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THE OVERLAP

HOME & PRO BREWING

TRÖEGS
INDEPENDENT
BREWING

JOHN
TROGNER

BREWING A
NEIPA IN INDIA

NO RESPECT!
MALT LIQUOR

BREWING IN
THE GUIANAS

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OUR MISSION

Zymurgy celebrates AHA members and educates those who want to brew and ferment.



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Homebrewers Going Pro and Pro Brewers Homebrewing

I sat down recently with Cory Buenning, brewer from Fritz Family Brewers in Niwot, Colo. Buenning has earned numerous Great American Beer Festival and World Beer Cup awards over the years. He began his career in 1992 as a homebrewing college student in Boulder and learned from other brewers as an active member of the Hop Barley and the Alers homebrew club. Regular trips to his local homebrew supply store What's Brewin' eventually got him a job there, so he was pretty much steeped in Boulder's nascent '90s homebrewing community.

It seemed inevitable that he would take this passion a step further and begin brewing professionally. He spent two years at Tommyknocker in Idaho Springs, Colo., then another 17 years at Snake River Brewing in Jackson, Wyo., honing his craft. Eventually, he and his wife, Kelly, moved back to Colorado to start their own family-owned and -operated brewery, where he now makes some of the best beer west of Munich. My interest in speaking with him stemmed not only from admiration for his incredibly good lagers, but also to garner information about a traditional Bavarian liquid acid brewing ingredient called *sauergut* that, among other things, is used to control pH. Buenning is one of the only craft brewers in Colorado, if not the U.S., using this technique. You may recall Ryan Pachmayer's May/June 2024 *Zymurgy* article on Cervecería Hércules in Mexico—one of the things that elevates Josh Brengle's lagers to world-class status there is his use of *sauergut*. Buenning is another one of the few brewers outside of Bavaria making his own.

Producing *sauergut* on a professional scale is not an easy thing. Thanks to recent translations of classic Bavarian brewing texts, information on how to culture and propagate this wort-based liquid acid is now available, but it takes research, time, no small capital investment, specialized equipment, added brewhouse procedures, and nothing less than a leap of faith to actually make it work. Buenning got his

isolated culture of *Lactobacillus amylolyticus* from the revered labs at Weihenstephan, and he paid a large sum for a tiny refrigerated vial to be delivered to his brewery in Colorado. Then he convinced the Brewing Science Institute (BSI) to culture and bank it for his use. This too proved to be a challenge—BSI had a rough time propagating it, as they found it difficult to believe the strain preferred fermentation temperatures of 120°F (49°C). But they finally got it going, and now Buenning orders it from them every few months. Like Brengle's process, he brews up multi-barrel batches of *sauergut* as needed, stores it cold but alive in kegs, and uses it fresh.

This was astonishing to me. Why go to so much trouble? Does it make that big a difference? According to both brewers, yes it does. Brengle believes it adds a particular flavor without which a Bavarian helles just doesn't taste authentic. It can also scavenge oxygen in the mash tun. Both brewers practice low-oxygen brewing, which involves painstaking steps to evacuate the mash tun of oxygen, mash in with de-aerated water, and even remove O₂ from transfer lines. Some might say this level of attention to detail is counterproductive to a company in business to make a profit. So again, why? Buenning admitted what I suspected: Because it's traditional Bavarian practice, and it results in a superior end product. Obviously, these brewers are perfectionists when it comes to their craft, and in the brewing world, that's what separates businesspeople from the artisans, those who keep their passionate homebrewing roots alive in their professional ventures.

In this issue, we celebrate the intersection of home and craft brewing. Case in point: the GABF Pro-Am competition. It's right around the corner, and it's a great place to taste the award-winning collaborations between homebrewers and pros. In many ways, the AHA has been an incubator for producing the very best craft brewers the world has known. As Buenning and Brengle did, they learn brewing as a hobby,

then take it orders of magnitude above the amateur level through experience, training, and dedication. Look no further than Chris and John Trogner in Mark Pasquinelli's success story of two homebrewers going pro.

Of course, most homebrewers have no intention of making a career out of brewing. Homebrewer and world traveler Tim Hobbs takes us on a journey to India for a glimpse at how that country's home and craft brewing cultures are catching on, and while he's perfectly content with the amateur brewing world, he was thrilled to make one of his homebrew recipes on a professional system. Hobbs' feature, "Brewing a NEIPA in India," introduces some of the challenges pro brewers have to endure to get their delicious brews to the masses, and may give ambitious amateur brewers some idea of what it means to scale up to a much larger brewhouse.

It goes the other way as well, of course. Sam Calagione, Vinnie Cilurzo, Wayne Wambles...there are so many great and successful pro brewers who continue to support the homebrewing community. Pro brewers recognize the importance of their homebrew origins, and the ones who keep in touch with the homebrew community do so for a reason: these days, there is no better source for brewing inspiration and creativity than homebrewers. Pro brewers need to keep up with the constantly changing demands of the craft beer consumer, and staying tuned in to the enthusiasts who are always looking for new flavor combinations in their favorite beverage is a great way to achieve that. That said, would you be brave enough to brew a malt liquor dosed with pepperoncinis? Of course you would, and Ron Minkoff will show you how in his feature "No Respect! Malt Liquor."

The eloquent David Schmidt graces us with another of his travel features, this time to a corner of South America known as the Guianas. Recipe inspiration is born from the ferments of ancient civilizations. Finally, Kristen Kuchar takes us to England to learn about that country's venerable cider traditions. The months of September and October, in many places, mean apple season, and apples mean hard cider.

Making the transition from amateur to professional brewing requires a significant paradigm shift, and it isn't for everyone, but when it succeeds, as it did with Cory Buenning, it can be a beautiful testament to the science, passion, and artistry that is brewing. I, for one, can't wait for another half-liter of his Dortmunder.

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

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TRÖEGS: TWO HOMEBREWERS BUILD A CRAFT EMPIRE

The rise of Tröegs Independent Brewing in Hershey, Pa. represents the quintessential American success story—two local homebrewers making good.

By Mark Pasquinelli



BREWING A NEIPA IN INDIA: A HOMEBREWER'S COMMERCIAL BREWERY ADVENTURE

World traveler and homebrewer Tim Hobbs gets a chance to brew one of his recipes on a commercial scale at the Effingut Brewpub in New Delhi.

By Tim Hobbs



NO RESPECT! MALT LIQUOR

In the homebrew world, malt liquor isn't taken seriously. There's no BJCP category for it, other than 34C (Experimental), and few people brew it. It don't get no respect, no respect at all. It's the Rodney Dangerfield of beer styles.

By Ron Minkoff



BREWING IN THE GUIANAS, THE HIDDEN CORNER OF SOUTH AMERICA

Guyana, Suriname, and French Guiana, collectively known as the Guianas, are home to a variety of languages and cultures, and a diverse array of brewing traditions.

By David J. Schmidt



SHARPLY BITTERSWEET: ENGLISH CIDER

While beer may be England's go-to drink, cider is a much-beloved beverage. In fact, the United Kingdom consumes more cider than any other country in the world.

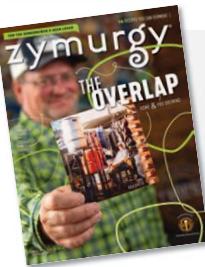
By Kristen Kuchar

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By Amahl Turczyn

19**23****Cover Photo**

© Jeremy Drey/Tröegs Independent Brewing

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zymurgy®**(zī'mərjē) n:** the art and science of fermentation, as in brewing.**ON THE WEB**Find these homebrewing recipes and more on our website @ HomebrewersAssociation.org/homebrew-recipes

NOW ON Tap

VERTICALS FOR VETS
Presented by Aurora City Brew Club

VETERANS
COMMUNITY PROJECT
LONGMONT

Aurora Brew City Club



Verticals for Vets Auction

Last September, the Aurora City Brew Club (AC/BC) hosted the first Verticals for Vets rare beer auction, raising over \$16,000 for the Veterans Community Project (VCP) to help end veteran homelessness. The event featured rare Thomas Hardy's Ale vintages and united homebrewers, beer enthusiasts, and locals for a great cause.

Building on this success, AC/BC is excited to announce the second Verticals for Vets on November 10, 2024, at Dry Dock Brewing Company in Aurora, Colo. from 2:00 PM to 6:00 PM. Join the Aurora City Brew Club for camaraderie, exceptional drinks, and support for homeless veterans. "We were overwhelmed by the generosity at our first event," said Scott Threlkeld, an AC/BC representative. "The funds raised will significantly impact veterans' lives, and we're excited for our next event to honor them." Mark your calendars and raise a glass for our veterans!

The club is also proud to announce the release of a special collaboration beer, Verticals for Vets IPA. This exclusive brew, created in partnership with Bent Barley



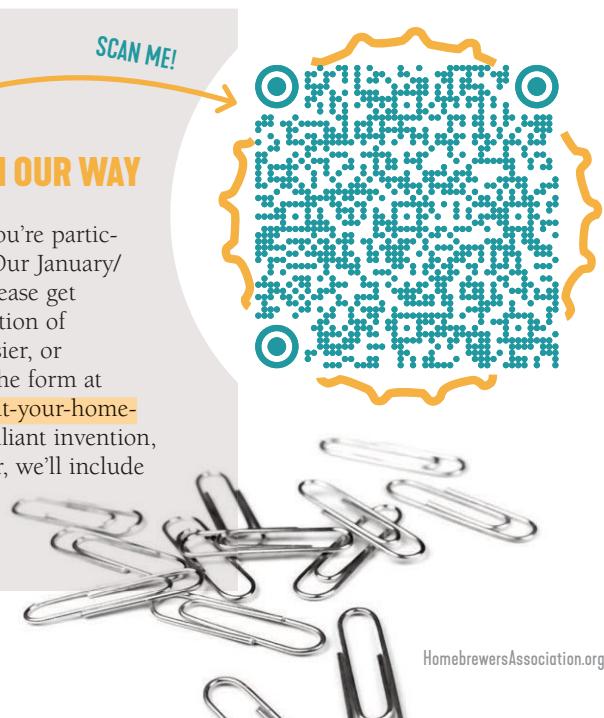
Brewing, Launch Pad Brewery, and Dry Dock Brewing, will debut at the fundraiser. Starting November 11, Veterans Day, the beer will be available at each brewery while supplies last. All proceeds will benefit the Veterans Community Project in Longmont, Colo.

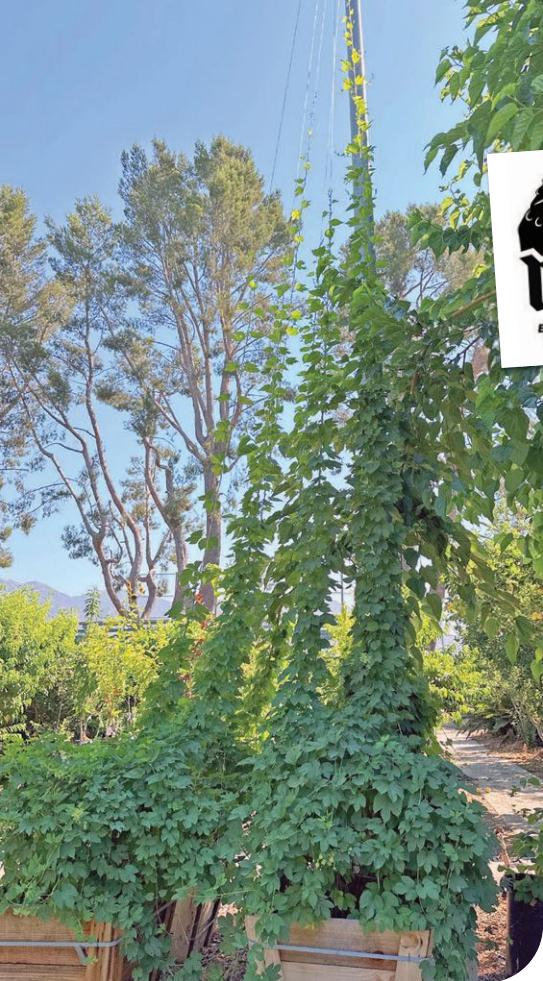


Call for Gadgets FROM GEEKY TO SIMPLE, SEND THEM OUR WAY

Have a brewing gadget or a DIY invention that you're particularly proud of? Share it with Zymurgy readers! Our January/February Gadgets issue is coming up soon, so please get your photos uploaded along with a brief explanation of how your gadget makes your brew day faster, easier, or more efficient. Simply scan the QR code or use the form at HomebrewersAssociation.org/how-to-brew/submit-your-homebrew-gadgets-to-zymurgy and if we like your brilliant invention, idea, method, shortcut, workaround, or whatever, we'll include it in the Gadgets issue.

Submit your gadgets by October 1, 2024.





Maltose Falcons Support High School Hop Growers

The oldest homebrew club in the nation is celebrating its 50th anniversary with a party! The club, started in 1974, has been celebrating 2024 all year with collaborations and special homebrews showcasing their adventurous club spirit and their esteemed and admired community of brewers. But it all culminates with a formal dinner party near the Los Angeles International Airport (LAX) on Saturday, October 19. The event will feature live entertainment from The Maltose Falcons Band, a raffle, and a silent auction with awesome donations from various equipment manufacturers.

Proceeds from the auction go to the Sylmar Charter High School Agriculture program, which is growing its own hops. One member of the Falcons suggested they run lines up a light pole on the school grounds to support the hop bines. Someday, the Falcons hope to enjoy a great homebrewed beer with fresh hops from these future brewers and hop growers.

Zymurgy Live **EXCLUSIVE MEMBER BENEFIT**

Join us for this **member only access** broadcast where 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 watch the webinar.

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

Recent sessions include...

- Pregame for Home Fermentation Day 2024 - Sauergut with Amahl Turczyn and Josh Brengle
- Award-Winning Homebrewing with Mike and Stephanie Butler
- 2024 Big Brew Day Pregame and Live Brewing Demo: May the Fourth Be With You
- Rewards, Risks and Recipes for Non-Alcohol Homebrewing
- Brewing Modern Lager the Old-Fashioned Way
- And more!

zymurgy
LIVE WEBINAR



Read more about how these Big Brew 2024 recipes were designed in Last Drop on page 72 of this issue of *Zymurgy*.

Brew This!

A New Hope Pale Ale

This recipe was designed by homebrewer Tyler Maybee and adapted by Big Brew 2024 sponsor Rahr Malting Co. A New Hope Pale Ale is as bright as Tatooine's twin suns. This <5% American pale ale is the kind of beer you would be drinking at Mos Eisley Cantina, the wretched hive of scum and villainy on Tatooine. Each sip is as refreshing as the last, making it perfect for the desert planet. May the wort be with you!

Batch volume: 6 U.S. gallons [22.7 L]
Original gravity: 1.043 (10.7°P)
Bitterness: ~75 IBU
Color: 4-5 SRM
Alcohol: 4.85% by volume
Boil time: 60 minutes

MALTS

5.5 lb. [2.5 kg] Rahr Pale Ale malt
3.5 lb. [1.6 kg] Crisp Finest Maris Otter Ale malt
0.75 lb. [0.34 kg] Rahr White Wheat malt
0.5 lb. [0.23 kg] Simpsons Crystal Light malt
0.5 lb. [0.23 kg] Rahr Dextrin malt

HOPS

0.5 oz. [14 g] Citra hops, 12% a.a. (60 min)
1 oz. [28 g] Citra hops, 12% a.a. (20 min)
1 oz. [28 g] Citra hops, 12% a.a. (10 min)
1 oz. [28 g] Citra hops, 12% a.a. (5 min)
1.5 oz. [42 g] Citra hops, 12% a.a. (hop stand)
3.5 oz. [99 g] Citra hops, 12% a.a. (dry hop)

YEAST

Kveik Yeast such as OYL-061 or California Ale Yeast

BREWING NOTES

Mash grains at 149°F (65°C) for 1 hour. Mash out at 167°F (75°C) for 10 minutes. Boil 60 minutes, adding hops as indicated. Allow the hop stand addition to soak for 20 minutes around 194°F (90°C). Chill beer and pitch yeast at 65°F (18°C) or at the temperature called for by your preferred yeast. Ferment at 65°F (18°C) for around 10 days. After primary fermentation, add the dry hop addition for 5-7 days. Package and enjoy.



Brew This!

The Empire Strikes Back Dark Ale

This recipe was designed by homebrewer Paul Crowther and adapted by Big Brew 2024 sponsor Rahr Malting Co. Get a taste of the dark side with The Empire Strikes Back Dark Ale recipe. The use of a dark-roasted specialty grain deepens the color and adds mild roasted notes in the finish, while additions of Citra hops offer balance to reflect the lighter moments of Episode V. Brew or brew not... there is no try!

Batch volume: 6 U.S. gallons [22.7 L]
Original gravity: 1.052 (12.9°P)
Bitterness: ~75 IBU
Color: 30-35 SRM
Alcohol: 5.5% by volume
Boil time: 60 minutes

MALTS

5.5 lb. [2.5 kg] Rahr Pale Ale malt
3.5 lb. [1.6 kg] Crisp Finest Maris Otter Ale malt
1 lb. [0.45 kg] Weyermann® Carafa® Type 3
0.75 lb. [0.34 kg] Rahr White Wheat malt
0.25 lb. [0.11 kg] Weyermann® Munich Type 1

HOPS

0.5 oz. [14 g] Citra hops, 12% a.a. (60 min)
1.0 oz. [28 g] Citra hops, 12% a.a. (20 min)
1.0 oz. [28 g] Citra hops, 12% a.a. (10 min)
1.0 oz. [28 g] Citra hops, 12% a.a. (5 min)
1.5 oz. [43 g] Citra hops, 12% a.a. (hop stand)
3.0 oz. [85 g] Citra hops, 12% a.a. (dry hop)

YEAST

California Ale Yeast

BREWING NOTES

Mash grains at 149°F (65°C) for 1 hour. Mash out at 167°F (75°C) for 10 minutes. Boil 60 minutes, adding hops as indicated. Allow the hop stand addition to soak for 20 minutes around 194°F (90°C). Chill beer and pitch yeast at 65°F (18°C) or at the temperature called for by your preferred yeast. Ferment at 65°F (18°C) for around 10 days. After primary fermentation, add the dry hop addition for 5-7 days. Package and enjoy.



Brew This!

Return of the Jedi Pale Ale

This recipe was designed by homebrewer Andrew Saunders and adapted by Big Brew 2024 sponsor Rahr Malting Co. Return of the Jedi Pale Ale reflects Endor, the forest planet home to the furry and ferocious Ewoks. This pale ale recipe has more piney and earthy hop notes to reflect the forest setting of the final battle between the Rebel Alliance and the evil Empire. Trub, trub!

Batch volume: 6 U.S. gallons [22.7 L]
Original gravity: 1.042 (10.5°P)
Bitterness: 60-65 IBU
Color: 5 SRM
Alcohol: 4.5% by volume
Boil time: 60 minutes

MALTS

5.5 lb. [2.5 kg] Rahr Pale Ale Malt
3 lb. [1.4 kg] Crisp Finest Maris Otter Ale Malt
0.75 lb. [0.34 kg] Rahr White Wheat Malt
0.5 lb. [0.23 kg] Rahr Dextrin Malt
0.5 lb. [0.23 kg] Simpsons Crystal Light Malt
0.25 lb. [0.11 kg] Weyermann® Munich Type 1

HOPS

0.5 oz. [14 g] Citra hops, 12% a.a. (60 min)
1 oz. [28 g] Citra hops, 12% a.a. (20 min)
1 oz. [28 g] Citra hops, 12% a.a. (10 min)
1 oz. [28 g] Citra hops, 12% a.a. (5 min)
3 oz. [85 g] Simcoe hops, 13% a.a. (dry hop)
3 oz. [85 g] Chinook hops, 13% a.a. (dry hop)

YEAST

California Ale Yeast

BREWING NOTES

Mash grains at 149°F (65°C) for 1 hour. Mash out at 167°F (75°C) for 10 minutes. Boil 60 minutes, adding hops as indicated. Chill beer and pitch yeast at 65°F (18°C) or at the temperature called for by your preferred yeast. Ferment at 65°F (18°C) for around 10 days. After primary fermentation, add the dry hop addition for 5-7 days. Package and enjoy.





The AHA's 2024

Member Gathering



IT'S NOT HOMEBREW CON BUT...

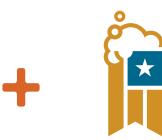
The American Homebrewers Association (AHA) has existed since 1978 and continues to evolve today. For 2024, we are pleased to celebrate AHA members in October by surrounding you with layers of beer appreciation, education, and off-the-charts networking at the who's who of U.S. beer gatherings. The Great American Beer Festival (GABF) was first hosted by the AHA in 1982 and has more beer lovers, brewers, judges, and beverage media in attendance than any other event worldwide.

Dubbed *AHA at GABF*, our 2024 gathering represents a shift from the traditionally hosted annual June Homebrewer's Conference (HBC), also known as Homebrew Con. We know some AHA members will miss HBC this year. I see you and hear you, but it is not judicious to host multiple annual events in which revenues do not meet expenses. In 2022 and again in 2023, HBC registration numbers were encouraging (1,300 yearly), but still lower than projected totals once venue contracts and plans were made. With today's event landscape a very different proposition for any national gathering, we need to reassess the HBC model. Additionally, how we as homebrewers interact, and what we want from the events we attend, have both changed. Smart stewardship demands we

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prevent a third consecutive year of HBC losses as we consider the event goals for both attendees and the AHA and options to host and attend a less expensive gathering.

