www.AHArally.org

August 23

AHA Rally—Anchor Brewing Co. San Francisco, CA. Contact: Kathryn Porter, E-mail: kathryn@brewersassociation.org, Web: www.AHArally.org

August 23

AHA Rally—Big Time Brewery & Alehouse Seattle, WA. Contact: Kathryn Porter, E-mail: kathryn@brewersassociation.org, Web: www.AHArally.org

October 9-11

Great American Beer Festival™ Denver, CO. Contact: Bradley Latham, Phone: 888-822-6273 x 145, E-mail: Bradley@brewersassociation.org, Web: www.GABF.org

September 27

AHA Rally—Bell's Brewing Co. Galesburg, MI. Contact: Kathryn Porter, E-mail: kathryn@brewersassociation.org, Web: www.aharally.org

November 1

AHA Teach a Friend to Homebrew Day Contact: Janis Gross, Phone: 888-822-6273 x 134, E-mail: Janis@brewersassociation.org Web: www.beertown.org/events/teach/index.html

Barley and the Alers, who provided direct support for the event, as well as Foam on the Range in the metro Denver area, Keg Ran Out Club (KROC) in Broomfield, Liquid Poets of Fort Collins, and the High Plains Drafters of Cheyenne, Wyo.

Zymurgy: What were some of the prizes donated for the event?

BK: Beer at Home contributed a nice stack of gift certificates as well as two drop-off locations. Redstone Meadery gave us a fleece vest for the BOS mead winner. Hop

KUDOS—BEST OF SHOW

AHA/BJCP Sanctioned Competition Program

February 2008

CABA Porter Competition, 11 entries—Rick August, Regina, SK.
SODZ British Beerfest, 140 entries—Frank Barickman, Delaware, OH.

March 2008

2008 Peach State Brew-Off, 324 entries—Colby Sheridan, Marietta, GA.

Boston Homebrew Competition, 238 entries—Alastair Hewitt, MA.

Kona Brewers Festival Home Brew Competition, 259 entries—Emmett Kinney, Mililani, HI.

10th Annual UKG Drunk Monk Challenge, 429 entries—Bob and Kim Barrett, Ann Arbor, MI.
Bockfest, 32 entries—Dave Corbet and Tom Mikleievich, Milford, CT.

UNYHA 30th Annual/17th Empire State Open, 317 entries—John C. Sullivan, Rochester, NY.

Best Florida Beer Commercial Competition, 84 entries—Mike Helf and Jeff Lampila, Pensacola, FL.

Tanunda Show—Home Brew Section, 86 entries—Brenton Rehn, Angaston, South Australia.

IBU Open, 156 entries—Adam Stern, St. Paul, MN.

McChord Club Brewfest, 41 entries—Ken Frauenthal, Tacoma, WA.

March Mashness, 167 entries—Chris Smith, Minneapolis, MN.

Hudson Valley Homebrewers 18th Annual Homebrew Competition, 287 entries—Ray Sykes, High Falls, NY.

Shamrock Open XIII, 424 entries—Barry Ledford, Wadmalaw Island, SC.

Great Arizona Homebrew Competition, 130 entries—Edward Mathis, Beecher, WI.

The Happy Gnome Firkin Fest, 18 entries—Summit Brewing, St. Paul, MN.

March Madness, 20 entries—Al Sullivan, Sammamish, WA.

08 Snow Goose Break Up Home Brew Competition, 49 entries—Steve Jayich, Anchorage, AK.

Bluebonnet Brewoff, 1,090 entries—Jason Lyon, Dallas, TX.

Chicago Cup Challenge, 223 entries—Brian Richards, Marquette, MI.

TRASH XVIII hosted by Hereford & Hops Steakhouse & Brewpub, 223 entries—Keith Kost, Pittsburgh, PA.

World Cup of Beer, 333 entries—Nate Smith, Oakland, CA.

March in Montreal, 96 entries—Christian Scubli, Mississauga, ON.

AHA Club-Only Competition Perfect Porter Challenge, 69 entries—Paul and Jamie Langlie, Washington, D.C.

April 2008

Hunter Brewing Championships, 80 entries—Stephen Brown, Newcastle, NSW, Australia.

