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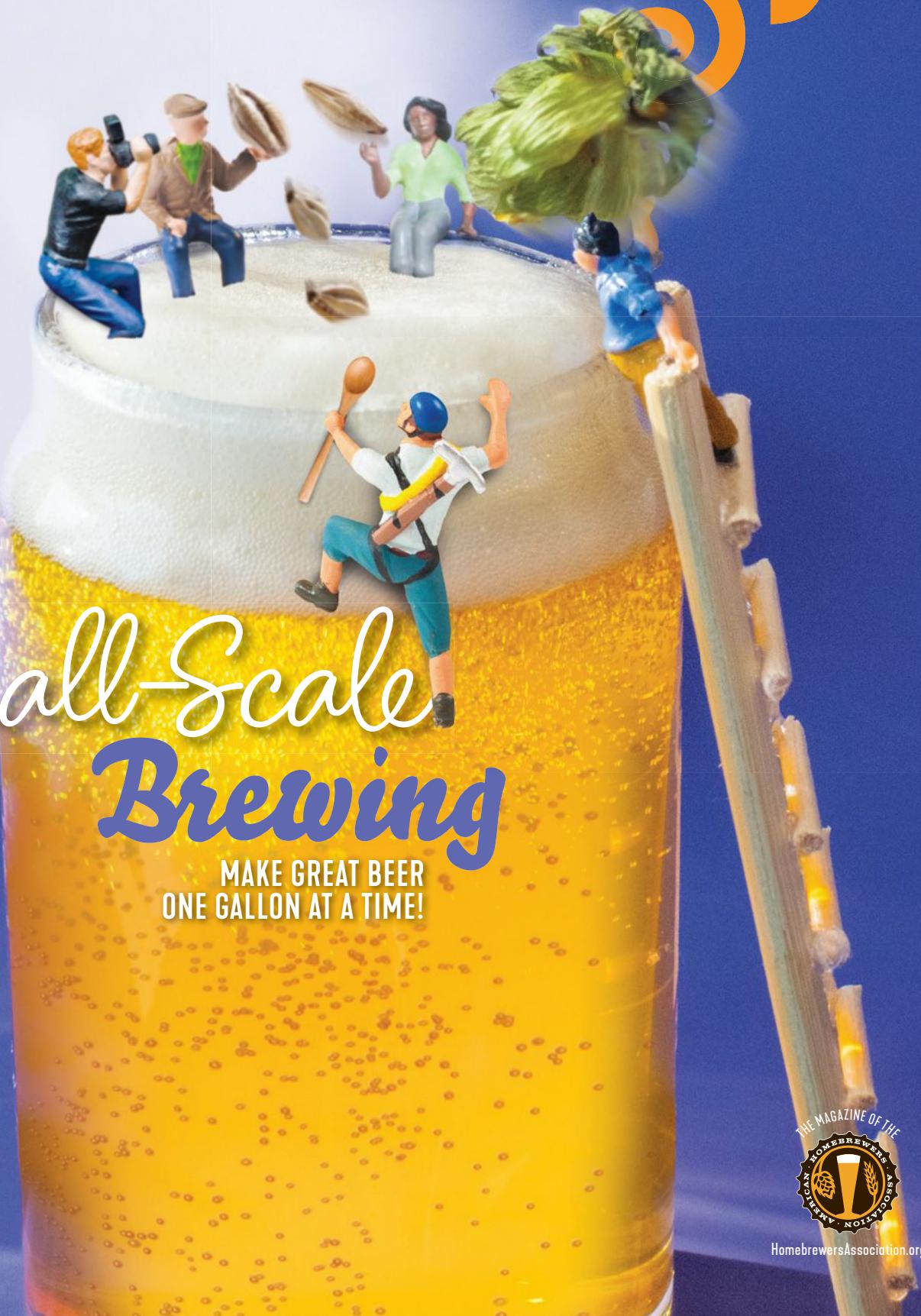
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GADGETS

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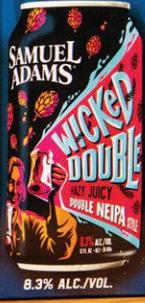
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# Planning the Perfect Pairing



I won't lie: sometimes I drink wine. I enjoyed wine years before I got into beer, although I never fell nearly as far down that rabbit hole as I have the one in which I presently find myself.

Wine has enjoyed a place at dinner since approximately the Big Bang, while your and my favorite beverage was all too often relegated to tailgates and cookouts. Only recently has beer been invited to the grownup table.

Beer is brewed from (say it with me!) malt, hops, water, and yeast. Wine is made from grapes and yeast (and bacteria in the case of a malolactic fermentation). Almost all beer is carbonated. A few types of wine are, but most aren't. Based on these observations alone, it's just a simple fact of life that beer has more flavor, aroma, and texture dials to turn than does wine. With its great diversity of classic styles, and with new styles coming along all the time, beer offers more opportunities to create memorable food pairings than wine.

This isn't a dig at wine, which as I said at the start, I enjoy. For the record, my favorite reds and whites are Côtes du Rhône and Gewürztraminer because their spellings require diacritical marks (also they are tasty). My day-to-day reds and whites, however, are Malbec and Sauvignon Blanc because you can purchase them in convenient, affordable boxes.

Despite beer's culinary flexibility, wine remains the first choice of many restaurants when it comes time to pair a beverage with food. Happily, it's getting better, although there's some way to go before we reach pairing parity.

One of my favorite beer styles to enjoy with food is saison. It complements a wide variety of dishes, and its dry effervescence offers an especially nice foil to the rich, hearty dishes we often enjoy at the holidays. If you happen to read this before your next holiday meal, consider pulling a bottle of homebrewed saison from your stash, or purchase a commercial example from your local brewery to pair with turkey, ham, salt cod, vegan roast, or whatever you happen to enjoy this time of year. It's almost guaranteed to work well.

Another classic is blue cheese (I'm a fan of Stilton) served with a Belgian-style dark strong ale such as Rochefort 10, St. Bernardus Abt 12, or Chimay Grande Réserve (the blue one). Naturally, if you've brewed one of these yourself or if your neighborhood brewery happens to make one, opt for the locally produced stuff. Otherwise, these examples are widely available and remain classics for a reason. (I just brewed my own dark strong ale to put away for next year's festivities.)

Whether you're omnivorous, pescatarian, kosher, or vegan, the right beer for your meal is out there. Browse the recipe archives at HomebrewersAssociation.org to find tons of inspiration.

Drink what you like, of course, but if you'd like to learn more about how to create great food-and-beer pairings, there are some excellent books to help guide your exploration. Check out *Beer Pairing: The Essential Guide from the Pairing Pros* by Julia Herz and Gwen Conley, *The Brewmaster's Table: Discovering the Pleasures of Real Beer with Real Food* by Garrett Oliver, or *The Beer Pantry: Cooking at the Intersection of Craft Beer and Great Food* by Adam Dulye with Michael Harlan Turkell.

Cheers to you, and bon appétit!

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



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# Features



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## SMALL-BATCH BREWING

Whether you're an experienced homebrewer or a total novice, there are many compelling reasons to brew beer in small batches. Making great beer by the gallon is easy, and doing so opens up all sorts of possibilities.

By Dan Jablow



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## GADGETS 2023

It's once again time to celebrate the inventive inclinations that make brew day more manageable and more fun. We hope you find these bespoke homebrew contraptions inspiring and entertaining.

By Zymurgy readers



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## 2022 GREAT AMERICAN BEER FESTIVAL® PRO-AM COMPETITION

Returning from a two-year COVID-19-induced hiatus, the GABF Pro-Am Competition once again offered amateur brewers the chance to brew their recipes with professional brewers.

By Kristen Kuchar



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## WASTE NOT

Brewing beer at home is already a net positive for the environment, but there are a few practices that can take things even further. You don't need to restructure your brew day, though. Just do what you can with what you have!

By Sean VanSickel

# A THANK YOU TO OUR FARMERS FOR THEIR DEDICATION



Another harvest has come to an end and the spring barley crop is on its way from grain to glass. Early harvest reports were positive, noting good to average quality – a much needed change from last year's challenges.

Barley is one of the most complex crops in the agriculture industry, requiring great care, hard labour, and a special craft, just like your beer. We're proud to be Canada's largest malting company, supporting farming communities across the Canadian Prairies. We raise our glasses to the individuals who make our malt products possible.

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and [CountryMalt.com](http://CountryMalt.com)**

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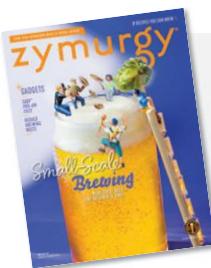


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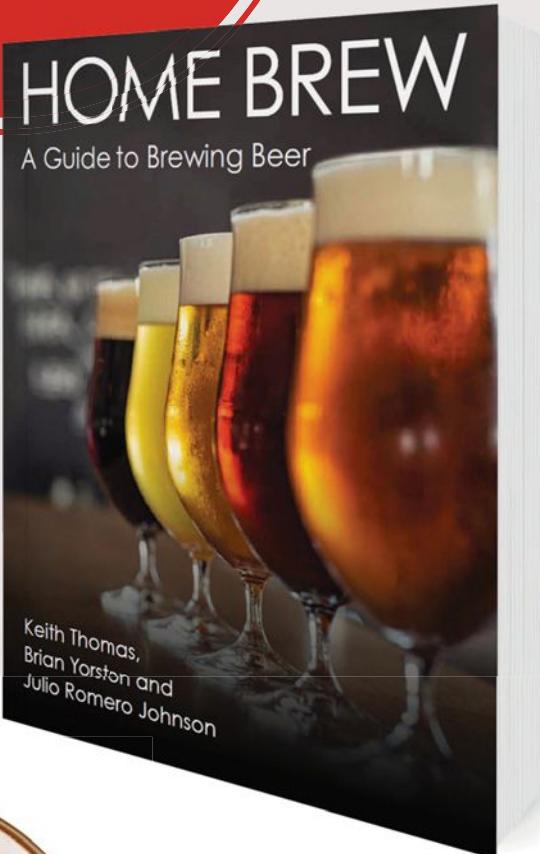
# zymurgy®

(zī'mərjē) n: the art and science of fermentation, as in brewing.



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

# NOW ON Tap



## AHA Member Deals + Cicerone = Win

Exclusive member deals are one of the most visible benefits of AHA membership, and those deals just got a lot sweeter. The AHA is pleased to add the Cicerone Certification Program to the ranks of AHA Member Deals. Now AHA members enjoy 20 percent off all Cicerone study materials, BeerSavvy Online (which includes the Certified Beer Server exam), Road to Cicerone courses, flash cards, and more. Visit [HomebrewersAssociation.org](https://HomebrewersAssociation.org) to check out all the Member Deals available only to members of the AHA.

## New Book

### HOME BREW

A GUIDE TO BREWING BEER

BY KEITH THOMAS, BRIAN YORSTON, AND JULIO ROMERO JOHNSON

The Crowood Press

From a trio of beer experts at the UK's Brewlab comes a new title aimed at home beer enthusiasts. Aptly named, *Home Brew* equips would-be homebrewers with all they need to get started, in an approachable volume.

Geared to UK homebrewers, American readers may find some terminology slightly different from what they're used to, but lexical differences are minor and readily overcome in context. The text maintains a helpful, conversational tone throughout and manages to explain even highly technical concepts with relative ease.

*Home Brew* retails in the UK for £16.99 in paperback or for £12.99 as an e-book. The title should reach US readers in June 2023, but if you'd like a copy sooner, check out The Crowood Press's website or Book Depository, which offers free international shipping.

To learn more, visit [crowood.com](http://crowood.com).

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## New Product

### WHITE LABS PUREPITCH NEXT GENERATION

Once upon a time, White Labs packaged homebrew yeast pitches in hard plastic vials with which many of us enjoyed a love/hate relationship. We loved that opening the vials required just the twist of a cap and that they could be resealed and repurposed. We hated that the aforementioned cap twisting sometimes resulted in one's spraying yeast foam all over the place.

In 2014, White Labs introduced PurePitch packaging, a flexible dual-film system that made yeast spray a thing of the past. However, opening those pouches required sanitized scissors, and resealing was out of the question.

Now, White Labs offers homebrewers the best of both worlds with PurePitch Next Generation (PPNG). PPNG combines a flexible pouch, featuring one-way permeability, with an easy-to-use cap. The result is a convenient yeast vehicle that combines the best features of the previous two designs. PPNG packs also boast increased cell counts of 150 billion,

allowing homebrewers to achieve a pitch rate of 7.5 million cells per milliliter in 5-gallon (18.9-liter) batches.

According to Neva Parker, White Labs director of operations, a proprietary "racing glove" fused-film technology allows gas to escape the packs without permitting anything to come in from outside. This design improves yeast viability, meaning more healthy cells even as the pack approaches the end of its storage life. That means shorter lag times and more robust fermentations for you.

At press time, WLP001 California Ale was being shipped in the new format, with WLP066, WLP002, and WLP029 fast on its heels. Expect all White Labs homebrew strains to appear in PurePitch Next Generation packaging in the coming months.

Visit [Whitelabs.com](https://Whitelabs.com) for more information and to check out the company's online pitching calculator that dials in how many packs you'll need for your next brew.



## Sensory Station Guidebook

A step-by-step approach to conducting simple beer sensory training

Keith Lemcke



## Improve Your Sensory Abilities

### SENSORY STATION GUIDEBOOK BY KEITH LEMCKE

Siebel Institute of Technology

The Siebel Institute of Technology recently updated its *Sensory Station Guidebook*, by Keith Lemcke, a practical handbook for conducting sensory training sessions. The guide explains how to organize and conduct sensory training, from acquiring materials to setting up the space.

In addition to the Guidebook, the Siebel Institute has also launched a series of videos on its YouTube channel. Viewers will learn how to mix flavor spikes, discover suggested tasting methods, and find descriptions for each of the compounds in the Siebel Institute's sensory kits.

Homebrew clubs, competition organizers, and those studying for BJCP or Cicerone exams will find a wealth of information in these materials.

Visit [SiebelInstitute.com](https://SiebelInstitute.com) to learn more, and scan the QR code to check out the Institute's informative YouTube channel.



# NATIONAL HOMEBREW COMPETITION

The American Homebrewers Association is pleased to announce a return to the First-Round and Final-Round competition model for the National Homebrew Competition. More details are on the way! Stay tuned to [Zymurgy](#) and [HomebrewersAssociation.org](#) for the latest.

## 2023 Calendar

The new year is upon us! Be sure to save these important dates on your 2023 calendar:

- January 24–31:**  
AHA National Homebrew Competition registration
- March 1:**  
AHA Homebrew Con San Diego registration opens
- March 6–15:**  
AHA National Homebrew Competition First Round shipping window
- March 31:**  
Deadline to submit entries for the AHA Radegast Club of the Year Award
- May 6:**  
Big Brew for National Homebrew Day
- June 21:**  
AHA National Homebrew Competition Final Round judging
- June 22–24:**  
AHA Homebrew Con San Diego
- August 5:**  
Mead Day
- September 21–23:**  
Great American Beer Festival®
- November 4:**  
Learn to Homebrew Day

Visit the calendar on [HomebrewersAssociation.org](#) for the most up-to-date listing of events, including upcoming AHA/BJCP-sanctioned homebrew competitions.



## Radegast Club of the Year

Brought to you by:  
  
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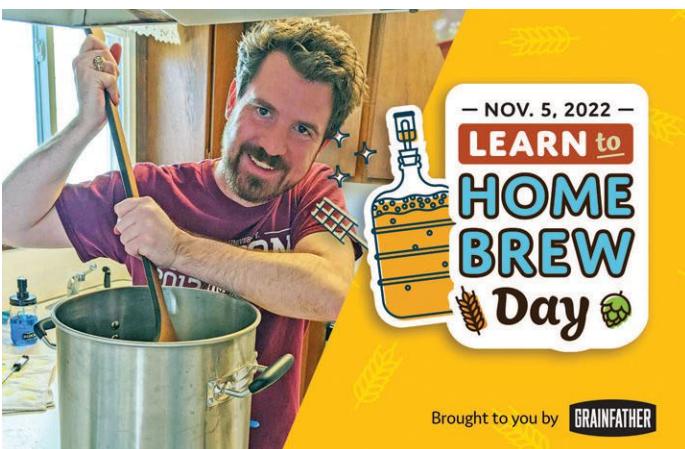
Homebrew clubs host events that introduce the public to our hobby, mentor new homebrewers to help them brew better beer, and generate funds for local charities. Clubs deserve recognition for all they do, and that's exactly what the AHA Radegast Club of the Year Award does.

If you are a member of a homebrew club that is doing great things, let us know about it by submitting an entry for the Radegast Club of the Year Award. The winning club earns a trophy from award sponsor Yakima Chief Hops and splits a \$1,000 cash award with the charity of the club's choice.

Entries are due by March 31. We'll announce the winner of the 9th annual Radegast Club of the Year Award during the awards ceremony at the 2023 Homebrew Con in San Diego, on June 24. See the Community section of [HomebrewersAssociation.org](#) for more details.



2022 Radegast Club of the Year  
Three Rivers Underground Brewers (T.R.U.B.), Carnegie, Pa.



## Learn to Homebrew Day

AHA executive director Julia Herz made Learn to Homebrew Day kits available to all staff of the American Homebrewers Association and its parent organization, the Brewers Association. Several of us celebrated Learn to Homebrew Day by brewing up our own batches of this year's recipe. We like to practice what we preach.



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# BREWING WITH HEMP

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# Looking Ahead to 2023

**T**here is much to look forward to in 2023 and beyond for homebrewing and the American Homebrewers Association (AHA). Here is a look at what is new. →



## NATIONAL HOMEBREW COMPETITION

### NATIONAL HOMEBREW COMPETITION (NHC): BACK TO FIRST ROUNDS AND MORE!

You asked, and we heard. As part of this 45-year strong competition, we are bringing back First-Round judging sites to multiple US states in spring 2023. This step allows the AHA, in concert with the Beer Judge Certification Program (BJCP), to judge all entries at a regional level to determine which homebrews qualify for Final-Round judging in San Diego during Homebrew Con in June. Woot.

This move also brings back the BJCP scoresheet judging process for First-Round entries with Final-Round entries judged using the same comment sheets from 2022 NHC. So, get brewing and get ready to enter the world's largest homebrew competition to compete against the best in the world. Competition registration opens January 24, 2023. For more information, visit [HomebrewersAssociation.org/national-homebrew-competition](https://HomebrewersAssociation.org/national-homebrew-competition).



### HOMEBREW CON™ | JUNE 22–24, TOWN AND COUNTRY, SAN DIEGO, CALIF.

Time to plan for a fermentation vacation! In 2023, look for the world's most robust educational homebrew gathering to be more "vacation style." We'll emphasize outdoor events, new workshops, and more sleeping in, yet still with plenty of world-class seminars from the world's top homebrew speakers. At the same time, don't miss leadership gatherings including a new Homebrew Club Officer Bootcamp and Industry Convention. Registration opens March 1, 2023, with an early-bird rate for the full conference and social package and discounted hotel rooms available while they last. For the latest information, check out [HomebrewCon.org](https://HomebrewCon.org).



### WELCOME TO ZYMBURGY ONLINE LEARNING!

In 2023, we will produce a new exclusive webinar series for members to participate in live or watch via rebroadcast. This virtual opportunity allows us to offer the same level of world-class homebrew content you've come to expect from Homebrew Con seminars, all year long. Look for monthly topics that cater to beginners and advanced homebrewers alike.

### MEMBER DEALS: MORE ROBUST NATIONAL DISCOUNTS

We're all about the reward of membership paying itself back exponentially. Did you know you have access to more than 2,000 members-only deals at homebrew shops, breweries, and online retailers? The savings more than pay back the cost of your AHA membership. In 2023, look for even more robust national discounts. Want a sample? As of December 2022, AHA members now get 20 percent off all Cicerone study materials, BeerSavvy Online (which includes the Certified Beer Server exam!), Road to Cicerone courses, flash cards, and more.





## HOMEBREW SHIPPING

One of the top things homebrewers ask me about is the legality of shipping homebrew and solutions for shipping to competitions. The bottom line is that it is federally illegal to ship alcohol through the US Postal Service, so solutions require state-by-state private carrier help.

With support from the Brewers Association (BA), the 501(c)(6) not-for-profit trade association that works on behalf of small and independent craft brewers and parent organization to the AHA, we continue to work on this issue. Getting homebrewing legalized in all 50 states is one example of what can happen when your national organization works with state-based organizations. Today we stand ready to do the same for shipping and assist unified state efforts where homebrew clubs and state brewers guilds are in sync.