We're planning a new and exciting GABF for 2024, and AHA members attending *AHA at GABF* have the added benefit of getting to choose which GABF sessions to attend. This will keep member costs lower than attending HBC in 2022 and 2023, plus hotel room rates will be competitive. Pro-tip: #BookHotelRoomsEarly. →



GREAT AMERICAN
BEER FESTIVAL®

2024 AHA AT GABF OCTOBER 9–12

Keeping with Homebrew Con Tradition

- **Denver, CO**—Pittsburgh hosted HBC in 2022, and San Diego hosted in 2023. This year, the central location of Denver aligns with our desire to maximize accessibility by continuing to move to different U.S. beer regions. Did you know Denver is known as the Munich of the West?
- **Club Night**—We are so excited to offer Club Night again this year thanks to our host venue, Denver Beer Company. This gem of a party is where homebrew clubs from across the U.S. showcase their best offerings, personally serving AHA members in attendance. Costumes are expected.
- **AHA Member Gathering**—Join your fellow AHA Members and AHA Committee Members for a kickoff toast and a chance to preview the wild and wonderful weekend ahead, along with AHA 2025 plans in the making.
- **Beer Judge Certification Program exams**—The BJCP will again host beer, mead, and cider exams, helping advance today's judges and shine a spotlight on competitions.
- **Bootcamp for Club Officers**—This second annual bootcamp is where homebrew club leaders share resources and best practices to help each other thrive.
- **2024 National Homebrew Competition Awards**—Announced in the festival hall, these are THE awards that designate the best homemade beer, mead, and cider in the world. 2024's competition had close to 4,000 entries, nine first-round judging sites (Chicago, Denver, Kansas City, Indianapolis, New York, Philadelphia, Portland, Ore., San Diego, and Tampa), and one final-round judging in San Diego.
- **AHA at GABF Headline Session: *The Future of Homebrewing***—Join us and a panel of today's top players in homebrewing as we take on this top-of-mind topic.
- **Satellite Events**—Some will pop up around Denver. Keep an eye on the GABF week events calendar and have your AHA membership card ready for Member Deals and discounts around town too.



New This Year

- **Homebrew Headquarters**—This AHA-only 3,000-square-foot area inside the GABF hall will include live demonstration brewing, GABF Pro-Am beer tasting, a You Be The Judge judging area to learn how to be a beer judge, Homebrew Marketplace, Homebrew Rockstars serving and sharing the story behind their beers, and more.

Access is exclusive to AHA members. Check out this link for a full schedule of events and where to register in advance.

HomebrewersAssociation.org/aha-gabf

STRATEGIC PLANNING

If you caught the AHA June 2024 Midyear Update on HomebrewersAssociation.org, you read about the AHA's strategic planning for 2025. Strategic work for innovation is a necessary pursuit, especially for an individual membership group of nearly 30,000 members, each with a wide spectrum of needs. As your newer Executive Director (since 12/21), I see a changing marketplace, evolving and passionate members, and an AHA structure worthy of updating. With that, here are some questions on my mind for planning.

- What investments serve the most members?
- What resources and member benefits fit for tomorrow's members?
- What solutions should the AHA provide, and what programs or services will see the most engagement?
- What business model sets up the AHA for future success?
- What type of national and annual gathering will resonate and attract the most members, where should it be

hosted, and what is a reasonable cost of attendance?

- How can the AHA continue providing community when fewer members attend events?
- What role should the AHA play in supporting homebrew clubs and retail supply shops?
- What technologies and media platforms best serve how you, as members, want to receive information?
- How can we get more beginners to homebrew, and how best can we help intermediate brewers to advance?
- What evolutions in homebrewing should we anticipate, and what other fermentation and beverage interests will AHA members have?

Tied to planning, the AHA fielded a June survey sent to all members who opt in to receive AHA emails. Respondents who requested a summary will receive aggregated results. We also look forward to sharing updates at the AHA Member Gathering on October 10 during AHA at GABF and in future issues of Zymurgy.

Cheers and good beers to you, thank you for your ongoing membership, and here's to providing reasons, recipes, rewards, and resources to brew and ferment.

**Much of the above is an adaptation of our June 2024 AHA Midyear Update published on HomebrewersAssociation.org. For AHA's latest, sign up for the What's Brewing newsletter.*

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.



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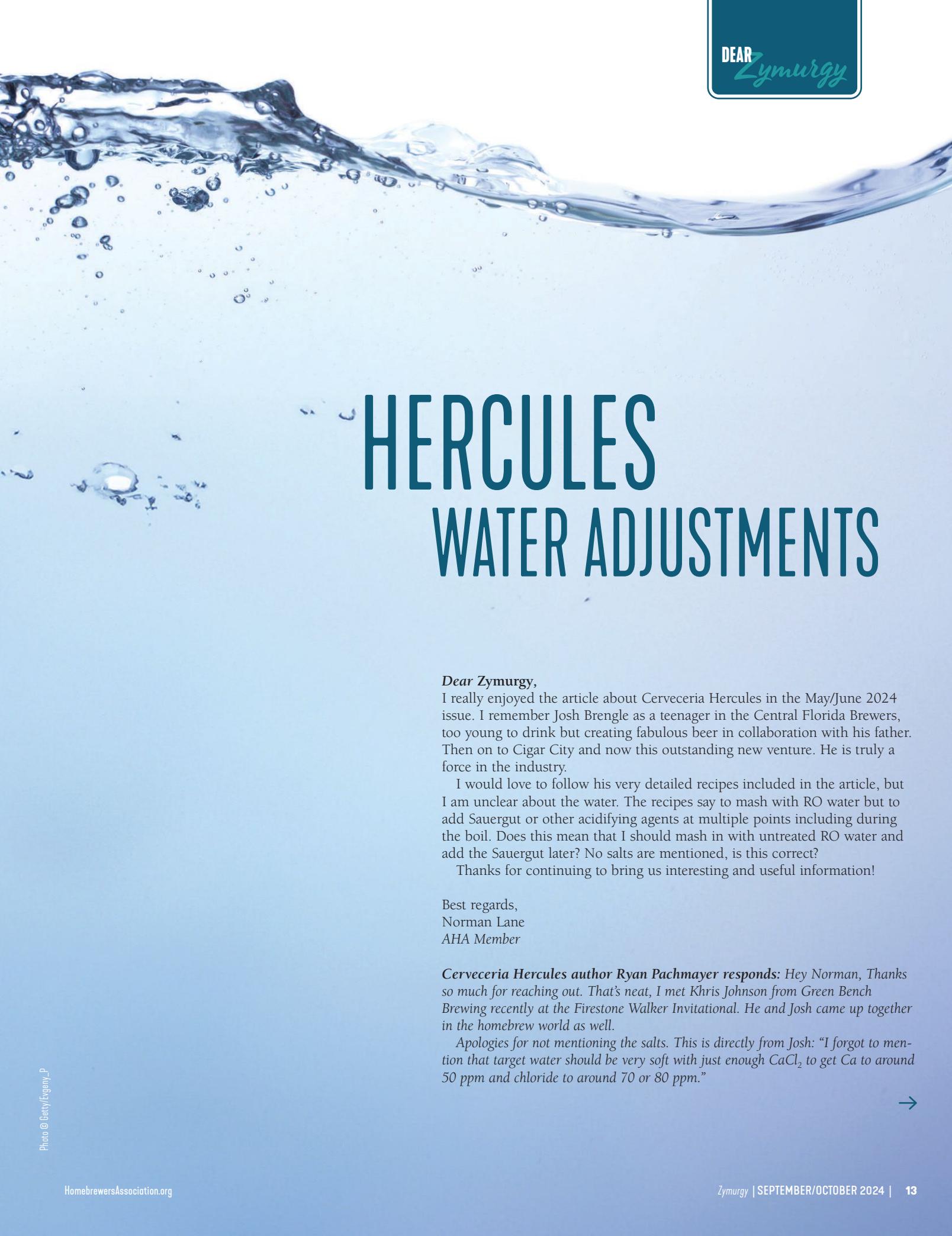


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HERCULES WATER ADJUSTMENTS

Dear Zymurgy,

I really enjoyed the article about Cerveceria Hercules in the May/June 2024 issue. I remember Josh Brengle as a teenager in the Central Florida Brewers, too young to drink but creating fabulous beer in collaboration with his father. Then on to Cigar City and now this outstanding new venture. He is truly a force in the industry.

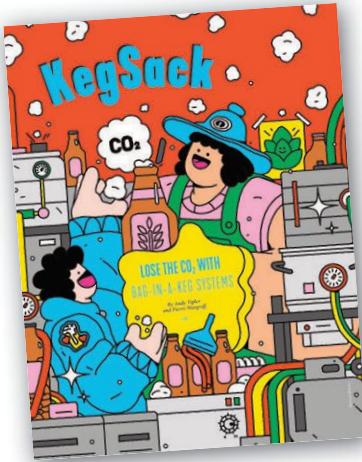
I would love to follow his very detailed recipes included in the article, but I am unclear about the water. The recipes say to mash with RO water but to add Sauergut or other acidifying agents at multiple points including during the boil. Does this mean that I should mash in with untreated RO water and add the Sauergut later? No salts are mentioned, is this correct?

Thanks for continuing to bring us interesting and useful information!

Best regards,
Norman Lane
AHA Member

Cerveceria Hercules author Ryan Pachmayer responds: Hey Norman, Thanks so much for reaching out. That's neat, I met Khris Johnson from Green Bench Brewing recently at the Firestone Walker Invitational. He and Josh came up together in the homebrew world as well.

Apologies for not mentioning the salts. This is directly from Josh: "I forgot to mention that target water should be very soft with just enough CaCl_2 to get Ca to around 50 ppm and chloride to around 70 or 80 ppm."



BAG-IN-A-KEG DISPENSE SYSTEMS: SINGLE-USE KEG WARNING

Dear Zymurgy,

While the KegSack article in the July/Aug 2024 issue does address the disadvantages of using a commercial single-use keg for homebrew and a BIAK system, I would go a step further and discourage their use altogether. (See Performance Guidelines for Single Use Kegs at brewersassociation.org/educational-publications/single-use-beer-keg-guidelines/). They are simply not designed to stand up to cycles of pressurization and depressurization or any type of cleaning (heat or chemical), and over time they will become dangerous to operate. While they are rated at 100 psi, the

material is not designed for long-term use and will deteriorate over time.

Old, deteriorated plastic can shatter when it fails and create a lot of shrapnel. Most single-use kegs don't have any UV protection and can become very brittle if left in the sun. Because of their light weight, I have seen pictures of other failures where the keg became a missile. When a single-use keg is new, it will most likely fail safe. If reused and has lost its integrity, all bets are off. The images I have seen for some of these single-use kegs that have failed in various ways are frightening.

If someone did decide to use a BIAK system with a single-use keg, it would be beneficial to discuss their pressure ratings and longevity. The Corny keg idea is much safer. This is not meant to be a criticism, just an observation from decades of watching people finding creative ways to hurt themselves.

Chuck Skypeck
Brewers Association Technical Brewing Projects Director

KegSack: Bag-In-A-Keg Systems authors Pierre Margraff and Andy Tipler respond:
Hi Chuck, you make some valid points. It appears that most arguments against reusing PET containers focus more on the potential

release of chemicals from within the plastic as the walls are flexed over a long period. With the BIAK approach, the beer never makes contact with the keg walls, so this concern is moot. It also means that the keg needs minimal cleaning—the need for harsh chemicals that could affect the integrity of a PET keg. In a BIAK system, the beer bag is removed for external cleaning and/or replacement.

The ability to withstand repeated pressurization through keg reuse might still be a concern, but PET is surprisingly strong—2-L soda bottles claim to have a pressure rating of 150 psig and the manufacturers' claimed pressure ratings for their PET beer kegs are in the range of 50 to 60 psig—all much higher than the usual carbonation pressure of beer (~20 psig or less). If a PET vessel ruptures at this pressure, we don't think it would be dangerous (but very messy). With BIAK, the keg only holds air, and there is a low risk of beer leakage, as the internal bag should fill the rupture and seal it.

Also worth noting: in Brazil and Africa, Coca-Cola uses "Universal" PET bottles that can be refilled up to 25 times with soda at about 55 psig. This has cut down their use of new plastic bottles by 90 percent. So safe, reusable PET kegs are possible, and hopefully in time we will see similar products made for homebrewers. [For more on Corny kegs and alternative options for packaging, see Beer School on page 23.]

CITRUS PEELS AND YEAST FERMENTATION

Dear Zymurgy,

I have observed a strange phenomenon when I brew with lemon peel. This has happened three times now with different recipes. When I add >1 oz fresh zest to the boil, the resulting beer will get stuck at 1.020 FG. I have tried adding yeast energizer, new yeast, sugar, and nothing works to bring the gravity down. I almost never have a stuck fermentation when I don't use lemon peel, so I doubt it is related to my process. This is when I use only lemon peel—no juice or anything acidic. Is there any explanation? Has anyone else experienced this? Is it just a weird coincidence?

Christiana Bockisch

Editor-in-chief Amahl Turczyn responds:
Hi Christiana, there was some discussion of this topic on the AHA Forum. One responder

suggested that as the lemon peel degrades, it creates an excess of oxygen in the fermenter, which, that late into fermentation, then causes the yeast to fail. Apparently, this becomes an issue with fermenting hard iced tea with lemon, which is why commercial producers just add ethanol to a sweet tea-and-lemon concentrate. Regardless, it was suggested that any citrus peel added to beer for flavoring should be done post-fermentation for best results. If any readers can provide further explanation for this citrus peel mystery, please share your thoughts.



DEAR ZYMURGY

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

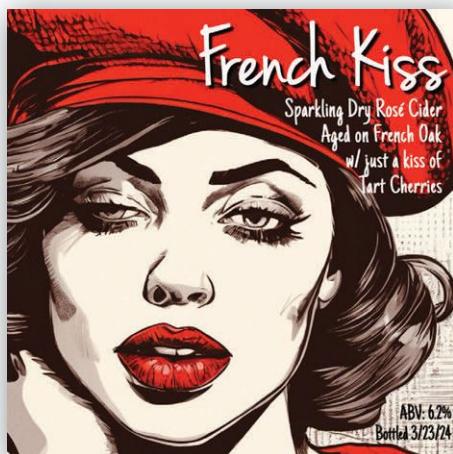
YOUR HOMEBREW LABELS



A leap year in the midst of the flower power movement across America, Reservoir Hill Brewing's 1968 represents that leap into a floral, fruity beer experience symbolic of a rapidly evolving time in our society. With a tropical/floral hop immersion across a refreshing summer ale, 1968 represents a time of inner peace and flower power, soundtracked by great music.

Phil Littlefield

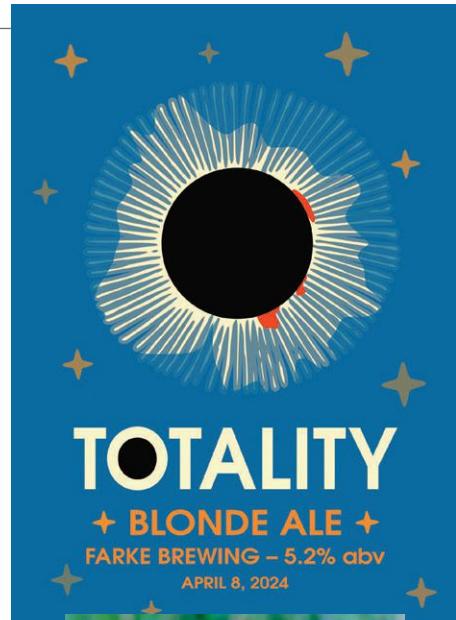
(Homebrewer 14 years,
AHA member 1 year)
Reservoir Hill Brewing
Methuen, Mass.



This cider was the winning entry of a local competition put on by Brick River Cider in St. Louis. It was a collaboration batch made by a fellow Brewhog, Richard McWhirter, and myself. We called it French Kiss due to the use of French yeast, oak, and tart cherries to make it blush.

Giovanni Piva

(Homebrewer 8 years,
AHA member 6 years)
STL Brewhogs
Saint Louis, Mo.



I was thrilled to witness the total solar eclipse on April 8, 2024, and it inspired me to create a beer in honor of the occasion. Totality Blonde Ale is a wonderfully drinkable American blonde ale, made with the astronomically themed Galaxy and Eclipse hops. It's a perfect summer beer for sipping while watching the stars from our backyard.

The label was a "just for fun" project, when I needed a distraction. The stylized solar prominences and shape of the corona around the sun are patterned after what we viewed in the eclipse itself. I drafted the art in the open-source vector program Inkscape.

A full write-up about the beer, with recipe, is on my blog: andybrews.com/2024/05/29/totality-blonde-ale

Andy Farke

(Homebrewer 17 years,
AHA member 10 years)
Horse Thief Brewers Association
Claremont, Calif.



This is my label for a raspberry wheat beer. I got its name from my cat assistant who likes to keep an eye on my brews and be the person I can talk through ideas with.

Chris Crow

(Homebrewer 3 years, AHA member 1 year)
East Side Brewers
Belleville, Ill.



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!

SCAN ME



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



My supervisor, Bark W. Griswold, is inspecting my brew day progress of an amber ale. He approved!

Michael Slater

(Homebrewer 9 years, AHA member 5 years)
Littleton, Colo.



The Big Angus Brewery is named after two of my Labradors. It's our most frequently visited entertainment space. We always have four homebrews on tap as well as a cooler for commercial beers. In the photo you can see our kegerator, fermentation chest, Anvil all-in-one system, and our bar.

Bruce Farrar

(Homebrewer 14 years, AHA member 1 year)
Columbus, Ind.



I brew with my Grainfather system and two BeerMkers. I installed a winch to raise and lower my Grainfather mash tun. My two-tap kegerator serves the beer at the right temperature and has space for lagering. Two beer fridges keep my mini kegs, as well as my hops and yeast, cold.

John Reinhardt

(Homebrewer 13 years, AHA member 7 years)
Dade City, Fla.



Carson Weiss (age 3) helping make his first Braggot.

Aaron Weiss

(AHA member 3 years)
Pittsburgh, Pa.



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 🐓's love the spent grains from one of the Brewers Association staff brew days.

Zoe Robb

Brewers Association, Membership Assistant
Boulder, Colo.

I've been brewing for over 20 years now. It started as a challenge, but now I have a 20-gal. Spike system and custom-built equipment, which makes my brew days quick and easy!

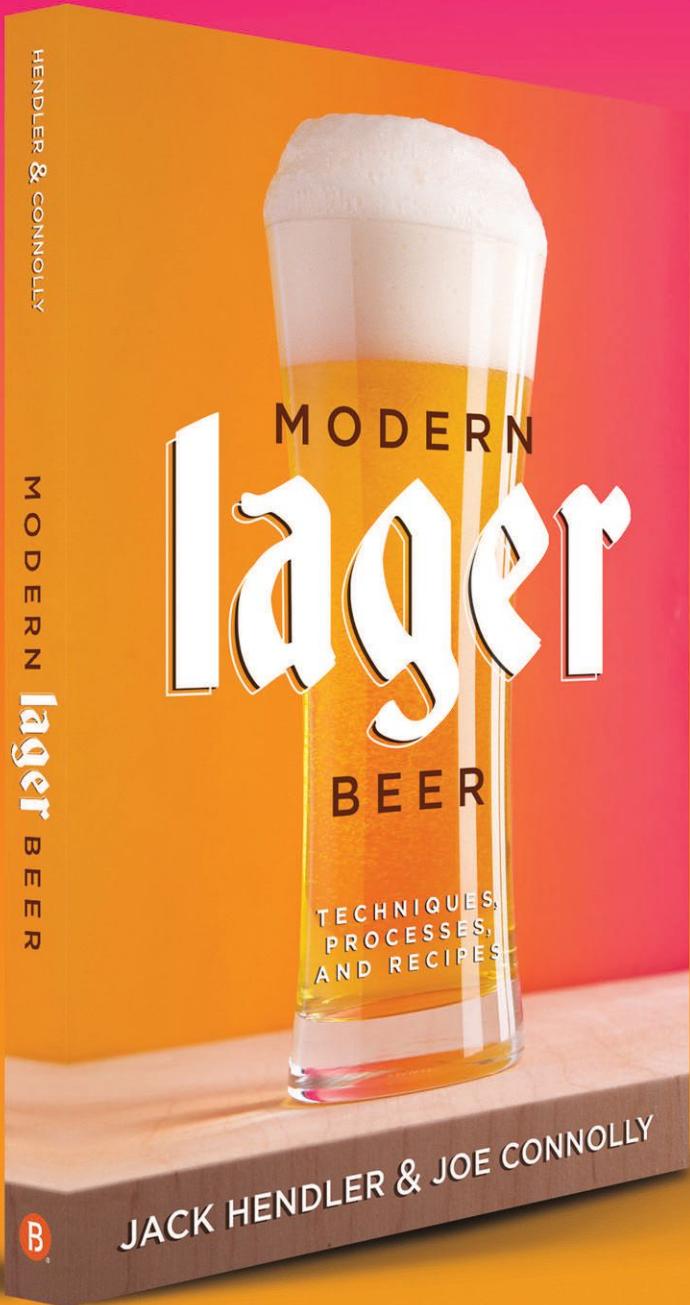
Joseph Eberhardt
(Homebrewer 20 years, AHA member 2 years)
Lehigh Valley Homebrewers
Allentown, Pa.

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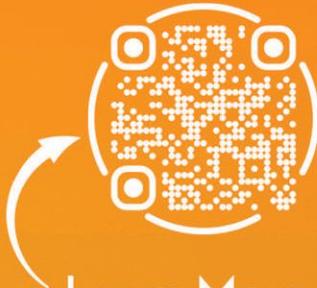
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Cinnamon Rolls

By Amahl Turczyn

As the days grow cooler, it's time to think about spiced baked treats, and cinnamon rolls are some of the best comfort foods home bakers can make. These treats start with a sweet dough, and are filled with a combination of nuts, butter, cinnamon, and sugar, with a dash of vanilla extract for good measure. Pretty much any type of nut works, though I particularly enjoy pecans. Since my brother-in-law is allergic to them, however, when I visit my sister, I substitute almonds, and they work just fine.





The base dough is a fairly rich one that produces a soft, buttery bread. In fact, it's a recipe for an Italian milk roll called *panini al latte*. It's a great recipe to use for dinner rolls around the holidays, but it's a perfect match for cinnamon rolls as well. If you have a stand mixer, the procedure is easy. I start with whole milk, room-temperature butter, and sugar, and warm them to about 100°F (38°C). All weights are in grams, so get out your trusty digital scale...the one you use for hops on brew days. Once the butter starts to melt, add your yeast, one egg, the flour, and finally the salt.

