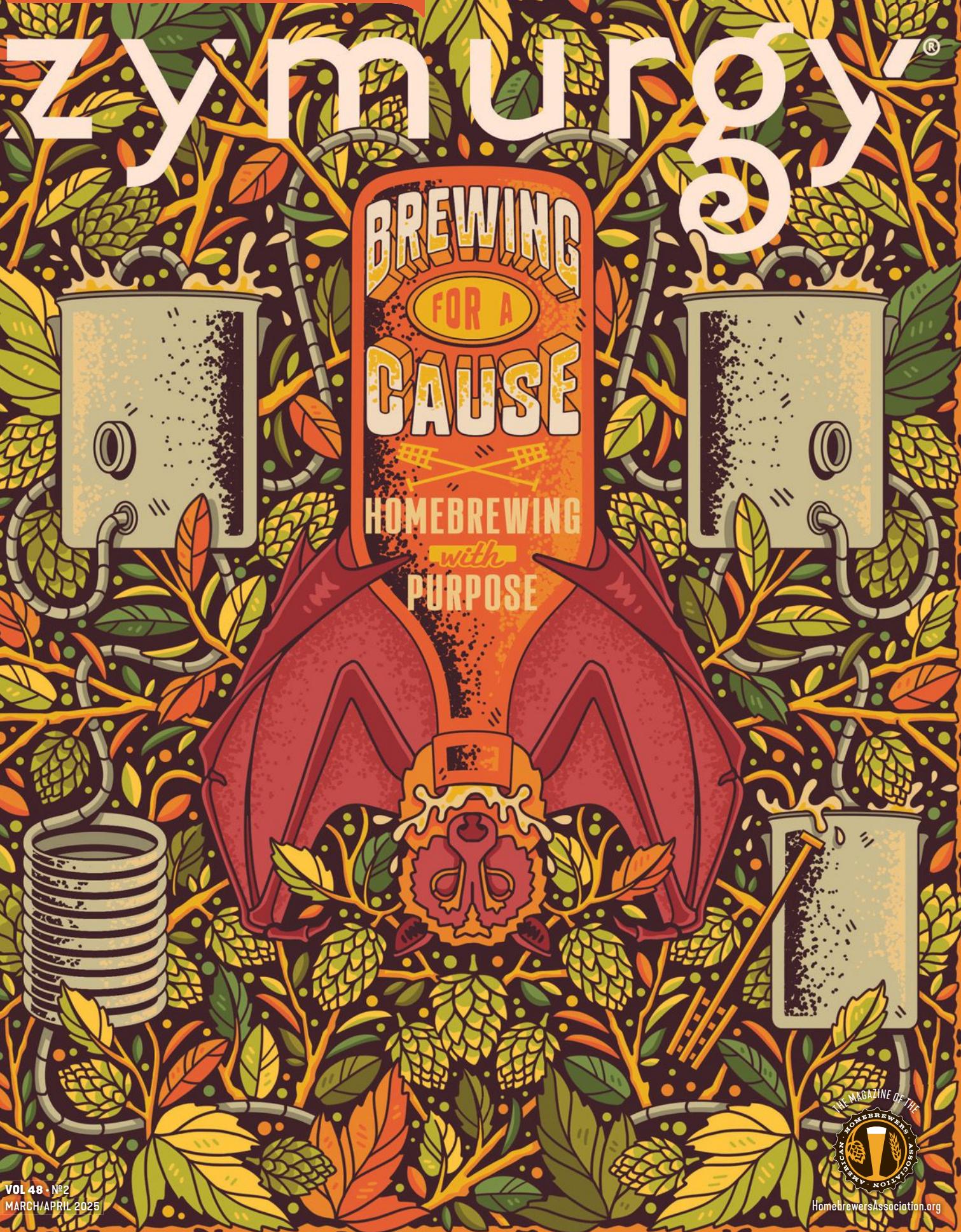


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ERIC & JANET HEUKESHOVEN began homebrewing in 2010. The retired music professors continue to perform, and explore brewing traditions at breweries all over the world.

2025

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Good Beer for a Good Cause

Homebrewing is a privilege, not a right. It is still illegal in countries such as Iran and Malaysia; Japan allows its citizens to brew, as long as the fermented beverages do not exceed 1% ABV. Most countries worldwide do not allow the home manufacture of distilled beverages, and the sale of homebrew is almost universally forbidden. Here in the United States, let us not forget that the brewing of alcoholic beverages at home was also illegal for many years; supplies had to be obtained surreptitiously from dubious sources, equipment could only be cobbled together from repurposed kitchen supplies, and brewers carried out their clandestine brew days in constant fear of getting caught, often under less-than-sanitary conditions. Obviously, homebrewing during the dark years of Prohibition rarely produced what one would today be considered a high-quality beverage. But that all changed.

Thanks to former President Jimmy Carter, may he rest in peace (see Now On Tap on page 6 for our salute to one of the most important founding fathers of our hobby), homebrewing was legalized at the federal level on October 14, 1978 with the signing of bill H.R. 1337. However, legalization at the state level was another matter. According to John Moorhead's article "Homebrewing is Legal, but the Fight Continues," it took until 2013 to legalize it in Alabama and Mississippi, and there are still legislative holdouts that vary from region to region in this country. Even today, in Tennessee and Mississippi, it's illegal to brew anything over 10% ABV. In Oklahoma, homebrewers must obtain an annual permit to homebrew. In Alabama, homebrewers are not allowed to brew more than 15 gallons per calendar quarter and may not be in possession of more than 15 gallons of homebrew at any given time. These are just a few of the restrictions homebrewers continue to battle. Those of us who enjoy greater freedom to brew at home would do well to remind ourselves how privileged we really are. (For more details on the ongoing struggle for legal-

ization, visit HomebrewersAssociation.org/homebrew-community-culture.)

This issue of *Zymurgy* not only honors our right to brew, it also honors those who choose to use their favorite hobby to do good in the world. On the whole, homebrewers are an unselfish lot—we're not brewing up hooch in our bathtubs for a cheap buzz. The truly exceptional homebrewers among us are willing to share their time, wisdom, and ferments to help others. In these pages we will explore the diversity of causes homebrewers are supporting today to make a difference, whether the beneficiary is environmental, ecological, economical, personal, or historical. The same creativity that drives our passion for crafting unique, delicious beverages also inspires the most innovative homebrewers to brew in support of those in need. Statistically, homebrewers tend to come from the better educated and better paid socioeconomic strata, but the flip side of that is their enduring generosity towards those less fortunate.

Frequent contributor Ron Minkoff once again demonstrates the tireless commitment of his Hogtown Brewers homebrew club to creative causes with his feature detailing an unusual environmental cause: Bats in the Beer Garden. Chris Stovall reminds us of how critical it is to main-

tain a clean supply of beer's number one ingredient, water, with his feature on the ReBrew Wastewater Challenge. World traveler Tim Hobbs brings us to one of those places in the world where homebrewers must still operate on the fringes of legality to produce tasty beverages with his feature on Himalayan Rice Beer. And what higher purpose could homebrewing serve than supporting the welfare and education of one's children? French beer journalist Anaïs Lecoq inspires us to recognize that sometimes brewing for a cause can mean building friendships, personal relationships, and even careers, with Finding Purpose: Happiness Through Homebrew. And finally, Eric and Janet Heukeshoven return to the same Oberpfalz region of Bavaria Franz D. Hofer visited in the Jan/Feb 2022 issue of *Zymurgy* to emphasize how important it is for homebrewers to preserve the centuries-old communal brewing traditions that bring beer enthusiasts, amateur brewers, and pros together in their feature on Communal Zoigl Brewing.

We hope you will be inspired to take these examples of brewing good beer for good causes and find your own way to make the world a better place through homebrew.

Amahl Turczyn is editor-in-chief of *Zymurgy*.



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BATS IN THE BEER GARDEN

The Hogtown Brewers homebrew club down in Gainesville, Fla. goes batty each October for the opportunity to show off their brewing chops and help raise funds for a unique nonprofit organization in their area: the Lubee Bat Conservancy.

By Ron Minkoff



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REBREW WASTEWATER CHALLENGE

ReBrew is a homebrew competition at the annual conference for the Georgia Association of Water Professionals (GAWP) that takes place every year in Savannah, Ga. It promotes awareness of reusing of this valuable resource for brewing.

By Chris Stovall



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HIMALAYAN RICE BEER

The production of *jahr*, or rice beer native to the Himalayan region, has many names according to locality. Every village makes its own recipe—it even varies between households—but all versions of this homebrew have a few commonalities.

By Tim Hobbs



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HAPPINESS THROUGH HOMEBREW

When a French journalist offers her partner a homebrew workshop to bolster his growing interest in brewing, little does she know it would have life- and career-changing consequences for the couple and their brewing friend.

By Anaïs Lecoq



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ZOIGLBIER

A pair of retired music professors embark on a journey to uncover the secrets of a 600-year-old communal brewing tradition: Zoigl. Join them as they explore breweries in Bavaria's Oberpfalz that bring pro brewers and homebrewers together.

By Eric & Janet Heukeshoven

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NOW ON Tap



Tested Products

We at the AHA love reviewing products we think will be of interest to our members. We'll give you the lowdown on the good, the bad and the pricey.

FLASH BREWING KITS FROM MOREBEER!

The major draw of these kits is that they are an all-in-one solution for brewing 5 gallons (18.93 L) of high-quality beer quickly and conveniently. They come with brewing instructions, a bag of dry malt extract, yeast, and hops. The company was kind enough to send us one of these kits to test. Our kit was for a Citra Session Pale Ale, and it included five pounds of extra-light DME, a 30-IBU



HopBite shot of hop extract in a syringe to provide bitterness, dry yeast, and 2 oz. (57 g) of Citra Cryo hops. We only needed to provide a fermenter with an airlock, good-quality water, and sanitizer. (You will also need a racking tube and bottles or a keg for packaging.) As advertised, the actual brew day was a breeze. It was simply a matter of sanitizing the fermenter, filling it with 3 gallons of brewing-quality water (we used RO), and adding all the ingredients provided. You don't even have to stir. Once everything is in, including the HopBite shot, Cryo hops, malt extract, and yeast, you just top off the fermenter with more water, and you're ready to go.

What We Liked:

➤ **Ease of Use** – It literally took us less than 20 minutes to get a 5-gallon batch up and running. It's a great solution for busy folks who love good brew but don't have the time to commit to a several-hour brew day. It's a great gift idea for the hard-working brew enthusiast in your life.

➤ **Quality Ingredients** – MoreBeer! didn't skimp on the ingredients. The dry malt extract was fresh and very pale, the yeast was also fresh and started up in a matter of hours, and perhaps best of all, the HopBite extract did its job—30 IBUs was plenty for a 4.9%-ABV session pale ale. The Cryo Citra hops expressed that bright, fresh, familiar citrus character of everyone's favorite hop, and the finished beer had plenty of Citra character as a result.

➤ **Value** – These kits aren't inexpensive, but considering what you get for the money, they're still a bargain. As you know, Cryo Citrus hops are expensive, and trying to put together a similar kit from the same ingredients purchased

separately would run you a lot more than the kit's asking price. Plus, with the purchase of most of these kits, you'll qualify for free shipping from MoreBeer. If not, you won't be far off—all you need to do is pick up a few more items on their website and they'll foot the bill for the delivery.

➤ **No-Boil Convenience** – Who knew you could ferment malt extract cleanly without a boil? But this no-heat dump-and-go solution works great. You don't even have to oxygenate or stir the wort.

➤ **Style Variety** – There are a bunch of Flash Brewing kits available, including a fresh-pressed IPA, a pale ale, a blonde, a red ale, and even a hefeweizen, so you're sure to find something you like. Obviously, the higher-alcohol styles such as their Ugly Fish IPA carry a higher price tag.

What Could Be Better:

➤ **It Still Takes a While** – While the "flash" part really does save you a whole lot of time on brew day, the fermenta-

tation, racking, packaging of the beer, conditioning, and clean-up times are the same as they are with any beer. Not that we really expect to be drinking this beer within a week—just know that the "flash" part is all up front.

➤ **Malt Transfer Can Be Messy** – You really need a wide-mouth fermenter such as the FerMonster (which MoreBeer! sells separately) to get all that malt extract in cleanly. We used an old fashioned 5-gallon glass carboy, but as careful as we were, we still made a bit of a mess funneling the DME through the narrow opening of the carboy.

The Verdict

We have to say, the finished beer was pretty good, and we can see buying kits for friends and family members to try and tempt them into the fold of homebrewing...it's a simple, painless way to get into the hobby that eliminates many of the hiccups most of us encounter when we first start brewing. So kudos to MoreBeer! for making Flash Brewing kits available!

THE HOMEBREWING COMMUNITY REMEMBERS

President Jimmy Carter

Though he was often associated with peanuts, for some, former President Jimmy Carter's name evokes thoughts of hops.

On October 14, 1978, President Carter signed Bill H.R. 1337, which contained Amendment 5354 sponsored by Senator Alan Cranston (D-CA) and Representative William Steiger (R-WI). That amendment created an exemption from taxation for beer brewed at home for personal or family use. Essentially, it lifted regulations imposed by Prohibition—laws put in place over 50 years previously.

Some states were quick to adopt federal legalization as state policy on home brewing, while others developed their own language. It wasn't until 2013—nearly 100 years after Prohibition made homebrewing illegal—that making beer at home became legal in all 50 states, with Mississippi and Alabama both establishing homebrew legality that year.

After the enactment of H.R. 1337, homebrewing experienced steady growth as more people discovered the joy and satisfaction of making beer at home, which set the stage for the first generation of modern small brewery owners.

Today, the American Homebrewers Association (AHA) and other homebrew organizations continue to pursue fair usage homebrew laws across the country. Even with homebrewing now legal in all 50 states, some states still have legislation that makes it difficult to be a homebrewer. Antiquated laws that restrict transporting and sharing homebrew are at the forefront of homebrew legislation initiatives these days.

Cheers, and thank you to an American homebrew hero, President Jimmy Carter. His legacy will live on in every batch of beer brewed.



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Join us for these **member-access-only** broadcasts during which we discuss homebrewing techniques, hear from some of the best minds in brewing, and explore the world of all things fermentation! Register at HomebrewersAssociation.org/zymurgy-live to tune in to the webinars.

Missed an episode or need to catch up? Watch or listen to recordings at your convenience and up your homebrew game!

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- Beer Travel for a Deeper Understanding and Better Brewing
- Pregame for Learn to Homebrew Day
- Master your Homebrew by Decoding Beer Evaluation
- Pregame for Home Fermentation Day 2024—Sauergut
- Award-Winning Homebrewing
- 2024 Big Brew Day Pregame and Live Brewing Demo
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Homebrew club members know the fun and value of being in a club—and the degree of risk that is involved when a group of people gathers to share alcoholic beverages. At risk are both the venue hosting the club meeting or event and the club itself if an accident were to occur following a homebrew club gathering. The AHA, in partnership with West Insurance, offers homebrew club insurance that is a good fit for clubs.

Open enrollment in the six-month policy period runs from February 1 to March 1, 2025. The policy term runs from March 1 to September 1, 2025. Your club can sign up for coverage for only \$2.53 per member. For more details, visit HomebrewersAssociation.org/homebrew-clubs/homebrew-club-insurance.

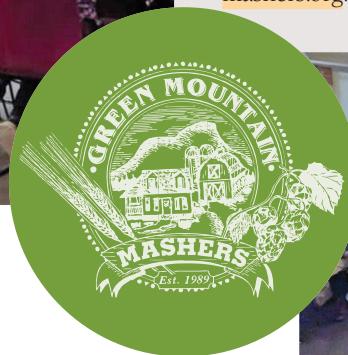
As an additional benefit, clubs that demonstrate an AHA membership rate of 75% or more are eligible to have their general liability and liquor liability insurance premium payments reimbursed by the AHA!



The Green Mountain Mashers CELEBRATE THEIR 35TH ANNIVERSARY

In October 2024, Vermont's Green Mountain Mashers Homebrew Club celebrated the 35th anniversary of the founding of their club. Mashers new and old from near and far gathered in Burlington, Vt. to celebrate 35 years of homebrewing in the Green Mountain state.

Homebrewed beer, cider, and mead were shared, along with many stories and memories. Several founding members were in attendance, including John Gallagher (pictured with the microphone) who, along with the late Greg Noonan, were the impetus for the club. The Mashers are still going strong after all these years, and you can learn more about the club at mashers.org. Cheers to 35 years!



NATIONAL HOMEBREW COMPETITION

THE 2025 NATIONAL HOMEBREW COMPETITION

It's that time again! The registration window for 2025's NHC runs from Jan 28–Feb 19. Pit your entries against the best homebrewed beer, cider, and mead in the country! Get all the juicy details at HomebrewersAssociation.org/nhc. Best of luck to all entrants!

BREW OVER

AHA Member Dennis Kaupilla of West Barnet, Vt. astutely pointed out that in the Jan/Feb 2025 issue of Zymurgy, on page 78, "Build Your Own Coolship," the photo caption reads "Steel sinks and maple syrup excavators." It should read *evaporators*, since the sugar houses exist to boil maple sap to make maple syrup—not dig. Thanks for keeping us honest, Dennis!



2025 Founding Board



SHAWNA CORMIER (Chair)

BA Board of Directors
AHA Committee chair



SANDY COCKERHAM

BJCP president
Former AHA Committee member



DREW BEECHUM

Homebrewing educator
Brewers Publications author



GREG ROSKOPF

Tau Kappa Epsilon chief risk officer
BJCP judge and homebrewer
Former AHA Committee member



GARY GLASS

Former AHA director
Head brewer,
Left Hand Brewing, Longmont, Colo.



JULIA HERZ (Staff Liaison)

AHA executive director
Beer educator
Certified Association Executive

THE AHA IS GOING INDEPENDENT!

How We Got Here and Why We Celebrate

Big news. On January 22, 2025 the American Homebrewers Association (AHA) filed for incorporation in the state of Colorado as a step to becoming an independent 501(c) nonprofit organization.

Founded in 1978, the AHA has operated as a division under the umbrella of the Brewers Associationsm (BA)—the nonprofit trade association dedicated to small and independent American craft brewers—since 1983. Before the end of 2025, the AHA will operate as a nonprofit organization autonomous from the BA. We have created a new founding board and are in the final stages of discussions to hire an association management company to carry out AHA operations.

The AHA's founding board, comprised of chairperson Shawna Cormier, members Sandy Cockerham, Drew Beechum, Greg Roskopf, Gary Glass, and staff liaison and current executive director Julia Herz, will act as a transition committee to steward the AHA to organizational independence in 2025 and establish the nascent organization's bylaws, vision, mission, strategic priorities, and leadership elections to happen in 2026.

This transition allows the AHA to prioritize the needs of homebrewing and the community in new and exciting ways. It also elevates membership to have a board of directors, bringing more opportunities for member engagement and contributions. The AHA had the option to stay with the BA, but with fewer members since 2019 (AHA's height was 46,000 members, and today we have 23,000) comes fewer resources.

Experimentation, innovation, and overall strategic planning are all areas the AHA has been looking to develop but could not be fulfilled based on the current structure at the BA. As shared in the November/



Editor's Note: A version of this Director's Cut column was published on HomebrewersAssociation.org on January 22, 2025.

December 2024 issue of *Zymurgy*, AHA members helped birth the entire craft beer and independent brewer movement, and we are a vital part of the beer ecosystem. We take the AHA legacy, homebrewers' importance in culture, and member needs seriously, and this change will lay a path for new growth and member engagement.

WILL MY BENEFITS STAY THE SAME?

Yes, for 2025, AHA member benefits will stay the same. In the future, look to see benefits refined based on member input.

WHY AND WHEN DID THE MOVE TOWARD INDEPENDENCE START?

- Over the past few years, we've been increasingly hearing from members and the AHA committee that we need a reinvigorated new vision. Staff also voiced their desire to transition to an independent organization.
- This decoupling is mutually supported by current AHA and BA leadership, and the board of directors.
- Establishing the AHA as an independent entity allows for tailored governance, an evolved staffing model, and strategic flexibility to address member needs and market dynamics.
- Extensive research in 2024 supports a continued need and demand for a national organization focused on homebrewing.

WHAT WAS THE PROCESS THAT LED TO THIS MOVE?

- In 2024, the AHA embarked on a comprehensive strategic planning process.
- Research that informed the AHA's new direction included a review of the AHA's mission and relevance, membership and retail supply shop trends, staff input on operations and program impact, committee and stakeholder insights on member benefits, a member/non-member survey that garnered 3,755 responses; a STEEP (Social, Technological, Economic, Environmental, and Political) analysis; and an independent financial review.

WHAT HAPPENED TO HOMEBREW CON™?

- Unfortunately, we have yet to find a suitable partner to execute a cost-effective 2025 Homebrew Con (HBC), the AHA's annual member gathering, and the usual location of the awards ceremony. However, we are on track with an ongoing search for options to bring back HBC as a valued and important annual event in 2026.

- We hope to host the 2025 National Homebrew Competition (NHC) awards ceremony onsite in Kansas City after the final round of judging. We will share additional details as soon as we have them. Stay tuned for more information.

THIRSTY FOR MORE?

- To see an overview of the AHA's volunteer opportunities, visit HomebrewersAssociation.org/membership/volunteer-opportunities
- To see a recent update on the AHA's current activities and its incredible history of helping change the world of beer as we know it, visit HomebrewersAssociation.org/news/2024-american-homebrewers-association-overview
- Renew or join the AHA at HomebrewersAssociation.org/membership/join-or-renew to be a part of this history as it unfolds.
- Sign up to get the AHA's What's Brewing newsletter at HomebrewersAssociation.org/newsletter-signup
- Participate in the AHA conversation and community on the AHA Forum at forum.HomebrewersAssociation.org
- Enter the 47th National Homebrew Competition to compete with

AHA members worldwide at HomebrewersAssociation.org/nhc. The entry window is from January 28 to February 19, 2025.

We hope you share our enthusiasm for the opportunities our new independence brings. We appreciate your membership, support, and feedback as we work to steward the association into its next chapter. It's essential to acknowledge that future AHA members and volunteer leaders will walk, brew, and ferment in the footsteps of thousands of pioneer homebrewers who helped make the AHA, and craft beer, what it is today. What the AHA is tomorrow is now up to us.

Here is to a fantastic new future for the incredible, fun, and rewarding hobby of homebrewing.

Shawna Cormier is chair of the AHA Founding Board, co-founder of Seattle Beer School, and director of membership and events, Washington Brewers Guild.

Julia Herz is executive director of the American Homebrewers Association. You can follow Julia's homebrew talks and travels on Instagram @ImmaculateFermentation or contact her at ahaed@brewersassociation.org.



FOUNDING BOARD OF DIRECTOR POSITION DESCRIPTION AMERICAN HOMEBREWERS ASSOCIATION JANUARY 2025

TERM

2025 Foundational Board members will be appointed to a one-year term by the American Homebrewers Association committee chair and the Brewers Association board chair. This may be adjusted to align with the bylaws once they are developed.