## THE STATE(S) OF SHIPPING

In repealing national Prohibition in 1933, the Twenty-first Amendment incorporated the language of the Webb-Kenyon Act and empowered states to regulate interstate commerce in alcoholic beverages. Since then, primary regulatory oversight of activities like shipping and delivering alcohol has been left to the states. Even today, while the federal government plays a role in regulating alcohol shipping, restrictions and privileges primarily flow from state law. As such, policies regarding the shipping of beer or homebrew will turn substantially on state-by-state laws, and therefore can vary widely from place to place.

—HomebrewersAssociation.org

## MORE ROBUST DIVERSITY, EQUITY, AND INCLUSION (DEI) EFFORTS

The second top topic I get asked about, which also comes up in our member surveys, is how the AHA can advance diversity among homebrewers. With only an estimated 5 percent of membership being women and 8 percent non-white, we have a lot of work to do. In 2023, we will build upon earlier efforts and offer more best-practice materials and resources, including

- New 2023 DEI mini-grants open to homebrew events, media production projects, and educational initiatives focused on inclusivity;
- Training resources for homebrew leaders who want to be more inclusive;
- AHA Model Code of Conduct for homebrew clubs;
- Bringing the AHA into the overall BA DEI membership committee structure giving AHA members an expanded voice in overall organizational DEI work and resources.



## A PAUSE OF GOVERNING COMMITTEE ELECTIONS

The AHA has paused our 2023 election, and current GC members slated to term out in 2023 were given the option to extend their term for one additional year. I advocated for pausing the election, and this proposal was approved by the GC. It's a unique step for unique times and a direct result of the GC's work having been interrupted by COVID-19. This doesn't mean you can't participate or lead at the AHA. Part of the GC's recent work has been to formalize a new path to tap and train volunteer leader members and establish new subcommittees and working groups, an overview of which appears in the sidebar (for access to the GC overview page, visit HomebrewersAssociation.org).

### AHA GOVERNING COMMITTEE MISSION

*Supports the health of the American Homebrewers Association and homebrewing. Responsible for: Subcommittee and working group work of the AHA; Advising the AHA Executive Subcommittee, Executive Director, and BA Board; Ensuring AHA member resources fit with member needs.*

### AHA GOVERNING COMMITTEE EXECUTIVE SUBCOMMITTEE MISSION

*The lead steering group to prioritize issues for the full GC and represent the GC to the Executive Director and BA Board.*



## NEW GOVERNING COMMITTEE SUBCOMMITTEE AND WORKING GROUPS

AHA members ready to roll up their sleeves to advance the AHA and homebrewing, should look for prerequisites and application information to be published in the early months of 2023.

### • Events and Education Subcommittee:

Bring together AHA member leaders to provide input and support for AHA-driven events, educational offerings, and sponsorship/support from outside organizations to increase member value and retention.

### • Competition Working Group:

Provide input and support to execute the world's largest and most respected homebrew competition that appeals to the broadest number of homebrewers.

### • Industry Working Group:

Connect industry members and AHA members to provide industry insight and support and align industry resources with AHA membership needs to ensure mutual benefit.

### • Homebrew Con Seminar Working Group:

Guide the seminars at HBC based on what AHA members believe are the most critical issues and topics for the homebrewing community that year.

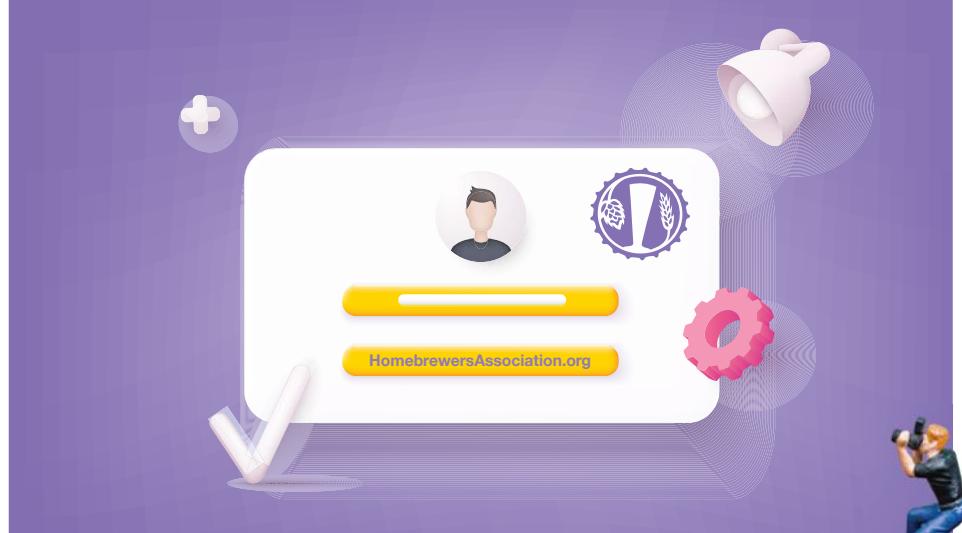


## NEW GROUP MEMBERSHIP OFFERINGS

Now breweries can purchase group memberships for their teams, and non-member breweries can also purchase AHA group memberships. This is the perfect team gift and/or professional development offering. Reach out to our membership team Monday through Friday between 8 a.m. and 5 p.m. Mountain Time at 888.822.6273, ext. 2, or email info@brewersassociation.org.

## NEW ASSOCIATION MANAGEMENT SYSTEM MEANS ENHANCED ONLINE EXPERIENCE

In 2022, we moved to a new association software platform to better manage member data and benefits. The benefits to you include enhanced data protection and a better member experience. While this is exciting, and while most of the change takes place behind the scenes, you'll need to create new credentials to access your AHA website benefits. We ask you to partner with us to provide input on what we can refine and improve from here. If you have not recently logged into your account on HomebrewersAssociation.org, please do



so, and do not hesitate to reach out with feedback or for assistance. Our membership team is here to help.

### FINANCIAL UPDATE

Because of our amazing access to world-class talent and the infrastructure of the BA, we stand ready to support, as resources permit, AHA efforts to secure better legal treatment for homebrewers while we further invest in member benefits, deliver increasing value, and advance the hobby of homebrewing. As

you may have noticed, changes are far-reaching in the homebrew business due to COVID-19 and its variants. The global economy is in a new space, inflation is rising, and here in the US, challenging economic times are afoot for homebrew shops, our allied trade partners, and us as homebrewers.

It's all enough to make one want to go brew, right? So, brew I do, as I share that this affects the AHA, too. Despite headwinds, challenges, and working hard to be revenue neutral we are fortunate to have the support of our parent organization, albeit a fraction of annual revenue and expenses. For organizational financial updates see Annual Reports on BrewersAssociation.org.

### EXCITEMENT AND OPTIMISM

Summarizing 2023 leaves me excited and optimistic, with an eye for growth. AHA growth means membership renewals and new memberships, both of which are essential to us and to the broader ecosystem of homebrewing as a hobby.

So, please renew and recruit with abandon while we continue to over-deliver on benefits that help you recoup your marginal membership cost exponentially. Can we grow our 37,000 AHA member community to 50,000? To 100,000? Just think of what we could do. Here is to an amazing year ahead and, as always, for the latest, be sure to opt in to our bi-weekly *What's Brewing* newsletter.

Cheers,  
Julia Herz

julia@brewersassociation.org  
@ImmaculateFermentation (Instagram)  
@ImmaculateBeer (Twitter)

**Julia Herz** is executive director of the American Homebrewers Association. Follow her on Instagram @ImmaculateFermentation.

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# Mysteries Revealed



**Dear Zymurgy,**

This is in reference to those mystery kegs Scott Risely inquired about in the Sept/Oct 2022 issue. Very interesting vintage stuff; it's always fun.

What you have there with those two tanks are now novelties. Should you wish to use them in a vintage style, just as Civil War reenactors like to cook with period foods and cookware, go right ahead. Practically speaking, you can use them for fun, for water collection, as water spray tanks for the kids when it is hot, and so on. I am sure with enough time and trouble you might find lid O-rings that may work, but why? Here's a bit of history...

There were and are still many industries that use what the beverage industries call **soda transfer tanks**. There originally were five manufacturers of such kegs. (There is no such thing as a "corny keg." That is just a generic term, like saying "soda" when asking for

a Coca Cola.) We can make some educated guesses based on the features shown in the photos.

The Pepsi logo script style that we see on the plastic post caps began in 1943. That style of script ended in the early to mid-1960s. I doubt those are original, for the word *Drink* is shown, and that ended with the pre-1943 logo. I also doubt any malleable man-made material would last 60 years.

The tank posts appear to be John Wood Type 85 and/or old Firestone Container Corp. posts. If memory serves me well, I believe them to be Firestone, for the word *plug* can be seen on the post. For verification, measure the posts' internal threads. The gas post would be 11/16"-18 and the liquid post 3/4"-18 (see Figure 1 and [chicompany.net/tank-posts-adapters-c-376\\_1\\_490/john-wood-type-older-firestone-p-1138.html](http://chicompany.net/tank-posts-adapters-c-376_1_490/john-wood-type-older-firestone-p-1138.html)). →



**Figure 1:**  
John Wood Type 85  
& older Firestone gas post.

Those posts show a flat edge seen above the *plug* script, while currently available units have a beveled edge. Most tank posts were made by the Hansen-Tuthill Couplings Group. I believe they have since been bought out. The currently available units are manufactured by Eaton.

The poppets (see Figure 2 and [chicompany.net/poppet-valves-c-376\\_1\\_492/firestone-long-p-16.html](http://chicompany.net/poppet-valves-c-376_1_492/firestone-long-p-16.html)) would have had the spacers shown in Figure 3 (and at [chicompany.net/tank-posts-adapters-c-376\\_1\\_490/firestone-challenger-tank-post-spacer-p-775.html](http://chicompany.net/tank-posts-adapters-c-376_1_490/firestone-challenger-tank-post-spacer-p-775.html)). Some tanks had a “flat washer,” essentially a flat disc approximately  $\frac{1}{4}$ ” thick, that used a non-“long leg” poppet. Most of these flat washers were black in color.



**Figure 2:**  
Firestone “long leg” poppet.



**Figure 3:**  
Firestone Challenger  
tank post spacer.

(As an aside, neither Pepsi nor Coca-Cola wanted the other to use each other’s equipment, which is what gave us the competing ball-lock and pin-lock standards. But where did Pepsi’s 19/32"-18 tank post size come from? To prevent an easy change of posts to another fitting, the engineers needed something distinctive. The Great War had just finished, and one of the engineers who had worked for Boeing Aircraft remembered *one*—just *one*—fitting that had been used on a B-17: 19/32"-18. This size is not a standard machine fitting size and is not used on any mass-produced machinery today.)

Another hint that leads me to Firestone is the missing dip tube on the tank on the right. It is known as a “beveled top” dip tube. This style was for gas side only, and we had to have those recreated back in the day (see Figure 4 and [chicompany.net/diptubes-c-376\\_1\\_493/diptube-plastic-beveled-p-3344.html](http://chicompany.net/diptubes-c-376_1_493/diptube-plastic-beveled-p-3344.html)).



**Figure 4:**  
“Beveled” gas  
tip tube.

The tank lids shown in the pictures are compression lids. You’d apply the cap, turn to “lock” it into place, and then turn the wing nut to compress, and thus expand, an interior gasket/O-ring to make a seal. We have seen lids that also had cork washers inside the lid!

Pepsi & Coke phased out this compression style lid in the early 1960s, for it was wholly unsanitary and would not have met the increasing sanitation requirements of the time. Keep in mind, though, that there were then many industries that used these

tanks for pressurizable liquids—these may not have originally been Pepsi or Coke tanks, even though ball lock suggests Pepsi.

The tank base is metal, most probably with a rubber ring insert:  $\frac{1}{2}$  inch wide for 5-gallon tanks or 1 inch wide for 10-gallon tanks. That metal base ended in the late 1960s, although some manufacturers continued it for specialty uses.

If the pressure relief valve is not leaking, do not pull up on the rod. You might break the seal (corrosion), and it might never work again. Those parts are no longer available.

Matthew Chitiea  
**The CHI Company**  
Diamond Springs, Calif.



### SKEPTICISM ABOUNDS!

**Dear Zymurgy,**

I’ve really enjoyed the “Skeptical Brewing” series. I think, though, that the consideration of the IBU as a bitterness scale (Nov/Dec 2022) left out some important information.

First, Moltke and Meilgaard (whose method was adopted by the ASBC as the official IBU method) “wished to measure perceived bitterness in beer. Their assumption was that [auxiliary bitterness compounds] also contributed to bitterness and should be measured” (Val Peacock, “The International Bitterness Unit, Its Creation, and What It Measures,” in Hop Flavor and Aroma, MBAA, 2009, p. 159). (The other method, from Rigby and Bethune, attempted to easily measure only iso-alpha-acids (IAA) and they realized that their method “could only be correlated with bitterness with caution” (*ibid.*, p. 159)).

Moltke and Meilgaard deliberately included auxiliary bitterness compounds in the IBU measurement, so the IBU does not only consider the concentration of iso-alpha-acids in beer. While the IBU was scaled at that time to be correlated with 1 ppm of IAA, thus leading to the claim that one IBU equals 1 ppm of IAA, that correlation only holds for beers of the 1950s and 1960s. Val Peacock explains in more detail why the IBU is better described as measuring a combination of both the concentrations of IAA and auxiliary bitterness compounds (*ibid.*, p. 161).

Second, Christina Hahn’s Master’s thesis (Oregon State University, 2017) showed that even in modern beers, there is a strong correlation ( $r^2 = 0.86$ ) between sensory bitterness and the IBU (p. 50). That evaluation looked at 91 beers with IBU values ranging from 10 to 118. The IBU is therefore an effective measurement of the perceived bitterness of beer. (Hahn also pointed out that “a mistaken conventional wisdom is that 1 mg/L of iso-alpha acids is equal to 1 IBU” (p. 44).)

In short, with an additional set of sources, I come to the opposite conclusion than that of the article: IBUs do objectively measure beer bitterness. The IBU will not be perfectly correlated with bitterness for every beer drinker under every brewing circumstance, but it is not an outright myth.

John-Paul Hosom – Portland, Ore.

**Leandro Meiners responds:** Moltke and Meilgaard did include auxiliary bitterness compounds in the IBU measurement, but it is based on the proportions of auxiliary bitterness compounds present in the aged hops that would have been used in the ’50s and ’60s. This is not necessarily representative of proportions in modern hops (due to varietal differences and handling/storage conditions) or of extraction into beers via late hopping and dry hopping, which are the types of beers for which the IBU measurement skews →



### DEAR ZYMGURGY

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further off (see table 2 of the article “Hidden Secrets of the New England IPA” by Maye, which shows that auxiliary bittering compounds are about 2.5 times higher, on average, for NEIPAs versus West Coast IPA).

With regards to your observation on IBU and its relationship to perceived bitterness, the mentioned thesis states “BU describes the bitterness of beer in a linear fashion, and for low BU beers this relationship holds true. However, when using a linear BU response to predict bitterness intensity over the entire data set within

each study, there was an obvious systematic lack of fit with the tendency to under-predict in the mid-range of bitterness and over-predict at the extremes.” These are mainly where hop-forward modern beers will land in terms of the IBU measurement. The “strong correlation ( $r^2 = 0.86$ ) between sensory bitterness and the IBU” is when the BU value is used as a predictor of sensory bitterness using the quadratic equation shown on page 50 of that thesis. The equation takes the IBU measurement and shows that a strong correlation of ( $r^2 =$

0.86) is possible, from which the factors in the equation can be derived. Thus, in order to use the IBU method to predict sensory bitterness, said equation would need to be used (instead of relying on the IBU as a measurement of sensory bitterness). Given the difference in values obtained under both studies (single versus multi rep), it is likely hard to come up with “average values” that could be used for prediction of the bitterness intensity relying on the IBU measurement, although it would be an interesting avenue to explore further.

## YOUR HOMEBREW LABELS



↑ I created these labels with my daughter in preparation for her wedding. I resumed brewing after a 10-year hiatus and relocation. After making a few batches, my daughter asked me to brew the beer for the wedding. After six months of brewing every week, these made the cut. The Connie, a ginger cider, is named after her husband who is a ginger in his own right. This was a first attempt at a cider and modeled after my wife's favorite from a Cidery in Vermont. The cider was the big hit at the wedding and I did not make enough to last the night. As an IPA fan, the double IPA was one I had done before. However the Gose and raspberry wheat were new to me as an inexperienced homebrewer. Souring the Gose for the first time was quite interesting and a fun learning experience. In all, it was a fun and memorable way to celebrate their marriage. (Homebrewer 2 years, AHA member 1 year)

Bill Gunn – Fincastle, Va.

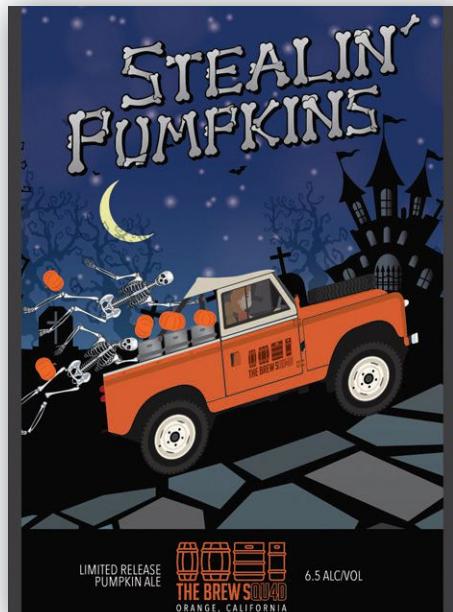
→ Pumpkin Ale was the first beer we perfected (in our minds). We have had a couple of beers that started with Stealin’ to start the name. We use the Rover because we own one and they just look cool. I just love the skeletons hanging off the back of the Rover and pumpkins flying off. (Homebrewer 5 years, AHA member 4 years)

Ron Pollard  
Orange, Calif.

I am retired military so my business partner and I have done quite a bit of traveling. We love the British pub experience and tried to channel that in a label with a brand that soothes a weary soul with great beer and hospitality. A friend of my son’s designed these, and after a few earlier designs, he nailed it with this one. I’m putting these on my homebrews that we pass around to friends and competitions. Cheers!

(Homebrewer 5 years, AHA member 1 year)

Marty Ellerby  
Woodstock, Va.



### SUBMIT YOUR LABEL

Do you make custom labels for your homebrew? Want it featured here in the pages of Zymurgy for all to see your work?

Send them to us at [HomebrewersAssociation.org/magazines/submit-bottle-label](http://HomebrewersAssociation.org/magazines/submit-bottle-label) and we will take it into consideration!

## YOUR HOMEBREW EXPERIENCE

Homebrewing is all about sharing, and we get hoppy when Zymurgy readers share their homebrewing and fermentation experiences with us. We'd love to show the AHA community what *your* experience looks like. From 1-gallon batches on the stovetop to 20-gallon brew days on your custom sculpture, we all have fun with family, friends and pets while we make and enjoy our favorite beverage. Show us your brewing/fermentation day, who you brew with, the ingredients you include, what special processes you use, and how you enjoy the final product of beer and beyond.

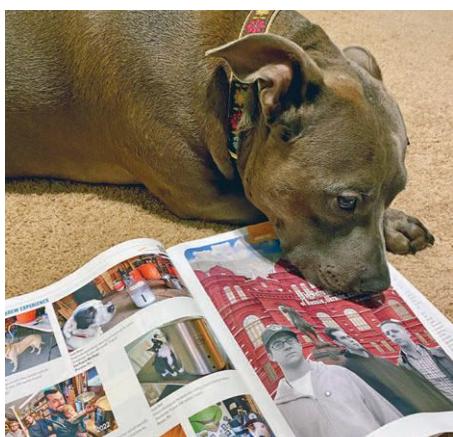
Upload photos of your homebrew-related fun at  
[HomebrewersAssociation.org/your-homebrew-experience](https://HomebrewersAssociation.org/your-homebrew-experience)



Amy Martin's brewing support dog Jazz  
(Homebrewer 11 years, AHA member 4 years)  
Frankfort, Mich.