The Highland Cup, 81 entries—Aaron Schenk, Asheville, NC.

Slurp & Burp Open, 371 entries—Ted Hausotter, Baker City, OR.

2008 ALES Homebrew Open/AHA Qualifier Competition, 211 entries—Kurt Stenberg, Edmonton, AB.

Titletown Open XIV, 139 entries—Ed Mathis, Beecher, WI.

2008 South Shore Brewoff, 140 entries—Rick Rocheleau, Danielson, CT.

Homebrew at the V.E.B., 223 entries—Mike Krawczak, Royal Oak, MI.

Maltose Falcons Mayfaire, 368 entries—Mike Mraz, El Dorado Hills, CA.

COHO Spring Fling 2008, 142 entries—Ted Hausotter, Baker City, OR.

Worthog Brewers Summer Beer Festival, 21 entries—Andre de Beer, Pretoria, South Africa.

Madison River Brewing 2nd Annual Homebrew Competition, 11 entries—Scott Gruber, Bozeman, MT.

World Expo of Beer Competition, 365 entries—Cocoa Loco Arcadia Brewing Company, Battle Creek, MI.

May 2008

Great Basin Brew-off, 50 entries—Chris Whitbeck, Reno, NV.

Barley has purchased a handblown glass beer mug or glass for the BOS Beer and a handblown mazer for the BOS mead winner for the last several years from Glass Mountain Studios in Bellingham, Wash. The glass artist is Ed Schmid, a former member of the Alers.

Zymurgy: What were some of the more unusual entries you received?

BK: We had a Samiclaus clone, a Poblano Porter, and one aged in a Stranahan's whiskey barrel.

Zymurgy: Have you noticed an improvement in the quality of entries in the competition over the last several years?

BK: I think you can't overstate the high quality of the entries. We get some fantastic beers every year.

Amaul Turczyn Scheppach is a former craft brewer and associate editor for Zymurgy, and now brews at home in Lafayette, Colo.

AHA/BJCP SANCTIONED COMPETITION PROGRAM CALENDAR



Want to discuss judging, beer styles, competitions and exams? Join the BJCP Members Forum at www.bjcp.org/phpBB2/index.php.

To register a new competition, please go to www.bjcp.org/apps/comp_reg/comp_reg.html. Check the AHA or BJCP Web sites to see the latest calendar of events. Competition organizers: please remember to submit your results promptly using our electronic system. Competitions not filing organizer reports will not be allowed to register in the future.

Interested in becoming a beer judge? See www.beertown.org/homebrewing/scp/judge.html for information.



June 21

Homebrew Fair 2008 Seattle, WA. Contact: Eric J. Wilson, Phone: 425-303-0585, E-mail: ejwilson@gte.net Web: www.homebrewfair.com

June 22

21st Annual Southern California Regional Homebrew Championship Corona, CA. Contact: Jim Delperdang, Phone: 951-686-4710, E-mail: jimdelperdang@earthlink.net Web: www.hopheads.com

June 22

San Diego County Fair Homebrew Competition Del Mar, CA. Contact: Jonathan Stevens, Phone: 619-694-9779, E-mail: zuvaruvi@cox.net Web: www.sdfair.com

June 28

OC Fair Homemade Beer Competition Costa Mesa, CA. Contact: Kimiko Young, Phone: 714-708-1554, E-mail: kyoung@ocfair.com

July 6

2008 WanCup2 Hamamatsu, Shizuoka, Japan. Contact: Tadashi Tsuda, E-mail: 2008@wancup2.org Web: www.wancup2.org

July 12

Indiana State Fair Brewers Cup Indianapolis, IN. Contact: Anita Johnson, Phone: 317-257-9463, E-mail: BrewersCup@indianastatefair.com, Web: www.brewerscup.org

July 12

Amador County Fair Homebrew Competition Plymouth, CA. Contact: William F. Tarchala, Phone: 209-223-1976, E-mail: wtarchala@mulfil.com Web: www.brewangels.com

July 12

Amador Invitational Commercial Microbrewery Competition Plymouth, CA. Contact: William F. Tarchala, Phone: 209-223-1976, E-mail: sharkbrew@gotsky.com Web: www.brewangels.com