BOARD RESPONSIBILITIES

The Founding Board is accountable for oversight that will lay the foundation for AHA independence as a new 501(c). To that end, it shall also:

- Comply with fiduciary obligations of care, loyalty, and obedience.
- Comply with BA expectations for board members.
- Oversee AHA's business and financial affairs.
- Advise on Association Management Company issues as needed, and once incorporated, select and appoint the association chief staff executive.
- Perform duties entrusted to officers and directors of a nonprofit corporation.

OTHER RESPONSIBILITIES

All Board of Director members are responsible for strategic direction and oversight of the Association's affairs, and as such, must:

- Engage in foresight and establish a vision, mission, and strategic priorities for the AHA.
- Recommend and adopt policies consistent with the Association's mission and statement of purpose.
- Ensure the Association adopts and implements a succession plan for officers.
- Ensure the governance structure supports a diverse, competent, committed pipeline of volunteer leaders to help transition the AHA into an independent organization.
- Promote AHA membership and champion the transition of AHA into an independent entity.
- Once independent, approve an annual budget and operating plan, evaluate the performance of the association's director and Association Management Company, determine the Association and board strategic priorities, and monitor the achievement or non-achievement of planned objectives.
- Perform duties as assigned by any future Association governing documents.

Learn More About Your AHA Founding Board

2025 foundational board members are appointed to a one-year term by the American Homebrewers Association (AHA) committee chair and the Brewers Association (BA) board chair. The AHA's founding board is comprised of board chair Shawna Cormier, members Sandy Cockerham, Drew Beechum, Greg Roskopf, Gary Glass, and staff liaison and current executive director, Julia Herz. They will act as a transition committee to steward the AHA to organizational independence in 2025 and establish the nascent organization's bylaws, vision, mission, and strategic priorities.

SHAWNA CORMIER BOARD CHAIR

Shawna Cormier is director of membership and events for the Washington Brewers Guild, an Advanced Cicerone®, BJCP judge, co-host of *Cheers to Beers* podcast, on the BA Board of Directors, and chair of the founding board of the newly independent AHA. With an MFA in Acting (no joke), she discovered her love of beer through homebrewing. She loves playing with her son and daughter and singing cheesy musical theatre with her husband.

QUOTE: *Homebrew now. Homebrew forever. Homebrew for all!*

AHA Member for 11 years and counting

SANDY COCKERHAM

A native of Indiana, Sandy Cockerham initially became interested in beer around 1983 after befriending some chemists at work who introduced her to English ales at a local pub. She started homebrewing in the late 80s. In 2007, she took her first BJCP exam and scored a National score under the BJCP's legacy exam and became a Master judge in 2012. She then ran for a BJCP representative spot in 2014. She currently holds the rank of Grand Master 11 and also has mead and cider endorsements. Cockerham is president of the BJCP and serves as a Representative for the Midwest region.

QUOTE: *I have judged at well over 300 competitions in the last 17 years and enjoy traveling and judging homebrew and commercial competitions all over the world. My favorite parts of judging are meeting so many great people in addition to helping brewers, cidermakers, and meadmakers.*

AHA Member for 36 years and counting

DREW BEECHUM

Drew Beechum joined the AHA back in 2001 to help organize the Los Angeles Homebrew Conference with his club, The Maltose Falcons. He's written for Zymurgy and other beer magazines, been a club officer for 25 years, served on the AHA Governing Committee for nearly a decade, written seven books on the art of home fermentation, and hosts a regular podcast: *Experimental Brewing*. He was the 2023

recipient of the AHA Governing Committee Recognition Award.

QUOTE: *I am of the fervent belief that fermentation is the closest thing humanity has unlocked to true magic and alchemy. It's fun and wild and should be enjoyed by one and all—and it's much better than building another bird house!*

AHA Member for 24 years and counting

GREGORY ROSKOPF

Gregory Roskopf's love for beer and brewing began while growing up in Milwaukee, Wis., a city rich in brewing history and culture. Starting his homebrewing journey in 2007, Roskopf deepened his passion through membership in the Beer Barons of Milwaukee (former club), the Foam Blowers of Indiana (current club), and his travels across the U.S. and Europe. As a Certified BJCP Judge, he has expanded his knowledge of beer styles to help others and serve the homebrewing community. With 20 years of experience in association management and higher education, Roskopf specializes in membership growth, educational programming, and risk management. As chief risk officer for Tau Kappa Epsilon International Fraternity, he leads an award-winning team, driving membership value and event success. Married with three children who often join him on brew days, Roskopf is dedicated to fostering community and celebrating the art and science of brewing—all while keeping it fun and approachable.

QUOTE: *Homebrewing challenges us to honor tradition while fostering innovation. By advancing the AHA's mission, we create connections among brewers, cultivate inclusivity, grow our skill sets, and celebrate what truly makes homebrewing special—the people and shared experiences that bring us together.*

AHA Member for more than eight years and counting

GARY GLASS

Gary Glass is head brewer at Left Hand Brewing Company in Longmont, Colo. Prior to

working for Left Hand, Glass spent 20 years working for the BA in various roles, including 14 years as AHA director. He is a Certified BJCP beer judge and is a judge for the prestigious Great American Beer Festival and World Beer Cup competitions.

QUOTE: *Today, we are fortunate to have flavorful beer brewed in all 50 states by professionals and homebrewers alike. Prior to the founding of the AHA in 1979, that was not the case—there were very few homebrewers, and beer was mostly bland and homogenized. It took a revolution led by homebrewers and the AHA to get us where we are now. It was an honor to be part of the AHA's journey as director for many years. I'm honored now with the opportunity as a board member to help launch this next chapter in the AHA's history.*

AHA Member for 25 years and counting

JULIA HERZ STAFF LIAISON

Julia Herz, AHA's executive director, has more than two decades of experience in brewing, including two prior roles at the BA. Herz is a Certified Association Executive (CAE), BJCP Certified beer judge, Advanced Cicerone®, medal-winning homebrewer, and experienced zymurgist having made beer, mead, and fermented foods since 1994. She is the co-author of *Beer Pairing: The Essential Guide from the Pairing Pros* (Voyager Press, 2015), the CraftBeer.com Beer & Food Guide, and co-host of the Sense of Beer Style Show. Herz's accomplishments include creating and publishing Craftbeer.com, the website for craft beer lovers, and passionately leading the promotion of small and independent craft brewers and the independent craft brewer seal, and promoting responsible beer appreciation to mainstream media and beer lovers.

QUOTE: *Here is to innovation and continuing to bring the fun of homebrewing and fermenting to the world. We take the AHA legacy, homebrewers' importance in our culture, and member needs seriously. This evolution better positions us to deliver on what members are requesting.*

AHA Member for over 25 years and counting

EXTRACT BREWING

To Each Their Own

Dear Zymurgy,

In response to Steve Ruch's excellent "Last Drop: Respect the Extract," in my experience, most homebrewers do not look down on anyone for brewing with extract. At least no one I know. We all understand there is no "one right way" to make beer. I am in the same camp—"switched to all grain but still do an occasional extract batch." I will make wheat beer solely with extract because I don't like mashing wheat. I also use extract to supplement a mash for making old ale, barleywine, and stronger beers whose mash bill exceeds my capacity.

The biggest drawbacks to brewing with extract are the cost and the level of control. Pound for pound, extract costs more than starting with grain. And the brewer doesn't have as much control because grains have already been mashed to produce the extract.

The biggest advantages of extract are time and convenience, as well as not needing as much equipment. It's even simpler than brew-in-a-bag (BIAB). Whenever I brew an all-extract batch, I am very happy with the much quicker and easier brew day.

There is no reason to look down on anyone for brewing with extract. To each their own.

Bill Wible
Oxford, Pa.



DEAR ZYMURGY

Send your Dear Zymurgy letters to
zymurgy@brewersassociation.org.
Letters may be edited for length
and/or clarity.

Contributor Steve Ruch responds:

While it's true that negative attitudes towards brewing with extract have receded somewhat, I still see a fair number of postings about "homebrew twang" blamed on extract: "You can't brew good beer with extract." I started with extract in the late '90s and don't remember getting any twang, although I may not have been knowledgeable enough to have recognized it. I certainly don't get it nowadays with present-day-quality DME. Bill makes a good point about the added cost, but that's somewhat balanced out with the time savings and less work.

I do mostly all-grain, BIAB, but keep two to three batches' worth of extract on hand for a hot summer's day brew session, and times when I don't feel energetic enough for an all-grain mash. I wouldn't if I didn't feel the results were close enough to satisfy my tastes.

Cheers, Steve



MORE PRAISE FOR EXTRACT

Dear Zymurgy,

Bravo to contributor Steve Ruch for finally giving some props to extract brewing in the Jan/Feb 2024 issue. Respect the extract indeed! I've been a homebrewer since 1996 and have proudly brewed extract for all that time. Sure, I've visited fellow brewers with all-grain setups on their brew day and it's a fun experience. But their equipment often runs into the thousands of dollars and takes up a lot of storage when they're not brewing. For me, the ease and speed of extract brewing resonates. As Steve indicates, a lot of folks can't differentiate between all-grain and extract beers. The newer techniques of adding specialty malts and tweaking yeast and hop selection also make extract recipe creation fun and interesting. I taught beginner brewing for over two years at my community center, and always recommended starting with the extract basics. Steve's statistics indicate most homebrewers also started this way—so let's remember our roots, fellow homebrewers. Long live the extract!

Chris Smith
Pluff Mudd Hop Heads Homebrew Club
Beaufort, S.C.



SAVING THEIR LOCAL HOMEBREW SUPPLY SHOP

Dear Zymurgy,

I am a homebrewer from New Orleans, La. Given the recent closure of Atlantic Brewing Supply among countless others, I thought it would be cool to reach out to you guys and give you a success story. Brewstock Homebrew Supplies, the only remaining homebrew supply store in the state of Louisiana, was at risk of closing as the owner decided to liquidate the store after owning it for five years with no parties interested in purchasing. As of December 1, 2024, more than

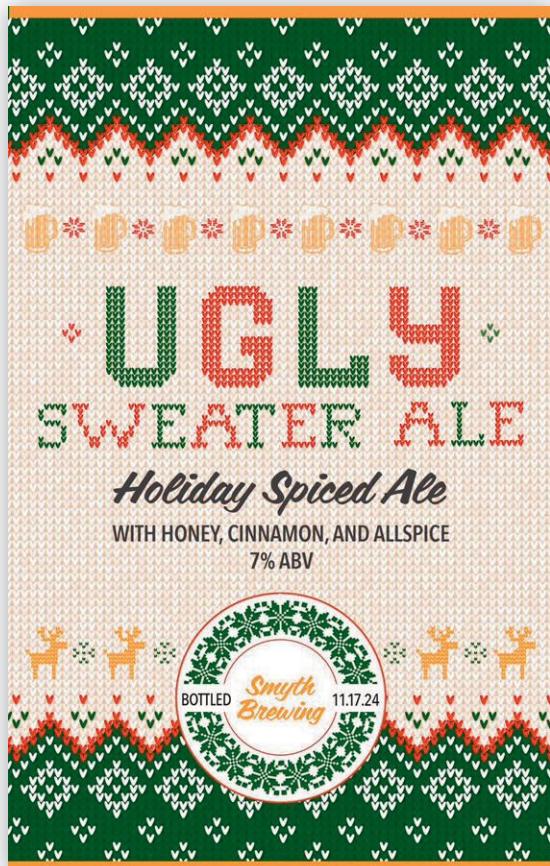
30 homebrewers from south Louisiana pooled resources to create a cooperative and purchase the store. By doing so, we ensured that Brewstock remains a fixture in the craft beer and homebrew scene. Our ownership group is comprised of members from four different homebrew clubs in the New Orleans area and Baton Rouge, as well as some local professional brewers.

Daniel Bryde
New Orleans, La.

Zymurgy editor-in-chief Amahl Turczyn responds: Hi Daniel, thanks so much for sharing this success story with Zymurgy readers. Craft and amateur brewery co-ops have been a fixture in many parts of the world for hundreds of years (see Zoigl Communal Brewing on page 50), but they are not so common in North America. It's great to know homebrewers are stepping up to not only save their local homebrew supply stores, but to support their local craft brewers in the process (and vice-versa). Kudos to all the clubs and craft brewers who made this rescue happen.

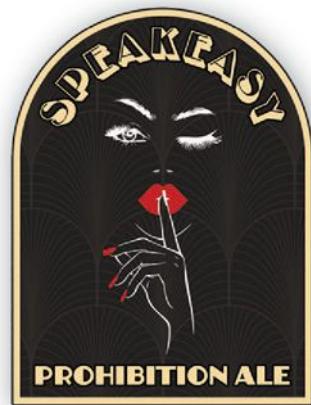
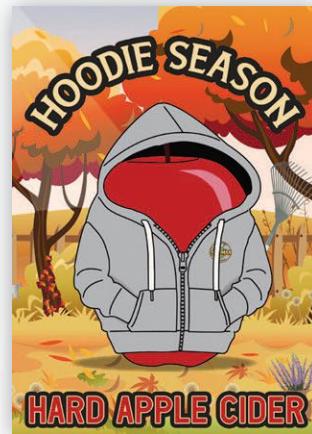
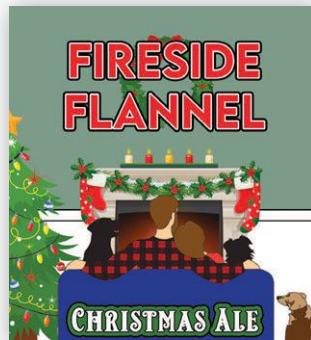
An advertisement for Oktober Can Seamer. On the left, a close-up photograph shows a can being sealed by the machine. The machine is a stainless steel unit with a black base and a silver upper assembly. The word "Oktober" is printed on the side of the base. On the right, there is a large, stylized script font "Oktober" above the words "CAN SEAMERS". Below this, in a larger, bold, sans-serif font, is "THE BENCH MK". Underneath that, in a smaller sans-serif font, is "AS RELIABLE AS YOUR DRILL." At the very bottom, in a large, bold, sans-serif font, is "EVERYTHING YOU NEED AT OKTOBERDESIGN.COM". The background of the ad is dark with blurred lights.

YOUR HOMEBREW LABELS



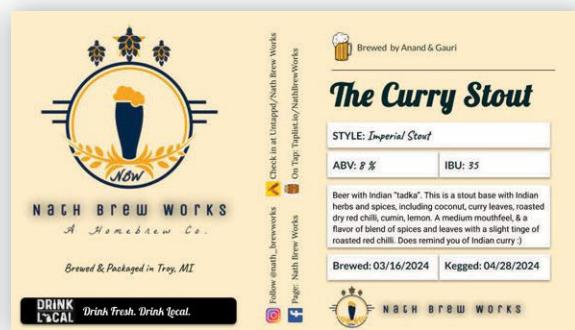
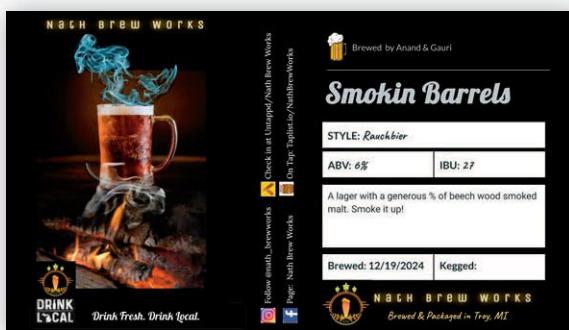
At the end of each year I hand out my holiday brews as gifts. This is the label for the 2024 batch, which my cousin graciously designed! (Homebrewer 8 years, AHA member 7 years)

Ben Smyth
Saint Louis, Mo.



(Homebrewer 7 years, AHA member 1 year)

Jared Silliman
Cooksville, Ill.



My bottles always have a label with my logo and my (home) brewery name. I love making them as much as I love brewing beer. My wife, Gauri, always helps me with the brewing day! (Homebrewer 3 years, AHA member 1 year)

Nitendra Nath | Troy, Mich.



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?

Upload your label to HomebrewersAssociation.org/your-homebrew-experience and we will take it into consideration!



YOUR HOMEBREW EXPERIENCE

Show us your labels, 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



Brew buddy Ginger, the golden doodle. She's always trying to find spilled wort to drink!

John Arnold
(Homebrewer 10 years, AHA member 8 years)
Del Mar, Calif.



The #BrewDawgs (Midas and Nesto) are in the BrewLab experimenting with a thiolized IPA that will finish around 9% ABV. If all of the numbers hit, they'll take me for a walk at the end of the brewday! They also love tearing through Zymurgy magazines!

Bryan Pietrzak
(Homebrewer 10 years, AHA member 7 years)
Twelvenote BrewLab
Stamford, Conn.



Zymurgy's gadgets inspire me to continuously innovate in my brewing hobby. An interest with antiques propelled me to restore a couple items I found at auction. Here is my 1914 candy scale which weighs up to 30 lb. of grain and a 1913 coffee grinder which mills grain at adjustable 0.002" increments.

Chuck Tomsovic
(Homebrewer 26 years, AHA member 10 years)
Society of Oshkosh Brewers (SOB)
Omro, Wis.



Our beer booth at a recent pouring event held at Southern Brewing in Tampa for an Epilepsy Foundation fundraiser.

Peter Terzian
(Homebrewer 10 years, AHA member 8 years)
Brandon Bootleggers
Brandon, Fla.



SHARE YOUR BEST HOMEBREWING SHOTS!

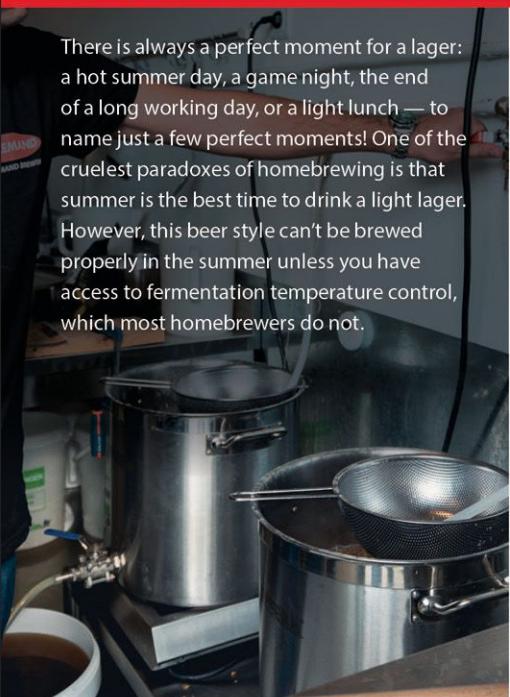
Homebrewing is all about fun and sharing. We would love to show others in the community what your homebrewing/fermentation experiences look like. Upload photos of your homebrew-related fun at HomebrewersAssociation.org/your-homebrew-experience and you may see it in the pages of Zymurgy!

SCAN ME



THE RIGHT YEAST FOR HOMEBREWING CLEAN LAGERS

There is always a perfect moment for a lager: a hot summer day, a game night, the end of a long working day, or a light lunch — to name just a few perfect moments! One of the cruelest paradoxes of homebrewing is that summer is the best time to drink a light lager. However, this beer style can't be brewed properly in the summer unless you have access to fermentation temperature control, which most homebrewers do not.



www.lallemandbrewing.com

What is Lager yeast?

A lager, by definition, needs to be brewed with lager yeast of the species *Saccharomyces pastorianus*. The *S. pastorianus* yeasts are hybrids of *S. cerevisiae* ale yeast with *S. eubayanus*, a cold-tolerant yeast species. The optimal fermentation temperature range for different types of lager yeasts is determined by genetics. Of the two traditional lager yeast lineages, Group I (Saaz) strains have more DNA from *S. eubayanus* and ferment at cooler temperatures (8 - 12°C), whereas Group II (Frohberg) strains have equal DNA from *S. eubayanus* and *S. cerevisiae* and ferment slightly warmer (10 - 15°C). A few years ago, yeast scientists used non-GMO breeding methods to select a novel lineage of lager yeasts. These Group III strains have a broader temperature tolerance because they have more DNA from *S. cerevisiae*. The first commercial Group III lager yeast is LalBrew NovaLager™, which has a wider optimal temperature range of 10 - 20°C.

Refreshing lagers brewed at home with LalBrew NovaLager™

The ability to ferment warmer with Type III strains is a huge benefit for homebrewers since no diacetyl rest is required. LalBrew NovaLager™ will not produce H₂S since it lacks a gene for sulfur metabolism. Furthermore, LalBrew NovaLager™ has a greater amount of *S. cerevisiae* DNA, meaning it efficiently uptakes valine from the wort and produces lower levels of diacetyl compared to traditional lager strains. Clean and neutral flavors are consistently reported when fermenting LalBrew NovaLager™ throughout the temperature range of 10 - 20°C. A few brewers have even pushed the limits above 25°C with great results.



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SOY SAUCE SECRETS

CREATE
THE ULTIMATE
UMAMI

By Gabe Toth

Soy sauce is an age-old ingredient, a culinary treasure that has spread across the globe on a millennia-long journey. Once a byproduct, it's grown into a whole catalog of variations, inspired the creation of other food products, and become an irreplaceable ingredient for avid cooks and chefs.

Harold McGee, in his encyclopedic work *On Food and Cooking*, writes that soy paste, a predecessor to miso, came to prominence in Chinese cooking around 200 CE. Rich, dark juices would collect at the tops of weighted vats of fermenting soy mash, and the liquid would, in time, supplant soy paste in prominence.

"Soy sauce began as a residue resulting when soy paste was made with excess liquid, but it became more popular than the paste, and by 1000 [CE] was prepared for its own sake," he observed.¹

After Buddhist monks brought these savory products to Japan sometime in the first millennium CE, wheat was added to the fermentation base, and the soy/wheat combination evolved into Japanese miso paste and *shoyu* soy sauce, eventually becoming an exotic ingredient that spread to Western tables by the 17th century as a part of the transcontinental spice trade. (According to Lea & Perrin's company lore, the inimitable character of soy sauce inspired the creation of Worcestershire sauce.)

Soy sauce comes in several styles and varieties, light and dark, using different ingredients and preparations of ingredients (including roasted grains for added depth of flavor in certain types). Many Chinese soy sauces and Japanese *tamari* are still made exclusively with soybeans, but the addition of wheat in Japanese *shoyu* lends sweetness, a slightly higher alcohol content, increased browning reactions from amino acids and sugars, and complexity from other fermentation activity.

The most important stylistic delineation, though, might be between soy sauce produced via acid protein hydrolysis and traditionally fermented soy sauce. When buying soy sauce, it's important to check the ingredients list.

Industrial soy sauce relies on modified soy protein—described as “hydrolyzed vegetable protein” on the label—as its base. This protein is broken down using hydrochloric acid and the dangerous pH of the solution is neutralized with an alka-

line addition such as carbonate, then the product is finished with caramel color, sugar, and salt.

This type of soy sauce takes just days to produce, but pales in comparison to the character of fermented soy sauce. By comparison, traditional soy sauce relies on a months-long fermentation using *koji*, or *Aspergillus oryzae* mold—a bountiful source of enzymes. *A. oryzae* is used for all sorts of products, including *sake*, *shochu*, *amazake*, and exogenous enzymes used in brewing and distilling. In *shoyu* production it's tapped to create proteases that break down proteins and starches in the soy/wheat substrate.

