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AHA ANNIVERSARY
CHEERS TO 40 YEARS

VOL 41 • NO 6 NOVEMBER/DECEMBER 2018

111>



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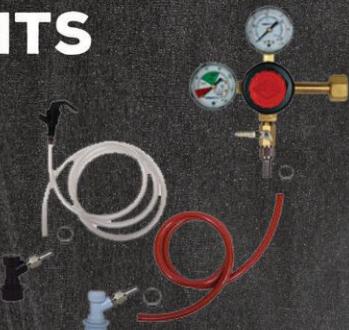
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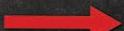
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Published by the American Homebrewers Association, a division of the Brewers Association. The purpose of the Brewers Association is to promote and protect small and independent American brewers, their craft beers, and the community of brewing enthusiasts. The Brewers Association is a not-for-profit trade Association under Section 501(c) (6) of the Internal Revenue Code. Offices are located at 1327 Spruce Street, Boulder, CO 80302 USA. Membership is open to everyone. *Zymurgy* (ISSN 0196-5921, USPS 018-212) is the bi-monthly journal of the American Homebrewers Association and is published six times per year. Periodicals Postage Paid at Boulder, CO and additional mailing offices. Canada Post Agreement Number 41197537. Annual memberships are \$43 U.S., and \$52 International and include a \$35 subscription to *Zymurgy*.

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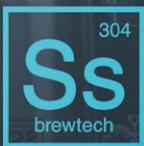
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Pumpkin beer: yes or no?

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Perspective Matters

The earth is not flat. Apart from a few vocal occupants of the internet's less savory corners, we all know that. We can infer the earth's curvature by combining assorted terrestrial and celestial observations with flavors of math commonly forgotten within minutes of the "Pencils down!" cue. For visual proof, one could fly far away and snap a photo of the earth in all its spherical glory, as Apollo 17 astronauts did in 1972 from a distance of 18,000 miles (29,000 km).

Nevertheless, viewed from the positions most of us occupy for most of our lives, the earth *appears* flat. We acknowledge that a gap can exist between perception and truth and that it need not be troubling.

Despite full evidence of the earth's approximately spherical shape, if you only need to navigate yourself from a campsite to your parked car, you can still get away with assuming a flat earth. Going for a short hike requires zero knowledge of the precise overall shape of the planet. All that matter are the lakes, trees, and mountain peaks that constitute your local reality.

Everything we see, hear, smell, taste, and touch approximates the true nature of our world. Perspective matters.

Ancient civilizations constructed monumental pyramids and temples without knowing anything about quantum mechanics—quantum effects just don't make a difference at such grand scales. On the other hand, if the designers of LASIK devices didn't possess at least a rudimentary understanding of certain parts of quantum theory, elective eye surgery wouldn't be nearly as popular as it is today.

BREWING PERSPECTIVE

Knowing what matters, when it matters, is also important in the brewing world. Professional brewers and ambitious homebrewers can turn to classic brewing texts and peer-reviewed journals for a detailed understanding of best practices and the state of the art. If you fall into this group, you'll enjoy consulting with Fix, Lewis, and

Bamforth. See what Narzisi, Heyse, and Kunze have to say. Read the proceedings of the American Society of Brewing Chemists. You won't be led astray. Go seek the truth.

But, you don't have to earn a diploma in brewing science to make great beer. What matters most is your perception (and that of judges if you're into competitions). Do you enjoy drinking your beer? Did you have fun making it? If not, what can you learn to change that? If so, do you need to change anything, or is good enough sufficient?

Homebrewing has come a long way in the 40 years that have passed since the founding of the American Homebrewers Association. It has come so far, in fact, that we now regularly have spirited debates about whether decoction makes a difference, whether low-oxygen methods are worth the effort, whether you need to bother with a stir plate, and whether racking to secondary helps or hurts.

Such debates are not bad. They are *wonderful*. Our predecessors would have loved to have the kinds of ingredients, equipment, and knowledge that enable such advanced discussions. Forty years ago, they just wanted hops that weren't brown.

I believe *Zymurgy*'s job is to offer the best information and guidance possible while acknowledging that what constitutes best practices today may very well be replaced by something else tomorrow. Look back at old issues of this magazine (which I encourage you to do for many reasons, not the least of which is to read some of Charlie Papazian's old homebrew raps—yes, raps), and you'll find a treasure trove of information. Most of it remains relevant today, but certainly not all of it.

In addition to informing readers about how to homebrew, *Zymurgy* has an obligation to highlight why we homebrew. That's why *Zymurgy* has never been and will never be a technical academic journal. There's a human story to what we do, and that deserves to be celebrated. Even as brewing recommendations evolve, the brewers behind those recommendations remain rooted in a common passion.

A FACELIFT AT 40

To celebrate 40 years of *Zymurgy*, we've given your favorite magazine a little facelift. Nothing too ostentatious, just a fresh look. The last major refresh was in 2005, and we were due for an upgrade. In the AHA's recent reader survey, you let us know that you were generally pleased with *Zymurgy*'s content, so you won't see any dramatic changes to the types of stories we cover. But you will notice an update to the look and feel.

As Charlie Papazian and Professor Surfeit depart the AHA after 40 years of service, you'll find their last installments of World of Worts and Dear Professor, respectively, in this issue. We are introducing new sections called Ferment on This and Ask the AHA to take up the reins after Charlie and the Professor have moved on to greener hop fields, so to speak.

Our new format recognizes that the internet is a better source of some kinds of information than a bimonthly publication. To that end, we're de-emphasizing beer festival calendars, and we're no longer printing lists of upcoming AHA/BJCP-sanctioned competitions. You can always find the latest, most up-to-date competition calendar at HomebrewersAssociation.org/competitions.

We recognize that recipes are one of *Zymurgy*'s most valuable resources, and the refreshed format is the first step in a broader effort to modernize and standardize how we make beer recipes available to AHA members. On page 82 you'll find a new permanent section called Relax, Don't Worry, Have a Homebrew!, where we offer some handy references for your brew day and beyond.

I'm excited to be part of the future of *Zymurgy*, and I hope you're just as excited to explore it with me. Here's to another 40 great years. Cheers!

Dave Carpenter is editor-in-chief of *Zymurgy*.



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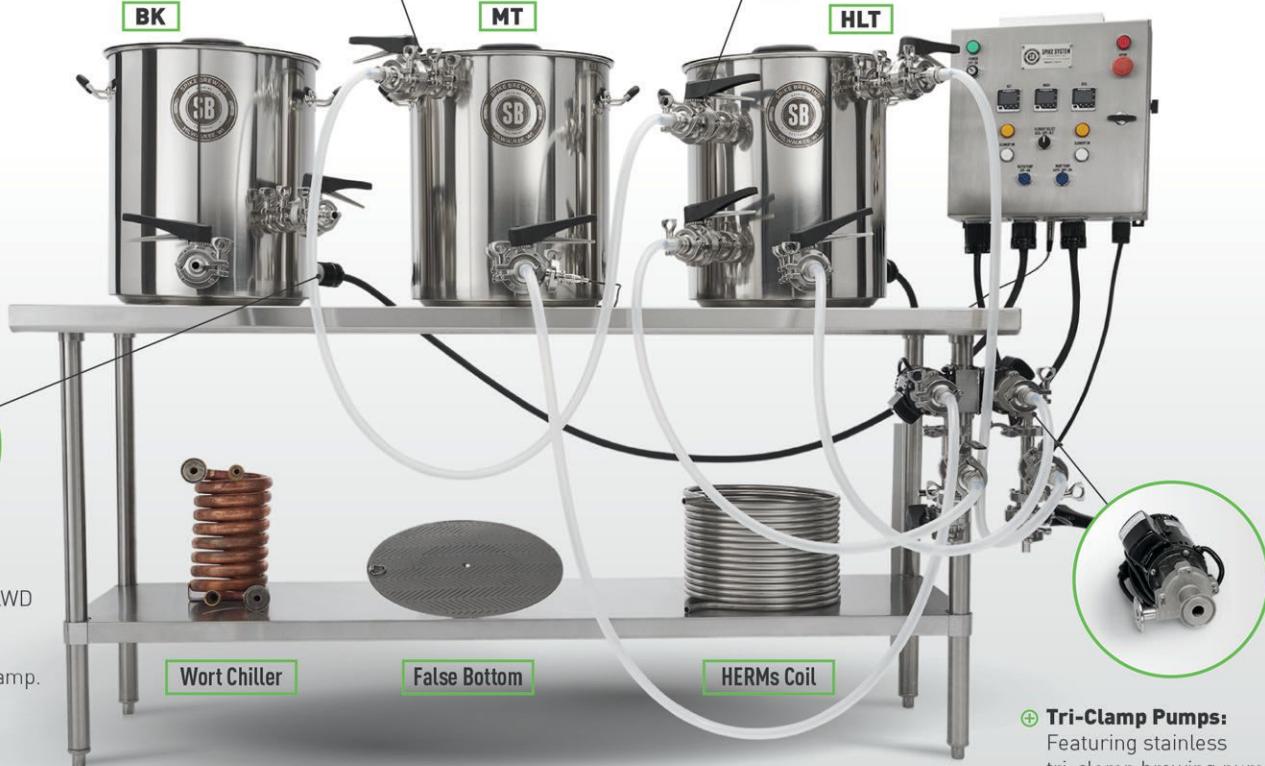
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Features



KRÄUSENING: IMPROVE YOUR BEER BY ADDING MORE BEER

Learn how this old lager brewing technique can invigorate fermentation, help your beer reach terminal gravity, and scrub oxygen along the way.

By Chris Colby



CAELIA: PRE-ROMAN BEER IN IBERIA

We associate the Iberian peninsula with wine. But before the Romans elevated the grape, ancient locals enjoyed beer.

By Travis Rupp
with Jonathan Carlyon



GENEROUS FLAVOR: PAIRING FOOD AND HOMEBREW FOR A GOOD CAUSE

Pairing beer with meals adds another level of interest to our enjoyment of food and beer.

By Jim Vondracek with
photography by Freddy Zavala



MEASURING ACIDITY IN SOUR BEER

To better understand sour beers, you need to know a little about acidity, how it is measured, and how it works.

By Fal Allen



ZYMBURGY'S HOLIDAY GIFT GUIDE

25 new and noteworthy items for the homebrewers and beer lovers on your list.

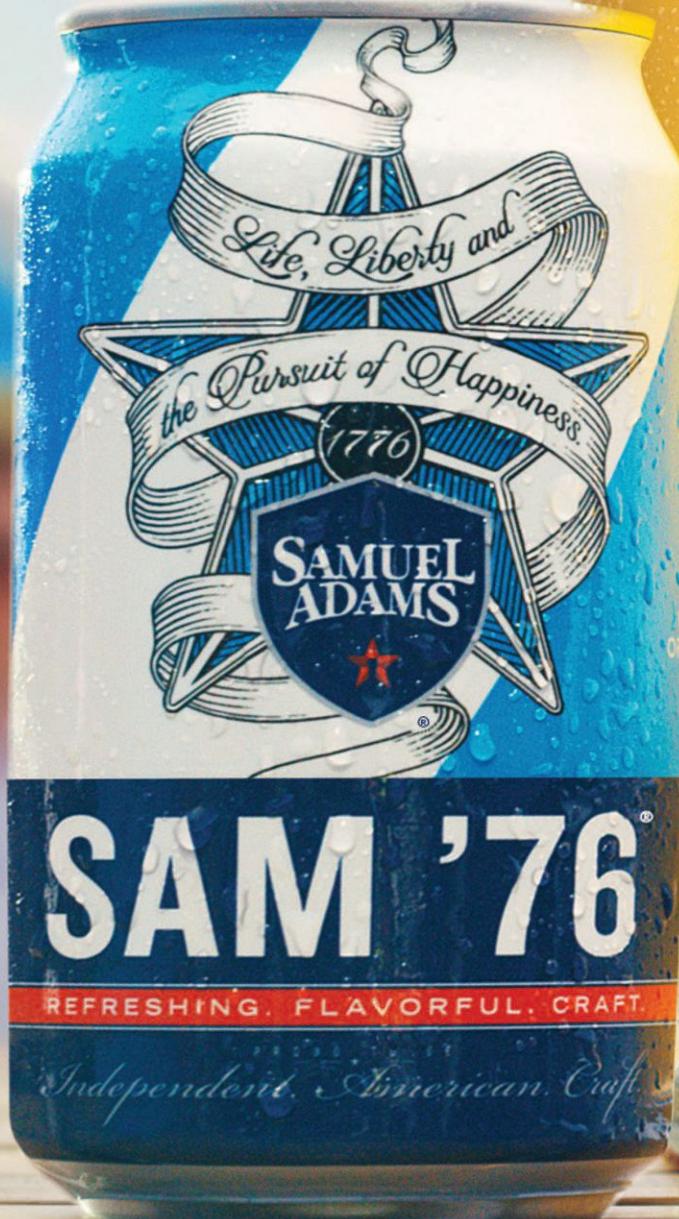
By Zymurgy's editors



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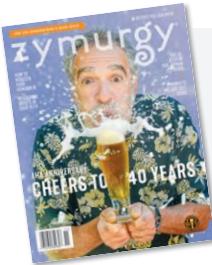


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By Dave Carpenter

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Cover Photo
Luke Trautwein

Vol 41 • No. 6
November/December 2018



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ON THE WEB

Find these homebrewing recipes
and more on our website @
[HomebrewersAssociation.org/
homebrew-recipes](http://HomebrewersAssociation.org/homebrew-recipes)

NOW ON Tap

Beer Nuts

We've always thought Stone Brewing's Greg Koch was a little bit nutty, but now he's gone and proven it beyond all doubt thanks to a collaboration with Nutista Stoneground Nutbutters, of which he also happens to be a cofounder.

Nutista's nutty spreads echo the flavors of some of Stone Brewing's most iconic beers. Nutista/Stone w00tstout Nutbutter, for example, includes Belizian chocolate, bourbon-soaked malt, dry malt extract, Brazil Oberon coffee, malted rye, roasted barley, brewer's yeast, and coconut. The resulting mélange of flavor parallels the sensory delight that is Stone Brewing's Drew Curtis / Wil Wheaton / Greg Koch Stone Farking Wheaton w00tstout.

"We created the w00tstout beer," says Koch, "in honor of all things geeky and nerdy that go with [San Diego] Comic-Con."



Now we have nutbutters worthy of geeking out, and this particular one has a geek-beer counterpart. Nerd on!"

Additional flavors include Nutista/Stone Tangerine Express IPA Nutbutter and Nutista/Stone Totalitarian Imperial Russian Stout Nutbutter. Look for these nutty goodies online at [nutista.com](#) and at [shop.stonebrewing.com](#), as well as at all Stone Brewing locations in California and Virginia.



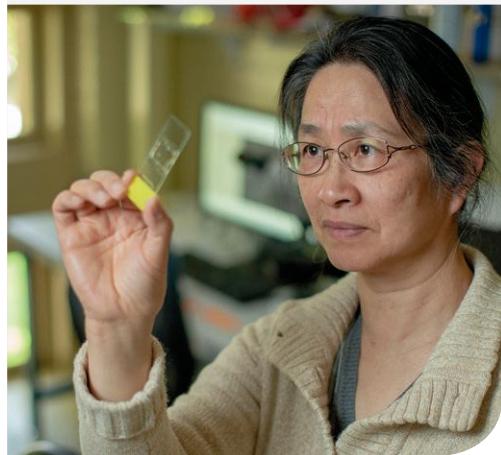
Automatic Beer for the People

From the crew who brought you the BrewJacket comes an automated, self-contained countertop brewery that promises to deliver the equivalent of a 12-pack of homebrew with just the flip of a switch. If you were lucky enough to be at the Great American Beer Festival® in September, you might have already seen this shiny piece of equipment in action.

The BeerMKR is designed for beer lovers who want to have a fresh pint at the ready without futzing around with burners, picnic coolers, and rack-ing canes. All you have to do is plug in the machine, connect it to Wi-Fi, add the ingredients, and use the BeerMKR app to monitor progress. The app sends you push notifications when it's time to add yeast and when fermentation is complete. Otherwise, you're free to sit back and relax (and not worry and have a homebrew).

After fermentation has wrapped up, simply remove the 144-ounce (4.3-liter) bag of beer and pop it into the refrigerated dispenser along with a CO₂ cartridge. Twenty-four hours later, it's time to share and enjoy.

To learn more, head over to [beermkr.com](#).



Professor Li Liu of Stanford University finds and records starch grains.

“World’s Oldest Brewery”

We've always suspected that a respectable chunk of the development of civilization happened thanks to humanity's relentless quest to find a drink. After all, how many days and evenings have you planned around beer?

Now researchers from Stanford University claim to have discovered the world's oldest known brewery in a cave near present-day Haifa, Israel.

Professor Li Liu and her team took a close look at stone mortars dating back about 13,000 years. They wanted to find out what early humans in the area were eating, but they ended up discovering evidence of fermentation from cereal grains, legumes, and other starches. The implied chronology places the earliest evidence of beermaking right in the same period as the earliest evidence of bread baking.

The findings suggest that early humans may not have developed brewing as a way to make use of agricultural surpluses, but rather as a deliberate practice that may have directly contributed to the cultivation and domestication of grain.

The proto-beer is described as having been a cloudy, chunky gruel—in other words, the earliest-known New England IPA. (We kid, we kid...)

For more info on this tasty discovery, head over to news.stanford.edu.



Honey Squished IPA

All Grain

This New England-style India pale ale (see, we do love NEIPA) has accents of honey from the grain bill and comes to us courtesy of Bob Negro of the Central Alabama Brewers Society (CABS). Check out Bob's Last Drop article in this issue to learn how this Alabama homebrew club is introducing newcomers to our wonderful hobby.

Batch volume: 5 US gallons [18.9 L]
Efficiency: 63%

Original gravity: 1.056 (13.8°P)
Final gravity: 1.006 (1.5°P)

Bitterness: 35 IBU
Color: 8 SRM
Alcohol: 6.7% by volume

MALTS

8 lb. [3.63 kg] 2-row pale ale malt (1.8°L)
1 lb. [454 g] Victory malt

1 lb. [454 g] honey malt
1 lb. [454 g] turbinado sugar

HOPS

1 oz. [28 g] Motueka, 6.8% a.a. @ 60 min
1 oz. [28 g] Chinook, 13.8% a.a. @ 10 min

1 oz. [28 g] Warrior, 16.3% a.a. @ 10 min
1 oz. [28 g] Simcoe, 11.9% a.a., dry hop 7 days

YEAST

1 L starter White Labs WLP008 East Coast Ale

ADDITIONAL ITEMS

1 tsp. gypsum (calcium sulfate)

BREWING NOTES

Mash grains in 3 gal. (11.4 L) filtered water for 60 minutes at 152°F (66.7°C). Fly sparge with 5 gal. (18.9 L) water at 170°F (76.7°C) and collect 6 gal. (22.7 L) wort. Stir in and dissolve turbinado sugar and gypsum. Bring to a boil and boil 60 minutes, adding hops at stated intervals. If you normally add Whirlfloc or Irish moss, leave it out to promote a hazy finish. Chill to 68°F (20°C), oxygenate, and pitch yeast slurry. Ferment at 68°F (20°C) for 7 days and then transfer to secondary for dry hopping. Two weeks after brew day (or when final gravity has been reached), keg or bottle the beer.

PARTIAL-MASH VERSION

Substitute 5.25 lb. (2.38 kg) pale dry malt extract (DME) for the 2-row pale ale malt. Steep the remaining grains in a grain bag for 45 minutes in 2 gal. (7.6 L) of 152°F (66.7°C) filtered water. Remove the steeping grains and add the DME, turbinado sugar, and gypsum. Top up to 6 gal. (22.7 L), bring to a boil, and proceed as above.



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Brew-Over

Sometimes you screw up and add the 10-minute Citra when you should have added the 60-minute Chinook. Oops. Here are a few recent blunders that are totally our fault.

In Sept/Oct 2018, we erroneously attributed authorship of "Homebrew Competitions as Entertainment" to Karl Summerfield. In fact, the article was written by Mike Stringer. In Commercial Calibration, we incorrectly said that Wandering Aengus Cider was in Hood River, Ore. Some of the apples are grown in Hood River, but the cider company itself is in Salem, Ore. And, finally, in From the Glass, we accidentally swapped digits and listed Senate Resolution 567 as Senate Resolution 576.

We sincerely apologize for these errors and shall now go hide in the corner with a snifter of barleywine, tails between legs.

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Happy 40th Birthday AHA!

This fall, we celebrate the 40th anniversary of a couple of momentous events in the history of homebrewing. First, on October 14, 1978, President Jimmy Carter signed H.R. 1337, an omnibus transportation bill, which included an amendment sponsored by Senator Alan Cranston of California to federally legalize homebrewing in the United States for the first time since Prohibition was enacted in 1920. The new homebrew law went into effect February 1, 1979. Second, on December 7, 1978, two guys named Charlie (Papazian and Matzen) launched the American Homebrewers Association with the publication of the Volume 1, Number 1 issue of *Zymurgy* magazine. (We're now on Volume 41, Number 6.)

To celebrate our 40th birthday, we've given *Zymurgy* a bit of a facelift. See Dave Carpenter's Editor's Desk column (page 3) for more details on the refreshed look that starts with this issue.



LEARN TO HOMEBREW DAY

Speaking of anniversaries, November 3 will be the 20th anniversary of the AHA's annual Learn to Homebrew Day. On this day, we celebrate our beloved hobby of homebrewing by passing our knowledge to a new generation of homebrewers. I'm sure you know someone whose life would be enriched by learning to homebrew. Well, November 3 is the day to do it!

Find details on the event, including event registration, a map of registered sites, and resources for beginning brewers on the slick new Learn to Homebrew Day website. Find it under Events at HomebrewersAssociation.org.

Something to bear in mind as you prepare to introduce your friends and neighbors to homebrewing is that it can be intimidating for the uninitiated. Many outside the hobby shy away from homebrewing after seeing elaborate brewing systems and complex pro-

cesses. I recommend keeping things simple when teaching newbies by brewing an extract batch. This method requires the least amount of knowledge and minimal equipment, so it is less intimidating than all-grain brewing.



BREW GURU APP

For all of those new homebrewers you bring in on Learn to Homebrew Day (or current homebrewers who haven't yet embraced the AHA), the AHA's Brew Guru app offers an awesome free introduction to membership. Nonmembers can experience a 30-day, no-obligation trial of AHA membership, complete with access to all of the benefits of membership (except for exclusive competition and event registration).

It's a great way for AHA members to show their friends the value of AHA membership.

HOUSEHOLD MEMBERSHIP

For many of us, homebrewing is a family affair. Did you know you can add anyone living in your household to your current membership for just \$29, regardless of when your membership is set to expire? (Separate rates apply for lifetime memberships.) Just click the Join/Renew button on HomebrewersAssociation.org to add household members. Household memberships can be added to new and renewal memberships as well.



2018 HOMEBREW CON SESSION RECORDINGS

One of my favorite benefits of AHA membership is free access to the recordings of the

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Homebrew Con educational sessions. The 2018 Homebrew Con session recordings are now available for viewing along with past recordings going back to 2012. Check out the Seminars section under How to Brew Beer on HomebrewersAssociation.org. There you'll find hundreds of Homebrew Con sessions presented by experts on just about every brewing subject imaginable.

2019 HOMEBREW CON SPEAKER PROPOSALS

That segues nicely into my next topic. Next year's Homebrew Con in Providence, R.I., scheduled for June 27 to 29, currently has 50 to 60 educational session slots open, and we are now accepting proposals to fill them. Each session includes approximately 45 minutes of presentation and 15 minutes of Q&A. If you have an area of expertise that you'd like to share with your fellow homebrewers, please submit a proposal. Presenters get complimentary Full Conference passes to Homebrew Con. Proposals are due by December 17. Go to HomebrewCon.org for more information and to submit your proposal.

Look for more conference details on HomebrewCon.org in early 2019. Don't miss your chance to experience the most fun annual event in homebrewing!

AHA GOVERNING COMMITTEE CALL FOR NOMINATIONS

The AHA Governing Committee is taking nominations for the 2019 Governing Committee election. Voting takes place in February and March next year. There are three open seats on the 15-member Governing Committee to be filled in the 2019 election.

AHA Governing Committee members advise AHA staff and shape the organization's future path. They participate in monthly conference calls and the annual in-person meeting at Homebrew Con. Committee members also serve on various subcommittees focused on clubs, diversity, competition, and more. AHA members interested in running for the Governing Committee can submit a nomination. For more information, see the Governing Committee pages under the Community section of HomebrewersAssociation.org.



JUNE 27-29
PROVIDENCE, RI



GOVERNMENT AFFAIRS

The AHA's work on government affairs issues, ably led by AHA competition coordinator John Moorhead, continues. Over the past few months, we have been engaged in issues at both the state and federal levels.

In Missouri, the AHA received a written communication from Missouri Alcohol & Tobacco Control regarding homebrew competitions on licensed premises.

In the wake of last year's passage of a new homebrew bill in North Carolina, the AHA provided preliminary input to the Alcohol Beverage Control Commission (ABC) on creating rules to enforce the

state's new homebrew legislation. The ABC's proposed rules for homebrewing are open for public comment until November 5, 2018. The AHA sent an action alert to our North Carolina members to encourage homebrewers to submit constructive comments to the ABC on those rules.