I'm a bit particular about the type of each ingredient, but you don't have to be. I use Kirkland A2 whole milk, organic eggs, New Zealand grass-fed butter, and organic all-purpose flour, all from Costco. The salt and sugar brands aren't that important, but my favorite yeast is Saf-Instant Instant Dry Yeast, and I highly recommend it for getting a good, quick rise. I also like using a spiral mixing attachment on my KitchenAid stand

mixer, as it doesn't shear the dough as much as a standard dough hook, but that's kind of nit-picky...the regular dough hook does an adequate job.

Once the dough comes together, allow it to proof for 90 minutes. I have a proof setting on my Wolf oven that keeps the dough at 80°F (27°C), but allowing it to rise at room temperature is fine too. Once the dough doubles in volume, it's ready to be scraped out of the bowl and onto a floured surface for a quick knead. The dough will be sticky, so a little flour is necessary.

While you are waiting for the dough to proof, you can make the cinnamon filling. This is just 125 g (~1 cup) of whole nuts, pecans, walnuts, almonds, or whatever you have on hand, 15–30 g. (1–2 Tbs) of cinnamon (I prefer Ceylon), 40 g. of butter, 40 g. of brown sugar, 3 g. of salt, and about a teaspoon of vanilla extract. I use a large grinder for this operation, as it makes quick work of the nuts and produces a chunky, spiced nut butter, but you can also use a Vitamix. I'll often make double batches of this mixture, as cinnamon rolls are popular for breakfast at my house, and I can store half of the batch in the freezer until the next time I bake them.

The proofed, kneaded dough is rolled out into a large rectangle that's a bit less than an inch thick. Make sure you have enough flour under it so that it doesn't stick, and then spread your filling out evenly, leaving a bare inch or two across the top of the rectangle. The filling can go all the way to the edges everywhere else.

Proofed dough.



Proofed dough rolled into a rectangle.



“
I'll often make double batches of this mixture, as cinnamon rolls are popular for breakfast at my house.

Starting at the bottom, roll the rectangle up tightly to make a thick cylinder that's roughly three to four inches in diameter. Wipe the bare ribbon you left at the top with a bit of water, then continue rolling up, sealing the filling inside. With a sharp knife, cut the cylinder into 1½- to 2-inch slices and place them spaced an inch or two apart on a buttered baking pan, or one that's been lined with a silicone baking mat.

Back they go into the proofing oven to rise—this should only take 30 or 40 minutes. To help them along, I'll often place a

Dough with filling. Note bare ribbon at the top.



tray of boiling water in the oven with them. The steam keeps them warm and helps them to not dry out as they rise. When the sides of the rolls are touching, and they've doubled in size, it's time to bake. Remove the water tray, set your oven for 350°F (177°C), and when it's hit that temperature, place the baking tray in the middle to lower third of the oven to bake. They'll only need about 20 minutes to develop a golden brown color, and your kitchen should be smelling pretty good right about now.

Roll up dough and wet the top with water to seal.



Cylinder ready to slice.



Rolls in a buttered baking pan ready to rise.



Risen rolls ready to bake.



Baked rolls.



Cream cheese icing optional.



You can of course make up an icing of confectioners sugar and milk, or perhaps confectioners sugar with softened cream cheese and butter, but the thing I like about this recipe is that even though it's very dessert-like, it isn't overly sweet like shopping mall cinnamon rolls. Any leftover rolls will keep a few days in the fridge. Happy baking.

Amahl Turczyn is editor-in-chief of Zymurgy.



Cinnamon Rolls

Recipe courtesy of Amahl Turczyn

Batch Volume: about 10 large rolls

DOUGH

117.6 oz. [500 g] all-purpose flour
10.6 oz. [300 g] whole milk@100°F [38°C]
1 egg
1.8 oz. [50 g] sugar
14 oz. [40 g] butter, room-temperature
1.7 tsp. [10 g] salt
2.25 tsp. [7 g] Saf-Instant dry yeast

FILLING

125 g. [1 cup] pecans, almonds or walnuts
15–30 g. [1–2 Tbs] cinnamon
1.4 oz. [40 g] butter
14 oz. [40 g] brown sugar
1 pinch [3 g] of salt
1 tsp. [5 mL] vanilla extract

DIRECTIONS

Warm milk, butter, and sugar together until they reach about 100°F (38°C). Add yeast, egg, flour, and finally salt. Mix in a stand mixer with a dough attachment for about 5 minutes or until a soft dough forms. Proof dough for 90 minutes. While you are waiting, add filling ingredients to a large grinder or Vitamix and process to your preferred level of chunkiness. Scrape the dough out onto a floured surface and roll into a large rectangle that's a little less than an inch thick. Spread the prepared filling over the surface, leaving a 1-inch ribbon of bare dough at the top. Roll up from the bottom into a thick cylinder. With a sharp knife, cut the cylinder into 1½- to 2-inch slices and place them spaced an inch or two apart on a buttered baking pan, or one that's been lined with a silicone baking mat. Allow rolls to rise in a warm place, optionally with a tray of boiling water to keep them company. Remove tray when they have doubled in size and bake them in a 350°F (177°C) oven for about 20 minutes, or until golden brown.

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PACKAGING YOUR HOMEBREW

Cornelius Kegs and Their Alternatives

By Chris Colby

Cornelius kegs have been a staple of homebrewing for over 50 years. While they've become the standard for amateur brewers who want to serve homebrew on tap, used Cornelius—or "Corny"—kegs are getting harder to find, and their price is rising. New kegs are available but now cost over \$100. As such, some homebrewers are looking for alternatives for bulk packaging. So let's take a look at Cornelius kegs and their alternatives.





CORNY KEGS

Cornelius kegs were designed to dispense soft drinks: sodas, soft drinks, or pop, depending on your region of the country. They were originally manufactured by Cornelius, Inc., hence their name. They were first adopted by Coca-Cola in 1957 for dispensing pre-mixed Coke products. Later, Firestone/Spartanburg began producing comparable soda kegs. These companies no longer produce these kegs. But today there are specialty manufacturers, such as AEB Italy, who still produce new stainless Corny kegs.

BOTTLE CONDITIONING

Bottle conditioning is an alternative to packaging beer in Cornelius kegs. Filling a seemingly endless number of bottles is what encouraged most homebrewers to switch to kegging, but there are a few things to consider before completely dismissing bottle conditioning.

A 5-gallon (19-L) batch of beer can be packaged in 53 12-oz. bottles. That's a lot of filling and capping. But with larger bottle sizes, you can lower these numbers. Using 22-oz. "bombers" reduces the number of bottles required by roughly half. You only need 29. One-liter swing-top bottles are not hard to find, and now you only have 19 to fill—plus you don't need crown caps. (You will need, however, to replace the gaskets every few batches.) Two-liter growlers are likewise common, and now you only have 9 containers to fill, with enough beer left over to fill a 1-L bottle. And finally, one common size of soda bottle is the 3-L PET bottle. Fill just 6 of these, reusing the screw-top caps, and you'll have about 11 oz. of beer left over.

If you have a CO₂ tank, you can also use carbonator caps to carbonate 2-L PET bot-

Corny kegs were also adopted by Pepsi. But some time later, Pepsi introduced the "bag-in-a-box" bags of syrup. The syrup is mixed with carbonated water at the fountain to create the soda on the spot. The bag-in-a-box design takes up less room than Corny kegs and the packaging is cheaper. So, soda manufacturers started replacing pre-mix steel keg soda fountains with post-mix dispensers using the bag-in-the-box packaging. This change did not occur overnight, and—given the ubiquity of soft drinks in our society—there was a large surplus of used kegs available to homebrewers at a reasonable price in the 1980s and beyond.

There were a wide variety of Corny-type kegs produced. The most popular size was 5 gallons (19 L), but 3-gallon (11-L), 10-gallon (38-L), and 2.5-gallon (9.5-L) kegs were not hard to find. Most were made with 304 stainless steel.

Coke kegs were fitted with pin lock connectors for the gas-in and liquid-out posts. Pepsi's kegs had ball lock connectors, and these were more popular with homebrewers. Coke and Pepsi kegs varied slightly in their dimensions—a 5-gallon (19-L) keg of Coke was 9 inches in diameter and 23 inches tall; a 5-gallon (19-L) Pepsi keg was 8.5 inches in diameter and 24.74 inches in height. This is not much of a difference, and most soda fountains could accommodate either or both types of

kegs. Both designs could take 130 pounds per square inch (PSI) of pressure. Soda was typically dispensed at 5 volumes of CO₂. As such, the kegs at soda fountains were placed under 39 PSI at 40°F (4°C). This is a slightly higher pressure than homebrewed beer packaged in a Corny keg.

The threads on the posts differed slightly in kegs made by Cornelius and kegs manufactured by Firestone/Spartanburg. Cornelius kegs had 19/32-inch threads while Firestone/Spartanburg's posts were 9/16-inch. A small difference, but enough that posts from one company wouldn't fit the other, even though they both had 18 threads per inch.

If well cared for, Cornelius kegs will last pretty much indefinitely. Fortunately, periodic maintenance is easy. You will just need to replace the gaskets on the lid and on the posts as they wear out, but the gaskets are inexpensive (and still not hard to find). Eventually, beer stone (calcium oxalate) will become an issue and will require removal with chemical cleaners designed specifically for the task. An effective and relatively safe clean-in-place (CIP) procedure to remove beer stone from steel kegs is to use a phosphoric/nitric acid solution at 120–140°F (49–60°C) for 15 to 30 minutes, followed by a non-caustic alkaline solution in the same temperature range, without a rinse in between, for the same duration. Then rinse thoroughly with water.



ties. The plastic cap is threaded to fit the standard 2-L soda bottle, and this gas-in fitting can be attached to a ball-lock gas-out fitting from the CO₂ tank. Most 2-L bottles will hold up to 150 PSI (for a while at least), which is a lot more pressure than you would ever need to carbonate beer.

An added advantage of using PET bottles of any size for packaging homebrew is that you can easily gauge the level of carbonation in the beer just by squeezing the bottle. This is particularly handy

for bottle conditioning high-carbonation styles such as Bavarian wheat beer and Berliner weisse. One disadvantage is that most PET bottles are not dark enough to protect the beer from UV light, so they need to be kept in the dark to prevent light spoilage from mercaptan, which is responsible for "skunking."

Bottles are cheap, reusable, and they are easy to take to homebrew club meetings or parties. So, for completeness, bottle conditioning is worth mentioning.



CASK CONDITIONED BEER

Cask conditioning is another alternative to kegging. Pins hold 5.4 U.S. gallons (20 L) and firkins hold 11 gallons (41 L). For 5- or 10-gallon batches, you only have one vessel to fill. However, casks are primarily used for British-style, lightly carbonated ales. Hence, they aren't a good alternative for lager brewers or homebrewers who make brewpub-style ales.

Casks have two bungs, one on the top and the other at the front of the cask. The front bung hole can be fitted with a key-

stone, the “plug” that is broken when the keg is tapped. Although not particularly expensive, the bungs and keystones need to be replaced after use. Also, unless a cask breather is used, the beer should be consumed quickly, ideally in one sitting. Cask ale is usually still good after a couple of days if the cask has been kept at cellar temperature, though.

If you like British-style cask ales and love throwing parties, tapping a pin or a firkin can be a fun flourish to impress your guests.



PRESSURIZED GROWLERS

Pressurized growlers, most ranging in size from 64 oz. (1.9 L) to 1.3 gallons (4.9 L), are a popular choice for people who want to transport small amounts of beer to gatherings. Most are pressurized using the 12-g., 16-g., or 25-g. “paint ball” CO₂ cartridges, and on many you can adjust the gas pressure within a reasonable range for dispensing beer.

You can also force-carbonate your beer in the growler. Once finished, the CO₂ cartridges will maintain pressure and push the beer for dispense. If you carbonate your beer—whether by kegging or bottle conditioning—before transferring it to the growler, you will save money on CO₂ cartridges. One obvious tactic would be to let a beer carbonate in a 2-liter PET bottle, then carefully transfer it into the growler. Some growler designs may even allow you to do this under pressure to retain conditioning. The CO₂ cartridge would then be used only for dispense.

Pressurized growlers can also be used to package extremely small batches of beer. Given their cost, packaging 5 gallons (19 L) of beer in nine 64-oz. growlers (with a little left over) would be more expensive than any other option. However, like Corny kegs, their sturdy design means they can last indefinitely with proper cleaning and a little periodic maintenance.



PET KEGS

An Australian company called Kegland now produces PET plastic kegs that take the standard ball lock gas-in and beer-out fittings. Kegland makes 5.2-gallon (20 L) and 2.1-gallon (8.0 L) kegs of orange PET plastic. The plastic is see-through, so you can see the beer in the keg. However, there is some protection against UV light from the amber color. The company claims a lower rate of oxygen ingress through their plastic than standard PET soda bottles. And because the fittings aren't sealed with rubber gaskets, they claim less oxygen ingress through the fittings and lid.

The kegs come equipped with a floating dip tube, so beer is drawn from the surface. This means you could “bottle condition” the beer in the keg and dispense it without the sediment becoming a problem until the last couple of pours. And of course, because the kegs hold over 100 PSI of pressure, you can force carbonate using the same procedure for forced carbonation as you would in a stainless steel Corny keg. PET kegs also cost less than used Cornelius kegs—frequently less than \$40 for the 5.2-gallon (20-L) size.

The kegs themselves—minus the modifications for Corny keg fittings—are designed for single-use applications in commercial beverage dispense. Kegland claims you can reuse the kegs as long as you pressure test them every two years, but any commercial keg intended for single use should be approached with caution (see *Dear Zymurgy* on page 13). This lack of durability compared to steel means PET kegs will not last as long as a Corny, and regardless of pressure test results, should be replaced every few years. The BA has determined that reusing single-use kegs might pose risks.

Tried-and-true Cornelius kegs have their faults, but because they are so durable, they are not going away anytime soon. However, there are some good alternatives available for packaging your precious homebrew.

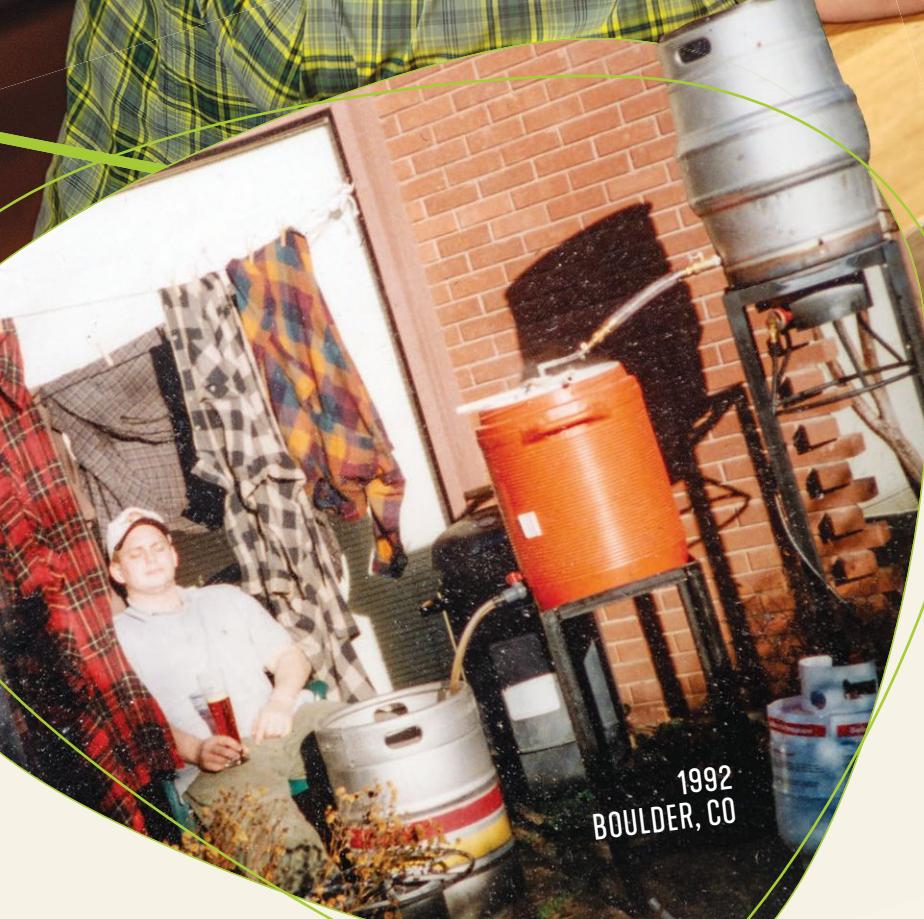
Chris Colby has been a homebrewer since the early '90s, when he studied molecular evolutionary genetics at Boston University. After receiving his PhD in 1997, he briefly worked in educational publishing before becoming a beer writer and editor. He is the author of *Methods of Modern Homebrewing* (2017), *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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TRÖEGS SCRATCH LAB

JOHN TROGNER

2024
HERSHEY, PA



TRÖEGS

TWO HOMEBREWERS BUILD A CRAFT EMPIRE

By Mark Pasquinelli

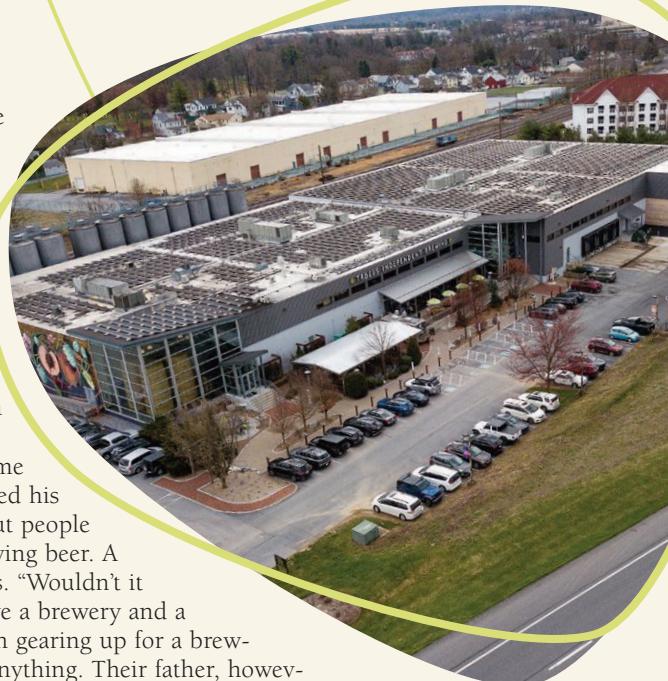
Most homebrewers will never go pro, but we can dream—I certainly have—and dreams can come true. The task may seem daunting, but where there's a will, there's a way. I've admired Tröegs Independent Brewing from the beginning, not only for its amazing assortment of craft beers—refreshing wheats, malty bocks, bold West Coast and hazy IPAs, sours, and seasonals—but also because the brewery represents the quintessential American success story—two local homebrewers making good. I recently got to sit down with co-owner John Trogner to learn the Tröegs story, discover how he and his brother did it, and perhaps live vicariously through them.

GERMINATING SEEDS

John and his younger brother Chris always knew they wanted to start a business. They just weren't sure what. College sent them on that quest. John moved to Philadelphia to study finance. Chris took Horace

Greeley's advice and went west to Boulder. John soon realized he wanted no part of the suit-and-tie uniform-and-cubicle grind of the corporate world. Chris, on the other hand, visited Coors and the now-defunct Walnut Brewery in Boulder and caught the beer bug without realizing it. He began homebrewing immediately—until the shop owner carded him and realized he wasn't 21.

When the two reunited at home during the holidays, Chris regaled his brother with mythical tales about people who actually made a living brewing beer. A lightbulb went on in their heads. "Wouldn't it be fun," John recounted, "to have a brewery and a restaurant together?" They began gearing up for a brewpub startup, without knowing anything. Their father, however, thought it would be wise for them to have some practical experience first. So John packed his bags and joined his brother in Boulder. →



While Chris attended school, John sought work in the still-emerging brewing world. He interviewed at several places. Not surprisingly, no one was interested in a finance major from Philly with no experience. Then, by chance, he stumbled into Boulder's Oasis Brewing Company just as it was dealing with a burst hose in the kitchen, which was adjacent to the bottling room. He asked if there was any work and was hired on the spot. But he'd have to work his way up from the bottom.

A BREWER IS BORN

Within six months, John went from having never brewed to managing the seven-barrel, four-shift Oasis operation. He'd gone from mopping the floor to working on the bottling line, to scrubbing tanks in the cellar, to eventually helping out in the brewhouse. With his dedication and do-anything work ethic, he finally became a full-fledged brewer. "It was a phenomenal learning experience," he said, shaking his head, seeming to still struggle to comprehend it fully. "I had free rein to brew what I wanted, as long as it didn't taste bad."

Indeed, Boulder in the early '90s was magical—an epicenter of an emerging craft beer revolution—and John found himself in a serendipitous convergence of place and time. The Association of Brewers (now Brewers Association) was nearby, and Charlie Papazian would often visit the bar,

giving advice...and criticism. "He could be blunt," Trogner remembers with a smile. "I didn't realize how wild that experience was until much later."

Oasis Brewing expanded, adding a packaging brewery, which John had to re-engineer. To do this, he had to fortify his brewing education by becoming several tradesmen at once: welder, plumber, electrician, and all-purpose handyman. When he couldn't learn a particular discipline, he took courses to make himself more proficient. Most importantly, the second brewery gave him another perspective on design. Formal education at Siebel in Illinois and U.C. Davis in California followed.

Meanwhile, Chris was working on an entrepreneurial major at school and contributed by making beer the crux of every project assignment, slowly formulating a business plan. After graduation, he went to brewing school in England.