July 12

14th Annual Eight Seconds of Froth Cheyenne, WY. Contact: Brian Mertz, Phone: 307-638-6754, E-mail: windywy@aol.com Web: www.bbbriggs.vcn.com/8seconds.html

July 12

E.T. Barnette Homebrew Competition Fox, AK. Contact: Scott Stihler, Phone: 907-474-2138, E-mail: stihlerunits@mosquitobytes.com Web: www.mosquitobytes.com/Den/Beer/Events/Events.html

July 19

Ohio State Fair Homebrew Competition Columbus, OH. Contact: Brett Chance, Phone: 614-644-4126, E-mail: b.chance@expo.state.oh.us Web: www.ohioexpocenter.com/osf/downloadbooks/entertainmenthomebrewform.pdf

July 19

Ohio Brew Week Homebrew Competition Athens, OH. Contact: Jason Klein, Phone: 765-404-7446, E-mail: bescheurt@hotmail.com Web: www.ohiobrewweek.com/contest.htm

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ESB Winter Homebrew Competition Sydney, NSW, AU. Contact: Peter Symons, Phone: 0295801165, E-mail: psymons@optusnet.com.au Web: www.aussiehomebrewer.com/forum/index.php?showtopic=21403

July 19

2008 All-American Beers Competition Appleton, WI. Contact: Daniel Grady, Phone: 920-205-0157, E-mail: dangrady@gmail.com Web: www.thealeclub.org

July 23

Fort Collins Brewery's 2008 Homebrew Your Way to Fame Competition Fort Collins, CO. Contact: Margaux Dart, Phone: 970-472-1499, E-mail: margaux@fortcollinsbrewery.com

July 26

GHHA Mountain Brewer Open Huntington, WV. Contact: David Zalewski, Phone: 740-886-8828, E-mail: zalew@msn.com Web: www.hbd.org/ghha

August 2

AHA Club-Only Competition Mead Minneapolis, MN. Contact: Al Boyce, Phone: 612-927-8968, E-mail: alboyce@bigfoot.com Web: www.beertown.org/homebrewing/schedule.html

August 2

Lunar Rendezbrew XV Houston, TX. Contact: Hugh Lomas, Phone: 281-488-4512, E-mail: hwomas@sbcglobal.net Web: www.mashtronauts.com

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13th Annual Montgomery County Agricultural Fair Homebrew Competition Gaithersburg, MD. Contact: William Ridgely, Phone: 301-762-6523, E-mail: aaronridge@comcast.net Web: www.g_a_b.s.tripod.com

August 6

Tillamook County Fair Homebrew Competition Pacific City, OR. Contact: Darren Welch, Phone: 503-965-7007, E-mail: darron@pelicanbrewery.com Web: www.PelicanBrewery.com

August 9

Homebrew Beer Competition Salem, OR. Contact: Curt Hausam, Phone: 503-378-0774, E-mail: aknives@qwest.net

August 10

Kentucky State Fair Louisville, KY. Contact: Chuck Harp, Phone: 502-254-3734, E-mail: chuck.harp@bellsouth.net

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Minnesota State Fair Homebrew

Competition St. Paul, MN. Contact: Sean Hewitt, Phone: 651-604-0314, E-mail: morelia1@prodigy.net Web: www.mnbrewers.com/events/mnfair

August 16

Alamo City Cerveza Fest San Antonio, TX.

Contact: Mike Molloy, Phone: 210-867-9088, E-mail: accf_2008@att.net Web: www.sabeer-group.org

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Blues and Brews Homebrew Competition

Fitchburg, MA. Contact: Joe Zadrozy, Phone: 978-342-5522, E-mail: joez3@verizon.net Web: www.foambrew.com

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Beer and Sweat Ft. Mitchell, KY. Contact: Ray Snyder, Phone: 513-759-2573, E-mail: raysnyder@fuse.net Web: www.bloatarian.org

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Tasting Tuesday Homebrew Competition

Milwaukee, WI. Contact: Aimee Kelchen, Phone: 414-604-7210, E-mail: akelchen@cdhh.org Web: www.cdhhs.org

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Colorado State Fair Homebrew Competition