On September 27, the AHA co-hosted the first annual Homebrew on the Hill event in Washington, D.C., with the Brewers Association. This event showcased homebrewing to members of Congress and their staffs, promoting the hobby and encouraging participation in the third annual Capitol Hill Staff Homebrew Competition in December.

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Every year around the holidays we have our Give-the-Gift offer that includes one of three free books from Brewers Publications (*Brewing Classic Styles*, *Farmhouse Ales*, and *Wild Brews*) along with a 1-year AHA membership. Gift cards are easy to ship (they conveniently fit into an envelope) and are sure to please.

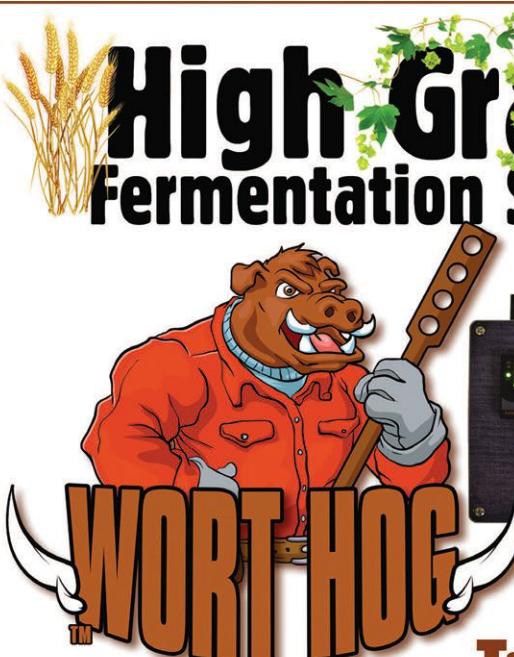
With more than 2,000 businesses now offering AHA Member Deals, an AHA membership is a great gift even if the recipient isn't an active homebrewer. Your gift will support the AHA and help us continue to protect and promote homebrewing. See HomebrewersAssociation.org for more details.

Until next time, happy brewing!

Gary Glass is director of the American Homebrewers Association.



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All that Glitters...

Dear Zymurgy,

The article titled "Glitter? Not in My Beer!" (Sept/Oct 2018) really got my attention for its antiquated view on how to help women receive the respect they deserve in the brewing community. This article harms women, and the worst part is that a female voice is delivering the damage. Glitter beer does not diminish the status of women in brewing. Criticizing creative, successful women who are enjoying a brief and rare spotlight diminishes the status of women in brewing.

Yes, glitter beer is silly. It's a gimmick that probably sells well for those who are making it. But it gets people talking, creates buzz, and encourages people to visit breweries owned, operated, and led by women. This is what we should be talking about.

The next time an article focusing on women and beer trends comes along, I hope that your editors can take a closer look at what is being said and recognize it for what it is. I am sure there is room in *Zymurgy* to celebrate women instead of encouraging the perpetuation of gender bias and stifling creative females. No one would ever say that beard beer diminishes the status of men in the craft brewing industry.

Thank you for your time,
Anna Bellizzi
Grass Valley, Calif.

Dear *Zymurgy*,

Praise Dr. Christiana Bockisch for standing up to say what needed to be said. Glitter in beer? Why? Glitter is for snow globes, not beer! This writer is dead on, and anyone looking to make a ridiculous statement may wish to purchase a jar of glitter. My wife and I know fantastic female brewers, and they would never stoop to glitter.

Tom Schürmann
Lakewood, Colo.

LAST DROP

By Dr. Christiana Bockisch

Glitter? Not in My Beer!

MAKE THE BEST POSSIBLE BEER THAT YOU CAN.

DON'T CUT CORNERS. STRIVE TO BE THE BEST.

CREATE A NEW STYLE.

I recently attended a MeetUp group consisting of all-female craft beer enthusiasts. The head of the group mentioned an upcoming brew day at a craft brewery. She was discussing the style we would be brewing and then said, "Of course we will be adding glitter." Of course because we are women and happen to be brewing a beer, it must contain glitter. I also saw this happen at a Craft Beers brew day in which I participated. My protest against this unnecessary ingredient fell on deaf ears. I think female craft brewers should be taken seriously and respected. Adding glitter to beer does not garner respect.

I have had my own struggles being treated with respect by other homebrewers. About 5 times out of 10, if I start a conversation with a male brewer I have not met before, he assumes I am inexperienced and unapproachable. This rudeness isn't intentional in most cases. It is simply a common and unfortunate assumption that because I don't have a beard, I must know much about brewing.

I cannot count how many times I have been asked, "Have you ever brewed before?" at a homebrew club meeting. I have

had homebrew store employees ask if I was buying ingredients for my husband. I have been brewing all-grain for seven years and have won awards in competitions. Making glitter beer only serves to justify the notion that women in brewing are not worthy of respect. It's a cliché.

Glitter beer assumes that all women must love glitter, which is not true. Aren't we all a bit playful, making assumptions about us? Making the change can start with us! Glitter beer is akin to a female police officer having pink, glittery handcuffs—because she is a woman. Another male-dominated profession is culinary arts. Yet, we do not see female chefs sprinkling bisques and duck confit with glitter.

No body really seeks out glitter beer. You don't see people lined up around the block for a can of glitter blonde. It doesn't taste like or have the substance or flavor to the beer. It's a novelty item. Plus, it's made of the mineral mica. Maybe I'm out of left field, but I don't want sand in my beer.

There are more constructive ways for women to make their mark in the brewing world. Make the best possible beer that you can. Don't cut corners. Strive to be the best. Create a new style. Combine preferably non-toxic ingredients that are actually used. If you taste upon including glitter in the process, put it on the outside of the glass, and design an awesome logo. It recall an IPA as a hot pink color. The Shop in Temple had people lining up out the door. Dash the glitter beer. We're better than that.

Christiana Bockisch enjoys the scientific and technical aspects of brewing. In May 2018, she earned her PhD in chemistry at Arizona State University.

Photo © Getty/Milko [glitter]
Photo © Getty/Milko [christiana bockisch]



SUGAR INVERSION AND pH

Dear Zymurgy,

The article on Belgian Dark Strong Ale (Style Spotlight, May/June 2018) discusses making dark invert sugar. The information I have seen on making dark invert has mostly been incomplete or incorrect, and this article has the most plausible set of instructions I've seen. However, I would like to point out one part that might be incorrect.

In the article "Sweet Taste of Success" (*Brewer and Distiller International*, December 2015), author Steve Curtis notes that while dark invert syrup is heavily caramelized, its commercial production [at Ragus Sugars Manufacturing Ltd.] involves a pH increase from 1.6 to between 5 and 6 after inversion and before caramelization. Have you tried a higher pH?

Sincerely,
Roger Masson
Oak Park, Ill.

Zymurgy associate editor Amahl Turczyn responds: I enjoyed the "Sweet Taste of Success" article, and I have no doubt that a commercial producer uses the most effective method for acid (or enzyme) hydrolysis to convert sucrose into invert sugar. As you point out, Ragus apparently acidifies sucrose syrup to a pH of 1.6, monitors the ratio of sucrose to glucose/fructose, and then neutralizes the solution with sodium carbonate to between 5 and 6 pH. When fully inverted, it is stable enough to keep as-is, or it can be heated and caramelized for dark invert syrup.

This process of acidification to invert followed by alkalization to caramelize is the same basic principle I was trying to relate in the Style Spotlight article on producing invert dark syrup at home, although my suggested pH range of 6.8 to 7.3 seems anemic by comparison—1.6 pH is pretty darn acidic!

I'm guessing that lowering pH to that level of acidity inverts the sugar quickly, which would be important for commercial production, but I don't think such a low pH is necessary for homebrewers and home chefs. In another article on the sub-

ject, "Sucrose Degradation Under Model Processing Conditions," authors Andrews, Godshall, and Moore observe that even slight acidity promotes inversion.

"Sugars and molasses maintain a near neutral pH of 6.0 to 7.0 (Iqbal and others 2000). Under even slightly acidic conditions, sucrose undergoes inversion through acid hydrolysis into equal amounts of glucose and fructose (Edye and Clarke 1992). It has also been shown that, during evaporation, as color increases, so pH decreases (de Brujin and others 1998). Sucrose is most stable at a pH of 8.2 (Roberts 1975) while invert sugars are most stable under very acid conditions, pH 3 to 4 (Edye and Clarke 1992; Farine and others 2000)."

It isn't clear what acidification processes or materials are used at Ragus, but their method is surely far more effective than using citric acid or cream of tartar, as I suggest. Using sodium carbonate instead of food-grade lye sounds like a much safer way to bring pH back up.

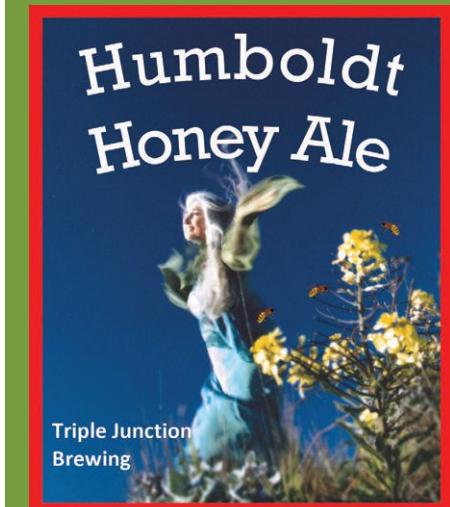
But to answer your question, no, I haven't tried either acidification to that low a pH or stabilizing to that high a pH range for the caramelization, but I think it warrants further study. Thanks for bringing this to my attention, and with any luck craft brewers will begin taking an interest in using brewer's sugars and syrups to add flavor, color, and textural nuances to their beers, as British brewers did in the early to mid-20th century, and as Belgian brewers have done for longer than that!



AHA FORUM

Continue the conversation online in the AHA Forum at HomebrewersAssociation.org/forum.

READER-SUBMITTED HOMEBREW LABELS

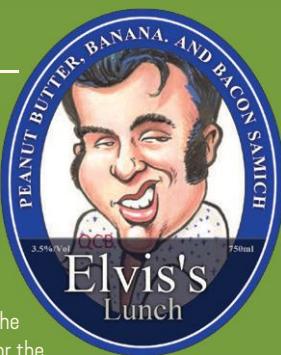


The photograph on my label is from the 2008 Humboldt Honey calendar, a fundraiser that benefits 12 Honeys' favorite nonprofit organizations (ours is Friends of the Dunes). My little sweetie is Miss March, whom we call the Queen Mother Honey because she is old enough to be the other Honeys' mom.

Did I mention she keeps bees? Bees are cool. They make honey, which I use in my brews: Humboldt Honey Ale, Porter, and IPA. My challenge is to make the beer as awesome as the label.

I brew with four friends every Tuesday in the basement of a 1908 Victorian mansion in Eureka. We are Triple Junction Brewing ("Triple Junction" refers to a group of faults that meet just off the shore of Humboldt County). We have been at it since 2012. Each week, it's another guy's turn to brew. We make 5-gallon batches, and we each have certain favorites, so there is quite a variety to savor. We also participate in The Humboldt Homebrewer Festival each year in Arcata.

Roy Marin,
Eureka, Calif.



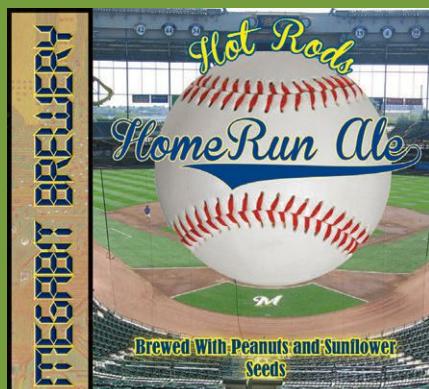
I have been homebrewing for 12 years and an AHA member for three. I made this for a beer I am still perfecting: smoked wheat for the bacon, hefe yeast for the banana, biscuit malt for the bread, and peanut butter for the, well, peanut butter. It's a fun beer!

Jerry Wood
The Clarksville Carboys
Clarksville, TN

Hello!

Here are a few labels I have made for my homebrew. I have been homebrewing for three years now, brew all grain and extract, and became an AHA member in March 2017. Zymurgy magazine has been a great resource for me, so thank you.

Timothy Lynch, Jr.
Manitowoc, WI



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Dear Professor: A vALEdition

I began answering beer and brewing questions in the 1978 inaugural issue of *Zymurgy*. After 40 years and 197 consecutive regular issues, I, Professor Surfeit, am hanging up my cap and gown, cloak and dagger. My detective work will continue on a personal basis as I collaborate with Charlie Papazian and we brew into new horizons.

As I reflect, I have to admit I didn't know all the answers, but sometimes that's OK. Homebrewing is about knowledgeable endeavors. You learn as much as you can, and even when you don't know the answer, you know enough to continue to make great beer. More often than not, you find your own answers in the process of pursuing your dream beers and day-to-day tipples.

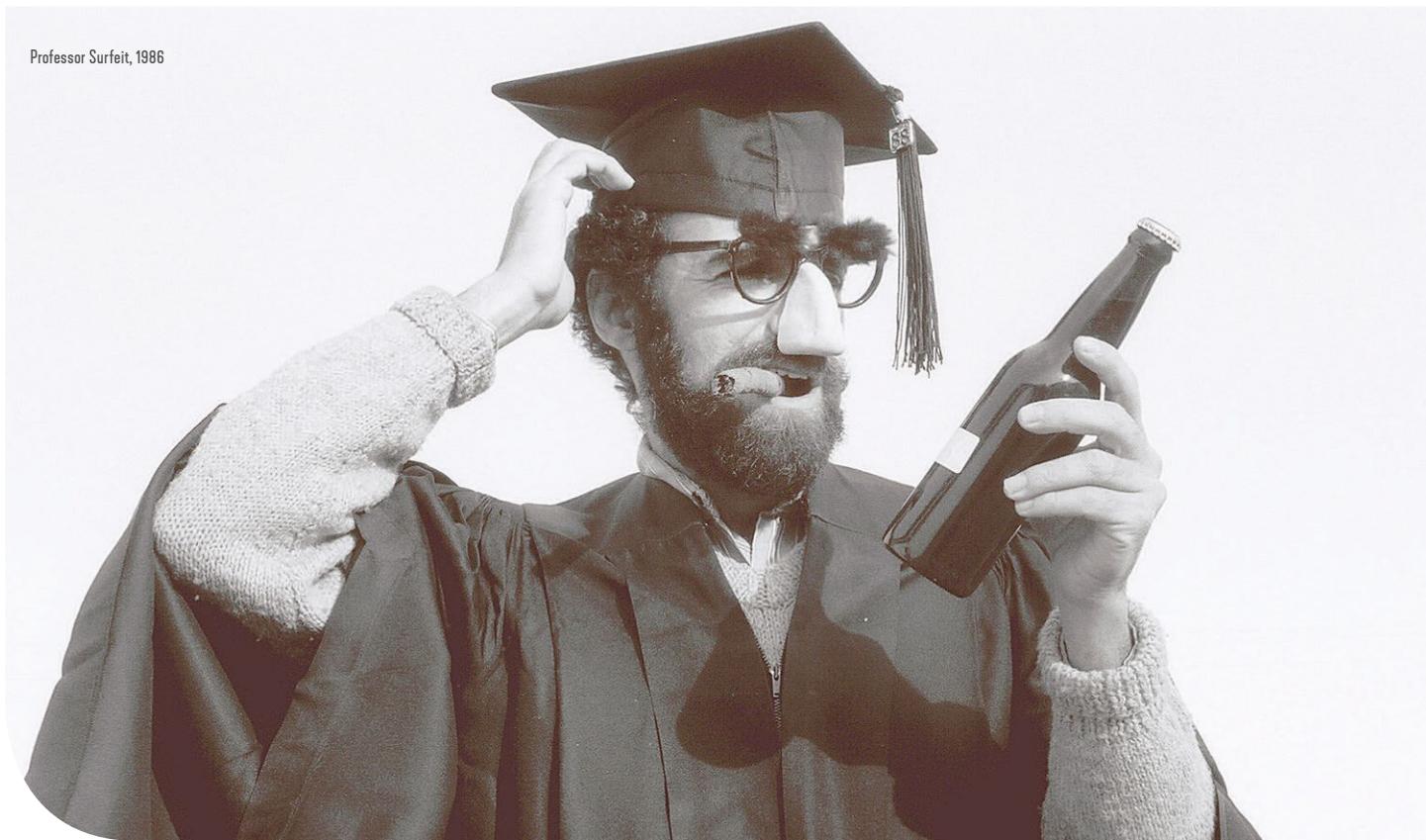
Most people don't know what my last name really means. In the mid-1970s when researching my family history, I came across the original edition of Mrs. Byrne's *Dictionary of Unusual, Obscure, and Preposterous Words*. There, *surfeit* was defined as "... over indulgence in food and drink..."

Now, I don't know which came first, the definition or my family name, but obviously

somewhere in my family tree, someone had the right idea. Even though moderation is the key to being able to enjoy drink and food in a long life, celebrations happen. Don't they?

One other historic tidbit is worth mentioning. When Charlie Papazian wrote the original edition of his more advanced book *The Homebrewers Companion* (he originally wanted to name it

Professor Surfeit, 1986





The Complete Joy of Homebrewing, Volume 2) he asked me if he could develop the outline for his book by studying all the questions that had been submitted to Professor Surfeit over a 13-year period.

I gave him the green light, and all those most important questions served as the knowledge foundation for the entire book. So, you see how important it was that homebrewers asked questions. The future of homebrewing is still all about asking questions, finding answers that work, and pursuing both traditional beers and new frontiers.

Both Charlie and I, the Professor, have had a great 40-year collaboration. But more importantly, I've had a 40-year collaboration with all the members of the American Homebrewers Association.

Cheers to our future and the world of homebrewing,

—The Professor, Hb.D.

Thank you, Professor Surfeit, for 40 wonderful years! Nobody could ever replace the Professor, but AHA members' burning questions still need answers. So, we've assembled an expert panel of professional brewers, authors, podcasters, NHC award winners, and staff of the Brewers Association and American Homebrewers Association to tackle your homebrewing challenges. Although we're sad to see Professor Surfeit go, we're excited to introduce a new Q&A space: Ask the AHA.

MASH TEMPERATURE AND FERMENTABILITY

I want to re-brew one of my recipes with a slightly lower final gravity than that of the previous batch. I was planning to reduce the mash temperature to promote higher β -amylase activity and get slightly more fermentable sugar. However, I wasn't sure how much I should lower the temperature to get the reduction in final gravity that I was hoping for. I searched the tubes for a chart, but I was unable to find one.

All other things held constant—plenty of things can affect conversion rates, so pretend we are all perfect brewers—how much would a 1°F change in mash temperature change the amount of fermentable sugars? This obviously depends on the original mash temperature and whether you are moving towards or away from an enzyme's ideal functional temperature, so I expect this is not a constant. Any resources you can point me to would be GREATLY appreciated.

Thanks,
Mike Banos
Longmont, Colo.



Left:
1986 AHA National Homebrewers Conference in Estes Park, Colo.
(left to right) back: Greg Noonan, Bill Murphy, Pat Baker, Charlie Olchowski, Steve Stroud; front: Chuck Cox, Professor Surfeit.

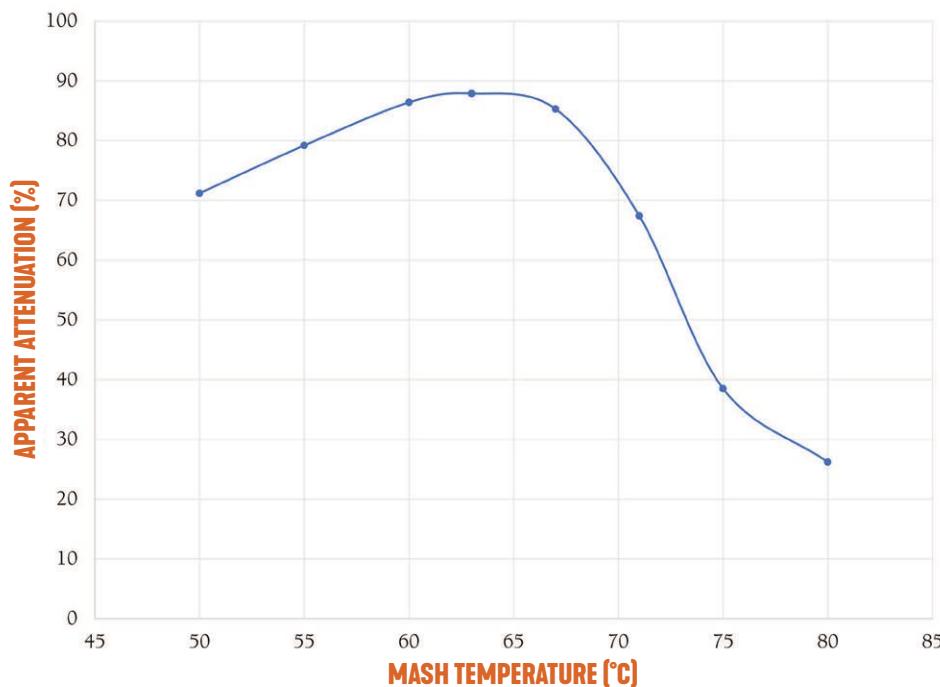
Right:
Professor Surfeit at the 1990 AHA National Homebrewers Conference in Oakland, Calif.

Zymurgy editor-in-chief Dave Carpenter responds: You're right, Mike: many factors affect wort fermentability. Mash variables like pH, thickness (water-to-grist ratio), duration and schedule, crush, and grist composition all influence the fermentability of the finished wort, which is why it's probably impossible to find a single general-purpose chart that captures what you're looking for. However, you can make some educated guesses.

One data set taken from a widely used brewing textbook is given in Table 1 and plotted in Figure 1. The data are for an 80-minute mash at a single temperature. There are similar data sets out there, and depending on the source, the actual numbers will vary due to differences in mash variables mentioned above.

However, the trend is always similar. As mash temperature warms to the mid-60s °C (upper 140s °F), attenuation hits a maximum, and, consequently, final gravity reaches a minimum. Then there is a considerably sharper decrease in attenuation (and corresponding increase in final gravity) as the mash temperature warms even further and enzymes denature.

FIGURE 1: EFFECT OF MASH TEMPERATURE ON DEGREE OF ATTENUATION.



Raising or lowering the mash temperature by just 1°F (0.6°C) can have a big effect on wort fermentability if you are mashing a bit to one side or the other of peak enzyme activity. However, if you're already mashing at a temperature that puts you near the peak of attenuation, then changing the temperature by such a small amount won't do a whole lot. In other words, you have to know where you are to know where you can go.

If you are trying to dial in a recipe, your best approach is to brew the beer several times and take good notes while trying to keep all variables as constant as possible. You can vary the mash temperature from one batch to the next to see

the effect. Also, consider performing a fast fermentation test every time you brew. That'll tell you if your fermentation practices are getting the beer to finish out as low as it can go.

Conducting a fast fermentation test is easy. All you do is draw off a portion of wort—enough for a hydrometer reading—before you conduct the main fermentation. Overpitch this small sample with the same yeast you are using to ferment the main batch, and then keep it warm and agitate it frequently (or use a stir plate) while the main batch chugs along.

After a couple of days of warmth and agitation, the small sample will have fer-

mented out as low as the wort allows, and measuring its gravity will tell you the limit of attenuation. If the main batch reaches the same final gravity, you know your yeast has given its all. But, if the main batch finishes a few gravity points higher than the fast-fermented sample, it could mean you have the potential to eke out a few more gravity points without even changing the wort composition. Then you can look into things like pitch rates, oxygenation, and yeast health to help your beer finish a little drier.

Have a question for our motley crew of brewing geeks? Hit us up at asktheaha@brewersassociation.org



TABLE 1: EFFECT OF MASH TEMPERATURE ON DEGREE OF ATTENUATION

Mash temperature	Real attenuation	Apparent attenuation
50°C [122°F]	58.0%	71.2%
55°C [131°F]	64.4%	79.2%
60°C [140°F]	70.0%	86.4%
63°C [145.4°F]	71.2%	87.9%
67°C [152.6°F]	69.0%	85.3%
71°C [159.8°F]	54.5%	67.4%
75°C [167°F]	31.2%	38.5%
80°C [176°F]	21.3%	26.2%

Source: Narziß, Ludwig, and Werner Back. *Die Bierbrauerei: Band 2: Die Technologie der Würzebereitung*. 8th ed. Weinheim, Germany: Wiley-VCH Verlag, 2012.



ASK THE AHA

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Diacetyl

One of the most common off-flavors in beer is a buttery, toffee-like, or butterscotch-like character caused by diacetyl compounds, also known as vicinal diketones (VDKs). VDKs are made up of both diacetyl and 2,3-pentanedione, and it doesn't take much of these compounds to be detectable in beer. The threshold level, that at which some people can smell or taste it, is just 100 micrograms per liter. By comparison, most flavor compounds are detectable in the milligrams per liter range (1 milligram = 1,000 micrograms).