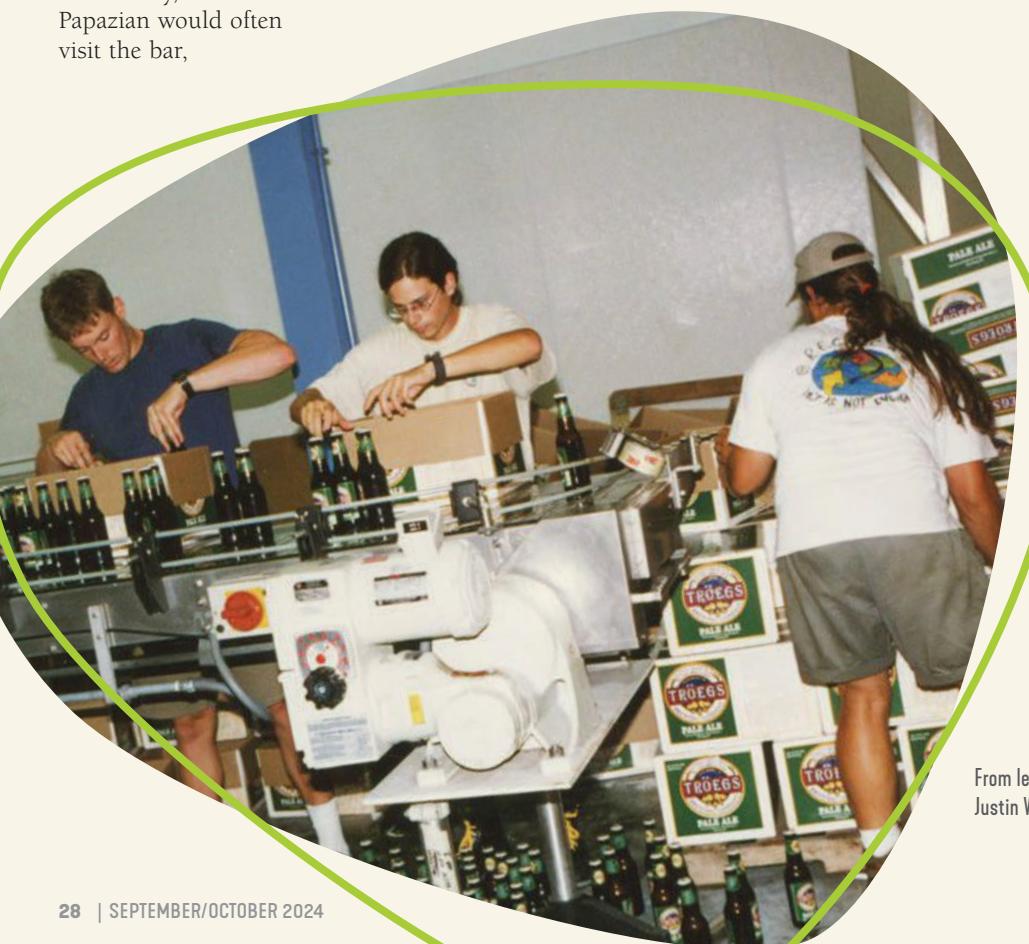
Their plan was rapidly falling into place when one evening, undoubtedly after too many test brews, the brothers hit upon the name Tröegs for their brewery—a combination of their last name and *kroeg*, the Flemish word for pub.

STARTING THEIR OWN MICROBREWERY

Believing they were finally ready, John and Chris returned to their roots in central Pennsylvania. They convinced a bank to give them a loan, found a warehouse in Harrisburg, and hung a sign with their odd name on the door. Fortunately, the craft beer revolution was in full swing by then, and the brothers didn't have to repurpose their equipment, as brewing pioneers like Sierra Nevada were forced to do. With John's experience at the Oasis breweries, the design of their 20-barrel brewhouse and cellar of 60-barrel fermenters, which were large for their time, was already set. "It was simple equipment, but well-designed equipment," said John. The brewery served its first beer, a pale ale, on July 18, 1997. Those early days were exciting but chaotic. Friends and family ran the bottling line, while the brothers oversaw brewing operations. Their business grew, becoming a home for kindred spirits with imaginative ideas.

Success, however, came with inevitable growing pains. By early 2010, John and Chris' brewery was starting to feel tight. The Trogners set their sights on constructing new digs, and Chris' sketches became a reality in late 2011 with a facility in nearby Hershey. The new, built-from-the-ground-up brewery contains three separate brewhouses. The largest, a 100-barrel system, is for general production. Each component is separate, from mash tun to whirlpool, so batches can be piggy-backed to fuel the 24/7, six-day-a-week operation. The smaller 4- and 15-barrel systems serve as their launching pads for research and development. "Everything in the brewhouses is custom automated," John added, "so our brewers can use their brains, not their backs."

A massive tasting room with a snack bar resides in the midst of the 100-barrel brewhouse. John jokingly refers to it as their "brew garage." The room is based on the concept of homebrewing in your garage (their initial design had roll-up doors) and inviting friends and neighbors over for drinks. The open space allows folks to enjoy a pint and watch the brewery's goings-on from above.



From left: Blair and Chris Trogner, with friend Justin Weaver, bottle the first batch of Pale Ale.

RESEARCH AND DEVELOPMENT

Recipe design has evolved radically since John's days at Oasis. "Back in Boulder, we were brewing beers we'd only read about," he explained. It wasn't too far removed from homebrewing. "None of us could go to the Czech Republic or wherever, and actually taste those beers. We were making just over minimum wage. When we tried to revive Old World styles, we dreamed about what those beers should taste like. If something tasted good, you started experimenting—carefully."

He mentioned that the jumping-off point for those dreams and experiments began with the writings of Michael Jackson and Charlie Papazian, the same writers who inspired me when I started crafting my first homebrew recipes.

Nowadays, Tröegs' new recipes start not in the brewery, but upstairs, where ideas are kicked around. Their recipes originate from ESB, Nut Brown, and Pale Ale core brews. For example, Pale Ale became the genesis for everything from LaGrave, a Belgian golden, to Perpetual IPA. This is where the Scratch Beer Series, a concept started to celebrate Tröegs' 10th anniversary, comes into play. "We're learning about components of recipes, not searching for exact recipes, but trying to find combinations of ingredients that can be put into beer," said John. It's a sort of creative recipe incubator from which perennial brewery favorites such as Troegenator Doppelbock, Mad Elf (a Belgian-style holiday strong ale), and Hopback Amber were born.

Test batches are brewed on the 15-barrel system and split into four fermenters, typically with different yeast, fruit, and hop combos. The brothers, having already done the tedious up-front work of learning individual ingredient flavors, can then make several tweaks at once. "We assess what the combos taste like

and make blends that can be scaled up, so the outside world can finally taste them. There may be up to 10 versions of a beer before it makes it to a tap. We learn from brewing repetitively," John continued. "Every once in a while, we package a small amount. If it goes well, scalability comes into play—going from a 200-case to maybe a 50,000-case batch. It's hard to do if you want something interesting and nuanced. Some breweries are good at winging it. I can't do that."

When designing new recipes, John also emphasized the subjectivity of taste. What one person tastes may not be what another perceives. This is why Tröegs always prefacing its descriptions with "We taste..." I asked John what he thinks makes Tröegs' beers special. He paused for a moment, in deep thought, before saying, "We probably overthink. There's always a reason behind the recipe. We don't have finance and

marketing departments pushing us. We just try to make stuff that tastes good and make it as consistently as possible."

TRICKS OF THE TRADE

While I had the opportunity, I couldn't resist asking a few questions about how Tröegs rolls. Maybe I could even pick up a few homebrewing tips. Everything starts with water. It's reverse-osmosis-filtered. A small percentage of untreated water is blended back in to create a super-soft base that becomes the foundation for further mineral additions. An automated system picks up malts according to the recipe. Chaff and stones are removed, and the grains pass through a six-roller mill with three sets of rollers and sieves in between.

Tröegs' vast lineup requires a wide variety of ingredients. In addition to domestic malt, grain comes from Canada and Germany. The brewery also likes to support local agriculture. Pennsylvania two-row is blended into several recipes. Over 3,000 pounds of pumpkins find their way into



Homebrewing in Mechanicsburg, Pa., 1992.



John in the four-barrel Scratch brewhouse.

Master of Pumpkins, a fall seasonal; and 25,000 pounds of wildflower honey from nearby Carlisle is added to Mad Elf.

I'm a big IPA fan and was especially interested in their hops, which come from the Pacific Northwest, New Zealand, and Europe. "The most important thing we do is hop selection," John confirmed. "We'll go to Oregon, and the Yakima Valley in Washington to hand-select our hops out of piles and piles."



DreamWeaver Wheat

Recipe courtesy of Tröegs Independent Brewing

Batch Volume: 5 U.S. gallons (18.9 L)

Original Gravity: 1.047 (11.75°P)

Final Gravity: 1.011 (2.8°P)

Efficiency: 75%

Color: 4 SRM (7 EBC)

Bitterness: 7 IBU

Alcohol: 4.8% by volume

MALTS

5 lb. 2 oz. [2.32 kg] Briess White Wheat

2 lb. 14 oz. [1.30 kg] Weyermann® Pilsner

2.4 oz. [68 g] Weyermann Melanoidin

HOPS

0.08 oz. [2 g] German Northern Brewer pellets,
8.5% a.a. @ 75 min

0.17 oz. [5 g] German Northern Brewer pellets,
8.5% a.a. @ 60 min

YEAST

1 package Wyeast 3068 Weihenstephan Weizen

BREWING NOTES

Adjust soft water to 100 ppm CaCO₃. Mash in at 145°F (63°C) for 30 minutes and raise temperature to 161°F (72°C) for 30 minutes. Mash out at 172°F (78°C) and sparge to obtain 5.5 gallons (20.82 L). Boil for 75 minutes, adding hops as directed. Top off volume if needed. Chill to 60°F (16°C) and pitch activated yeast Smack-Pack. Do not make a starter or aerate. If daring, use an open fermenter covered with cloth. Hold fermentation at 62°F (17°C) for 24 hours and then allow to rise to 64°F (18°C) until completion. Carbonate to 3.5 volumes CO₂.

Over a year's worth of hops are purchased at a time to ensure overlap and uniformity of flavor, as individual lots of Citra, for example, can vary greatly, with aromas ranging from passionfruit to grapefruit. At least three people go on the trips, which can be demanding on both the body and the senses. Palate fatigue is a huge problem. "Someone always goes down," John said with a smile, "but on the other hand, you can hang out all night with brewers, drinking beer."

I'm a single-infusion kind of guy, maybe because of its simplicity. Tröegs instead uses Hochkurz ("high-short") step mashes, usually starting in the mid 140s °F (low 60s °C) and ending with a daring (at least for me) finish in the low 160s °F (low 70s °C) before lautering. This regimen produces better head retention and increased dextrins, resulting in a maltier flavor. After a few tastes of their brews, it's hard to argue otherwise.

Brewing a proper hefeweizen is a challenge for homebrewers and professionals alike. The yeast strain and fermentation tricks are what create the perfect flavor combination of banana and hints of clove. Tröegs uses Doemens 465 yeast from Germany. I doubt it's available to homebrewers, but there's still much knowledge to be gleaned from their fermentation procedure. This yeast is underpitched, and several hours later, the trub is dumped. Next, the fermenting wort is racked to an open fermenter, where the yeast gets about a tenth of the normal amount of oxygen. "We stress it out," said John. This process—combining under-pitching, open fermentation, and low oxygen—enhances the desired esters. Fermentation starts in the low 60s °F (16–18°C) and is allowed to rise a few degrees. When fermentation slows and the krausen begins to collapse, the green beer is racked to a closed tank to finish and mature.

Tröegs doesn't use CO₂ extracts for bittering or advanced products such as terpenes, preferring pellets for early bitterness and whole flower cones for late hot-side hopping. "I have nothing against those products," said Trogner. "We just like the flexibility of pellets." Dry hopping techniques are always a big topic of discussion among homebrewers, and Tröegs doesn't go with a one-size-fits-all approach. "It depends on the recipe and what flavor components we want to pull out."

Their regimen was discovered by simple trial and error, something all homebrewers can relate to. West Coast-style Perpetual IPA is dry-hopped warm so the hop creep fermentables are consumed before chilling to keep the finishing grav-

ity low. Hazy IPAs have a higher finishing gravity. After a diacetyl rest, hazies are chilled to 58°F (14°C) and the yeast is dumped before dry hopping. "You don't want the hop creep potential to activate," said John, who believes this method also helps accentuate the beta hop flavors.



Troegenator Doppelbock

Recipe courtesy of Tröegs Independent Brewing

Batch Volume: 5 U.S. gallons (18.9 L)

Original Gravity: 1.082 (19°P)

Final Gravity: 1.020 (5°P)

Efficiency: 75%

Color: 18 SRM (35 EBC)

Bitterness: 25 IBU

Alcohol: 8.2% by volume

MALTS

8 lb. [3.63 kg] Canada Malting Pilsner

3.5 lb. [1.59 kg] Canada Malting Munich 10L

1 lb. 14 oz. [0.85 kg] Canada Malting

Dark Munich 20L

12 oz. [340 g] Briess Caramel 80

6.6 oz. [187 g] Weyermann Melanoidin

2.2 oz. [62 g] Dingemans Special B

2.2 oz. [62 g] Briess Chocolate

HOPS

0.75 oz. [21 g] Northern Brewer pellets,
8.5% a.a. @ 75 min

0.40 oz. [11 g] Northern Brewer pellets,
8.5% a.a. @ 15 min

YEAST

2 packages Fermentis SafLager W-34/70

OTHER INGREDIENTS

0.5 tsp. Wyeast yeast nutrient @ 10 min

1 tablet Whirlfloc @ 5 min

BREWING NOTES

Adjust soft water to 82 ppm CaCl₂. Mash in at 146°F (63°C) for 10 minutes and then raise temperature to 154°F (68°C). Hold for 40 minutes and then raise to 162°F (72°C) for 10 minutes.

Mash out at 172°F (78°C) and sparge to obtain 5.5 gallons (20.82 L). Boil for 75 minutes, adding hops as directed. Top off volume if needed. Chill to 53°F (12°C), add yeast, and ferment until completion. Carbonate to 2.2 volumes CO₂.

An interesting sidebar to dry hopping at Tröegs is the sheer scale of the operation. Many of their IPAs are fermented in massive 1,000-barrel tanks. Sometimes up to two pallets of hops are required, and since many of their FVs sit outside the brewery, dry hopping from a top hatch isn't feasible. To solve this, a hop slurry is pumped into the bottom of the tank, circulated through a loop, and then back through a pipe with a Venturi, causing a churning action that actually shakes the massive fermenters. "It's the only way we can do it, but we have to be careful about over-extraction," Trogner said. "We've learned how to get more out of our hops. A lot of breweries talk about using seven pounds of hops per barrel, but if we did that, it would destroy your brain."

As a final question, I asked John if he could believe what he and his brother Chris have accomplished—creating an

award-winning brewery that produces over 100,000 barrels a year, encompasses dozens of different styles, including over 500 (and counting) Scratch beers, not to mention employing over 175 people. "No," he stated simply, still in amazement after nearly 30 years of living the dream. Not too shabby for a couple of homebrewers from central Pennsylvania. With a little work and perseverance, it could happen to you, too. The chasm between homebrewer and professional may feel wide, but it's not as far as it seems.

REFERENCES

troegs.com/about/our-story

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 for seven felines.



Perpetual IPA

Recipe courtesy of Tröegs Independent Brewing

Batch Volume: 5 U.S. gallons (18.9L)

Original Gravity: 1.065 (16°P)

Final Gravity: 1.008 (2°P)

Efficiency: 75%

Color: 5 SRM (10 EBC)

Bitterness: 65 IBU

MALTS

10.75 lb. (4.88 kg) Canada Malting Pilsner

8 oz. (227 g) Briess Carapils

4 oz. (113 g) Briess Caramel 80

0.6 oz. (17 g) Cascade pellets, 5.5% a.a.,
dry hop 3 days

0.25 oz. (7 g) Nugget pellets, 13% a.a.,
dry hop 3 days

YEAST

1 package SafAle US-05

OTHER INGREDIENTS

0.5 tsp. Wyeast yeast nutrient @ 10 min

1 tablet Whirlfloc @ 5 min

BREWING NOTES

Adjust soft water to 135 ppm CaCl_2 and 100 ppm CaSO_4 . Mash in at 146°F (63°C) for 10 minutes and then raise temperature to 154°F (68°C). Hold for 40 minutes and then raise to 162°F (72°C) and hold for 10 minutes. Mash out at 172°F (78°C) and sparge to obtain 5.5 gallons (20.82 L). Boil for 70 minutes, adding hops as directed. Top off volume if needed. Chill to 66°F (19°C), add yeast, and ferment until completion. Dry hop for 3 days. Carbonate to 2.5 volumes CO_2 .

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BREWING A NEIPA IN INDIA

A Homebrewer's Commercial Brewery Adventure

By Tim Hobbs

June 7, 2024

Greetings from New Delhi, India! Think sweltering 112°F (44°C) heat, insane traffic that follows none of the rules the Western world would expect, thick, dusty air, and people everywhere going in every direction all at once. Chaotic it may seem, but it is organized chaos, and it works here. It's the rhythm of India's capital city. This is my 10th trip to India since 1997, and the country and its culture, cuisine, and people are no strangers to me. It's one of my favorite places in the world.

Amid the sweaty pandemonium sits an oasis of brewed delights, an air-conditioned respite—Effingut Brewpub, located in the Saket area of New Delhi. This is one of several locations of a small but fantastic chain of brewpubs here in India, with other brewpubs in Pune, Mumbai, and Kolkata. The brewery boasts awards across Asia, and it's no surprise. It's one of Asia's finest craft breweries, and one of the best I have visited worldwide. Effingut's beers rival those I have experienced in the U.S., and their German-style and Belgian-style brews are spot on and true to style. Their chef has exceptional skills as well, producing fine international and fusion flavors, and the staff is extremely friendly, attentive, and sweet.

The name Effingut is a play on English and German words. “Gut” is German for “good,” and “effin,” well, you can probably figure that part out.

With a 1,000-liter (8.5-bbl) brewhouse and 10 1,000-liter conical fermenters, Effingut Delhi's brew system is 100% made in India by Taurus Engineering, complete with a PLC (programmable logic controller). It rivals top-tier craft brewhouses from other countries.

I've spent much time at the brewpub enjoying various beers, food, and hookah. On one occasion, they released a fantastic kölsch. Crisp, clean, and tasty, I'm sure it would even impress the brewers in Köln. I wrote a letter complimenting the owner and brewer on their kölsch and all their brews, which gave rise to a friendship. Shortly after, I was invited to brew with the brewing team and was asked to help make one of my own recipes on their system for commercial release. I considered it an honor just to be asked, so of course I graciously and excitedly accepted.



Apprenticeship Brew

The first step was to assist owner and head brewer Sandip Malavi on a special beer he developed just for the Indian palate. Aam Panna Sour is an ale made with 90 percent Pilsner malt and 10 percent torrefied wheat, and is flavored with *aam panna* syrup, which is added at the end of the boil. Aam panna is made from young, green mangoes, water, sugar, and cumin. This traditional beverage is deliciously refreshing during India's hot summer days.

After seven hours of work, we were finally able to taste the finished wort; it had a light and tangy green mango flavor and a slight hint of cumin, which would lessen a bit during fermentation. The finished beer turned out fantastic, with the same slightly sour mango notes and a hint of cumin you had to concentrate on to find. I have included the recipe if you'd like to brew it yourself.

Having only ever homebrewed on a self-built 15-gallon (57-L) brew tree for the past 23 years, I finally realized a long-time dream to brew one of my recipes on a professional system and have it on tap at a commercial brewpub. Sandip and I discussed the various styles in my recipe list on BeerSmith, and we settled on my New England IPA, which I'd named RockHobbster.

Obstacles to Overcome Before Brew Day

We scaled up the recipe to suit a 400-liter (3.4-barrel) batch and then sought to source the ingredients, many of which were not available at the time: Amarillo and Centennial hops, flaked oats and wheat, and the London Ale III yeast that I usually

pitch. We found suitable substitutions that we all agreed would render a result similar to mine back home in Florida. I opted to eliminate the Amarillo hops and increase the amounts of Mosaic and Citra in both the whirlpool and dry hopping additions. We used my software to profile their RO (reverse-osmosis) water, which resulted in adding some salts and minerals to match that of Vermont water.

Instead of an amateur intruding on a professional brewer's space, I felt accepted as an equal.

The grain order was placed and a brew date set, but we had to push it back four days due to issues with receiving the malt order. There were ongoing transportation delays in the country caused by election activities nationwide. Interestingly, the government there strictly enforces dry days two days before elections and the day of elections itself. No alcohol sales whatsoever are allowed. The election results announcement day is also a dry day.

Since brewing one of my homebrew recipes on a commercial system was a dream come true, one might expect me to feel nervous come brew day, but instead it felt natural and familiar. Throughout the process, Sandip treated me as an equal and deferred to me on every part of the process

regarding ingredients, temperature settings, and timing. Instead of an amateur intruding on a professional brewer's space, I felt accepted as an equal.

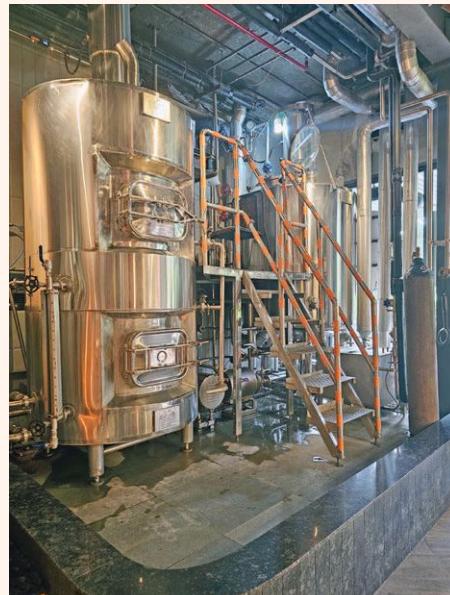
The Big Day

Effingut is in a shopping mall, so space is at a premium. The grain storage and mill are located on the second lower level of the parking garage. A medium crush is performed here, and then the milled grist is bagged and hand-carried by assistants up car ramps, several flights of stairs, and through the mall to the brewery. There is a small elevator, but they are not allowed to use it due to weight restrictions. Some may think that sounds brutal, and it probably would be to many in the Western world, but this is India. Inexpensive labor abounds, and many folks are just happy to have the work.