Pueblo, CO. Contact: Deborah Wallace, Kristin Taylor, Phone: 719-404-2080, E-mail: debbie.wallace@ag.state.co.us Web: www.coloradostatefair.com

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Summer Sizzler/Porter House Brew Shop

Amateur Brewing and Winemaking Competition Slippery Rock, PA. Contact: Kevin Webb, Phone: 800-245-8118, E-mail: cazzcokevin@comcast.net Web: www.thesummersizzler.com

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Western Washington Fair Amateur Beer

Competition Puyallup, WA. Contact: Grace Nilsson, Phone: 253-845-9791, E-mail: pat@the-fair.com Web: www.thefair.com

August 27

Brew Bubbas Big Brew Brew-Off Warren, MI.

Contact: Craig Belanger, Phone: 586-945-8629, E-mail: craig@brewbubbas.com Web: www.brewbubbas.com

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15th Annual Dominion Cup

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Yeast Pitching Rates, Carbonation

By Steve Holle

Editor's Note: The following discussion, the final of the series, presents a step-by-step overview of some important calculations for the advanced homebrewer. The procedures are excerpts from A Handbook of Basic Brewing Calculations that have been modified for use by the homebrewer. Many of the scientific principles supporting the calculations that are explained in detail in the book are only summarized in this discussion to focus on applying the calculations to a typical brew.

The usefulness of the equations is illustrated through the brewing of 10 gallons of beer (12° Plato, 35 IBU) using a typical homebrewing system consisting of a 15-gallon mash/lauter tun and 15-gallon kettle. The steps are presented sequentially so that the reader can understand how the various steps and outcomes relate to each other.

More often than not, homebrewers pitch their brews with insufficient quantities of yeast. Under pitching can lead to an increased risk of bacterial or wild yeast infection, incomplete fermentation, and incomplete reduction of green beer flavors, particularly diacetyl and acetaldehyde.

Ale yeast are typically pitched at a rate of 5 to 10 million cells/mL of wort for beers with a normal wort gravity of 12° Plato. Lager yeast are pitched at a higher rate of about 15 million cells/ml, or double the average rate for ale yeast. The difference in pitching rates is due to the difference in fermentation temperatures for the two types of yeast. Colder lager fermentation temperatures slow the yeast's metabolism, including reproduction, for which the higher initial inoculum of yeast compen-

sates. An adequate inoculum of pitching yeast can be expected to multiply to a maximum population of about 80 to 100 million cells/mL in sufficiently aerated wort with an adequate content of carbohydrates and amino acids.

This range of maximum cell populations can be used to estimate the number of yeast cells in a liquid yeast starter. Adequate aeration of the starter during propagation is critical to achieving high cell counts. Plugging the propagation flask or jug opening with a sterile foam stopper or sterile cotton wad will allow dust-free air to enter the vessel and aerate the wort when it is agitated on a stir plate or shaken intermittently by hand. To estimate the data in Table 1, an optimistic assumption was used that the cell count in our yeast starter achieves a cell concentration of 100 million/mL.

If an average pitching rate for an ale is 7.5 million cells/mL and our starter has a concentration of 100 million cells/mL, we can pitch our ale starter into wort that is 13.3 times larger ($100\text{M cells/mL} \div 7.5\text{M cells/mL} = 13.3$). If our wort volume is 9.5 gallons (0.5 gallon was lost in the hot trub and kettle bottom), we need a starter volume of 0.71 gallon (9.5 gallons/13.3). If we are pitching lager yeast, we can pitch our yeast into wort 6.7 times larger ($100\text{M cells/mL} \div 15\text{ M cell/mL} = 6.7$), so we would need a starter with 1.4 gallons (9.5 gallons/6.7), or twice as much as the ale yeast starter.