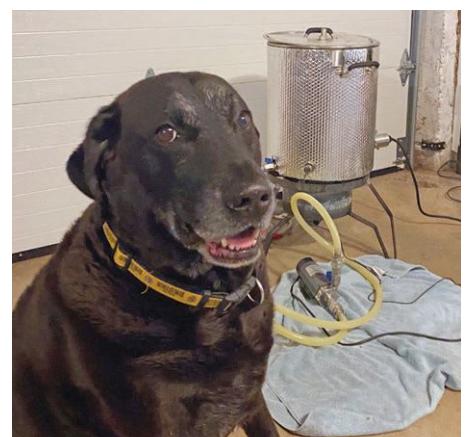
Gerard Spin with Otis  
(Homebrewer 1 year, AHA member 1 year)  
Drentebier  
Gieterveen, Drenthe, Netherlands



Kevin Corley with Maisy helping to read the Sept/Oct 2022 issue of *Zymurgy*.  
(Homebrewer 4 years, AHA member 1 year)  
Tampa, Fla.



John Smith's dog Tango, watching over his Munich Dunkel and SMASH beer! (Photo credit: Keri Smith)  
(Homebrewer 1 year, AHA member 1 year)  
Red Earth Brewers  
Oklahoma City, Okla.



Mike Headd's dog Murphy  
(Homebrewer 11 years, AHA member 1 year)  
Meriden, Conn.



### SHARE YOUR BEST HOMEBREWING SHOTS!

Homebrewing is all about fun and sharing. We would love to show others in the community what your homebrewing/fermentation experiences looks like. Upload photos of your homebrew related fun at [HomebrewersAssociation.org/your-homebrew-experience](https://HomebrewersAssociation.org/your-homebrew-experience) and you may see it in the pages of *Zymurgy*!

SCAN ME



A photograph of a traditional Norwegian farm building made of dark red-painted vertical wooden planks. A white-framed window is visible on the left side, showing a person's silhouette inside. The building sits on a low wall of rough stones.

You Can  
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# MEAD MATTERS

## with Lars

### Creating a Norwegian Farmhouse-Inspired Mead

By Andrew Luberto

**O**n Sunday, May 15, 2022, the American Mead Makers Association's (AMMA's) Home Governing Committee held another episode of its "Mead Matters" series on Crowdcast. Hosts Kevin Meintsma and I were excited to speak with author and beer historian Lars Garshol about making mead using kveik yeast strains.

The popularity of using kveik for mead-making has grown exponentially in the past few years. From a meadmaking standpoint, kveik's benefits are unmatched by any other strain of *Saccharomyces*. Remarkably fast fermentations, warm fermentation temperatures, low pitch rates, high sugar tolerance, and high alcohol tolerance make kveik an attractive fermenter.

I recall the first time someone in my club told me they were going to ferment their mead at 95°F (35°C) and expected fermentation to finish in 48 hours. They might as well have asked me where they could park their zebra. I believe my response was something along the lines of “Enjoy your rocket fuel.” However, the finished mead was very much not rocket fuel, and I was intrigued enough to give it a go myself. After fully fermenting a very drinkable 16% braggot at 100°F (38°C) in three days, I was convinced. It only takes trying it once to be fully converted.

All that said, almost any information about using kveik in meadmaking is purely anecdotal. In the absence of any formal research or guidance from yeast suppliers, most home meadmakers have taken it upon themselves to post results and speculations on various social media platforms. Thus, the AMMA was looking for someone to weigh in on best practices for using kveik. Lars Garshol has limited meadmaking experience, but it’s hard to imagine anyone more knowledgeable than he when it comes to kveik.

Additionally, we wanted Lars as a guest because his book *Historical Brewing Techniques* is a fascinating read. Part travel

“  
The unique characteristics of kveik are a byproduct of natural selection.

literature, part brewing history, and part homebrew guide, the stories throughout are entirely engaging. I was frequently astounded at some of the traditional brewing practices employed by his subjects.

For the talk, cohost and AMMA Home Governing Committee member Kevin Meintsma helped formulate and ferment a draft mead recipe using linden honey, meadowsweet, and juniper branches. This later became the official 2022 AHA Mead Day recipe, and it’s reprinted in this issue of *Zymurgy*. It’s the perfect warm-weather

refresher or easy-drinking accompaniment to a host of light fare. During the talk, we discussed the mead’s finished attributes and suggested tweaks for anyone looking to take a deeper dive on the recipe itself.

We visited several topics during the episode, including kveik’s role in Norwegian brewing history, best practices for using these types of yeast strains, nutrient regimens, strain considerations, optimal fermentation temperatures, fruit and spice additions, and the storage, propagation, and harvesting of kveik.

The advertisement features a stainless steel counter pressure bottle filler with a blue rubber gasket being used to fill a brown glass bottle. The device is connected to a chrome faucet. To the left, there's a logo for 'Tapcooler' and another for 'GREAT FERMENTATIONS BEER x WINE MAKING Supplies'. The main headline reads 'BOTTLE FROM THE TAP' with five orange stars above it. Below the headline, it says 'ITEM N° GF883' and 'COUNTER PRESSURE BOTTLE FILLER'. At the bottom, there's a call to action 'Order online:' followed by the website 'GREATFERMENTATIONS.COM/TAPCOOLER' and a small logo for 'GREAT FERMENTATIONS'.

While I don't want to give away the entire talk (it's free for anyone to watch at the link below), there were several key takeaways. One of the most important facts in demystifying kveik is that genetic testing in 2016 identified it as part of the family of common brewing yeasts categorized by researchers as *Beer 1*. This is important because it helps us understand that the unique characteristics of kveik are, like those of all organisms, a byproduct of natural selection.

Kveik's unique characteristics within the *Beer 1* family, specifically its production of the sugar trehalose, make it well-suited to the traditional farmhouse brewing processes of western Norway, where it was commonly used at warm temperatures and where rapid fermentation was desirable. This knowledge should assuage any lingering concerns that using it in mead is some sort of fermentation witchcraft (although feel free to keep thinking of it in that way if you like the idea of fermentation witchcraft).

Another point was how best to utilize nutrient additions when making mead with kveik. Kveik strains have a high reliance on

free amino nitrogen (FAN), typically double the amount you would use for more common meadmaking yeast strains. It should be noted, however, that there can be differences among the kveik strains currently available on the market.

This high nitrogen requirement can present a bit of a challenge for meadmakers, given the minuscule presence of nitrogen in honey and the fast fermentation times characteristic of kveik strains. Lars suggested front-loading all the nutrients at the start of fermentation instead of staggering the additions as is commonly done. However, there is room for debate as to best practices for high-gravity meads. This would be a great topic for additional research.

One interesting discussion concerned commercially available kveik yeasts, many of which are single strains isolated from sometimes very complex original cultures. While isolating single strains is the norm in yeast research and commercial production, some kveik cultures are astoundingly complex environments that support several co-dependent strains. According to Lars, "When kveik sort of appeared, microbiologists didn't

really have the best methods for identifying what the culture is actually composed of."

As a result, different yeast labs selling kveik strains under the same names could be marketing different isolates from the original culture, resulting in different characteristics and attributes. Additionally, these single-strain isolates could be missing key symbiotic co-dependencies from other microorganisms in the original cultures. Lars speculated that combining strains might be beneficial, but he also recommended a few labs that don't isolate single strains from kveik cultures.

For storage and propagation, kveik yeast is best dried and kept in a freezer—yes, a freezer. Lars suggested harvesting early during high kräusen, letting the yeast dry on parchment paper, and then breaking it into chips to be stored in a freezer-safe zip-top bag. "It's best to dry it," according to Lars, and doing so early helps keep the inevitably present bacteria from propagating in subsequent fermentations.

One of the most defining features of kveik that sets it apart from its other *Beer 1* counterparts is its preferred fermentation

AMMA Mead Matters:  
Left to right are Lars Garshol,  
Kevin Meintsma, and Andrew Luberto.



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Find your copy of Lars Marius Garshol's book *Historical Brewing Techniques* at [BrewersPublications.com](https://BrewersPublications.com)

temperature. In *Historical Brewing Techniques*, Lars cites examples of people fermenting at 110°F (42°C)! Ultimately, he recommends fermenting at around body temperature, so roughly 97 to 99°F (36–37°C).

If this seems unusual, it's only because modern industrial yeast strains have been cultivated over decades to behave differently. As Lars points out, "It's not kveik that is unusual; it's the modern brewing yeasts that are unusual. That they produce off flavors at high temperatures."

It's an interesting point that suggests a shift in the way many of us view modern

brewing yeasts. The preferred fermentation temperature of modern brewing yeasts only seems "normal" through the lens of post-industrial brewing processes. Pre-industrial yeast strains typically propagate and metabolize sugar much more efficiently at higher fermentation temperatures than most currently in use in the brewing world.

Despite many Viking-derived stereotypes, meadmaking was rare among the western Norwegian brewers who used kveik, but its natural application to meadmaking is undeniable. As the literature and research grow, I'm certain we'll see

much more at both the home scale and commercially. If you're looking for a place to get your feet wet, please check out Kevin Meintsma's recipe, watch the replay of Episode 8 of AMMA's Mead Matters, and keep your eye out for future episodes by following the AMMA on Crowdcast.

Episode 8 of Mead Matters can be found at [crowdcast.io/e/mead-matters-episode-8](https://crowdcast.io/e/mead-matters-episode-8).

**Andrew Luberto sits on the Home Governing Committee of the American Mead Makers Association and is a frequent Zymurgy contributor.**



## Norwegian Farmhouse-Inspired Mead

Kevin Meintsma created a recipe based on conversations with the American Mead Makers Association (AMMA) team to identify ingredients and processes inspired by Norwegian farmhouse brewing. He made the mead and an updated recipe based on tasting results, so you can try it for yourself. This recipe was the American Homebrewers Association's Mead Day recipe for 2022.

**Batch volume:** 5 US gal. (18.9 L)

**Original gravity:** 1.050 (12.4°Bx)

**Final gravity:** 1.001 (0.3°Bx)

**Alcohol:** 6% by volume

### HONEY

7 lb. (3.15 kg) linden/basswood or heather honey

1.1 lb. (500 g) linden/basswood or heather honey for backsweetening to 1.020 finishing gravity

### WATER

4.3 gal. (16.3 L) low carbonate/sulfate chlorine/chloramine-free water

### ADDITIONAL ITEMS

20 oz. (570 g) thin juniper branches, preferably with berries (30 grams/L)

6.25 g Go-Ferm Protect, dissolved in 125 mL water

16.4 g Fermaid O (FAN source), dissolved in 290 mL water

5 g meadowsweet, dried

2.8 g potassium metabisulfite

7.5 g potassium sorbate

### YEAST

5 g Kveik VOSS (dried)

### MEADMAKING NOTES

Heat water to 180°F (82°C). Allow to cool to 160°F (71°C) and immediately pour over the juniper branches. Infuse for at least 1 hour, covered or wrapped with a blanket to retain heat. The infusion may be left overnight for convenience.

When the juniper infusion is ready, taste it! If it does not have detectable pine, resin, and spice notes, use another source of juniper branches. Alternatively, use spruce or fir tips, light-green spring growth only, 1 oz. per gal. (7.5 g/L). Taste before using, as spruce and fir tips can have a powerful impact!

Measure the Go-Ferm into a flask or beaker, add 4 oz. (125 mL) of 150°F (65°C) water, and mix thoroughly. Allow the mixture to cool to 95°F (35°C).

While the Go-Ferm mixture cools, remove the juniper from the infusion, incorporate the honey into the resulting liquid, and mix thoroughly to create your must.

When the Go-Ferm mixture has reached the desired temperature, add the yeast, mix thoroughly, and allow it to "bloom" for no more than 10 minutes. Check the temperatures of the must and the yeast. If they are within 10°F (6°C) of each other, pitch the yeast into the must. If not, add 4 oz. (125 mL) of must to the yeast to "temperate" the mixture. Repeat this process every 10 minutes until the yeast and must are within 10°F (6°C) of each other and then pitch the yeast.

Mix the yeast and must thoroughly. Oxygenate the must to 10 ppm—if this is not possible for your setup, whip air into the must for several minutes to reach approximately 6 ppm oxygen.

While the yeast acclimates to the must, dissolve the Fermaid O in 10 oz. (290 mL) of 150°F (65°C) water. Allow the mixture to cool to 100°F (37°C) and then incorporate into the must. This is called "front loading" and is a departure from the typically recommended four staggered nutrient additions.

Close the fermentation vessel and attach a blowoff tube or an airlock. This will be a vigorous fermentation, so ensure there is at least 2 gal. (7.6 L) of headspace in the fermenter.

Ferment at 104°F (40°C) until the mead reaches a terminal gravity of 1.000 or less. It's likely this will be reached within 24 hours, but let it ferment until it reaches terminal gravity.

Chill the fermenter to drop some of the yeast and then rack off the lees to a new vessel. Stabilize the mead with potassium metabisulfite and potassium sorbate. Mix gently and wait 4 hours for the SO<sub>2</sub> sources to integrate.

Warm the backsweetening honey to 95°F (35°C), pull approximately 8 oz. (250 mL) of the mead from the fermenter, and incorporate into the honey until thoroughly mixed.

Add the meadowsweet in a "hop bag" to the mead and decant the backsweetening volume into the fermenter. Gently mix until well incorporated and let it sit for 1–2 days. Taste once or twice per day to assess the effect of the meadowsweet addition. Pull the meadowsweet as soon as it reaches your desired intensity.

Rack the mead to a new vessel for fining. If you don't want to fine, you can enjoy as is, or wait until it's clear. If you wait, you should have as little headspace as possible to avoid oxidation of the mead.

Enjoy!

# Some Like It Cold

## The Provenance of Cold IPA



By Dave Carpenter

Commercial draught systems are typically optimized to serve at a temperature that's great for American lager, which the country ballad canon dutifully reminds us should be ice cold, but much too frigid for barleywine or imperial stout. Serving different styles at different temperatures is logistically burdensome, so most taprooms serve their whole lineup at the coldest common denominator. After all, you can always let a beer warm in the glass. →

This is why I'll sometimes order two beers and enjoy a pint of cold-as-the-mountains pale lager while I wait for the high-gravity sipper to warm up, cupping the snifter in my hands between bouts of delivering lager to my mouth. By the time I've finished my aperitif, the entrée will have just about reached the right temperature.

I have never, however, desired an even remotely warm IPA. It needn't be honky-tonk cold, mind you, but all else being equal, I want my IPA served, let's say, aggressively cool. Thus, when I first heard a mention of Cold IPA, I thought to myself, Yes...and?

Does anyone want warm IPA? No, they most definitely do not. But, it turns out, plenty of us want Cold IPA.

## A STYLE IS BORN

It's rare that one can trace a beer style to a single place and time, much less to a single person. In the case of Cold IPA, however, we can do just that, at least if we restrict ourselves to commercial beer (I subscribe to a corollary of the Infinite Monkey Theorem when considering alleged new beer styles and assume that, at some point in the past, a homebrewer created the exact same beer, emptied the keg, and never mentioned it to anyone).

Kevin Davey at Wayfinder Beer in Portland, Ore., is credited with having brewed the first Cold IPA in 2018. He wanted to create an IPA that was, in his words, "wester" than West Coast, a dry beer that would combine the unfettered drinkability of Pilsner with the hoppy exuberance of West Coast IPA. You might say he wanted to push West Coast IPA to its inevitable conclusion. The result, Relapse IPA, was a hit, and it has since been rebranded simply as Cold IPA.

I hesitated to ask Davey the obvious question, the one I was sure he'd already answered a thousand times before. But all rock stars have to play their greatest hits, so I forged ahead: *What makes Cold IPA different from brut IPA or India pale lager?*

"Brut IPA achieves its dryness with an enzyme," begins Davey, "but there are no checks and balances."

He's referring to amyloglucosidase, a.k.a. glucoamylase, which is introduced somewhere in the process to convert complex sugars into glucose, which *Saccharomyces cerevisiae* can metabolize. The trouble with adding an enzyme is you don't have much control. It's a bit like turning on a chainsaw and tossing it onto the wood pile.

Adding amylase on the hot side gives the enzyme an opportunity to denature in the boil, which is desirable, but achieving a repeatable level of wort fermentability

requires some trial and error. Do you add it to the mash? Do you add it when lautering? How much do you add and when? Each permutation affects wort composition to some degree. Add the amylase on the cold side, though, and there is no denaturing. You could end up with diacetyl, acetaldehyde, or exploding bottles.

Cold IPA eschews auxiliary enzymes and relies instead on a rice or maize adjunct to achieve its signature dryness. Adjusting mash temperature and the grist fraction of adjunct allows for more predictable apparent attenuation, which Davey suggests should be about 82 to 88 percent.

But what about India pale lager (IPL)? In my opinion, the main problem with trying to compare anything to IPL is we never *really* defined what IPL is, apart from intuitively understanding it ought to be a hop-forward lager of some kind. The usual approach is to start with an IPA recipe, swap the top-fermenting yeast with a bottom-fermenting strain, and ferment it cold like a lager. This introduces all the complexities one normally deals with in lager brewing, including sulfur and diacetyl production, cold conditioning, and so on.

Plus, there's also the little inconvenience that West Coast IPA formulations include (or at least used to include) a good dose of caramel malt, which tastes great in the right hands (Celebration Ale, anyone?) but is inconsistent with the goal of dryness.

Finally, we get to fermentation, which is where I think the term Cold IPA does some disservice with respect to the whole IPL confusion thing. We're not talking cold, per se. We're talking, well, aggressively cool. With respect to lager, it's even warm.

Cold IPA usually relies on a lager yeast fermented at a relatively warm temperature, which immediately brings to mind California common. However, California common yeast has been selectively pressured to perform well in a temperature range approximately from 60°F to 68°F (16–20°C). Push it much colder, and it gets sluggish and may not ferment at all.

Lager yeast, however, has no problem going down below even 50°F (10°C). But some strains (more on this later) can also perform rather well at near room-temperature conditions.

As I gathered information from Davey and researched what makes an IPA Cold, I began forming my own lexicon. Yes, there's an element of "cold" involved in that fermentation is cooler than room temperature. But ales, IPA included, commonly ferment at 64°F (18°C) or so. That's where I start with Chico-style strains, and then I'll push things closer to 66°F or 67°F (18–19°C) as

## COLD IPA STYLE DESCRIPTION

*Reprinted with permission of Wayfinder Beer.*

**COLOR:** Straw to pale.

**CLARITY:** Appearance should be clear. Chill haze should not be present.

**PERCEIVED MALT AROMA & FLAVOR:** Malt sweetness is very low to low. Alcohol sweetness is medium. These beers finish extremely dry. Increased perceived sweetness may be due to increased alcohol.

**PERCEIVED HOP AROMA & FLAVOR:** High, exhibiting floral, fruity (berry, tropical, stone fruit and other), sulfur, diesel-like, onion-garlic, catty, citrusy, piney, or resinous character that was originally associated with American-varietal hops. Hops with these attributes now also originate from countries other than the USA.

**PERCEIVED BITTERNESS:** Medium to high, but not harsh.

**FERMENTATION CHARACTERISTICS:** Fruity esters and complex alcohol aromas and flavors are acceptable at low levels. Alcohol should not be solvent-like. Diacetyl should not be present.

**BODY:** Low to medium-low.

**ADDITIONAL NOTES:** Finish should exhibit low to medium-low body with a clean, crisp malt character evident at low levels. Up to 40% corn and/or rice in the grist should be used. These crisp and refreshing beers are fermented warm with lager yeast or cold with ale yeast.

• **Original Gravity (°Plato)** 1.055–1.065  
[13.5–16.0 °Plato]

• **Apparent Extract/Final Gravity (°Plato)**  
1.006–1.009 [1.6–2.4 °Plato]

• **Alcohol by Weight (Volume)** 5.1%–6.3%  
[6.4%–7.9%]

• **Hop Bitterness IBU** 50–70

• **Color SRM** 2.5–5



fermentation nears its end to eke out those final gravity points. I only go higher if that's where nature and my fermentation chilling methods conspire to go. With absolute respect for Davey and his choice of nomenclature—when you invent something, you can call it what you like!—I personally find the term somewhat confusing.

What defines this style for me is adjunct-derived dryness; a clean, unobtrusive malt foundation; assertive bitterness; and, of course, because it's IPA, an overabundance of hop flavors and aromas.

My working description for Cold IPA, therefore, is "a dry, firmly bitter, very pale beer that delivers powerful hop aromas and flavors atop clean, simple malt." *Cold IPA* certainly rolls more readily off the tongue.

It's less about being "cold" than it is about creating a malt backbone that gets out of the way and allows a metric buttload of hops (sorry to use a technical term) to shine in all their glory.

## BREWING COLD IPA

Kevin Davey was kind enough to offer a professional's perspective, but how might a homebrewer approach this problem? I turned to Mark Boelman, who has plenty of medals to prove his brewing prowess (full disclosure: we're both members of the Weiz Guys homebrew club based in Loveland, Colo.).