Brewing started at noon. Nothing in India really starts before 10 a.m., often 11 a.m., and it's rarely ever on time. We began by rinsing and pre-heating the steam-jacketed mash tun, and then ran the strike water. Sanju, the brewing associate, handed each bag of crushed grain up to the platform, and we dumped them in. Ah, that magnificent, familiar aroma! We used a 1:3 grist-to-water ratio, and the agitator was set to move constantly at 65 percent speed. We mashed at 148°F (64°C) for one hour.

Both Sanju and Sandip are outstanding human beings. Sanju has a small frame but is quite strong and wiry. He works very hard, and has a big, bright, infectious smile. Sandip is much taller and broader,

Left to right: Effingut's lead brewer Sandip, the brewpub's brewing deck, and the Programmable Logic Controller [PLC].



but is somewhat shy and speaks softly. He's a very talented and skilled brewer, but is sheepishly modest about it, especially when complimented. One of his most impressive accolades is a Masters in Brewing from Vasantdada Sugar Institute in Pune, Maharashtra, India. One of his former classmates is the head brewer at a neighboring brewery in New Delhi and produces fantastic beer as well. They are both assets to the capital city's growing brewing community. I didn't get to know Sandip's brewing assistant Ajit, but I did get to see him in action at the very end of the process. He isn't formally trained, but is learning on the job, and Sandip tells me that he does very good work.

A few minutes before the end of the mash, we took a sample and performed a saccharification test. The iodine indicated unconverted starches remained, so we set the system for an extra 15 minutes of mash time, with a 3.5°F increase in temperature to speed up conversion.

Meanwhile, we pre-heated the lauter tun. When the mash was complete, the wort and grains were pumped into the lauter tun and allowed to rest for 20 minutes before recirculation commenced. Additionally, the paddle in the lauter tun was set to spin very slowly at intervals so that the grain bed would not get compacted. Stirring the mash bed is something most homebrewers do not do, but it was part of the mash regime on this commercial system. The total mash time was 1.5 hours.

During the sparge, the strained wort was pumped back to the pre-heated mash tun, which also serves as the boil vessel. I watched the beautifully cloudy wort flow



through a sight glass in the piping, which elevated my excitement even more.

The wort was heated in the tun as the transfer occurred, which reduced the time it took to bring it to a boil. We soon reached a moderately rolling boil, and the timer was set for one hour. The top hatch was left open for evaporation and release of DMS. Sandip maintains that, in his system, the DMS is evaporated in one hour for lighter beers and in 1.5 hours for darker

beers. I have always boiled at home for 1.5 hours regardless of style, so this was a good lesson for me.

After flameout, the wort was dropped out of boil temperature range with the addition of potable ice. Sandip does this to reduce bitterness extraction during the whirlpool hop addition. The wort volume

Left to right:

The mash tun, bar area, and the author trying a sample of RockHobbster NEIPA off one of the bright tanks.



Aam Panna Sour

Recipe Courtesy of Sandip Malavi, Effingut Brewpub, New Delhi, India
All Grain

Batch volume:	5 gallons [18.9 L]
	Scaled down from 400 liters
Original Gravity:	1.046 [11.4°P]
Final Gravity:	1.008 [2°P]
Alcohol:	5% by volume
Color:	3.2
Bitterness:	14.4 IBUs

FERMENTABLES

8 lb.	[3.63 kg] Pilsner malt
1 lb.	[0.45 kg] torrefied wheat

HOPS

0.4 oz. [11.3 g] Centennial, 10% a.a., @ 60 min

YEAST

1 package SafAle Fermentis BE-134 yeast

ADDITIONAL INGREDIENTS

1 cup	aam panna syrup*
0.9 g.	citric acid
1.25 g.	kosher salt

BREWING NOTES

Single-infusion mash for 1 hour at 147°F [64°C]. Sparge and transfer wort to boil kettle. Boil wort for 60 minutes. At 10 minutes left in the boil, add the aam panna syrup, citric acid, and kosher salt. Chill and transfer to fermenter. Pitch yeast. Ferment at 62°F [17°C].

If kegging, force-carbonate to 2.5 volumes.

Special, but optional, serving suggestion: lightly squeeze a slice of lime over the rim of a beer glass and dip the rim into a mixture of sea salt and ground cumin. Then pour and enjoy!

*Aam panna syrup can be sourced online. If it is not available, you can make your own by scraping the pulp from one or two green mangoes (depending on size), adding 1 cup water, and boiling for 15 minutes with ¼ teaspoon sea salt or kosher salt. It is not necessary to add the cumin or sugar that you find in commercially produced aam panna syrup. The cumin flavor dissipates during fermentation.

was pre-adjusted to account for the 88 lb. (40 kg) of ice added. The whirlpool was set for 20 minutes, and the hops were added.

Then the final transfer of the wort to the fermenter began. Valves were switched and pumps were activated. Through a massive

plate chiller with a hop filter, the system chilled the wort to 62°F (17°C) while transferring it to the 1,000-liter (8.5-bbl) conical fermenter upstairs. The original gravity of 1.054 (13.3°P) was measured with a Brix hydrometer, then Sandip climbed a ladder and pitched the dry yeast by sprinkling it on top of the wort in the fermentation vessel. He does not make a yeast starter in his operation. This was the first time I had ever made a beer with dry yeast, so I was excited to see how it turned out. The fermentation temperature was set to 63°F (17°C) for one day, then lowered to 60°F (16°C) for the remainder of fermentation. We lowered the temperature to avoid phenols, and this worked like a charm.

The beer had attenuated to SG 1.014 (3.6°P) in five days, which is one day longer than it takes me at home pitching a starter of liquid yeast. Sandip saves time and resources at the beginning of the process by pitching a moderate amount of dry yeast without a starter, and since things move more slowly in India, waiting an extra day for fermentation to complete is not a concern.

On day five at 1.013 SG, after tasting the beer, we decided to dry hop to preserve mouthfeel. The tank was pressurized to settle the yeast and hops, and periodic rousing with CO₂ was performed to suspend the hop particles to aid in obtaining maximum effectiveness from the dry hopping.

After two days on the first dry hop addition, we tasted the beer. It tasted amazing already and had a slightly dry finish, with an emerging tropical hop flavor, but it was not yet enough. The beer also had a slight earthiness, presumably from the Mosaic and Northern Brewer hops, and was bitter. With a stroke of luck and a friendly contact at another local brewery, we were able to obtain some Amarillo hops! Therefore, I adjusted the recipe for the second dry hop addition to increase the Amarillo hops slightly over the Citra and Mosaic, and reduce the Mosaic, to add more citrusy flavors over the earthy undertones. We added the second dry hop batch that afternoon and let it go for four days.

Trouble Brews with the Cooling

One day into the cold crash, three of the four rooftop chillers stopped working. They needed German parts that were two days out from delivery. It took Sandip all afternoon to source those parts. This was a taste of commercial brewing challenges that I as a homebrewer had not considered. The nearly 126°F (52°C) India heat that day had caused those very necessary pieces of equipment to fail. Sandip frantically tried to get them working even temporarily, but to no avail. He put a water hose on the single remaining chiller compres-

Left: Associate brewer Sanju, the author, and Sandip.
Below: Sandip takes a gravity reading.



RockHobbster NE IPA

Recipe Courtesy of Tim Hobbs
All Grain

Batch volume: 5 gallons [18.9 L]
Scaled down from 400 liters
Original Gravity: 1.054 [13.3°P]
Final Gravity: 1.014 [3.5°P]
Alcohol: 5.3% by volume
Color: 3.7 SRM
Bitterness: 37 IBUs

FERMENTABLES

7 lb. [3.18 kg] pale two-row malt (50.9%)
2 lb. [0.91 kg] Vienna malt (14.5%)
2 lb. [0.91 kg] torrefied wheat (14.5%)
1 lb. [454 g] flaked oats (7.3%)
1 lb. [454 g] wheat malt (7.3%)
12 oz. [340 g] Carapils malt (5.5%)

HOPS

1 oz. [28 g] Northern Brewer, 8.5% a.a., 20 min WP
1.5 oz. [42 g] Mosaic, 12.25% a.a., 20 min WP
1.25 oz. [35 g] Citra, 12% a.a., 20 min WP
1 oz. [28 g] Mosaic, dry hop 6 days
1 oz. [28 g] Citra, dry hop 6 days
1 oz. [28 g] Mosaic, dry hop 4 days
1 oz. [28 g] Citra, dry hop 4 days
1 oz. [28 g] Amarillo, dry hop 4 days*

YEAST

1 package SafAle S-04 dry ale yeast

WATER

4.5 g. CaCl, 2.25 g. MgSO₄

BREWING NOTES

Single-infusion mash for one hour at 148°F (64°C). Sparge and transfer wort to boil kettle. Boil wort for 60 minutes. After flameout, add whirlpool hops and whirlpool for 10 minutes. Chill to 63°F (17°C), oxygenate, and pitch yeast. Allow to ferment for one day, then lower to 60°F (16°C) for the remainder of fermentation. Add dry hops as indicated, holding for six days total. Purge settled hop material and crush to 46°F (8°C). Hold 24 hours, then drop to 39°F (4°C), holding there for three days. Purge hop debris each day if possible. Package, condition, and serve fresh.

* Amarillo hops were originally not available when this recipe was first developed and brewed. They should have been in each hop stage. Amarillo hops were finally sourced two days into the dry hop additions.



sor to keep it cool enough to continue running. Meanwhile in his fermentation tanks, he could only maintain 50°F (10°C) across all 10 fermenters. Luckily no lagers were in process, but he did have a tripel that needed lower temperatures. Over lunch, I asked Sandip how worried he was about his brews, and he replied, "they are all my babies. I am worried." His care for his fermentations is something all homebrewers can relate to.

Later that evening, Sandip notified me that he had found the needed parts, and that a technician was on the way. The chillers were repaired and operational within an hour, and it took around 18 hours for all the fermentation tanks to get back to their proper temperatures. This was a huge relief for me and all the brewery staff.

Fast-forward to day six and the end of the dry hopping. We purged the tank of the hop debris that had settled to the bottom. To drop the remaining hop particles in suspension, we started a cold crash after the initial purge. We crashed to 46°F (8°C), then dropped it the day after to 39°F (4°C), holding it there for three days. Each day of the cold crash, the settled hop debris was purged from the tank.

The cold crash took four days, ending at 39°F; the hop particulate fell out nicely, leaving behind a less-bitter beer. After the cold crash, the beer was naturally carbonated, which took three days. We gave it a small injection of CO₂ to help it along due to the lost day from the chiller issue. A deadline had to be met, as the brewpub had planned and advertised a huge release party.

Left to right: The finished NEIPA served at the bar; a brewpub bartender; and the author indicating his IPA on tap.



A Beer to Sink Your Teeth Into

The day before the official release, I went to the brewery to check the carbonation and to taste the crazy-good 5.3% ABV beer. It had an "Effin" gloriously bright hop bouquet on the nose with a top note of grapefruit followed by a lemony, not earthy, hint of coriander. The locals also detected a hint of mango on the nose. It tasted of grapefruit and intense tropical fruits, with a subtle spice, silky mouthfeel, overall smoothness, slight earthiness from the Northern Brewer and Mosaic hops, and low bitterness at around 40–45 IBUs. Beautifully to style, it was a delicious, quaffable drink for these brutally hot New Delhi days and nights. I was much more pleased than I had been just one day earlier.

I had been tasting it frequently and found it to be too bitter for my taste and the style. Today, one day before the launch, I had virtually tearful realizations that we achieved the style as I brew it at home, even with my late and perhaps questionable substitutions.

After tasting the beer, a brewery visitor who claimed they were a loather of IPAs and bitter beers exclaimed, "I would never drink an IPA. The only reason I even put this one in my mouth is because of the bouquet." I have to agree and empathize. I too dislike overly bitter beers. They disrupt the palate significantly, and lots of bittering hops can often be used to hide mistakes in the grain bill and process. New England IPA is the only IPA-type beer I brew.

I learned a lot brewing on a commercial system, and Sandip even admitted that he had learned from me as well. Can the pros really learn from us homebrewers? More and

more, it's being proved that pro-am collaboration can produce amazing results, and in this case, cross-cultural goodwill as well. I look forward to doing this more and hope the opportunity arises soon.

I learned a lot brewing on a commercial system, and Sandip even admitted that he had learned from me as well. Can the pros really learn from us homebrewers?

With India's continuous development into a world power, it is certainly taking a bite into the brewing scene with epic ventures taking place all across the country. The public are quickly becoming attuned to the joy of consuming craft beer, and the emergence of a middle class bolsters this movement. As said in Punjabi, *chak de flatte!* Translated, this literally means, "take a bite out of it," and the expression is used in the same manner as the Western "cheers!" Indeed, take a bite out of it: life and beer especially.

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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→ NO RESPECT! MALT LIQUOR

By Ron Minkoff

But homebrewed malt liquor can be quite worthy.

Homebrewers show disrespect for Budweiser and Coors all the time, but there are always plenty of BJCP (Beer Judge Certification Program) competition entries for categories 1A (American Light Lager) and 1B (American Lager). Those homebrewers think, "I can brew the same style as Bud but make it better and like it." And for many homebrewers, they're right. You could say malt liquor is in a similar position. Actually, it's worse. In the homebrew world, malt liquor isn't taken seriously. There's no BJCP category for it, other than 34C (Experimental), and few people homebrew it. It don't get no respect, no respect at all. Basically, malt liquor is the Rodney Dangerfield of beer styles.



QUICK HISTORY

There are a number of articles and videos on malt liquor's history. Apparently, malt liquor was marketed as an upscale beer style in the 1950s and '60s, but that didn't get any traction. Beverage companies eventually began targeting buyers who recognized malt liquor's ability to provide a strong buzz at a relatively low price, thanks to its use of cheap adjuncts such as corn and sugar, which we'll chat about shortly.

Both the package size and the alcoholic strength were ramped up. The stereotype of buying a "forty" at your local gas station packaged in a paper bag for take-out entered the scene and survives to this day. Suffice to say, malt liquor has been considered a low-brow beverage for decades. If only there were a talented, fearless collection of craft artisans (perhaps homebrewing zymurgists) who could elevate malt liquor beyond its lowly status.

PARADIGM SHIFT

I certainly had the same mindset as everyone else. My initial malt liquor encounter, as is typical, was in college. I bought a pack of Mickey's Wide-Mouth Malt Liquor. I didn't think it was great, but the bottles stacked up nicely into a pyramid shape. So other than its value as dorm room window art, that was the last of Mickey's (and malt liquor in general) for me.

Twenty-plus years later, I'm hanging out at my neighbor's tiki hut next to his pool. He offers me a tall boy of something brewed by Anheuser-Busch that I've never seen before. I always try new beers, even if they come from macro breweries. This next statement, however, may make you rip this page out of your magazine (or fling your tablet across the room like a Wham-O Frisbee), but here goes: I liked it. I genuinely liked it.

I re-read the can. It was Anheuser-Busch Hurricane High Gravity Malt Liquor with 8 percent ABV. It was balanced, had a firm body, a noticeable but smooth alcoholic warmth, and a pleasantly assertive malt flavor. It contrasted greatly with my memory of Mickey's, and I couldn't get it out of my head that, much like any beer style, maybe malt liquor could be enjoyable—if done right.

I got curious about what it would take to brew a tasty one. But first, I needed to figure out what it was exactly that makes a malt liquor, malt liquor.

KEY INGREDIENTS

As stated, there is no official BJCP category for malt liquor, but there are several

articles and publications that dissect what distinguishes the style. Fortunately, they're all in general agreement. Although it shares some ingredients with the American Lager style, malt liquor tends to have a sweeter corn-like flavor, though it finishes dry. It is robust, but is not as heavily hopped as an American Lager. It has a higher alcohol content due to the generous use of ABV-boosting adjuncts such as corn and sugar. Some brands are described as having a fusel alcohol characteristic, which does no favors for its reputation.

It struck me that this ingredient list is a match for another beer style. If you look at BJCP category 1C, you'll note the ingredients are virtually the same. Besides the base malt, the ingredients for this style include up to 20 percent maize (corn) and up to 20 percent sugar. It's not overly hopped, it's light colored, and it can also be fermented with lager yeast. We're talking about Cream Ale. So basically, with only a little imagination, malt liquor is essentially an Imperial Cream Ale. Oh yeah, I can brew that. I wondered, though, if there was a distinct flavor and character difference between the two. Sounds like a job for a side-by-side blind tasting!

MALT LIQUOR VS. AMERICAN LAGER BLIND TASTING

If you've read my previous article on blind tastings ("The Game is Afoot!", Zymurgy July/August 2023), you know one of my favorite blind tasting formats is to have participants identify the styles of 10 samples. I planned to use this method, but first, I had to procure all

FUN FACT

Remember that in the July/August 2016 issue of Zymurgy, current editor-in-chief Amahl Turczyn wrote an article that included a comparison of malt liquor to the Belgian Golden Strong Ale style. They share the common ingredients of a simple base malt and sugar, and they are both dry, effervescent, and have a high percentage of alcohol by volume. So, is BGSA a high-class, sophisticated beer drinker's libation, or is it just malt liquor fermented with ale yeast? Since we're homebrewers, this is a question best answered with brewing trials and a few friends over to help us compare and come to an educated conclusion.

the different beers. Normally this is a mundane task, but I wanted the full malt liquor experience. I chose to bypass my local Total Wine and bottle shops, and instead headed to my nearby Amoco gas station just down the road. As it turned out, procuring malt liquor at a gas station was the only option, since I later found that neither my local Total Wine, bottle shop, or mega mart even carried it. No respect indeed.

It was a different story at the Amoco. This was my first time stepping inside this particular convenience store, and there was a wide selection to choose from. From



A variety of malt liquor brands at a convenience store

Colt 45 to King Cobra to Steel Reserve, they had it all. (Well, no Hurricane High Gravity, unfortunately.) But it made my checkout experience interesting.

As mentioned, I normally buy blind tasting supplies from my local bottle shop and think nothing of ringing up \$200 worth of beer. But despite the fact that the selection here was better than at a dedicated beverage outlet, I had a hard time getting over the fact that I was buying multiple bottles of beer at a gas station quickie mart. I know it's all for a noble cause, but would I get heckled? Given the side-eye from the cashier? I opted to stay under the radar and spread out my purchase, buying only a few here.

I'd finish the other half of my malt liquor shopping at the BP down the road.

On another side note, I couldn't help but notice the difference in cost. A four-pack of malt liquor was only \$5.50 (about \$1.38/can), whereas an equivalent amount of Budweiser or Pabst Blue Ribbon was much more expensive (and of course, craft beer is even more expensive). I remember thinking, I sure wish I liked commercial malt liquor more because wow, that's cheap!

Now that I had procured all my beer candidates, the blind tasting could begin. Ten participants determined whether their respective sample was a malt liquor or an American Lager. After everyone's verdict was registered, we discovered that

the vast majority were able to tell the difference. One key characteristic was the taste: If the sample was smooth and clean (or, you know, watery and bland), it was likely commercial American Lager. If there was any other character present (e.g., corny sweetness, alcoholic warmth, or low bitterness), it was likely a malt liquor. The favored brands were King Cobra and Colt 45, while the least preferred was Steel Reserve, which had a noticeable fusel character.

MALT LIQUOR HOMEBREW

Feeling up to the challenge of bypassing your neighborhood gas station and making your own homebrewed malt liquor? One that's actually tasty? Your best option might be to take a favored cream ale recipe and raise the ABV by adjusting the amount of base malt. If you'd like to strictly adhere to classic ingredients, you can use six-row base malt, but I tend to use all Pilsner malt, or a 50/50 blend of Pilsners and two-row. It's your homebrew; use whatever speaks to you.

Be sure your recipe has a healthy percentage of corn and sugar, which can each make up between 5 and 20 percent of the fermentables. Use any light-colored sugar: dextrose, honey, or brewer's corn syrup work best, but you can also use cane sugar in the spirit of malt liquor's frugal ingredients. Use a yeast strain that can ferment well at cool temperatures (60°F/16°C or colder). My malt liquor yeast of choice tends to be SafLager W-34/70. I did once brew a malt liquor using Voss kveik yeast that fermented around 75°F (because I ran out of SafLager W-34/70). It worked. I liked it. But it wasn't as clean, which is something I've noticed about kveik yeast in general.

Because of the similarity in ingredients between cream ale and malt liquor, I often brew both at the same time. I do this by brewing 9.25 gallons (35 L) of malt liquor. Five gallons (18.9 L) stay in the carboy as malt liquor. The other 4.25 gallons (16 L) get diluted with 3.2 quarts (3 L) of water to make approximately 5 gallons of cream ale with an OG of 1.055–1.059. If you would like a lower gravity cream ale, one option is to start with only 4 gallons of malt liquor (15 L) and dilute with 1.05 gallons (4 L) of water. Ferment as indicated above.

This recipe was inspired by Anheuser-Busch's Hurricane High Gravity and Schlitz's High Gravity Malt Liquor (both are 8–8.5% ABV). Single-infusion mash at 150°F (65.5°C) using a water-to-grain ratio of 1.25. Boil wort for 75 minutes. Add sugar in the last 15 minutes of the boil. Ferment at 53°F (11.7°C).

To make 5 gallons of malt liquor and 5 gallons of cream ale, take the recipe above and scale it up with brewing software so that 9.25 gallons (35 L) are available to put in your carboys. Put 5 gallons in one carboy (the malt liquor batch) and pour 4.25 gallons (16 L) into the other carboy (the cream ale batch). Dilute the 4.25 gallons with 3.2 quarts (3 L) of de-chlorinated water to make approximately 5 gallons of cream ale with an OG of 1.055–1.059. If you would like a lower gravity cream ale, one option is to start with only 4 gallons of malt liquor (15 L) and dilute with 1.05 gallons (4 L) of water. Ferment as indicated above.