Soy sauce could be considered a form of indirect fermentation. The *koji* itself goes dormant in the salty, oxygen-poor fermentation environment used in soy sauce production, but the enzymes it already created—not microbes themselves, but byproducts of the *koji*'s growth—will act upon the soy/wheat mixture. There is further secondary activity as salt-tolerant yeasts and lactic acid bacteria act upon the liquid medium. (A batch of soy sauce that doesn't get mixed for a while can even let off a pungent whiff of ethanol once stirred.)

Salty and intensely savory, soy sauce is packed with amino acids because of the breakdown of proteins into their flavorful constituents and a complex medley of additional fermentation activity, with salt keeping any potential infections at bay.

“Several hundred aroma molecules have been identified in soy sauce, with roasty compounds (furanones and pyrazines), sweet maltol, and a number of meaty sulfur compounds among the more prominent,” McGee writes. “All in all, soy sauce is a concentrated, mouth-filling liquid, a versatile flavor enhancer for other foods.”²

MAKING HOMEMADE SOY SAUCE

This batch size is scaled to propagate the *koji* on a full-size restaurant sheet pan (about 18"x25"), but could be split between two home sheet pans, or cut in half.

Raw wheat is traditionally used for *shoyu*, but I like substituting malted Oland wheat from my local farm/malthouse, Root Shoot Malting. I think the added steps of germination and kilning create a more flavorful wheat going into—and therefore coming out of—fermentation. The malting process may also make the wheat starches more available for breakdown by *koji*, though this has not been tested empirically.

Realistically, *koji* could be inoculated onto any mix of legume and grain. *Shiro* (white) soy sauce, for example, is more wheat than soy. Experiment with increasing or decreasing water content for a more or less concentrated sauce.

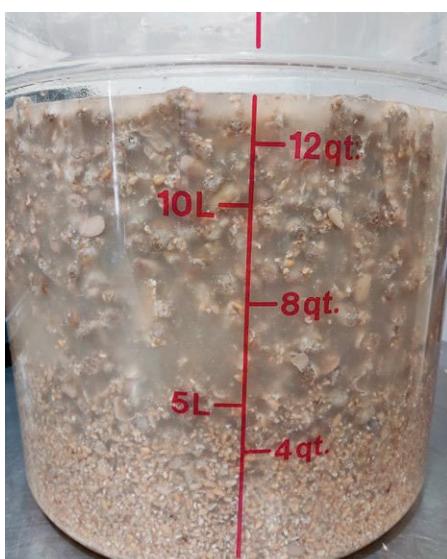
Ingredients

2 lb.	mature white soy beans
2 lb.	raw or malted wheat
6 g.	koji kin starter
635 g.	salt

Soak the soybeans overnight, at least 12 hours.

Once the cooked soybeans are cooled, mix in the *koji* and wheat so that they're evenly dispersed, and spread the mixture out on a large sheet pan.

After a day or two, the *koji* growth should be obvious on the soybeans, predominantly in the form of white fuzz.



Soak the soybeans overnight, at least 12 hours. Add water to keep them covered as necessary. The soybeans will at least double in size. Cook the soybeans by boiling them in water for about six hours or until tender, or steaming in a pressure cooker for an hour and a half. For the pressure-cooker method, place a steamer basket in the bottom of the pressure cooker, add a half-cup to a cup of water without bringing the water level high enough to cover the basket, and put beans in the basket. Cook on high pressure. Drain and cool soybeans after cooking.

While the soybeans are cooling, grind the wheat through a two-roller mill or in batches using a spice grinder or food processor. The grain doesn't have to be ground to a flour, but a grind similar to an all-grain mash—breaking each grain up into smaller pieces without pulverizing it—will make the starches accessible to the koji enzymes.

Once the soybeans are cooled, mix in the koji and wheat so that they're evenly dispersed, and spread the mixture out on a large sheet pan. Use your fingers to cut small rows in the mixture every few inches to increase surface area and help the mix vent excess fermentation heat.

Cover the sheet pan with foil and leave in a warm place, around 80–85°F (27–29°C), for two to three days. A spot near a home furnace or in the oven with the light on should keep the temperature roughly in range, but a heated mat con-

nected to a temperature controller with the probe in the soy-koji mixture would offer greater precision.

Check the mix a few times a day for overheating and stir it up to ensure an even, consistent propagation of koji on the beans. Break up any clumps that form, spread the mix out again with fresh rows, cover, and replace in the warm spot.

After a day or two, the koji growth should be obvious on the soybeans, predominantly in the form of white fuzz. A light yellow to light green colored mold is also acceptable. If any becomes contaminated with dark green to black growth, remove those sections. The soybeans are ready when the koji has fully covered them, though the home fermenter doesn't need to stress about small patches or pockets that lack white fuzz.

Dissolve the salt in 3 quarts (2.84 L) of water in a 2- to 3-gallon (7.5–11 L) container (such as a Cambro or similar plastic food storage container) and break up the soy-koji-wheat mixture before adding it to the brine. Mix the slurry and cover.

Ferment at room temperature. Continue to mix the shoyu slurry every day for the first couple of weeks, as the solids will separate to the top more during the beginning of fermentation. After the first two weeks, stirring can be reduced to once a week.

As the slurry ferments, the grain will hydrate and then begin to break down, and the water locked up in the soybeans will get released as they break down. The mix-

BREWERS PUBLICATIONS
Explore more exciting ways to ferment with Gabe Toth's book *The Fermentation Kitchen*. Buy yours at BrewersPublications.com

ture will slowly get thinner, and Maillard reactions will gradually darken it. (A clear container, allowing light to penetrate into the mixture, will hasten the process of creating the classic coloration for dark soy sauce.) Tasting the fermenting soy sauce periodically after stirring will help to gauge its progress.

Once the soy sauce has reached its desired flavor profile—after at least six months but ranging up to a year or longer, as desired—it can be separated out and finished. The slurry—much looser and more homogenized at this point—can be

Mix the shoyu slurry every day for the first couple of weeks.



Once the soy sauce has reached its desired flavor profile—after at least six months but ranging up to a year or longer, as desired—it can be separated out and finished.



Bottle.
Enjoy!



SANICLEAN NOW CLEAR

We've updated the look, but not the performance



ladled in batches into a large cotton mesh bag, nut milk bag, or drawstring hop bag, and then squeezed to filter out solids from the savory liquid.

The process should yield a little less than a gallon of soy sauce—possibly brown and hazy, depending on how vigorously you squeeze the bag of solids—and about three quarts of a fermented soy-wheat mash that can be used like miso. The soy sauce can sit another month or two to allow residual solids to settle to the bottom and float to the top (colonies of white mold might start forming on the brown layer that coalesces at the top of the soy sauce, but they can be skimmed off), then be strained through a coffee filter or fine-mesh cloth, or siphoned out from below the layer of solids into a pot to be pasteurized. Bring the soy sauce just up to a simmer to eliminate any continuing microbial or enzymatic activity and stabilize it. After that, let it cool, bottle, and enjoy!

REFERENCES

1. McGee, Harold. *On Food and Cooking: The Science and Lore of the Kitchen*. Revised and expanded edition. New York, Scribner, 2004, p.497
2. Ibid, p. 499

*Gabe Toth is a beer and spirits journalist who resides in northern Colorado. The former craft distiller and craft brewer is the author of *The Fermentation Kitchen: Recipes for the Craft Beer Lover's Pantry* from Brewers Publications®.*





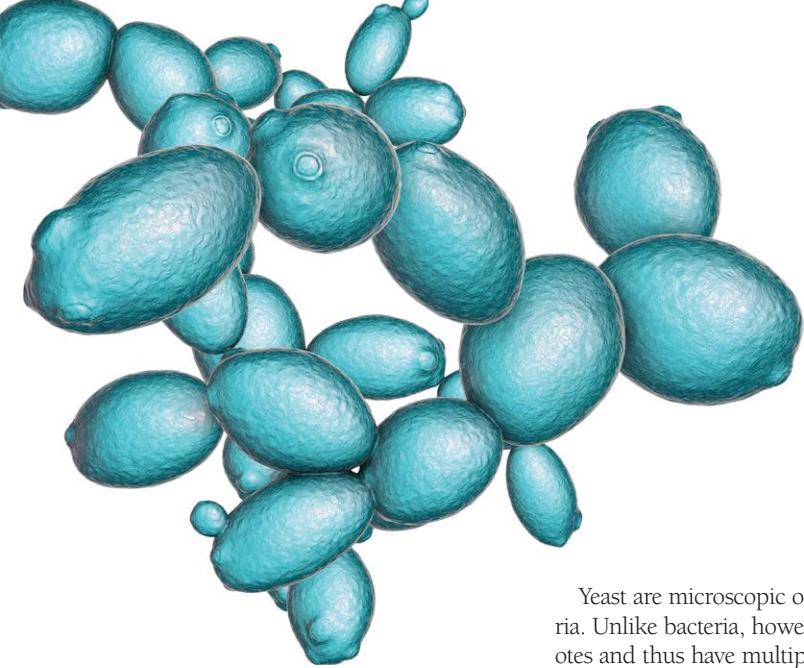
A BEAUTIFUL MUTATION THE ORIGIN OF LAGER YEAST

By Chris Colby

Fermentation was discovered by humans long ago—at least 9,000 years ago, probably in China. Since then people have fermented bread, wine, mead, and—of course—beer. However, until the last few hundred years, the basis of fermentation was unknown. In addition, until relatively recently, most human-conducted fermentations used *Saccharomyces cerevisiae*, what brewers called ale yeast. Lager fermentations—and the organisms that perform them—did not exist. Recent work by geneticists is clarifying why this is so.

MEET THE WORKHORSE

S. cerevisiae is a member of the kingdom Fungi, in the phylum Ascomycota. The 20 or so members of the *Saccharomyces* genus are single-celled, budding yeasts that would be easy to overlook except that two of them are of enormous economic importance—*S. cerevisiae* and *S. pastorianus* (lager yeast). (*S. cerevisiae* is also a model organism in genetics.) The rest of the species in the genus are wild, with no commercial uses. The wild species *S. paradoxus* is the closest known species to *S. cerevisiae*. →



For a long time, *S. cerevisiae* was only found near human developments. As such, it was thought not to exist in the wild. Later, however, it was found in locations with little human impact. In North America, for example, it can be found feeding on sugar from the sap in the bark of oak trees.

Once discovered, scientists found that wild populations of *S. cerevisiae* contain considerably more genetic variation than the cultured strains. This is almost certainly due to the continuous subsampling of ale yeast in breweries—a small amount of yeast is saved from one fermentation and used to start the next, and so on. As such, genetic variation is lost.

Yeast are microscopic organisms, like bacteria. Unlike bacteria, however, they are eukaryotes and thus have multiple linear chromosomes—like animals, plants, and protists. In contrast, bacteria usually have several copies of a single circular chromosome. *S. cerevisiae* is a diploid species, meaning it contains two complete sets of its 16 chromosomes. In the brewing environment, *S. cerevisiae* reproduces asexually by budding. However, in times of stress it can reproduce sexually.

For most of the history of human-run fermentations, *S. cerevisiae* has been the workhorse. There are other odd strains of yeast used for certain fermentations, but their numbers were dwarfed by the number of *S. cerevisiae*-mediated fermentations.

THE NEW GUY

At some point, perhaps as early as the 1400s, a new type of fermentation emerged. Brewers in Bavaria began brewing beers

that fermented at cooler temperatures than before. Whenever the origin, colder fermentations were common by 1600. The differences between the two types of fermentation are marked. Ales generally ferment in the temperature range of 65–72°F (18–22°C). In contrast, lager fermentations are generally conducted in the 50–58°F (10–14°C) range. Lager fermentations are slower to start and take longer to complete than ale fermentations of comparable starting gravities. They often produce copious amounts of hydrogen sulfide, unlike ale fermentations. Finished, cold-conditioned (lagered) lager beers are frequently described as being “cleaner” than ales, as they lack the ester compounds often encountered in ales.

Around the mid-17th century, brewers from the original Hofbräuhaus in Munich put a culture from the beer they were fermenting on a stagecoach and sent it to the Carlsberg Research Laboratory in Copenhagen, Denmark. Then in 1883, Emil Christian Hansen, a scientist in the lab, isolated a pure strain of lager yeast from the Hofbräuhaus culture. He originally designated it *Unterhefe* No. 1. The new type of lager fermentation was conducted by an organism other than *S. cerevisiae* (although that was not immediately obvious).

We now call the yeast for lager fermentations *S. pastorianus*. Lager yeasts are often categorized into two groups. Group I yeasts are collectively called the Saaz type. This is the yeast isolated by Hansen. Interestingly, it is still used by Carlsberg and some breweries in Bavaria. Group I yeasts are better able to ferment at low temperatures than Group II yeasts.

Due to their fermentation characteristics, Group II yeasts are used much more widely today, especially at larger breweries. These yeasts are called the Frohberg type. They were first isolated by Hartog Elion at Heineken, three years after Hansen isolated the first lager yeast. Frohberg yeasts include the Weihenstephan WS 34/70 strain. A few biologists classify the Saaz-type yeasts as *S. carlsbergensis*, reserving the name *S. pastorianus* for the Frohberg type. (In this article, I'll follow the general convention and use *S. pastorianus* to refer to any lager yeast, specifying Group I or II if a distinction is required.)

PROBABLE ORIGINS

S. pastorianus is not found in nature. So where did it come from? Scientists have known since the 1980s that lager yeast was a hybrid, an organism resulting from the mating of two different strains or species.



Group I lager yeasts are triploid, meaning they have three sets of chromosomes. This suggests they inherited two sets of chromosomes from one yeast strain and one set of chromosomes from another. Group II lager yeasts are tetraploid, containing four sets. This could have resulted from a hybridization of two diploid species, or a more complex series of hybrids. New species emerging through hybridization is a fairly common occurrence in plants, but it's significantly more rare in animals. Fungi are less well studied, and scientists are unsure how often it happens in that group.

Differences between the two lager yeast types strongly suggest that these two groups are the result of two separate hybridization events. And evidence strongly suggests they occurred within a brewery.

THE LIST OF SUSPECTS

Early DNA sequencing studies found many sequences within *S. pastorianus* with a high degree of similarity to *S. cerevisiae*. This was expected, since both yeast strains are used to make beer. However, scientists found other DNA sequences in *S. pastorianus* that clearly fell into the *Saccharomyces* genus, but did not belong to any known species. At first, it was thought that perhaps the sequences were derived from *S. uvarum* or *S. bayanus*. *S. uvarum* yeast is sometimes found as a contaminant, especially in lager and other “cold” fermentations. It was once considered a sub-strain of *S. bayanus*, which is sometimes employed in strong wine fermentations, but this was later ruled out. Scientists knew the sequences must have come from a closely related yeast strain, but at the time, no other species of *Saccharomyces* had been isolated whose DNA matched. Since lager fermentations occur at lower temperatures, scientists believed the missing *Saccharomyces* species would be a yeast adapted to cooler climates—cryotolerant, in the lingo.

Then, in 2011, researchers found a species with a match for the cryotolerant component of *S. pastorianus* in the South American region of Patagonia. Scientists from Argentina and the U.S. discovered two strains of yeast living on Southern Beech trees (from the genus *Nothofagus*). One was associated with two different species of beech (*N. antartica* and *N. pumilio*) and one was associated with a third species of beech (*N. dombeyi*). The two yeast species did not appear to be interbreeding.

The species associated with *N. dombeyi* was found to have sequences very similar to *S. uvarum*. When the researchers compared

“

Lager yeast was created in a brewery very recently in human history and continues to reside only in breweries.

the DNA of the second yeast to the non-*S. cerevisiae*-derived sequences of *S. pastorianus*, they were highly similar. The missing species of yeast had been found. This new yeast showed some sequence similarity to *S. bayanus*, so scientists proposed that the new species be called *S. eubayanus*.

So, the DNA sequences matched, but the geography was perplexing. How did a yeast from South America hybridize with ale yeast from Europe? At the time, scientists hypothesized that this wild yeast from Patagonia contaminated a European brewery in the 15th century. Europe traded with



South America at the time, so items made of beechwood carrying *S. eubayanus* may have shuttled the yeast there. This diploid yeast (*S. eubayanus*) hybridized with an ale strain of *S. cerevisiae* (also diploid), producing the tetraploid ancestor of modern lager yeasts. This combination of a proven beer fermenter and a species that thrived in colder climates was selected accidentally as brewers cold-aged their beer. But later discoveries were to overturn this idea.

Further searching revealed that *S. eubayanus* was relatively rare but could be found outside of Patagonia. Populations were found in Tibet, North America (Wisconsin), and later, Ireland. Ireland is, of course, closer to Germany, where the hybridization most likely occurred. Scientists also found that there are two subpopulations of *S. eubayanus*, belonging to different lineages. Southern populations of the yeast had much more genetic diversity than northern populations. And the sequences of the northern strains matched the *S. pastorianus* sequences more closely than southern strains.

THE MOMENT(S)

It wasn't until the late 1880s that brewers started using cultured yeast of a single strain. Early Bavarian lager brewers were fermenting with a mixed culture which probably contained a reasonably cold-tolerant strain of *S. cerevisiae* and *S. eubayanus* as a separate organism. Thus an ale yeast

could have hybridized with *S. eubayanus* to produce a strain that shared the cryotolerance of *S. eubayanus* with the fermentative capabilities of *S. cerevisiae*. Brewers would have noticed that some cold fermentations worked better than others and saved yeast from those fermentations, increasing the amount of the new hybrid yeast in the mixed cultures of brewer's yeast.

If a lager fermentation in which *S. eubayanus* was present was contaminated with ale yeast, where did the ale yeast come from? The *cerevisiae* strain being used is an obvious choice. However, one group of researchers believe the hybridization occurred in Munich's Hofbräuhaus between 1602 and 1615, a period when both lager beer and wheat beer were being produced in the same brewery. These authors went on to hypothesize that the ale yeast strain that hybridized with *S. eubayanus* was an outside ale strain. Evidence suggests it might have originated from the Schwarzach wheat beer brewery or from the city of Einbeck. This hypothesis is interesting in that it is consistent with both the genetic evidence and the historical evidence. However, it leaves unresolved the question of whether both hybridizations occurred in this brewery, or just one of them.

It was the Group I yeast that Hansen found in the culture from Hofbräuhaus. Relatively recent studies have shown that the *S. cerevisiae*-like sequences in the Saaz

and Frohberg types differ, most likely because they came from different strains of ale yeast. Some scientists studying lager yeast believe that the *S. eubayanus* and *S. cerevisiae* hybridization only occurred once and the difference in the *S. cerevisiae*-like sequences is due to subsequent evolution.

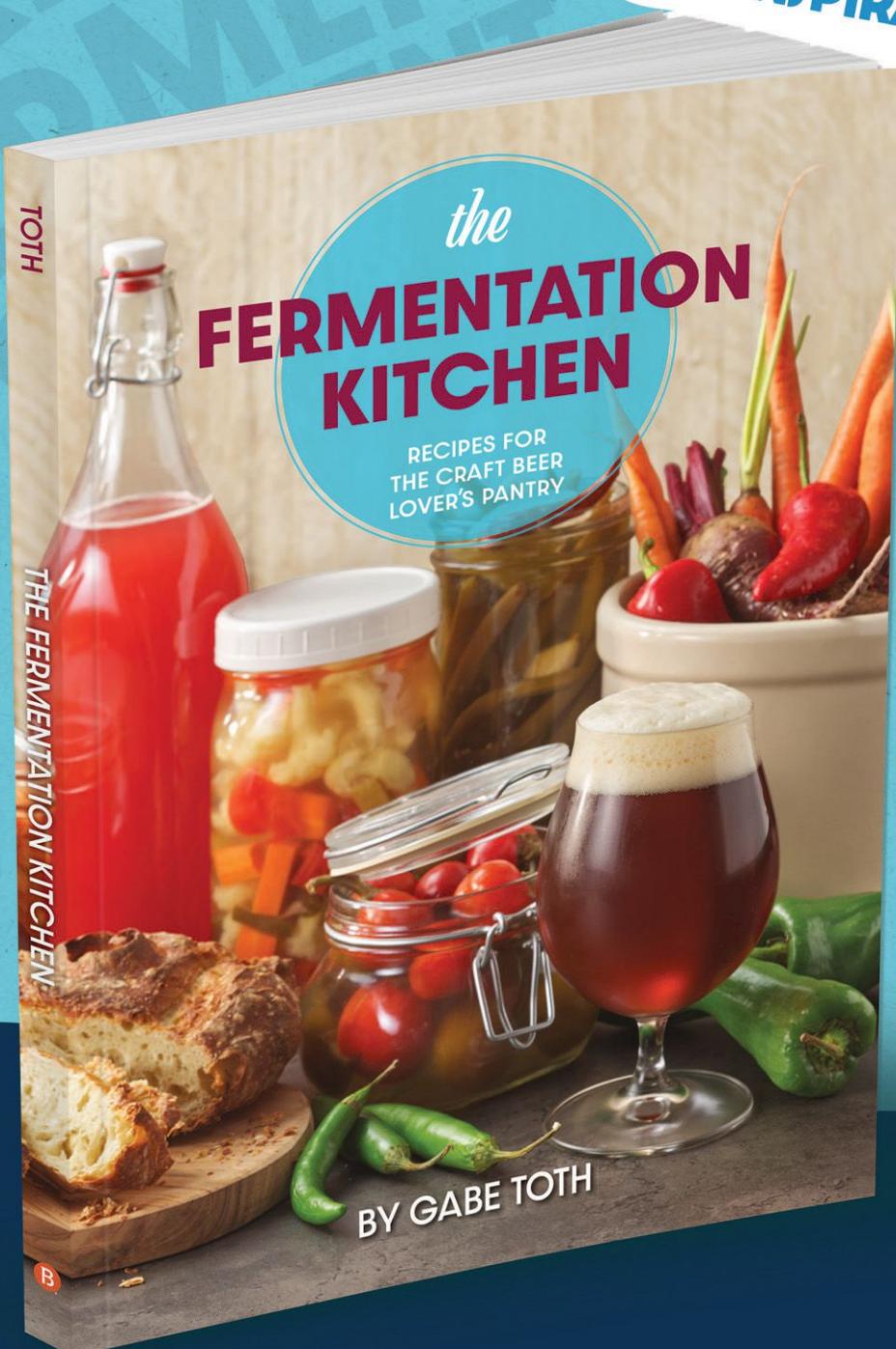
Taken as a whole, these findings indicate that *S. eubayanus* has hybridized twice with two different strains of *S. cerevisiae* to form the two groups of lager yeast. Interestingly, *S. eubayanus* has also hybridized with *S. uvarum* and *S. cerevisiae* to form *S. bayanus*. This would seem to indicate that this species is prone to hybridizations with other *Saccharomyces* yeasts. And in fact, scientists have recently made new *S. eubayanus* and *S. cerevisiae* hybrids and tested their fermentation capabilities in an attempt to create lager strains with better fermentation characteristics. This is an active avenue of research and, although the exact details of the story will likely change, a few things seem well supported. *S. pastorianus* is a hybrid of *S. cerevisiae* and *S. eubayanus*, and there are two groups of lager yeast. Genetic and historical evidence strongly point to a strain of *S. cerevisiae* from Einbeck being introduced to a mixed slurry, low-temperature fermentation at the Hofbräuhaus (Bavaria), resulting in a hybridization with *S. eubayanus* that produced a strain of *S. pastorianus*, most likely a Group I lager yeast (but that's less certain). Other lines of evidence, weaker and not outlined here, point to a separate hybridization event earlier in Bohemia that produced another strain of *S. pastorianus*. Given that breweries at the time used mixed cultures and yeast slurries were passed from brewery to brewery, pinpointing the exact origin (and subsequent spread) of both types of lager yeasts is not possible. It's also possible that other lager yeast strains resulted from other hybridization events, but have been lost over time.