Last February, Boelman's Cold IPA took gold in the Experimental Beer category at the Weiz Guys' Sweethearts Revenge homebrew competition and landed him a pro-am with SweetWater Brewing Co., which opened its Rocky Mountain outpost in Fort Collins, Colo., at the end of 2021. I had



the opportunity to enjoy JB3 Cold IPA at its release party, the name a reference to this as Boelman's third—blind!—pro-am selection by SweetWater head brewer Ryan Joy.

Let's start with the malt. Some combination of Pilsner malt and pale malt forms the bulk of the grist. Davey's background as a lager brewer naturally steers Wayfinder's formulation toward Pils, while Boelman opts for a blend of Pils and pale (or, if you prefer, "two row").

If you're building your first recipe, my recommendation would be to go with what you have. That's not to suggest the choice

of Pils versus pale malt won't play a role, but rather that it's a higher-order consideration. Once you've established a baseline recipe, you can tweak the relative percentages of Pils and pale or swap out brands.

There's no need for specialty malts unless you prefer to use acidulated malt for mash pH correction. Caramel and roasted malts are out of place in this style. Stick to the pale stuff.

A hallmark of Cold IPA is the use of unmalted adjunct, specifically rice or maize, to lighten the body and enhance drinkability. Davey's recommendations



Mark Boelman (left) and SweetWater head brewer Ryan Joy (right).



Corlet and Mark Boelman celebrate the release of Mark's Cold IPA at SweetWater in Fort Collins.



Ryan and Mark on the brew deck at SweetWater in Fort Collins.

place the amount of adjunct as high as 40 percent of the grist. Boelman's example uses about 17 percent. If you're starting from scratch, I'd probably target 20 percent and then adjust up or down from there according to your preference.

Remember, you're mashing for attenuation. In Lager Land, that might mean a step protocol, but a single-temperature infusion mash works just fine. You do want to mash cool, though. Think 150°F (66°C) or perhaps even a degree or two less.

Depending on your hops choices, Cold IPA can offer many of the same organoleptic perceptions as hazy or juicy IPA—tropical fruit, citrus peel, and stone fruit—but the similarities end there. Davey says that while brut IPA has “low, low bitterness,” Cold IPA should be aggressively bitter. “I see some Cold IPAs that don't have enough bitterness, not enough dryness or alcohol.”

That aggressive bitterness separates Cold IPA from brut IPA, IPL, and West Coast-style Pilsner. Both Boelman and Davey emphasize how ethanol is an integral part of the formulation and that hops quantities must track ABV as it climbs.

Boelman applies “new-school hop techniques” to deliver a bitter punch and loads of fresh hop flavor and aroma. He begins with an uncomplicated single-temperature infusion mash at 150°F (66°C).

To achieve the bitterness associated with classic West Coast IPA while creating a fruity, resinous hop personality that explodes on the palate, he relies on a relatively modest bittering charge from first-wort hops backed up by loads of classic and contemporary American hops as late-kettle and whirlpool additions.

Fermentation is cool relative to many ale yeasts and warm relative to virtually all lager yeasts. Davey's approach is to use a lager yeast at around 65°F (18°C), which avoids the sulfur problem associated with colder fermentation. Boelman's example relies on an oldie but goodie.

Weihenstephan 34/70 ferments cleanly up to about 68°F (20°C), although Cold IPA's elevated original gravity pushes the limits of that characterization. Account for that as you would for any high-gravity lager by pitching lots of healthy yeast. (Check out José Pizarro's excellent 2019 Homebrew Con presentation “The Most Neutral Lager Strain? Effect of Pitching Rate and Fermentation Temperature on Strain Weihenstephan 34/70,” available at HomebrewCon.org, to learn how pitch rate, original gravity, and fermentation temperature affect sensory outcomes and measured flavor compound concentrations.)

It's also possible to make a great version using a classic “hybrid” approach with a Kölsch, altbier, or California common

strain fermented in their usual comfy zones, provided you manage ester production. However, given the wide availability of 34/70 in both dried and liquid forms, I don't have a compelling reason to head down those paths unless you are pining to brew and that's all you have.

If it's your first time out, trust that 34/70 can work its magic at close to room temperature and run with it. If you don't have advanced temperature control, it may be more convenient to use a proven lager yeast at room temperature (-ish) than it is to maintain a hybrid strain in its sweet spot.

## Extract and Partial-Mash Options

Homebrewers should delight in learning that, unlike hazy IPA, Cold IPA lends itself exceptionally well to extract-based brewing. Those hazies often rely on unmalted oats or wheat to achieve turbidity, and while there are some reasonable work-arounds, such ingredients don't readily lend themselves to a brew day that doesn't include some kind of mash.

Brewers who regularly use malt extract recognize that fermentability is set when those products are produced. But by swapping in simple sugars for some of the malt extract,



**JB3**  
Cold IPA

Recipe by Mark Boelman.



The batch volume is given as 11.5 gal. (43.5 L), but the final bottling or kegging volume will be closer to 10 gal. (37.8 L) after volume losses due to trub and dry hops.

<b>Batch volume:</b>	11.5 US gal. (43.5 L)	<b>Color:</b>	4 SRM
<b>Original gravity:</b>	1.067 (16.4°P)	<b>Bitterness:</b>	82 IBU
<b>Final gravity:</b>	1.011 (2.8°P)	<b>Alcohol:</b>	7.4% by volume

**MALTS & ADJUNCTS**

16 lb.	[7.26 kg] Root Shoot Pilsner malt
8.5 lb.	[3.86 kg] Root Shoot Genie pale malt
5 lb.	[2.27 kg] flaked rice

**HOPS**

1 oz.	[28 g] Columbus/Tomahawk/Zeus (CTZ), 15.5% a.a., first wort
1.5 oz.	[43 g] Galaxy, 14% a.a. @ 10 min
1.5 oz.	[43 g] Loral, 11.5% a.a. @ 10 min
4.2 oz.	[119 g] Galaxy, 14% a.a., whirlpool 20 min @ 185°F (85°C)
2 oz.	[57 g] Amarillo, 9.2% a.a., whirlpool 20 min @ 185°F (85°C)
2 oz.	[57 g] Loral, 11.5% a.a., whirlpool 20 min @ 185°F (85°C)
2 oz.	[57 g] Amarillo, 9.2% a.a., dry hop 10 days @ high kräusen
12 oz.	[57 g] Galaxy, 14% a.a., dry hop 10 days @ high kräusen
2 oz.	[28 g] Loral, 11.5% a.a., dry hop 10 days @ high kräusen
3 oz.	[85 g] Amarillo, 9.2% a.a., dry hop 5 days when kräusen begins to fall
3 oz.	[85 g] Galaxy, 14% a.a., dry hop 5 days when kräusen begins to fall
2 oz.	[47 g] Loral, 11.5% a.a., dry hop 5 days when kräusen begins to fall

**YEAST**

1 sachet Fermentis SafLager W-34/70, propagated up in a two-step starter

**ADDITIONAL ITEMS**

2 tablets Whirlfloc @ 15 min  
 Yeast nutrient @ 15 min  
 Biofine

**BREWING NOTES**

Mash at 150°F (66°C) for 75 minutes. Boil 75 minutes, adding hops, Whirlfloc, and yeast nutrient as indicated. Chill to 61°F (16°C) and pitch yeast. Allow fermentation to naturally rise to 64°F (18°C) and hold. Add 10-day hops at high kräusen and 5-day hops when kräusen begins to fall. Perform a 2- to 3-day diacetyl rest at 68°F (20°C) and then cold crash. Fine with Biofine and carbonate to 2.7 vol. (5.4 g/L) CO<sub>2</sub>.

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HomebrewersAssociation.org

Photos © Getty/pioneer111 [ice cubes], Givaga [ice cube]

one can boost attenuation and promote dryness. That's usually as simple as subbing in some corn sugar (dextrose), which ferments out completely and doesn't add any flavor, aroma, or color of its own.

Rice and maize extracts are also convenient and readily available. Look for dried rice extract, rice syrup solids, brown rice syrup, or corn syrup (just avoid the high-fructose stuff). Build your malt foundation using up 40 percent.

#### *Finishing Touches*

Boelman is a strong proponent of Biofine and gives fining some credit for his success in competition with this beer. He also advocates for doing all you can to avoid oxygen ingress because the robust hop load of Cold IPA makes it as vulnerable to oxidation as all those trendy hazies.

"If I'm entering a competition where I can drop off my entries, I bottle from a keg the night before the last day entries are accepted," he says. Packaging at the last minute also ensures the beer stays cold as long as possible before it makes its way to competition.

When it comes to carbonation, Davey recommends targeting the high side, about 2.7 to 2.8 volumes (5.4–5.6 g/L) of carbon dioxide. Elevated effervescence enhances the perception of dryness and renders an already refreshing tipple even more so.

#### **WHAT'S OLD IS NEW**

I'm not personally convinced cold IPA is as much a new style as it is an established style viewed through a different lens. It's the IPA you obtain in the limit as malt and yeast contributions approach zero and hops contributions approach infinity. It's one stop along the way to a pure expression of hops.

But, when the day arrives that a competition receives enough Cold IPA entries to warrant its own category, we'll all need to agree on some guidelines for evaluating those entries, and that's ultimately what makes a style a style. We kinda, sorta did that for IPL (GABF and Brewers Association), but not really (BJCP). If Cold IPA is A Thing That's Here to Stay (and I hope it is), I propose we stick with the definition Davey himself suggests in the sidebar. After all, he invented it.

Semantics aside, though, if dubbing Cold IPA a style is what is needed for crystal-clear, aggressively bitter hop bombs to gain more traction, then consider it hereby decreed. Because when the hops are good, the beer is *really* good.

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

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 **Fermentis**  
by Lesaffre



# Small-Batch Brewing

By Dan Jablow

I love craft beer, and I love to make things. After casually enjoying the craft beer made by others for so many years, I knew it would only be a matter of time before I'd eventually want to brew my own. About three and a half years ago, the bug finally bit me, and I started researching how to brew beer. Right from the start, I knew I wanted to focus on all-grain brewing, figuring that my formal culinary training and experience as a chef would serve me well on my quest to develop my own recipes. As I began investigating how to get started, I ran into a few potential issues.

My research at the time suggested that the most common homebrewing setups would produce 5 or 10 gallons (19 or 38 liters) of beer at a time. As the sole drinker of beer in my household, producing that much beer at once was far more than I needed. I also figured that if it took me a long time to go through that much beer, then I'd be brewing relatively infrequently, which defeated my goal of brewing frequently to gain experience.

Whether I chose a three-vessel or an electric all-in-one system, I'd need to part with some of my hard-earned cash. Such systems, along with the additional gear I'd need to support fermentation and packaging, seemed like they were not going to be cheap. At the time, I was also renting a house that had a very small and poorly laid out kitchen that wasn't conducive for batches of that size, nor did I have access to any real outdoor space for brewing.



The idea of brewing in smaller sized batches came naturally to me after wrestling with, and ultimately passing on, the decision to buy an all-in-one system capable of producing 5 gallons of beer at a time for the reasons above. If I were going to start homebrewing, I'd need something that would better fit my needs.

I thought about the lowest common denominator here and asked myself if could produce beer one gallon at a time. I scoured the internet and initially didn't find too many people brewing such small batches until I landed on Brooklyn Brew Shop's online store. They offer equipment and recipe kits that contain just about everything a would-be homebrewer needs to produce beer in 1-gallon batch sizes.

Some of the items included in their equipment kits include a single-gallon glass carboy, a three-piece airlock, and the tubing and siphon needed to draw beer out of the carboy on packaging day. I watched one of their instructional videos and was pleased to learn that most of the other items I'd need for my first brew day were already in my kitchen—a stock pot, stirring spoon, thermometer, and strainer.

The first brew I ever made turned out just fine—it wasn't amazing, but it wasn't awful either. More important than the finished product was that my first batch opened the door to future brewing endeavors. Fast forward a few years to the present, and I've got more brews under my belt than I can remember. I have since moved from my small and cramped quarters into a house with much more space, including an outdoor patio and a stand-alone garage. I have also finally added a 5-gallon electric all-in-one brewing system to my arsenal so I can brew in support of parties and events, but I still mostly brew on my small-batch setup.

## Why Go Small?

Whether you're an experienced homebrewer or a total novice, there are many compelling reasons to brew beer in single-gallon batches. My technique has improved greatly thanks to frequent practice, trial, and error over the years. To me, that's the fun part and it's something I get to do often because my small setup encourages me to brew often. Setting up for a small-batch brew day is quick and easy. Heating, chilling, and clean-up times are also significantly shorter when I brew on my small-batch system, which makes for shorter brew days than those on which I brew 5 gallons.

Because I can brew right on the stovetop, my small-batch system allows me to brew inside during all seasons and all weather conditions. I can chill my wort down



2-Gallon Pot



Stirring Spoon



Smaller Pot



Thermometer



Vessel



Fermenter



Measuring Cup



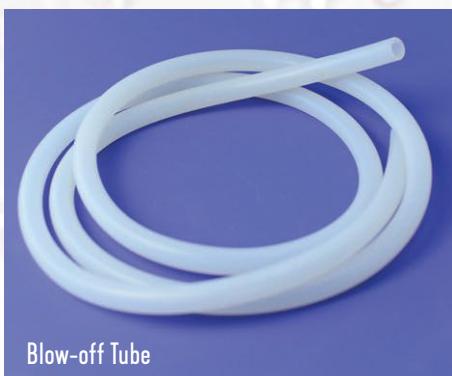
Auto-siphon



Large Brush



Mesh Strainer



Blow-off Tube



Funnel



Lid



Scale



Airlock



Sanitizer

to typical ale yeast pitching temperature quickly in an ice bath in my sink without using a lot of water. A 1-gallon setup is the perfect size for experimentation, and it makes a great pilot system—I don't brew anything on my 5-gallon setup that hasn't been tested as a smaller batch first. And, most importantly, because I get to brew frequently, I always have a good pipeline of beer to fill the gallon-sized kegs I use for my home draught system.

### Brewing Equipment

The specific equipment that I use for small-batch brewing has evolved quite a bit since that very first brew day, but it remains simple at its core. Let's start with a list of what I consider to be the essentials to get you started. Those who already brew on larger systems and are looking to downsize probably already have some of these items on hand:

The heart of the system is made up of three pots or vessels:

- One 2-gallon pot** with a lid is used for mashing and boiling.
- A smaller pot** with a 1-gallon capacity is used to heat sparge water.
- A vessel**, also with a 2-gallon capacity, can be a pot or some other kind of vessel. It won't be placed on a burner; rather, the wort will be drained from the 2-gallon pot and into this vessel. Having volume graduations is handy, which is why I use a clear, 12-quart Cambro container with marks on the side so I can see how much wort I've collected prior to boiling.

Other equipment needed includes

- A measuring cup.** I prefer a glass measuring cup that can hold 1 quart of water.
- A stirring spoon.** I prefer metal as it's easiest to clean, but plastic works, too.
- A thermometer**, preferably digital, but it doesn't have to be. I started out with a candy thermometer because that's what I had in my kitchen.
- A carboy or fermentation vessel** of at least 1-gallon capacity, preferably one with a spigot.
- An auto-siphon** and 4-foot length of silicone or plastic tubing if your

fermentation vessel doesn't have a spigot.

- A large brush** with a long wire handle to clean your carboy after fermentation.
- A lid** for your fermentation vessel of choice.
- A blow-off tube.**
- An airlock** for the fermentation vessel.
- A large mesh strainer** to use for lautering.
- Either a funnel** with a fine mesh screen filter or a second fine mesh strainer, depending on your fermentation vessel.
- A kitchen scale** that can display units in increments of 0.1 gram.
- Star San** (or your sanitizer of choice).

Next up are some optional items. They aren't required when you're starting out, but you may want to add them as you get more comfortable with the brewing process. Some will allow you to fine tune your brewing water in much the same way that proper seasoning can really make the flavor of that perfectly cooked steak stand out. Gravity readings will help you determine exactly when fermentation is finished, let you estimate your beer's alcohol concentration, and allow you to dial in your recipes and process, which will help your brews become more consistent batch over batch.

- Campden tablets** for removing chlorine from brewing water.
- A pH meter.**
- Lactic acid.**
- Small syringe.**
- Brewing salts** for water chemistry adjustments.
- Fining agent(s)** such as Whirlfloc or Irish moss.
- A more precise scale** that can display units down to 0.01 gram.
- A hydrometer** and an accompanying test jar or an electronic density reader



- A hop spider** to keep hop matter out of your wort.

## Serving Equipment

Once the yeast has done its job and fermentation is over, you've got a decision to make as to how you want to package your finished beer. Like many before me, when I started homebrewing, I favored bottling given its low cost and minimal space requirements. Beyond bottles and crown caps, not much additional equipment is needed to support bottling aside from a capper, a bottling bucket with a spigot, a length of tubing with a bottling wand, and some form of priming sugar (e.g., corn sugar, table sugar, honey, or carbonation drops) for yeast to munch on and create the carbon dioxide that gives your beer fizz.

I didn't have a bottling bucket when I

first started homebrewing, so I just used one of the pots in my kitchen along with an auto-siphon. I eventually converted a 2-gallon food-grade bucket into a bottling bucket using a stepped drill bit to drill a hole in the side of the bucket close to the bottom of it, where I installed a spigot.

When I want to give beer to friends, enter a homebrew competition, or age a particular beer more than a few weeks, I will bottle it, but these days I typically I keg my homebrew. Kegging does require a bit more of an up-front investment, but it's totally worth it to me, as there's nothing better than enjoying a homebrew on draught. I also find kegging to be easier and faster than bottling because there's only one vessel to clean, sanitize, and fill, and you don't need to bother with priming sugar if you force carbonate your beer.

To support kegging my small batches, I



Brew  
This!



# Your First SMaSH Ale

Here's the full recipe for my SMaSH ale, which I still brew frequently to experiment with new hops, yeast, malt, or brewing processes. I typically use a two-row pale malt.

This recipe is designed with the novice brewer in mind, so I've skipped some key steps here, including water chemistry adjustments and gravity readings. These can certainly help you make great beer, but a good understanding of technique, process, and gaining comfort with your brewing setup are much more important as you get started.

Bitterness will vary with the hops you select. Consider starting with a variety that offers moderate alpha acids, such as Cascade, to establish a baseline. The next time you brew, you can try a higher- or lower-alpha hop for more or less bitterness.

**Batch volume:** 1 US gal. (3.8 L)

**Original gravity:** 1.055–1.065 (13.6–15.9°P)

**Final gravity:** varies with yeast selection

**Color:** 4–10 SRM, depending on base malt selection

**Bitterness:** varies with hops selection

**Alcohol:** varies with yeast selection

## Malt

2.25 lb. milled base malt of your choice

## Hops

0.5 oz. (14 g) any hop of your choice @ 60 min

0.25 oz. (7 g) the same hop @ 15 min

0.25 oz. (7 g) the same hop @ 0 min

## Yeast

Any variety of yeast will work. I recommend starting with a dry yeast, as it is easy to measure the amount required for a 1-gallon batch. Fermentis and Lallemand both make excellent dry yeasts in 11-gram packets, enough to brew a typical 5-gallon batch. Since we're only brewing a single gallon, we need one-fifth of that packet, or 2.2 grams. Having the jeweler's scale here is helpful. Tightly package up any remaining yeast and store in the refrigerator for future use.

## Water

1 gal. (3.8 L) for mashing and another 0.75 gal. (2.8 L) for sparging



## Brewing Notes

Heat 1 gal. (3.8 L) water to 160°F (71°C). Add the milled malt and mash at 147–150°F (64–66°C) for 60 minutes. After 60 minutes, increase the temperature of the mash to 170°F (77°C) and hold 10 minutes for mash out.

While you're mashing out, heat 0.75 gallon of water to 170°F (77°C) in a separate pot. Set a large mesh strainer over a third pot, 12 qt. Cambro, or other large vessel and pour the mash through the strainer to separate the wort out from the spent grains. Slowly pour the sparge water over the spent grain until you've collected about 5.5–6 qt. (5.2–5.7 L) of wort.

Pour the wort into a pot and bring to a boil. Watch closely, as boil-overs can happen. Add the 60-minute hop addition once the wort comes to a boil. With 15 minutes remaining, add the second hop addition, and at the end of the hour-long boil, add the final hop addition.

Chill the wort down to the recommended yeast-pitching temperature by placing the entire pot into an ice bath in your sink. When the wort has reached the appropriate temperature for yeast pitching, transfer it to a clean, sanitized fermentation vessel. Make sure that anything that touches the wort from this point on is sanitized.