To infuse pepperoncini peppers into your malt liquor or cream ale, take 20 pickled pepperoncini peppers, cut a slit down each, and scrape out the seeds. Place the peppers into a couple of hop bags and steep in the keg. After two days, try a sample. If the heat and flavor taste right, remove the hop bags.

SPICING IT UP

Malt liquor and cream ale act as nice blank canvases for easy post-fermentation flavor additions. After all, malt liquor is the base for many flavored "malt beverages." One of



HURRICANE SUGAR MALT LIQUOR

Recipe courtesy of Ron Minkoff

Batch Volume: 5.25 U.S. gallons (19.87 L)

Original Gravity: 1.071 (17.3° P)

Final Gravity: 1.013 (3.32° P)

Efficiency: 65%

Color: 6 SRM

Bitterness: 26 IBU

Alcohol: 8% by volume

FERMENTABLES

5 lb. (2.27 kg) pale two-row malt (34.5%)

5 lb. (2.27 kg) Pilsner malt (34.5%)

2 lb. (0.9 kg) flaked maize (13.8%)

1 lb. (454 g) flaked barley (6.9%)

8 oz. (227 g) 40°L crystal malt (3.4%)

1 lb. (454 g) cane sugar (6.9%) @ 15 min

HOPS

0.3 oz. (8.5 g) Magnum, 16.50% a.a. @ 60 min.

1.5 oz. (42 g) Hallertau Mittelfruh, 4.40% a.a.

@ 5 min.

YEAST

Fermentis SafLager W-34/70

my favorite post-fermentation tricks that's a real crowd-pleaser is to infuse pepperoncini peppers into the batch. It's also a judge-pleaser: it's garnered bling at multiple competitions, including a gold medal in the first round of the 2023 National Homebrew Competition, and a recent first place Best-of-Show award at the 2024 Hogtown Brew-Off (a 400-entry competition).

The technique is simple. Buy a jar of pickled pepperoncinis. To prepare the peppers, slice off the stems and cut a slit down the middle of each one. Scrape out the seeds. To treat five gallons of kegged malt liquor, place 20 pepperoncini peppers into a couple of hop bags and steep them in the keg. After two days, try a sample. If the heat and flavor taste right, remove the hop bags. If you own a carbonator cap and want to try this on a small scale, fill a two-liter bottle with 36 ounces of malt liquor and drop in two pepperoncini peppers. Taste until the balance is right.

*That's the story of my life, no respect.
I was in a bar, they told me to get out,
they wanted to start the happy hour.*

— Rodney Dangerfield

BASICALLY, WITH ONLY A LITTLE IMAGINATION, MALT LIQUOR IS ESSENTIALLY AN IMPERIAL CREAM ALE. OH YEAH, I CAN BREW THAT.

BOMBSHELL OF A BREW

Malt liquor doesn't tend to get much love from craft beer fans or brewers, but you'd be surprised by how tasty a homebrewed version can be. I bet that your fellow homebrewers will be curious about your attempt and want to try it. Homebrewers (and craft brewers!) have always been good at pushing the boundaries and experimenting, but we shouldn't forget about overlooked styles such as malt liquor. Paper bag

is optional, but you might just find that homebrewed malt liquor is an enjoyable treat worthy of respect.

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 and mead judge, and a periodic visitor to his neighborhood petrol station quickie mart.



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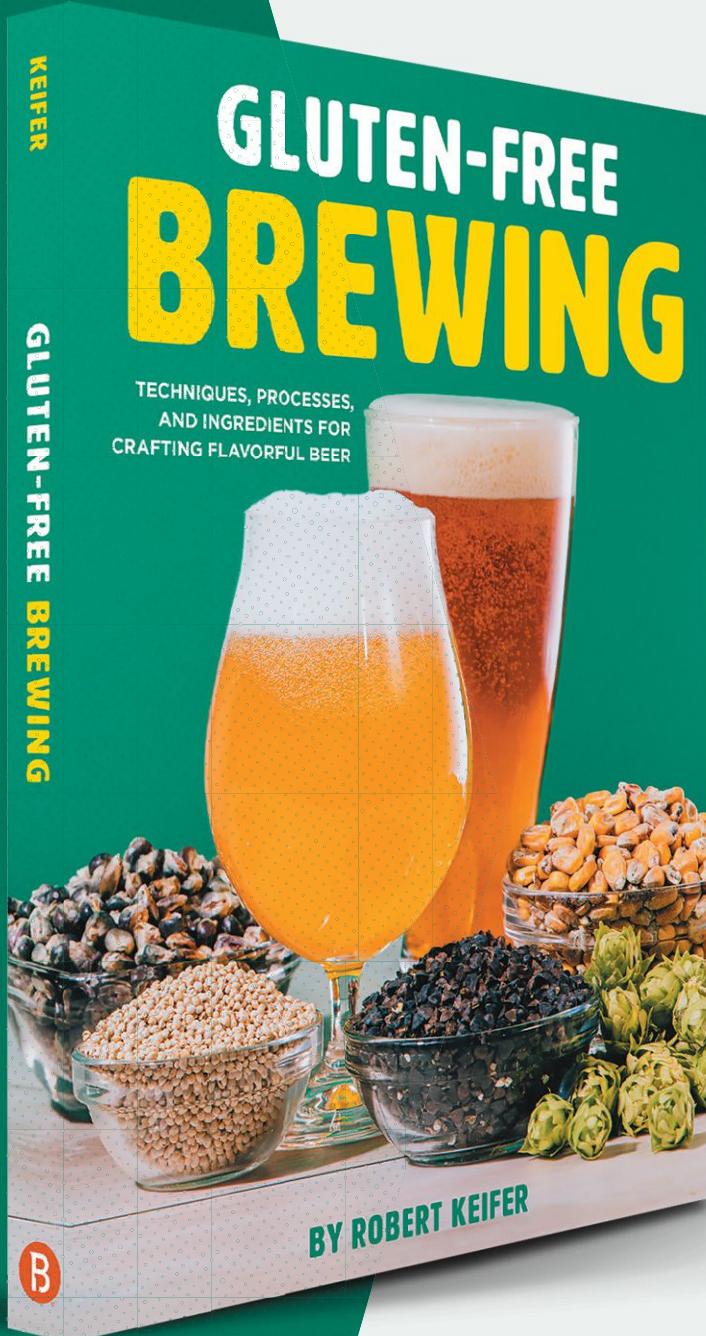
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Brewing in the GUIANAS

*the Hidden Corner
of South America*

By David J. Schmidt



Our long, wooden canoe pulled up to the rocky outcropping at the river's edge. The green jungle towered above us on both sides. Past the riverbank, I could make out the conical thatched roofs of the village above us.

The canoe's driver cut the motor, pulled up to the flat stones, and a few of our passengers disembarked at the village. A local stepped out onto the outcropping, a bronze-skinned indigenous man wearing only shorts and sandals, and greeted them in the local language. He then invited the rest of us, all 15 passengers of the canoe, to join him for a drink.

We climbed up the rocks where the man stood holding a plastic bucket of opaque, pinkish-white liquid. He dipped a half gourd in and we took turns drinking. This was *casiri*, a local brew made with cassava roots and bright red sweet potatoes. It had a mellow flavor, with a slightly sour, yeasty aftertaste.

It was just the refreshing break we needed after hours on the river, fighting our way upstream through treacherous rapids. Other villagers drank gourds of *casiri* nearby, lounging about on hammocks beneath the shade of thatched roofs. The late afternoon sun shimmered on the waters of the river as a chorus of tropical birds filled the nearby forest.

This was one of the many unique, traditional brews that I tried during my recent trip to this intriguing corner of South America.

SUGARCANE AND RUM, SLAVERY AND REBELLION: A BRIEF HISTORY OF THE GUIANAS

"Guyana? Suriname? Where are those countries, in Africa somewhere?"

This was a common response when I told friends where I'd traveled recently. Most of them had never even heard of these places, and were most likely unable to even locate them on a map.

But it's not difficult—find South America, and you'll see three tiny countries of similar shape nestled between the much larger Venezuela and Brazil, along the northeastern edge of the continent on the Caribbean coast. The three of them—Guyana, Suriname, and French Guiana—are referred to collectively as "the Guianas."

They are a South American anomaly, the only part of the continent that isn't part of Latin America. Unlike their neighbors, the official languages here are English, Dutch, and French. They are ethnically diverse, with a predominance of African roots, alongside various Southeast Asian ancestries and the indigenous peoples who inhabit the jungled interior. Guyana and Suriname gained independence much later than other countries in the area (1966 and 1975, respectively), while French Guiana is still a European territory, the last one on the continent. →

This fascinating little region is home to an equally diverse array of traditional brews. Some of them, like cassava beer, go back thousands of years. Other brews emerged during the colonial period, while some are very recent arrivals. From their coastal cities to the inland wilderness, the Guianas are home to some of the most unique brews on earth. I was lucky enough to try many of them during my visit. Fittingly for this article, the history of this entire region—its cultures, ethnic diversity, and languages—was all shaped by alcohol. More specifically, rum.

During the colonial period starting in the 1600s, this corner of South America was invaded by various European powers, claimed and counterclaimed, swapped and exchanged, during the rush to carve up “the New World.” When the dust had settled, these three small territories lay in the hands of England, Holland, and France. From west to east, they were known as British, Dutch, and French Guiana. In this tropical land, the colonial economy centered on the commerce of sugarcane and rum.

The European colonists brought thousands of enslaved Africans to work those sugarcane plantations, and they endured some of the most brutal conditions on earth. Death from disease and exhaustion was abhorrently common on the plantations, requiring a steady flow of new people brought from Africa. Africans and their descendants soon vastly outnumbered Europeans in the Guianas. Many of these workers organized armed uprisings, while many more—known as Maroons—escaped into the jungle, where they formed free communities that exist to this day.

Although slavery was outlawed in the 1800s, the sugar-and-rum economy continued. The plantation owners brought contract laborers from other parts of the world, primarily from India and Indonesia, to endure the same brutal conditions of the sugarcane plantations. Surinamese author Cynthia McLeod has written several books about this history. *The Cost of Sugar* looks at the human suffering behind the production of sugar and rum, while her novel *It Happened at Marienburg* centers on the 1902 massacre of workers at Marienburg, one of the largest plantations and rum distilleries in Suriname.

I visited the ruins of Marienburg during my visit. It's been abandoned for decades now, and the jungle has reclaimed its industrial remains. The old, rusty machines have been swallowed by the forest, while vines and roots lay claim to the empty shell of the former rum distillery. My guide, a descendant of Indonesian laborers, told me the place was cursed. After the massacre, all of Marienburg's



Above: Puddle-jumper plane ready to fly out into the bush.

Right: The airport and general store in Makushi territory.

subsequent plantation directors died by mysterious causes. “The workers’ blood cries up from the ground,” he said. “People around here still see their ghosts sometimes.”

Of course, few of those who drank that rum ever thought about its human cost. The high-quality beverage quickly became a hit in Europe, and was popular among the European colonialists as well. British author Henry Kirke describes colonial drinking habits in his 1898 book *Twenty-Five Years in British Guiana*.

Because of the region's equatorial heat, he explains, “the perpetual state of perspiration in which one lives in the colony creates a perpetual thirst.” He describes a frequent scene at a highbrow gentleman's club in Georgetown, the Guyanese capital city:

“There is an unwritten law in the club that no one shall drink alone, so the unwary stranger, who is admitted within its sacred portals, finds himself invited to drink by thirty or forty gentlemen (...) not wishing to appear rude and disobliging by refusing, finds himself by eventide very much mixed, and wondering how he is to find his way to his virtuous couch.”

Kirke writes that the most popular drink among Europeans in the colony was a cocktail known as the swizzle. This concoction was whipped up by spinning a special “swizzle stick” between the hands. “In Georgetown the sound of the swizzle-stick is heard all day,” he writes. “It is one of the



common objects of the country, like those plagues, the frogs and mosquitoes. There is no wrong without a remedy, and the soothing swizzle makes you forget the one and despise the other.”

Some of the world's best rum still comes from this part of South America. Guyana's El Dorado rum has won first place in several international competitions, while Suriname and French Guiana produce renowned brands of quality rum as well.

However, alcohol goes back much further in the history of the Guianas, much of it free of the taint of slavery and human suffering. Thousands of years before Europeans reached these shores, before the Asian sugarcane plant was ever brought to this tropical soil, the indigenous people here were already brewing. I had the chance to try their traditional brews on their own turf, far from the coastal cities, in the remote jungles of Guyana.



Counterclockwise from top left:
First taste of paracari (cassava beer) with local man, Gary, during a volunteer work project; Cassava beer; Traditional indigenous strainer for straining the juice of ground cassava; English colonial style house in Georgetown; Colorful potatoes used to brew flai at home in San Diego.

gorgeous view from the window. After we flew past the multicolor wooden homes of Georgetown, we abruptly transitioned to a nearly unbroken expanse of thick, green jungle. The dense mass of vegetation was only interrupted by the occasional native village: a small clearing of thatched huts, next to brown patches of cultivated cassava fields.

Our pilot expertly landed the plane on the tiny landing strip carved out of the jungle. The landing strip was next to a small, local dispatch and general store that sold food, supplies, and commercial beer, mainly Banks, perhaps Guyana's most readily available lager. Our group of visitors was greeted by the local *tushao* (chief), a middle-aged man wearing Western clothing and a traditional feathered headdress.

From the landing strip, a weathered old van drove us down a rugged dirt road, a strip of red clay cut through the wilderness. Much of the terrain was flat, this being the savannah. We finally reached Surama, a rustic ecolodge with a panoramic view of the surrounding grasslands and forested mountains.

Despite its remote location, the Surama lodge offers many modern conveniences: running water, electric generators, and even a sporadic WiFi connection. It consists of a central dining hall, a round open-air building built in the traditional indigenous style of a *benab*, a circular wooden frame with a thatched roof. Cabins were rustic but cozy, with individual bathrooms and beds covered with mosquito nets. The refreshingly cold shower provided some momentary

CASSAVA BEER IN THE JUNGLE

In all three of the Guianas—Guyana, Suriname, and French Guiana—the majority of the population lives in cities and towns along the coast. Most of the inland territory is a vast wilderness: pristine, sparsely populated, and largely undisturbed. These jungles have been home to indigenous communities for millenia. Most of them farm the staple crop of cassava, a tuber vegetable that is made into both bread and beer. I experienced this all firsthand in Guyana.

My journey began in Georgetown, the capital city, where life goes by at a relaxed, Caribbean pace. Old wooden houses of various colors line the dusty streets. Most of the locals are of African descent, with a large group of Indian ancestry as well. Everyone speaks a creolized form of English, with a lilting, musical accent similar to that of Jamaican *patois*, and dialects

common to other Anglophone parts of the Caribbean. This close to the equator, the sweltering heat is ever-present. I quickly resigned myself to the fact that I would be covered in sweat every second of the day and night, making me immensely grateful for those brief moments when a soft breeze brought fleeting relief.

From Georgetown, I headed into Guyana's interior, known locally as "the bush." This wilderness is home to Guyana's nine indigenous peoples: the Arawaks, Wai Wai, Caribs, Akawaio, Arecuna, Patamona, Wapixana, Makushi, and Warao. I was headed to Makushi territory, in the highland savannah region known as the North Rupununi. It was only 190 miles (305 km) from Georgetown, as the crow flies, but travel by land would have taken several weeks of arduous treks across dirt roads, jungle trails, and rivers.

The best way to get to most of Guyana's interior is by propeller plane, of the small "puddle-jumper" variety. The journey was an exciting one, as sporadic tropical storms rocked the tiny plane with sudden jerks, shakes, and drops. Once I adjusted to these unnerving movements, I could enjoy the



relief from the constant, oppressive heat. I was grateful for the windows, mere wooden slats of blinds that were open to the elements. Although they allowed entry to lizards and all manner of other creatures, they also brought in a refreshing cross-breeze. Most importantly, the cabin's walls kept out much more worrisome jungle creatures: jaguars, anacondas, and caimans.

Over the following days at Surama Eco-Lodge, I would enjoy a menu of varied local delights and spicy dishes of stewed vegetables and meat. One delicious dish known as "pepperpot" consisted of stewed meat served in a thick, spicy, darkly-colored sauce. It reminded me of the *mole* so common in Mexico.

Nearly every meal was accompanied by cassava, a staple crop of tropical South America, Southeast Asia, and West Africa. Also known as yucca or manioc, it's a tuber similar to a potato, with a more firm and grainy texture. It was served to us in various forms: in long, fried strips; as boiled chunks; or as flat bread baked from the flour of ground cassava. Cassava bread is white, crispy, and porous, with little flavor of its own, similar to a rice cake.

The Makushi, along with Guyana's other nine indigenous nations, have been farming cassava for millennia. I tried my first taste of cassava beer a few days into my stay, while doing some volunteer work in the community. Along with other visitors, I was helping to clear a plot of land, working with machetes and hoes. The locals brought us something to quench our thirst: a plastic bucket filled with an opaque, off-white liquid. As they dipped dry gourds in to serve the drink, they explained that it was a local cassava beer, known here as *paracari*.

I found it had a very neutral taste, with a slightly sour edge from the fermentation. There was not much remaining sweetness from any fermentable sugars. The texture was grainy, like *tesgüino*, the corn beer made by the native Rarámuri people of northern Mexico.

"How do you like it?" one of the local men asked. A heavy-set man with a thin, black mustache, his eyes twinkled with an infectious smile. He spoke English with the lilting, musical Caribbean accent I'd come to expect in Guyana.

Counterclockwise from top left:
The ruins of the rum distillery and sugar cane plantation of Marienburg, Suriname; Pepperpot, a traditional Guyanese dish made with the juice of the cassava plant; A colonial wooden church in Georgetown; Books on the Guianas on display at a library.

"I love it," I replied in earnest. I explained that I had tried many folk brews around the world. Although I had written an article about cassava beer ("Would You Drink My Spit?", Zymurgy May/June 2021), it was based solely on book research. "It's exciting to try the real thing."

"That's great to hear," the man said, introducing himself as Gary. He explained that he was a professional tour guide who also led birdwatching trips, and loved introducing outsiders to his cultural traditions. "We Makushi like to share a gourd of paracari when we're working. We have a tradition called the *mayo*, a volunteer work party. If a family needs some work done, they will make up a whole lot of paracari. Then the whole community comes together to help out, and everyone drinks it together."

I told him I had participated in similar work-and-drink parties in indigenous



Brew This!

Flai

Guyana's sweet potato beer

In the absence of authentic, Amazon casiri potatoes, you will have to improvise. I went to a local specialty market and bought a variety of brightly-colored potatoes and yams: South American purple potatoes, sweet beauregards (orange inside), Japanese sweet potatoes (white), Okinawan potatoes (marbled purple), and ordinary North American yams. The diced chunks of all these diverse tubers looked beautiful before the boil, as you can see in the photo. Once they'd been mashed and boiled, however, they acquired a mottled, wholly unattractive hue.

Thankfully, after fermentation, the brew took on a pleasant, light peach color. This is perfectly fine, but if you want to get the authentic, bright red color of Guyanese flai, you may have to add some form of food coloring.

STEPS

1. Peel approximately five pounds (2.27 kg) of sweet potatoes.
2. Boil them until they're soft and mushy.
3. Add four pounds (1.81 kg) of sugar. Any type will do: white table sugar, brown cane sugar, *piloncillo*, etc.
4. Mash any solid chunks. Stir the mash over low heat until all the sugar is dissolved.
5. Top it off with water to five gallons (18.93 L), then cool it to fermentation temperature.
6. Pitch any yeast. Fleischmann's yeast works fine, as well as any live culture from a previous brew.
7. Ferment the brew for up to seven days.
8. Strain out any solids and add it to a secondary fermenter to ferment for a couple more days.
9. Bottle the finished beer, adding sugar to carbonate, if desired.

You could spend your whole life out here in the bush, studying all the different kinds of alcohol we have.”

— Gary

communities in Mexico. The Rarámuri call them *tesgüinadas*, serving up corn beer.

“That's great that they keep their traditions alive, too,” Gary said. “I care about that a lot; I love my homeland. I was born here, I was raised here, and I plan on dying here.”

I asked if there were any other traditional uses for paracari.

“We drink it on holidays,” Gary said. “Especially Christmas, that's a big deal. People who migrated to the city and other far-off places, they come back home to North Rupununi for Christmas. We kill chickens and livestock and hold a big feast on December 25, with plenty of paracari.”

I asked Gary how the brew was made. He explained that the first step was to peel the cassava roots. “Four to six roots should be enough to make a bucket of beer. Although it depends on how juicy the cassava is.”

The raw juice—toxic unless cooked—must then be pressed from the cassava. This is done with a “squeezer,” a long, cylindrical container woven from reeds. I had seen several of these squeezers in local villages, and Surama lodge even sold small, novelty versions of them as souvenirs. The dry cassava pulp is then ground into a flour, formed into flatbread patties, and cooked on large metal pans over an open fire.

“How do you get it to ferment?” I asked.

“You have to mix that flatbread with water,” Gary said, “and put it inside wild banana leaves. Then you sprinkle dried cassava leaves onto it. We call this ‘the dust.’”

I was fascinated—the natural yeast to ferment paracari came from the cassava plant itself!

This mixture sits for two days to ferment with water, either inside a traditional hut or outdoors in a shady spot. “Up to this point,” Gary said, “the mixture is still sweet, and kids can eat it with a spoon like porridge.” The brew is then transferred to a container for a secondary fermentation. In the old days, a traditional clay pot called a *gobi* was used for this.

“That's when the alcohol gets stronger,” Gary chuckled. “You can't give it to kids anymore after that!” The fermented liquid is strained through a sieve, traditionally made of woven grass, and the paracari is ready to drink.

“This used to be one of the only alcoholic drinks we had, back in the day,” Gary said. “We had to be self-sufficient, making everything on our own. This part of Guyana was like its own country up until the 1980s and '90s. We had very little connection with Georgetown. In a lot of ways, we were culturally closer to Brazil than we were to the English heritage of Georgetown. You can still see the effects to this day. People out here like playing soccer, just like the Brazilians, while people in the capital are more into cricket.”