One thing is certain: *S. pastorianus* continues to exist only in breweries. Research on this important organism continues.

Chris Colby has been a homebrewer since the early '90s, when he studied molecular evolutionary genetics at Boston University. After receiving his PhD in 1997, he briefly worked in educational publishing before becoming a beer writer and editor. He is the author of Methods of Modern Homebrewing (2017), Home Brew Recipe Bible (2016), and the Brewers Publications® title How to Make Hard Seltzer: Refreshing Recipes for Sparkling Libations (September 2020). He lives in Bastrop, Texas, with his wife and many cats.



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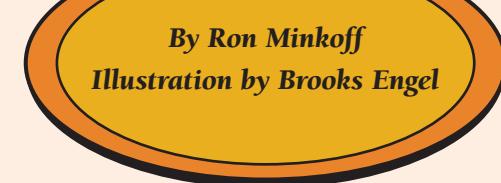




BATS IN THE BEER GARDEN

By Ron Minkoff

Illustration by Brooks Engel



YOU LIKE BATS?

DO YOU LIKE POURING HOMEBREW FOR PEOPLE WHO ARE FANS OF BATS?

The Hogtown Brewers homebrew club down in Gainesville, Fla. goes batty each October for the opportunity to show off their brewing chops to bat fans and help raise funds for a unique nonprofit organization in their area: the Lubee Bat Conservancy. The story of how this evolved could be a guide to how other homebrew clubs can help a local nonprofit they favor raise some extra cha-ching.

Philanthropy is your homebrewing superpower!



LUBEE BAT CONSERVANCY

Lubee's mission is to save bats and their habitats through conservation, education, and community engagement. Lubee was founded in 1989 by Luis F. Bacardi. Does that last name sound familiar? Yes, it's the same Bacardi family associated with that bottle of rum bearing the bat logo that may be in your liquor cabinet! With over 200 bats housed on-site, Lubee specializes in bat care, husbandry, and medical management. Lubee proudly proclaims they are the "ONLY organization in the world that houses endangered bats while maintaining active conservation and education programs."

These days the captain who steers the Lubee ship is Brian Pope. Pope, who has a BSc in Biology, previously worked as an animal care specialist at the Pittsburgh Zoo and Disney's Animal Kingdom for 11 years. He joined Lubee full time in 2007, becoming the director in 2011. Pope also happens

to be a craft beer fan (yes, we just sprinkled some foreshadowing there).

You may be amused to hear that from 1995 to 1999 Walt Disney World housed some of their animals at Lubee (including giraffes, kangaroos, white rhinos, Malayan tapirs, and other species) while Animal Kingdom was being built in Orlando, Fla. Today, the bats that reside at Animal Kingdom are on loan from Lubee.

For those who are curious: no, bats are not blind; all bats can see. While bats can carry rabies and spread it to humans, most bats are healthy—fewer than 1% carry the virus. And yes, vampire bats are a thing. Of the nearly 1,500 bat species, only three are vampire bats. (I think my cat thinks he's a vampire bat.)

Perhaps your own home has an amazing man/woman cave, but you decided your domicile is not quite complete without its own bat house. That's another area where Lubee shines! Bat houses are great for providing bats with an alternative roosting site, and they return the favor by helping to control insects in your area. Lubee builds



and installs about 20 to 25 houses each year and has done so throughout Florida and Georgia. Proceeds go towards conservation and education programs.

One of the other major ways Lubee raises funds for its programs is by putting on an annual bat festival. The Lubee Bat Festival just celebrated its 20th year in 2024. When the festival initially started it was held at the local Florida Museum of Natural History where only about 60 people attended. Since then, the festival has moved to the actual site of the conservancy where it sits on 40 acres and between 4,000 and 5,000 bat fans now attend.

To foster that growth, the festival added many bells and whistles such as the addition of a kids' zone, live music, more vendors, merchandise, new toys for the bats, new education centers, games and interactive displays, as well as opening an area called the Oak Hollow where guests can relax in the shade of 250-year-old live oaks. But you know what can make a good thing great? Beer! And you know what can make a great thing spectacular? Homebrew!

BATS GET A BEER GARDEN

Lubee attracts a following during the normal course of their day by hosting tours and other educational sessions. A number of Hogtown club members have interacted with Lubee and were impressed with what they saw. Impressed enough that, starting in 2016, the club included Lubee as one of their charity partners for the Hogtown Brewers' own craft beer festival (which started in 2012). As of 2024, that festival currently has a lifetime donation to all of its charity partners of \$274,000 and counting.

Brewing mead, bats, and a mural at Lubee Bat Conservancy.



Photos courtesy of Lubee Bat Conservancy and Ron Minkoff

TODAY THE BEER GARDEN HOSTS ALMOST 800 PATRONS AND GENERATES 30 TO 34% OF THE TOTAL FUNDS RAISED AT THE BAT FESTIVAL!

In the latter half of 2016, one of our club members, Craig Birkmaier, proposed the idea of upgrading the Lubee Bat Festival with a beer garden where local breweries would donate their beer stash and pour for an adoring audience of bat and beer fans to raise additional funds for Lubee. In other words, a mini-beer festival within a festival. Pope, a craft beer aficionado as stated, was open to giving it a shot. But how would that actually work?

It was decided that the beer garden would be an added tier to the ticket sale. Patrons can buy regular tickets for access to the general festival. They can then also purchase an add-on ticket that provides a wristband and sample glass that grants them access to samples in the beer garden area. The general festival patrons are not restricted from the beer garden, but without a wristband and glass, they cannot get samples. However, a patron could choose to quickly purchase an add-on ticket during the festival if that beer garden looked enticing to them!

Aside from ticket sales, the regular minutiae of putting on a mini-beer festival had to be dealt with, including brewery recruitment, glassware, wristband procurement, etc. This is where the Hogtown



Counterclockwise from below: Entrance to the beer garden; Garden vendor and sponsor sign; Clubs in attendance.





Brewers were able to shine thanks to their experience with their own craft beer festival. Birkmaier and his Hogtown helpers led the effort in the initial years to bring in the breweries, arrange the layout of the garden, and set up a check-in system for the patrons.

The beer garden had moderate success in the first few years with 100 to 200 patrons sampling in the garden. Today the beer garden hosts almost 800 patrons and generates 30 to 34% of the total funds raised at the bat festival!

HOMEBREW GETS IN ON THE ACTION

These days, Lubee can take care of most of the beer garden chores now that they've got their rhythm, and Hogtown happily continues to assist Lubee to get the beer garden ready for game day. But when it comes to beer pouring, the brewers in Hogtown don't sit on the sidelines. We carve out our own spot on the playing field with a couple of tents typically featuring 12 to 15 delightful homebrewed beers, meads and ciders, as well as timed, special tappings. This is where homebrew clubs steal the spotlight.

Whereas commercial beer tents tend to have two to five offerings at your typical beer festival (and don't always last until the end of the event), homebrew clubs often offer an amazing variety that attracts a lot of the patrons' attention. Homebrew clubs also tend to have enough homebrew ammo to outlast most of the commercial beer tents and make it until last call. This doesn't go unnoticed.

Having one homebrew club in the beer garden is spectacular, but more is better. For Lubee Bat Festival's 20th year we invited neighboring clubs, including the Daytona Beach Brew Club, Jacksonville Ale eXchange, and the Ocala Brick City Brewers to join, show off their own homebrewing chops, and help elevate the beer garden experience. No surprise the patrons responded by flocking to tents that had the biggest variety of beers on tap.

Teaming up with fellow brewers and neighboring clubs that work together to brew and pour for a good cause generates all kinds of goodwill and gives you quite the dopamine hit when patrons get surprisingly delighted after trying something you poured that they've never had before. Especially when they bug you and ask

Hogtown Brewers festival tent;
Brewing a mead with interested bees.



where they can buy a bottle to take home (and you explain that that won't happen... because it's homebrew).

One of the brewers in the Daytona Beach Homebrew Club, David Castello, sent a post to his club afterwards and summed up the experience nicely: "Everyone in the club should realize that we are making a difference by choosing to support charitable events. It's amazing what 15 to 20 gallons of beer can do to support an event. Charity through beer!"

THE HOMEBREW BUMP

Lubee Bat Conservancy is not the only nonprofit Hogtown has helped with the creation of a fundraising mini-beer festival. We've also provided consultation to the Santa Fe College Teaching Zoo that helped them establish their "Brew at the Zoo" event, which raises funds to support the zoo and their mission to educate, inspire, and secure a future for wildlife. Hogtown also does its own homebrew mini festival of sorts by teaming with a nonprofit (usually with the North Central Florida Humane Society) to put on a beer/food pairing that raises close to \$4,000 for the nonprofit. The details of how to put on the beer/food pairing were described in the May/June 2020 issue of Zymurgy ("Eat This, Drink That") so any homebrew club could use that as a guide for their own event.

Homebrew clubs are in a great position to make a difference. They have homebrew to attract a crowd, and more importantly, people in numbers to contribute labor, ideas, connections, enthusiasm, the whole package. Whether it's a beer fest, beer/food pairing, beer run, or other spectacular brew-related idea, pick a favored nonprofit in your area to elevate its fundraising and give it the homebrew bump. That's your homebrew superpower!

Ron Minkoff has been brewing in the comfort of his driveway since 2003. He is a past president of the Hogtown Brewers, a BJCP certified beer & mead judge, and pet owner of a tabby named Dexter, because the kitty frequently likes to draw blood! 🍻



Counterclockwise from below: Lubee sample glass; More brewing onsite; JAX Homebrewing Club of Northeast Fla.; Another mural at the Lubee Bat Conservancy.



LET'S NOT CALL IT POO BREW



THE REBREW WASTEWATER CHALLENGE

By Chris Stovall

ReBrew sample glass.

Tall started five years ago when I received a call from beer writer/travel guru/BJCP judge Owen Ogletree. He asked if the Savannah Brewers League Homebrew Club might be interested in helping with a homebrew competition at the annual conference for the Georgia Association of Water Professionals (GAWP) that takes place every year in Savannah, Ga. Ogletree was friends with the then-Reuse Committee chair Marilyn Hall, who had hatched the ReBrew homebrew competition and beer festival idea right after their 2019 conference.

The catch? All the homebrew would be made with reuse water from a local wastewater treatment plant. Being a water engineer myself (and having already made my own “poo brew” with water from various reclamation facilities I had designed), I was immediately intrigued, but knew there would be many logistical issues in getting something like this completed. Little did I know how many setbacks and pitfalls we would encounter, or the fact that finally reaching the finish line would take five years! →

Photos courtesy of Chris Stovall, John Wilson, and Meredith Burns



WATER SCARCITY

Long-term challenges to our water supply are expected to increase over time in the Southeastern region of the U.S. as a result of drought, growing demand, and other stressors.

Developing alternatives to providing a potable water supply to homes, farms, and industries will become more and more critical over the coming decades. One of those alternatives is developing potable water from other sources.

The brewing industry is water-intensive, using an average of six gallons of water to produce one gallon of beer. A number of breweries have taken on the task of treating their process water to drastically reduce the amount of “fresh” water needed for operations (Lagunitas, Carlsberg, and others) and also to use those process byproducts (e.g., methane) as energy sources to boil wort, for example. A number of breweries have made one-off demonstration beers that used “reused” water, so ReBrew was not a first-of-its-kind idea, but a continuation of the GAWP’s educational goals.

"TOILET TO TAP"

Reuse of treated municipal wastewater has been explored for irrigation, industrial processes, cooling, and even drinking water. Across the U.S., water utilities take great care to prevent pollution and provide safe drinking water to the public through the

aid of advanced technologies. This ensures wastewater has been treated adequately to meet or exceed drinking water standards. Many drinking water systems in the metropolitan Atlanta area already rely on water treatment technologies that support reuse of water in various applications.

Even though the science around reuse of wastewater effluent is settled, the psychological “ick factor” hurdle is just too much for some people to overcome.

To address that mental block, the GAWP teamed up with the Savannah Brewers League to plan a homebrew competition and beer festival that would promote the use of wastewater treated to high-quality drinking water standards.

Another key player in this collaboration was The Water Tower, a Georgia nonprofit organization and research facility with the goal to bring public and private sectors together to tackle the water industry's greatest challenges. Working with a local water reclamation facility that already treated water to urban reuse standards (e.g., irrigation, cooling water, and other non-potable uses), they would run that treated effluent through a pilot treatment system that used ozonation, biofiltration, and final chlorination to produce water that met drinking water standards.

The plan was to ship this water to Savannah, where homebrew club members could pick it up and brew with it. Atlanta's

drinking water supply is akin to that of Pilsen, Czech Republic's—blessed with high softness and little mineral content, making it a great base water. The reuse water would be similar. Style-specific water profiles could easily be created with salt additions as needed.

BACK TO THE FUTURE

So, back to 2019. I joined the GAWP Reuse Committee and we began a large effort to have the event take place in the summer of 2020. Improved state and local water guidance was needed, sponsors had to be obtained, sample glasses needed to be ordered, a locale needed to be reserved, and most importantly, we had to get the brewing water. The pilot water treatment system mentioned above was at that time in place for a treatment study, which was perfect timing for the event if all the other pieces were to fall into place.

By March, the water was ready to be shipped (who in our group has a one-ton truck available?) and things were coming together. Then...COVID. The entire conference was cancelled. 2021 was also cancelled as an onsite event as the pandemic continued. In 2022, events were back but mostly as reduced/partial in-person, so again we waited. Finally, in 2023, we were ready to get things back on track. The pilot unit had been mothballed but The Water Tower determined they could get it

ReBrew in full gear.



Service Brewing owner Kevin Ryan (center).





back online and operate it to provide the brewing water. Melissa Meeker with The Water Tower would then personally ship the water to Savannah in May 2023. At the time, however, the Savannah Convention Center was undergoing a large renovation, which was creating issues for GAWP staff. To reduce stress on everyone, we decided to once again delay for a year.

So 300 gallons of water had already been delivered to Savannah. The options were to start up the pilot unit again, test, and deliver it a second time, or to maintain the existing water—however, after sitting for a year, there was concern about its quality. We decided to test the delivered water...and it came back excellent except for trihalomethanes (THMs), which are formed from a combination of organics and chlorine over a long time period (we had been adding pool chlorine to maintain it all year). Luckily, THMs are volatile, so they boil off in roughly three minutes. A “NO no-boil batches” edict went out to the brewers. All would do at least 60-minute boils. And just to be on the safe side, we added a granular activated carbon (GAC) filter to the feed line when brewers came to get their water.



Mexican Lager

International Pale Lager

People's Choice Award Winner, ReBrew Challenge

Recipe courtesy of
Chris Martin and Jonathan Eckles

Batch volume: 10 U.S. gal [37.9 L]

Original gravity: 1.053 [13°P]

Final gravity: 1.014 [3.5°P]

Color: 2.6 SRM

Efficiency: 74%

Bitterness: 16.6 IBU

Alcohol: 5.1% by volume

MALT

10 lb.	[4.54 kg] U.S. 2-row malt
6 lb.	[2.72 kg] U.S. flaked corn
2 lb.	[0.9 kg] U.S. Pilsner malt
1 lb.	[454 g] U.S. Vienna malt

HOPS

2 oz.	[57 g] Crystal, 4.5% a.a @ 60 min
1 oz.	[28 g] Cashmere @ flameout

YEAST

2 packs LalBrew NovaLager lager yeast

BREWING NOTES

Add 5 grams of gypsum, 2 grams of calcium chloride, and 50 ml of 10% phosphoric acid to the Reuse water. Mash corn at 130°F [54°C] for 15 minutes. Mash all grains at 155°F [68°C] for 60 minutes. Boil 60 minutes. Ferment at 59°F [15°C].

We've had great support from the local pro beer community in Savannah. Coastal Empire Beer Co. was gracious enough to store our reuse water for an extended period. In 2019, we had planned to hold the ReBrew Challenge at Service Brewing, but then needed to replan the whole event after the long hiatus. The Savannah Brewers League had been meeting at another local brewpub, Moon River Brewing Co., for more than 20 years. Owner John "Pink" Pinkerton, who is passionate about environmental causes, said, "hold it here." We agreed, but then, unfortunately, three weeks before the event, Pink informed me that he was going to have to close permanently due to financial issues.

This was, of course, another huge blow to our plans. My first call was to Kevin Ryan at Service Brewing to once again request that we hold the event there. Ryan, a former U.S. Army Captain who stresses "service" in everything they do at the brewery, didn't hesitate, and the event was saved.

DAY OF FOLLIES

I gave a technical talk with another Reuse Committee member, Michael Watts, at the conference in the early afternoon prior to the fest. Once we were done,

I dashed to my truck to help with setup—the SBL folks already had it all handled, and everything looked great. However, at 5:00 p.m., 30 minutes before the start, the Reuse Committee chair, Tammy Hill, received an alert that the river ferry system and all other river traffic were shut down due to a drowning incident in the Savannah River (the convention center is located on an island across from downtown and all the hotels, so most people used public transportation to get from one side to the other). The GAWP and Convention staff worked hurriedly to transport people across the river on trolleys. In the end, the turnout was fantastic and great beer was served to the 150+ thirsty attendees. The Savannah Brewers League made 10 batches of summer beers spanning from pale lagers to wheats to farmhouse styles. Both a People's Choice Award and a BJCP To-Style Award were given out.

The event took five years and literally hundreds of steadfast and undeterred folks (homebrewers, pro brewers, GAWP staff, and volunteers) to pull it off. Thanks to all who kept their eyes on the mission and who care deeply about sharing their sustainability passions with other beer lovers.

Chris Stovall has been homebrewing since 1996 and is a National BJCP judge. In his non-brewing time, he is senior environmental group leader at Thomas & Hutton Engineering, and now lives in Cumming, Ga., after 25 years in Savannah.



Hefe-Weissbier

BJCP To-Style Award Winner, ReBrew Challenge
Recipe courtesy of Chris Stovall

Batch volume: 8 U.S. gal (30.3 L)

Original gravity: 1.052 (12.7°P)

Final gravity: 1.014 (3.5°P)

Color: 4.1 SRM

Efficiency: 75%

Bitterness: 11.8 IBU

Alcohol: 5% by volume

MALT

7 lb. [3.18 kg] pale wheat malt

5 lb. [2.27 kg] U.S. 2-row malt

1 lb. [454 g] light dry malt extract

1 lb. [454 g] light dry wheat malt extract

HOPS

0.6 oz. [17 g] Sterling, 8.4% a.a @ 60 min

YEAST

1 pack LalBrew Munich Classic ale

½ pack SafAle WB-06 Wheat Beer Dry ale

BREWING NOTES

Dry extract used due to limited mash tun space. Mash at 152°F [67°C]. Add lactic acid to obtain 5.3 pH in mash. Boil 60 minutes. Collect 6.5 gal. [24.6 L] @ 1.069. Rack 3 gal. [11.4 L] to two carboys, adding 1 gal. [3.8 L] distilled water to each for an original gravity of 1.052 (12.7°P). [Use Reuse water for all remaining water, as-is.] Pitch the 2 blended yeast strains, half each into the two separate carboys. Ferment at 62°F [17°C] for 2 days, then at 68°F [20°C] for 10 days.

TABLE I: WATER QUALITY OF BREWING CITIES & REUSE WATER

City	Ca	So ₄	Mg	Na	Co ₃	Cl
Atlanta	7	8	1	3	10	7.3
Burton	268	638	62	54	200	36
Dortmund	225	120	40	60	180	60
Dublin	118	54	4	12	319	19
Savannah ground	32	2.6	5.8	9	62	5
Savannah surface	14	27.6	2.3	7.4	67	11.8
London	52	77	16	99	156	7.8
Munich	76	10	18	2	152	2
Pilsen	7	5	2	2	14	5
St. Louis	25	100	16	38	23	9.3
Vienna	200	125	60	8	120	2
Reuse Water	10	<10	3	18	20	15

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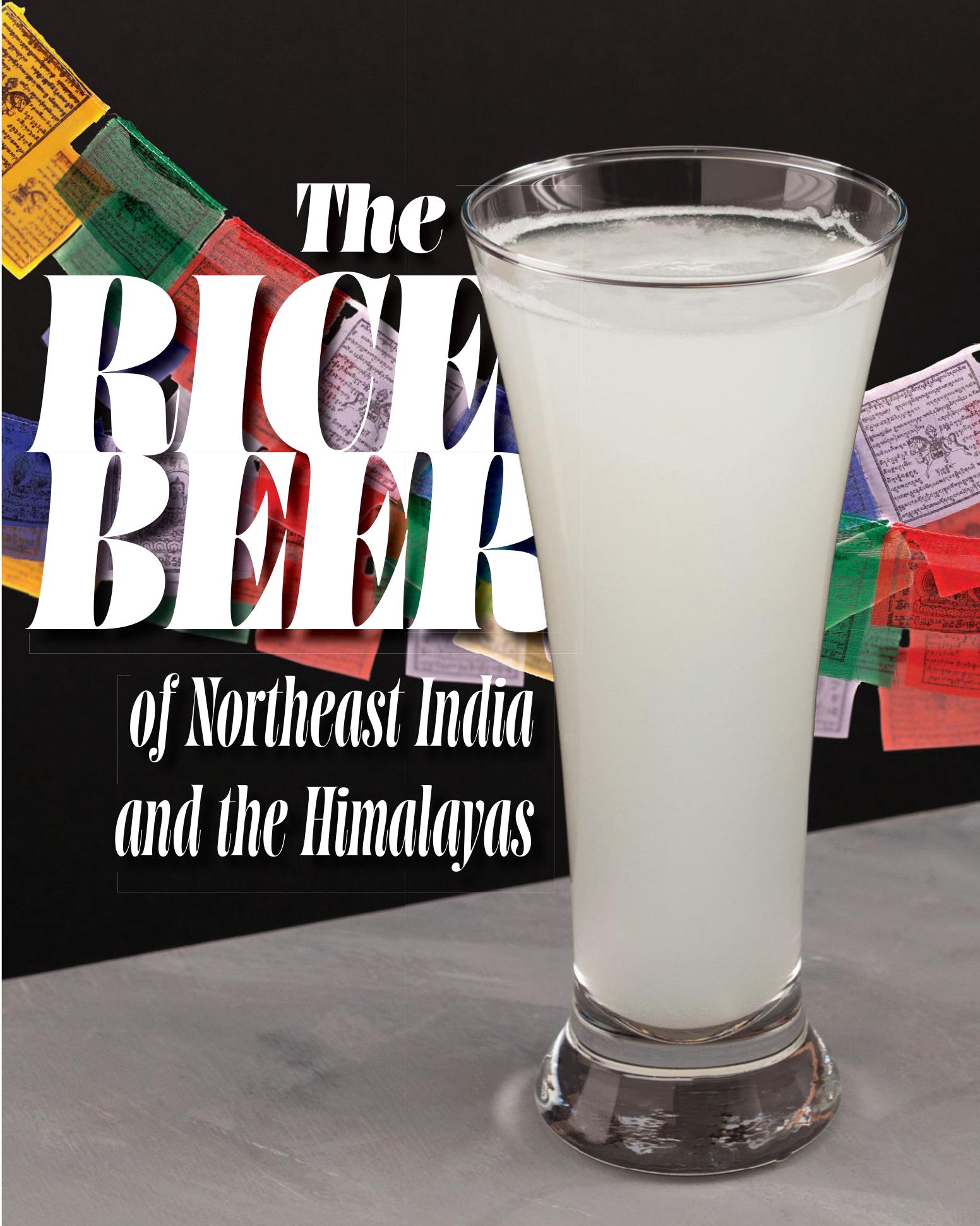
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The Big Beer *of Northeast India and the Himalayas*





By Tim Hobbs

Jahr is the name given in Darjeeling to a rice beer/wine common to the Himalayan regions. Pronounced “jar,” it is known by many different names throughout the countries in that area. In Tibet it is called *chaang*, in Nagaland it is called *zhutho*, and in Manipur it is called *tingba*. This fermented, uncarbonated beverage, generally referred to as “rice beer” or “rice wine,” has many names according to locality, and every village makes its own recipe—it even varies between households—but all have a few commonalities.