Add the yeast to the wort, close the fermentation vessel, and shake it vigorously on and off for about 45 seconds to aerate it. Run a blow-off tube from the fermenter to a jar or a small pot filled with sanitizer. This will prevent air from entering the soon-to-be beer but will allow CO<sub>2</sub> to escape.

Within 12–24 hours there will be a decent amount of bubbling that will quiet down after about 3–4 days. Once this happens you can replace the blow-off tube with an airlock. Two weeks later, fermentation will be complete and you can package your beer in bottles or a keg.



invested in a slim, 1-gallon keg that was packaged with a lid that has a tap handle dispenser and a ball-lock post along with a mini-CO<sub>2</sub> regulator that uses replaceable cartridges as a source of CO<sub>2</sub>. The keg itself is quite compact, about the size of a half-gallon of milk, and it fits nicely in the door of my refrigerator. It accepts a 74-gram CO<sub>2</sub> cartridge, which provides enough gas to force-carbonate and dispense roughly two or three 1-gallon batches of homebrew. I have also added a few 1.5-gallon Torpedo kegs that connect to a standalone 5-pound CO<sub>2</sub> tank, which I keep in a separate mini-refrigerator.

Both draught systems accomplish the same goal, and there are advantages to each. The mini-keg setup is self-contained and highly portable, so I can bring homebrew to a friend's house to share; on the downside, the disposable CO<sub>2</sub> cartridges can be expensive and aren't readily recyclable. Using a more traditional CO<sub>2</sub> tank requires a greater up-front investment, but I believe it is a more effective way to force-carbonate beer. The tank lasts longer than the cartridges, but when it's empty, I can't just order more CO<sub>2</sub> online and have it shipped to my house the way I can with cartridges. Luckily, my local homebrew store offers a CO<sub>2</sub> tank exchange where I pay a small fee to swap my empty tank for a full one.

## Recipe Design

As I was getting comfortable with the brewing and bottling processes, I sourced 1-gallon, all-grain recipe kits from several popular online homebrew supply stores. Once I felt comfortable with brewing beer from a recipe kit, I started to explore brewing beer based on recipes I found online. Most of the recipes I found online were written for 5-gallon batches, so I'd work

with those by scaling them down, dividing the ingredient quantities by 5 to yield a single-gallon batch.

These “custom” recipes required a different approach to ingredient sourcing. I’m lucky because I have an excellent homebrew supply store a short drive from my house. They have an online storefront where I pre-order whatever ingredients I need, including yeast, hops by the ounce, and whatever base and specialty malts I need. They have it ready for pickup within a few hours. There’s no minimum purchase, and the shop will mill malt at no extra charge, never giving me a hard time when I order only a few ounces of something.

As I started to brew using ingredients sourced this way, I purchased a jeweler’s scale capable of measurements in 0.01-gram increments, which allows me to weigh out the exact amounts of hops and yeast I’d need for a given 1-gallon recipe. Quantities needed for small batches are usually much smaller than what comes in standard-size packages.

With all this experience, I’m now at a point where a most of the beers I brew are my own recipes. It took me some time to get here, and

I recommend starting slowly with this process. The first few brews that I made with my own recipes were all based on the single-malt and single-hop (SMaSH) concept. This format is great because it’s easy to work with and allows easy comparison across different versions of the same basic beer.

For example, let’s say I wanted to test out the difference between a beer hopped with Citra and one hopped with Mosaic. The best way to do that would be to brew two beers using the same basic recipe and only altering the hops. Based on all the other recipes that I had previously brewed, I noticed that most recipes were using about 2 to 2.25 pounds of base malt per gallon of finished beer (240 to 270 grams per liter). With my setup and personal taste, I lean towards using 2.25 pounds of malt per finished gallon of beer and find that the beer has a bit more body and flavor than one brewed with 2 pounds or less of malt per gallon.

### **Small Batches for the Win**

Not only is small-batch brewing a great entry point into the homebrewing hobby, but it’s also a great way to homebrew peri-

od. For all the reasons outlined here, I almost always favor brewing single-gallon batches. There will always be a time and place for my 5-gallon system, but for me, it’s hard to beat the quick setup and cleanup time, the lower total cost, and the convenience and flexibility that my small-batch system provides.

*Dan Jablow is a self-taught all-grain homebrewer with a passion for brewing beer in single-gallon batches. He is a graduate of the Beer Brewing Professional Certificate program at the University of Richmond, as well as a formally trained chef and a graduate of the Cambridge School of Culinary Arts. Dan’s first business, a smoked-meat company called Jablow’s Meats, was voted in 2012 by the SF Weekly as having one of the best sandwiches in San Francisco (pastrami!). Today, Dan can be found tinkering with recipes, experimenting with ingredients, and sharing a behind-the-scenes look into small batch brewing at home on his Instagram feed (@small.batch.brewing) and his blog, Welcome to Homebrewing (welcometohomebrewing.com).*

The advertisement features a central brown glass bottle of "FUSION CITRA" terpenes, labeled "25 ml". The bottle is set against a blue background with a faint, stylized illustration of a city skyline and a DNA helix. To the left, the brand name "OAST HOUSE OILS" is displayed in large, bold, white letters, with "PURE EXTRACTED BREWING Aroma" below it. At the bottom left, there's a stylized illustration of a hop cone and the text "FUSION PREMIUM TERPENES". To the right, the website "OASTHOUSEOILS.COM" is prominently displayed in large, white, textured letters. A QR code is located in the bottom right corner.

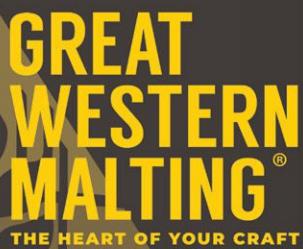


# A THANK YOU TO OUR FARMERS FOR THEIR DEDICATION

Farmers across the United States wrapped up the harvest season for the winter barley crop over the summer and are now finishing up harvest for the spring crop. Overall, weather conditions have been favorable, and growers were grateful for cool, wet weather conditions this spring to combat drought concerns.

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# GADGETS

2023

BY ZVMURGY READERS

It's that time again! Time to celebrate homebrewers' inventive inclinations and witness an array of bespoke contraptions that make brew day more manageable—or at least more fun. Whether you've never built a homebrew gadget or have a garage full of them, we hope you find these ideas inspiring and entertaining.



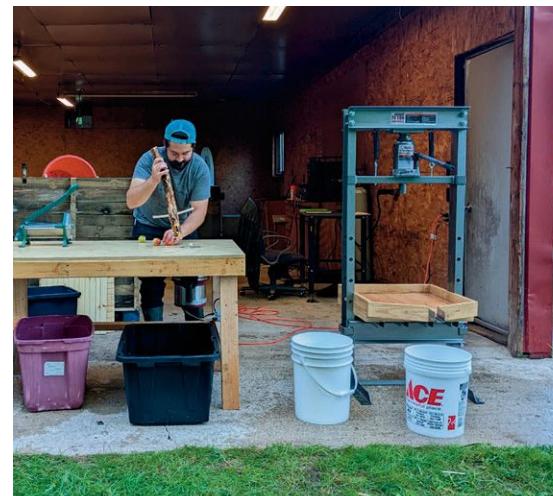
## CIDER PRESS

My husband Trace Redmond and I built this cider press at my family farm in Bliss, Mich. We're using it to press apples from an old orchard we've been reviving for two years. This was our second year making farm ciders for my family and our little brewery/cidery in-planning, Elder Piper. We plan to ferment about 80 gallons (300 liters) of cider this year.

From building the table to mounting the French-fry cutter and garbage disposal to welding a spout for the press, this was all handmade. We got 16 gallons (60 liters) from this first trial press and expect to run it two more times to process the rest of our harvest.

**Eva Redmond**

Elder Piper Beer & Cider  
Bliss, Mich.



## KEG SCALE

I hate it when I discover a keg is empty by blowing out the last half pint or having to lift the keg, only to rouse the sediment I worked so long to settle out!

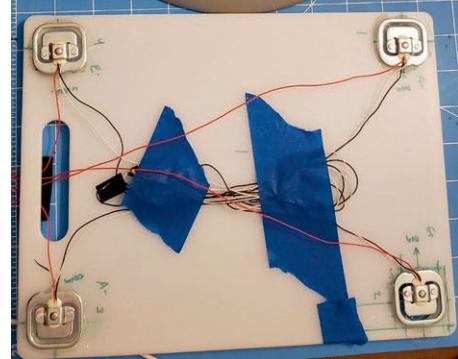
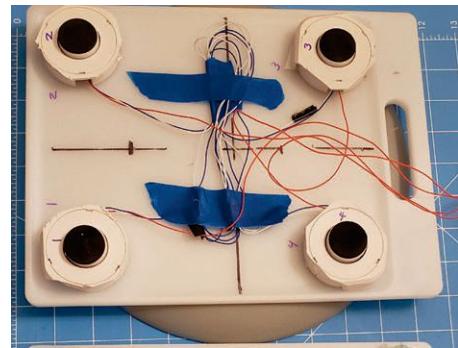
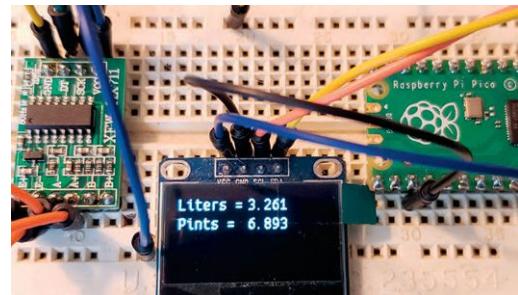
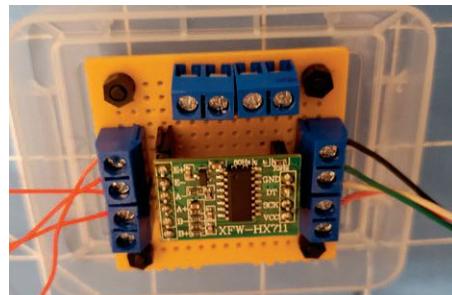
This keg scale helps you keep track of what's left in the keg. I have to thank John Baker from the CAMRA homebrewing club, who built a similar device, for giving me the idea. This project requires some familiarity with electronics like using a micro-controller, coding, and wiring.

This system uses 50-kilogram load cells, a digital amplifier, and a micro-controller to measure the weight of the keg, which is shown on an LCD or LED display. I'm using a Raspberry Pi Pico with an LED display, but you could also use an Arduino or any other micro-controller you're comfortable with. You can get load cells from your favorite online store (Amazon, AliExpress, etc.), or you can "scavenge" them from an old digital scale.

The digital amplifier, which converts the load cell readings to a format the micro-controller can use, is typically a HX711. If you order load cells online, they may already come with this chip, but if you're taking them from a scale, you'll have to order the amplifier separately.

You'll also need some way to mount the load cells—you'll find several 3-D printing designs online. If you get the load cells from a scale, they're already mounted and you can use those. One tip: the wires from the load cells are thin and can be a bit unwieldy, so treat them carefully! I used a small plastic cutting board to mount the load cells and set the keg on.

Depending on how complicated you write your code, you can simply show how many pints or liters were poured, or you can weigh the keg empty, then full, and count down how much remains. In my



case, every time the keg's weight drops by 473.18 grams, it shows a pint poured! The options are endless!

Future upgrades to my system include adding a second weight pad and a digital thermometer through the micro-controller. There are many resources online to get hardware setup and code examples for the micro-controller type you use.

## RESOURCES

1. 50 kg load cells with HX711 and Arduino. 4x, 2x, 1x Diagrams. Indrek Luuk: [circuitjournal.com/50kg-load-cells-with-HX711](http://circuitjournal.com/50kg-load-cells-with-HX711).
2. Beer Keg Scales. Posted on Instructables by username "ItsGraGra": [instructables.com/Bier-Keg-Scales](http://instructables.com/Bier-Keg-Scales).
3. MakerBot Thingiverse page using the search term "load cell." 3-D printing files for 50-kg load cell holders: [thingiverse.com/tag:load\\_cell](http://thingiverse.com/tag:load_cell).

## Kirk Bigger

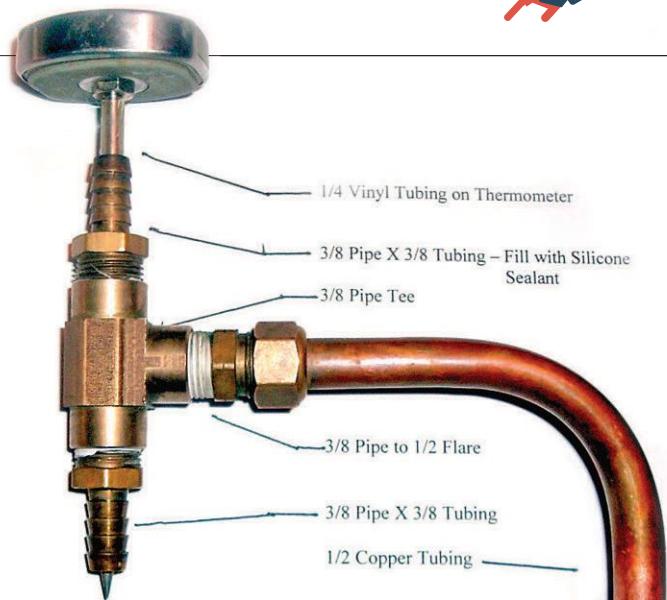
Charlottesville Area Masters of Real Ale (CAMRA)  
Charlottesville, Va.

## CHILLED WORT THERMOMETER

When I switched to a plate chiller, I no longer needed to cool the entire batch of wort to pitching temperature at once, so I came up with this gadget to continuously show the temperature of the wort exiting the chiller. I circulate wort through the chiller until the wort in the kettle has fallen to 100°F to 125°F (38–52°C) and the output of the chiller is 68°F to 72°F (20–22°C), at which time I begin the transfer to the fermenter. I used 3/8-inch pipe and ½-inch copper tubing because that's what I had on hand.

### Bill Kenney

HAZE (Placerville) and TDBC (Folsom) Rescue, Calif.



## ALL-IN-ONE BREW CART

After using a three-tier system for almost 15 years, I wanted to go low profile when I switched to brew-in-a-bag, so I built this. I basically welded up a base on wheels that has little posts onto which the burner legs slide. Then I mounted a pump and counter-flow chiller. I made it adaptable so I can use my 26-gallon kettle with propane or my electric 65-liter Brewzilla. The top section of the burner lifts off, and a board with studs drops onto the bottom leg section to use the Brewzilla.

**Bryan Ogden**

Vancouver, Wash.

### PHOTOS

1. Cart base with pump and chiller.
2. Cart with the burner.
3. Cart with burner and 26-gallon pot.
4. Cart with base for Brewzilla.
5. Cart configured for Brewzilla.
6. Cart fits neatly under a counter.





## MEAT GRINDER MILL

The meat grinder attachment for my stand mixer cracked. So, I broke off all the plastic pieces from the auger to leave just the stand mixer attachment and the auger shaft. I then attached the auger shaft to my roller mill using a 12-millimeter to 12-millimeter clamp-on coupler, and now I have a powerful variable-speed mill motor. The number 8 setting on the mixer drives 180 rpm consistently.

**Charlie Tritschler**  
Silicon Valley Sudzers  
Los Altos, Calif.



## MOBILE CLEANING CART

Considering how expensive stainless-steel triple sinks were, I decided to make my own cleaning station. I purchased three plastic laundry-room sinks and built a base with casters that allow me to move it anywhere in my brewing space. I purchased a 12-inch swivel faucet and connected it to a hose, so now I can fill each tub with cleaner or sanitizer or rinse my beer glass during a brew session.

**Andrew DeCanniere**  
Lombard, Ill.



## BEER FRIDGE

This is my custom four-tap beverage fridge. I bought a large convertible refrigerator-freezer to store my homebrew kegs as well as other beer. I drilled holes in the door (away from the electronics of course!) and installed shanks and faucets on the outside. Now I can enjoy up to four 5-gallon kegs any time!

**Andrew DeCanniere**  
Lombard, Ill.

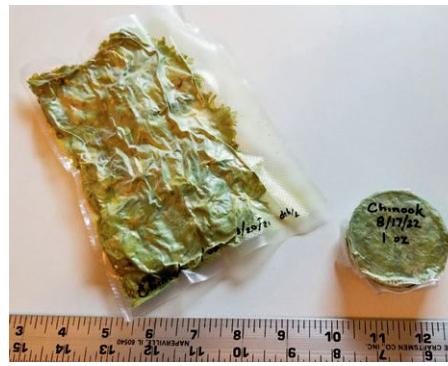


## HOP PLUGGER

I grow hops as part of my homebrewing hobby, and after my 2021 harvest, I thought there had to be a better way to store and use homegrown hops. The technique I used in 2021 was to push dried hops into a bag, which I then vacuum sealed. The process was time consuming, and often leaves would be pulled during the vacuuming process and cause the bag not to seal. I considered pelletizing hops, but it was too expensive for my level of harvest. Online research uncovered another way to store hops: hop plugs.

I assembled this contraption for making hop plugs. Dried hops are inserted into the PVC pipe (via a funnel made from a plastic orange-juice container). The pipe is sealed at the bottom using a small section of a dowel. A longer wooden dowel is put into the top of the PVC pipe, and a pipe clamp is used to compress the hops. The bottom of the PVC pipe is then opened and the hop plug is extruded through the bottom of the pipe using the dowel. The hop plug is then vacuum sealed in a small bag for storage.

The hop plugs store efficiently in my freezer, and they are easy to use. The plugs expand back into hop cones when they contact liquid, and they easily fit in a 400-micron filter basket or a hop sock if one doesn't want them to free float in the kettle.



## Art Conat

Kalamazoo Libation of Brewers (KLOB)  
Kalamazoo, Mich.

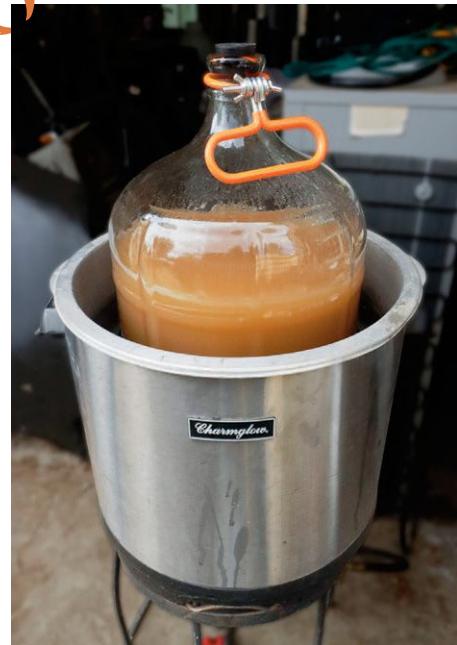


## Pasteurizer

I found this CharmGlow deep fryer at a secondhand store for 10 dollars. These were used for deep-fried turkey and other massive meats, and my repurposing involved using water instead of oil to transform it into a pasteurizer. It features an integrated thermostat-controlled heating element, and its circular size accommodates glass carboys up to 7 gallons—basically a water-jacketed heating scheme.

I use it to pasteurize batches of juice prior to fermentation. With a full-time day job, I need a way to store lots of juice, so this device heats up to kill nasties, and then I let it cool down with a stopper, which “vacuum seals” the carboys until I’m ready to brew.

I ran initial temperature tests to calibrate the thermostat and noted that it runs about 10°F (6°C) hotter than the setting, possibly due to thermal differences between water and oil. For obvious reasons, I keep it under 200°F (93°C)! And with a nice Wi-Fi dual-temperature digital thermometer app, I can remotely monitor the water bath and juice temps. It takes a bit longer than an hour and a half to bring it to 150°F (66°C).



The Charmglow unit with a 5-gallon carboy filled with Asian pear juice. Handles are also a very good idea.



The Charmglow control panel. The timer on the left is not used. The thermo control section on the right has been tested and found to run about 10°F “hot.”



I have several stainless-steel pots that also fit in this device for when I need to do a boil or cook up fruit. I used it to create a mango melomel.

**Gus Frederick**  
Foothills Spargers  
Silverton, Ore.

## FRANKENDRAINER

Due to space and resource constraints, I brew small batches on my kitchen stove using the brew-in-a-bag method. One issue I had was removing the bag from my kettle without making a mess. I tried lifting the bag with my hands and holding while it drained, which took more arm strength than I had imagined. Plus, I couldn’t squeeze. I also tried using a strainer, but the bag hung over the sides of the strainer and kettle. Obviously, my wife wouldn’t be too happy with me mounting a pulley to the kitchen ceiling, so I had to come up with a solution. That solution came in the form of Frankendrainer.