The reason we say "some people" is that sensitivity to diacetyl varies. A significant percentage (some sources say 20 percent) of the population cannot detect it at any level, while others are highly sensitive to it. As a beer judge, it's good to test for and be aware of one's own response (or lack thereof) to diacetyl.

BEER STYLES THAT ARE DOWN WITH DIACETYL

In some cases, a trace amount of diacetyl is acceptable. It can even be a desirable part of the profile for a few styles. Nearly all ales can have low diacetyl in their aromatic profile, but it is most accepted in Scottish and Scotch ales.

Some lactic acid bacteria produce diacetyl, especially *Pediococcus damnosus*, and its presence can complement the flavor profile of oud bruin (Flanders brown) and Flanders red ales. Even Czech/Bohemian Pilsners and Vienna-style lagers can have a bit.

Table 1 indicates acceptable levels of diacetyl as presented in the BJCP 2015 Style Guidelines. These parameters differ somewhat from what was published in the 2008 guide. For all beer styles not listed, diacetyl is generally considered non-desirable.

MOUTHFEEL

Not only do diacetyl and 2,3-pentanedi-one contribute that characteristic buttery flavor and aroma but they can also influence mouthfeel and cause a slick sensation on the palate. At low levels, this silkiness can seem like a favorable addition to some beer styles, particularly dark British ales, adding heft to the palate and accentuating the malt. However, diacetyl can be unstable, and any positive flavor and mouthfeel traits soon become unpleasant in beers meant for aging.

TEMPERATURE

High temperatures increase both the production and reduction of diacetyl, and most diacetyl is produced during the first few days of fermentation. A good strategy to reduce diacetyl in finished beer, then, is to maintain a cool fermentation initially and then allow it to warm for a period toward the end.

For lagers, a diacetyl rest allows yeast an opportunity to reabsorb unwanted VDKs. During a diacetyl rest, the fermenter is simply warmed from the lager fermentation temperature of 48 to 55°F (9 to 13°C) to about 58 to 60°F (14.4 to 15.6°C) and held for two or three days before cooling to the conditioning temperature. This rest is most effective when performed 1 to 2 degrees Plato (2 to 5 specific gravity points) before terminal gravity is reached.

For ales, such a rest is usually not necessary, as fermentation temperatures are sufficiently high for yeast to reduce diacetyl without assistance. However, this can be strain-specific, so some ale strains may need help after all.

TABLE 1: BEER STYLES THAT CAN (SOMETIMES) ACCOMMODATE DIACETYL.

3A. Czech Pale Lager. Aroma: light (but never intrusive), often perceived more as a rounded body than overtly in aroma and flavor. Significant buttery diacetyl is a flaw.
3B. Czech Premium Pale Lager. Aroma and Flavor: light amounts acceptable but need not be present.
3C. Czech Amber Lager. Aroma and Flavor: optional and can range from low to none.
3D. Czech Dark Lager. Aroma: low amounts may be present. Flavor: low to moderate.
7C. Kellerbier. Aroma and Flavor: may be present. Mouthfeel: may cause a slight slickness if present. <i>Pale Kellerbier.</i> Aroma and Flavor: very low to moderate if present. Mouthfeel: may cause a slight slickness if present. <i>Amber Kellerbier.</i> Aroma and Flavor: very low to low if present.
11A. Ordinary Bitter. Aroma and Flavor: Generally none, although very low levels are allowed.
11B. Best Bitter. Aroma and Flavor: Generally none, although very low levels are allowed.
11C. Strong Bitter. Aroma and Flavor: Generally none, although very low levels are allowed.
12A. British Golden Strong. Aroma and Flavor: Little to none.
13A. Dark Mild. Aroma: very low to none. Flavor: low to none.
13C. English Porter. Aroma: low to none. Flavor: moderately low to none.
14A. Scottish Light. Aroma: low butterscotch is allowable. Flavor: subtle butterscotch character is acceptable, but blatant "butterscotch" character is not traditional.
14B. Scottish Heavy. Aroma: low butterscotch is allowable. Flavor: subtle butterscotch character is acceptable, but blatant "butterscotch" character is not traditional.
14C. Scottish Export. Aroma: low butterscotch is allowable. Flavor: subtle butterscotch character is acceptable, but blatant "butterscotch" character is not traditional.
15A. Irish Red Ale. Aroma: May have a very light buttery character (although this is not required). Flavor: Rarely has a buttered toast or toffee-like quality. Mouthfeel: Low levels may cause a slightly slick mouthfeel.
16A. Sweet Stout. Aroma and Flavor: low to none.
16B. Oatmeal Stout. Aroma and Flavor: medium low to none.
16C. Tropical Stout. Aroma: low to none. Flavor: medium-low to none.
16D. Foreign Extra Stout. Aroma: low to none. Flavor: medium-low to none.
17A. British Strong Ale. Flavor: low to none.
17B. Old Ale. Flavor: low to none.
17C. Wee Heavy. Aroma and Flavor: low to none.
22D. Wheatwine. Aroma: very low levels are acceptable but not required.
23B. Flanders Red. Aroma and Flavor: perceived only in very minor quantities, if at all, as complementary.
23C. Oud Bruin. Aroma and Flavor: perceived only in very minor quantities, if at all, as complementary.
27G. Historical Beer: Pre-Prohibition Porter. Aroma: low to none
X3. Italian Grape Ale. Flavor: very low to none

YEAST STRAINS

Some strains produce higher levels of diacetyl than others. Highly flocculent yeast strains tend to leave higher amounts of diacetyl in the beer because they drop out before they can metabolize the diacetyl they've produced. For the same reason, early removal of yeast from beer, or having insufficient yeast in suspension, can result in elevated diacetyl levels.

If you ferment with an ale yeast strain that's known to be highly flocculent and produces high levels of diacetyl, leaving the beer in primary for a couple of extra days after reaching terminal gravity can help reduce diacetyl to below-threshold levels. Yeast does this by absorbing diacetyl and enzymatically breaking it down into acetoin and 2,3-butanediol, both of which have such high flavor thresholds that they are very difficult to detect.

BACTERIA

Some lactic acid bacteria produce diacetyl, so one possible cause of diacetyl in beer is bacterial contamination. This is best prevented with proper sanitation techniques, but once it's happened, it is sometimes possible to clean up a beer with bacteria-induced diacetyl by introducing a fresh yeast culture.

Unless there is too much present for it to handle, yeast will metabolize the excess diacetyl. If the beer happens to have high levels of the precursor acetolactate, diacetyl can be produced after bottling. Bottle conditioning with fresh yeast can allow for the absorption of bacterial diacetyl. Kräusening, a common practice in German breweries is one way of doing this. For more on this process, see Chris Colby's article on page 37.

OXYGEN AND NUTRIENTS

Introducing sufficient oxygen to wort just prior to pitching is critical to yeast health, which in turn allows it to clean up any diacetyl it produces. However, introducing oxygen to beer after fermentation can trigger diacetyl precursors.

One such precursor is acetolactate, an intermediate compound secreted by yeast during the production of the amino acid valine. Any acetolactate that isn't used for valine production can, particularly in the presence of heat and oxygen, be converted to diacetyl by way of a redox reaction.

Ensuring yeast is healthy from the onset of fermentation will keep it going long enough to clean up residual diacetyl. Low nutrient levels force yeast to produce its own amino acids and other nutrients, which can delay fermentation, weaken the yeast, and potentially lead to higher concentrations of diacetyl precursors like acetolactate. Worts that are deficient in free amino nitrogen (FAN) are for these reasons more susceptible to diacetyl production, as critical amino acids like valine may not be present in sufficient quantities.

When yeast assimilates valine, the reaction that causes acetolactate to become diacetyl is suppressed. In high-FAN worts, valine concentrations are high enough that only minimal quantities of diacetyl are produced. The most common causes of low-FAN worts are (1) using malt extract that is FAN deficient, and (2) using excessive adjuncts.

Amahl Turczyn is associate editor of Zymurgy. He celebrates 50 years of life and 30 years of brewing this year, but he wishes it were the reverse.



Beer Vacations

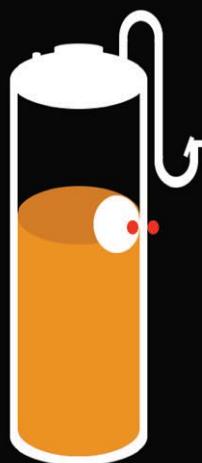
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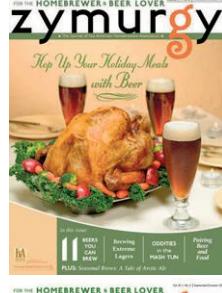
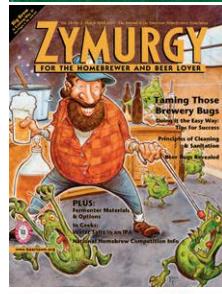
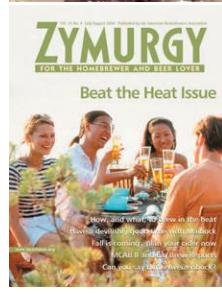
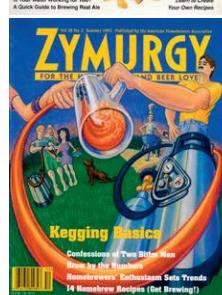
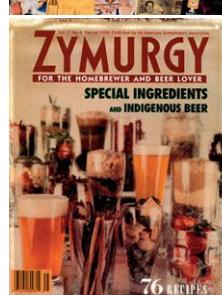
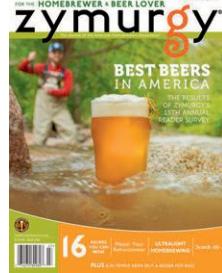
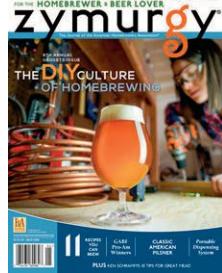
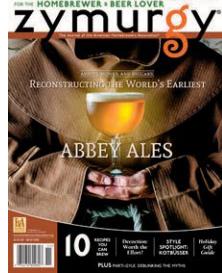
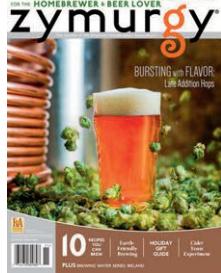
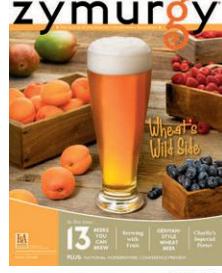
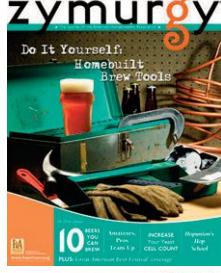
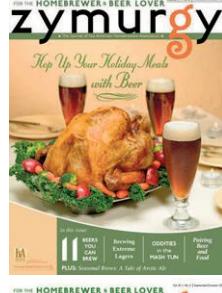
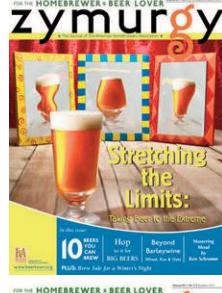
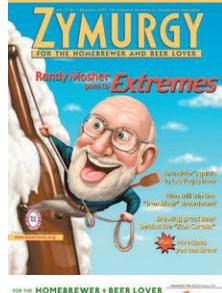
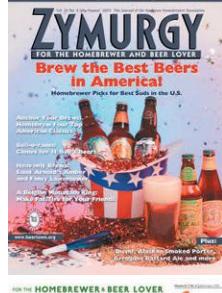
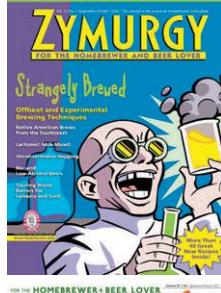
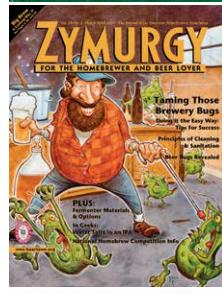
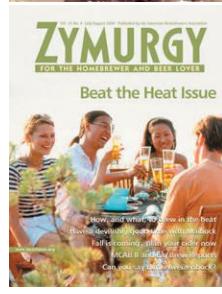
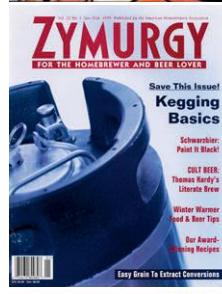
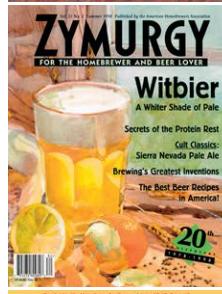
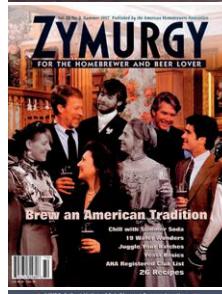
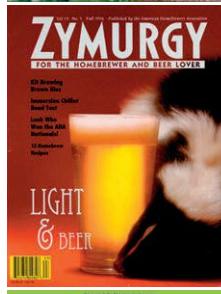
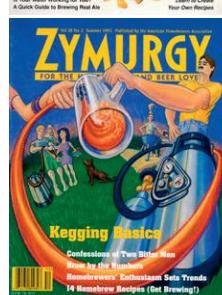
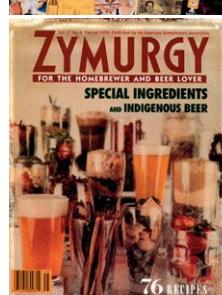
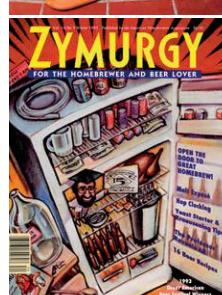
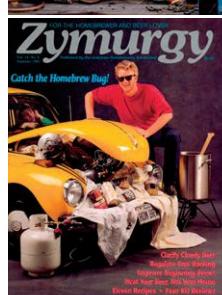
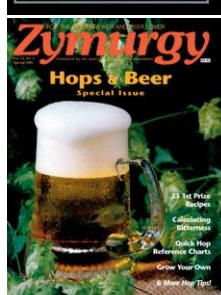
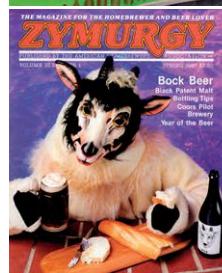
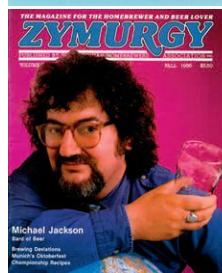
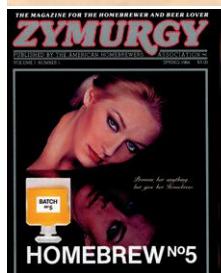
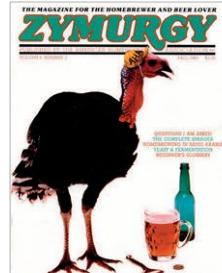
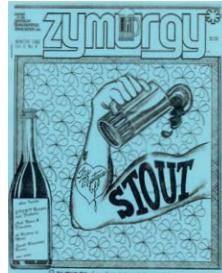
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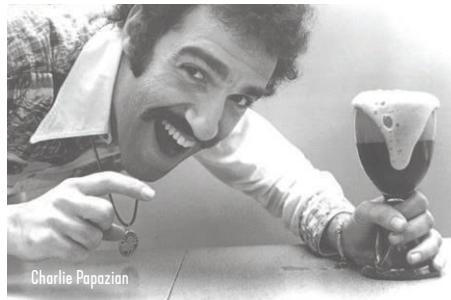
Brewing Up Zymurgy

40 Years of Beer

By current and former Zymurgy editors

The first issue of *Zymurgy* greeted thirsty homebrewers in December 1978. In the four decades since, our homebrew-fueled passion has burst out of the kitchen and into the taproom, with an estimated 90 percent of America's more than 6,000 small and independent breweries having been started by homebrewers.

Forty years is a big deal, and a certain amount of reflection is inevitable. So grab a homebrew and join *Zymurgy* editors past and present to see where we've been, how far we've come, and where we're headed.



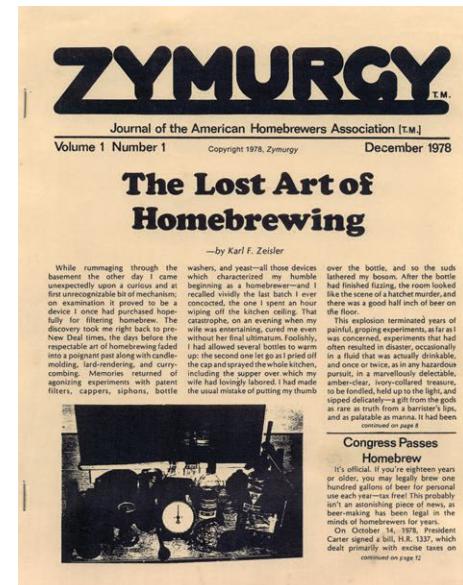
CHARLIE PAPAZIAN

I've worked directly with a lot of excellent editors and art directors. I recall that our early special issues were real game changers. The All-Grain issue, the Special Ingredients issue, the Troubleshooting issue, the Beer Styles issue, the Hops issue: all were ground zero for so much that followed. Even now, when I look back at the **Special Ingredients** issue that was published in 1994, it stands up to a lot of the information that is being published today.

Our Fall 1981 "bloopers" issue was a compilation of crazy, silly mistakes that were common (and not so common) with homebrewers at the time. In retrospect, that issue is an outstanding testament to the driving forces that helped popularize homebrewing. We not only shared our mistakes, but we laughed at ourselves, learning all the time and improving our beers. It was the underlying foundation of collaboration and fun. It helped people feel welcome and not intimidated about starting to homebrew.

The Fall 1982 cover of *Zymurgy* was a hidden gem. It shows several hands toasting with beers. One hand was in *The Guinness Book of World Records* [now simply *Guinness World Records*]. The fingers on that huge hand were so big around that they equaled the diameter of an Eisenhower silver dollar! You could fit one of those huge silver dollars through his ring. He lived in Boulder at the time.

I think one of the most important and valued relationships we had very early on was with a few newspaper editors from



Zymurgy, Vol. 1 No. 1, December 1978.

the Washington Post who contacted me out of the blue to say, "We want to help." They were big beer fans and opened a world of stories and valued relationships in those early days. Among them were Paul Freedman and Dan McCoubrey, both of whom later helped found the DC-Maryland area homebrew club BURP (Brewers United for Real Potables).

The cover of the premiere issue of *Zymurgy* in December 1978 (see above) featured a reprinted story about homebrewing from the 1930s. That story wasn't just a random find. It was written by our copy editor's father. Kathy McClurg volunteered to copyedit (that's what she did for a living

over the bottle, and so the sudsathered my bosom. After the bottle exploded, I was shocked to find like the scene of a hatchet murder, and there was a good half inch of beer on the floor.

This explosion terminated years of painless brewing experiments that had often resulted in disaster, occasionally with tragic results. It was unpredictable, and once or twice, as in any hazardous pursuit, in a marvelously detectable, though not necessarily predictable, manner. The explosion was so violent that it was fended, held up to the light, and sipped directly—a far from the most palatable of manna. It had been

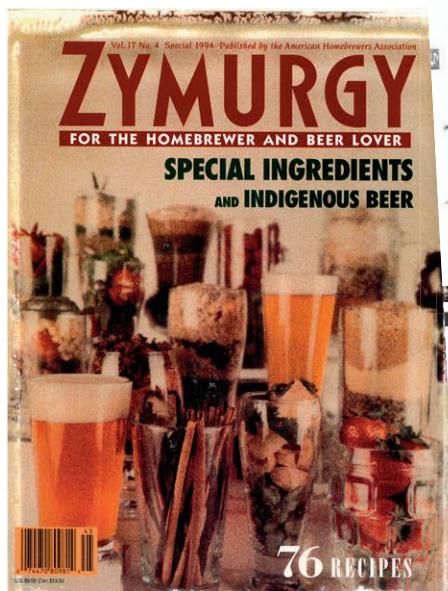
continued on page 8

Congress Passes Homebrew

It's official: Since 1976 (when you or older, you may legally brew one hundred gallons of beer for personal use without paying taxes), homebrew isn't an astonishing piece of news; as beer-making has been legal in the midwest since the 1930s.

On October 14, 1976, President Carter signed a bill, H.R. 1327, which dealt specifically—a far from the most palatable of manna. It had been

continued on page 12



BREWING WITH GINGER IS A SNAP

BREW BLACKBERRY BEER



Even now, when Charlie looks back at the Special Ingredients issue from 1994 (above), it stands up to information being published today.

for the University of Colorado) with the very first issue of *Zymurgy* and she continued to copyedit for over 20 years.

There are so many more important people and events that come to mind with every one of those early issues. We were all explorers wading into the hidden jungle of beer knowledge. Little did we know that there was a Lost City of Beer we discovered with our endeavors.



TRACY LOYSEN

I started off as a word processor and gradually worked up to *Zymurgy* editor, though I think I was probably surreptitiously copy-editing on the fly from the get-go. That was in the days of the Vector, an ancient computer that ran so slowly I felt compelled to work two machines at once, for which I was known as the Vector Queen.

I got the job as a part-time gig while taking classes at the University of Colorado in preparation for applying to graduate schools in psychology. It turned into a real

job without me quite knowing what had happened, and it ended up being really hard to leave. In fact, I didn't fully leave for another few years and kept editing books for the Association of Brewers (now the Brewers Association) during my summers of graduate school.

I remember that Charlie went to Thailand once and came back with small, swan-shaped, painted boxes for each of us with little pebbles inside and that he issued us all a challenge: "Come to my office if you dare." How could anyone resist? Apparently, some could, but I have no idea how. Not me—I knocked on the door and was invited to sit down.

He pulled out from behind his desk a bottle of brilliant chartreuse-colored alcohol with a dead snake curled up inside, set it on the desk along with a shot glass, and announced that if I wished on the pebble and took a shot of the liquor, my wish would come true. OK, then. Down the hatch!

One of my most memorable articles was one we couldn't even publish. It was an unsolicited piece sent to us by a very creative and resourceful inmate. It was about all the ways he and his buddies found to liberate fermentables of all kinds and how they constructed and hid their distilling systems in the prison ceilings. Impressive and very entertaining.

I didn't even like beer when I came to work at the AHA, but over the course of my few years there, I learned to appreciate a lot of beer styles and made a couple of pretty good ones in my brief run as a brewer. I even made an all-grain brewing setup for my brother as a wedding present. What I

The Fall 1982 cover of *Zymurgy* was a hidden gem. It shows several hands toasting with beers. One hand toasting beer (bottom right) was in *The Guinness Book of World Records*.

remember most [about working at the AHA] are the people I worked with, the antics, the good-heartedness, and the camaraderie. It was one of the best jobs I ever had.



DENA NISHEK

I helped edit and publish all manner of publications, including catalogs, directories, books, and magazines. Our process was cumbersome by today's technology standards. In the early '90s, the AHA had just gotten Mac computers. There were never-ending struggles to get articles from authors in a format we could use. I'm talking handwritten documents, faxes, and floppy disks. I often reformatted or retyped articles.

Our editorial process required each reviewer to use an assigned pen color because we passed print copies around, including to out-of-house grammarian extraordinaire Kathy McClurg. We had to know who made which marks so we could

clarify if necessary. If folders went missing, there were likely suspects.

The art department at that time saw the transition from waxy paste-up to digital layouts. I consulted with a community of technical editors, and, of course, Charlie Papazian, who ensured the content was solid. I'm thankful for the creative brewers and beer lovers who contributed to the magazine in so many ways on topics from mathematics to beer styles and beyond.

My favorite projects were the special issues where we dove deep into a subject from many angles without the usual constraints. I'm especially proud of the lasting resources we created on special ingredients and indigenous beers, grain, hops, brewing traditions, and equipment. Several of those indigenous beers went on to find commercial exposure.

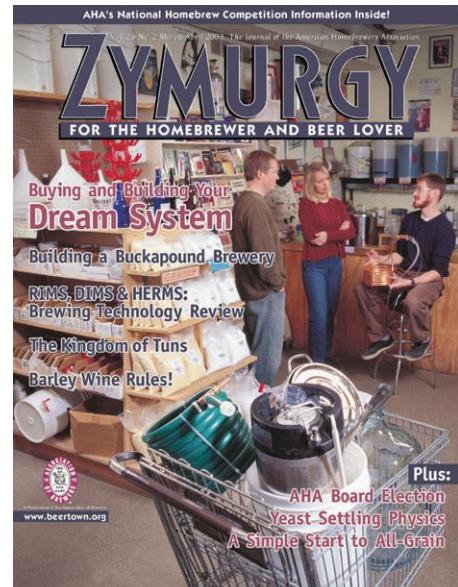
Working at the Association of Brewers in my 20s was a lot of fun, with Beer Camp, hop tours in Yakima, conferences, the Great American Beer Festival® (GABF), and cigars. My husband will never understand why I left a job in which beer arrived with the press releases. I learned how to brew beer and mead, the nuances of beer styles, how to taste and judge beer (thanks to many, including the late James Spence) in addition to the business of magazine production. And I'm grateful for the lasting friendships from my time on staff. Happy anniversary, Zymurgy.