Production of jahr spans the Himalayan regions from Tibet and Nepal to the Northeastern regions of India, including Manipur, Nagaland, Sikkim, Assam, and Darjeeling (northern West Bengal). This article focuses on the village traditions and the bootleg production of rice beer in

India’s capital city, Delhi, by Northeastern Indians living there. It is illegal to produce and sell in Delhi, but homebrewers are a crafty bunch.

In general, Himalayan rice beer is made by mixing a special yeast with cooked rice and letting it ferment. After the resulting liquid prize is released from the rice and rises to the top, it is poured or strained off, bottled, and consumed. Sounds simple, and in some ways, it is, compared to the brewing of traditional Western-style brews using barley and wheat malt. Depending on the ambient temperature of the fermentation, it can take anywhere from three to seven days for the alcoholic liquid to leave the maceration of rice grains. After the beer is withdrawn from the rice bed, the remaining rice is then mashed and sold as an intoxicating paste for consumption as well. Slightly sweet and aromatic, jahr is a pleasant, refreshing beverage. Just-made rice beer also has a little effervescence to it, though it dissipates quickly.





However, rice beer is more complex than that. The rice cannot be overcooked, the yeast must be added at the right temperature, and the yeast, well, the yeast is complex. Many villages have their own concoction of yeast, or starter, cultivated from numerous plants and roots, but the most commonly used is commercially made in the Manipur state of India. Called *hamei*, the starter contains around 163 strains of yeast, comes fortified with nutrients and herbs, and is sold in a dried cake form. The *hamei* starter cake is commonly purchased as a silver dollar-sized ¼-inch-thick disk (around 30 to 50 grams), which is the customary amount needed to ferment one kilogram's worth of uncooked rice.

Scientific research published in the *International Journal of Food Microbiology* identified the 163 strains in *hamei* yeast cakes, of which the most common species were:

- *S. cerevisiae*: 32.5%
- *P. anomala*: 41.7%
- *Trichosporon* sp.: 8%
- Other yeast species associated with *hamei* include: *Candida tropicalis*, *Pichia guilliermondi*, *Candida parapsilosis*, *Torulaspora delbrueckii*, *Pichia fabianii*, and *Candida montana*.

Some in Nagaland add ingredients for different flavors. One example is the addition

of an exotic purple flower to the finished zhutho, which lends the beverage a light purple color and a flavor similar to grape Kool-Aid. I tried this delicious version of zhutho in a small, back-alley restaurant in Delhi where the Naga owner, Mhathung, makes it. Since its production is illegal, his name has been changed for this article, even though he keeps the local police and officials bribed well enough to overlook his production. This practice is known as *bakshish*. Such is commerce throughout India.

Zhutho is made in the villages and varies by village and household. Some use sticky rice (*bora saul*), others use the nutritious black rice of the Northeast (*ahu saul*) or a short, wide, aromatic rice (*Joha* or *zoha saul*). Mhathung uses the Joha rice, and the purple flower that he adds, unidentified because it's a trade secret, is a newly adopted technique in the realm of rice beer. Flavorings and adjuncts were not done in the past but are more common now. Mhathung adds the flower to the beverage after fermentation and lets it steep before serving.

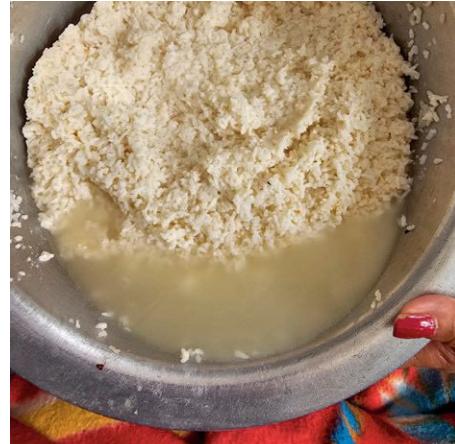
Mhathung reports that zhutho is traditionally consumed through a bamboo straw, is only served during festive seasons, and takes between 2.5 to 4 months for fermentation to complete, depending on the village's process. He states that there are two general types of zhutho made: one with added sugar to increase alcohol and one

without sugar that ferments for six months and can reach up to 30–40% ABV! This particular style is only for special occasions. Mhathung's brew ferments for two to three weeks and reaches approximately 6% ABV.

There is a new zhutho tradition observed in seven villages of the eastern region of the state of Nagaland, where the Tangkhul Naga people live. Each village invites neighbors to two annual festivals: the seed-sowing festival (*Luira Phanit*) and the harvest festival (*Chumpha*). Every house in the village places pork and rice beer in front of the house for guests to come and enjoy as much as they want. However, the guests that visit must finish all that is given to them or it's an insult to the host village. There is lots of celebration and merriment, and many people who are not used to the sweet rice beer often overconsume and become extremely intoxicated.

There is also a special fermented fruit drink that families in the region make. It's more a wine than a beer, as it contains mostly fruit. The mixture is placed in a large bottle, sealed, buried in the ground, and fermented for a year. All family members drink this beverage, even the children, in small amounts since it aids in digestion after eating.

Left to Right: Drinking zhutho through bamboo straws; Sangita and author with glass of jhar; Finished jahr in fermentation vessel.



I was informed there are two communities, one of Tibetan monks and another of Nepalese, that make rice beer within Delhi, so I planned a day trip to visit and investigate. The jaunt included around four total hours in traffic and exposure to pollution, sweltering heat, and humidity—in other words, a routine day in Delhi. My guide and translator was a friend of some Darjeeling natives.

However, the excursion to the Tibetan community in search of the rice beer-producing monks was a bust. No one would talk about it, but some said the production was halted some time ago. From reading their nervous faces, I could tell they were protecting something, but I still responded with a “*koee baat nahin*” (Hindi for “no problem”). I talked to one Tibetan shop owner who told me about the Tibetan chaang, which is similar to the Naga zhutho and the Darjeeling jahr. He scribbled out a crude recipe for me, and I saw it used the same Manipur yeast.

The visit to the Nepalese community and ensuing hunt did not turn up any active beer production, but did get us to a place where we found the special Manipur yeast. The shop owner dug back behind some other items to uncover the treasured package of yeast cakes. Since we had the key ingredient, our friend, Sangita, said she would make some with me so I could document the process and provide a good recipe to Zymurgy.

Sangita is a close friend and caretaker of my elderly father-in-law in Delhi, and is originally from a village near Darjeeling, India. Her jahr was considered high quality by her community and the surrounding villages when she regularly made it 20 years ago. She says that's all there is to do in the villages these days—make and sell momos (dumplings), noodles, and jahr. She used to make her jahr in 10-kilogram batches over an open wood fire and sell it from her home through an underground, bootleg operation. One mug of jahr cost just a few rupees. Since the operation had never been large enough to be exploited by police

Clockwise from right:

Sangita preparing rice for jahr; Pork and chilies; Prayer flags above a city street; The treasured Manipur yeast cakes; Zhutho flavored with purple flowers.





looking for bakshish, it was conveniently overlooked. She was able to put her three children through local school from the proceeds; there are no free public schools here like there are in many other countries.

Sangita's father and grandfather had both served in the Indian Army, and her family used to live near an army camp. The soldiers would visit her home on the

sly to purchase her jahr as well as her famous momos and noodles. Her children didn't know what she was doing, but noticed the house always had a strangely persistent and pungent smell. She would always keep multiple batches going at the same time.

A simple, sweet lady, Sangita has no last name, no birth certificate, and no formal education; however, she is highly skilled

and accomplished at Indian cuisine, hospitality, elder care, and, as a surprise to us all, jahr. Similar to most of the people of Darjeeling, she is unassuming and shy, but highly attentive to and intuitive with visitors. She is the strong boss lady who oversees the staff of a successful Airbnb villa on sprawling grounds in South Delhi. She runs a tight, efficient ship, and the owner is extremely fortunate to have her. She does not make jahr in her current

Brew
This!

Sangita Ka Jahr (Sangita's Rice Beer)

This is the recipe Sangita used to put her children through school in Darjeeling, West Bengal, India. The recipe scales up by the amount of rice. One kilogram of uncooked rice yields 850 ml to 1 liter of approximately 5–8% ABV jahr rice beer.

INGREDIENTS

- 1 kg Tukda Basmati ("broken Basmati") rice or Joha rice – see notes below
- 6–8 cups cold water (enough to cover the rice by $\frac{3}{4}$ to 1 inch)
- 1 Hamei starter cake (30–50g disk size) – see notes below

PROCESS

Wash the rice in a container with water, frequently draining and replacing the water with fresh water until the runoff is almost clear. This removes impurities and the exterior starch from the grains and keeps the rice from clumping as it cooks.

Put the rice in a large cooking pot and pour in enough cold water to cover the rice by $\frac{3}{4}$ to 1 inch. Bring to a slow boil over high heat, then reduce the heat to a simmer, cover, and cook for approximately 10 to 20 minutes, stirring frequently to prevent clumping, until all the water has been absorbed. Do not let the rice overcook or caramelize at all on the bottom. Remove from the heat, cover, and let rest for 10 minutes to steam. The rice should be slightly *al dente* and not mushy; the grains should be separate for the most part.

After the covered rest, spread out the rice uniformly across a large, sanitized surface, breaking up any clumps, to allow for quick cooling. A large baking sheet can be used for this step. Cool to a temperature below 90°F (32°C).

Crush or grind the starter cake into a powder. Sprinkle over the top surface of the rice, and mix very well, like kneading bread dough, but not with as much force.

Place rice/yeast mixture into a non-reactive container that will allow for some air exchange (it must be able to breathe a little). In the villages, they use large earthenware pots for this. Cover the container (not completely air-tight), then wrap the container in a warm blanket or two, and store it in a dry, dark place, like a cabinet or cupboard. The fermentation process will produce a somewhat pungent odor, so do not keep it in the house if the aroma is unwanted.

The fermentation can take anywhere from three to seven days, depending on the ambient temperature where the mixture is kept. The cooler the location, the longer the fermentation time.

FINISHING THE PROCESS

After fermentation is complete, the rice bed should have compacted and the jahr risen to the top. Either carefully pour the jahr out of the container or strain it using a large sheet of cheesecloth. The jahr should be cloudy. The leftover rice is quite intoxicating as well and can be blended with a little water to make another type of drink. Try mixing it with your favorite Kool-Aid flavor packet.

TASTING NOTES

Drinking the jahr that Sangita and I made was a treat. It was fragrant, with alcohol notes on the nose and a subtle ricey sweetness on the front end of the palate. It finished with hints of nuttiness and a slight dryness. There were no bitter or sour flavors. It was very refreshing served over ice. We estimated it to be 5–8% ABV.

When tasting the freshly poured jahr without ice, it has a slight effervescence that is amazing. For homebrewers trying this recipe, try carbonating it slightly for a nice twist.

NOTES

1. Tukda Basmati rice, also called "broken Basmati," can be found online and in Indian supermarkets in the U.S. Do not use regular or long-grain basmati, as the granules need to be small in order for the yeast to convert as much sugar as possible. It's for this same reason that malted barley and wheat are crushed before mashing. If broken basmati cannot be found, look for Joha rice as a suitable substitute.
2. Proper, authentic Hamei can be obtained online at the following link: <https://tinyurl.com/ywuarw3c>. The author could not turn up any sources within the U.S. The Northeast Shop in Bangalore, India claims on their website that they ship to the U.S. and the U.K. The author reached out to them to confirm this but did not receive a response.

situation, as it is not allowed by law; however, she kindly made a batch with me for the purposes of this article only. For the record, after I was finished with the jahr we made, there was none left for anyone else—all incriminating evidence was conveniently and happily consumed.

Regardless of the local name, rice beer is certainly a tradition throughout the Himalayan regions, and in some ways it is also a shared ritual. Communities and families plan events around it, rely on it, and it is ingrained into the culture and lifestyle. Due to these intrinsic circumstances and qualities, rice beer is due all the respect given to Western-style homebrew. If not for these reasons, then for the alcohol content and flavor. After all, an alcohol-induced face plant is the same anywhere in the world, the only difference being what you land on.

Timothy Hobbs is a security engineer, author, and homebrewer. He has worked in 74 countries to date and is a native Floridian who, when not somewhere else around the world, makes his home in Lakeland, Fla.

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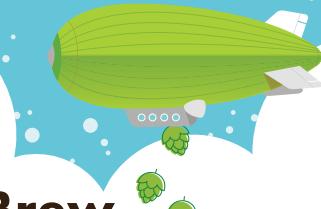


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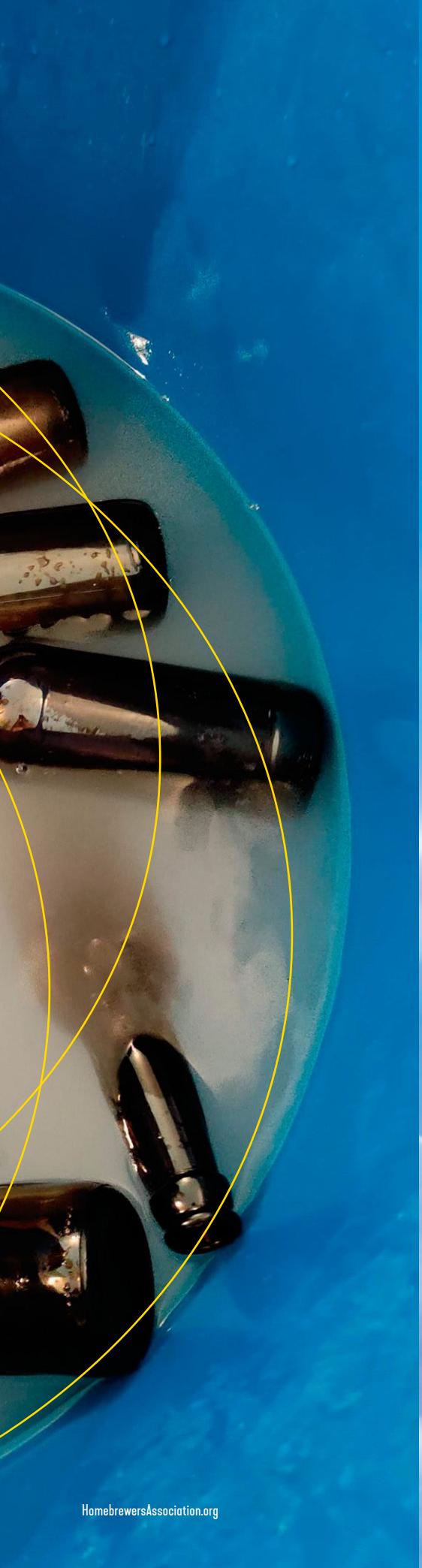


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FINDING PURPOSE, ONE HOMEBREW AT A TIME

BY ANAÏS LECOQ

It's a sunny but chilly Sunday. A ray of sunshine finds its way through the morning mist, glowing through the empty glass bottle I'm holding. I think about how good I would feel under a warm and cozy blanket, a large, steaming cup of tea heating up my hands. Instead, they're freezing from the cold liquid that fills the bottle. Distracted for just a second, I accidentally overfill the bottle, and ice-cold beer drips onto my fingers.

I look at my partner, Jason, busy energetically capping bottles, and say, "if I knew this was what my Sunday mornings were going to turn into, I would never have offered you that brewing workshop."

We laugh it out as I hand him the dripping bottle. In a few weeks, once the bottles finish conditioning, I will spend a Friday evening labeling them, using milk as glue.

Back in July 2018, the class sounded

like a good idea. Learning how to make his own beer made perfect sense for the beer enthusiast Jason was. Along with his best friend, Victor, he attended the workshop at a local brewery—which has since closed—and I was crowned the best girlfriend ever. Then things got out of hand.

Homebrewing was all he could think about and all I heard about from that moment on. Things escalated quickly, from reading books and watching homebrewing videos on YouTube to buying equipment and building his own homebrew system.

"I wasn't that much into beer," Victor recalls, "but seeing Jason so passionate about it, I just followed along." And so did I.

One morning I woke up to find the bathroom sinks full of empty bottles in soapy water, to soak the labels off. I thought to myself, "I live with a brewer. This is my life now."

THE TEAM

Homebrewing was a project my partner started with his friend, but I quickly became the third member of the club, and an integral part of the operation. And almost against my will, at first.

My old, pink yoga mat was cut down to size and taped to the mash tun, for better insulation. And then the mesh bag I used to make oat and almond milk was “borrowed” to filter fruit residue—to this day, I still haven’t gotten it back.

But then I began bringing pastries to the early birds, who started their batches at 6:00 a.m. on the weekends. Since I was there, I figured I could also sanitize the equipment, or make a hop addition, or scrub bottles, or meticulously peel oranges while also removing all the bitter white pith.

Before I realized it, I was spending my Saturday mornings scraping old labels off beer bottles in a kitchen filled with the bready, toasty aromas of fresh wort, which was the only comfort I could find for being up that early. Doesn’t this sound like the most accurate definition of true love?

I was more than “the brewer’s girlfriend” in this whole thing. I was part of the team. And what made our team a great one is that we all had our own defined missions and skills.

Jason was the brewer and creative mind, wanting to try every experiment he could. He was the classic homebrew beginner, emerging from deep dives on the internet with brilliant and unheard-of ideas, like crafting a marshmallow imperial stout. (Even though it was awful to brew, the big, decadent beer turned out great.)



The Wild Badgers homebrew team.

Victor, with his training as a fluid mechanics engineer, was the voice of reason, the brain calculating everything, not afraid to tell Jason when his ideas weren’t feasible (or any good).

As for me, I was happy just being there documenting the whole thing, lending a hand when needed, tasting the beer mid-fermentation, and baking plenty of breads, cookies, waffles, and granolas with spent grain—my own experiments.

The reason our team worked is the same reason homebrewing brought us together at that particular moment in our young adult lives: We were young and still finding our way at that time, and we needed a hobby to focus on outside of work. Jason was miserable at his desk job in a windowless office; Victor was between jobs, struggling to find a permanent position as an engineer (and was later laid off when the



Above: Brewing with marshmallows.
Right: A few of our first homebrews.



pandemic hit); while my job as a local journalist was looking less and less like journalism every day—not something I signed up for. Homebrewing provided a much-needed creative outlet that also brought us all together.

It was our weekend escape, sparking our imaginations and motivating us to improve. “I was unemployed, fresh out of a long relationship, kind of in between things,” Victor explained. “Homebrewing gave me a purpose, a daily rhythm, which I desperately needed then.”

FORGOTTEN BAGS AND STICKY WALLS

Those years were sweet and innocent ones. We managed to turn a cold, unrenovated apartment into a warm and welcoming space. I brought the sofa I had from my first apartment, an old espresso machine still did the trick for an early morning pick-me-up (along with fresh croissants from the nearby boulangerie), and the artisan living next door followed Victor’s engineering sketches to build us a 20-liter (5.5-gallon) brew system.

Everyone chipped in to help us build our own little brewery: a family friend gave us two mini fridges for fermentation temperature control, Victor repurposed his mom’s unused SodaStream into a bottle rinser and purger, and Jason’s parents were the ones who let us occupy the old apartment.

We made the place our own. The decaying green wallpaper started filling up with notes written in black marker—mostly lists of brewing tips and rules, nostalgic reminders of the mistakes we made along the way.



Photos © Getty/Romolo Tavani [sky]. Courtesy of Anaïs Lecoq



RaspJam racked through a mesh bag to filter out the fruit.

Number one, “GENTLY introduce the hops,” came after our boilover during the first batch. Number three, “open the windows,” hints at the importance of ventilation during the boil, even if it’s freezing outside. Number four, “don’t spit in the wort,” is there just in case. Number eight, “sometimes there are two bags,” is a dig at my partner forgetting to add the other half of the malt to one recipe.

Rapidly, that decrepit apartment became a lively home, with friends and family visiting on brew days. The GoPro installed in the corner captured every visit, every energetic discussion, every boring wait time between brewing steps, every dance-off in front of the camera, every failure, and every success.

“I remember our open windows overlooked the street, and neighbors would pass by and wonder what we were doing,” Jason reminisced. “Friends were always visiting, people would come and go throughout the brew day—it was a cheerful place.”

During that period, we crafted over 30 recipes and had our fair share of gushing, infected, disgusting beers. But we also made cool, innovative, and delicious brews we were proud to share with our loved ones. We took it quite seriously, even labelling each bottle with our name (Wild Badgers), our logo, the list of ingredients, and pairing recommendations. “Our first beer looked more like mud than beer, but it was still drinkable, which was an accomplishment in itself,” said Victor.

Anaïs brewing.