Commercial breweries have the advantage of frequently brewing the same beer

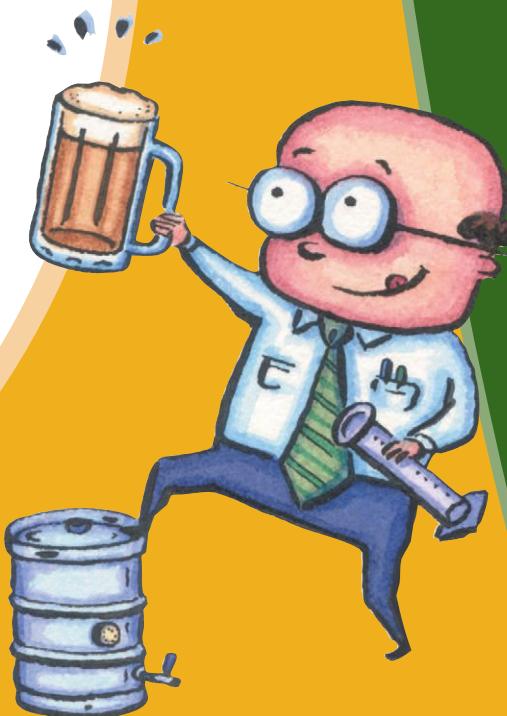


TABLE I. YEAST PITCHING RATES PROVIDED BY CORRESPONDING STARTER AND SLURRY QUANTITIES

Pitching Rate (million cells per mL wort)	Ratio of Wort Volume to Starter Volume	Oz of Yeast Slurry per 1 gal of Wort
5	20.0	0.21
6	16.7	0.26
7	14.3	0.30
8	12.5	0.34
9	11.1	0.38
10	10.0	0.43
11	9.1	0.47
12	8.3	0.51
13	7.7	0.55
14	7.1	0.60
15	6.7	0.64
16	6.3	0.68
17	5.9	0.73
18	5.6	0.77
19	5.3	0.81
20	5.0	0.85

and having a ready supply of wort for propagation that is the same wort used in the beer being brewed. If we are unable to hold back wort (by freezing or sterile bottling) from a prior brew for propagation identical to the wort being inoculated, the starter may change the character of the beer (e.g., color, bitterness, flavor, etc.). For this reason, if we cannot use

the same wort for propagation as the beer we are brewing, we may need to use yeast slurry by allowing the propagated yeast to settle and discarding the beer in the starter, or buying the yeast already in slurry form.

If we are using yeast slurry, 0.32 ounce of yeast slurry per gallon of wort will provide

a pitching rate of about 7.5 million cells/mL for ales. A slurry of 0.64 ounce/gallon will provide a pitching rate of 15 million cells/mL for lagers. So, for our 10 gallons of wort, we would use 3.2 (0.32 x 10 gallon) and 6.4 (0.64 x 10 gallon) ounces of slurry per gallon for the ale and lager beers, respectively.

Pitching rates should increase with wort strength above 12° Plato. A common practice is to pitch 1 million cells/mL for each 1° P, or the brewer might simply increase the pitching rate by the same rate of increase in wort strength above 12° P. If 7.5 million cells/mL is adequate for a 12° Plato wort, then a 16° Plato wort should receive 10 million cells/mL ($[16^{\circ}\text{P}/12^{\circ}\text{P}] \times 7.5\text{M cells/mL}$). A pitching rate of 10 million cells/mL would require a starter of 1.0 gallon ($10 \text{ gallons} \div [100\text{M cells/mL} \div 10\text{M cells/mL}]$).

Carbonation

Bunging: When yeast ferment sugar, about 50 percent of the sugar weight is converted to alcohol and the other 50 percent to CO₂. Furthermore, 5.0 grams of CO₂ in 1 liter produces about 2.5 volumes of CO₂ (at 50° F), a typical CO₂ content for most beers. Since 1 liter weighs about 1,000 grams, 5.0 grams of CO₂ is about 0.5 percent of 1 liter by weight. Since 1° P means that there is 1-percent sugar by weight in solution, or 10 grams of sugar in one liter (10/1,000), 10 grams of fermentable sugar will produce 5 grams of CO₂ which produces about 2.5 volumes of CO₂. Consequently, if we close our lager tank and not allow any gas to escape when about 1 percent of fermentable extract (i.e. 1° P) still exists before fermentation is complete, we can carbonate our beer to a typical 2.5 volumes. So, if we have determined that the final gravity of our beer will be 2.5° Plato, we can close the tank when our hydrometer indicates 3.5° Plato. (Final gravity must be determined by a "forced" fermentation in a small flask of the same wort that is pitched or "over pitched" with the same yeast and typically held at warmer temperatures to speed final attenuation. The ending gravity of the force-fermented beer is then measured to predict the final gravity of the beer in the fermenter.)