JILL REDDING

I started at the Brewers Association (BA) in 2002 as associate editor for *Zymurgy* and *The New Brewer*, which was a contract position. Before that, I was senior editor at *Inside Triathlon* magazine. I had left *Inside Triathlon* to focus on freelance writing and editing and heard through a former coworker about an opening at the BA. Little did I know that I would become the full-time editor-in-chief for both *Zymurgy* and *The New Brewer* in 2006. I learned a lot in a very short time about beer and brewing. In 2016, with the growth of both magazines, we decided that each should have its own dedicated editor. It was a tough decision, but I ultimately decided to stay with *The New Brewer* as I felt that its format and content were more suited to my strengths.

Diana Davis's article "Brew Dogs" in the Sept/Oct 2012 issue stands out. That humorous piece about, well, brew dogs, became one of the most popular *Zymurgy* articles of all time, and it inspired a great many readers to send in photos of their own dogs, cats, chickens, and even a deer who became part of their brew days. The photos just keep on coming and it's

"We were all explorers wading into the hidden jungle of beer knowledge."



Jill was on the cover of the March/April 2003 issue of *Zymurgy*.

fun to see. In addition, the Mar/Apr 2003 issue is memorable to me because I'm on the cover. It's hanging among a gallery of *Zymurgy* covers in the hallway right outside my office, so I have to look at it every day. Several BA staffers have made the cover of *Zymurgy* and *The New Brewer* over the years.

In the May/June 2006 issue, Drew Beechum wrote an article about Champagne beer. That article, like a lot of Drew's brewing experiments, was ahead of its time. At a beer breakfast at GABF a few years later, Boston Beer's Jim Koch told the crowd that he reads every issue of *Zymurgy* for inspiration. When I thanked him afterward, he said, "It's true. In fact, our



"Brew Dogs" by Diana Davis in the Sept/Oct 2012 issue of *Zymurgy*.

Infinium [a Champagne beer collaboration with Weihenstephan] was inspired by an article I read about in *Zymurgy*." Well, that made my day, to say the least.



Drew Beechum wrote an article about Champagne beer in the May/June 2006 issue of *Zymurgy*.

We also had a cover article about kumquat beers in Mar/Apr 2014. I remember a professional brewer telling me afterward that they had decided to brew a kumquat beer. They thought they were hitting on something that hadn't been done before, and then that issue of *Zymurgy* arrived in their mailbox the next day and took some wind out of their sails. We had a good laugh about it.



The March/April 2014 issue of *Zymurgy* featured kumquat beers.

I enjoyed my tenure at *Zymurgy* tremendously. Homebrewers are endlessly creative and passionate about what they brew. Cheers to Charlie for starting such an amazing magazine that has been a tremendous source of education and inspiration for brewers, both amateur and professional, for 40 years!

DAVE CARPENTER

My first two published articles as a fledgling writer found homes in *Zymurgy* (Nov/Dec 2012 and Jul/Aug 2013), so joining the AHA as *Zymurgy* editor in 2016 was a bit like coming home. In the three years in which I have been entrusted with the magazine, I have enjoyed meeting AHA members across the country and around the world at Homebrew Con, AHA Rallies, the Great American Beer Festival, and other events.

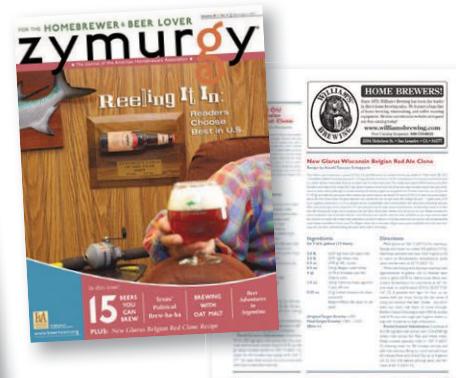


< *Zymurgy*, Nov/Dec 2012
▼ *Zymurgy*, July/Aug 2013



in the world. They have to be. I've never been much for entering my own beers in competitions—too miserly with my homebrew, maybe—but for me there is no better feeling than learning I've had a part in someone else's success. Mind you, it doesn't happen often, but here are a couple of times it did.

During an email conversation a few years ago with member Jason Goodloe, who took a best-of-show award at the DC Homebrewers Club Cherry Blossom Competition, I asked about the inspiration for his winning recipe, and he informed me, "You are probably going to get a kick out of this. I started going back through my notes to respond. I found that a recipe that you wrote in July/August 2007, New Glarus Wisconsin Belgian Red Ale Clone, was one of the recipes that I used as the basis for my beer."



The March/April 2007 issue of *Zymurgy* included a New Glarus Wisconsin Belgian Red Ale Clone.

It has been exciting to work closely with Jason Smith (*Zymurgy*'s art director) and Gary Glass (AHA director) on the refreshed design of the magazine that you hold now. While the updated look and feel are the most obvious changes for readers, the refresh has given us an opportunity to build a more robust publishing process behind the scenes that will dramatically improve our ability to deliver the kinds of content we know AHA members want.



AM AHL TURCZYN

Some of my greatest *Zymurgy* moments over the past 20 years come from learning that an article or recipe of mine helped someone win at a competition. Brewers who medal at club-sponsored competitions and the National Homebrew Competition (NHC) are truly some of the finest brewers

More recently, I was emailing Jack Price, gold medal winner of the 2018 NHC Strong Belgian Ale category for his BGSA "Golden Diablo," to get a few missing details on his recipe, and he was kind enough to write, "I forgot to tell you that my original recipe back in 2015 was based on a Russian River Damnation clone.

Then you published an article in the July/August 2016 issue of *Zymurgy* and had a recipe for The Blue Devils BGSA. I used that as the basis for my next batch and then tweaked from there. So, a big thank you for your great article and focus on technique." The irony was that I'd been so intrigued by the improvements he'd made on Blue Devils, that at the time he wrote that email, I had a batch of his Golden Diablo in my conical at home.

These kinds of vicarious victories and the brewers who show so much passion for the hobby really make it all worth it for me.

Happy birthday, *Zymurgy*!

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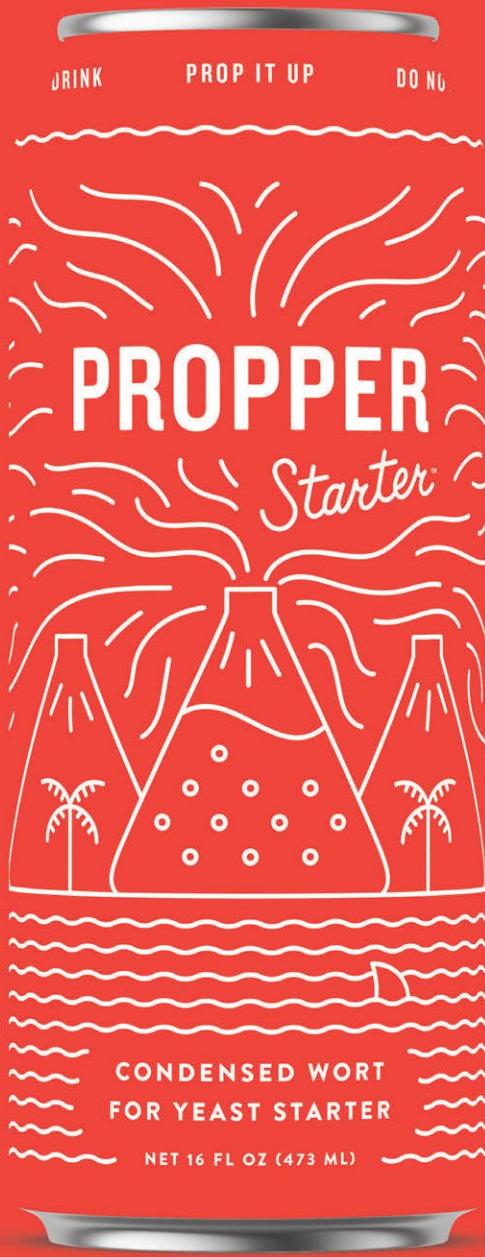
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KRÄUSENING

By Chris Colby

IMPROVE YOUR BEER BY ADDING MORE BEER

Homebrewers sometimes wonder what they can add to their beer to make it better. In fact, there may be an extra ingredient that can transform your good beer into better beer. That ingredient is beer—more specifically, kräusen beer.

Kräusening (pronounced “CROY-zen-ing”) is an old lager brewing technique in which a dose of fresh, actively fermenting beer is added to another beer that is approaching final gravity. The fresh beer reinvigorates the main batch, helping it reach terminal gravity more quickly and scrubbing residual oxygen in the process. Usually, the amount of added kräusen beer is 5 to 10 percent of the volume of the main batch, although occasionally it’s more.

More importantly, kräusening can quickly clean up com-

pounds in “green” beer that need to be reduced during conditioning, such as diacetyl. I find that many homebrewed lagers have a distinct “homebrew lager” character, and kräusening can eliminate this in an otherwise well-brewed beer. Kräusening generally occurs at the same temperature as the main fermentation, and, because it reduces diacetyl, the technique can make a diacetyl rest unnecessary. (For more on diacetyl, see Beer School on page 27 of this issue of *Zymurgy*.)

For commercial brewers, kräusening has the additional benefit of filling tanks. Brewers leave a fair amount of headspace to accommodate the rising cap of fermentation foam. The specific volume of headspace depends on yeast strain and fermentation condi-

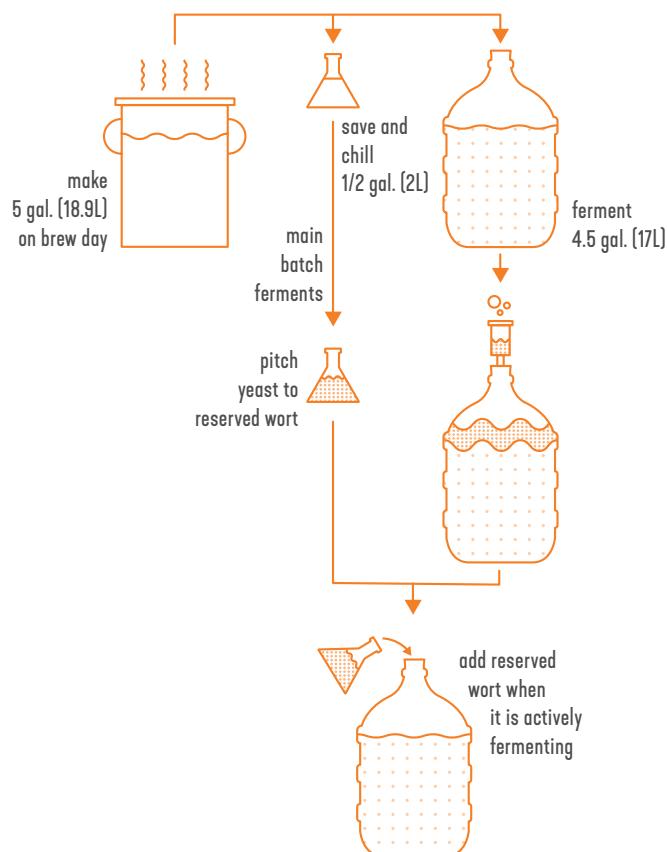
tions, but around 20 percent is not uncommon. Adding kräusen beer near the end of fermentation reduces headspace in the fermenter and allows the brewery to achieve greater throughput.

Many commercial breweries also “cap the tank” after kräusen beer has been added. The tank is sealed, and carbon dioxide (CO_2) from the reinvigorated fermentation is trapped, which carbonates the beer. A pressure relief device called a spunding valve releases excess pressure that builds up in the capped tank to prevent over-carbonation. Kräusening can sometimes produce unwanted hydrogen sulfide (H_2S) during the final bit of fermentation, and the beer can retain a sultry odor if the tank is capped. Periodic venting, however, can ease this problem.

It's routine for pro brewers to have the same type of beer in tanks at several stages of fermentation, which makes kräusening relatively straightforward in a commercial setting. Kräusening is not common among homebrewers for the opposite reason—few of us keep more than one batch of the same recipe going simultaneously. There are, however, a few viable options for those who want to try this practice at home.

OPTION

2



SAVE SOME WORT

You can also save a bit of wort on brew day and withhold it until the end of the main fermentation. For example, you could prepare and boil a 5-gallon (18.9-liter) batch of lager wort, reserve half a gallon (about 2 liters) after chilling but before aeration and pitching, and store it cold. Then, when your lager fermentation slows, pitch a healthy amount of lager yeast into the withheld wort and let it start fermenting. When this kräusen wort is strongly fermenting, add it to the main batch.

For this to work, you need to be very sanitary in your handling of the kräusen wort and keep an aliquot separate pitchr yeast strain healthy while the main batch ferments. If you store the reserved wort in a sanitized glass bottle, you can put the bottle in a plastic bag and pour crushed ice around it. Store the bag in your refrigerator and the wort will remain somewhere between fridge temperature and 32°F (0°C). The ice is not strictly needed, but I think it helps a little.

You can reserve a small volume of yeast from the yeast starter and store it in the fermentation chamber while the main batch ferments. If you make a properly sized starter and wish to add kräusen beer in a volume representing roughly 10 percent of the finished volume of beer, save about 15 to 20 percent of the yeast from the starter to pitch to the kräusen wort.

You want the kräusen wort to start fermenting within a day or so, and the yeast you set aside from the starter will be several days old when the time comes to kräusen. So, slightly overpitching the kräusen beer is a good practice. Alternately, you could use a sachet of dried lager yeast as the source of yeast for your kräusen beer.

This method works well if you maintain enough healthy yeast to get the kräusen beer vigorously fermenting in one or two days.

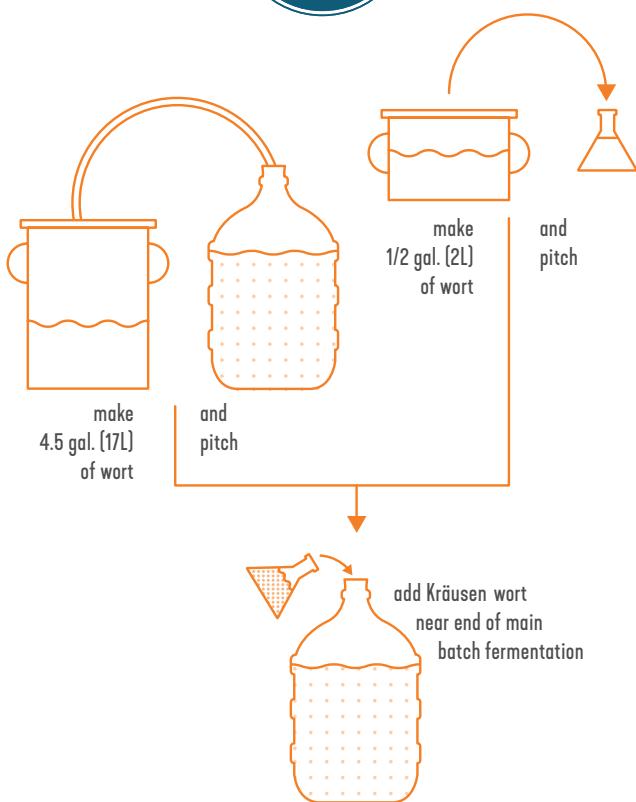
BREW IT AGAIN

The first option is obvious: brew the same beer again, right as the first fermentation is winding down. On the plus side, you generate fresh kräusen beer of the right type at the right time. The downside is you have to brew the same batch twice (or more).

At the 5-gallon (19-liter) scale, one way to do this is to brew 4.5 gallons (17 L) of When fermentation starts winding down, brew 5 gallons (18.9 L) of the same beer. When this second beer reaches high kräusen (the peak of fermentation), or slightly before, transfer half a gallon (about 2 liters) of fermenting beer to your initial batch. This will leave you with 4.5 gallons (17 L) of fermenting beer beone vessel and 5 gallons (18.9 L) of kräusened beer ibehe other. When the fermentation of the second batch is wrapping up, you can brew a third batch, and so on until you want to brew something different.

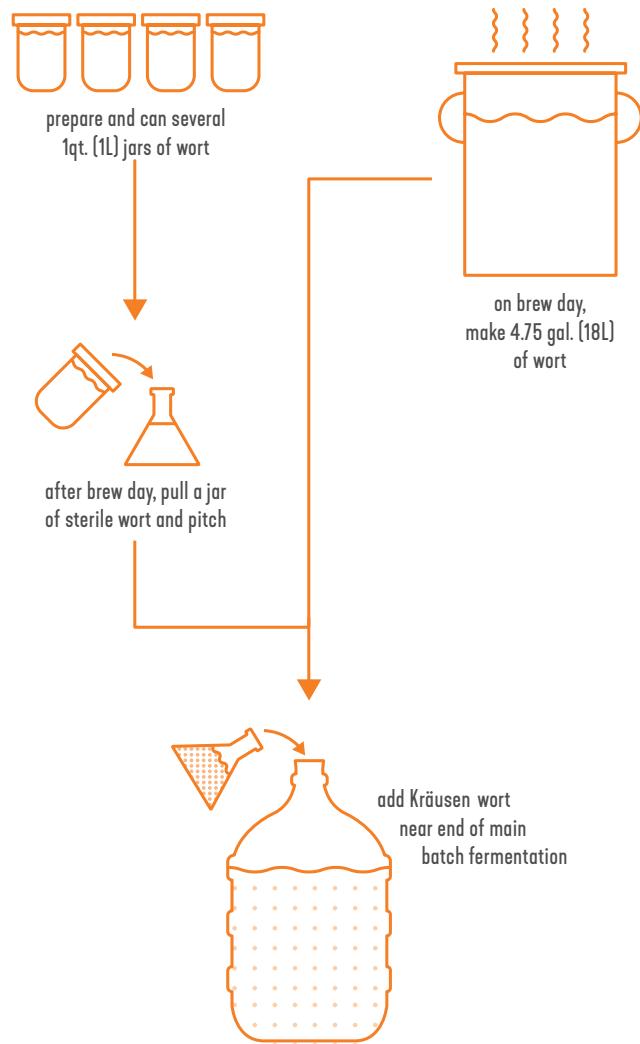
OPTION

3



OPTION

4



MAKE A SMALL BATCH OF KRÄUSEN BEER

You can also make kräusen wort as needed. Simply wait for the proper time—three or four days before you expect the main fermentation to finish—and make the kräusen wort by scaling down the beer recipe and brewing a small batch of it. Pitch yeast to the kräusen wort, let it ferment a day or two—however long it takes to reach peak fermentation—and then pitch it. This is conceptually simple, and the only issue to resolve is where your yeast will come from. As before, you could save some from your yeast starter or use a fresh package of yeast.

A simpler alternative is to brew your main beer to be slightly more flavorful, more colorful, and hoppier than the desired finished beer. Then you can kräusen it with pale, unhopped wort. This wort can be made by mashing pale grains or simply by boiling malt extract. The slightly concentrated beer then hits the target malt flavor, color, and hop bitterness when diluted with the pale kräusen wort.

To do this for a 5-gallon (18.9-liter) batch, use full quantities of specialty grains and hops—the amounts you would normally use to make 5 gallons (18.9 L)—to brew just 4.5 gallons (17 L) of slightly concentrated beer. Decrease the base grains (or malt extract) so that the resulting 4.5 gallons (17 L) of beer has the correct original gravity.

When the beer nears the end of fermentation, make 0.5 gallons (1.9 L) of pale, unhopped kräusen wort, which should have the same original gravity as your intended beer. Next, pitch the yeast. When the kräusen wort is fermenting strongly, add it to your batch. You now have 5 gallons (19 L) of beer with the right proportion of specialty malts, the right bitterness, and the correct measure of base grain for the appropriate “virtual” original gravity.

PRESSURE CAN SOME WORT

If you brew a lot of lagers, one way to make the kräusening process easier is to have kräusen wort on hand whenever you need it by pressure canning some wort. One quart (0.95 L) is roughly 5 percent of a 5-gallon (18.9-liter) batch; two quarts (1.9 L) is 10 percent. Canning kräusen wort ahead of time lets you prepare kräusen beer with little effort. Just pour the wort into a starter vessel and pitch it.

Think of all the lagers you'd like to brew, and prepare kräusen wort at the lowest original gravity, lightest color, and lowest level of bitterness of all these beers. Calculate the ingredients that go into each quart (liter) of kräusen wort, and use that information when formulating the grist and hop charges for your main batch. Formulate your recipe as you normally would (most likely using beer recipe software) and then subtract the ingredients in the quart (liter) of kräusen wort from your main recipe. Use the altered recipe to brew 4.75 gallons (18 L) of lager. When you add the kräusen beer, you will have 5 gallons (18.9 liters) of beer brewed with the original ingredient list for the full batch size.

“
Kräusening is closely associated with lager brewing for a number of reasons, but there's no reason you can't kräusen any beer: lager, ale, or hybrid.

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KEYS TO SUCCESS

Kräusening is closely associated with lager brewing for a number of reasons, but there's no reason you can't kräusen any beer: lager, ale, or hybrid. The biggest keys to kräusening success are

1. Making sure your kräusen beer is free from contaminants.
2. Making sure your yeast is healthy.
3. Ensuring that the kräusen beer is vigorously fermenting when the main fermentation is just about ready to quit.

The biggest potential problem is excess sulfur production. However, if you use an airlock to allow gas to escape the fermenter—i.e. don't “cap the tank”—this should not be a problem.

Chris Colby has been a homebrewer since the early 90s, when he studied molecular evolutionary genetics at Boston University. After receiving his PhD in 1997, he briefly worked in educational publishing before becoming a beer writer and editor. He is the author of *Home Brew Recipe Bible* and is currently editor of *Beer and Wine Journal* (beerandwinejournal.com). He lives in Bastrop, Texas, with his wife and many cats.



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CAELIA

EXPLORING ANCIENT IBERIAN BEER AND BREWING

By Travis Rupp

From black IPA and barrel-aged sours to hazy IPAs, pastry stouts, and even classic lagers, trends ebb and flow with the demands of our ever-changing and increasingly educated consumer. While the shifting demands of the drinking populace are challenging and exciting for America's more than 6,500 registered breweries, our nation has, in fewer than 250 years of independence, developed distinct beer style regions. From West Coast IPA to New England IPA, beer styles are defined by location and culture.

As a beer archaeologist who works for Avery Brewing Company in Boulder, Colo., and teaches at the University of Colorado, Boulder, I have spent the last five years exploring how people have produced, defined, and viewed beer throughout history. This journey has led to my developing the Ales of Antiquity Series at Avery Brewing Co. and the recreation of eight ancient beers thus far. We recognize that history often repeats itself, and the idea of regions, nations, and cultures defining beer styles is deeply rooted in ancient Western history. Endeavoring to complete my first book on the topic, I have settled on ancient Iberia (modern-day Spain) as the most appropriate location to conclude this examination of 8,500 years of history.



The monks from Monastero di San Benedetto in Italy visit Avery Brewing Co. in July to try Ales of Antiquity "Benedictus" and "Nursia."

Left to right: Colin Quinn (Innovation and Wood Cellarman, Avery Brewing Co.), Father Martin (monk at Monastero di San Benedetto), Travis Rupp (Innovation and Wood Cellar Manager, Avery Brewing Co.), Brother Augustin (Head brewer and monk at Monastero di San Benedetto).

A BEER BY ANY OTHER NAME

The use of different terms to describe different styles of beer extends back some 7,000 years in Western culture. From the Akkadian *shikru* to the Israeli *shekar*, and the Egyptian *zythum* to the Illyrian *sabaia*, the ancient Greeks and Romans titled beer according to its origin. In fact, there is no universal word for beer in ancient Greek or Latin. Though perceived as predominantly a wine-centric culture, I argue that the Romans were the first culture to stylize beer.

During Emperor Dicoletian's tax reforms (284–305 CE) following the utter decimation of the Roman economy during the Third Century Crisis, a milieu of terms appeared concerning the cost to produce and price of beer in the provinces. Each country, culture, tribe, and region had a distinct term for beer(s) produced in a given area. The charge to consume said beverages may have been tied to quality as well. *Zythum* (Egyptian beer) came at a cost of 2 denarii per pour, versus 4 denarii for *cervesia* (Celtic wheat beer) and 8 denarii for the cheapest wine.

Ancient Iberia was certainly privy to these qualifications following the Roman invasion in 206 BCE. Like the United States, this peninsula had a longstanding history of war, shifting cultural norms, and designation as an ancient melting pot of peoples. Its known history includes native tribal constructs, Phoenician colonization from the Near East, Celtic migration from northern territories, southern invasion from the Carthaginian Empire, and the eventual dominion of the Roman Republican Empire.

The Romans provide a glimpse of certain time periods and ethnic populations



TRAVIS RUPP AND THE ALES OF ANTIQUITY SERIES AT AVERY BREWING CO

- **Nestor's Cup, Ancient Mycenaean Beer**
c. 1350 BCE
(Release Sep 2016)
- **Khonsu Im-Heb, Ancient Egyptian Beer**
c. 1800 BCE
(Release Dec 2017)
- **Pachamama, Ancient Peruvian Beer**
c. 1100–1400 CE
(Release Dec 2017)
- **Ragnarsdrápa, Ancient Viking [Finnish] Beer**
c. 900–1000 CE
(Release April 2017)
- **Nursia, Ancient Monastic Beer**
c. 825 CE
(Release Jan 2018, re-release Oct 2018)
- **Benedictus, Ancient Monastic Beer**
c. 825 CE
(Release Jan 2018, re-release Aug 2018)
- **Beersheba, Ancient Israeli/Jordanian Beer**
c. 3rd cent. BCE
(Release May 2018)
- **George Washington's Porter**
late 18th century CE
(Tentative Release Nov/Dec 2018)



Left to right:

Straw filtration for Benedictus.