RaspJam

Raspberry witbier

Recipe courtesy of Anaïs Lecoq

Batch volume: 5.2 U.S. gal (20 L)

Original gravity: 1.054 (13.2°P)

Final gravity: 1.017 (4.2°P) before raspberries

Color: 3 SRM before raspberries

Bitterness: 15 IBU

Alcohol: 4.9% by volume

MALT

5.5 lb. (2.5 kg) Pilsner malt

5.5 lb. (2.5 kg) wheat malt

HOPS

0.5 oz. (14 g) Target hops, 11% a.a @ 60 min

YEAST

11 g WB-06 SafAle Dry Wheat Beer

ADDITIONAL ITEMS

6.6 lb. (3 kg) whole raspberries, in secondary, 15 days

BREWING NOTES

Thoroughly clean and sanitize all your equipment. Mash 4.4 gal (16.5 L) water at 152.6°F (67°C) for 60 minutes. Sparge with 5 gal (19.3 L) water at 167°F (75°C). Add 0.5 oz. (14 g) Target hops (or another bittering hop) at the beginning of the boil. Boil 60 minutes. Whirlpool, chill the wort, and transfer to the fermenter, then pitch a pack of WB-06 yeast. You can also boil 100 ml water in a sterilized jar, add the yeast when the water drops down to 86°F (30°C) to rehydrate, and pitch. Ferment at 66.2°F (19°C). When fermentation is almost finished, add 6.6 lb. (3 kg) whole, unfrozen raspberries to a sterilized fermenter and transfer the beer into it. Let it ferment for two more weeks until final gravity is reached and the beer is stable. Cold crash to 35.6°F (2°C) and hold for a week before packaging. Mix in priming sugar and bottle (you can use a sterilized mesh bag to prevent raspberry residue from being bottled). Then leave bottles at room temperature for three weeks.



L'Arme à Gauche

Habanero Imperial Stout

Recipe courtesy of Anaïs Lecoq

Batch volume: 5.2 U.S. gal [20 L]

Original gravity: 1.119 [27.8°P]

Final gravity: 1.024 [6°P]

Color: 56.5 SRM

Bitterness: 60 IBU

Alcohol: 12.5% by volume

MALT

15.4 lb.	[7 kg] Pilsner malt
3.9 lb.	[1.75 kg] oatmeal
2.2 lb.	[1 kg] chocolate rye malt
2.2 lb.	[1 kg] peated malt
2.2 lb.	[1 kg] pale rye malt
21.2 oz.	[600 g] rice hulls (in mash, to aid sparge)
17.6 oz.	[500 g] brown malt
17.6 oz.	[500 g] crystal malt [50–80°L]
3.5 oz.	[100 g] roast barley

HOPS

14 oz.	[40 g] Hallertau Magnum, 16% a.a. @ 90 min
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YEAST

125 ml	Wyeast 1084 Irish Ale
125 ml	White Labs WLP099 Super High Gravity Ale

ADDITIONAL ITEMS

90 ml habanero pepper tincture [see Notes]

0.17 oz. [5 g] yeast nutrient @ 10 min

BREWING NOTES

A few weeks before brewing, chop up a fresh habanero pepper or two and add 0.17 oz. (5 g) to 3.4 oz. (100 ml) of a neutral alcohol solution (preferably a 40% ABV fruit alcohol). The alcohol must completely cover the chopped peppers. On brew day, mash 9.5 gal (36.1 L) water at 154.4°F (68°C) for 90 minutes. Sparge with 1.8 gal. (6.8 L) water at 167°F (75°C). Add hops at the beginning of the boil. Boil 90 minutes. When 10 minutes are left, add yeast nutrient. Whirlpool, chill the wort, and transfer to the fermenter, then pitch a pack of 1084 Irish Ale. Ferment at 66.2°F (19°C). Fermentation can be tricky. Leave enough room in the fermenter to avoid losing too much volume to blowoff. If you fail to reach final gravity, repitch with WLP099 Super High Gravity Ale. Ferment until final gravity is reached and the beer is stable. Cold crash to 35.6°F (2°C) and hold for a week before packaging. Mix in priming sugar and habanero tincture to taste, and bottle. Enjoy after leaving the bottles at room temperature for at least three weeks.

My favorite recipe was one of the simplest ones: a raspberry wheat beer called RaspJam. It was so popular that we made several repeat batches of it.

Jason's favorite, on the other hand, was the most difficult batch we'd ever made: *L'Arme à Gauche*, a phrase that comes from the French expression *passer l'arme à gauche*, which means "to pass away." It was a habanero-infused imperial stout that was 12% ABV. "The original gravity was huge, and I had to pitch it twice with an alcohol-tolerant yeast strain to reach the target final gravity," Jason recalled. "Half the contents of the fermenter blew off and we spent hours and hours cleaning. It was so awful and sticky, but the remaining beer was so good that it was all worth it."

Victor also remembered that beer dearly: "We pushed our equipment to its maximum capacity," he said. "As an engineer, removing some of the mystical aspects of beer and seeing how it all works explicitly was deeply satisfying."

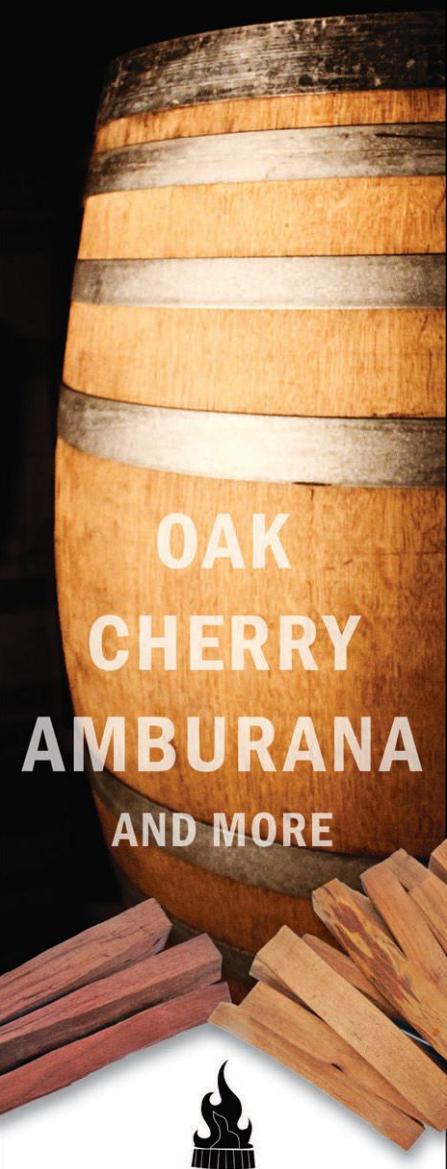
Jason and Victor both have one bottle left from that batch and still don't know when they'll open it.

A NEW PATH

A year after Jason started homebrewing, he quit his job with the dream of becoming a professional brewer. Thanks to France's generous unemployment benefits—eligible citizens can receive financial assistance for up to 18 months as opposed to six months in the U.S.—he was able to perfect his plan and train at breweries, all the while homebrewing



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with relentless passion. Homebrewing didn't just end up giving us a hobby to share; it also gave us a new purpose. As the months passed, my own job was becoming more of a burden, and the beer itch got me as well.

Spending our weekends chatting, eating croissants, and capping bottles in our small apartment now meant everything. Watching my partner meet new goals by becoming a professional brewer made me want to dig into my own aspirations and write about something that really mattered to me. What attracted me most to beer was not the making of it, but learning about it, researching it, documenting it, and meeting people who have mastered it.

One brew day morning, I said, "I have an idea for a beer-related book I want to write." And that was the start of it. The book, a journalistic essay about women's place in the beer industry, was published by a small publishing house in March 2022. This was two months after I quit my job to work at a brewery and begin doing some freelance writing as a side gig.

Since then, not only have I been able to maintain a career writing about beer professionally, I've won several awards for it and even signed a second book deal. Although Victor ended up finding the engineering position he was looking for, beer remains a passion we've kept alive between the three of us.

In early 2024, my partner and I moved across the country (a six-hour drive) so that he could take on a new brewing position—and he's now thriving more than ever before. Even though we have a lot more

going on in our lives right now, we kind of miss our silly experiments. We no longer have enough space for our homebrew equipment, but we'll get it back soon.

"I miss homebrewing," admits Jason. "Or maybe I mostly miss everything that goes along with it—being with friends, sharing the experience, and experimenting with anything and everything that comes to mind."

If I had known this is where we would end up, I would have offered him that homebrewing workshop a lot sooner.

Anais Lecoq is a French freelance journalist, award-winning beer writer and author focused on French drinking culture and history. Her first essay, "Maltriarcat—Quand les femmes ont soif de bière et d'égalité," explores beer, gender, and sexism.



Zoigl

PRESERVING A COMMUNAL
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The traditional six-pointed
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By Eric & Janet Heukeshoven



Reinhard Fütterer (center) sings with friends in the Neuhaus Brewhouse.

It began in Pilsen. After visiting the original Pilsen brewery in 2009, our then-14-year-old son Max said, “I think we should learn how to brew beer.” His birthday is a few days before Christmas. So we decided a starter homebrewing kit would be a fun present. After brewing a couple of extract recipes, Max said, “no, this isn’t the way they did it. We need to do it the ‘real’ way.” And so began our family’s journey into the amazing world of beer. What began as a hobby has turned into more of an obsession—moving from bottling to five taps in a keezer (four kegs on CO₂, one on nitro), barrel-aging, and better equipment. Our fascination with different brewing traditions has taken us on beer adventures in Poland, Iceland, Belgium, and this year to the Oberpfalz region of Bavaria, Germany, where the unique beer culture known as Zoigl has thrived for 600 years.

An article in the January 2022 issue of *Zymurgy* magazine by Franz D. Hofer entitled “Zoiglbier – Brewing Up a Living Tradition in Bavaria’s Oberpfalz” describes in detail the 600-year tradition of communal brewing tradition. Zoiglbier is the region-specific tradition of brewing bottom-fermented beers by the community, and for the community, in the Oberpfalz. Once numbering 75, now only five cities in this idyllic region of Bavaria near the Czech border continue the Zoigl tradition: Windischeschenbach, Neuhaus, Falkenberg, Mitterteich, and Eslarn. After reading Hofer’s story and info on www.zoiglbier.de, we decided to ask if one of the brewers mentioned would agree to let us join them for one or more brew days. Reinhard Fütterer graciously agreed. →



ZOIGL TRADITIONS

In the U.S., co-op breweries such as Fair State in Minneapolis are supported by memberships. The Zoigl communal brewhouses, however, are not open to just any brewer. In 1415, residents of Neuhaus were the first to be granted the rights to brew beer in their community's facility. Other towns were soon granted this *Braurecht* (brewing right), including Windischeschenbach in 1455, Falkenberg in 1467, Mitterteich in 1516, and Eslarn in 1522. The brewing rights have been passed on for generations.

Zoigl culture extends to how and when the beer is offered to the public. According to Hofer, "the centuries of tradition embodied in the tavern culture of the Oberpfalz's five Zoigl towns are just as important as the beer itself. Historically, Zoigl was served in the brewer's kitchen or living room. Today the *Zoiglstube* (tavern) takes the place of the literal kitchen." We visited several Zoiglstuben, each as unique as the family whose name is above the door. Opening at 10:00 a.m., these establishments typically don't close until at least 11:00 p.m. and are often busy all day.

Naturally, Zoigl is best enjoyed with the local cuisine, which often includes *Brez'n* (pretzel), smoked trout, a variety of cheeses, locally baked bread, and *Leberkäse* (a type of meatloaf). Enjoy the sense of community—grab a seat at the long tables, order a *Halbe* (half-liter) of Zoigl, visit with friends, or in our case, make new ones!

Teicher Zoiglstube in Neuhaus on a busy Sunday afternoon.

To find an open Zoiglstube, one needs only to look for the traditional six-pointed Zoiglstern (Zoigl star) that consists of two overlapping triangles. One triangle symbolizes the elements of fire, earth, and air; the other triangle's points stand for the beer ingredients of water, malt, and hops. The word "Zoigl" is derived from the word "Bierzeigl" (beer sign or symbol), which were displayed outside the houses where the beer was being served. The original word "Zeigl" later became "Zoigl" in the Oberpfalz dialect. Zoiglstern were well known and easily recognized in the Middle Ages. The symbol is displayed by a Zoiglstube when it is open.

BREWING ZOIGL

The brew day begins at 6:00 a.m. in Neuhaus. Some of the towns mill their grain at the brewhouse, but Neuhaus has a mill located nearby. The milled grain is delivered the afternoon before brew day. Water is added to the mash tun the night before, usually by whomever is brewing the next day. The average volume brewed is approximately 33 hectoliters (about 870 gallons). The heavy bags of grain must be carried about 15 feet from the delivery wagon to the mash tun. A multi-step procedure requires the mash temperature to be raised over a period of more than an hour, with rests at each stage. The mash tun in Neuhaus is a new stainless-steel vessel.



Zoiglstern outside Zoiglstube
Schoilmichl in Neuhaus.

ZOIGL FAMILIES

Here are some of the Zoigl families actively brewing in two of the towns when we traveled to in the Oberpfalz. Keep in mind that this is not necessarily a complete list, and it may be subject to change. Each of the five towns publish a calendar indicating when the various Zoiglstuben will be open; it's always best to check these calendars before planning your own Zoigl tour of the region.

NEUHAUS ZOIGLSTUBEN

- Bahler – Thomas Witt Family, Marktplatz 12
- Käck'n – Matthias Schönberger Family, Marktplatz 18
- Lingl – Klaus Bauer Family, Burgstraße 1
- Schafferhof – Reinhard Fütterer Family, Burgstraße 6
- Schoilmichl – Markus Punzmann Family, Marktplatz 20
- Teicher, – Jürgen Punzmann Family, Marktplatz 4

WINDISCHESCHENBACH ZOIGLSTUBEN

- Beim Glosner – Martin Popp Family, Lehnerberg 2
- Binner – Robert Sperber Family, Kleiau 3
- Schloßhof – Weiss Family, Schloßhof 13
- Zum Roud'n, – Anton Heinl Family, Stadtplatz 3
- Zum weißen Schwan – Schrembs Family, Pfarrpl. 1





A fresh tank of unfermented Zoigl arrives at Teicher-Zoigl.

When mashing is complete, a pump transfers the wort to an older copper *Kessel* (kettle) that is heated by a traditional wood fire inside a one-cubic-meter stove. Hallertau hop pellets are added as soon as the wort reaches a boil. The boil lasts for 90 minutes or longer. Some brewers add a late addition of Hallertau for aroma. A local farmer then collects the spent grains with his tractor in the afternoon and feeds them to his cows. It is an amazingly eco-friendly operation.

As soon as the boil is complete, the wort is ready to be pumped to the *Kühlschiff*

Mattias Schönberger adding hops to the boil.

(coolship). Located on the second floor of the brewhouse, the coolship in Neuhaus is a newer stainless-steel model. In Windischeschenbach, an older copper unit is still in use. Watching the hot wort gush into the coolship is truly amazing. By now, the brew day is ending. The wort is allowed to cool overnight in the open air. All the brewers we spoke with said there is generally little risk of infection.

As the sun rises over the rolling hills the next morning, the wort is ready to be transferred from the brewhouse to the brewers' home fermenters. The brewers share a mobile



Hot wort floods the *Kühlschiff*.

tank pulled by a tractor (known locally as a 'bulldog'). Gravity does the work of draining the wort from the coolship to the bulldog. Once the tank is filled, the coolship is sprayed clean so it's ready for the next batch.

Each of the six families in Neuhaus has equipment to ferment and store the Zoigl at their house. The wort is pumped into an open-air fermenter located in a refrigerated room. Again, there is no concern about the beer being exposed to air during fermentation. Fütterer mixes his yeast by "drawing it up" 17 times between two containers. According to Fütterer, brewers in Mitterteich say a prayer each time they draw up the yeast and then perform the Christian sign of the cross. When primary fermentation is complete, the beer lagers in adjacent tanks for up to eight weeks.

HOMEBREWERS ARE THE KEY

In addition to the families who produce large batches of Zoigl for sale, a handful of residents also have brewing rights, but brew much smaller batches only once or twice a year. Homebrewers Richard Franz and Alfons Bergler showed us their stone cellars, which house some small kegs and open fermenters. Bergler stressed how important it is for the entire community to keep the Zoigl tradition alive, and homebrewers are at the forefront of these preservation efforts.

At its core, Zoiglbier has always been about upholding centuries-long homebrewing traditions. Franz and Bergler, for example, are immensely proud of their contributions to Zoigl culture. Even though they have access to the large-scale equipment in the communal brewhouse, they are truly homebrewers at heart and go to great lengths to improve their craft.



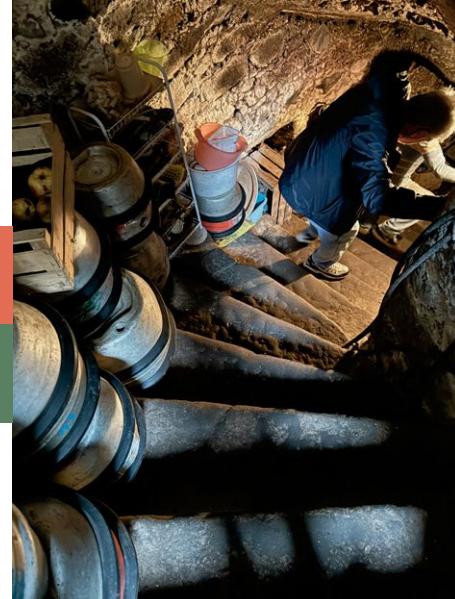


Bergler's kegs of Zoigl.

Maintaining a stone cellar to lager your beer is, after all, neither cheap nor common. It is a labor of love.

American homebrewers also act as beer ambassadors. Introducing friends to unfamiliar styles through tastings or experimenting with new—or ancient—

recipes to discover what is possible are both ways in which homebrewers foster community. Our purchase of a Grainfather this past year was our own attempt to not just expand our abilities and increase our knowledge, but to continue sharing our love of beer with the world.



Entrance to Alfons Bergler's stone cellar.

TASTING ZOIGL

By now, you're probably wondering what Zoigl tastes like. The short answer is, like homebrew, each batch of Zoigl is unique. The brewers are proud of this fact. While none of the brewers we met would reveal their recipes, the basic grain bill is about 70% Pilsner malt and 30% dark Munich



Zoigl

An unfiltered Bavarian lager

Recipe courtesy of Reinhard Fütterer of Schafferhof Zoigl

None of the Zoigl brewers we met in the Oberpfalz would share their recipe with us, but when we asked Reinhard Fütterer for his, he approved and added some specific directions to the brewing notes.

Batch volume: 6.08 gallons [23.1 L]

Original gravity: 1.053 [13.1°P]

Final gravity: 1.009 [2.3°P]

Efficiency: 80%

Bitterness: 26 IBU

Color: 12 SRM (medium amber)

Alcohol: 5.7% by volume

MALTS

8.6 lb. [3.9 kg] German Pilsner, 1.6°L
3.5 lb. [1.6 kg] Munich Malt, 20°L

HOPS

1.25 oz. [35 g] Hallertauer Mittelfruh
4.25% a.a. @ 60 minutes
1 oz. [28 g] Hallertauer Mittelfruh
4.25% a.a. @ 20 minutes
0.5 oz. [14 g] Hallertauer Mittelfruh
4.25% a.a. @ 0 minutes

YEAST

Wyeast Bavarian Lager 2206
(make a 1-liter starter and see
pitching instructions in Brewing Notes.)

WATER

Soften your water with your usual procedure or treat 10 gal. [37.9 L] of reverse osmosis water with ½ tsp lactic acid, 1.1 g gypsum [CaSO₄], 1.1 g Epsom salt [MgSO₄], and 6.2 g calcium chloride [CaCl₂].

BREWING NOTES

The following mash steps are recommended:

- protein rest @ 137°F [58°C] for 10 minutes
- beta rest @ 147°F [64°C] for 40 minutes
- alpha rest @ 162°F [72°C] for 20 minutes
- Check starch conversion before mashing out for 10 minutes at 170°F [77°C].

Water volumes:

Mash 4.84 gal [18.3 L]
Sparge 3.73 gal [14.1 L]

Boil time: 90 minutes

This is where the Zoigl traditions kick in. Allow the wort to cool overnight in the open air. When sufficiently cooled to pitching temperature (Wyeast suggests 46–58°F or

8–14°C), it is critical to prepare the yeast starter by aerating it. Fütterer's technique is to pour the yeast between two sanitized containers a total of 17 times. In one of the Zoigl communities, a prayer is recited between each pour, with the purpose of ensuring a successful fermentation.

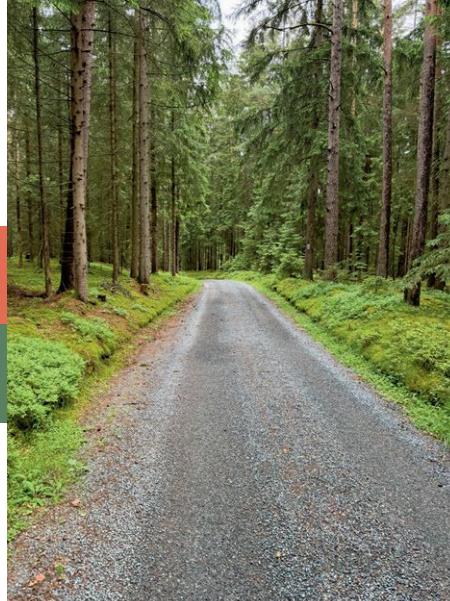
Pitch aerated starter and ferment at 48°F [9°C] (if possible, in an open fermenter) until primary fermentation is finished, then lager for no less than four weeks at 44°F [6.6°C]. Carbonate to 2.2–2.3 vol. [4.4–4.6 g/l] CO₂ and serve unfiltered.

malt. This ratio gives the beers a beautiful, almost glowing amber appearance. As mentioned earlier, Hallertau hops are primarily used for bitterness. The lager yeast does not impart any particular flavor.

Of the dozen or so samples we tasted, some leaned towards the malty side, others were a bit more bitter, but our favorite struck the perfect balance between hops and malt with an ABV of around 5%. Zoigl shares some similar attributes with Zwickelbier and Kellerbier, but it is truly unique—a fresh-tasting, unfiltered lager with a fullness of character that other traditional coolshipped lagers express (see Ryan Pachmayer's "A Cool Tradition" in the Jan/Feb 2025 issue of *Zymurgy*). A word of warning: If you are in the Oberpfalz and find a bottle of "Zoigl" on a grocery store shelf, know that it will not come close to an *echten Halbe* (the real thing).

OBERPFALZ...NOT JUST ABOUT ZOIGL

Our visit to the Oberpfalz region was all too brief. The area offers excellent hiking and biking trails, including a portion of the 660-kilometer Goldsteig trail. There is also a local Zoigl trail linking the five towns. It's hilly terrain—the hill leading from the Naab river valley into Neuhaus is an 18% grade—so consider renting an e-bike from Carl Menner. The tourism office in Windischeschenbach was extremely helpful in planning our visit, and I'd recommend enjoying the impressive countryside during any beer-tasting tour.



Along the Zoigl Trail.



Zoigl open air-fermenting at Schafferho.



Eric and Janet Heukeshoven in the Neuhaus Kommunbrauhaus.



Alfons Bergler with his fermenter.

HEARTFELT THANKS

We owe a huge debt of gratitude to brewers Reinhard Fütterer and Mattias Schönberger who gave us the chance to experience the entire brew process as well as taste many delicious beer samples, breads, cheese, and Leberkäse. Thanks also to Otto Punzmann (Teicher), Renate and Ernst Schönberger (Käckn'), Gabi and Johanna Fütterer (Schafferhof), and Markus Punzmann (Schoilmichl) in Neuhaus, and Martin Popp (Gloser) and Robert Sperber (Binner) in Windischeschenbach for sharing their stories with us. You may not want to

spend days of precious vacation time shoveling spent grain or cleaning out copper brew kettles, but experiencing the true community spirit and learning about the incredible history that is Zoigl will create memories and new friendships that will last for a lifetime.