If travel between this region and Georgetown is difficult today, Gary explained, in the old days it was nearly impossible. “You had to journey for months over jungle trails and hard roads. Missionaries started coming out here in the 1950s and 1960s and built the first airstrips, but very few planes came, and air travel was expensive. So most of us stayed here our whole lives. We made do with what the jungle provided us.”

Life in Makushi territory is rapidly changing. More and more young people move to the city, Gary said, looking for work and higher education. “Most of our kids now speak English as their first language. They study Makushi here in our local schools, but it's almost a foreign language for them now.”

He stared out at the forested mountains on the horizon and took a deep breath. “The last shaman in our community died five years ago. We managed to record some of his knowledge, but many things were sacred and secret. They could not be written down or recorded. He took this knowledge with him when he died.”

“Still, we're fighting to keep our traditions alive. Our language, songs, dances, food...and drinks like paracari. It's all part of what makes us who we are.”

TASTY FLAI FOR THE FOREIGN GUY

Cassava beer wasn't the only traditional brew I tried in Makushi territory. Another common drink, made from local sweet potatoes, is known as *flai*. The flesh of the potatoes is bright red inside, which lends its remarkable color to the brew. Since my first taste of *flai*, I knew I would have to try and replicate it back home.

This would prove difficult, as the main ingredient, known locally as the "red casiri potato," only grows in this tropical region. Despite all this, I was able to create an approximation with ingredients available in most North American cities. (See recipe.)

I had *flai* many times during my stay. In the Makushi villages, there seemed to always be some of it nearby, poured from a repurposed plastic bottle filled with the bright red liquid. The flavor and consistency varied wildly from one batch to the next. My first taste, during a local soccer game in one village, was mild and low in alcohol content. The slightly acidic flavor reminded me of a pleasantly dry red wine, a nice chianti or cabernet.

My last drink of *flai* couldn't have been any more different. I had it during a farewell dinner, held for the various groups of visi-

tors, in the Makushi village of Wowetto. A team of talented local teenagers performed traditional songs and dances for us. Dressed in ornately beaded skirts and feathered headdresses, they danced a rhythmic two-step while singing in the Makushi language.

After the cultural presentations, the people of Wowetto served us a feast of roasted chicken and cassava bread, accompanied by plentiful jugs of paracari and *flai*. Unlike the earlier batches, this one tasted quite strong, like a very starchy, yeasty mead. I would guess that the alcohol content was somewhere in the 8 to 10 percent range.

I spotted Gary's smiling face in the crowd and approached him. "How is it that this batch tastes so different from the others?" I asked.

"It depends on the potatoes they use," he said. "Some casiri potatoes are sweeter than others. Also depends on how much sugar you add."

I mentioned that, although the drink went down smooth, it kicked in after I took a few breaths.

"Be careful, David. It tastes sweet now," he laughed, "but later on you might start to feel it in your knees!"

He explained that some locals in Makushi territory brew casiri, the mellow, pinkish-white brew I'd been served from a gourd upon arrival, as a mix of paracari and *flai*. Some communities refer to *flai* with the same term, casiri.

"We also make another drink out here that we call 'bush rum.' It's just fermented sugar cane. It's only recently that distilled rum has come here from Georgetown. Back in the day, people would drink bush rum instead. Another name we have for it is 'panther,'" he chuckled.

I asked if this name had to do with the drink's ability to knock a person down, like a fierce jungle cat.

"Maybe," Gary smiled. "It sure can be dangerous."

I recalled that old colonial author, Henry Kirke, and his description of the rum-based swizzle: "The potency is so skillfully veiled that the unsuspecting imbiber never discovers he is taking anything stronger than milk, until he finds that his head is going round, and that the road seems to be rising up and trying to slap him in the face."

I told Gary that I would have to come back to the North Rupununi sometime, if only to try this local bush rum.

Top: The author standing before a traditional indigenous benab structure in Macushi territory.
Bottom: The Promenade Gardens of downtown Georgetown, Guyana.



Swizzle Rum Cocktail

Colonial-era recipe

This recipe comes from Henry Kirke's book, *Twenty-Five Years in British Guiana*, published in 1898. Kirke writes that the swizzle is "taken before breakfast and dinner" and makes the tropical heat much more bearable.

INGREDIENTS

- Small glass of rum, hollands (Dutch gin), or brandy
- Same amount of water
- Half-teaspoon Angostura bitters
- Small quantity of simple syrup
- Crushed ice, *ad libitum*

This is all whipped up by a swizzle-stick, to be twirled rapidly between the palms of the hands until the ice has melted. The liquid should form into a soft, pink cream.

"I think it's a pretty common drink," Gary said. "Even non-indigenous people all over Guyana make it."

I could tell that I had just barely scratched the surface of native brews, a fact that Gary confirmed. "Go to any other indigenous community out here, and you'll find they all have their own recipes, drinks made from different plants. You could spend your whole life out here in the bush, studying all the different kinds of alcohol we have."

"Sounds like a great career path to me," I said.

IN SEARCH OF BUSH RUM

I headed back to Georgetown the following day, planning to search for information about bush rum. I had tasted a similar brew in Oaxaca, Mexico, known there as *tepache* (see "Quest for the Moonshiner's Yeast", Zymurgy Sept/Oct 2021), but I wanted to know more about the bush rum made in the Guianas. It seemed fitting, in this land of rum and sugarcane, that people should ferment sugarcane juice on their own. Something about it felt rebellious and liberating—reappropriating sugarcane to make a folk brew, independently of the plantations and big distilleries.

My first stop in Georgetown was the National Library, a lovely, pillared, two-story building built by the Carnegie Foundation in 1909. The lobby contained a display of freedom fighters in Guyana's colonial history, men and women who fought against slavery during those cruel plantation years. I headed up the wide, curving staircase to the reference section on the second floor.

The materials I found confirmed my firsthand observations of paracuri and flai. One book, entitled *Amerindian Legends of Guyana*, referred to cassava beer as *pai-warri*. It also mentioned casiri (alternately spelled *casseri*), describing it as "a pink, pleasant-tasting alcoholic drink made from sweet potatoes and sugar cane. Sometimes, a small amount of cassava is added." Another book, *The Making of Guyana*, explained that the native peoples' "chief food consisted of cassava bread and pep-perpot, and their chief drink was *paiwarri*, a kind of wine made from the cassava."

Cassava in all its forms was significant in the culture of Guyana's Creole (Afro-Guyanese) people as well. The plant even had ritual uses in local folklore, as I learned from the fascinating cultural compendium *Guyana Metegee*, published in 1970 in the newly independent nation. The book explains that, "To pin down a roving evil spirit, wait until the jumbie (ghost) goes into the grave, and plant bitter cassava or 'dead-man-flesh' on the grave."

I found several mentions of bush rum as well. Just as Gary had said, it appeared to be quite common in traditional Guyanese life. *The Dictionary of Guyanese Folklore* mentions bush rum, stating that it was also known as "Dr. Jacob," named after a finance minister who had increased the tax on rum.

Both distilled commercial rum and fermented bush rum had many ritual uses in Guyanese folk culture. Homemade rum and other alcoholic drinks are integral to many religious rituals in the region, and is common at other celebrations and gatherings as well, including wakes for the dead and pre-wedding celebrations known as *queh-queh*.

From the library, I walked a few blocks down the street to the National Anthropology Museum, the oldest such museum in the English-speaking Caribbean. It was located in an old, two-story wooden house built in the English colonial style, with a wide wrap-around porch on both stories and wooden Demerara blinds over the windows, angled outwards to allow tropical rain to run off and cross-breezes to flow in.

The museum contained a broad array of artifacts from Guyana's indigenous cultures, many of which I had seen firsthand in Makushi territory: wooden dugout canoes, pictographs, traditional bows and arrows,

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blow darts and blowers. On the second floor, I was happy to find an entire section devoted to cassava.

Glass display cases contained traditional cassava graters, wooden planks fitted with plant thorns or fish teeth. I saw many different versions of the long, cylindrical strainers used to leach the poisonous juice from the raw cassava, along with other tools used to process the plant, as well as the *warishi*, a woven backpack used to carry cassava roots. There was even a life-sized recreation of a native hut, with a mannequin of an indigenous woman using the cassava strainer. Dressed in traditional garb, she sat on a thick branch affixed to the strainer, draining the juice into a clay pot.

Other display cases showed the many uses for the cassava root. The toxic juice could even be used to stun fish and collect them from the river. When boiled, the juice becomes safe for human consumption, taking on a dark molasses color.

"We cook with that juice here in the city as well," a museum employee told me. She was a young Afro-Guyanese lady dressed in a long skirt and blouse. "The cooked cassava juice, the dark liquid in that bottle, is called *casareep*." (Pronounced KAH-zuh-rripp.) "It's used in Guyanese Creole food, to make a dish called pepperpot."

"So that's what gives pepperpot its dark color! I had some recently, with a side of cassava bread. I tried homemade cassava beer, too."

"Here, in Georgetown?" she asked.

"No, I just got back from the bush. I was in North Rupununi."

"Oh, then you had the real thing! You went right to the source."

I felt honored to have experienced cassava in such an up-close and personal way. It was no longer limited to museums and anthropology textbooks.

Still, I hadn't tried any bush rum. For that, I would need to cross the border eastward, into the neighboring country of Suriname. I would visit the remote communities of the Maroon, descendants of those Africans who had escaped the horrors of the sugarcane plantations. As I would learn, the Maroons had reappropriated rum and sugarcane into their own traditions—fiercely independent and uniquely African.

(To be continued in Part 2...)

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David J. Schmidt is an author, homebrewer, and multilingual translator who splits his time between Mexico City and San Diego, Calif. Schmidt speaks 14 languages and has spent the past 20 years traveling throughout rural Mexico, Latin America, and Africa in search of ancient folk brews, making him a veritable Indiana Jones of home brewing. (Think Harrison Ford with a beer gut.) He can be found on Facebook, YouTube, and X with the handle "Holy Ghost Stories" or via the website www.HolyGhostStories.com.



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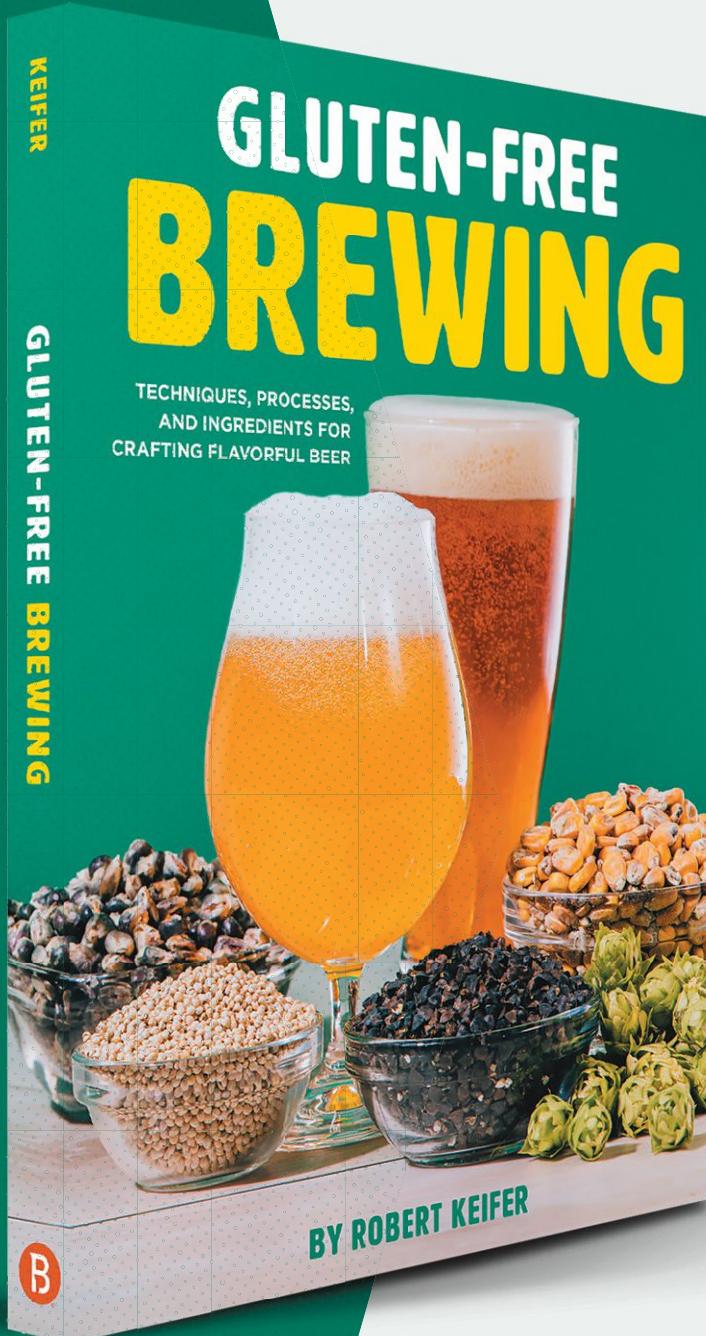
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SHARPLY *Bittersweet* ENGLISH CIDER

By Kristen Kuchar



Photo courtesy of National Association of Cider Makers



While beer may be England's go-to drink, cider is also a much-beloved beverage. In fact, the United Kingdom (U.K.) consumes more cider than any other country in the world.¹ In 2023, cider and perry revenue was an estimated \$2.38 billion in the U.K.²

Cider, which has a wide range of styles in England, is made throughout the country. Well-known cider areas include Herefordshire, Gloucestershire, Somerset, Devonshire to the west, and Kent to the east. In Hereford, the Museum of Cider preserves and shares the history of cidermaking.

ROOTS THAT GO WAY BACK

As with most prominent cider regions, there is a rich history that shaped its journey and evolution in England. It's believed that around 600 CE, monasteries planted orchards and made cider for monks as well as the whole community. When Normans invaded England in 1066, they planted more apple orchards and introduced tannic apple varieties. Between the 16th and 19th centuries, wine wasn't as readily available due to the halting of imports and a cooler climate, which impacted grape production. This led to an increased interest in cider. There are even written records dating back to 1204 CE showing that cider was once used as a form of payment.



"The origins of cidermaking in the U.K. date back centuries, and some of our cidermakers can trace their history back before the 1700s," said Fenella Tyler, Chief Executive of the National Association of Cider Makers (NACM), a group that promotes the cider and perry industry in the U.K. Tyler explained that most cidermakers started out as farming families who had a few acres of apple trees; these grew into the large orchards of today that specifically supply larger-scale cidermaking operations. "While the traditions and heritage of cidermaking have evolved over time and modern technology has been gradually introduced, the process of growing orchards, pressing apples, extracting the juice and fermenting it to make cider remains consistent over time," Tyler noted.

Gemma Evans, Brand Manager for Westons Cider, said 500 years of cider-making history can be found in the three counties of Herefordshire, Gloucestershire, and Worcestershire, where Westons Cider is located. "Traditionally, English cider has been rurally produced due to the sourcing of the apples from the surrounding land," Evans explained. "However, today this has expanded to urban cidermakers supplied from community orchards, and on the other side of the country, the counties of Suffolk and Kent produce ciders made from dessert fruit."

Perry also has a long history in the region and can trace its roots to pear trees that are over 300 years old. They can grow to almost 50 feet tall and are



grown historically in Gloucestershire, Herefordshire, Worcestershire, and Somerset.³ While there's a wide range of styles, compared to cider, perry tends to be mostly floral and light.

"U.K. ciders and perries are such a diverse category that there isn't a simple description that covers everything," said Tyler. She pointed out that with a cidermaking industry dating back centuries, different styles have evolved over time. Some are specific to a region, such as Herefordshire or Somerset, while other styles are characterized by the type of apple used, such as Dabinett or Michelin. U.K. ciders range from crisp and light to full bodied, and from dry to sweet. "That is perhaps why we are the largest cider market in the world. It's that range and diversity that is unique to the U.K.," Tyler

WHAT IS SCRUMPY?

Scrumpy is an unfiltered, rustic cider that's primarily produced in western and southern England. The root of the term "scrumpy" comes from "scrumping," which used to mean "stealing fruit." Nowadays this strong, still, often cloudy form of cider is made with locally produced apples that may have fallen to the ground or been scavenged.

Compared to traditional cider, scrumpy tends to be higher in tannins and alcohol content. It has an intense apple taste and a distinct earthy flavor. It is typically produced with traditional methods and made in small batches. Often this type of cider is made with no sweetener or extra juice, and is not pasteurized.⁴ The end result is cloudy and still.

asserted, noting that styles can span different drinking occasions and appeal to a broad range of drinkers. "U.K. ciders are made by fermenting out all of the sugar, which results in a very dry cider base. That is then blended to make the final cider, a process that sets it apart from many other traditional cider-making countries."

TAKING ENGLISH CIDER KNOWLEDGE STATESIDE

Gregory Hall, cidermaker and founder of Virtue Cider, located in Michigan, traveled through England and France to learn about cidermaking when he made the leap from brewing beer at Goose Island. He wanted to "meet the maker," he said, just as he did when visiting Germany, Belgium, and the Czech Republic to learn about beer.

When it came to the ciders of England, he found that traditional farmhouse ciders have loads of tannins that come from the fruit itself. They are generally fermented with wild yeast, and therefore contain a little bit of funk. "Cidermakers in England often let the apples drop, which leads to more of an overripe apple than a fresh-picked one," he said. "There's a priority to use local fruit,





The beauty of cider is the range of flavors you can get from different varieties of apples and various yeasts.

—Tim Hatcher,
general manager of The Apple Cider Boat Bristol

whether it's fruit they grow themselves or fruit from a neighbor," he added, "and aging in a barrel is another important aspect."

He noted that cidermaking is often just one part of a farm's work, alongside the raising of animals and the harvesting of crops, similar to how wineries and breweries can often be found on larger farms. Hall was inspired by these "farm-made" ciders that weren't produced in shops or factories, and he wanted to do the same at Virtue.

Hall pointed out how much English cider can vary amongst local producers. "It's really exciting that cider has such regional appeal. Of course it differs from country to country, but in England, it's county to county."

SWEET OR SHARP, BUT DEFINITELY BITTER

As with most cider regions, it's all about the apples. There are more than 2,500 indigenous apple varieties in the U.K. In general, the apples used for cidermaking are mostly bittersweet and bittersharp (high tannin and high acid) apples. Some popular cider apples include bittersweet varieties such as Yarlington Mill, Ashton Brown Jersey, Dabinett, Somerset Redstreak, and Bulmer's Norman; bittersharp varieties such as Porter's Perfection, Stoke Red, Foxwhelp, and Kingston Black; sharp varieties such as Crimson King, Brown's, and Frederick; and sweet varieties such as Sweet Alford, Morgan Sweet, and Sweet Coppin.

Tyler pointed out that in the west and southwest of England, there are around 16,000 acres of cider apple orchards, many of which have been producing cider apples for decades and are grown by farming families. "These cider apples differ from culinary (eating/cooking) apples," Tyler

explained. "They are unique to cidermaking, because they have plenty of sugar, but also have higher levels of tannins, which add astringency." The result is a bittersweet taste profile that has become intrinsic to many regional, traditional ciders. "Varieties such as Yarlington Mill and Foxwhelp are far better to press for cider than to be used as table apples, and they can be blended to bring out specific characteristics such as a full body or a little acidity."

Bob Chaplin, who has worked in the industry for 50 years and is secretary of the South West of England Cidermakers' Association (SWECA), notes that in England and the U.K. there is an incredible range of cider apples and a vast amount of cidermaking knowledge that goes back hundreds of years.

"Firstly, traditional cider apples grown mainly on the western side of England are now spreading across the U.K.," Chaplin

said. "These apples, especially the bittersweet varieties, contain tannins that create the astringent character associated with traditional ciders." Chaplin explained that dessert apples grown in the east of England make a wine-like cider that's more acidic, fruity, and has little or no tannin characteristics. Some commonly used dessert apples include Falstaff, Jonagold, Red Windsor, and Bramley. "Cider production in England is very diverse, from small hobby makers using oak casks to ferment and mature their ciders to major producers using very controlled processes making millions of liters per year," Chaplin said.

With such a diverse array of apples, there's a wide assortment of ciders to enjoy. "The beauty of cider is the range of flavors you can get from different varieties of apples and various yeasts," said Tim Hatcher, General Manager of The Apple Cider Boat Bristol, which serves a wide



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range of ciders and perries. He's seen fruit ciders increase in popularity over the last 10 years and provide yet another variant to the widely loved beverage. He also noted that you can really taste the difference in high-quality options that use fresh-pressed juices. "As a whole, I feel cider in the southwest is very accessible and can be enjoyed by people from all walks of life, especially if they've got a sweet tooth," Hatcher said. "Some cider-makers still press using 100-year-old gear; others have updated and innovated their equipment to keep up with demand. There is no wrong or right way; cider's an art, so to each their own."

PEAR-ING CIDER WITH FOOD

Besides there being no single way to produce cider in England, there's certainly no single, specific occasion that calls for the enjoyment of cider. Tyler explained that, cider being such a diverse drink with a huge range of styles, it can suit any occasion: draught ciders are sold in pubs in pints and half pints; in restaurants large bottles can be had for sharing with a meal; and in supermarkets small bottles and cans are available for enjoying at home. Sparkling ciders are great for extra-special occasions and celebrations.

Cider is also often associated with picnics and barbeques in England, as it is refreshing and very suitable for summery outdoor occasions. Tyler recommended the following pairings. The acidity works perfectly with cheese and meat dishes containing pork, sausage, duck, and lamb. Lighter ciders pair well with fish. Tyler said cooking with cider also works well and makes fantastic sauces,



gravies, and marinades. "Cider can also be mulled, where it's warmed gently with spices, perfect to sip on a cold winter's evening, or mixed with fruit for a light summer punch."

Evans added, "cider is also served at sporting events and can be used as a celebration drink instead of champagne." Evans' food pairing recommendations include street food, snacks, cheeseboards, and steak and chips.