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TABLE 2. VOLUMES OF CO₂ DISSOLVED IN BEER AT VARIOUS TEMPERATURES AT ATMOSPHERIC PRESSURE

Temperature	20°C/68°F	10°C/50°F	5°C/41°F	0°C/32°F
Volumes	0.86	1.17	1.4	1.7

Priming: Adding 0.57 ounce of 100-percent fermentable sugar to 1 gallon of beer will provide 1 volume of CO₂ (at 50° F). Priming sugar is typically close to 100-percent fermentable. But some priming—for example, dry malt extract or malt syrup—is not. Powdered malt contains unfermentables like proteins and sugars known as dextrins. Malt syrup not only contains unfermentable solids, but also water. Unless the manufacturer provides the fermentability of the malt extract or the brewer can make a test wort and determine the actual fermentability, there is no way to make an accurate estimate of priming with malt extract. However, if the fermentability of the priming were known, it would be necessary to divide 0.57 by the fermentability percentage. So, if the priming is 90-percent fermentable, 0.63 ounce would be needed to produce 1 volume in 1 gallon ($0.57/0.90 = 0.63$)

The temperature at which the beer was fermented is also important because even at atmospheric temperature a certain amount of CO₂ will be dissolved in the beer naturally (see Table 2). Furthermore, the amount of CO₂ that will be dissolved will increase as the temperature decreases. (Gases are more soluble at lower temperatures.) Consequently, if we have 9.0 gallons of beer to prime (0.5 gallons was lost to cold trub and transfer) to 2.6 volumes, we will need 0.57 ounce of 100-percent fermentable priming for each gallon to produce 1.0 volume. But our priming is 0.97-percent fermentable so we need 0.59 ounce ($0.57/0.97$). However, the beer is an ale fermented and held at 68° F, so the beer already contains 0.86 volumes (see Table 2). Consequently, we only need to add 1.74 volumes ($2.60 - 0.86 = 1.74$). To produce 1.74 volumes, we need 9.25 ounces of sugar.

$$\text{Oz of Sugar} = (\text{0.57 oz/gal} \div \text{fermentability}) \times (\text{desired CO}_2 - \text{existing CO}_2) \times \text{gal}$$

$$= (0.57 \text{ oz/gal} \div 0.97) \times (2.6 - 0.86) \times 9.0 \text{ gal}$$

$$= 0.59 \text{ oz/gal} \times 1.74 \times 9.0 \text{ gal} = 9.25 \text{ oz}$$

How do these calculations compare to the old reliable standard of 0.75 cup of corn sugar per 5 gallons of beer? Randy Mosher in his book, *The Brewer's Companion*, indicates that 0.75 cup of sugar equals 5.0 ounces. Using this assumption, let's use the following example of a 5-gallon batch fermented at 68° F that we want to carbonate to 2.6 volumes for a comparison. We will also assume that the corn sugar is 100-percent fermentable.

$$\text{Oz of Corn Sugar} = (2.60 \text{ volumes} - 0.86 \text{ volumes}) \times 0.57 \text{ oz/gal} \times 5 \text{ gal} =$$

$$= 1.64 \times 0.57 \times 5 = 4.96 \text{ oz}$$



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This example demonstrates the similarity of the two methods. The 0.75 cup per 5 gallon rule is easy but can be unreliable since the weight of sugar in the 0.75 cup will vary depending on how tightly packed it is. Secondly, the CO₂ content of the beer will vary if not adjusted for the starting CO₂ content, which is dependent on fermentation temperature. Consequently, a cold fermented lager beer using the same rule would contain more CO₂ than the ale.

Conclusion

Let's recap what we've done (over the previous four installments in *Zymurgy* along with this one) and note some of the relationships between the variables in the

brewing process. In order to produce 10 gallons of cool wort at the end of boiling we estimated the following water and beer volumes for a beer with an original gravity of 12° P.