Avery Brewing Company's Barrel Warehouse.

regarding beer. However, when exploring these descriptors, we must also remember that their accounts come from Roman elites—just one percent of the population was literate. Imagine if we left it to one percent of the population to write our nation's history! The conclusions drawn would undoubtedly be startling and misleading.

Nonetheless, there are several repeated clues, facts, and terms used by various authors that help us understand what the ancient Spaniards were drinking. The Celtiberians (located in central Iberia) are

credited with having developed *caelia*, a beer consisting primarily of fermentables derived from unmalted wheat. Their very name bears witness to where the trade may have derived.

ANCIENT IBERIAN BEER

The Celtiberians were a migratory subset of the Celtic peoples of the North. Julius Caesar is one of the first authors to indicate that "Celt" and "Gaul" were sweeping general terms for a mass of northern peoples spanning from Britain all the way to Anatolia south of the Black Sea. In Celtic regions of northwestern Europe, evidence for scalable production of beer is found, most notably in Hochdorf, Germany, and in Roquepertuse, France. In the latter example, evidence was uncovered for the production of *corma*, a hazy beer consumed by the masses. A more detailed description of this beer is provided by Athenaeus of Naucratis (end of the second to early third centuries CE). He indicates that it was a wheat beer augmented with honey. This beer likely bore semblance to the uniquely Spanish *caelia*.

But why not simply look at native texts from the region to discern the recipe for this beer? Posidonius (c. 135–51 BCE) tells us there were no written records to study from the Celtiberians because their culture consisted purely of an oral tradition. When it comes to literary examples, we are forced to rely on the literate, Roman elite. Most of their descriptions reference Spanish *caelia* and *cerea* (which I argue was barley based, distinguishing it from *caelia*) as inferior to wine. However, their descriptions of the effects and bene-



Left to right:

Jonathan Carlyon in Calatanazor, Spain, with a colleague from the Ministry of Development; Jonathan Carlyon with students at the CSU Ramskeller in Fort Collins, Colo.; Cold Conditioned Benedictus - Ancient Monastic Beer c.825 CE.



THE SEARCH FOR CAELIA

By Jonathan Carlyon

I work at Colorado State University (CSU) in Fort Collins, Colo., as a professor of Spanish literature. When I first learned about CSU's new fermentation sciences major, I wondered what types of collaborative opportunities might be available. However, when I spoke to anyone from Spain about beer, they directed me to the monks in Belgium. Belgium was once part of the Spanish Empire, but I soon learned that the history of beer far predated these monks.

I asked a colleague from the University of Valladolid if he had heard about pre-Roman beer in Iberia. An archeologist by training, he preferred to focus my attention on indigenous winemaking. Although the idea of pre-Roman wine fascinated me—I had always associated wine production with the arrival of the Romans to the peninsula around 200 BCE—my university had a focus on beer, and I needed to keep searching.

Since the Roman conquest of Spain, wine has been the culturally acceptable drink. Indeed, when Spain itself became a conquering empire a thousand years later, the first historians echoed their Roman predecessors by giving greater attention to grapes than to wheat.

One colonial Spanish historian, Gonzalo Fernández de Oviedo (1478–1557), wrote in his *Summary of the Natural History of the Indies* that the New World offered luscious vines and grapes. Specifically in the Caribbean, he stated, “In those parts of the main land in the mountains and wooded forests one often finds very good wild vines, very full of bunches of grapes, not small, but even larger than those in Spain raised in groves, and not so sour, but better and of better taste, and I have eaten them many times and in great quantity.”

Nonetheless, although Spanish conquistadors may not have known about indigenous American alcohol, I knew there were numerous examples of these beverages in pre-Colombian times, such as *pulque* in precolonial Mexico and *chicha* in Peru. Might the same be true for indigenous Spain?

At this point, I learned about *caelia*.

While conducting a search of databases of Spanish periodicals, I discovered an interview of a Spanish brewer in Soria, Marcos Sanz. To draw attention to the earliest brewers from his part of the country, he had named his company CAELIA, the ancient name for beer in Spain. Fascinated, I shared this information with my biologist friend Manolo, and we proceeded that summer to attempt to find the pre-Roman brew.

Background research revealed that although forgotten today, the Romans had nonetheless been aware of indigenous beer production on the Iberian Peninsula. Roman historian Pliny the Elder wrote about Spanish beer in his famous *Historia Naturalis*, published in 77 CE: “From the cereals are also made beverages called zythum in Egypt, *caelia* and *cerea* in Spain.” Pliny even reported that “the froth of all these is used by women as a cosmetic for the face.” However, Pliny’s bias towards wine was apparent: “But to the beverages themselves, it will be best to pass on to a discussion of wine.”

As Manolo and I set out to find Spanish *caelia*, we were encouraged by another early writer, Paulus Orosius, who also speaks of *caelia*. Born in Galicia around 375, Orosius speaks of the military vigor of the Numantians, who shot out of their doors to battle the Romans “after having drunk a large quantity, not of wine—which doesn’t abound in his area—but of an elaborately made wheat juice, a juice they call ‘*caelia*’ because it is necessary to heat it.” So, we traveled to Soria, and in this land of the Numantians, Manolo and I finally found Caelia Cerveza Artesana.

fits of these beers indicate that *caelia* and *cerea* were yeasty, viscous beverages.

When Pliny the Elder tells us that the yeast of *caelia* and *cerea* was used as a facial cream for women (*Nat. Hist.* 22.81), we can discern that they were either collecting the kräusern from the top of the fermenter or the flocculated material from the bottom of the vessel. He also mentions that foam during fermentation was collected and used to make a “lighter” bread than that of nearby cultures (18.68). Essentially, one could achieve the same result by using live cultures in beer to make a sourdough starter and vice versa. The ancients knew something was special about the byproduct of fermentation nearly 1,800 years before Louis Pasteur delivered his groundbreaking study on yeast.

These characteristics likely prompted further angst from the snobbish Roman elite. In a first century BCE medical text, Dioscorides indicates that *kourmi* (a term bearing semblance to the early French *corma*, a hazy beer) was “made from barley, and often drunk instead of wine, produces head-aches, and is a compound of bad juices and does harm to muscles. A similar drink may be produced from wheat, as in western Spain and Britain” (*De Materia Medica* II, 88). Though he is undoubtedly trying to sully the reputation of this “barbaric beverage,” what he describes mirrors the results I experience after consuming three or four New England IPAs in one sitting. Though mighty tasty, residual yeast can produce a raging hangover!

FROM BEER TO WINE

If beer is so deeply rooted in ancient Spanish culture, why do we affiliate Spain with wine? As the old saying goes, history goes to the

victor. Not only did Roman texts and later Christian doctrine belittle and damn the production of beer in provinces like Spain, they literally sought to rewrite the botanical landscape of Iberia. Prior to the Roman invasion of 206 BCE, wild and domesticated barley and wheat dominated Spanish agriculture. The grape was all but nonexistent.

Though grapes likely grew wildly in some Spanish environs, archaeology, archaeobotany, and literature bear no witness to grape farming and winemaking prior to Roman arrival. Roman dominion forced the domestication of grapes in Spain. After bringing grapes to Iberia at the end of the third century BCE, the industry boomed and continued to thrive to the present day. Beer production hung on by a mere thread. Isidore of Seville (560–636 CE) tells us that beer could still be found in parts of Spain “not fertile in wine” (*Etym. 20.3.18*). The term *caelia* would even reemerge in eighth and ninth century CE texts as referential of Spanish beer.

What else can we discern about ancient Iberian brewing? Though there are many references to Spanish beer in the Roman record, they become repetitive. Further explanation lies in the very construct that literally “damned” beer throughout Europe. As Saint Cyril indicates in the fifth century CE, drinking wine over beer in the provinces acted as a symbol of Christian conversion (*Cyril, Comm. In Is. 2.4.287–288*). This became the status quo for several centuries throughout Europe, but the likes of St. Brigid of Kildare in Ireland (451–525 CE) and Saint Benedict of Nursia in Italy (480–543 or 547 CE) sought to preserve the art of brewing.

RECREATING CAELIA

I believe that Spanish *caelia* directly influenced the later monastic production of *celia*, a beer first referenced in about 825 CE and produced as one of three beer types at the Abbey of St. Gall in St. Gallen, Switzerland. *Celia* was a beer reserved only for traveling guests and the abbot of the abbey. It was the best and most expensive beer. References to and recipes for its production indicate that it was a gruit consisting of juniper, wormwood, marjoram, and several other strong spices. This beer also contained an exceptionally high amount of wheat. Horst Dornbusch indicates upwards of 35 to 40 percent of this floor-malted cereal. I recreated this beer in the Ales of Antiquity Series, and the sheer volume of wheat made me a bit nervous. Modern brewing systems don’t typically agree with such a high percentage of wheat berries in the grist.

The final product (named *Benedictus* and released in February 2018) turned out quite



BENEDICTUS

Ancient gruit ale

Recipe courtesy Travis Rupp and Avery Brewing Co.
Reworked from Travis Rupp's Ales of Antiquity Series at Avery Brewing Co.

Batch size: 5 US gal. (18.9 L)

Original gravity: 1.065 (16°P)

Final gravity: 1.016 (4°P)

Bitterness: 0 IBU

Alcohol: 6.5% by volume

MALTS

5.4 lb. [2.45 kg] German floor-malted Bohemian wheat malt (45%)

3.6 lb. [1.63 kg] German floor-malted Bohemian Pilsner malt (30%)

1.2 lb. [544 g] German floor-malted Bohemian dark malt (10%)

1.2 lb. [544 g] German smoked malt (10%)

9.6 oz. [272 g] acidulated malt (5%)

GRUIT BLEND

0.25 oz. [7 g] juniper

0.22 oz. [6.25 g] lavender

0.11 oz. [3.25 g] marjoram

0.10 oz. [3 g] wormwood

0.05 oz. [1.5 g] bay leaf

0.05 oz. [1.5 g] rosemary

ADDITIONAL INGREDIENTS

wheat straw

YEAST

Propagate yeast from any bottle-conditioned Trappist or monastic beer. Make a starter to verify yeast viability and vitality. A good commercial option is Wyeast 3787 Trappist Style High Gravity.

BREWING NOTES

Target a relatively high mash temperature so that the beer finishes near 4°P (1.016). I recommend 155–160°F [68.3–71°C].

Add the gruit blend 5 minutes before flameout, or steep after flameout for 15 minutes, agitating every 3–5 minutes (I prefer the results of flameout steeping.)

Filter the beer through wheat straw post-fermentation.

This beer would have consumed still, but it is very tasty and stable as a carbonated beverage. Feel free to follow standard bottle-conditioning protocol if you prefer effervescence.

well. Employing experimental archaeology further aided my theory that Spanish *caelia* and monastic *celia* were similar beers though separated by nearly 1,000 years. Employing the monastic process of cold conditioning, I sought to discern the stability and shelf life of the monks’ brew, which I fermented with yeast derived from Monastero di San Benedetto’s brewery *Birra Nursia*.

After four months of cold conditioning, the beer was immensely stable and even tastier than the beer when it was fresh. The spice load had mellowed and become more drinkable. After eight months, the beer continues to improve. This experiment brought me back to a rare statement uttered by Pliny the Elder concerning the stability of Spanish beer in the first century BCE.

Pliny claimed that beer made in the Spanish provinces could “bear being kept a long time” (*Nat. Hist. 14.149*). Is he indicating that ancient beer could have a shelf life? If

celia is the successor of *caelia*, I can see how and why. Yet, there are nuances and processes that make the Spanish *caelia* uniquely its own style. I plan to figure out what these are and release it as a part of the Ales of Antiquity Series in 2019. The cold-conditioned versions of *Benedictus* and *Nursia* (a concurrent monastic project) will be released in August and October 2018, respectively.

Travis Rupp is the research and development manager and beer archaeologist at Avery Brewing Company, where he has worked for over six years. He is also a full-time adjunct professor of Classics, Art History, History, and Anthropology at the University of Colorado, Boulder, where he teaches all things Egyptian, Near Eastern, Greek, and Roman. Travis is writing books on the beginnings of beer in the ancient Mediterranean and brewing in the early monastic tradition.

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GENEROUS FLAVOR:



*By Jim Vondracek,
with photography by Freddy Zavala*



Last May, I organized a beer and food pairing event that combined a joyful trifecta: homebrewing, having fun with friends, and doing good. It turned into a great evening, with six brewers, 55 attendees, a beautiful spring night in an urban courtyard, vibrant handmade beers, interesting pairings, and delightful conversation. And we raised funds to support a cause I believe in.

It all started with my desire to do a fundraising event for the Peace Camp, an interfaith effort that my wife, the pastor at Augustana Lutheran Church of Hyde Park, helped launch last year. Peace Camp is a three-night, multigenerational event with food, art, guest speakers, and discussions that end with s'mores around a campfire.

If you organize an event as a fundraiser, you have to be excited about the cause: your excitement will attract others and feed their involvement and investment. I had three goals for this event: raise funds for the Peace Camp, introduce newcomers to the wonderful world of fine beer and food pairing, and enjoy a fun, low-key evening with a good mix of program and conversation.

PAIRING FOOD AND HOMEBREW FOR A GOOD CAUSE



MELISSA AND PATTY'S SAISON SAISON

**Contributed by Patty McGuire Cook
and Melissa Edwards Hiller**

Batch volume:	10 US gal. (37.9 L)
Original gravity:	1.060 (14.7°P)
Final gravity:	1.008 (2.1°P)
Color:	7 SRM
Bitterness:	30 IBU
Alcohol:	6.9% by volume

MALTS AND SUGARS

21 lb.	(9.53 kg) Belgian Pilsner malt
1.5 lb.	(680 g) torrified wheat
1.5 lb.	(680 g) light Munich malt
2 lb.	(907 g) table sugar (sucrose), added to boil

HOPS

3.4 oz.	(96 g) Hallertau 4% a.a. @ 60 min
1.5 oz.	(43 g) Hallertau 4% aa @ 0 min (steep 5 minutes)

WATER

Ca 42 ppm, Mg 14 ppm, Na 13 ppm, SO₄ 10 ppm, Cl 18 ppm, HCO₃ 129 ppm.

YEAST

4 packs Wyeast 3711 French Saison

ADDITIONAL ITEMS

1 tube White Labs WLN4000 Clarity Ferm, added to primary

BREWING NOTES

Mash 90 minutes at 147°F (63.9°C). Boil 90 minutes. Ferment 21 days at 65°F (18.3°C).

EXTRACT VERSION

Substitute 11 lb. (5 kg) extra light dry malt extract, 2 lb. (907 g) amber dry malt extract, and 2 lb. (907 g) wheat dry malt extract for the Belgian Pilsner malt, torrified wheat, and light Munich malt. Dissolve malt extract in reverse osmosis water, top up to desired boil volume, and proceed with the boil.



Before each pairing, brewers introduced their beer and the paired dishes. Left: (left to right) Jim Todd, Bill Goetz, Tom Truffer, Patty McGuire Cook, Melissa Edwards Hiller, and Jim Vondracek; Top: Melissa Edwards Hiller and Patty McGuire Cook; Bottom: Jim Vondracek.

BASICS OF PAIRING

Enjoying beer with meals by thoughtfully pairing dishes with different beers adds another level of interest to our enjoyment of both the food and beer. While many people associate pairing food with wine, beer pairings offer a much wider range of sensory options for the creative host. The breadth of styles in beer, and their aromas and tastes, eclipse what is available in wine.

For example, a tart, fruity kriek has no equivalent in the wine world and can pair with fatty roast meats, cutting through the richness deliciously. And that old standby of pairings, wine and cheese, really doesn't work. Cheese coats your tongue and mutes your enjoyment of the wine. On the other hand, the effervescence of beer clears through that palate-clogging richness.

Pairings are all about combining flavors, aromas and textures in ways that please. Three concepts provide some guidance in thinking about pairings:

- **Complementary pairings:** aromas and flavors in beer and food are similar and work together to build upon each other.
- **Contrasting pairings:** the beer and food's aromas and flavors are different and provide a contrapuntal but harmonious mix.



Left and right: Bill Goetz and James Cook serve beers to attendees; Bottom: a glass of saison paired with aged gouda and cucumber with pesto.



- **Palate cleansing pairings:** some characteristic of a beer (e.g. bitterness, tartness, or carbonation) cuts through a dish's unctuous quality.

For more in-depth reading about pairings, look at Garrett Oliver's excellent book *The Brewmaster's Table: Tasting Beer* by Randy Mosher, *The Best of American Beer and Food* by Lucy Saunders, and *The Beer Pantry: Cooking at the Intersection of Craft Beer and Great Food* by Adam Dulye also offer thoughtful insights.

PAIRING WITH PURPOSE

I'd organized beer and food pairing events to support good causes twice before. The first time was for my oldest son's university campus ministry, with a gathering of about twenty-five in our home. A year or two later, I organized a pairing event as a part of the annual luncheon for a gardening not-for-profit that raised vegetables for local food pantries.

Because I wanted to feature homebrew, I first approached my homebrewing friends who I thought would be interested sharing their beers and asked if they'd be willing to help. When I had the five brewers lined up, we picked a date that worked for all of them.



LUPULIN MADNESS AMERICAN IPA

Contributed by Jim Todd

Batch volume:	6 US gal. (22.7 L)
Original gravity:	1.067 (16.4°P)
Final gravity:	1.012 (3.1°P)
Color:	12 SRM
Bitterness:	75 IBU
Alcohol:	7% by volume

MALTS

13.5 lb.	(6.12 kg) 2-row pale malt
0.75 lb.	(340 g) dark Munich malt
0.38 lb.	(172 g) Caramunich I malt
0.38 lb.	(172 g) melanoidan malt
0.38 lb.	(172 g) Special B malt
0.25 lb.	(113 g) acidulated malt

HOPS

1 oz.	(28 g) Columbus, 14% a.a., first wort hop
2.7 oz.	(77 g) Simcoe, 12.9% aa, whirlpool 30 min
4 oz.	(113 g) Amarillo 8.2% aa, whirlpool 30 min
4 oz.	(113 g) Falconer's Flight, dry hop 3 days

WATER

Ca 51.2 ppm, Mg 7.7 ppm, Na 21.4 ppm, SO₄ 45.1 ppm, Cl 79.9 ppm, HCO₃ 54.8 ppm.

YEAST

2 packs Fermentis SafAle US-05

ADDITIONAL ITEMS

0.5 tablet	Whirlfloc @ 5 min
1 tube	White Labs WLN4000 Clarity Ferm, added to primary
10 drops	Fermcap S, added to primary

BREWING NOTES

Mash 45 minutes at 149°F (65°C), then 60 minutes at 158°F (70°C). Boil 60 minutes. Ferment 14 days at 64°F (17.8°C).

EXTRACT VERSION

Substitute 15 lb. (6.8 kg) extra light dry malt extract and 2 lb. (907 g) amber dry malt extract for the 2-row, Munich malt, Caramunich malt, and acidulated malt. Steep melanoidin and Special B malts in 150°F (65.6°C) water for 30 minutes. Dissolve malt extract, top up to desired boil volume, and proceed with the boil.

We structured this as a donation event, so we didn't sell tickets. In Illinois, tickets for events featuring homebrewed beer can be sold if the purpose is charitable, but setting a ticket price can discourage guests from giving more than that ticket price, and I wanted people to think of this as a donation, not a ticket.

I set a suggested donation amount of \$35 per person and ended up with an average donation amount exceeding \$50. I made it possible for folks to contribute electronically, via PayPal or QuickPay, prior to the event, and guests also brought checks and cash the night of. Before the event, I emailed registrants an introduction to tasting beer that I had written for a largely non-beer-nerd audience. A few days later, I sent another piece, this one on the styles we would try at the event. (See HomebrewersAssociation.org/nd18 for the articles.)

THE PAIRINGS

Fifty-five guests attend our pairing event, which was held in Augustana's attractive courtyard in Chicago's Hyde Park neighborhood. As attendees arrived and signed in, we served a Czech pale lager available as a gathering beer. A large glass jar set prominently on the sign-in table encouraged folks to be generous, as did I on a couple of occasions during the evening.

Once everyone had assembled, I offered some brief remarks about tasting beer, beer and food pairing, and the Peace Camp we were raising funds for that evening. Then, I introduced the first brewer, who spoke about his beer's style, its characteristics, its history, and the brewing process. This was important because most attendees were not homebrewers, and many had only a cursory familiarity with craft beer styles.

While the brewer was speaking, a couple of volunteers and I brought out trays of the paired food, which we had plated earlier that afternoon. As the brewer spoke, other volunteers poured samples of the beer for everyone. After everyone had an opportunity to enjoy the pairing, I introduced the next brewer and we repeated the process.

We paired five styles of beer with five plates that night. Each plate, except the last, featured a cheese plus another item.

GERMAN PILSNER WITH BRIE AND PICO DE GALLO ON TORTILLA CHIPS

Bill Goetz, from the Brewers of South Suburbia (BOSS), brought his German Pilsner. Germany is the original home of the lager. In the 16th century, Bavarian authorities banned brewing during the summer months. Forced to produce their beers in the winter, brewers created an environment that fostered the evolution of lager yeast, which is suited to ferment in colder temperatures.

Bill's beer was crisp, clean, and refreshing, showing off both Pilsner malt and noble hops. We enjoyed this beer with mild brie (a soft cow's milk cheese) and tortilla chips with pico de gallo. The softness of the brie complemented the soft, round bready notes of the Pilsner malt, and the spicy pico de gallo emphasized the beer's refreshing bitter snap and effervescence.

GREAT FEATS OF STRENGTH BARREL-AGED IMPERIAL STOUT

Contributed by Jim Vondracek

This beer won first place in the Wood Aged Beer Category at the 2017 Brixtoberfest competition. Three brewers combined a total of 15 gallons in a 15-gallon bourbon barrel and aged it for six months.

Batch volume: 10 US gal. (37.9 L)

Original gravity: 1.121 (28.3°P)

Final gravity: 1.026 (6.6°P)

Color: 55 SRM

Bitterness: 54 IBU

Alcohol: 13% by volume

MALTS

15 lb. (6.80 kg) pale malt

5 lb. (2.27 kg) Vienna malt

5 lb. (2.27 kg) Munich malt 10°L

2 lb. (907 g) chocolate malt

350°L

2 lb. (907 g) roast barley 300°L

1.5 lb. (680 g) caramel malt 75°L

1 lb. (454 g) Briess Blackprinz malt

12 lb. (5.44 kg) extra light dry malt extract, added to boil

HOPS

4 oz. (113 g) Challenger, 6.8% a.a.

@ 60 min

1 oz. (28 g) Pacific Jade, 11% aa

@ 60 min

4 oz. (113 g) East Kent Goldings

5.6% aa @ 20 min

WATER

Ca 42 ppm, Mg 14 ppm, Na 13 ppm, SO₄ 10 ppm, Cl 18 ppm, HCO₃ 129 ppm.

YEAST

4 packs Fermentis SafAle US-05

ADDITIONAL ITEMS

1 Tbsp. (15 mL) Irish moss @ 10 min

1 tube White Labs WLN4000

Clarity Ferm, added to primary

BREWING NOTES

Mash 60 minutes at 156°F (68.9°C).

Boil 60 minutes. Ferment 28 days at 65°F (18.3°C).

EXTRACT VERSION

Substitute 11 lb. (5 kg) extra light dry malt extract, 2 lb. (907 g) amber dry malt extract, and 2 lb. (907 g) wheat dry malt extract for the Belgian Pilsner malt, torrified wheat, and light Munich malt. Dissolve malt extract in reverse osmosis water, top up to desired boil volume, and proceed with the boil.

CALIFORNIA COMMON WITH ANTIPASTO STICKS

My friend Tom Truffer has made the transition from homebrewer to professional and brought a California Common that he brewed with Half Day Brewery in Chicago's northwest suburbs. Half Day's version was rich, toasty, and full of caramel flavors with a spicy hop finish. We paired this beer with antipasto sticks—skewers of fresh mozzarella, cured salami, artichoke hearts, olives, and cherry tomatoes. The rich caramel of the beer provided a background for the bright, sharp antipasti, while the carbonation helped clear the palate between the bites of different flavor.

SAISON WITH AGED GOUDA AND CUCUMBER SLICES WITH PESTO

From CHAOS homebrew club, Melissa Edwards Hiller and Patty McGuire Cook brought their saison. It was dry, effervescent, and full of black pepper spice and lemon fruitiness.

Saison is great for pairing because it is so versatile. We paired this with an aged Gouda cheese, a traditional pairing for saisons. The creaminess and slight funk of the cheese melded nicely with the spicy

intensity of the beer. The second pairing was a cucumber slice with pesto, the herbs of which also complement saison's spicy, rustic nature.