Authentic Zoigl – unfiltered, unpasteurized, refreshing, and delicious!

Eric & Janet Heukeshoven began homebrewing in 2010 with the founding of Brauhaus Heukeshoven in their basement. When not brewing, the retired music professors continue to perform, even while visiting breweries in Belgium, France, Poland, Iceland, the Czech Republic, Austria, Germany, and other countries.

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FOR GEEKS
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REVAMPING THE RIDE

UPGRADING KEGERATORS



Forward-sealing faucets
keep their parts coated in
beer and don't dry out.

By Ethan Elliott

Most homebrewers eventually tire of bottling and begin storing their brews in kegs. To serve kegged beer, either perpetually fill a trash can (or jockey box) with bags of ice, or get a kegerator. Choosing a kegerator can feel similar to purchasing a car. Some buyers want the cheapest thing they can find; others want a beautiful extension of themselves; and still others desire the pride that comes from hand-picking every component and assembling a custom hot rod. Let's meet each type of prospective kegerator owner and find just the right “ride” for their beers. →

FEELS LIKE THE FIRST TIME

For many first-time buyers, knowledge and budget are limited. This often leads to the classic refrigerator with a hole drilled into the side, or a dorm fridge with a single-tap tower screwed to the top. Hey, sometimes a ratted-out Mitsubishi Mirage is all a person can afford. Luckily, used kegerators can also be had relatively cheaply—around \$100 in most markets. I can't fix a person's budget, but I can share some tried-and-true wisdom. Let's start with basic terminology.

Coupler: The piece that connects the keg to the liquid and gas lines. Nearly all commercial American kegs use a Sankey D coupler, while most homebrewers use Cornelius

(aka Corny) kegs that feature either ball- or pin-lock posts and use quick-disconnect fittings.

Faucet: The on/off valve at the other end of the liquid line for dispensing beer.

Shank: This horizontal piece connects the faucet in front to the beer line in back.

Tap: Traditionally, the act of hammering a faucet into a wooden keg to start pouring from it, but also used to indicate that a beverage is being served on draught (i.e., “what's on tap?”).

Tower: The cylindrical extension from the main kegerator body through which the liquid lines extend to reach the faucet.

Regulator: Adjusts the pressure of gas (CO_2 or nitrogen) between the gas source and the keg. The difference in pressure causes liquid to flow when the faucet is opened.

One-tap kegerators are perfect for people who want to serve a single beer. However, most homebrewers like variety—an IPA today, a lager tomorrow, maybe a stout on Saturday. They need more taps and a larger cooling chamber. At that point, it's time to graduate to a better kegerator.

KEG MATH

Purchase a kegerator based upon the number and size of kegs to be served, which impacts both the size of the kegerator and the number of faucets. A quick lesson in keg fundamentals: half-barrel ($\frac{1}{2}$ BBL) commercial Sankey D kegs hold 15.5 gallons of beer and measure 16 1/8" x 23 3/8". Five-gallon Cornies typically come in two different types/sizes: ball-lock (Pepsi) Cornies are 8.5" x 25"; and pin-lock (Coke) Cornies are 9" x 22".

Most kegerators designed to house one $\frac{1}{2}$ BBL keg can hold two 5-gallon Corny kegs—diagonals are our friends. However, kegerator capacity varies by manufacturer. Always measure dimensions before buying, taking compressor bump-outs and

height into consideration. Many a kegerator build ended when the chamber wasn't tall enough to accommodate the chosen keg type. Plan for at least 25" high, which should fit most kegs, plus some extra room for the coupler. Corny disconnects need about 2", and low-profile Sankey couplers are available. Leave extra room on top of that for wiggle room and airflow.

Next, determine the space where the kegerator will be parked, *and the path it will take to reach that space*. Measure door openings, hallways, and corner angles. Then consider ventilation requirements at the final destination. Some kegerators circulate hot air to the rear; others have condensers in their sides. For this reason, only certain units can be installed under cabinets.

THE SHOWROOM FLOOR

Like cars, a healthy variety of consumer-level kegerators are produced by manufacturers such as Summit, Kegco, Danby, EdgeStar, and KegLand (also the maker of KOMOS). Kegerators come in black, white, stainless, and wood finishes, with couplers, towers, and faucets to fit many needs. But looks

aren't everything. To find the right kegerator, it's important to ask the right questions.

Will it serve commercial beer out of Sankey D kegs, or will it serve homebrew out of Cornies? Will it be used indoors or outside? Indoor kegerators designed for temperature-controlled rooms work a lot less to maintain temperature than those sitting on a back porch all year. Will it be in the open or built into a cabinet? Should the CO_2 be stored inside the kegerator or outside of it? While CO_2 does compress better when it's colder, other factors to consider before putting it inside are available space and regulator access. Should it use an analog or digital temperature control?

Another important consideration is frequency of keg changes. While consumer kegerators are great at keeping kegs cold, they're not as well-equipped for getting kegs cold. Commercial models by True, Beverage-Air, and Micro Matic are usually built with larger capacity and beefier (i.e., more power-hungry) components that are designed to withstand the beating of constant beer changes.

After kicking a few tires, it's time for the final question: buy or build?

FRAME UP

The fun really ratchets up when custom-building a kegerator. At this stage, knowledge is essential, and budget may go out the window. Once capacity and location have been determined, it's time to play with parts. Top amongst those is the actual cooler to be used—the chassis of our hot rod. Custom kegerators can be built out of a refrigerator (possibly to be sold to a college kid later for \$100), a freezer (which becomes a keezer), or by gutting an existing kegerator and starting from scratch.



The original kegerator: a refrigerator with shelving removed, shanks and faucets added.



Converted freezers become keezers. They require temperature control. Courtesy Carlos Ojeda



Most kegerators designed to house a 1/2 BBL Sankey keg can fit two Corny kegs on a diagonal. Find space for the regulator, or risk drilling a hole into unknown territory.

Refrigerators and keezers have one thing in common: they don't start out with towers or faucets. But that's not a problem. Add shanks directly through the chamber wall, attach lines inside, and mount faucets outside. Not sure if there are condenser coils in the sides? Use a heat gun to superheat a socket the same diameter as the shank, and then carefully push it through the plastic (not metal) side wall without endangering any metal tubing that might be hiding inside. Once verified safe, use the saw, drill, or Dremel of choice to cut through the metal exterior. Remember, temperature controllers are vital for keezers, to avoid freezing things.

Most home kegerators are about 24" square and hold two Corny kegs. The real



Commercial kegerators offer greater capacity, but also have higher electrical requirements.

challenge is finding a four-Corny kegerator with that same footprint. Ads for used kegerators don't often include accurate dimensions. After driving to multiple strikeouts, I thought I'd found my forever kegerator when I measured the floor of a Summit unit and verified it functioned. Then back at home, I discovered there was a bump-out in the top just tall enough to accommodate a ½-BBL keg, but too low for a ball-lock Corny. I was able to partially solve this by buying some one-handled Corny kegs to push in just under the lip. But I was still looking.

My search entered commercial kegerator territory. I finally bought a used Beverage-Air for \$650, then a four-tap tower (\$130), a four-body secondary regulator (\$130), plus faucets, lines, and quick-disconnects. In the end, I was in over \$1,000 but had the chassis I wanted.



On multi-tap installs, you can label each beer line and faucet with colored electrical tape. For complete control, do the same to the regulator.



Corny disconnects are available with (left to right) barbed, flare, and Duotight fittings.

UNDER THE HOOD

Before starting a custom build, unplug it, remove old components, and clean everything. Then focus on the tower. Towers are available in several configurations: common vertical cylinders, horizontal T-bars, cool-looking Cobra towers, and custom designs. While T-bars serve all beverages across a single horizontal plane, vertical towers lack real estate and require properly spaced faucets. One-, two-, and three-faucet vertical towers usually have two- to three-inch diameters, while four-faucet towers are 4.5"—extra room for fat hands. Add an insulator sleeve to minimize temperature loss and consider installing a circulating fan to keep beer at the faucet cool. It's also possible to add new ports to a tower by using a knockout punch.

Next, attach shanks and faucets to the tower, starting with the lowest or deepest. Rear-sealing faucets are common on many kegerators, but their valve shaft is exposed to both beer and air, so it gets sticky and sometimes stuck between pours. Also, some rear-sealing chrome-plated faucets are brass,





The Double T Bar offers just enough room to fit an arm halfway down.



Duotight fittings and tubing compete for limited tower space.



The X Plus holds eight kegs, if you're good at Tetris.

and others are merely plated plastic. Chrome plating wears off and brass can pit. When affordable, I highly recommend investing in stainless steel parts. Forward-sealing faucets keep their internal parts bathed in beer only and don't dry out. A go-to brand is Perlick, although newer models are available from Micro Matic, Kegco, and Intertap/Nukatap. There are also flow-control faucets, which we'll get to later.

Through shanks, the faucets connect to beer lines, and there are dozens of tubing options available. Kegerators typically use 5/16" (8 mm) tubing for liquid. While polyvinyl chloride (PVC) tubing has been the de-facto for decades, recent concerns over chemical leaching and oxygen permeation have led to a push for alternative tubing. PVC-free options include Accuflex Bev-Seal Ultra 235, KegLand EVABARRIER, and EJ Beverage Ultra Barrier, which the company claims is 70% more resistant to oxygen permeation than PVC.

Two products that I've used are EVABARRIER and Ultra Barrier. EVA is rated to 100 pounds per square inch (PSI) and is designed to work with push-to-connect fittings. As a result, it is stiffer and less forgiving at extreme bends. Ultra is much more flexible, only rated to 40 PSI, and works

with barbed fittings. EVABARRIER is now available in red gas line, and Ultra Barrier also produces "Red Stripe," a gas-specific tubing rated to 60 PSI. These significantly improve line identification.

NUTS AND BOLTS

In the world of fittings, there are countless ways to connect lines, kegs, faucets, and regulators together. While fun, choosing the right fitting can also be overwhelming. There are a LOT of fittings and connection types. While $\frac{1}{4}$ " is a common thread

size in beer, it's available in National Pipe Thread (NPT), British Standard Pipe (BSP), and Flare (MFL/FFL). Sankey connections use Beer Thread. None of these are compatible with each other, but there are a dizzying number of adapters to go between them all. Also, when it comes to regulators, pay attention to thread direction. Some manufacturers use right-hand threads for low-pressure fittings and left-hand threads for high. Left-hand threads have notoriously few adapters.

When connecting to hose, traditional barb fittings work for just about everything. However, once installed, the easiest way to remove a barbed connection is just to cut the tubing. Also, fitting barbed connections into small tubing sometimes requires the perilous use of boiling water and an awl. That's where I've found significant advantages to using threaded connectors. Installing a female flare (FFL) to the end of a hose allows quick changes from ball lock to pin lock to Sankey tailpiece. The ability to unthread hoses also makes line cleaning and drying easier.

All of the above require crimped connections. While hose clamps are a do-all solution, I've fallen in love with Oetiker clamps. Like barbs, Oetiker clamps are



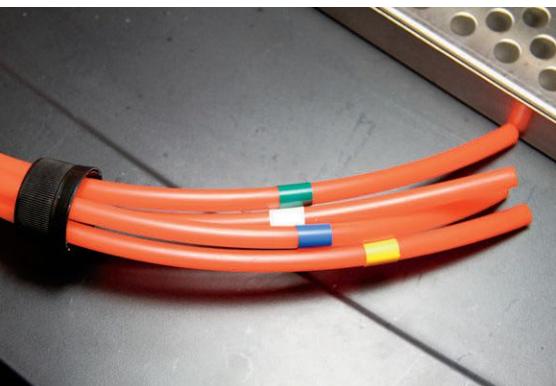
Use a 21/64" drill bit and modify a 2-liter cap to fit four gas lines inside one gas port.



There are even Duotight fittings for Sankey taps.



The X Plus accepts screw-on Carbonation Caps or two-liter bottle caps.



New red EVABARRIER is ideal for differentiating beverage lines from gas lines.

permanent but seal tight and look professional. Moving away from clamps, there are push-to-connect fittings like John Guest or its compatible cousin Duotight, which push on and remove easily. Despite industry acceptance, I've always had a nagging concern that they might leak, which I address later.

Choose the solution with the fewest fittings, as fewer fittings mean fewer failure points. Speaking of failure, be sure to add check valves on the gas side. They prevent liquid from backflowing into and damaging the regulator. If connected directly behind the disconnect, they also protect the gas line.

As for couplers, Sankeys have it all: true couplers that incorporate both beverage (on top) and gas (on the side). Ball-lock disconnects aren't so easy. Liquid and gas disconnects are nearly identical in size, with slightly different internal bevels—just enough to easily get one stuck on the wrong post. Identify posts by hash marks at the base of gas posts, or by the words "IN" and/or "OUT." When dealing with ball-lock Cornies, remember the mnemonic "black is beverage; gray is gas." Many take that a step further and change the O-ring on the gas post to green (gray or green for gas). This is where some believe pin-locks have an advantage: gas disconnects have two pins while beverage disconnects have three, which makes differentiating between the two easier.

For the final piece of the component puzzle, decide how many regulators to use. Regulators come in either primary (connects directly to the gas source) or secondary (connects to another regulator) versions. Every kegerator needs at least one primary regulator. American CO₂ regulators connect to a CO₂ bottle via a CGA 320 fitting. Split gas connections using a Y or T connector or a manifold.



KegLand's new MK5 regulator features a tool-free handle, and is protected by the optional gauge guard.

Now to set the pressure. Hmm...my brown ale calls for a minimum of 2 volumes of carbonation, but the saison does well at 3 volumes. That could be a 20-PSI difference. So what's the perfect serving pressure?

It's a trick question. There is no perfect serving pressure. Different beer styles call for different pressures, so the advantage of having multiple regulators is the ability to carbonate different beverages independently. This is a great choice if you want to really nail a variety of styles perfectly.

BALANCING ACT

With regulators in place, it's time to balance the serving system. This is a complex task with many contributing factors. Reference the Brewers Association Draught Beer Quality Manual for information on how to balance a system by ensuring the pressure applied to the keg is equal to the resistance of the draught system (length of line, height of faucets, etc.). Here are some basics: CO₂ absorption is affected by temperature, so first set the kegerator temperature. Next, reference a carbonation chart for style pressure, taking elevation into account, and then adjust the regulator. Now it's time to get the beer to the faucet.

In a perfect world, beer should be carbonated to and served at the same pressure, or it suffers "death by a thousand slices," describes Kee Doery, Product Development Director at KegLand. With each pour, the CO₂ volume of an unbalanced beer slowly changes along with its taste and mouthfeel. In order to maintain carbonation levels and ensure the "perfect" 10-second pour, calculate beer line length to carbonation pressure. The following is one example of how to do so.

Liquid meets resistance as it travels through a tube. Pressure at the faucet should be about 0.5 to 1 PSI. In my experience, 4-mm EVABARRIER tubing loses about

2.8 PSI/ft, while 3/16" Ultra Barrier tubing loses about 2 PSI/ft (EJ Beverage suggests a resistance of 2.8 PSI/ft).

With the Ultra Barrier tubing, a good starting length for the saison might be 15 feet ($30 \text{ PSI} \div 2 \text{ PSI/ft} = 15 \text{ ft}$), while the brown ale should be fine with 6 feet of line. Estimating the same runs for EVA Barrier would result in 10.7- and 4.5-foot lines. Of course, there are other complicating calculations: various faucets add different amounts of restriction, and regulator pressure should be increased 0.5 PSI for every foot the faucet is above the midpoint of a keg, plus for every 1,000 feet above sea level. There's also drinker preference. When in doubt, start with long lines and trim down from there. Add a thermometer to the kegerator to monitor temperatures.

My favorite line length calculator is available on Mike Soltys' website: mikesoltys.com/2012/09/17/determining-proper-hose-length-for-your-kegerator.

BUILD A FERRARI

For people who want a custom kegerator, but lack skill, time, or desire to assemble one from scratch, there's hope. Several manufacturers now offer kegerator kits that allow buyers to choose their tower, number of faucets, beer line, and couplers—it's like buying a sports car and only having to put the wheels on.

For this article, William's Brewing shipped me a custom-ordered KegLand Series X Plus Double-Wide Kegerator with an 8-faucet Bridge Tower and eight stainless steel Nukatap flow-control faucets. When it arrived, one look at that stainless draught tower made my heart melt. But do you remember my earlier comment about measuring the path to the install location? I hadn't. Fortunately, after removing the screen hardware and 30" back door, I was able to just barely scrape the unit into my basement. When building a kegerator, bring a friend. The X Plus is remarkably light, but moving it is still a two-person job.

RACE TO THE TOWER

At less than 36" wide, the X Plus can hold eight kegs and is packed with features like digital temperature control, two external gas ports, and a circulating fan aimed up the tower. I chose this model to learn how they designed so much into such a tiny box, hoping it would provide some inspiration for my own builds. I was never disappointed, but I did encounter a few head-scratchers.

First, the single-page instruction sheet supplied by William's left a lot of questions unanswered. Then there was assembly. Installing the six caster wheels was the most uncomfortable part. I lay on the floor for half an hour working bolts while my buddy drank beer. The most difficult task, however, was reaching our fat hands down the Double T-bar to install the shanks, starting from the middle. The 4.5-inch-wide tower is large enough to finger-tighten nuts to the backs of shanks, but not to turn the supplied 12-point wrench. With effort, we got about a half turn past hand-tightened. After an hour, seven shanks were firm, and no one was going back in for the eighth.

In hindsight, I may have been able to leave the Duotight fittings and tubing off, hold the nut in place with the wrench, use a faucet to tighten the shanks, then snake the tubing up the tower and push the Duotights on. Most things are easier the second time around. We hit another tight spot at the faucets on each side of the down columns. Faucet spacing is 4 inches apart, and dueling Duotight reducers stick out about 2 inches from the shaft, meaning both lines wanted to occupy the same space. In the end, I crimped one to avoid conflict.

Change is hard. When it came time to cut beer line, the old wrench turner in me

scoffed at using KegLand's recommended 4.5-foot lengths, so I calculated and cut 6-, 8-, and 10-foot sections. I marked each line with colored electrical tape for easy faucet identification, then used zip ties to tidy up. The internal spacing is fantastic, and even my shortest line was able to reach all four corners of the kegerator, although I would have appreciated roof or side hooks to hang loose beer lines.

Once inside the kegerator, I learned the benefits of Duotight fittings. Without danger of impalement by awl, I connected all Corny disconnects in seconds. I was still apprehensive about the Duotights working leak-free, but reserved judgement.

GAS UP

KegLand sent their new MK5 regulator, built with a tool-free CGA320 nut and a Duotight output. This allows for quick and easy separation when a gas tank needs to be refilled or swapped out. The X Plus's two rear gas ports made getting gas in extremely convenient. Even better, the threaded ports accept two-liter pop bottle caps and KegLand's plastic Carbonation Caps. I screwed a gas Carbonation Cap onto one port, plugged my ball-lock quick disconnect onto the input, then split the output four ways inside the kegerator. That second input port was calling me. While KegLand does

make a series of Duotight internal regulators, I wanted the ability to control multiple pressures from outside the X Plus. Could I give it more power?

Yes! I cut four lengths of 8mm tubing and verified they'd all fit through one rear port. Then I fabricated a test cap using successive pilot holes, working up to a 21/64" drill bit. The modified cap gave me just enough room to slide all four gas lines in, but not enough room for cold air to escape. Now I can serve beer at five different pressures. In the end, I cut a second cap and used some of KegLand's new red EVABarrier tubing to max out with eight independent serving pressures (this required two secondary regulators).

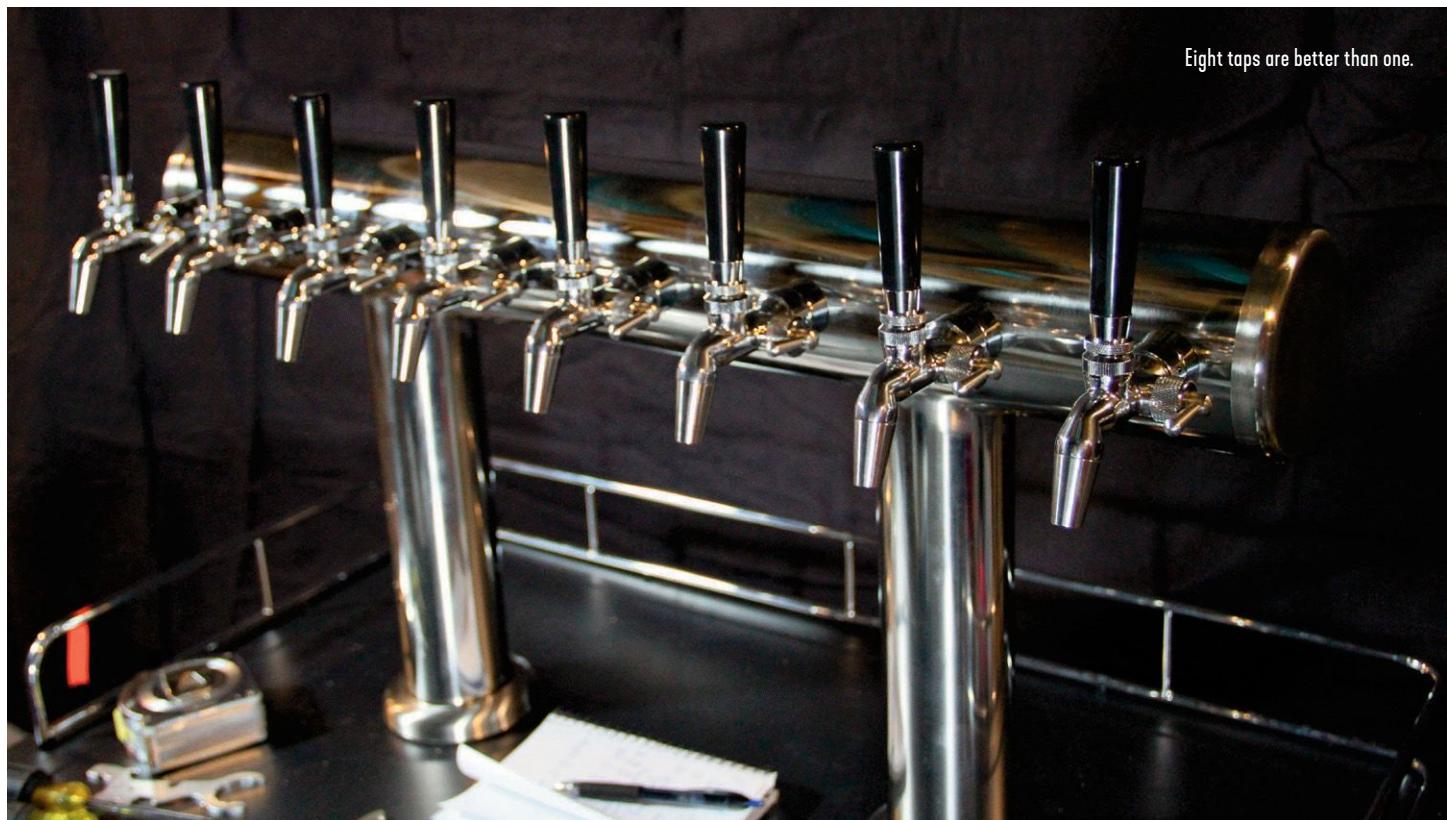
LOAD UP

To test the X Plus's capacity, I gathered eight empty ball-lock kegs. Seven fit easily, but I couldn't get the door closed on the eighth. Would it hold eight kegs?