	5.25 gal mash-in water (2.5 to 1 water-to-grist ratio)
plus	1.90 gal second infusion of mash water
	7.35 gal sparge water
	14.50 gal total water
less	2.00 gal absorbed by grain
less	0.50 gal lost to transfer and evaporation in mash tun
	12.00 gal cool wort in kettle pre-boil
less	2.00 gal evaporated in kettle

less	10.00 gal cool wort after boil
	0.50 gal lost to hot trub in whirlpool
	9.50 gal transferred to the fermenter
less	0.50 gal cold trub in fermenter
	9.00 gal for bottling

To produce 10 gallons of cool kettle wort after boiling, it required 1.45 gallons of water per gallon of wort and 1.74 pounds of grain per gallon of wort based on a 60-percent overall efficiency factor.

Obviously, there are a large number of variables that will change according to the recipe and brewing equipment. Furthermore, certain assumptions (e.g. brewhouse efficiency, evaporation rate, transfer losses) will have to be refined through repetitive brewing on a particular system. The procedures in this discussion are intended to provide for a systematic approach that will allow for more control, and ultimately more consistent results, and that, of course, means better tasting beer.

Resources

- Daniels, Ray. *Designing Great Beers*. Boulder: Brewers Publications. (1996). Holle, Stephen R. *A Handbook of Basic Brewing Calculations*. St. Paul: Master Brewers Association of the Americas. (2003). Mosher, Randy. *The Brewer's Companion*. Seattle: Alephoria Publications. (1993). Papazian, Charlie. *The Complete Joy of Homebrewing*. New York: Avon Books. (1983).

Steve Holle is the author of *A Handbook of Basic Brewing Calculations*. He is a member of the Brewers Association, Master Brewers Association of the Americas, and Beer Judge Certification Program, and is an associate member of the Institute and Guild of Brewing, London. He would like to thank members of the North Texas Homebrewers Association and especially Jim Layton, Kelly Harris and Bill Dubas for their help with this series of articles.



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All-Grain Brewing For the Soul

Like most homebrewers, I started with extracts—steep a little grain, add some hops and yeast, and it was good to go. The beers were tasty; my friends were impressed. Yet something was missing. I was intrigued by strange words: mash, lauter, sparge, and the utterly incomprehensible vorlauf; tantalized by grains not named crystal: Munich, Maris Otter, and Vienna. My brewing muse was calling. (Mine is a balding guy in a ratty T-shirt named Melvin.) And thus I traded steeping grains for a process steeped in mysticism, entered the magical world of all-grain brewing, and discovered contentment in a more complicated process.

My equipment isn't fancy. I envy the beauty of stainless steel brewing sculptures and admire the ingenuity of those who can construct their own RIMS or HERMS systems (where they find some of the parts is beyond me). But a hobby should be hands-on. My system is simple: an Igloo cooler hot liquor tank leading to another Igloo cooler with a slotted copper pipe manifold that serves as a mash/lauter tun. The run-off goes to a kettle on a propane burner. I'm not an engineer, but I built it myself, and it gave me a sense of a Bob Villa/Tim Taylor-like accomplishment.

Theoretically, all-grain didn't seem feasible. Add hot water and rinse, no special incantations necessary. That's all, I asked? In extract brewing, I added malt extract—something tangible. However, in all-grain brewing, the sugars appeared like magic. I felt as if I were an ancient alchemist who had actually created gold—liquid gold. I also love the organic quality of all-grain. The feeling of the grain running through my hands, cracking the kernels just right, and the comforting, hot cereal aroma of the mash

"ALL-GRAIN BREWING GOT ME OUT OF THE KITCHEN, INTO THE SUNLIGHT AND FRESH AIR."

harken back to a time of a far simpler, non-hydrogenated, less hurly-burly world.

All-grain brewing got me out of the kitchen, into the sunlight and fresh air. Previously I lived in dread fear of a boil-over on my wife's stove. Now there is less mess and cleanup is simple, just a few squirts from the hose. My wife, who was once dubious of my hobby, now makes suggestions about my next brew.

"Art is long, life short," opined the poet Goethe. One of our most valuable commodities is time. (Whatever happened to the leisure age we were promised?) Brewing all-grain is a commitment to time. A session takes me about seven hours, almost a full shift. But rather than complain, I embrace the commitment, see it as an opportunity, a chance to shut out—for a few hours, at least—the pressures of an ever-maddening world. The built-in downtimes allow me to refresh, relax and reflect, not to mention quaff a few homebrews. I emerge from a session with a sense of accomplishment—energized, as if I had finished an invigorating workout. And although impossible to quantify, I swear the tranquil environment has a karmic effect. Happy brewers make better beer.