AMERICAN IPA WITH AGED AMERICAN CHEDDAR AND PROSCIUTTO

For this pairing, we had two IPAs brewed by BOSS's Jim Todd and homebrewing friends Shelly and Chris Barnard. Jim's IPA was a great example of the style, with bracing bitterness and just enough malt to provide a canvas upon which to display the hops. The Barnards' IPA featured rye in the grist and had a delicious spicy quality.

For such a mouth-popping flavorful style, we paired a sturdy aged American cheddar—the beer and cheddar stood up to each other well. IPAs are also the perfect foil for fatty meats, such as the prosciutto we served. The combination of bitterness, malt, and effervescence cut right through the fat, making for a delicious combination.

BARREL-AGED IMPERIAL STOUT WITH STRAWBERRIES AND DARK CHOCOLATE

Our final pairing beer was a barrel-aged imperial stout I brewed as part of a group barrel project with my son Hugh, which won a gold medal at 2017's Brixtoberfest competition. A big, flavorful beer with a full body and notes of coffee, chocolate, and stone fruits, this beer was aged in a 15-gallon bourbon barrel for six months after fermentation and took on some of the barrel's characteristics of bourbon, oak, and vanilla.

The full-bodied, palate-busting flavors of this beer stand up well to funky flavors like blue cheese, but we decided to emphasize its dessert-like qualities and paired it with the sweet-tart flavors of strawberries and dark chocolate. The berries and chocolate complemented the stout's flavors and melded into a harmonious whole.

HOMEBREW, DO GOOD, AND HAVE FUN

Half of attendees were members of the Augustana community and half were not. A handful were homebrewing friends, but most learned about the event in other ways. It made for a great mix, and throughout the evening I made sure to introduce people to each other to foster conversation and community.

Sometimes I describe my homebrewing as "a hobby gone amuck" and there is some truth to that. But I love doing events like this—taking an aspect of that hobby, using that aspect to support an effort I care about,

and creating a fun evening of beer, food and community. In the end, sharing both my brewing avocation and those causes I care about adds depth and meaning to life. I hope you feel inspired to consider ways to use your homebrewing hobby to support those working to make a positive difference in our communities.

Jim Vondracek is a homebrewer in the Chicago area, a member of the BOSS and

CHAOS homebrew clubs, a BJCP National judge, and judging director at the Chicago Cup competition who writes a blog at singingboysbrewing.com and generally takes this whole homebrewing thing a little too seriously.

Freddy Zavala is an excellent homebrewer, a member of the CHAOS homebrew club, banker by day, and photographic artist by night.



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Beta-Acid %: 3 – 5

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Alpha-Acid %: 15 – 18.5

Beta-Acid %: 4 – 5.2

Total Oils (ml/100g): 3 – 4.4

Aroma: spicy, resinous, tangerine

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Alpha-Acid %: 17 – 19.9

Beta-Acid %: 4.6 – 6

Total Oils (ml/100g): 2.5 – 4.4

Aroma: black currant, dark fruits, strong herbal notes, pine tree

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Alpha-Acid %: 12 – 14

Beta-Acid %: 5 – 6

Total Oils (ml/100g): 1.6 – 2.5

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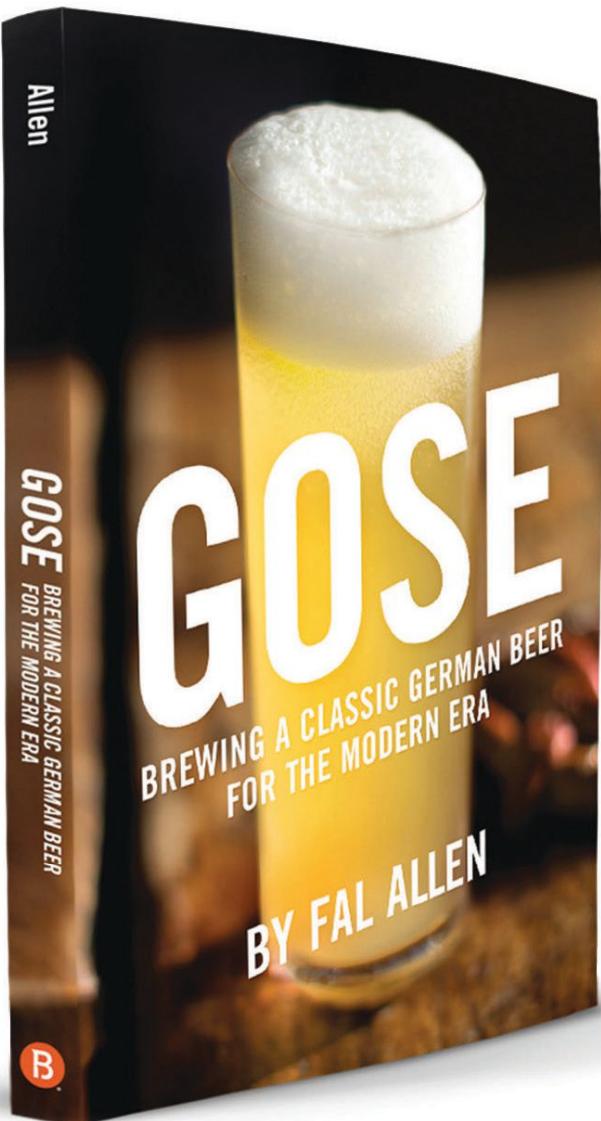
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Measuring Acidity in Sour Beer

By Fal Allen

Editor's Note:

The following is adapted from Chapter 2 of Gose: Brewing a Classic German Beer for the Modern Era by Fal Allen, available now from Brewers Publications. Content has been lightly edited and condensed to fit within the space available.

Acidity is a big part of Gose. It is the main thing that has defined the Gose style since its beginning and also what makes it so unusual as a German beer.

To better understand a Gose-style beer, you need to know a little about acidity, how it is usually measured, and how it works. There are two ways to measure acidity, namely pH and titratable acidity (TA). We will discuss pH first. Acidity is the effective strength of an acid in solution. We use the pH scale to measure that level of acidity or basicity. For the more scientifically minded, acidity is the concentration of hydronium (H_3O^+) in an aqueous solution and pH is one of the scales we use to measure that concentration.



PH

The pH scale was developed at the Carlsberg Laboratory in Denmark by Søren Sørensen in 1909. The *p* stands for “power of” or “potential of” and the *H* stands for hydrogen. The pH scale is the negative logarithm of hydrogen ion concentration, and it runs from zero (very acidic) to 14 (very alkaline, or basic), with 7.0 being neutral. At room temperature (77°F or 25°C), pure water is pH 7. Accordingly, a pH below 7 is acidic, and a pH above 7 is alkaline.

The pH scale is logarithmic, like the Richter scale that measures earthquake intensity, and uses base 10. Each increase or decrease of 1.0 on the pH scale indicates a tenfold change of hydrogen ion concentration. Thus, a solution of pH 4 is 10 times more acidic than a solution of pH 5, and 100 times more acidic than a solution of pH 6. Remember, the lower the number, the more acidic it is.

Temperature will affect pH, so pH readings should be taken at or calibrated to a temperature of 77°F (25°C). As the temperature rises, pH decreases. For example, at 32°F (0°C) the pH of pure water is 7.47, at 77°F (25°C) its pH is 7.00, and at 212°F (100°C) its pH is 6.14. Be sure to adjust your pH reading accordingly if the temperature of your solution is greater or less than 77°F (25°C).

pH plays an important role in the brew-house, both in the mash tun, where it will have an effect on enzymatic activity, and in the kettle, where it will affect protein coagulation, hop utilization, and Maillard reactions. Keeping track of pH can also give you vital information on the progress of fermentation. As fermentation progresses, pH decreases. In sour beers, the acidity level can tell you how far bacterial activity has progressed. Because of the many ways pH can

PERFORMING A TITRATABLE ACIDITY TEST

To perform a test for titratable acidity (TA) you will need a good pH meter, a solution of sodium hydroxide (NaOH) at a known strength, a pipette (in the 0.1 mL range), some glassware, and safety gear (plastic, latex, or nitrile gloves, and safety glasses).

You will need a precise volume of the beer at a specific gravity—but small differences in specific gravity don’t greatly impact the results of the equation too much, so don’t stress about it if you are not exact. The beer sample should be degassed by agitation. You will need to add small amounts of sodium hydroxide (0.1 or 0.2 mL at a time) to your beer sample. Stir vigorously after every drop and take a pH reading. Do this until you get a pH reading of 8.2—this is the American Society of Brewing Chemists (ASBC) standard. Sodium hydroxide can be purchased in 0.1M form or blended yourself. Once you reach a pH of 8.2 you will need to do the math.

$$TA \text{ (as lactic acid)} = \frac{0.9 \times [\text{mL of } 0.1\text{M NaOH added}]}{[\text{mL of beer}] \times [\text{specific gravity of beer}]}$$

As a side note, there are many people who use titratable acidity and total acidity as interchangeable terms, but they are not interchangeable. Total acidity is the total number of positively charged hydrogen ions that the organic acids of all types would release if they were fully dissociated. The titratable acidity is always going to be less than the total acidity, because not all of the hydrogen ions expected from the acids are found (or dissociated) during the determination of titratable acidity.

Tools: pH Meters and Strips

pH meter: The best tool for measuring pH is a pH meter. A pH meter measures the voltage between two electrodes, then converts the result and displays it as the corresponding pH value. To ensure accuracy, a pH meter must be kept clean, stored in a dedicated storage solution, and be calibrated regularly in a solution with a known pH value, preferably before each use. Usually, the more expensive a meter is, the longer it will last and the more accurate its readings will be. More expensive pH meters are often equipped with automatic temperature compensation, which can make taking readings even easier.

pH strips: These are a relatively inexpensive and fairly accurate way to measure pH. The strips are calibrated and will measure both acid and base sides of the pH scale. They change color after being exposed to a solution. The color can then be matched to the color chart that comes with the kit to identify the pH of the solution.

TABLE 1: TYPICAL pH VALUES IN NORMAL BREWING

Water pH	6.7 to 7.6 optimum
Mash pH	5.0 to 5.7 optimum (should not go below 4.8)
Sparge water over grain	less than 6.0
Wort pH	4.9 to 5.5 optimum
Beer pH	3.9 to 4.6 optimum
Rinse water pH	pH same as source water

affect your beer's flavor, good brewing practice dictates that pH should be measured and tracked throughout the process.

To brew Gose-style beers reliably and consistently, you will need a way to measure pH. I would suggest investing in a decent digital pH meter. A pH meter is much easier to read than pH strips and leaves no room for interpretation. They are also much more accurate than pH strips, although pH meters do need to be kept properly calibrated—a relatively easy process—by checking their accuracy against two standard buffer solutions of known pH.

The pH range for most finished, unsoured beers runs between 4.0 and 4.5. Sour beers will run in the range of about 2.9 to 3.9 pH.

PERCEPTION AND TITRATABLE ACIDITY

The other main way to measure acidity in liquids is titratable acidity (TA). While pH is an easier and more common method of measurement, TA will give you a more accurate measurement of how the beverage will be perceived. Both are measures of acidity, but TA is a more accurate measure of what you will taste. The general rule is, the lower the pH, the higher the TA, but in actuality these two measurement scales cannot be correlated very well. This is because pH measures only part of what TA measures. Titratable acidity is usually expressed in grams per liter (g/L).

These concepts of pH and TA can be confusing, but I will try to keep it as simple as possible. The more acid you add or create in a solution, the lower the pH, and the higher the titratable acidity. For weak acids, which include organic acids found in wort or beer, this relation can be explained in the formula:

$$\text{pH} = \text{p}K_a + \log \left(\frac{\text{base concentration}}{\text{acid concentration}} \right)$$

where $\text{p}K_a$ is the negative log of the dissociation constant of the organic acid being measured.

True, a great many people, myself included, struggle to understand this. So, if you don't get it, don't worry about it too much, just keep reading.

In a solution there is both free and bound hydrogen. The pH scale is a measurement of how many free, positively charged hydrogen ions are in the solution. When we measure titratable acidity (TA), we add sodium hydroxide (an alkali, or base) to the solution. When sodium hydroxide is in aqueous solution, it completely dissociates to Na^+ (sodium

ions) and OH^- (hydroxide ions). The hydroxide ion increases pH and causes H^+ (hydrogen ions) on weak, organic acids to dissociate.

In the solution, hydroxide first neutralizes the free, positively charged hydrogen ions, those measured by the pH scale. Once all the free hydrogen ions are neutralized, the hydroxide ion begins to start to unhook bound hydrogens that are attached to the remaining organic acids in the solution, and by doing so renders the hydrogen ions free to be measured. As this happens, we gradually add more sodium hydroxide to the solution. The hydroxide continues to unhook and neutralize hydrogen ions. Only when you have added a sufficient amount of hydroxide to unhook all the accessible hydrogens is our measurement of the titratable acidity complete. At that time your solution pH will be 8.2 if you follow the standard method of the American Society of Brewing Chemists (see sidebar). Titratable acidity does not just measure a specific acid in a solution, for example, lactic or acetic acid; TA measures all the acids in that solution.

Since the proportion of free and bound hydrogen varies greatly according to several variables, most notably the type of acid, so then does the relationship between pH and TA. Both measurements can be important, because they are measuring different, but certainly related, things.

There are many different kinds of acids, and each is made up a little differently. It is important to understand that each acid has a different strength of tartness on the tongue. Some acids are very sharp, others much less so.

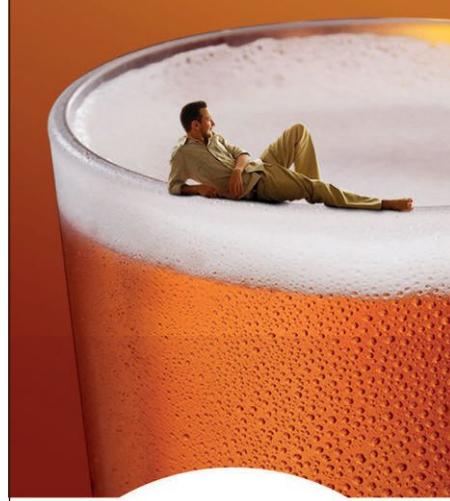
With this background on the perception of acidity, it should be easier to understand that how tart a beer tastes is not solely a function of its pH. Different acids will contribute different amounts of TA. And each type of acid will contribute its own unique character to beer. For example, lactic acid, produced by *Lactobacillus* or *Pediococcus* bacteria, is described as much softer on the palate than acetic acid (produced by *Acetobacter* bacteria). Acetic acid is often described as harsh, burning or biting. To give you a better idea, lactic acid is the main acid in yogurt; acetic acid is the main acid in vinegar. Imagine two beers with the same pH of 3.3. One gets 20 percent of its total acidity from acetic acid, the other gets 100 percent of its total acidity from lactic acid. The acetic acid beer will have a much sharper level of perceived acidity than the 100 percent lactic acid beer.

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The harshness of acetic acid is one reason many brewers say it is a flaw in almost all beers and should be kept to very low levels, even in the few styles, like *oud bruin* (sour Flanders brown ale), in which it is an accepted part of the flavor profile. Flavor perception is the reason we care about TA. The pH scale only quantifies the amount of free hydrogen ions in solution; however, your sense of taste interprets not just the free hydrogen ions, but also some of the bound hydrogen that is subsequently released by the acids in the beer. Most people agree that TA is a more accurate representation of how acidic something will taste. Again, keep in mind that different acids are perceived to have different levels of sourness intensity, so two beers with the same TA may taste very different—for example, a Gose with 100 percent lactic acid versus a Flanders brown with 20 percent acetic acid. Both have the same TA, but taste very, very different. Keep in mind that there are many other factors that can affect one's perception of acidity level, including residual malt sweetness, herbs, flavorings, temperature, and carbonation.

One may wonder, if TA is the measurement we taste, why bother with pH at all? There are many processes that are pH dependent: saccharification during mashing, hop utilization and protein coagulation during the boil, and healthy yeast metabolism. All these activities require specific pH ranges. If we are to assure that these processes progress in the manner desired, we need to provide the optimal pH range for them. Also, a pH reading is much easier to take and does not taint the sample with sodium hydroxide. But both measurement processes are valuable—the TA measurement, for example, can be a good tool for use in blending.

A professional brewer for more than 30 years, Fal Allen has lent his expertise to some of the world's top breweries, most notably Pike Place Brewery (Seattle), Anderson Valley Brewing Company (Northern California) and Archipelago Brewing (Singapore). In 1999, Allen was awarded the Brewers Association's Russell Schehrer Award for Innovation and Achievement in Craft Brewing. Allen's writing credits include co-authoring Barley Wine and more than 40 articles in American Brewer, The New Brewer®, Zymurgy®, MBAA Technical Quarterly, Celebrator, Malt Advocate, and other publications. Allen resides in Navarro, Calif.

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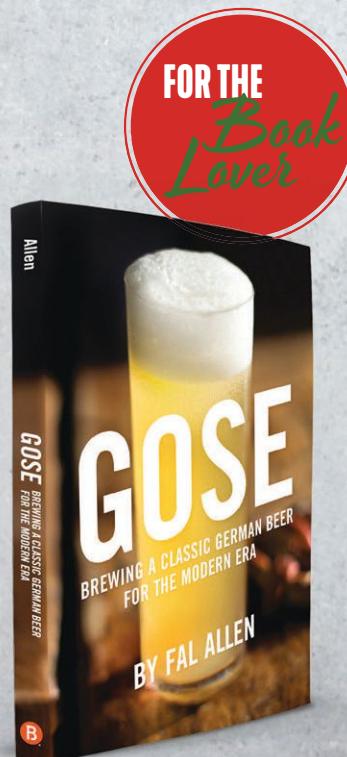




Zymurgy's 2018 Holiday Gift Guide

By Zymurgy editors

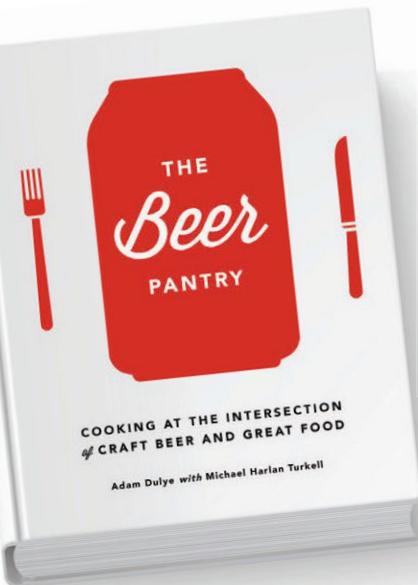
25 new and/or noteworthy items for the homebrewers and beer lovers on your list. Be sure to check out your local homebrew supply shop for many of these items and more gift ideas!



GOSE:
BREWING A CLASSIC GERMAN BEER
FOR THE MODERN ERA
BY FAL ALLEN

In *Gose: Brewing a Classic German Beer for the Modern Era*, Fal Allen of Anderson Valley Brewing Co. offers historical and technical glimpses into one of today's most popular tart beer styles. Salt and coriander in hand, homebrewers will delight in recipes from Sam Calagione, Gordon Strong, Jennifer Talley, Jamil Zainasheff, Ron Jeffries, Dick Cantwell, Ken Grossman, and many, many others. For a preview of the great content that lies within, check out "Measuring Acidity in Sour Beer" in this issue of *Zymurgy*, which is adapted from Chapter 2 of *Gose*.

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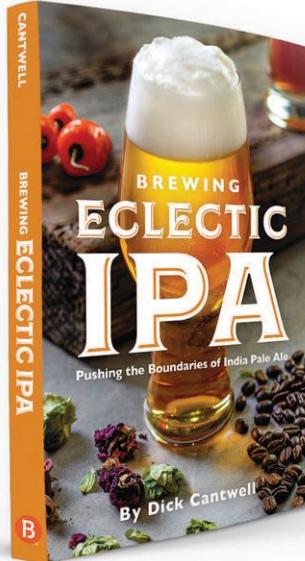
THE BEER PANTRY: COOKING AT THE INTERSECTION OF CRAFT BEER AND GREAT FOOD

BY ADAM DULYE

If you've ever attended SAVOR® in Washington, D.C., or PAIRED® at the Great American Beer Festival®, then you already know that chef Adam Dulye knows a thing or two about combining beer and food. In *The Beer Pantry*, chef Adam delivers bite after tasty bite of dishes that pair equisitely with today's best craft beer (and your best homebrew). Some recipes include beer, but most are just Damn Good Dishes that complement suggested pairings. Chocolate devil's food cake with stout milkshakes, anyone?

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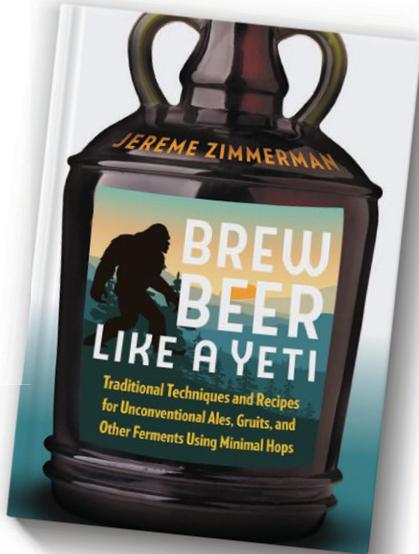
BREWING ECLECTIC IPA: PUSHING THE BOUNDARIES OF INDIA PALE ALE

BY DICK CANTWELL

India pale ale has come a long way from Burton. Having initially branched from English IPA, American IPA now finds itself as the progenitor of a seemingly infinite number of variations on a theme. In the pages of *Brewing Eclectic IPA*, Dick Cantwell takes this popular beer style on a whirlwind adventure. Redcurrant spruce IPA? Check. Coffee-cacao IPA? You betcha. Marijuana IPA? If it's legal in your state, by all means. For a little taste of this book, take a look at the May/June 2018 issue of *Zymurgy*, where Dick includes his recipe for TukTukTea Thai iced tea IPA.

[BrewersPublications.com](#)

\$19.95



BREW BEER LIKE A YETI: TRADITIONAL TECHNIQUES, RECIPES, AND INSPIRATION FOR UNCONVENTIONAL ALES, GRUITS, AND MORE

BY JEREME ZIMMERMAN

From the author who taught everyone to *Make Mead*

Like a Viking comes this treatise on brewing with unusual ingredients—well, unusual to us newfangled brewers with our fancy malt, hops, water, yeast, and what-not. *Brew Beer Like a Yeti* teaches readers how to use a wide and varied palette. Juniper, rhubarb, ginger, spruce, oak bark, heather, and mushrooms all find their way into the more than 25 recipes that grace this self-proclaimed fermentation revivalist's second book.

[chelseagreen.com](#)

\$24.95

AHA MEMBERSHIP GIFT CARD

Know someone who's curious about homebrewing? How about someone who likes to save money? Share the love! This prepaid one-year membership card just needs to be activated by the recipient to join the 45,000+ members of the AHA who enjoy benefits such as *Zymurgy* magazine, the Brew Guru app, and the AHA Member Deals program, with discounts at more than 2,000 breweries, brewpubs, homebrew shops, and more.

Pro tip: Give the gift of AHA membership and receive your choice of *Brewing Classic Styles*, *Farmhouse Ales*, or *Wild Brews* books. Cards activated before January 1, 2019 are entered to win an AHA swag bag.

[HomebrewersAssociation.org](#)

\$43



BREWSSSENTIAL STAINLESS STEEL SIPHON

Way back in the Jul/Aug 2016 issue of *Zymurgy*, we told you about a nifty new product called the Pro Brewers Siphon. Well, now it's all grown up and called the Brewssential Stainless Steel Siphon. Made from stainless steel and silicone that can be fully disassembled and sanitized—even baked in an oven if need be—this may be the last siphon you'll ever need. The optional-but-highly-recommended carboy sleeve and spring clip hold the device upright, freeing you to walk away and grab another homebrew.

brewssential.com
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BLICHHMANN ENGINEERING QUICKCARB

Commercial brewers have long relied on diffusion stones to inject CO₂ right into finished beer for rapid carbonation. Now Blichmann brings that same technology to homebrewers. The QuickCarb bubbles carbon dioxide into your beer for effervescence that takes minutes instead of days. The QuickCarb can also be hooked up to an oxygen source to deliver pure O₂ to fresh wort for healthier yeast and better fermentation.

blichmannengineering.com
\$179.99



SPEIDEL PLASTIC FERMENTER

Speidel is well-known for its Braumeister line of all-in-one electric brewing systems, but we think their sturdy plastic fermenters are also worthy of praise. The generous lid makes cleaning a breeze and practically begs for dry hops or fruit additions, while the oversized airlock eliminates the need for a blow-off tube. With convenient handles and an integrated spigot, it's all too simple to bottle or rack to a keg directly from the fermenter.

morebeer.com
Starting at \$39.99



FOODSAVER VACUUM SEALING SYSTEM

Every homebrewer needs a reliable vacuum sealer. Hops and milled grains simply last longer when stored in a low-oxygen environment, and there's no better way to keep homegrown hops fresh all year long. If that's not enough, handy homebrewers looking to sous vide will also wonder how they ever lived without one (see "Cooking in a Vacuum," May/June 2018). And if that's not enough, imagine vacuum sealing a few of your coworker's office supplies while they're on vacation to make their first day back at work extra special. Not that we know anything about that...



foodsaver.com
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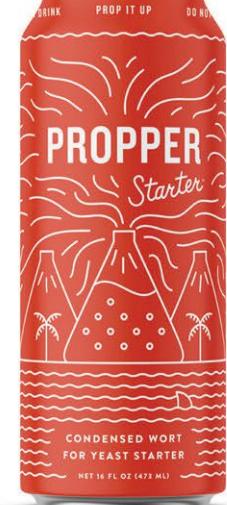
cholaca.com
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From the folks over at Omega Yeast comes this sterilized, concentrated wort in a can. Now you have zero excuses for not making a starter—come on, seriously, they made the wort for you. Or maybe you want to try kräusening (see Chris Colby's article on page 37)? This canned wort can help you do both. Pop open a can and follow the dilution instructions to yield starter wort with a specific gravity of 1.040 (10°P).