"If you're good at Tetris, it's eight," said Doery.

As a former Tetris phenom, I couldn't give up. I started wiggling each keg a hair at a time. Finally, epiphany: the rubber boot at the base of two-handle Cornies adds about a quarter inch of diameter. Sure enough, moving those kegs away from the center allowed me to squeeze eight kegs in and close the door. It was very tight, but

Eight taps are better than one.



Doery's claim is verified. I'm not ready to attempt it with full kegs, however.

FIRE UP

Now it was time to turn the key. The Duotight fittings proved their worth again when I switched to Sankey couplers. I quickly disconnected each beer line from its ball disconnect and easily pushed it onto a Sankey fitting. I tapped the kegs, opened the CO₂, plugged in the X Plus, and punched my preferred serving temperature of 40°F (4°C) into the digital temperature controller. It quietly hummed to life. While my Beverage-Air consumed a fairly constant 300 watts of

electricity, the X Plus compressor used only about 120 watts when cooling and then dropped to 3.5 watts when only running the fan. It took longer to cool four kegs, but I had time.

Now about those Duotight fittings. Despite my fears, they proved both reliable and convenient. One of the eight beverage connections did start to weep some beer, but a quick reinsert solved the problem. Meanwhile, the intricate web of gas Duotights worked, and my regulator maintained pressure during a month of testing, during which I also poured a few pints.

This was also when my first experience with flow-control faucets probably

At less than 36", the KegLand holds twice as many kegs as my previous kegerator and only takes up a little more space. Replaceable parts are available.



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became my last. Every beer poured thick with foam. After years of getting perfect pours out of precisely calculated line lengths and standard taps, I was used to everything just working. I reached out to Doert for advice. It turns out, flow-control faucets have limitations. First, they like the higher serving pressures in those shorter 4.5-foot lines. Next, according to Doert, they operate best with temperatures between 32 and 37°F (0–3°C), or else the CO₂ breaks out of solution as it passes the flow valve. I lowered my

temperature, gave it a few days, and tried again; it improved. I do know several people who swear by flow-control faucets, so perhaps there's a learning curve.

LETDOWNS

A few things troubled me during my month of testing. For such a large purchase, the one-page instruction sheet is scant. While there are instructional videos available, written instructions addressing tower setup and Corny keg layout would be helpful. Being new to them, I overbought Duotight

components. After placing my third order, I figured out how to make it work with what they'd shipped. More lessons learned.

With 16 lines to run, I didn't have enough colors of electrical tape. KegLand's new black and red EVABARRIER will significantly improve that. Speaking of line, I couldn't easily reach the nest of gas tubing and fittings hiding behind the kegs on the carbonation cap side. This could be addressed by adding mounting points to attach hoses or gas manifolds. Speaking of gas, multiple gas lines piped together really beg for check valves. I experienced some backflow during keg changes and would recommend adding a few. I felt much more confident about the four continuous lines I'd run on the other side and eventually replicated it—although that required additional hardware.

With the fan off, the digital readout registered four-degree temperature fluctuations. With the fan running, everything evened out quickly. Regarding temperature, because the X Plus's condensers are in the sides, KegLand recommends four to six inches of clearance. If the sides are more than 25–30°F over ambient air temp, give it more space.

While many might be in a hurry to get behind the wheel and drive their new kegerator, this was a slow build for me. I meticulously gathered and installed parts over two long weeks, aspiring toward the most efficient, elegant design. In the end, I was genuinely impressed by the X Plus. It looks great, boasts an inspiring feature set, and leaves plenty of room for the custom builder to tinker and perfect. I now trust Duotight fittings and will continue using them. However, without a need for barbed fittings, what will I do with my toolbox full of parts?

TAKE PRIDE IN YOUR RIDE

When the time comes to swap bottles for kegs, choose a space, identify units that fit the need, and buy or build what the budget allows. From simple single-taps, to masterpieces designed to cool and serve multiple beers, there's a kegerator out there for everyone, and I hope you find yours. I'm glad to have steadily graduated from beater to tricked-out supercar, and I won't be going back anytime soon.

Ethan Elliott is a Denver-based writer and homebrewer who would have made a great monk, except for the celibacy. As a hobbyist inventor, he lives by the motto "where there's an Ethan, there's a way."

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WAIT
Monitor temperature until fermentation begins (active aeration bubbles forming in the wort).

FERMENT
Adjust to the desired temperature for the yeast strain and pitch the yeast. Use a yeast activator instead.

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THE UNDERGROUND BREWERS OF CONNECTICUT

CELEBRATE A 50-YEAR QUEST TO MAKE BETTER HOMEBREW

By UBC Club Members

The Underground Brewers of Connecticut (UBC) Homebrew Club will celebrate its 50th anniversary this coming March, making it the second oldest homebrew club in the nation.

The club's rich history is intertwined with that of U.S. homebrewing itself. The club and its founders were instrumental in the legalization of homebrewing and the founding of some of homebrewing's major institutions. While the club has changed a lot over the past five decades, its ethos has remained the same—to help its members:

- brew better beer, mead, and cider at home;
- judge beer, mead, and cider according to Beer Judge Certification Program (BJCP) guidelines;
- learn about commercially made beer, mead, and cider; and
- elevate the enjoyment of drinking beer, mead, and cider.

Members come from all walks of life. Some are barely old enough to drink (legally) and others have been around seemingly forever. Some have hardly begun to brew, and others have shelves full of medals from national homebrew competitions. Many are BJCP judges, but what everyone has in common is a love of good beer and a desire to brew it.

THE FOUNDERS

It all started with the firm of Crosby and Baker, founded in 1968 in Westport, Conn. The principals of the enterprise, Pat Baker and Nancy Crosby, founded it as a wine-making supplies store.

At that time, making wine at home was legal and had been since the repeal of Prohibition that occurred with the adoption of the 21st Amendment to the Constitution in 1933. Making beer at home was not, however, mentioned in that amendment. So, for beer, Prohibition's controls remained on the books. While brewing beer at home was illegal, the laws were not widely or vigorously enforced.

Crosby and Baker eventually started importing homebrew kits from England, hops from Europe, and malt extract from Germany. Customers who made beer from these ingredients started meeting on weekends beginning March 1975. Baker began inviting them to the back room to taste each other's beers and offer constructive criticism. In the process, a club was born, about six months after the start of the Maltose Falcons brew club of California.

It was during these sessions that Baker and the other members worked out the 50-point judging scale that would eventually become the BJCP point system.



An early photo of Pat Baker hard at work.

The points were distributed across the categories of aroma, flavor, mouthfeel, and drinkability. Baker took this scoring system with him when he co-founded the BJCP in 1985.

Meanwhile, Nancy Crosby, the other half of Crosby and Baker, was active in a movement to legalize homebrewing, mainly through the Home Wine & Beer Trade Association, which she and Baker also helped found. Homebrewers in California lobbied vigorously as well. There was eventually enough support that, by 1978, homebrewing had become legal in the U.S. Ironically, however, homebrewing beer would not become legal in Connecticut until 1996.

A SECRET SOCIETY

The club's original name, The Underground Brewers of Southeastern Connecticut, reflects the quasi-legal nature of homebrewing at the time. While the club wasn't doing anything illegal—all club activities were focused on discussion, research, and education—the act of making beer at home was still illegal. Despite the name, the meetings were mostly held in Southwestern Connecticut, which the club felt created a playful sense of covert misdirection.

In the same vein, members called each other by nicknames rather than their real names. The roster included: Judge Wapner, Barfly, The Naughty Nurse, The Count, Chickenman, The Missing Link, Haystack, Dr. Pivo, Darvon, Double Coc, Crapper, Clone, Handy Andy, Hero, Nessie, Pizzaman, Pastry Dan, and Seabass. The club even had its own alias in those days—YAHOOOS (Yankee Association of Homebrewers Objecting to Organized Societies), further demonstrating its anti-establishment culture.

FOCUSING ON IMPROVEMENT

The early focus on beer judging continues to this day. Members evaluate each other's beers at nearly every meeting. The judging is always done blind, with attendees calling out their scores for each beer attribute (aroma, appearance, taste, mouthfeel, and overall impression) and explaining why. The homebrewer is not announced until the entry has been fully judged and award-



A recent UBC meeting at a generous member's house.

ed a final score. It is only when the maker has been revealed that members offer further constructive comments and suggestions. Since that approach essentially copies the BJCP competition guidelines, it accomplishes two things: it helps participants both improve their beers and gain experience judging within the BJCP guidelines.

This attention to evaluating and judging beer has led many members of the

club to become BJCP judges. Some have gone as far as becoming Master- and National-level judges, while many have reached Certified status. And because the club's other main aim has always been to help homebrewers improve their beers, it is no surprise that several of the club's participants have gone on to medal in many competitions and even become professional brewers.

Brew This!

Not-To-Style Golden Anniversary Ale

American Golden Ale

Recipe by Caysey Welton

Batch volume: 5 gallons (18.9 liters)	YEAST 1 packet Wyeast American Ale 1056
Original gravity: 1.043 (10.7°P)	
Final gravity: 1.011 (2.8°P)	
Efficiency: 75%	
Color: 5.3 SRM (10.4 EBC)	
Bitterness: 27.6 IBU	
Alcohol: 5% by volume	

MALTS & ADJUNCTS

- 7.50 lb. (3.4 kg) Briess 2-row brewers malt
- 1.25 lb. (566 g) American red wheat
- 0.25 lb. (113 g) caramel 60°L

HOPS

- 0.25 oz. (7 g) Magnum 15% a.a. @ 60 min
- 1.25 oz. (35 g) Centennial 10% a.a. @ 5 min
- 2 oz. (57 g) Citra 11% a.a., dry hop 2 days



Judging underway at SNERHC 2024.

Members of the club have organized training sessions to help one another prepare for BJCP exams, and they've also administered BJCP exams. Those efforts and contributions have led to even more qualified beer judges. When the BJCP added guidelines and judging programs for mead and cider, one club member organized training sessions for the two new beverages, which led to the addition of about half a dozen new mead and a dozen new cider judges in the Northeast, some of the first in the country. The UBC has also fostered excellent relationships with producers of honey (Wao Kele Honey in Hawaii) and apple juice (Beardsley's Cider Mill & Orchard in Shelton, Conn.) to help with mead- and cider-focused education and activities.

Despite the club's commitment to always learning and getting better, it's not all serious all the time. Santa's Sillibier Competition has been held at the end of some years, where "silly" beers get judged in silly categories. One tasty submission was Malted Milk Stout.

A LONG COMPETITION STREAK

The Southern New England Regional Homebrew Competition (SNERHC) has been organized and sponsored by the club since 1989. SNERHC is a major competition in the Northeast and attracts a lot of local and national interest. This event is typically capped at 400 entries, and slots are quickly filled by aspiring local, national, and international brewers. Volunteers and members from other homebrew clubs

FROM PAPER TO POSTS

In the days before the internet, the club published a newsletter called *The Brewers' Bugle*. A typical *Bugle* contained pictures, a report of the last meeting and its judging results, recipes of members' award-winning beers, a poetry column, a notice of the next meeting along with driving directions (no GPS apps yet), and articles about beer and brewing written by club members and editors.

Like many other clubs, the advent of electronic media has altered how we keep in touch with each other. The monthly newsletter is now sent via email, and the club has its own website (undergroundbrewers.org) and Facebook page (facebook.com/groups/ubc.yahoos), where additional news, events, and information are posted.

throughout the Northeast have graciously contributed their time, energy, and judging skills over the 30-plus years of the competition. And of course, local brew supply shops, restaurants, and breweries have generously lent their facilities to store submissions, host judging sessions, and provide meals, prizes, and gifts for volunteers and winners.

THE GOLDEN ANNIVERSARY CELEBRATION

For its 50th anniversary, the club is planning a big party with lots of good homebrew, commemorative merchandise, and a special beer that will be scaled up and co-brewed with New England Brewing Co. in Woodbridge, Conn.

More details can be found on the website at undergroundbrewers.org/50-for-50. If you are interested in learning more or joining the UBC, please visit the website at undergroundbrewers.org.

The club's current members are always happy to meet new brewers, guide them and learn from them, and invite them into a club with a long history of devotion to the craft and community of homebrew.



CLUBS CORNER IDEAS

Calling all AHA-Sanctioned Homebrew Clubs! Want to see your club featured in Zymurgy's Clubs Corner? Contact us at zymurgy@brewersassociation.org.

Make
This!

Sillibier Malted Milk Stout

INGREDIENTS

1 scoop vanilla ice cream
2 Tbp dry malt extract
1 bottle milk stout

PROCEDURE

- Put DME in a large mug
- Stir in a little ice cream to dissolve the DME
- Add remaining ice cream
- Pour in milk stout
- Run to the kitchen so it doesn't overflow onto the host's rugs
- Give mug with any remaining beer to esteemed guest

Relax, Don't Worry, Have a Homebrew!

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

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

ON THE WEB

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

BREWING WITH ZYMGURGY

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

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 (66–67.2°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.

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 – U.S. beer barrel (31 U.S. 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

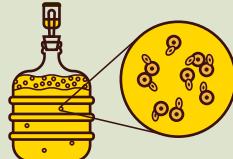
SMM – S-methyl methionine, precursor to dimethyl sulfide (DMS)

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. (28 g) of dextrose (corn sugar) per gallon of beer (7.5 g/L) for a good, all-purpose level of CO₂.
- Use less sugar for less fizz.
- Take care with higher carbonation levels—many single-use beer bottles aren't designed for high pressure.



If you force carbonate in a keg,

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



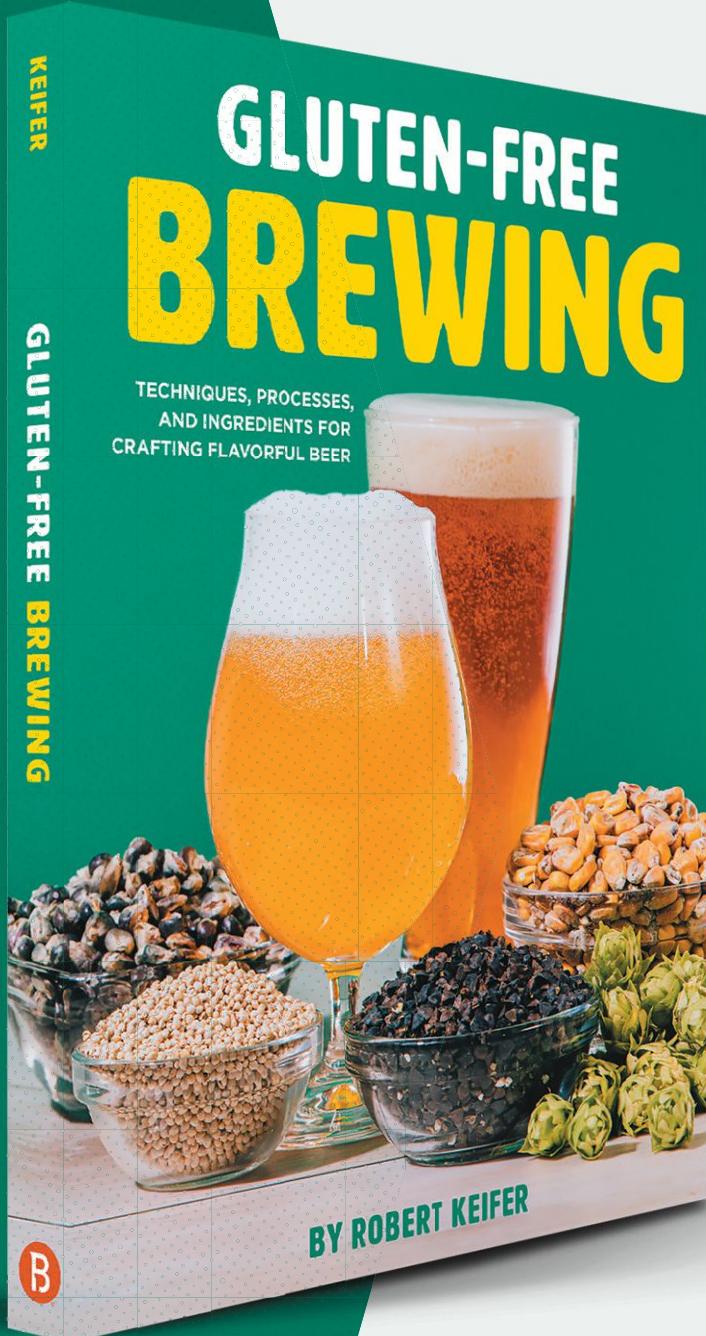
- Add 0.5 psi (35 mbar) for every 1,000 feet (300 meters) you live above sea level.
- To convert psi pressures to mbar, multiply by 69.
- To convert volumes of CO₂ to g/L, multiply by 2.

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

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

■ = PSI

Source: Brewers Association Draught Beer Quality for Retailers



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A Homebrewer's Rites of Spring

Every springtime, my thoughts are consumed by homebrewing—more so than usual. Perhaps this is because I live in Pennsylvania, where winter weather can be as unpredictable as a wild fermentation.

My brew garage is unheated. Add to that the possibility that I'm a bit of a wuss. Even with my propane burners firing, the building takes forever to warm. It's a futile and frivolous waste of energy. In addition, I have to open the water line from my house, only to have to flush it, along with my tankless heater, immediately afterward. It's a pain—something homebrewing shouldn't be.

I could brew extracts in the kitchen, but that's my wife's domain. The agreement keeps our marriage happy. It's a slippery slope I don't want to go down. (To my credit, I skillfully negotiated for an easement in the pantry, allowing me a place to make yeast starters.) Besides, chilling and then toting wort across the yard to my conicals in the garage would be an onerous task. Thus, with the onset of the holidays, I'm forced to shutter my homebrewing operations until the spring thaw.

I could whine and be envious of those who are able to brew year-round, but many years ago I resolved not to wallow in self-pity and play the hand I've been dealt; turn a negative into a positive. During this break, nary a drop of beer is made, yet in many ways this is a pivotal time of my homebrewing year—an opportunity to get my ducks in a row for the spring awakening.

The worst of the winter is a time for introspection and reflection, and crafting recipes is one of my passions. Magazine articles (my collection dates back to the early '80s), the AHA website, podcasts, and social media provide the inspiration for new recipes. I also review my brews of the past, tweaking those that could use some fine-tuning. My first Mexican lager surpassed expectations, but it would have been better with a few less IBUs and a lower ABV.

As temperatures warm up to tolerable, I move to the garage and begin the serious physical tasks of organizing, reviewing my workflow, and adding upgrades. Last year, for example, I installed a heavier-duty set of casters to my brew stand. It took a car jack to raise each side of that bad boy.

This is also when I do my annual ingredient inventory—taking stock of what I have before ordering more and cursing myself for not keeping track of everything on a spreadsheet. I consolidate my hops to a single location as well. I'm a bit of a hoarder, which stems from my lingering fear of hop shortages of the past, and have them squirreled away everywhere.

By now, the worst of winter is over, and the weather is finally mild enough to comfortably withstand. I'm chomping at the bit to brew. Absence from the kettle has indeed made my heart grow fonder. The break has been an ordeal, but I've emerged from it energized—a homebrewer, reborn and pristine, starting with a clean slate.

The question now becomes what to make. My new year's inaugural homebrew is symbolic—something that will serve as a springboard for success. With that goal in mind and the need to get something on tap for St. Patrick's Day, stout naturally comes to mind. The style has often been touted as an elixir, a spring tonic.

Sadly, however, my attempts at brewing an Irish stout have been wanting, not doing remote justice to Guinness. I'm not sure why. My recipe, culled from an old issue of

Zymurgy, contained Maris Otter and flaked and roasted barley. Seemed simple enough, but I don't think nitrogenation would have helped it.

Last year, I didn't want to repeat the definition of insanity, so I switched gears to a sessionable American-style stout. Sierra Nevada's classic stout—which was actually their first brew, not pale ale—immediately sprang to mind.

I found an online recipe from a reliable source and tweaked a few ingredients—I omitted the Carafa II and replaced the crystal 60 with Special B, one of my favorite specialty malts that has the perfect flavor complements for stout.

It turned out to be one of the best homebrews I have ever made and was a big hit at two of my club's meetings. To my surprise, as it aged, the stout clone developed a creaminess that was reminiscent of Guinness.

And like all great homebrews, it was sublime to the Last Drop of the keg.

Mark Pasquinelli resides in the bucolic town of Elysburg, Pa., where he spends his time in varying degrees as a husband, writer, homebrewer, microbiologist, and manservant to seven felines.



Bandolero Lager

Recipe courtesy of Mark Pasquinelli

YEAST

1.5 L starter White Labs WLP940 Mexican Lager

BREWING NOTES

For soft water, add 1 tsp CaCl₂. Mash at 149°F [65°C] for 1 hour. Fly sparge with 168°F [76°C] water to collect 6.5 gal [24.6 L] of wort. Add hops as directed and boil for 60 minutes. Chill to 55°F [13°C], oxygenate, and pitch yeast. Ferment until a 50% gravity drop has been achieved. Raise temperature to 58°F [14°C] and ferment until a 75% gravity drop. Raise temperature to 62°F [17°C] and ferment until a 90% gravity drop. Raise temperature to 66°F [19°C] and ferment until terminal gravity is achieved. Package, carbonate, and allow to lager for at least a month before serving.

FERMENTABLES

3 lb. 10 oz. [1.6 kg]	Weyermann Pilsner malt [37.7%]
2 lb. [0.9 kg]	Briess flaked corn [20.8%]
2 lb. [0.9 kg]	Briess pale malt [20.8%]
2 lb. [0.9 kg]	Weyermann Vienna malt [20.8%]

HOPS

0.45 oz. [13 g] Magnum 13.2% a.a. @ 60 min

OTHER INGREDIENTS

1 tablet	Whirlfloc @ 10 min
1 tsp.	Wyeast nutrient @ 5 min

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BY KEITH VILLA, Ph.D.



Keith Villa, Ph.D., is brewmaster and co-founder of Colorado-based CERIA Brewing Company, a trailblazer in the rapidly growing market of non-alcoholic, cannabis-infused beers. After earning his Ph.D. in brewing from the University of Brussels in Belgium, Keith began his 32-year career as founder and head brewmaster at Blue Moon Brewing Company, an operating unit of MillerCoors. Since then, this beer doctor has gone on to brew several award-winning beers and continues to set new standards and push the boundaries of flavor, styles, and ingredients. Keith also is co-founder and head brewer of family business Donavon Brewing Company based in Arvada, Colorado.

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