Frankendrainer is a simple contraption made from ¾-inch PVC that solves my issue. After mashing, I set Frankendrainer on the brew kettle’s handles. I then take the loops of the brew bag and attach them onto the “antlers” of the cross tube. I then rotate the cross tube, which lifts the bag out of the wort. Once the bag clears the wort, I lock the cross tube in place using the chain and holes drilled into the cross tube. From there, I let the bag drain and then I can squeeze and lift the bag off with one hand without any spills or drips.

**Robert Resetar**  
Roswell, Ga.



## WORT FILTER

My mate Paul and I brew together, not frequently, but with large batches we can split share with friends, ranging up to 3 hectoliters (79 gallons) with dilution. Our rig is a bit of DIY setup using two repurposed 316 stainless pharmaceutical storage vessels just under 200 liters in capacity, where one is for the mash tun alongside a Grainfather G30 HERMS setup and the other as the kettle. Our mash tun has a capacity of 55 kilograms (121 pounds).

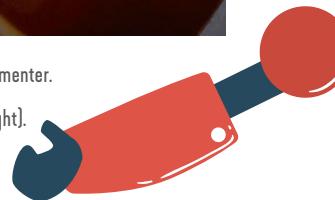
As our vessels are cubes, we sometimes have trouble transferring after the boil, and our plate chiller would get clogged with hop-heavy wort. The gadget we developed is a filter attached to two stainless steel floats connected via silicone hose to the butterfly valve pickup in the kettle. During boil, the gadget hangs over the edge of the kettle, and when it's time to transfer wort, it's placed back into the kettle. The gadget allows us to draw less trub at the start of transfer from the top of the kettle, thereby reducing the risk of trub blockages in the plate chiller.

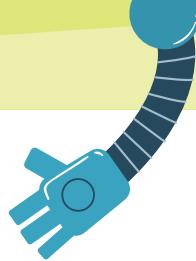
**Daniel Court**  
Ballarat, Vic, Australia



Top: Wort filter lying on bottom of boil kettle (left) and wort filter in action keeping trub out of the fermenter.

Bottom: Wort filter (left), chilling wort en route to fermenter (center), mash tun with recirculation (right).





## MASH RAKE

I built this motorized mash rake to ensure the mash is thoroughly wetted and mixed. It includes a mechanism for introducing strike water that also recirculates wort during the mash.

First, the motor is started and at 6.5 rpm. Strike water is added to the mash tun, and crushed grain is sent through the grain chute and into the grain basin. Once all of the grain is in the mash tun, the grain chute is removed and the strike water arm is replaced with the mashing valve setup.

Next the motor speed is reduced to 4.5 rpm, and the L-valve is adjusted to recirculate wort back into the mash tun. Then the mash is held for the required amount of time.

The motor is stopped during lautering and sparging. When the wort runs clear, the L-valve is set to direct liquor to linear flow valve and into the kettle.

If the mash gets stuck, the flow of sparge water into the mash tun is stopped, and the L-valve is set to return wort back into the mash tun. Then the motor runs very slowly until the grain bed is loosened. When things are unstuck, the motor is stopped again, the L-valve is reset to direct flow into the kettle again, and sparge water is again allowed to flow into the mash tun.

**Michael Vos**  
Taree, NSW, Australia



1



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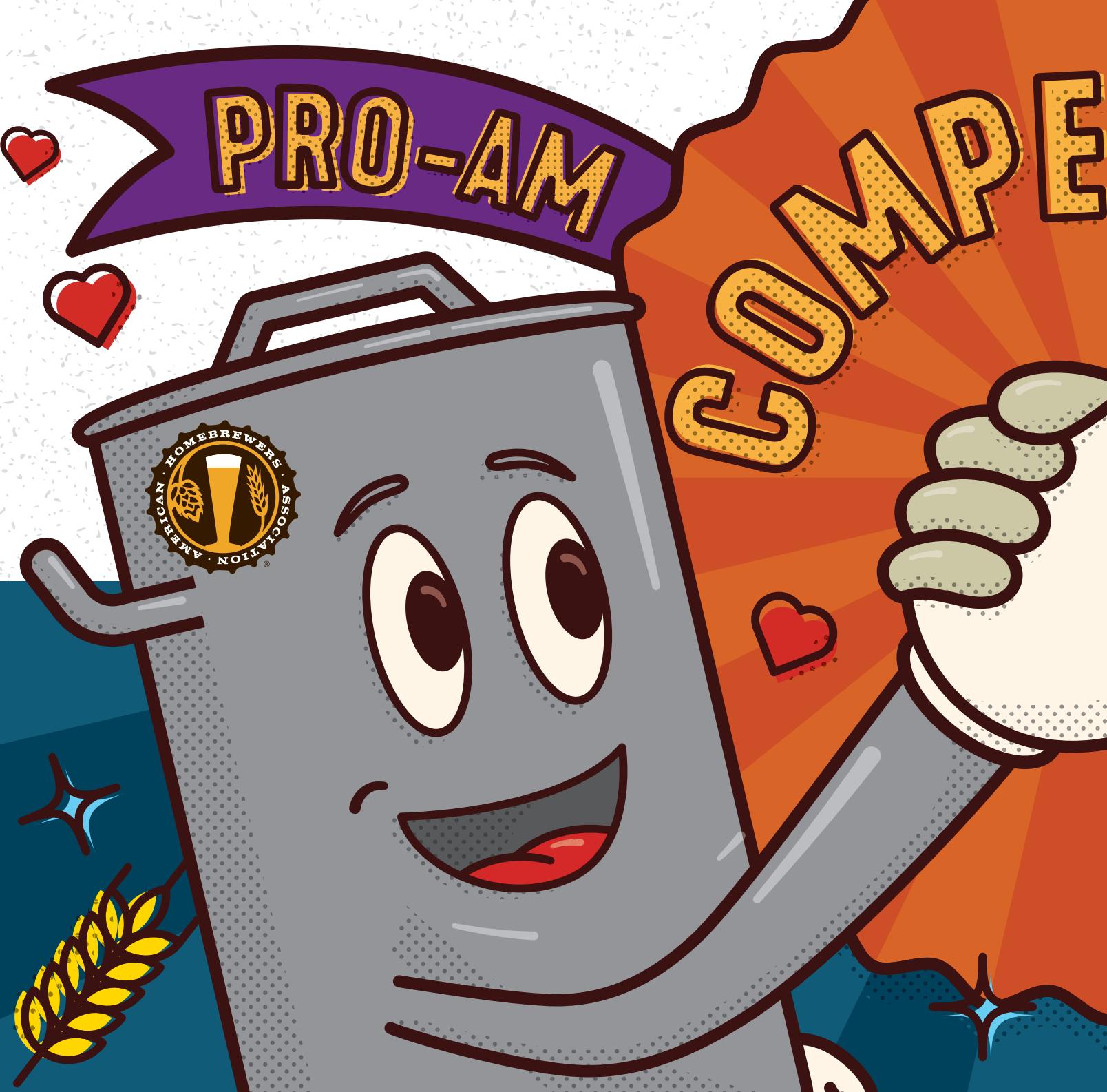
4



7

### PHOTOS

- 1 and 2. Rake arms with motor assembly sitting on stand. This prototype has a much larger motor than is needed.
3. Mash tun false bottom with shaft central bushing in center.
4. Grain bin removed, showing tripod rake shaft support sitting on bottom of mash tun.
5. Looking into mash tun with rake installed.
6. Grain chute and mash-in strike water arm.
7. Mashing configuration.



# 2022 GREAT AMERICAN BEER FESTIVAL

# PRO-AM COMPETITION



*By Kristen Kuchar*

Following two years of cancellation due to COVID-19, the Great American Beer Festival (GABF) returned to Denver's Colorado Convention Center last October. In the 2022 festival competition, 235 beer experts from seven countries judged 9,904 entries. Among

the 300 medals awarded to US breweries were three awards unlike any of the others. The GABF Pro-Am Competition offers amateur brewers a unique opportunity to brew their recipes commercially with professional brewers and take their beers to the next level.

Beers entered in the Pro-Am Competition must have already won an award at an AHA/BJCP-sanctioned competition and been brewed by a member of the American Homebrewers Association (AHA). Working closely with the winning homebrewer, a professional brewer then produces the beer, releases it to customers, and enters it into the Pro-Am competition.

In 2022, 35 Pro-Am entries underwent best-of-show-style judging over two rounds. Recipients of gold, silver, and bronze medals were announced at the start of the highly anticipated GABF awards ceremony in the Bellco Theatre in Denver on October 8, 2022.

The GABF Pro-Am is a chance for homebrewers to take part in a large-scale brew day and have their beers recognized at the national level at one of the largest beer festivals in the world. But it's even more than that—it's a celebration of the brewing community in its entirety, including homebrewers, and the pivotal role each group plays.

Chris McCombs, head brewer at CooperSmith Pub & Brewing in Fort Collins, Colo., who received the silver medal this year, points out the mutual respect and camaraderie that homebrewers and commercial brewers share.

"There is no more creative group in brewing than homebrewers," McCombs



says, adding that hobbyists inspire him in his professional capacity. The long-time brewer says it's a great boost for homebrewers to have their beer on the floor at GABF.

"It's wonderful that the GABF and the AHA made room for homebrewers and recognized the ties that bind homebrewers and commercial brewers," says Eric Coffman, homebrewer and this year's bronze-medal winner.

Further illustrating the impact of homebrewing on the craft beer scene is that all three of the pro brewers in this year's competition got their starts as homebrewers. McCombs, a former homebrewer, has

always loved to play with styles and ingredients, and gold-medal winner John Martin of Confluence Brewing Co. had 17 years of homebrewing under his belt before launching the Des Moines brewery.

Paul Young of Shoe Tree Young Brewing Company in Carson City, Nev., and his brother Jeff, bronze-medal winners this year, started homebrewing 15 years ago in Paul's garage. "We fell in love with brewing and quickly had the dream to have our own brewery one day," he says.

Young says the Pro-Am is a great tradition, and they love that it brings them full circle to where they started.

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Great Beer Starts  
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## GOLD | KALTRAUCH

**CONFLUENCE BREWING CO.  
& RANDY DANIELS AND KC MCKINNEY**

*DES MOINES, IOWA*

Randy Daniels and KC McKinney don't just set the bar high for homebrewers, but for fathers- and sons-in-law as well. The duo brew as a team, and together they took home the top prize at this year's Pro-Am Competition.

Daniels started out making his own wine and added homebrewing in May 2012. McKinney's homebrew journey began during the COVID-19 pandemic. His father-in-law Randy suggested he join him for a brew day or two. Brewing became a regular thing, and after a year of learning the process, McKinney purchased his own system and the two decided to start entering competitions as a team. "We now brew probably too much, but both [of us] love doing it and feel like we are making the best beer we ever have," McKinney says.

The Iowa Brewers Union members have taken best of show at the Midwinter Homebrewing Competition in Wisconsin with an American lager and best of show at the Iowa State Fair with a Munich helles in 2022. They entered Kaltrauch, which would go on to win a gold medal at GABF in the Iowa Brewers Union Open.

At the Iowa Brewers Union Open, Kaltrauch made an impression on John Martin, president of and head brewer at Confluence Brewing Company. The event was hosted by the Des Moines brewery, and Martin was helping judge best of show. "It just stood out as a really well-made beer, very well balanced," Martin says.

Martin was no stranger to Daniels and his beer-making talent. The homebrewer had previously won the competition and brewed his Salute Your Schwartz German-style schwarzbiere lager commercially at Confluence. Once Kaltrauch had won best of show, the pros and homebrewers got to work collaborating to scale up this award-winning rauchbier.

Daniels says Confluence was great about the entire process. "From the start, it was one of, if not the best rauchbier they had



ever had and didn't want to change anything unless 100 percent required," Daniels says. "They even brought in some grain that isn't something they normally use in order to keep it as close to our original as possible."

"The brew day was quite an eye opener as to how much different it is to brew on that scale as opposed to a home system," McKinney says.

Martin describes Kaltrauch as a little darker than a traditional Oktoberfest, with a nice layer of savory smoke and a sweet malt finish. Martin recalls another memorable smoky beer from his own homebrew days. His Smokey Schwarzenbach was

brewed for the first annual Blue Ribbon Bacon Fest held at El Bait Shop in Des Moines. "It was a smoky dark lager that paired very well with the bacon treats that day and was a precursor to our commercial beer called Campfire Black Lager," Martin says.

McKinney looks forward to homebrewing every week. "I get to hang out with great people and have a great time," he says. "The anticipation of the next beer being done and getting to try it and see if it turned out the way you intended, and figuring out how you can make it better, is one of my favorite parts."

# Kaltrauch

Rauchbier

Recipe by Randy Daniels and KC McKinney.

**Batch volume:** 5 US gal. (18.9 L)

**Original gravity:** 1.053 (13.1°P)

**Final Gravity:** 1.010 (2.6°P)

**Efficiency:** 70%

**Color:** 15 SRM

**Bitterness:** 26 IBU

**Alcohol:** 5.7% by volume

### WATER

Ca 65 ppm, Mg 7 ppm, Na 20 ppm, Cl 120 ppm,  
SO<sub>4</sub> 75 ppm, HCO<sub>3</sub> 100 ppm

You can achieve this profile by adding the following to 8 gal. (36.4 L) of reverse osmosis water: 7 g CaCl<sub>2</sub>, 2 g Epsom salt (MgSO<sub>4</sub>), 2.5 g gypsum (CaSO<sub>4</sub>), 3.75 g baking soda (NaHCO<sub>3</sub>)

### YEAST

3 sachets (34.5 g) Fermentis SafLager S-23

### BREWING NOTES

Dough in at 115°F (46°C) and hold 15 minutes. Then raise temperature to 154°F (68°C) and mash for 60 minutes, targeting a mash pH of 5.58. Lauter, sparge, and boil 60 minutes, adding hops at the indicated times.

Chill wort to 56°F (13°C) and ferment at that temperature for 17 days. Allow fermenter to naturally rise to room temperature for a 2-day diacetyl rest. Do not cold crash.

### MALTS

4.5 lb. (2.04 kg) Weyermann Beech Smoked Barley malt  
4 lb. (1.81 kg) Weyermann Barke Pilsner malt  
1 lb. (454 g) Weyermann Barke Munich malt  
1 lb. (454 g) Best Malz Red X malt  
12 oz. (340 g) Weyermann Caramunich 3 malt  
4 oz. (113 g) Weyermann melanoidin malt  
2 oz. (57 g) Briess black patent malt

### HOPS

1.5 oz. (43 g) Hallertau Mittelfrüh, 4.2% a.a.  
@ 60 min  
0.5 oz. (14 g) Hallertau Mittelfrüh, 4.2% a.a.  
@ 10 min



SILVER

## STICKY FINGERS SAISON

COOPERSMITH'S PUB AND BREWING  
& MARK PENNICK

FORT COLLINS, COLORADO

Homebrewer Mark Pennick brings his extensive training as a neuroscientist to his brewing approach: form a hypothesis, test it, redo the experiment, and be willing to repeat the process over and over again.

"Every beer I have is an opportunity to learn something or get better," he says. As a licensed clinical psychologist, Pennick values flexibility in thinking. Upon evaluating his creation, he turns to his homebrew club members of The Brew Crew, which meet at Diebolt Brewing in Denver, for reasoned and honest feedback. The members in the group are well educated about beer, with many members working in the beer industry in some capacity, he says.

"I really love that we just mostly want to try each other's beer and work in constructive ways to improve each other's recipes and processes," he says. He also values the feedback he gets from fellow homebrewers at the Altitude Brewing & Supply Homebrew Club.

Pennick makes the vital point that he'll patiently make a single alteration at a time. "Every single time I changed one thing and one thing only," he says. It doesn't always improve the beer, he explains, but then he can go back and tries something different.

His process has clearly proven successful. Pennick has won more than 215 total awards for his brews, and his Sticky Fingers Saison took silver at this year's GABF Pro-Am. When he heard his beer announced, he couldn't believe it, saying he felt like he was floating above his body in a dream.

The beer also won awards at the National Homebrew Competition in 2021, Bière de Rock, Colorado State Fair Homebrew Competition, Great American Homebrew Challenge, Rocky Mountain Homebrew Challenge, 8 Second of Froth, Halfpenny Brewing Homebrew Competition, and more.

His daughter's love of grapes served as inspiration for this award-winning beer. In early 2016, when she started eating solid

foods, she would squeeze grapes in her hands and then, of course, end up with sticky fingers. He decided to make a beer-wine hybrid with Sauvignon Blanc grapes hopped with Saaz, Hüll Melon, and Nelson Sauvin. He kept revisiting the beer to see how to continue to improve it, and when he thought it needed some citrus, he added grapefruit peel.

"It is a big beer, but a deceptive beer," Pennick says, describing it as fruit forward with apparent wine notes. There are also flavors of spicy white pepper and bread, with a balanced hop character and restrained bitterness.

When it came time for the Pro-Am selection, Chris McCombs, head brewer at Coopersmith's Pub & Brewing in Fort Collins, Colo., kept coming back to this fantastic, aromatic saison. This is what I want to brew, he thought to himself that day.

Mark says he enjoyed working with Chris and that the two worked well as a team, with much communication between the two brewing enthusiasts. Mark appreciated that Chris allowed him to develop the recipe and was respectful of the beer he created. For Chris, seeing Mark smile upon trying the scaled-up version of his homebrew was a great compliment.

"Mark was a pleasure to work with," McCombs says. "He has a solid technical background and a real appreciation for Belgian styles." And when he realized they won, McCombs was overjoyed: "It's always good to win a medal at GABF," he says.



But this may not be the last Pro-Am honor for the pair. Pennick's She Fancies Herself a Little Bit French won a gold at the 2022 National Homebrew Competition and subsequently took gold at the Liquid Poetry Slam. It advanced it to a blind tasting for Pro-Am, and was selected by Coopersmith's for the 2023 GABF Pro-Am. For this beer, Pennick utilized Pinot Noir grapes and sweet orange peel along with Nelson Sauvin, Mandarina Bavaria, and Czech Saaz hops.

"My advice to other homebrewers wishing to win at GABF is to identify their greatest recipes and pursue a scientifically based iterative brewing process that is informed by your previous examples, the historical record of beer, and the culinary arts," Pennick says.

**Brew This!**

# Sticky Fingers Saison

Recipe by Mark Pennick.

**YEAST**  
1.5 L stir-plate starter White Labs WLP568  
Belgian Style Saison Ale Yeast Blend

**ADDITIONAL ITEMS**  
8 oz. [227 g] rice hulls as lautering aid, optional  
1 oz. [28 g] grapefruit peel @ 15 min  
46 fl. oz. [1.36 L] Winexpert Sauvignon Blanc Grape Concentrate @ 0 min

**MALTS**  
4.68 lb. [2.12 kg] Castle Pilsen malt  
4.68 lb. [2.12 kg] Rahr white wheat malt  
1.5 lb. [680 g] Vienna malt  
1.25 lb. [567 g] torrefied wheat  
8 oz. [227 g] Carapils malt

**HOPS**  
0.4 oz. [11 g] Magnum, 15.2% a.a. @ 60 min  
0.5 oz. [14 g] Nelson Sauvin, 12.2% a.a. @ 10 min  
0.5 oz. [14 g] Czech Saaz, 2.4% a.a. @ 10 min  
0.5 oz. [14 g] Hüll Melon, 6.5% a.a. @ 10 min  
0.5 oz. [14 g] Nelson Sauvin, 12.2% a.a. @ 2 min  
0.5 oz. [14 g] Czech Saaz, 2.4% a.a. @ 2 min  
0.5 oz. [14 g] Hüll Melon, 6.5% a.a. @ 2 min

**BREWING NOTES**  
Mash at 148°F [63°C], for one hour using a mash thickness of 1.33 qt./lb. [2.8 L/kg] or as thin as 1.5 qt./lb. [3.1 L/kg]. No mash out. Continuous sparge at 170°F [77°C], to collect 6.8 gal. [25.7 L] boil volume.  
Boil 75 minutes, adding hops as indicated. At flameout, add the grape concentrate. Whirlpool 10 minutes to pasteurize the grape concentrate and partially isomerize the late kettle hop additions.  
Chill wort to 72°F [22°C], pitch yeast, and hold at that temperature until beer clears, likely 10 days, but up to 16. Bottle condition to 2.4 vol. CO<sub>2</sub> [4.8 g/L]. At home, I add EC-1118 to aid bottle conditioning, but repitching primary yeast is even better. This beer peaks at 3 months.