PropperStarter.com
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originalgrain.com
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HomebrewersAssociation.org
\$14.99

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BREWING INNOVATION



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OK, we might be just a little teensy bit biased, but we totally love these classic work shirts from Dickies. Featuring the American Homebrewers Association logo emblazoned proudly on the chest, these shirts feel just right for a long day of brewing beer. Not too heavy, not too light, you'll come back to these shirts again and again.

HomebrewersAssociation.org
\$33.99

REAL ART IS BETTER BEER PAINTINGS

realartisbetter.etsy.com
Starting at \$25

AHA member Scott Clendaniel paints many subjects, beer among them. His original paintings and prints draw inspiration from some of today's most iconic craft breweries. Some of our favorites, though, are his parodies of the masters. The subjects in Renoir's *Luncheon of the Boating Party* gain some well-deserved Pliny the Elder and Heady Topper, while Magritte's *Son of Man* trades his floating apple for a pint glass.





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Drinking homebrew or your favorite craft beer in the great outdoors just got a whole lot more fun thanks to Fermented Reality's new line of B Cups. Available in a variety of shapes to accommodate a variety of styles, these BPA-free plastic cups are shatterproof, rigid, and dishwasher safe. These cups look so great that you might even decide to use them indoors.

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For those who demand complete control over their homebrew comes the uKeg 64. Featuring double-wall vacuum insulation and adjustable pressure regulation from 0 to 15 psi, this gussied-up growler offers finer control than even some kegerators. The integrated sight glass tells you how much liquid you've got left, and the faucet boasts a locking mechanism to keep your beer safe when you're en route. You supply the beer and the 8 g or 16 g CO₂ cartridge. uKeg supplies the peace of mind.

growlerwerks.com
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Want to give up bottling but don't have room for a dedicated kegerator? The BrewQube holds 2.25 gallons (8.5 L) of beer and fits in a standard fridge. It uses off-the-shelf 74-gram CO₂ cartridges to dispense through a redesigned picnic tap. You can carbonate with those same cartridges or use a bit of priming sugar to get your carb on. And although many retailers might balk at filling your Corny kegs, few will bat an eye at dispensing craft beer into a square growler.

brewqube.com
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THUMBPINT CUSTOM BEER CAN GLASS

The humble beer can has come a long way. Once relegated to nothing but industrial macro lager, it now carries sours, stouts, and saisons. Perhaps the ultimate testament to the can's success is its new status as an art piece, as embodied by the modern can-shaped glass. This holiday season, you can have custom can glasses produced at a very affordable price, just in time for the parties. And we're 99.9 percent confident they will hold egg nog just as admirably as they hold beer.

thumbpint.com
Starting at \$10.95





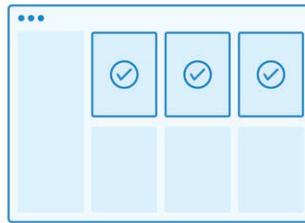
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MARKETPLACE

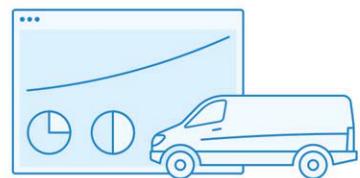
Where breweries go to connect and manage orders from bars, restaurants, and retailers



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marketplace.untappd.com

The screenshot shows the Untappd Marketplace website interface. At the top, there's a navigation bar with 'CATALOG', 'ORDERS', and 'DISTRIBUTORS' tabs, along with a shopping cart icon showing '27' items and a gear icon.

The main area is titled 'Catalog'. On the left, there are filters for 'PRODUCT' (Beer, Wine, Spirits), 'STYLE' (with a search input and a list of styles like Altbier, American Wild Ale, Applewine, Australian Sparkling Ale, Barleywine - American, etc.), and 'PRODUCER' (with a search input and lists for A Tutto Malto and A-One Brewery).

The central part displays a grid of product cards:

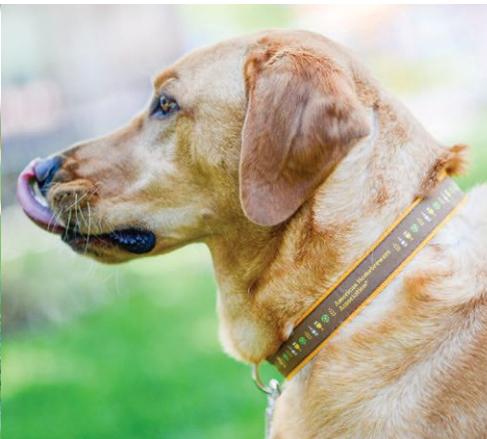
- The Waldos' Special Ale** by Lagunitas Brewing Company: IPA - Triple, 4.14 rating, 46,098 Ratings, Empire Distributors. Add to Cart button.
- Neon God** by New Anthem Beer Project: IPA - New England, 4.31 rating, 1,567 Ratings, New Anthem Beer Project. Add to Cart button.
- Son of a Peach** by RJ Rockers Brewing Company: Fruit Beer, 3.5 rating, 44,392 Ratings, Beverage South. Add to Cart button.



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[etsy.com/shop/pleasantvalleyfarmpa](https://www.etsy.com/shop/pleasantvalleyfarmpa)
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AHA DOGGIE GEAR

HomebrewersAssociation.org

Collar \$11.99

Leash \$14.99

Bowl \$6.99

We need no reminding that Zymurgy readers love their dogs. Well, now we have AHA swag for all the good boys and girls who stay by your side on brew day. Your puppy will love our new AHA doggie collar, leash, and bowl. These canine accessories are equally at home in your homebrewery as they are at the local park. And we have it on good authority that cats love them, too—well, the bowls anyway.

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40th Annual Upstate New York Homebrewers Competition



By Amahl Turczyn

The 40th annual Upstate New York Homebrewers Competition was held on May 12, 2018, in Rochester, N.Y. Run by the Upstate New York Homebrewers Association (UNYHA), the annual competition relies on an unusual synergy in the Rochester area between amateur and professional brewing organizations.

Organizer Steve Zoller explains, "What I find impressive about the whole Rochester brew scene is the amount of cooperation that happens within the community between breweries, homebrew shops, beer distributors, and the other homebrew clubs in Buffalo and Syracuse, which are an hour or two away."

A big part of this local beer scene is UNYHA. One of the oldest in the country, the club was founded in 1979, and while none of the original members are still around, membership has often exceeded 100. They hold multiple events throughout the year, including an Oktoberfest, a Summerfest, educational Brew Guru sessions (no relation to the app!), monthly meetings, and Pub of the Month gatherings to informally investigate local beer destinations, bars, and breweries.

The club describes itself as "dedicated to sharing and broadening the appreciation of and knowledge about the brew-

er's art within its membership and the public at large, through regular meetings and special events, in accordance with its philosophy of informed, mature and responsible enjoyment of homebrewed and commercially brewed beer." For the monthly meetings venue, UNYHA is fortunate enough to have a former local homebrewer who's since gone pro and is willing to host the group.

"We couldn't ask for a better meeting location than Swiftwater Brewing," Zoller adds. "Andy Cook started building this brewery some time after winning the most medals in our 2013 competition."



With the Upstate New York Home-brewers Competition, the club has maintained ties with a local brewery, not only to secure an appropriate venue, but also to offer the ultimate prize to the best of show winner. Zoller elaborates, "What we have tried to do with every annual compe-

tition is have the best of show brewed by a local brewery. This year we were fortunate enough to tie together our 40th annual competition with the 140th anniversary of the Genesee brewery in Rochester. They hosted the event this year, and the head of their sensory panel provided us their spa-

Left to right:
Judging crew including judging and stewards from Buffalo and Syracuse clubs on the Genesee brewery roof; Entries queued up for judging.

FAQ

Q: DO YOU SELL HOMEBREW SUPPLIES?

A: YEP.

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cious sensory evaluation room—this gave us the best space for competition judging that we've had in over 16 years. Genesee now has a pilot brewery that is part of a separate restaurant that also includes some museum exhibits showing the history of all of the breweries in the Rochester area. Really cool."

But while Genesee (part of North American Breweries, owned by Costa Rica's Florida Ice & Farm Co.) agreed to have a production-sized batch of this year's best of show winning beer produced in their brewhouse, there was a complication.

"The Best of Show was a wild ale," Zoller said. "It was brewed by Ken DeMarree, a member of the Buffalo-area club, Niagara Association of Homebrewers. The problem is the brewhouse was understandably unwilling to introduce wild yeast into their operation." Thus, the head brewer and Ken will come up with an alternative brew.

Local support plays heavily into the success of the Upstate New York competition. For its part, Genesee not only hosts the competition but also contributes prizes for medalists in a category. It also contributes by getting local area craft breweries involved. "Genesee reaches out to many of the local startup breweries and brewpubs, inviting them to participate in sensory evaluations at their headquarters."

That's a deep commitment to homebrewing from a large brewery. Other beer-related businesses pitch in, too.

"Southtown Beverage is a beer retailer, and they sell kegs and fill CO₂ tanks," Zoller notes. "They've been a local drop-off and ship-to location for as long as I can remember. The homebrew shops Niagara Traditions (Buffalo) and E.J. Wren (Syracuse) volunteer their precious space so brewers may drop off their competition entries. They also give us gift certificates to use as prizes." Beyond these, there is a long list of nationally known sponsors, though several local Buffalo, Syracuse, and Rochester sponsors willingly donate to the prize pool.

As far as judges, there are plenty to choose from in the area. "The Niagara Association of Homebrewers (Buffalo) and Salt City Brewers (Syracuse) each have their own competitions," Zoller reveals, "and all three competitions have many judges participating from other clubs. We send out an email blast, and they come, and our judges take a trip down the [New York State] Thruway when needed."

Best of show for the event went to Dr. Kenneth DeMarree, a college professor of psychology at the University of Buffalo, and a homebrewer extraordinaire. The recipe

he won with was a blend of four separate brews expertly combined in a 2:1:1:1 ratio. DeMarree called it Community Supported Agriculture, because it was aged for eight weeks on 10 to 12 pounds of mixed fruit left over from his CSA: peaches, nectarines, apricots, sweet and sour cherries, blueberries, and plums. And two kiwis.

The component beers were, in order, a one-year-old Brett blonde ale fermented with Wyeast 1214 followed by a secondary with Bootleg Biology Funk Weapon III; a two-year-old sour brown fermented with the dregs from bottles of Jolly Pumpkin and Hill Farmstead beers; a one-year-

old golden sour fermented with Bootleg Biology's Mad Fermentationist Blend and a bottle of Dunham Saison Rustique var. Brett Drei; and a more-than-two-year-old sour "mystery" cherry saison aged on Montmorency cherries. Due to the virtual impossibility of replicating said blend, Dr. DeMarree was kind enough to share a recipe for a more repeatable mixed fermentation recipe. This beer was in the Best of Show Circle the previous year at the same Upstate New York competition.

Of the recipe, DeMarree noted, "As with anything using mixed cultures, repeatability could still be a challenge, but the basic

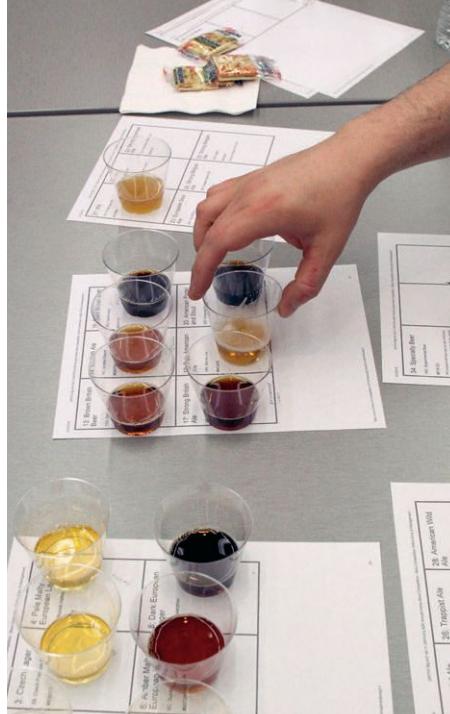
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Clockwise from top:

Samples from 28 categories; Category judging by Dr. Kim Broadwell and Jeff Morante (hat); Best of Show judging; prizes at Swiftwater.

components are simple enough. I made some minor changes to the recipe below based on my tasting/blending notes (e.g., I added a ferulic acid rest to increase Brett precursors), so this is the recipe I would follow if I were brewing it today.”

Amahl Turczyn is associate editor of Zymurgy. He celebrates 50 years of life and 30 years of brewing this year, but he wishes it were the reverse.

Brew This!

Sun-Dried Sour

Sour brown ale aged on dried currants

Batch volume: 5.5 US gallons [20.8 L]

Original gravity: 1.057 [14°P]

Efficiency: 75%

Final gravity: 1.007 [1.8°P]

Bitterness: 15 IBU

Color: 20 SRM

Alcohol: 5.5% by volume

MALTS

5.5 lb. [2.49 kg] Pilsner malt

2.75 lb. [1.25 kg] wheat malt

1.13 lb. [510 g] flaked oats

1 lb. [454 g] 120°L crystal malt

9 oz. [255 g] D-90 candi syrup

2 oz. [57 g] chocolate wheat malt

HOPS

1.5 oz. [42 g] aged hops, 1.2% a.a. @ 60 min [8 IBU]

OTHER INGREDIENTS

0.5 oz. [14 g] medium toast French oak cubes, boiled, in secondary

20 oz. [566 g] dried, rinsed currants, in secondary

YEAST

Wyeast 3711 French Saison, 2L starter

Propagated dregs from Jester King and Jolly Pumpkin beers

BREWING NOTES

Mash in at 113°F [45°C] for a 20-minute ferulic acid rest. Raise to 156°F [69°C] and hold for 60 minutes. Bring full wort volume to a boil; boil 60 minutes. Chill to 68°F [20°C] and aerate. Decant and pitch 68°F [20°C] yeast starter. Ferment at 68°F [20°C] until there is evidence of fermentation, and then allow temperature to free rise. Rack to secondary with propagated dregs and a small handful (about 3 g/gal. or 0.8 g/L) of medium toast French oak cubes, boiled 15 minutes to sterilize. After desired flavor has developed (up to 1 year, depending on cultures and temperature), add 4 oz/gal. [30 g/L] of dried, rinsed currants and ferment for about 2 additional months.

EXTRACT VERSION

Omit wheat malt and all but 2 lb. [907 g] Pilsner malt. Mash Pilsner malt with flaked oats, crystal malt, and chocolate wheat malt at 156°F [69°C] for 45 minutes. Drain, rinse grains, and dissolve 5 lb. [2.27 kg] wheat malt extract syrup into the wort. Top off with reverse osmosis water to desired boil volume and proceed with boil.

QUALITY MALT FROM GROWER TO BREWER

That's why we work directly with **Joe Yedlicka** and other growers known for producing high-quality malting barley. Located in some of the nation's most distinguished barley growing regions, our growers handle barley as meticulously in the field as we do in the malthouse. Controlling our barley supply chain from grower to brewer reaffirms our commitment to American Craft Beer — providing a consistent source of high-quality base and specialty malts for your continued success. **THE FINEST HANDCRAFTED BEER STARTS WITH THE FINEST HANDCRAFTED MALT.**

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Relax, Don't Worry, Have a Homebrew!



That mantra rings as true today as it did in 1978 when Charlie Papazian cofounded the American Homebrewers Association with Charlie Matzen. Homebrewing can be as simple or as complex as you want to make it, but the first step is always to relax and not worry.

To aid your relaxation and help you get the most out of Zymurgy, here are some standard assumptions and methods for our recipes. Of course, when a recipe says to do something different, follow the recipe. But you can always fall back on these general tips to brew great beer.



ON THE WEB

For more detailed info, head over to HomebrewersAssociation.org and dive into our How to Brew resources.

BREWING WITH ZYMBURGY

MAKING WORT

Most recipes in Zymurgy offer an all-grain version and a malt extract or partial-mash alternative. Pick the procedure you prefer and prepare some wort!



Malt Extract Recipes

Making wort from malt extract is easy.

- Crush specialty grains.
- Place milled grains in a mesh bag and tie it off.
- Steep the bag of grains in 150–160°F (66–71°C) water for 30 minutes in your brew pot.
- Remove the bag of grains from the pot.
- Fully dissolve the malt extract in your hot, grain-infused water.
- Top up with water to your desired boil volume. (Leave some room for foam!)

All-Grain and Partial-Mash Recipes

Unless otherwise specified, all-grain brewers can conduct a single-temperature infusion mash with these parameters:

- Water/grain ratio: 1.25 qt./lb. (2.6 L/kg)
- Mash efficiency: 70%
- Mash temperature: 150–153°F (66.7–67.2°C)
- Mash duration: 60 minutes

Partial-mash recipes make the same assumptions, just using a smaller amount of grain and augmenting the small batch of wort with malt extract.

BOILING

No matter how you get here, everyone loves adding hops.



- Boil time is 60 minutes.
- Boils are assumed to be the full batch volume, but you can also boil a concentrated wort and top up with water in the fermenter.
- Hop additions are given in minutes before the end of the boil.

Brew Lingo

Every field has specialized language, and homebrewing is no different. Here are some of the key terms, abbreviations, and acronyms you'll find throughout Zymurgy.

AA – alpha acid

ABV – alcohol by volume

AHA – American Homebrewers Association

BBL – US beer barrel (31 US gallons or 117.35 liters)

BIAB – brew in a bag

BJCP – Beer Judge Certification Program

Chico – ubiquitous American-style ale yeast, available as Wyeast 1056, White Labs WLP001, Fermentis SafAle US-05, and others

CTZ – Columbus, Tomahawk, and Zeus: interchangeable high-alpha-acid hops

DME – dry malt extract

DMS – dimethyl sulfide, an off flavor that reminds tasters of canned corn or cooked vegetables

DO – dissolved oxygen

EBC – European Brewing Convention (beer color)

FG – final gravity

FWH – first wort hops, added to the boil kettle as it fills with sweet wort after mashing

HERMS – heat exchange recirculating mash system

HLT – hot liquor tank

IBU – international bitterness unit

LHBS – local homebrew shop

°L – degrees Lovibond (malt color)

LME – liquid malt extract

MLT – mash-lauter tun

NHC – National Homebrew Competition

OG – original gravity

°P – degrees Plato (density of wort or beer)

RDWHAHB – Relax, don't worry, have a homebrew!

RIMS – recirculating infusion mash system

RO – reverse osmosis, a water purification process that removes most dissolved ions to yield a "blank canvas" of pure water

SG – specific gravity (density of wort or beer)

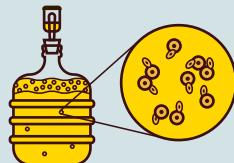
SMaSH – single malt and single hop

SMM – S-methyl methionine, the precursor compound to dimethyl sulfide (DMS)

SRM – Standard Reference Method (beer color)

FERMENTING AND CONDITIONING

Pitch yeast to chilled wort to make the magic happen.



- Use twice as much yeast for lagers as you do for ales.
- Ales ferment at 60–70°F (15–20°C).
- Lagers ferment at 45–55°F (7–13°C).
- Condition ales at room temperature or colder for a week or two.
- Condition lagers at close to freezing for several weeks.

BOTTLING AND KEGGING

If you bottle,

- Use 1 oz. of dextrose (corn sugar) per gallon of beer (7.5 g/L) for a good, all-purpose level of CO₂.
- Use less sugar for less fizz.



- Take care with higher carbonation levels—many single-use beer bottles aren't designed for high pressure.

If you keg and force carbonate your beer,

- Use the chart to dial in the pressure on the regulator.



- Add 0.5 psi (35 mbar) for every 1,000 feet (300 meters) you live above sea level.
- To convert psi pressures to mbar, multiply by 69.
- To convert volumes of CO₂ to g/L, multiply by 2.

REGULATOR PRESSURES (PSI) FOR VARIOUS CARBONATION LEVELS AND SERVING TEMPERATURES

TEMP. (°F)	VOL. CO ₂										
	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1
33	5.0	6.0	6.9	7.9	8.8	9.8	10.7	11.7	12.6	13.6	14.5
34	5.2	6.2	7.2	8.1	9.1	10.1	11.1	12.0	13.0	14.0	15.0
35	5.6	6.6	7.6	8.6	9.7	10.7	11.7	12.7	13.7	14.8	15.8
36	6.1	7.1	8.2	9.2	10.2	11.3	12.3	13.4	14.4	15.5	16.5
37	6.6	7.6	8.7	9.8	10.8	11.9	12.9	14.0	15.1	16.1	17.2
38	7.0	8.1	9.2	10.3	11.3	12.4	13.5	14.5	15.6	16.7	17.8
39	7.6	8.7	9.8	10.8	11.9	13.0	14.1	15.2	16.3	17.4	18.5
40	8.0	9.1	10.2	11.3	12.4	13.5	14.6	15.7	16.8	17.9	19.0
41	8.3	9.4	10.6	11.7	12.8	13.9	15.1	16.2	17.3	18.4	19.5
42	8.8	9.9	11.0	12.2	13.3	14.4	15.6	16.7	17.8	19.0	20.1

■ = PSI

Source: Brewers Association Draught Beer Quality for Retailers



Sanctioned Competition Program

JULY 2018

2018 Joint Base Lewis-McChord (JBLM)

Homebrew Competition, 183 entries

Matthew Hibbs, Auburn, WA

Concurso Engenheiro Cervejeiro, 19 entries

Carolina Dani Rinaldi, Videira, Brazil

7th Annual Merrimack Valley Homebrew Competition, 233 entries

Vincent Mancuso, Medford, MA

2018 Ohio Brew Week Homebrew Competition, 298 entries

Scott Pintabone, Easton, PA

Indiana Brewers' Cup, 1,509 entries

JD Vasher, Louisville, KY

Amador County Fair Homebrew Competition,

99 entries

Gordon Mauger, Walnut Creek, CA

North Dakota State Fair, 3 entries

Mike & Ashley De Le Vina, New Orleans, LA

Lane County Fair, 24 entries

Mark Rockwood, Eugene, OR

Concurso do 5º Festival das Confrarias de Cervejeiros Caseiros do Rio de Janeiro, 47 entries

Conceba, Baixada Fluminense, Brazil

South Australian Brewing Club Winter Competition, 52 entries

Mark Roberts, Adelaide, Australia

IV Concurso Nacional de Cervezas del Paraguay, 56 entries

Angel Alarcón, Asunción, Paraguay

Copa Cerveza San Arnulfo, 20 entries

Juan González, Guadalajara, Mexico

Worthogs Winter Beer Festival 2018, 30 entries

Rudie Buys, Johannesburg, South Africa

Delaware State Fair Homebrew Contest, 62 entries

Gary Black, Arnold, MO

The Niagara College Brewing Competition, 180 entries

Jamie Fowler, Kitchener, ON

Red, White, and Brew, 83 entries

Samuel Staley, Pasadena, CA

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IPA Beachslap!, 9 entries
Lee Jae-Won, Busan, South Korea

For What It's Wort, 175 entries
David Dodge, Carpentersville, IL

Deer River Bar-B-Que & Brew Fest, 78 entries
Mark Chamberlain, Grand Rapids, MN

Santa Clara County Fair Home Brew Competition, 63 entries
Beast Bay Brewers, Alameda County, CA

Fond du Lac County Fair Homebrew Competition, 18 entries
Caleb Meinke & Ray Zabrowski, Madison, WI

Western Brewers Conference Golden Promise SMASH, 12 entries
Dunc Blair, Auckland, New Zealand

Canberra Brewers 2018 Club Comp 2, 53 entries
Stephen Lawford, Higgins, Australia

AGWB Club Competition, 11 entries
Garth Mackey, Auckland, New Zealand

Copa Cervecería Mitad del Mundo, 507 entries
Noir Brett, Quito, Ecuador

Keep Em Brewing, 13 entries
Robert Olsen, Ballwin, MO

Single Shot Showdown, 8 entries
Nathan Fleming, Laramie, WY

2018 Los Angeles County Fair Homebrew Competition, 288 entries
Michael Hale, Apple Valley, CA

Tex Tubb's Reinheits-Revolt! Homebrewing Competition, 15 entries
Aaron Cahn and Connor Firth, Madison, WI

7º Concurso Cervejeiro Caseiro Bierland, 38 entries
Daniel Ferreira de Cordova, Florianópolis, Brazil