This is not meant to denigrate extract brewing. I have friends who make excel-

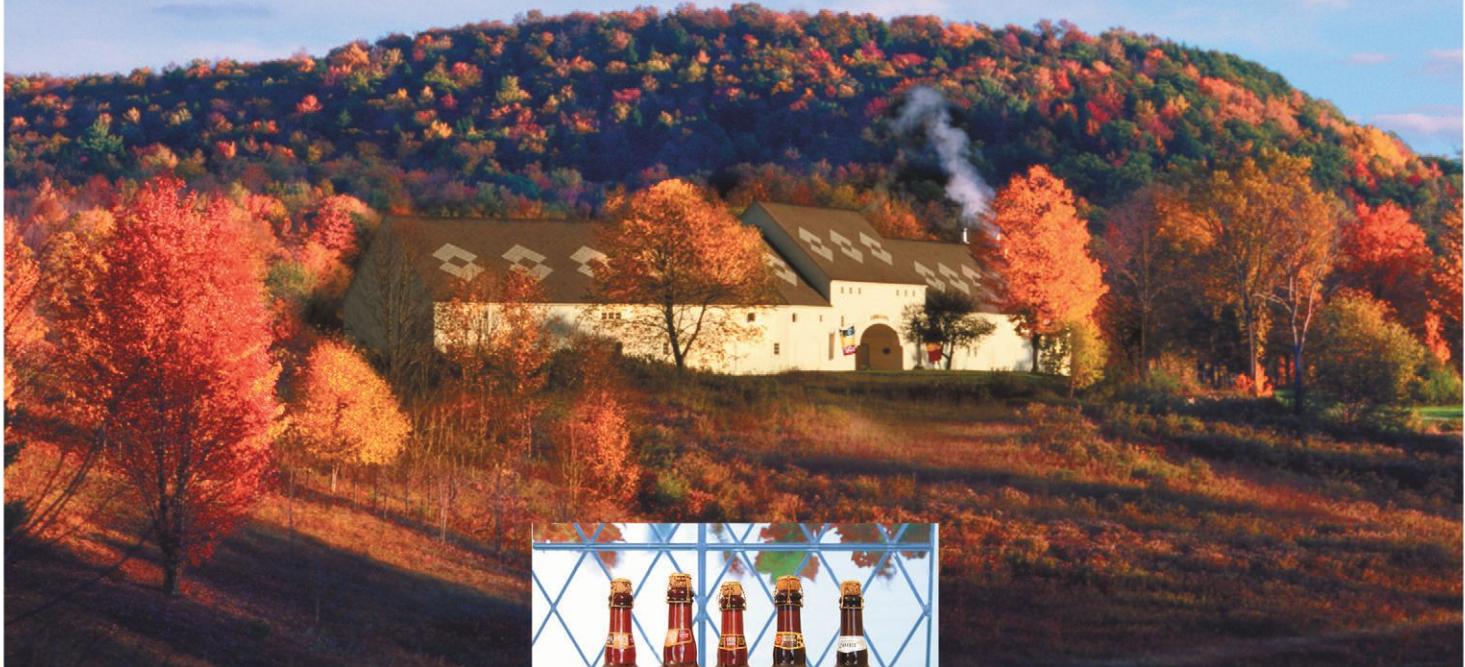


Outdoors in the fresh air, relaxed, and ready to brew a batch of Irish Red.

lent, award-winning beers that way. But ironically, by embracing a more complicated process, homebrewing has become an easier and more satisfying hobby. I urge everyone who has thought about brewing all-grain to give it a whirl and follow your muse—whatever his name may be.

Mark Pasquinelli resides in Elysburg, Pa. with his wife and five cats. He's a member of the PA-Alers Home Brew Club and has been brewing for 10 years, five as an all-grain brewer. He likes to brew Irish Red, Pumpkin Ale, and an Imperial Stout with hallucinogenic qualities.

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