## BRONZE | ALT ALE

**SHOE TREE BREWING CO.  
& ERIC COFFMAN**

**CARSON CITY, NEVADA**

The inspiration for homebrewer Eric Coffman's award-winning altbier comes from his connection to the style's origins. His mother is from Germany and he stays in close touch with his family there. He had the chance to visit his cousin a few times in Düsseldorf, home of this unique German-style amber-colored beer. "I started looking into how to brew it at home, and it's been in the rotation ever since," he says.

Coffman's favorite styles to brew are Kölsch and altbier because he enjoys German beer styles, and these two Rhine classics are top fermenting. He also likes to make a hazy IPA and an English strong bitter. He has received gold medals in local homebrew competitions for his Kölsch and English strong bitter.

Coffman entered his altbier in the Thirsty Boy homebrew competition, hosted by local homebrew shop Just Brew It, where it won best of show. Carson City's Shoe Tree Brewing picked it up there.

"Paul and Jeff started as homebrewers before getting into the commercial business," Coffman says of Shoe Tree Brewing's owners. "They are very community oriented and their support for local homebrewers is no exception."

"We have a great and talented group of home Brewers in Carson City," says Paul Young. "The best-of-show winner gets to brew their beer with us, and we enter it in the Pro-Am. Eric knocked it out of park."

Coffman says the experience was a genuine pleasure and that the pros did a great job of scaling up his recipe.

"On the brew day, Robert Fink, the brewer tasked with brewing the altbier, really let me get involved with the process," Coffman says. He helped mash the grain, fired up the kettle, and added the hops. "It was like a fantasy camp for a homebrewer."

Coffman was astonished when he learned they had won the Pro-Am medal. "Being recognized in a competition among so many high-quality homebrewers and com-



mercial breweries is a tremendous honor, and I will treasure this experience," he says. "I never imagined this hobby would get me a national award like a GABF bronze."

Young describes the beer as a well-balanced copper-brown ale, which was

served at both brewery locations. "Customers are loving it," Young says. His advice for future professional brewers involved in this competition is to stay true to the homebrewer's vision—it's their time to shine.



Recipe by Eric Coffman.

### ADDITIONAL ITEMS

½ tablet Whirlfloc @ 15 min

### BREWING NOTES

Mash grains at 152°F (67°C) for 60 minutes. Lauter, sparge, and collect enough wort to yield 5.5 gallons (20.8 liters) of wort after the 90-minute boil, usually about 6.75 gal. (25.6 L)

Boil 90 minutes, adding hops and Whirlfloc at the indicated times. After the boil, chill wort to 62°F (17°C) and pitch yeast.

Ferment at 62°F (17°C) for 10 days. When fermentation is complete, rack to secondary and continue to hold at 62°F (17°C) for 7 to 10 days.

Optionally lager the finished beer for up to 4 weeks at approximately 34°F (1°C). Bottle or keg with 2.5 to 2.7 vol. (5 to 5.4 g/L) of carbon dioxide.

### MALTS

8 lb.	(3.63 kg) Pilsner malt
2 lb.	(907 g) Vienna malt
2 lb.	(907 g) Munich malt
8 oz.	(227 g) Caramunich malt
4 oz.	(113 g) chocolate malt

### HOPS

1.25 oz.	(35 g) Tettnang, 4.5% a.a. @ 60 min
0.75 oz.	(21 g) Tettnang, 4.5% a.a. @ 15 min

### YEAST

Wyeast 1007 German Ale

Kristen Kuchar has covered the food and beverage industries for the past 14 years and is a regular contributor to Zymurgy. She has written for Brew Your Own,

BeerAdvocate, CraftBeer.com, The Beer Connoisseur, DRAFT, All About Beer, VinePair, and many more.



# WASTE NOT

## Practical Homebrew Tips to Reduce Your Environmental Impact

By Sean VanSickel

Brewing beer at home is good for the environment. That pale ale you brewed last month didn't require people driving to work to can it in packing that may or may not be recycled. It didn't spend months in cold storage or ride hundreds of miles in a (hopefully) refrigerated truck. The brewery's salesperson didn't have to drive hundreds of miles per week to service the accounts and sell into new ones. And your beer didn't sit on a refrigerated shelf until it is sold. →



## WASTE NOT

This grist for a session pale ale will live on after mashing as spent grain flour. Because it does not contain darker crystal malts or (especially) roasted/dark malt, it is an excellent candidate for spent grain flour.

Your pale ale might have taken as much as 4.3 kilowatt-hours of energy to boil, but compared to the amount of energy that goes into the commercial production, packaging, sales, and distribution of an equivalent beverage, you should be able to sleep easy at night on this front.

Your decision to brew beer at home is already a net positive for the environment, but there are a few practices available to us homebrewers that can take things even further. You don't need to fundamentally restructure your brew day here, and you don't even need to adopt all the following practices. All you need to do is figure out what will be easy for you to implement.

It's not about perfect vertical integration and a completely zero-waste brew day (unless you want it to be). It's about doing what you can with what you have and making sustainable changes where possible.

### USING SPENT GRAIN

The biggest waste output in brewing is what comes out of the mash tun. By milling on the finer side, I get a little over 80 percent efficiency doing 5-gallon brew-in-a-bag batches on my kitchen stove. On more efficient systems, I've gotten as high as 93 percent, but that number is only indicative of how much sugar is left in the grain. If you are tossing that wet spent grain in the dumpster, you are also tossing out a lot of fiber, minerals, and nitrogen, in addition to any remaining sugar. Good news, though—there are tons of ways to get rid of those grains, and some of them are pretty easy!

#### Animal Feed

If you have chickens or other birds (or even bigger animals like quadrupeds), you probably don't have any problems getting rid of your spent grains. If your animals eat your spent beer grains, they are getting a lean, nutrient-dense feed that you don't have to pay for it! One animal that loves a spent-grain supplement to its diet (up to 33 percent by weight) is the lowly tilapia, a hardy and fast-growing fish often raised in aquaculture and aquaponics.

Even if you don't have any critters on hand who are eager to wolf down your wet spent grains as soon as they cool off, you might have a neighbor, friend, or family member who does, and said individual might even be motivated enough to come to you and get it before it starts to smell off!

#### Intro to Bokashi Composting

Bokashi composting is a technique developed in Japan in the 1980s. Unlike traditional composting, which can take

up to a year to produce usable compost, bokashi composting can give you usable compost in 10 to 14 days, doesn't stink, takes up less space, allows the composter to process "un-compostable" materials (like animal tissue, dairy, and citrus) and produces much more nutrient rich, bioavailable, and pH-balanced compost. The only catch is that it requires adding some milled and inoculated grain (rice/wheat bran and spent beer grains are the most common) to the process—if only we had some kind of source of grain to work with...

You can buy bokashi grain online, but if you are already brewing at home, making bokashi grain (sometimes referred to as bokashi starter) is dead easy. To prepare your bokashi grain, you will need to inoculate the grain with *Lactobacillus* bacteria and then dry the grain for shelf-stable storage. Once you have it, simply alternate layers of kitchen waste with thin layers of your bokashi grain.



## WASTE NOT

Composted spent grains fertilized these hop plants, grown in 15-gallon pots on an apartment patio.

### Making Bokashi Grain

If you brew or drink sour beer already, just pour some of the dregs into a spray bottle and use that to inoculate your grains. If you don't like sours, no worries. Sours are much easier to brew when you are just using them as a vessel for *Lactobacillus* and don't have to care about making something that tastes good—those kitchen scraps are not going to care about oxidation or the accidental production of tetrahydropyridine (THP) or diacetyl. Simply toss a few cups of wort in a Mason jar, cover with cheesecloth (or an airlock if you are feeling fancy), and inoculate with a unpasteurized apple cider vinegar, probiotics, unpasteurized sour beer bottle dregs, or a purpose-made sour beer culture. After a couple weeks, transfer the *Lactobacillus* liquid into a spray bottle for easy application.

To dry the grains, take advantage of the sun, if at all possible. An electric dehydrator will dry the grains faster, but most 110-volt dehydrators do use a considerable amount of electricity, especially considering



## WASTE NOT

Spent-grain flour has less gluten and more protein than most wheat flour, but a little goes a long way!

the amount of water we need to evaporate from our wet grains. Additionally, as pleasant as those grains might smell when you mash in, by the time your spent grain is dry, the room your dehydrator is running in might start to smell a bit ripe. Since we are drying this grain for the sole purpose of acting as a biodegradable point of inoculation for anaerobically working bacteria, the grain getting "contaminated" by local bacteria while the sun dries it out is a feature, not a bug. Bokashi grain doesn't have to be food safe.

The easiest way to dry it out is to simply spread the grain in a thin layer (less than 1 inch or 25 millimeters) on top of a small tarp, ideally one with a silver or reflective side. In the blistering UV and heat of California's Central Valley summer, my grain is dry in a few hours, but a day or two should be expected in less hot and dry conditions. Spray your *Lactobacillus* liquid on top a couple of times during the drying process, and you will be good to go!

Level two is basically the same, but you just have to build a simple wooden frame (I used two-by-fours and deck screws) that the tarp can sit in. The tarp can even be attached to the frame, so if you plan to dry your grains somewhere that might see some wind, this modification is highly recommended.



## WASTE NOT

Wet spent grains can go in a worm composting bin as soon as they have cooled, and they will disappear quickly!



## WASTE NOT

**Wet grains can be dried for bokashi composting anywhere if you can take advantage of higher temperatures and lower humidity in your area.**

Level three is going to be a bit much if you are only using it for bokashi grains, but a full-fledged solar dehydrator will crank out bokashi grain at triple the speed of the grain-on-tarp method, and it can be used in many other applications, such as drying homegrown hops. It might be too much for a lone and occasional homebrewer, but it could be a worthwhile project for a club, a prolific and/or manic homebrewer, or a homebrewer with a garden.

The University of Oklahoma extension has published an excellent set of plans for building a solar dehydrator at home. Depending on the cost of materials, (something that fluctuates wildly and may vary depending on your area), expect to spend between 75 and 300 dollars and a few hours. You can build one with hand tools, but using an electric saw, drill, and an impact driver will save you some hours. Because I am a nerd and have an intractable need to tinker, I have added a 12-volt solar panel to power a 2-watt outtake fan, which speeds things up a bit, if only slightly. Since the design relies on heating air via passive solar energy and creating a natural chimney effect, the fan is certainly not necessary, and were I to do it again, I would probably omit it.

### Spent Grain Flour

If you don't want the microbes to have all the fun with your spent grains, and if you happened to pick up baking during the first months of COVID-19, turning some of your spent grain into flour might be worth your time and effort. Spent-grain flour is significantly higher in protein and fiber than even whole-grain wheat flour, but for those reasons and others, you usually don't want it to be the only flour used in a recipe.

I like to use 10 to 30 percent spent grain flour by weight for cookies and other sweets, and up to 50 percent for more savory efforts, like the cheesy baked crackers that tend to fuel a lot of my backpacking endeavors. I haven't yet been bitten by the sourdough bug myself, but my sourdough-smitten friends have enjoyed the nutty, roasted flavors that spent-grain flour bring to their creations.

Making spent-grain flour requires a bit more care and processing than making bokashi grain, but it is still quite easy. First, make sure the spent grains are mostly base malt, two-row or six-row, Pilsner malt, wheat, or rye. The one thing you do not want are dark and roasted grains, and I tend to avoid anything over 30 Lovibond. If you ever brew blonde ales, pale lagers, wheat beer, or hoppy beers with simple grain bills, you are golden. Dry them (feel free to use your oven on low, as we don't have to worry about killing off the *Lactobacillus* with high heat) and then use

either a dedicated flour mill, a grain mill that can be set to a very fine grind, or even a good blender.

### Using Wet Spent Grains

If drying spent grain sounds like too much of a headache and you don't have any hungry animals nearby, fear not! Wet spent grains have a very short life span, but if you don't mind using them soon after you mash out, the leftover water plumping up those grains won't be a problem.

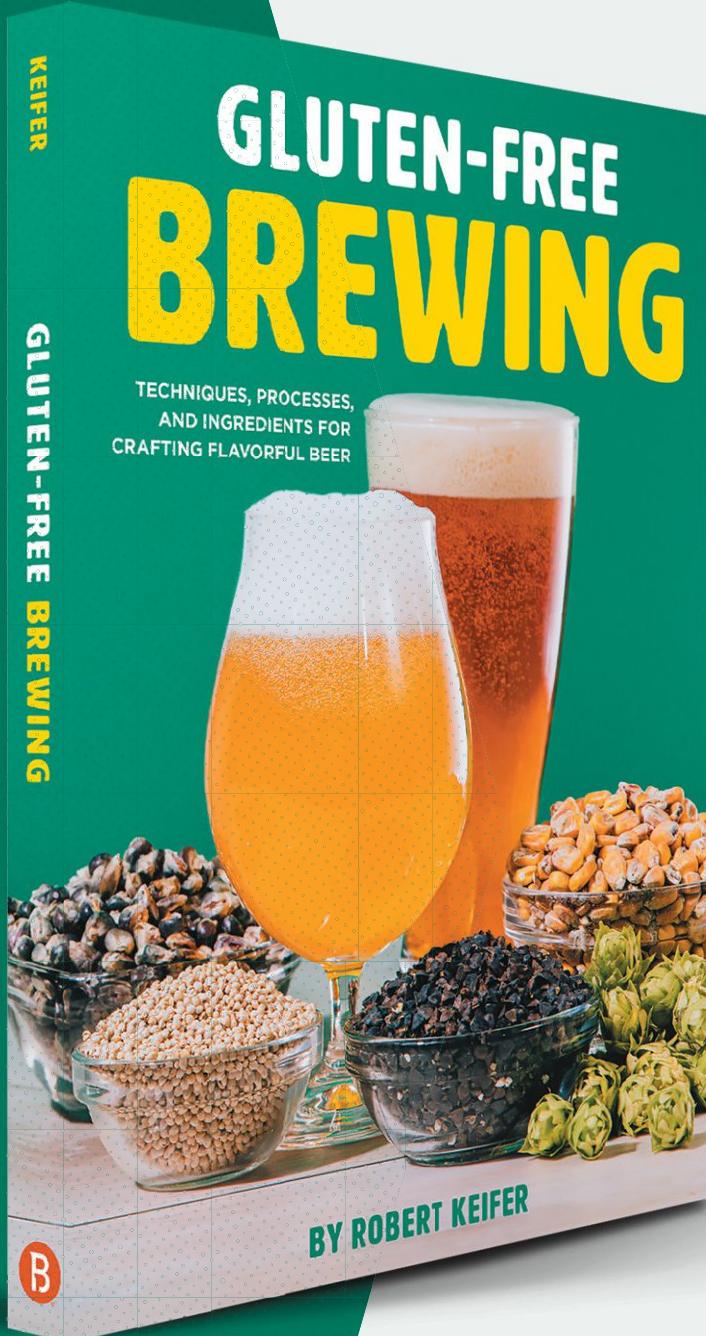
If you like making dogs happy and haven't used any hops in the mash (hops can be deadly to canines), just squeeze out any excess water and toss in some eggs and peanut butter, form into cookie shapes, and bake at 350°F (180°C) until they break cleanly in half.

If you prefer cooking for people, add some wet spent grain to any dough you are making—sourdough bread, crackers, pizza dough, whatever! Use a light hand at first, and keep in mind that the water in the spent grains will affect the composition and baking characteristics of whatever dough you are adulterating, so maybe skip this one for your cakes and soufflés.

If you compost but aren't sold on this whole bokashi thing, just toss your wet grains in the compost bin and work them in. Red Wiggler worms, our most efficient vermicomposters, can make short work of spent grains. If you are composting wet grains without worms, make sure to thoroughly work it into the mix to minimize odor (not a concern with bokashi composting).

### CONSERVING WATER

Since I live in California's Central Valley, water use is always a concern. Conventional homebrewing practices like the use of counterflow or immersion chillers require using water, usually somewhere around 5 to 30 gallons for a 5-gallon batch. This is about the equivalent of an average 10-minute shower, just to keep everything in context. The good news, though, is that it's a hell of a lot easier to reclaim chiller water than shower water, as the water passing through your chiller lines isn't greywater (wastewater contaminated by exposure to bodies, soaps, and other sundries) but simple tap water that has happened to pass through one more set of copper or stainless tubes. It can be collected and used for anything you would use tap water for: washing produce; watering a garden, trees, or lawn; adding to a cistern, pool, hot tub, or pond; or anything else that might otherwise require a garden hose.



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The easiest way to make use of chiller water is to simply attach a hose to the output of your chiller (I use  $\frac{3}{8}$ -inch tubing for the output hose on my homemade 50-foot copper immersion chiller). The end of that hose can go to wherever you are collecting or using the water—maybe a raised garden bed or a pool, or, in my case, plastic jerry-can-style containers. These are perfect for me because I have a balcony garden, and to water those plants I have to carry water upstairs. Be careful with running your initial chill water directly onto plants, though, as it can be quite hot and can damage or kill them.

A project I have waiting in the wings, and one I would recommend to anyone living where drought might be a concern, is a water cistern. This could be as simple as a rain barrel, or as involved as a massive buried tank with a capacity in the thousands of gallons. It could also be a pond or more natural water feature. With respect to homebrew wastewater, the cistern makes everything much simpler. There is no worry about having a container ready, or having just watered all the plants, or any other logistical complication. Chiller hose output goes to the cistern, that's that, and you're done.

Another aggressively simple modification to conventional homebrewing comes to us from our friends in the Southern Hemisphere—no chill brewing. Instead of chilling your wort, simply decant it into a 5-gallon HDPE plastic vessel, most commonly, a Hedpak cube. Let the temperature fall naturally overnight, and then the next day, set up your temperature control if your ferment requires it and pitch your yeast at the desired temperature. Food-grade HDPE plastic containers that remain food safe when exposed to high temperatures are not difficult to find, and they certainly do shorten the brew day.

## ENERGY USE

An average 60-minute boil of a 5-gallon batch of beer burns between 2 and 5.5 kilowatt-hours if we are heating the wort with electrical heating elements. My utility company charges me a little under 40 cents for this. For comparison's sake, we are talking about 10 percent of the energy my air conditioner uses in a single day in summer—not insignificant, but not life-altering, either.

I've had great luck using boils shorter than 60 minutes, but there are limitations for certain beer styles. I've gone no-boil for

mixed fermentation sours in the past, but I have found a 5- to 10-minute boil works best for mixed-fermentation beer that is going to be blended or aged. Hoppy beers with lower IBU goals (pale ales and New England styles especially) do well with a 20-minute boil, as do most English ales, saisons, and monastic-style Belgian beers.

## MAKING IT WORK FOR YOU

I've outlined quite a few approaches here, and while I have tried them all, they are not all part of my regular brewing. I've zeroed in on what is most effective for me and my needs, where I am, and with what I have access to. I'm able to brew beer with absolutely zero waste products (other than bottle caps on my aged mixed-fermentation sours), but that doesn't necessarily have to even be the goal.

Study after study shows that advocating minor reductions in meat eating is far more effective in reducing the total meat consumption of a population than advocating abstinence from eating meat, and the same holds true for things as diverse as single-use plastics, non-renewable energy use, recycling, and waste reduction in homebrewing. You don't need to build a turn-key bokashi compost system or install a cistern (unless that sounds fun to you, fellow weirdo) but asking around your social circle to see if anybody you know has backyard animals that would go crazy for your spent grain, making some cheesy spent-grain crackers, or stretching your chiller output hose to your hot tub could all be very easy and personally sustainable ways to participate.

The thing that you can do, even if it seems incomplete, is almost always better than a "complete" solution that is too cumbersome or inconvenient to actually do. Everyone has different gear and a different environment, so picking and choosing is the name of the game. The only universal is the fact that your beer is going to taste better when you take that first sip and are able to think about what you are consuming as part of a sustainable and regenerative cycle.

## RESOURCES

- extension.okstate.edu/fact-sheets/print-publications/fapc-food-and-agricultural-products-center/solar-dehydrator-construction-plans-fapc-207.pdf

*Sean VanSickel has worked both in the brewing industry and in education, but these days he is usually found just writing, fermenting something unconventional, or playing music. Contact Sean or peruse his other work at [Seansvansickel.com](http://Seansvansickel.com).*

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Julia Herz, executive director of the AHA.

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](https://HomebrewersAssociation.org) and dive into our How to Brew resources.

might include a water profile. If you can't (or don't want to) deal with water chemistry, don't worry about it: just go ahead and brew! Extract brewers needn't add minerals to water.