22nd Annual New Jersey State Fair Homebrew Competition, 334 entries
Eric Wembacher, Plainsboro, NJ

QUAFF COC - Adjuncts, 18 entries
Oleg Shpyrko and Matt Barrett, San Diego, CA

Iowa State Fair, 260 entries
Jeff Moyer, West Des Moines, IA

Ventura County Fair Homebrew Competition, 54 entries
John Anderson, Newbury Park, CA

AUGUST 2018

ASH HBOY Saison Mini-Comp, 19 entries
Kevin Lott, Chandler, AZ

2018 Michigan Beer Cup, 571 entries
Chad Zornerlei, Hudsonville, MI

Hogtown/Brick City 2018 Dry Stout Competition, 14 entries
Lucas Frank, Ocala, FL

Jeffco Fair & Festival Homebrew Competition, 72 entries
Bernie Peterson, Lakewood, CO

Best of the Bay, 212 entries
Jason Mantello, Bellingham, WA

Laramie County Fair, 2nd Annual, 22 entries
Doug Schmidt, Cheyenne, WY

Redstick Brewmasters Clash of the Carboys 2018, 51 entries
Lawrence Cramer, Branch, LA

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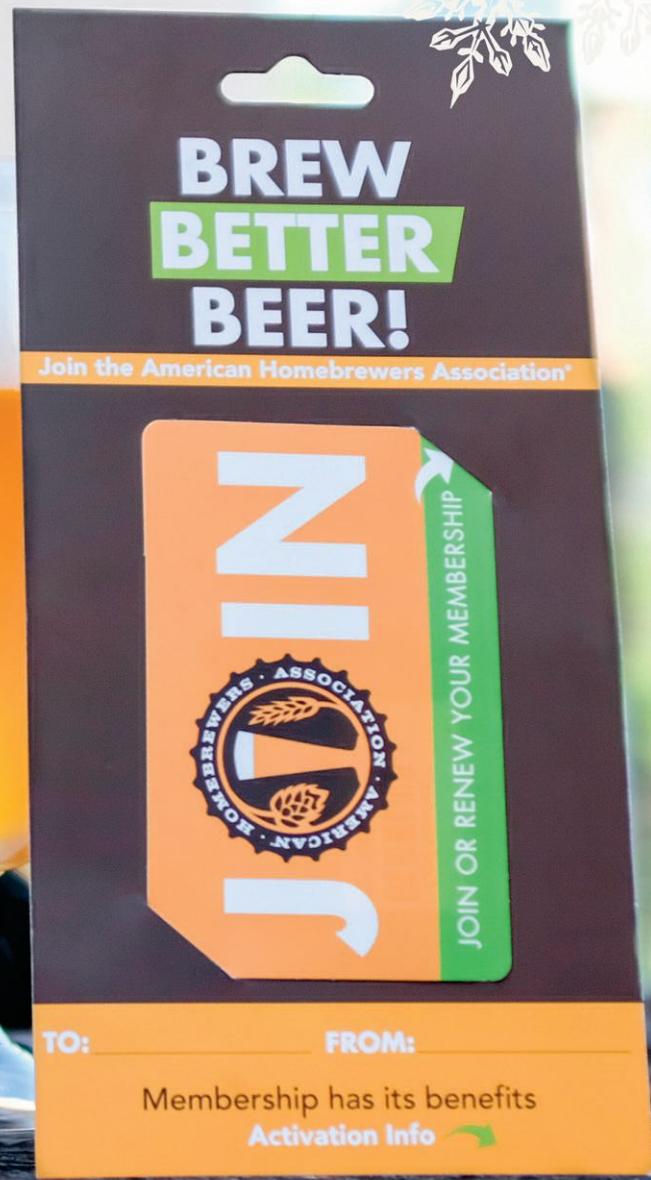
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Copa Cervejeira Concerva - Etapa Cascavel,
52 entries
Jonas Geiss, Guarulhos, Brazil

Auckland Home Brew Club BJCP Comp,
20 entries
Bradley Roberts, Auckland, New Zealand

Dakota County Fair, 14 entries
Ferlin Musky, Farmington, MN

Kentucky State Fair Homebrew Competition,
271 entries
John Wurth, Louisville, KY

Austin ZEALOTS Homebrew Inquisition,
315 entries
Justin Holman, Richmond, TX

Limbo Challenge, 2018 Edition, 274 entries
David Rogers, Cypress, TX

2018 Evergreen State Fair, 264 entries
Shelley Albright, Snohomish, WA

Nebraska State Fair Beer & Wine Competition,
136 entries
Thomas Stewart, Bellevue, NE

BASH Only Extract Beer Competition, 27 entries
Paul Holder, Corpus Christi, TX

Western Idaho Fair Homebrew Competition,
70 entries
*John McNeese with Nick McDowell & Evan Reed,
Boise, ID*

Minnesota State Fair Homebrew Competition,
578 entries
Ben Gentry, Woodbury, MN

2nd MO MASH In, 117 entries
Josh Aune, St. Louis, MO

WCB W-34/70 comp, 29 entries
Clinton Brookes, Perth, Australia

Beer & Sweat, 246 entries
Keith Kost, Pittsburgh, PA

Manitowoc County Fair Blue Ribbon Brew
Competition, 68 entries
Alex Hartlaub, Manitowoc, WI

Righteous Brewers of Townsville Annual
Competition, 25 entries
Nigel Hassell, Thuringowa Central, Australia

McHenry Rotary Blues Brews and BBQ,
17 entries
Christopher Van Eynde, Villa Park, IL



ON THE WEB

For an up-to-date calendar
of AHA and BJCP events,
visit the Events section of
HomebrewersAssociation.org

Hard Redz Summer Brew-Off, 25 entries
Danzeby Nickel, Hutchinson, KS

HHCBC Last Brewer Standing, 32 entries
Ken Dalton, Garden City, NY

2018 Maryland State Fair Homebrew
Competition, 104 entries
Michael Heitt, Lutherville, MD

SD Bomberos - 5th Annual Firefighter
Homebrew Competition, 36 entries
Brian Trout and Doug Brown, San Diego, CA

Red Brick Roads HomeBrew Competition,
33 entries
Brad Bassett, Pearl, MS

Hogtown End of Summer 2018 Intraclub
Competition, 13 entries
Joaquin Baralt, Gainesville, FL

Summer Beer Dabbler Home Brew Contest,
45 entries
Daniel Connelly, Plymouth, MN

Malt Madness XII, 372 entries
Dan Copper, Glenolden, PA

SEPTEMBER 2018

Campeonato Chilebruers 2^a Etapa, 44 entries
Johann Renner, Chillán, Chile

Mboyere Beer Cup 2018, 102 entries
Alain Bloos & Alejandro Gonzalez, Posadas, Argentina

Albion Area Fair, 12 entries
David Lesher, Albion, PA

Delco Fest, 139 entries
Josh Aune, Alton, MO

The Great Frederick Fair Homebrew
Competition, 114 entries
Tiffany Makowski, Frederick, MD

Mevashlim 2018, 45 entries
Or Dahan, Beer-Sheva, Israel



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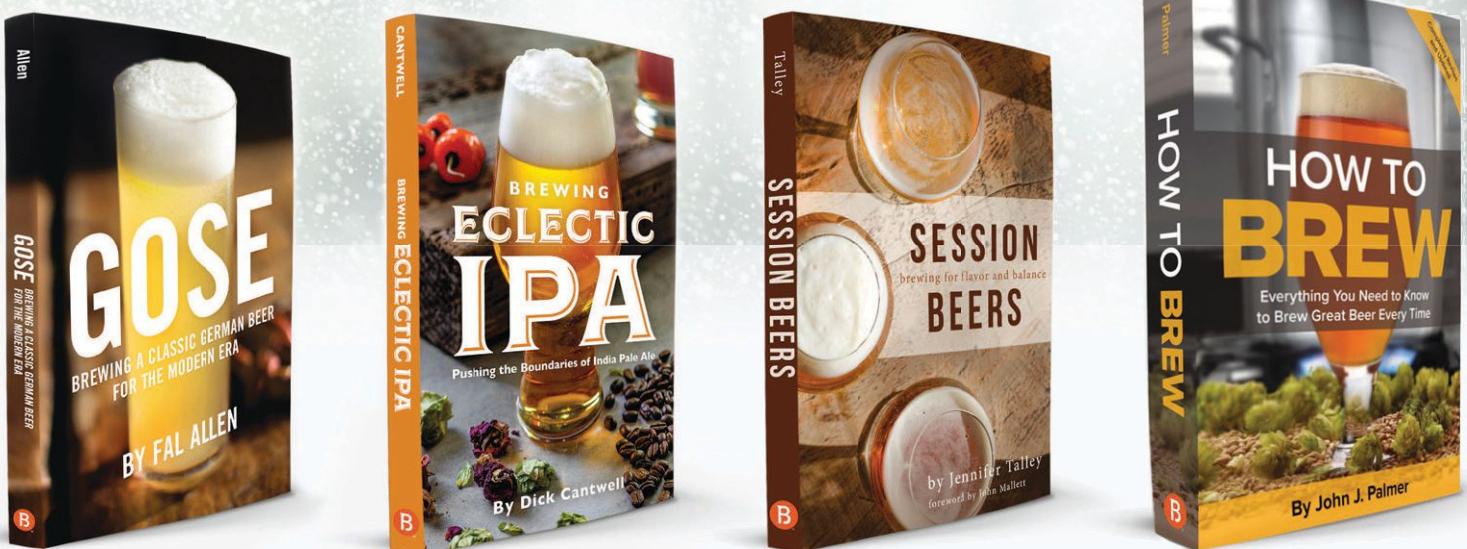
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By law, bourbon must be aged in first-use barrels. Thus, every cask of bourbon that rolls out of the warehouse yields an empty wooden barrel in need of a second home. Some of those barrels go on to store whisky in Scotland, whiskey in Ireland, Tequila in Mexico, and even maple syrup in Canada, all part of this complete breakfast.

Other bourbon barrels, however, are used to age any number of beers, many of them big and boozy. From wee heavy →

Judges' Score

BOURBON BARREL SCOTCH ALE

Central Waters Brewing Co., Amherst, Wis. | BJCP Category:

33B Specialty Wood-Aged Beer (base style 17C Wee Heavy)



SCOTT BICKHAM



SANDY COCKERHAM

→ and barleywine to imperial stout and coffee porter, big, chewy malt turns out to be the perfect foil for bourbon-soaked American white oak.

But there's another reason bourbon barrels are so beloved by your neighborhood craft brewer. Federal regulations prohibit commercial breweries from adding spirits directly to beer, but the law is perfectly fine with beer that has been stored in a wooden barrel that formerly hosted good old water of life. (Homebrewers, of course, are free to add anything to their beer, so go ahead and spike your next batch just because you can.)

Just in time for the colder months of the holiday season, we bring our judges a couple of heavyweight contenders that blend strong, malty base beers with harmonious vanilla, tannin, and oak components that can only come from aging in bourbon barrels.

Central Waters Brewing Company of Amherst, Wis., shows off its barrel skills with a massive 11.8% ABV Scotch ale from its Brewers Reserve series. This one's got elements of chocolate, dark stone fruit, and raisins, and of course a heady glow of bourbon and oak—perfect for sipping on a chilly winter night.

San Diego brewery AleSmith Brewing Company crafts its own bourbon-laced Scotch ale, with its decadent 10% ABV Barrel-Aged Wee Heavy. Matured in premium bourbon barrels for up to a year, this rich, malty brew gains layers of complexity, including vanilla, toasted oak, and coconut. Coupled with the Wee Heavy's caramel and toffee notes, it's an opulent treat that deserves a brandy snifter and long moments of blissful contemplation.

Read on to see what our lucky judges thought of these very special beers.

AROMA Begins with moderate vanilla and toasted wood, with some cocoa-like notes in the background. It's quite boozy with a distinct bourbon character. Higher alcohols with some solvent notes warm up the nasal passages. Underneath all of this is malt richness, providing sweetness, toffee notes and a touch of roast. **10/12**

APPEARANCE Very dark brown in color with ruby highlights. It would be a touch dark for a traditional Scotch ale but is permitted to have a darker hue from the barrel aging. The head is beige in color, forms easily and lasts surprisingly well given the high alcohol level. The clarity is excellent, and alcohol legs are evident when swirled. **3/3**

FLAVOR There is a big malt richness up front, along with nutty caramel and treacle notes. These transition to a complex array of flavors derived from the barrel aging, including vanilla and cocoa, plus low levels of raisins and dried fruits from oxidation. There is low hop bitterness and no hop flavor, as appropriate for the style. The finish is quite long with some residual sweetness and lingering alcohol notes. Balance is decidedly to the malt. **17/20**

MOUTHFEEL Moderate high carbonation combines with the residual sugars to create a creamy texture. The alcohol warmth is moderately high, with some higher alcohols that leave a slight burn. Low astringency leaves a little harshness after swallowing but is not a major detraction. **4/5**

OVERALL IMPRESSION Thanks for sharing a very nice example of a bourbon barrel-aged strong ale. It has a complex and balanced blend of malt richness and wood-aged character. The vanilla and cocoa notes marry well with the toasted and caramel notes from the malt. The base Scotch ale style is a little lost underneath the boozy bourbon character, perhaps ending up more like an English old ale (especially with the elevated alcohol). But overall, it's a well-crafted beer that challenges the drinker to work through many layers of flavors. **9/10**

TOTAL SCORE 43/50

AROMA Moderate bourbon and wood with low vanilla. No hop aroma. Medium to medium-high malt is richly bready with treacle, light caramel, and slight roast grain. Pleasant medium-low vinous notes may be oxidation. Medium-low dark fruit suggests raisins with a hint of plum or prune. No distinct esters beyond dark fruit. **9/12**

APPEARANCE The beer is deep brown and opaque. A finely beaded, tan head is moderate in size and has fair retention (good for such a strong beer). After falling, it leaves a skim of foam on the surface and a rim around the glass. The good lacing on the glass seems to prevent outright leg formation from the alcohol in the beer. **3/3**

FLAVOR Malt is medium-high and bready with a touch of caramel and treacle. As it warms, rich chocolate emerges. Moderate bitterness with no hop flavor. Medium burnt sugar, raisins, and low dried cherry add another layer. Moderate barrel character has wood plus low vanilla. Medium-low bourbon and alcohol push medium-high alcohol flavors with some solvent. Slightly sweet finish is malt balanced, but tannins and alcohol keep it from being cloying. Low wood flavor lingers long into the finish. **17/20**

MOUTHFEEL Medium-full body with medium to medium-high carbonation and light creaminess. Moderately high alcohol warmth. Low tannins on the tongue aren't overly astringent but seem to add some structure to the body. **4/5**

OVERALL IMPRESSION

Rich and very enjoyable bourbon barrel-aged strong Scotch ale. The base beer seems a little out of style and comes across more like a generic strong beer, but that does not lessen the enjoyment. Malt and barrel rule this beer with neither overpowering the other. Hop bitterness keeps it all in check. **8/10**

TOTAL SCORE: 41/50



Judges' Score BARREL-AGED WEE HEAVY

AleSmith Brewing Co., San Diego, Calif. | BJCP Category:

33B Specialty Wood-Aged Beer (base style 17C Wee Heavy)



DAVE HOUSEMAN



GORDON STRONG

AROMA Wonderful aroma of caramel, toffee, and dark milk chocolate with bourbon, alcohol, and dark fruits like raisins and prunes. Vanilla and oak play lesser but still supporting roles. No hop aroma, as appropriate. No diacetyl or DMS. **11/12**

APPEARANCE Very dark brown to black. Opaque but clear; some light does get through. Dense, rocky, brown head with very good retention. Looks great in a small tulip glass. **3/3**

FLAVOR Chocolate, caramel, and toffee malt character complemented by a balance of alcohol and bourbon. No hop flavor, as appropriate, with hop bitterness assertive but balancing. Alcohol in the finish is a bit hot and heavy for a wee heavy, but this is acceptable in a bourbon barrel-aged beer. There are tons of raisin and prune-like fruity esters with supporting vanilla and oak from the barrel. No diacetyl or DMS. Finishes a tad sweet to the hop bitterness and alcohol sharpness. **17/20**

MOUTHFEEL Chewy, full-bodied beer with a smooth mouthfeel, although the alcohol is a bit sharp with lots of immediate warming. **4/5**

OVERALL IMPRESSION The prune-like fruitiness, bourbon, alcohol, and chewy malts combine for a harmonious and complex warming, sipping beer. Buy several bottles to put aside and age for special occasions. The alcohol will mellow out, and this will be great for years to come. I would enjoy this with a juicy filet mignon covered in earthy mushrooms and brown onion gravy, then carried on to pair with a cigar after dinner. **9/10**

TOTAL SCORE: 44/50

AROMA Strong vanilla, toast, and wood character. Suggestive of bourbon without being super boozy. Rich caramel malt sweetness. No hops. Light esters. Restrained alcohol. Smooth. The vanilla, toast, and caramel notes are dominant, clean, and welcoming. The barrel character tends to dominate the base beer, but in a complementary way. **11/12**

APPEARANCE Medium-sized light brown head, tiny bubbles, frothy. Opaque, seems a touch hazy. Very dark mahogany brown color. **3/3**

FLAVOR Vanilla, toast, caramel, and a touch of coconut. Strong malt flavor with a balanced and complementary barrel character. Restrained char and booze. Slight bourbon sweetness. Medium-low bitterness. Medium-high esters. No hops. Slight acidity. Aftertaste of caramel, bourbon, and toasty vanilla. **18/20**

MOUTHFEEL Medium-full body but creamy. Medium carbonation. Warming. Light barrel tannin noted. Light acidity thins it a touch. **4/5**

OVERALL IMPRESSION Really good use of the barrel enhances the base beer without destroying it. Not boozy, but definitely strong. The vanilla and toast are great, and the bourbon doesn't dominate—it adds richness and sweetness that meld well. Some barrel tannin enhances the mouthfeel. I wish I had several bottles to cellar—this one is special and I'm saving some room on the score because I think it will keep improving. Bravo. **9/10**

TOTAL SCORE: 45/50



JUDGING

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 commercial beers (or meads or ciders) using the BJCP scoresheet. We invite you to download your own scoresheets at bjcp.org, pick up a bottle of each of the beverages and judge along with them in our Commercial Calibration.

OUR EXPERT PANEL

Includes Dave Houseman, a Grand Master VI level judge and competition director for the BJCP from Chester Springs, Pa.; Sandy Cockerham, a Grand Master IV level judge from Indianapolis, Ind. and an associate exam director and Midwest Representative for the BJCP; Scott Bickham, a Grand Master III 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 IX judge, principal author of the BJCP Style Guidelines, and president of the BJCP board who lives in Beavercreek, Ohio.



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World of Worts:

1,000 Brews and a Brewer's Manifesto



I've been brewing for 48 years. How many brews have I created? Quite some time ago I lost count. Maybe 900? Perhaps closing in on 1,000. In retrospect, I wonder what all these creations mean.

Am I an artist? Researcher? Scientist, engineer, craftsperson, teacher, poet, pragmatist, explorer? Showman or shaman? I think I have a thirsty soul, and that kind of sums it up for the time being. All those years, all those beers. I keep brewing, tasting the wort, tasting the progress of the brew at mash in, mash out, wort boil, primary ferment, secondary ferment, at kegging or bottling. Why? For reassurance, nurturing, cheering, hoping, discovering,

or, perhaps in occasional circumstances, anticipating a failed brew.

I brew favorites for comfort and revisiting memories. I take risks. My stylistic compositions can be traditional and/or innovative. New ingredients and classic favorites. Routine processes and quirky digressions. What is it that drives a brewer like me? No one tells me what to brew, but indeed my life experiences—day to day, year to year—drive my mojo. Am I impulsive, or is there a driving sense of reason that I'm pursuing?

I am a small and independent brewer.

I know these things. Every single beer reflects a moment, a conversation, the

direction of where a breeze may come from or be going to. A season, a reason, emerging ideas, circumstances, a composition, a memory recreated: they are in part an actualization of vision and thirst. A thirst for beer, a thirst for knowledge, a thirst for reasons. Every one of my 1,000 brews is a unique creation; I have no doubt about that. It feels like I've been following a path that leads to something more important than each and every brew.

My life has taken me on a melodic journey of encountering unanticipated opportunities and unexpected circumstances. Every one of my beers is enhanced with the breath of life at

creation. It releases life at the point of enjoyment, passing it on. I became aware of what the craft of brewing was really about during my first year of brewing. Beers from thoughtful brewers like me were unequivocally different from the beers I had once bought without thought.

I am a small and independent brewer.

My thoughts and my life are upon the palette from which I derive all my beers. My beers are not meant to be literal depictions of any one type of beer or of any emotion. They are abstract compositions, every one of them. Abstract art is a mix of

emotions and moments, an expression that offers to engage experiencing minds differently and personally. My beers take on the life of the beholder. My beers express life and experiences, personal for me and for those who enjoy them. For the people who enjoy my beers, they are starting points to know me and with which to express and personalize their own experiences.

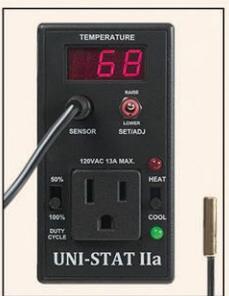
I am a small and independent brewer.

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monikers are simply road signs, paths to consider. At any one moment, the real view is to either side, beyond, and in back.

I have stories to tell. Beer is part of my story. My beers start as my story and become your story.

I can say all of this because it is real, and I am a homebrewer.

Let's cut the shuck and jive and get on with the recipe details.

Well, actually, this time I'm going to ask you to be seated. Close your eyes. Take yourself to a place that makes you smile. A place where you are content. A place you want to be. What does that feel like? Take those thoughts and reflect on your malt, water, hops, yeast, and any other ingredient that feels as though it reflects the moments that make you content. Brew for yourself or brew for others? You choose. Don't let any recipe tell you what to brew. The first step for a small and independent brewer is to connect with what you want to brew: a memory, a place, a time, a taste, an aroma, a color, an admired person, companionship, adventure, a comforting space.

This is your recipe that will guide you for the rest of your brewing life.

Charlie Papazian
Founder and Past President
American Homebrewers Association

This is Charlie's final contribution to Zymurgy as a full-time employee of the Brewers Association. His World of Worts column has appeared in every regular issue of Zymurgy since 1978. On January 23, 2019, he exits the Brewers Association after 40 years. He will continue to homebrew and pursue beer adventures. 



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Central Alabama Brewers Society

Beer Camp 2018

Alabama was the last state in the union to pass homebrew legalization legislation in 2013. It should come as no surprise that when I moved to Alabama in late 2016, I found that perception of the local homebrewing community was a bit behind the rest of the country. Some still erroneously confused homebrewers with moonshiners.

When I took a leadership position with Montgomery, Ala.-based homebrew club Central Alabama Brewers Society (CABS), my first course of action was to develop an event that would promote home beer brewing and increase public knowledge of the hobby. Over the course of six months, I worked with my fellow CABS members to develop the syllabus for a weekend Beer Camp training event.

We held our Beer Camp on Father's Day weekend (June 15–17, 2018). It was a three-day, immersive training seminar developed to take attendees from absolute beginners to experienced extract brewers in a "one-stop-shop" setting. For the nominal cost of a basic beer brewing equipment and ingredient kit, CABS gave attendees a wealth of experience, knowledge, and support to bring them confidently into the ranks of homebrewers.

CABS was lucky to have the support of James Weddle, owner of the Goat Haus Biergarten, which provided the venue. We promoted Beer Camp through word of mouth, social media, and posters placed at area craft beer venues. Public interest in Beer Camp exceeded our expectations, and we actually had to limit the number of attendees to assure a high instructor-to-student ratio.

Beer Camp began on Friday evening with CABS members giving three hours of classes on basic brewing techniques, ingredients, and equipment. The classes were fairly comprehensive and related a lot of information to our novice brewers



in a relatively short time. Sharing copious amounts of homebrew kept the attendees focused and motivated to learn how to brew themselves.

On Saturday, I took attendees through a five-hour, all-grain brewing demonstration. We made a New England-style IPA that featured the addition of honey malt and a sizable amount of hops (recipe on page 9). Beer Camp attendees got hands-on experience and learned the complexities of all-grain brewing by assisting at every stage of the process.

Sunday was the big day for our neophyte homebrewers as they took on the task of making their first 5-gallon batches of pale ale using an extract kit and equipment that were provided as part of their enrollment. CABS members offered oversight as our new brewers fired up the burners and made their inaugural batch-

es. Even with close supervision, several attendees had the quintessential experience of their first boil-overs. This hardy crew of new brewers showed what they were made of when their first brewing session ended amid a surprise torrential downpour. Broad smiles showed the obvious pride of the attendees as they finished brewing and received their certificates.

Beer Camp was a huge success, and it enlarged our homebrewing club. CABS welcomes these newly certified brewers: John Brooks, Hillary Toifl, Jason Compton, Becky Siers, William Logan, Andy Logan, John Davis, Shawn Siers, and Casey Williams. This was the first of what is sure to be many future CABS-sponsored Beer Camps.

Bob Negro recently retired after 20 years in federal law enforcement and has been involved in homebrewing since 2005.

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