#### Malt Extract Recipes

Making wort from malt extract is easy.

- Crush specialty grains, if any.
- Place milled grains in a mesh bag and tie it off.
- Steep bag of grains in 150–160°F (66–71°C) water for 30 min. in your brew pot.
- Remove bag of grains from the pot.
- Fully dissolve extract in the hot, grain-infused water (if there are no specialty grains in the recipe, you can skip directly to this step).
- 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 but use a smaller amount of grain and augment the wort with malt extract.

#### BOILING

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



- Boil time is 60 minutes unless otherwise stated.
- 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.

## 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! Some recipes

# 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 gal or 117.3 L)

**BIAB** – brew in a bag

**BJCP** – Beer Judge Certification Program

**Chico** – American ale yeast, AKA Wyeast 1056, WLP001, 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 similar to 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

**LTHD** – Learn to Homebrew Day

**MLT** – mash-lauter tun

**NHC** – National Homebrew Competition

**OG** – original gravity

**°P** – degrees Plato (wort/beer density)

**RIMS** – recirculating infusion mash system

**RO** – reverse osmosis, a water purification process that removes most dissolved ions

**SG** – specific gravity (wort/beer density)

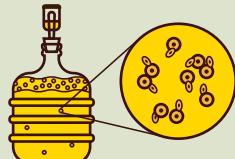
**SMaSH** – single malt and single hop

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

**SRM** – Standard Reference Method (beer color)

## FERMENTING & CONDITIONING

Pitch yeast into chilled, aerated or oxygenated wort.



- 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 if you can (traditional but not required).

## BOTTLING & 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 CO<sub>2</sub>.
- 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 force carbonate in a keg,

- Use the chart to dial in the gauge 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 CO<sub>2</sub> to g/L, multiply by 2.

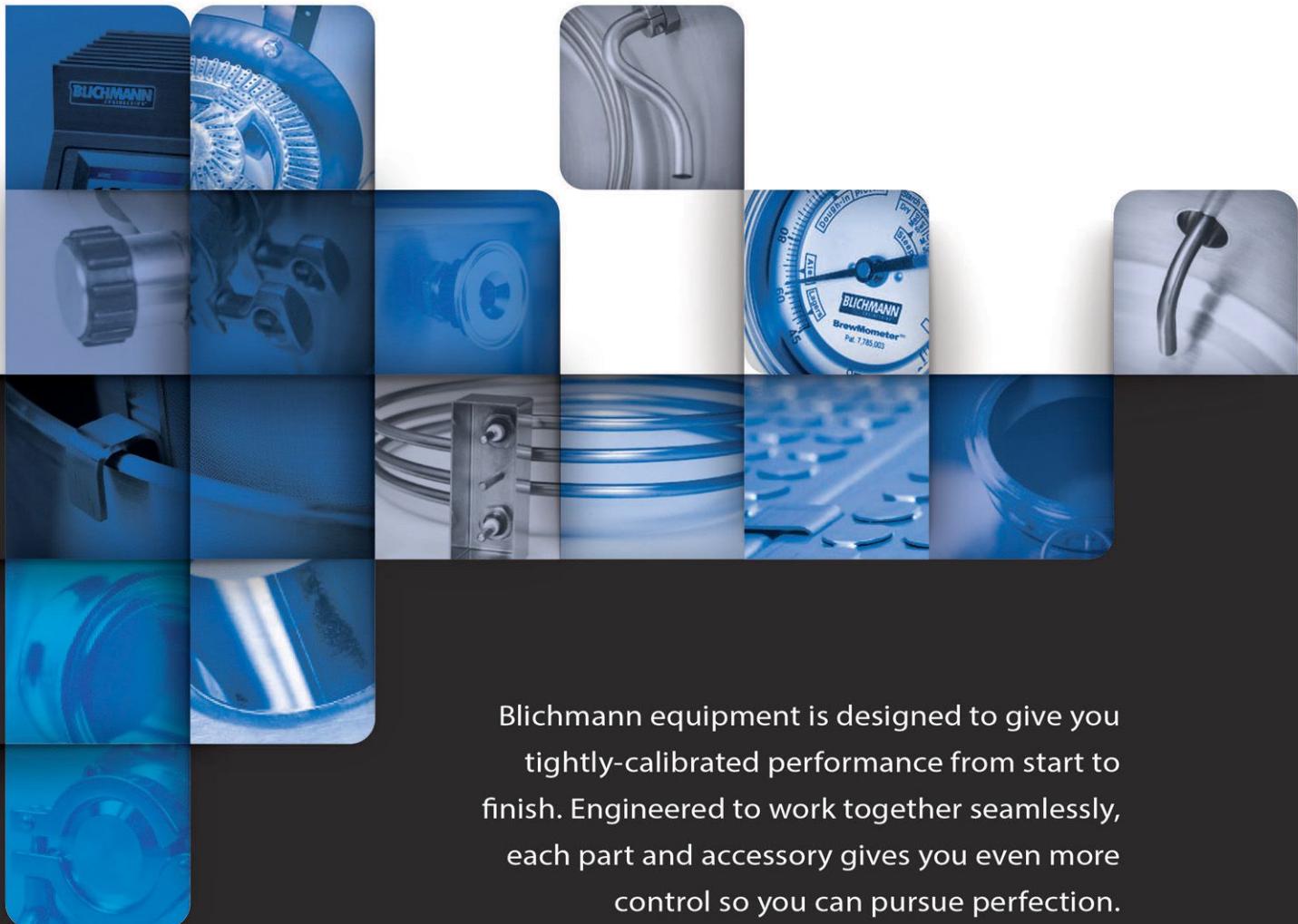
## REGULATOR PRESSURES (PSI) FOR VARIOUS CARBONATION LEVELS AND SERVING TEMPERATURES

TEMP (°F)	VOL. CO <sub>2</sub>										
	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

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# Märzenbier

By Jan Brücklmeier



Märzen does literally mean “March” in German, and most of us have heard its origin story. In the old days, before artificial cooling was a thing, brewing lager beer in the hot Bavarian summer months was difficult, so brewers brewed a stronger beer in March that survived lagering until autumn. This isn’t false, but it’s only part of the story. →

To understand the entire story, we need to go back in time. Thinking of beer and Bavaria back in the days, most people immediately think of the Reinheitsgebot of 1516 (if not, you can read my article “The German Reinheitsgebot” in the Nov/Dec 2022 issue of *Zymurgy*) and the influence it had for Bavarian beer culture. Many have never heard of a different law, which had at least an equally large impact, if not a greater one.

### SUMMER WITHOUT BEER?

The purity law of 1516 was proclaimed by Wilhelm IV, Duke of Bavaria, to improve beer quality. Unfortunately, it was only moderately successful. Beer brewed in cool weather benefited from the edict, but beer brewed in the hot months, so-called “summer beer,” was still cause for complaint and an obstacle to the economic success of Bavarian beer. Thus, Albrecht V of Bavaria, son of Wilhelm IV, proclaimed an edict in 1553 that banned brewing during the hot summer months altogether.

The so-called Sommerbrauverbot (Summer brewing ban) allowed brewing only between Saint Michael’s Day (September 29) and Saint George’s Day (April 23). It is unclear if he chose April 23 on purpose, as this was also the date on which his father had proclaimed what later became known as the purity law.

Without understanding the root cause for the bad quality of summer beer, Albrecht did the right thing. The cooler

temperatures between autumn and spring slowed the growth of beer-spoiling micro-organisms, which offered a big leap forward for beer quality.

But the change was more consequential than what brewers could see. In those days, yeast did not exist as the pure, uniform strains we know today. Yeast was called *Zeug* (literarily “things”) and was pitched from one batch to the next. It was a circus of different yeast strains—top- and bottom-fermenting alike—and other organisms. The cold temperatures promoted the growth of bottom-fermenting yeast, Darwinism at its best. Bottom fermentation, what we now call lager brewing, became the predominant way of making beer in Bavaria.

But everyone who knows Bavaria and Bavarians knows that they love to sit in the Biergarten and drink beer. We Bavarians are crazy, but not so crazy as to sit outside in midwinter when brewing was allowed. Artificial refrigeration was not a thing until the first refrigeration machine was installed in the Spaten Brewery in Munich by Carl von Linde in 1874. Now what?

### EXPORT HIT ICE

To have enough beer for the summer, brewers dug cellars in which to store their beer, but these cellars were not cold enough to preserve the beer from spoilage from April to September. So, brewers harvested ice from lakes and rivers during the winter and stored it in the cellars as well, along with



### MODERN REGULATIONS

Today, Märzen brewed in Bavaria and labeled with the Bavarian Quality logo needs to fulfill certain criteria.

#### Original extract

(gravity): 13–14.5°P [1.053–1.059]

Alcohol: 4.0–6.0% by volume

Color: 7.0–40.0 EBC [3.5–20.3 SRM]

Bitterness: 12.0–45.0 IBU



Source: Qualitätsregelung „Geprüfte Qualität“, Bayerischen Staatsministerium für Ernährung, Landwirtschaft und Forsten



Duke Albrecht V of Bavaria



Duke Wilhelm IV of Bavaria

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straw for insulation. This one reason why so many breweries in Germany are located near ponds.

In areas without large bodies of water from which to harvest ice, brewers erected wooden racks, sprayed them with water, and knocked the icicles off when the water had frozen. To become independent of the weather during the winter and the concomitant fluctuating ice production in Germany, tens of thousands of tons of ice were imported from countries including Norway, Sweden, and Russia.

## DRAW LOTS FOR BEER

But this is only one part of the myth around the Märzenbier. Were this the only limitation, not all beer would need to be stronger, since not all beer would be stored all summer long.

The other part of the story concerns how beer was sold in most cities. Beer was considered food and often, in contrast to water, it was the sole source of clean, unspoiled hydration. Thus, beer sales were highly regulated. On one hand, brewers were obliged to brew and store enough beer to ensure supply during summer.

On the other hand, that beer needed to be stored in such a way as to avoid spoilage. To keep the beer cold for as long as possible, access to beer cellars, and the frequency with which those cellars were opened, needed to be limited.

Thus was established a system called the Märzenbierlos Regulativ, which roughly translates to the “Märzen beer raffle.” Members of the brewers guild published how much beer they had brewed and stored for the summer, and then, under the watchful eye of a city council member, the guild’s master drew lots to determine the order in which individual brewers were allowed to open their cellars and sell beer.

Once a cellar had been opened, the entire contents of that cellar had to be sold before the next brewer was allowed to open his cellar. To limit warm air’s infiltration into the open cellar, the time during which a brewer was allowed to move beer was restricted to between 6 a.m. and 8 a.m., when the air was still cool, and after 5 p.m., when the heat of the day had moderated.

Photos courtesy of Dave Carpenter [beers]. It's Pilsner, not Märzen, but hey, it's in a Biergarten.



# Münchner Freiheit Märzen

## Märzen

Recipe by Jan Brücklmeier.

This quaffable Märzen will make every barbecue feel like Oktoberfest.

**Batch volume:** 5.28 US gal. (20 L)

**Original gravity:** 1.056 (13.8°P)

**Final gravity:** 1.008 (2°P)

**Efficiency:** 85%

**Color:** 6 SRM (12 EBC)

**Bitterness:** 21 IBU

**Alcohol:** 6.3% by volume

### MALTS

5.5 lb. (2.5 kg) floor-malted Pilsner malt

2.7 lb. (1.2 kg) Vienna malt

9 oz. (260 g) Carapils malt

4.6 oz. (130 g) melanoidin malt

3.5 oz. (100 g) acidulated malt

### HOPS

0.5 oz. (15 g) Hallertauer Mittelfrüh, 4% a.a., FWH

0.7 oz. (19 g) Hersbrucker, 4% a.a., FWH

0.35 oz. (10 g) Hallertauer Mittelfrüh, 4% a.a. @ 60 min

0.35 oz. (10 g) Hersbrucker, 4% a.a. @ 5 min

### YEAST

Bavarian lager yeast with low diacetyl and sulfur production. Good options include Lallemand Lalbrew Diamond Lager Yeast and Omega Yeast OYL-114, which is purportedly from Munich’s Augustiner brewery.

### WATER

Target a residual alkalinity (as  $\text{CaCO}_3$ ) of 0–89 ppm (0–5°dH). If necessary, decarbonate your brewing water by boiling, cooling, and racking off the precipitate. Adjust mash pH to 5.4 with lactic acid as needed.

### BREWING NOTES

Mash in at 127°F (53°C) with 16 qt. (15 L) of brewing liquor. Using infusions or decoctions, conduct mash rests at 127°F (53°C) for 10 minutes, 144°F (62°C) for 30 minutes, and 162°F (72°C) for 30 minutes. Mash out at 172°F (78°C). Sparge with approximately 14 qt. (13 L) water or until the wort reaches its target extract level. Boil 70 minutes, adding hops as indicated.

Pitch yeast at 48°F (9°C) and allow fermentation temperature to naturally rise to 50°F (10°C). After 10 days of fermentation at 50°F (10°C), rack to secondary, optionally holding the beer at 61°F (16°C) for one day if diacetyl is present. Carbonate to 2.75 vol. (5.5 g/L) of  $\text{CO}_2$  and lager at least 6 weeks before enjoying.



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## EVERYTHING HAS AN END

This system, which fixed the order in which beer cellars were opened, remained in place until 1799. After that time ice supply and the beer cellars had improved so much that brewers were now allowed to sell their beer all summer long. In 1807, the first breweries in Bavaria, which had deep enough cellars and enough ice, got the endorsement to deviate from the summer brewing ban.

In the following years, the number of breweries allowed to brew year-round continued to grow until the ban was lifted completely in 1868. Still, brewing during the hot summers in Bavaria came with high costs for ice and cellar maintenance. This eventually changed in 1874, when the first artificial cooling was installed in a brewery. It is not surprising, that Gabriel Sedlmayr, owner of the Spaten brewery, sponsored Carl von Linde, the inventor of the commercial artificial cooling.

Traces of these long-gone times can still be found all around Bavaria. One is obviously the Märzen beer. Another is the ubiquity of biergartens, which are located above these old storage cellars. Biergartens usually feature horse chestnut trees, which were planted for their large leaves and dense crowns, both of which are ideal for shadowing the underground cellars and keeping them cold. In Franconia, the biergarten is still called the Keller (cellar) for that reason.

## GOOD TO KNOW

I have witnessed a couple of discussions around Märzen and the famous Oktoberfest in Munich. Some claim the beer served at the Oktoberfest is Märzen; some claim it is not. Well, both sides are right.

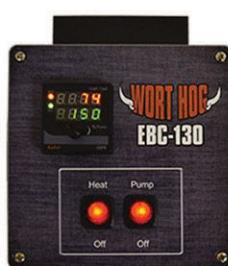
The first Oktoberfest was held on October 12, 1810, to celebrate the wedding of Prince Ludwig of Bavaria and his bride princess Therese. In 1810, the summer ban on brew-

ing was still in place for most breweries, and the new brewing season had started only 13 days before the festival—much too short to get a new batch of lager ready.

So, for sure, the first Oktoberfests were celebrated with Märzen. But the beer has changed over time and is no longer served at today's festival. But that's another story for another time.

*Born and raised in Munich, half a mile away from Oktoberfest and the Augustiner brewery, and with one grandmother in the beer business and the other a former pub owner, Jan Brücklmeier's destiny was almost predetermined. He brewed his first batch of beer in the late 1980s and made his passion a profession when he studied brewing sciences and beverage technologies at the world-famous beer university, Weihenstephan, from which he holds a master's degree. Jan has written two books about homebrewing and beer.*

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# The Ecstasy of Swag

## Boy howdy, comp day is here!

I arrive at the brewery early, eyes half closed. If judging doesn't start at 8:30, awards probably won't happen till midnight.

I'm still groggy from last night's penultimate judging session and the completely unnecessary (yet still somehow very necessary) after party. Today's the big one. Glad I brought coffee. Even gladder the organizers provide refills.

*O coffee, thy drugs are quick.* Thus, with a sip, I locate Table 9 and take a seat.

"Hello, hello, hello." We all introduce ourselves but will never remember one another's names. That's why the BJCP issues us badges.

Oooh, we got Rauchbier! Wakey wakey, beer and bacey. I can barely contain my excitement, for you see, I absolutely adore smoked bee—.

But what is this I see out of the corner of my eye?

*Cue dramatic score by Ennio Morricone.*

### THE SWAG TABLE.

OMG, the swag table. There are so many good reasons to enter and judge competitions. Getting feedback on my beer. Maybe winning a medal or two. Tasting a lot of different homebrews. And the unquantifiable feelings of respect and camaraderie engendered by bonding with fellow homebrewers, of course.

But, man, the swag table is where it's at. We all become kids in candy stores at the ol' comp swag table. We take home stuff we don't even need.

My attention is naturally drawn to the flagship item, the grand prize, the *pièce de résistance*. It's hewn from freshly polished SAE 304 stainless steel. I am Ralphie and this is my Red Ryder. But only one shall be worthy.

OK, time to get started. Focus up, man.

*First entry, number 1295, a smoked Märzen...*

And we're off.

We steadily tick entries off the flight, and I periodically shake my atrophied writing hand. *Why can't we type this stuff?* But I insist on good penmanship—people paid good money for this!—and try not to

notice when the other judges finish a good 10 minutes ahead of me.

As we continue down the flight, I notice donated goodies multiplying on the nearby table of bounty, imperceptibly at first, and then with greater intensity as the homebrew kicks in. Sacks of malt and faucets and (for some reason) stress balls with yeast lab logos on them and, and, and—

*Entry number 1202...*

OK, do not stare directly at The Big Shiny Thing. You may very well go blind—*Is it autoluminescent?* I don't want to appear too eager, it's so...so...bright! It has tri-clamps!

The flight ends. Who on earth gives judges smoked beer first thing in the morning? I would like to buy that person a beer.

"Would you look at that?" I casually mumble to another club member as we both side eye The Big Shiny Thing during a judging break.

"Well, I'll be," they concur.

We decide it would look great in either of our garages. I'd even put it on my nightstand, I half joke. We nibble our complimentary cookies.

"What exactly is it?" I ask.

"I mean, it *might* be a kettle," says the other, "but it looks more like a fermenter."

"Ah," I reply. "It reminds me of a large, upside-down thimble. On account of all the dimples."

"Gotta be a glycol jacket," they reply.

"One has to hope."

Lunch comes and goes. I've had this sandwich before, but I never turn down free ham.

We heroically push through the afternoon flights. With each pause in the day's deliberations, we all take a moment to pay homage to The Big Shiny Thing.

"I hear it makes homebrew all on its own," remarks an observer. "All you do is put a six-pack of your favorite commercial beer in that little door, and 15 minutes later you have half a gallon of clone beer."

"You don't say..."

I am visibly salivating now. Technology has come so, so far. Back when I started homebrewing, we had to walk uphill both

ways in the snow to get old slop buckets from Farmer Bob, but by golly, we still made beer in them, and we liked it.

Finally, the time arrives. Awards! As categories are announced, delighted homebrewers approach one by one and genuflect to The Big Shiny Thing before accepting their medals and selecting prizes from clearly delineated category piles. It's a good year for hops.

I take a couple of bronzes, and I'm happy with that. I don't really brew for competition, but I enter when I have stuff ready, mostly to support the club. If it wins, great. If not, I still get to drink it.

"And, best of show—wait for it—GOSE to Taylor!"

Taylor!

Taylor wins best of show all the time! Not gonna lie, that Gose is something else. I should get the recipe. Good job.

Taylor proceeds to the altar of freebies and, beaming ear to ear, hoists The Big Shiny Thing aloft and begins shuffling toward the back of the brewery and the door beyond which the carriage awaits.

"Hey, Taylor, what is that thing?" I shout across the room.

"Not a clue!" Taylor replies. "But it's stainless! This is my third one. They look great in the garage!"

And with that, we're done for another year.

By the time I get to the swag table, considerably more talented homebrewers than I have already picked up any number of books, sacks of grain, bags of hops, and vouchers for free yeast. What's left is slim pickings, but slim pickings are underrated.

*There's still plenty of meat on that bone.*

I grab a few stickers to put on the kegs, a koozie to take camping, and a little baggie with 10 oxygen-absorbing bottle caps in it. I eye a bottle of alkaline cleaner, but I already have enough alkaline cleaner to CIP the whole house twice over.

I grab it anyway. I mean, shiny things aren't gonna stay shiny on their own.

**Dave Carpenter is editor-in-chief of Zymurgy. Sometimes he writes silly fiction.**



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