Hall believes a good cider pairing is locally produced cheese, especially English cheddar. "Cheese is made in the same locale. Some of the really great cheeses of the world come from traditional English cider regions," he said, noting that both cheese and cider tend to like coastal climates. Chutney and meat pies were two other recommendations.

The NACM had more pairing ideas for specific styles of cider: a dry, fresh cider with smoked salmon or a rack of lamb; a dry, bold cider with mushroom risotto, cheddar cheese, or sea bream; a sweet, crisp cider with pad Thai, goat cheese, or raspberry pavlova; and finally, a sweet and fruity cider with a burger, chicken bhuna, or a chocolate brownie. A great way to start delving deeper into the best cider pairings is to get your own batch fermenting.

MAKING YOUR OWN

When it comes to making English cider at home, Tyler said it's all about using the right apples in the right environment. "Making great cider is all about creating the perfect conditions for the yeast: clean equipment, clean must, and the right fermentation temperature. The most important ingredient is, of course, the apples,

Photo courtesy of National Association of Cider Makers

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so choose varieties that have a flavor you like, and ensure they are picked at just the right moment so that they are full of flavor and sugar."

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Kristen Kuchar has covered the food and beverage industries for the past 14 years. She has written for Brew Your Own, BeerAdvocate, CraftBeer.com, The Beer Connoisseur, DRAFT, All About Beer, VinePair, and many more.





CHILL ANYWHERE

USING IMMERSION COOLERS TO FERMENT LAGER

By Nelson Crowle

I have been brewing lagers off and on for over 30 years, and my techniques have varied each time. One of my early systems used a mini refrigerator and a rectangular fermenter. I have fermented lager, without any extra cooling, in a 60°F (16°C) basement. I have used several kveik strains. I have tried pressure fermenting. Some methods worked better than others. See Table 1 for a comparison of some lager temperature control methods.

My goal in researching this article was to set up a lager fermentation system that can be used at ambient room temperatures, say 70–72°F (21–22°C), without refrigeration to keep the beer cool. A simple and self-contained immersion cooler system requires very little extra equipment: most of the components are used for other things in my brewery when not →

being used for lager cooling. The immersion cooler is a device that is inserted through the top of the fermenter and into the beer. It chills the beer by direct contact with the liquid, versus refrigerated air cooling a fermenter's external walls.

The basic design starts with a small reservoir of non-toxic liquid that's cooled (without freezing) and pumped through an immersion cooling device immersed in the beer. The fermenter uses a controller to read the current beer temperature and turn on the pump when the beer needs to be cooled, then turn off the pump when the beer has reached its target temperature.

The simplest option is to use a bucket of ice water that gets circulated through the immersion cooler. This requires regular attention (every few hours or at least daily) to add ice and drain the water, and this method ends up using a lot of ice for the often lengthy lager ferment.

A second option is to use a jockey box to chill a non-toxic coolant with a low freezing temperature, such as propylene glycol, that is circulated through the immersion cooler. One reason to use coolant rather than water is that, when the beer reaches the desired temperature and the pump stops, the beer lines in the jockey box will not freeze. This solution also requires daily attention to add ice to the jockey box and drain out the water, but the jockey box is well insulated, so

this system is more efficient than the first ice water option.

A third option replaces the jockey box with a device that chills the coolant using refrigeration. This is where you need to decide whether to make a monetary commitment. Glycol chillers such as the Grainfather Glycol Chiller or the BrewBuilt Ice Master are in the \$700–\$1,000 range. Flash chillers (basically electric jockey boxes that do not need ice and do not have a fluid reservoir) such as the Lindr are around \$850. Flash chillers, when not being used for lager cooling, can be used instead of a kegerator for on-the-fly draught beer.

This article will discuss all three solutions, as well as three immersion cooler types and will compare cost and automated features to balance budgetary concerns with supervision time required. To eliminate vendor bias, all additional components of these systems were independently purchased except the Lindr, which was on temporary loan.

INITIAL SETUP

All three solutions require a pump, a temperature controller, and an immersion cooler. For all tests, I used a 6-gallon (22.7-L) FerMonster (a wide-mouth PET plastic fermenter) containing 5 gallons (19 L) of beer starting at 72°F (22°C), with the goal to chill that beer to 48°F

(9°C) and maintain that temperature. In all tests, I wrapped the fermenter with double-reflective bubble foil insulation, but it is removed in the accompanying images to show the system components.

CHILLING COIL OPTIONS

First, before buying a chilling coil, ensure it is compatible with your fermenter's geometry. The Kegland Temp Twister, for example, is 4.33 inches in diameter, so it will not fit the narrow mouth of a regular carboy, and with a coil height of 14 inches, it may not fit into smaller fermenters (like the 3-gallon Speidel 12L). See Table 2 for a list of some commonly used fermenters and compatible cooling coils. Other options include using holed stoppers or getting an extra lid and drilling/modifying appropriately.

Table 3 shows the relative cooling efficiencies of the three cooling coil options. I used a 6-gallon (22.7-L) FerMonster with 5 gallons (19 L) of 75°F (24°C) water in it, and an ambient air temperature of 75°F. I then measured how long it took to chill the water down to 48°F (9°C). Photo 4 shows the three chilling coils tested: Anvil Cooling Coil, BrewBuilt CoolStix, and Kegland Temp Twister. For the Anvil Cooling Coil and the BrewBuilt CoolStix, I was a bit concerned that the temperature probe thermowell on the fermenter was too close to the cooling coil, which could cause the Inkbird to turn off prematurely. My solution was to wedge a #000 rubber stopper between the thermowell and the cooling coil to add a separating barrier.

CHILLING METHOD 1: BUCKET OF ICE WATER

This solution uses a 6-gallon (22.7-L) bottling bucket containing ice water. The bucket spigot connects to the inlet of the pump. The outlet of the pump connects to the inlet of the immersion cooler. The outlet of the immersion cooler goes back into the top of the bottling bucket to recirculate the ice water. Wrapping the bottling bucket in foil bubble insulation helps keep temperatures cool longer and extends the life of the ice. The pump that I used is not self-priming, so I kept the pump on the table at the same level as the base of the bucket, thus priming the pump by gravity whenever the bucket spigot valve was opened.

As mentioned, this method uses a lot of ice. I was going through a 7-pound (3.2-kg) bag about four times a day, so I made some adjustments. I replaced the bottling bucket with a 5-gallon insulated cooler

TABLE 1: LAGER TEMPERATURE CONTROL METHODS

Method	Advantages	Disadvantages
Kegerator	Multiple batches Flexible options for fermenters	All the same temperature Possible inaccurate temperature and overshoot
Keezer	Multiple batches Flexible options for fermenters	All the same temperature Possible inaccurate temperature and overshoot Possible freezing
Walk-in	Multiple batches Flexible options for fermenters	All the same temperature (unless zoned)
Immersion with ice water	Multiple batches	Adding ice Draining water
Immersion with jockey box	One temperature per circuit Flexible options for fermenters	Adding ice Draining water
Immersion with Lindr	One temperature per circuit Flexible options for fermenters	\$850 to buy a 2-circuit Lindr (reusable as electric cooled kegerator)
Grainfather	One temperature per fermenter	Grainfather GC2 Glycol Chiller: \$850 Glycol Chiller Adapter: \$199 GF30 Fermenter: \$695
BrewBuilt IceMaster Glycol Chiller	One temperature per fermenter Flexible options for fermenters	IceMaster Max-2: \$700 IceMaster 100: \$800
Blichmann Glycol Chiller	One temperature per fermenter Flexible options for fermenters	\$1,100

TABLE 2: IMMERSION CHILLER OPTIONS FOR FERMENTERS

Fermenter	CoolStix	Temp Twister	Anvil Cooling Coil
4–5 gal. (15–19 L) plastic water cooler carboy	#10 CoolStix stopper	N/A—mouth too narrow	#7 Anvil stopper with Southern Labs adapter 5
5-gal. glass carboy	CoolStix Carboy Hood	N/A—mouth too narrow	#7 Anvil stopper
Speidel 12L/20L/30L	CoolStix Carboy Hood	Spare lid—drill 2 holes (too tall for 12L)	#7 Anvil stopper with Southern Labs adapter 4
5–8 gal. (19–30L) bucket	#10 CoolStix stopper (drill hole in lid)	Drill 2 holes in lid	#7 Anvil stopper (drill hole in lid)
PET Carboy	#10 CoolStix stopper	N/A—mouth too narrow	#7 Anvil stopper with Southern Labs adapter 5
FerMonster 3–6-gal. (11–23 L)	#10 CoolStix stopper	Spare lid (drill 2 holes)	#7 Anvil stopper with Southern Labs adapter 5

Photo 1

Cooler Ice Bucket/Temp Twister.



that was configured as a mash tun (see Photo 1). The mash screen conveniently kept the ice from getting sucked into the pump. With the insulation upgrade, half of a bag of ice now lasted 12 or more hours—a big improvement!

I tried other improvements, such as using frozen 1-gallon jugs to chill the water, but they didn't transfer temperature very efficiently. I also tried freezing half-liter water bottles, which worked better than the gallon jugs, but not nearly as well as ice cubes.

Looking at Photo 1, the tube going from the pump outlet, which goes to the immersion cooler inlet, has a "T" in it with a valve and a coil of tubing. This is convenient for

draining water from the cooler—just open the valve to pump the water through the tubing to a bucket. No need to move or disconnect anything.

Before making comparison measurements of the various chilling options, I wanted to try a real-life example by brewing a test beer. For all of the test beers, I used the Kegland Temp Twister cooling coil in a FerMonster 3-gallon fermenter.

Test batch #1 was a 3-gallon (11.4-L) batch of helles bock. For the ice bucket and the cooling coil method, temperature control worked great and kept the beer between 50°F (10°C), the recommended lower temperature limit for Lallemand NovaLager yeast, and 53°F (12°C). I had the Inkbird controller set to a 3°F differential. The only time the temperature crept a bit higher was when I neglected to add ice to the bucket in time. This method worked, but required draining the melt water and adding ice about every 12 hours. The krausen dropped on day six, and I removed the fermenter from the chilling system on day seven.

Lessons learned from Method 1:

1. Drain water to the minimum needed to pump.
2. Add ice as needed to ensure that the cooling water keeps the beer within your preferred lager fermentation temperature range.
3. Insulate the cooling water container. For all configurations, insulate the fermenter.
4. Temperature maintenance is easier on the system when starting with cooler wort, so try to give the cooling system a head start by chilling the post-boil wort as much as possible.

CHILLING METHOD 2:

GLYCOL THROUGH JOCKEY BOX

To set up this configuration, I positioned the jockey box after the pump, but before the Temp Twister cooling coil. The liquid inlet of the jockey box connects to the pump output, and a beer faucet line cleaning adapter (replaces the faucet and has a 3/8" barb) transfers the cooled liquid to the cooling coil in the fermenter. The output from the cooling coil goes through a gas-in ball-lock quick-disconnect fitting and into a 6-liter Torpedo Corny keg. The liquid-out stem of the keg feeds into the pump through another quick-disconnect fitting.

The keg contains diluted propylene glycol. I opted for 40%, which is good to -8°F (-22°C). (Various tables on the internet give you dilution rates and temperature ratings). I wanted to guarantee that the cooling liquid would not freeze when the pump was off for a long time. I used 3 pints (1.4 L) distilled water and 2 pints (0.9 L) glycol to get to 40%, and to ensure enough volume to pump through the system. When using a Corny keg as a glycol reservoir, leave the PRV (pressure relief valve) open. Any positive or negative pressure may cause the pump to malfunction.

See Photo 2 for the glycol system setup that uses a jockey box and Temp Twister cooling coil.

Test batch #2, a Munich helles, used Fermentis Saflager W-34/70, which ferments at a minimum temperature of 54°F (12°C). I added 20 pounds (9 kg) of ice to the jockey box. Test batch #3, a Märzen lager, used the yeast cake from batch #1 (Lallemand NovaLager yeast) and was fermented at 50°F (10°C). I changed the

Photo 2

Jockey Box Glycol/Temp Twister.



Inkbird's temperature differential to 2°F, so the cooling system would kick on at 52°F (11°C) to bring the beer back down to 50°F. This time I used a 16-pound (7.3-kg) bag of ice, which needed to be refreshed with another 16-pound bag every 36 hours.

Photo 3

Lindr Glycol/Temp Twister.



CHILLING METHOD 3: GLYCOL THROUGH LINDR ELECTRIC JOCKEY BOX

Test batch #4, a schwarzbier, again used Lallemand NovaLager and fermented at 50°F (10°C) with a 2°F differential on the Inkbird. The only change from Method 2 was removing the jockey box and replacing it with the Lindr electric jockey box.

The Lindr comes from the Czech Republic, so the faucet coupling nut does not fit American faucets, which means the faucet line cleaning adapter won't fit the Lindr without an adapter. Use one tailpiece gasket between the Lindr shank and the stainless steel adapter, and then stack three tailpiece gaskets between the stainless steel adapter and the line cleaning adapter for a tight connection.

This configuration uses a 6-liter Corny keg that connects to the pump, which then connects to the input on the Lindr. The output of the Lindr connects to the Temp Twister, and the Temp Twister output goes back to the glycol-containing Corny keg. See Photo 3.

After hooking everything up and turning on the Inkbird/pump and the Lindr, I was very excited to NOT need to drain melt water or add any ice. The Lindr (with the cold knob set to 5 out of 7) did a great job of chilling the glycol running through the cooling coil quickly and efficiently.

TABLE 3: COMPARING CHILLING EFFICIENCY

Chilling source	Cooling coil	Hours:Minutes to 48°F
5-gal. (19-L) insulated plastic mash tun / 1 gal. (3.8 L) of water and 10 lb. (4.5 kg) of ice.	Kegland Temp Twister	0:54
5-gal. insulated plastic mash tun / 1 gal. of water and 10 lb. of ice. No ice remaining and 43°F (6°C) cooling water at 3:00, so drained water to 1 gal and added 5 lb. (2.27 kg) of ice.	Anvil Cooling Coil	3:00 to get to 51.8°F (11°C) 4:00 to get to 49.2°F (9.6°C) 4:59 to get to 48°F (8.9°C)
Jockey box with 16 lb. (7.3 kg) of ice.	Kegland Temp Twister	2:00
Lindr electric jockey box with cold dial set to 7/7.	BrewBuilt CoolStix	1:00 to get to 70.5°F (21.4°C) 2:00 to get to 65.7°F (18.7°C) 3:00 to get to 62.1°F (16.7°C) 4:00 to get to 59.7°F (15.4°C) 5:00 to get to 57.9°F (14.4°C) 6:00 to get to 55.9°F (13.3°C) 7:00 to get to 54.8°F (12.7°C) 8:00 to get to 53.6°F (12°C) 9:00 to get to 52.4°F (11.3°C) 10:00 to get to 51.2°F (10.7°C) 11:00 to get to 50.0°F (10°C) 12:00 to get to 48.8°F (9.3°C) 12:44 to get to 48°F (8.9°C)
Lindr electric jockey box with cold dial set to 7/7.	Anvil Cooling Coil	1:00 to get to 65°F (18.3°C) 2:00 to get to 58.3°F (14.6°C) 4:54 to get to 48°F (8.9°C)
Lindr electric jockey box with cold dial set to 5/7.	Kegland Temp Twister	1:00 to get to 52.2°F (11.2°C) 1:20 to get to 49.1°F (9.5°C) 1:30 to get to 48°F (8.9°C)
Lindr electric jockey box with cold dial set to 7/7.	Kegland Temp Twister	1:10

Table 4 shows a sample timeline of several cycles from when the Inkbird turned on the pump at 52°F (11°C) to when the beer reached 50°F (10°C) and the pump turned off.

The whole cycle of chilling to 50°F then rising to 52°F took about 2 hours. The

beer was cooled from 52°F to 50°F in 9 minutes, and the Lindr chilled its cooling plate for a total of 8 minutes, indicating that the cooling temperature setting on the Lindr was adjusted cold enough to efficiently cool the beer, but not too cold to cycle the Lindr unnecessarily.

TABLE 4: SAMPLE TIMELINE OF CYCLES

Minutes	Cycle
0	The pump turned on and began circulating glycol through the Lindr and cooling coil.
1	The Lindr cycled on for 90 seconds to chill its cold plate, then cycled off.
4	The Lindr again cycled on for 90 seconds, then cycled off.
7	The Lindr again cycled on for 90 seconds, then cycled off.
9	The temperature reached 50°F (10°C) and the pump turned off.
10	The temperature reached an overshoot to 49.1°F (9.5°C) from the residual cold in the cooling coil.
10	The Lindr cycled on for 80 seconds, then cycled off.
42	The Lindr cycled on for 70 seconds, then cycled off; fermenter temperature was 50.2°F (10.1°C).
82	The Lindr cycled on for 60 seconds, then cycled off.
128	The fermenter had reached 52°F (11.1°C) again and the pump turned on to start this cycle again.

TABLE 5: COMPONENTS AVAILABILITY

Component	Part number	Available from	Cost	Notes
Temperature Controller	FE640	MoreBeer.com	\$39.99	A
Pump	Bayite BYT-7A014A	Amazon	\$30.99	A
Kegland Temp Twister	FE139	MoreBeer.com	\$39.99	B
BrewBuilt CoolStix—Carboys	GLY510	MoreBeer.com	\$89.99	C
Anvil Cooling Coil		AnvilBrewing.com	\$38.49	D
Anvil #7–4 Hole Stopper		AnvilBrewing.com	\$4.49	D
Rubber Stopper #10–1 hole	FE470VS	MoreBeer.com	\$3.39	
Silicone Stopper #10–2 hole	FE486	MoreBeer.com	\$4.99	
Silicone Stopper #10–3 hole	FE486A	MoreBeer.com	\$7.99	CF
Silicone Carboy hood	FE501A	MoreBeer.com	\$7.99	CJ
Adapter #4 [7 to 8.5] (adapts stopper #3–#9 to #6.5–#9)	FASN07 (7 adapters)	SouthernLabware. com	\$16.66	G
Adapter #5 [7 to 11] (adapts stopper #6–#10 to #7–#11)	FASN07 (7 adapters)	SouthernLabware. com	\$16.66	H
FerMonster 3 gallon—ported	FE260	MoreBeer.com	\$28.99	I
FerMonster 6 gallon—ported	FE256	MoreBeer.com	\$39.99	I
3/8" ID, 1/2" OD tubing (about 10 feet)	R320B	MoreBeer.com	\$6.29	A
Thermowell 15-inch	H973	MoreBeer.com	\$15.99	A
Speidel replacement lid	FE712	MoreBeer.com	\$16.99	BK
FerMonster replacement lid with hole	FE253	MoreBeer.com	\$4.49	BL
Beer/Gas Quick Disconnect 3/8" barb to male QD	H553	MoreBeer.com	\$5.99	B (need 2)
Beer/Gas Quick Disconnect 1/4" barb to male QD	H550A	MoreBeer.com	\$9.99	D (need 2)
Beer Faucet Line Cleaning Adapter	CE15	MoreBeer.com	\$7.99	MN
Ball Lock Quick Disconnect—Out—Flare	KEG1115	MoreBeer.com	\$7.29	MN
Ball Lock Quick Disconnect—In—Flare	KEG1116	MoreBeer.com	\$7.29	MN
Flare to 3/8" barb				MN (need 2)
Food Grade Propylene Glycol—1 gallon	GLY501	MoreBeer.com	\$54.99	MN
Slimline Torpedo Keg—1.5 gallon	KEG426	MoreBeer.com	\$99.99	MN
Lindr	Kontakt 40	In-dispense.com	\$850.00	N
Stainless Dip Tube & Thermowell for Speidel	FE741	MoreBeer.com	\$39.99	O
Food Grade Propylene Glycol 100%	GLY501	MoreBeer.com	\$54.99	MN
Lindr to American Faucet Adapter		In-dispense.com	\$25	N

NOTES key:

- A – needed for all configurations
- B – needed for Temp Twister cooling coil
- C – needed for CoolStix cooling coil
- D – needed for Anvil cooling coil
- E – needed only for fermenters accepting #7 stopper
- F – needed only for fermenters accepting #10 stopper
- G – needed only for Anvil cooling coil #7 stopper to Speidel 12L/20L/30L fermenters (#8–8.5 stopper)
- H – needed only to adapt Anvil cooling coil #7 to fermenters taking a #10 stopper (FerMonster, PET carboy, plastic water-cooler carboy)
- I – recommended if you need a new inexpensive fermenter. 3-gallon for 2.5-gallon batches, 6-gallon for 5-gallon batches
- J – needed only to adapt CoolStix to Speidel 12L/20L/30L fermenters
- K – needed only to adapt Temp Twister to Speidel 20L/30L fermenters—also need FE711 Replacement Lid Gasket (\$5.49)
- L – needed only to adapt Temp Twister to FerMonster fermenters—also need FE251 Replacement O-Ring (\$2.99)
- M – needed for jockey box cooling option
- N – needed for Lindr electric jockey box cooling option
- O – optional to put thermowell with drain valve instead of through a connection in the lid

This is the most compact and travel-friendly of all the steups. The whole system (excepting the glycol in the keg) holds 33.5 fluid ounces (about 1 liter). The Lindr takes up about the same space as an additional 3- or 5-gallon fermenter, so this setup is ideal for lagering on a counter in a small room-temperature apartment.

THE BOTTOM LINE

First, I would recommend using the Kegland Temp Twister cooling coil. It has much more surface area than the Anvil Cooling Coil or the BrewBuilt Coolstix, so it cools and maintains beer temperature much more quickly. That said, both the Anvil and CoolStix did an adequate

Photo 4
Cooling Coil Options.

From left:
Kegland Temp Twister; Anvil Cooling Coil; Brewbuilt Coolstix.

job and would be good options for a narrow-mouth fermenter. Keep in mind that you can buy a 3-gallon, 6-gallon, or 7-gallon wide-mouth FerMonster for an affordable \$30 to \$40 and make use of the superior Temp Twister.

Regarding the cooling system (ice bucket versus jockey box versus Lindr), the Lindr was the hands-down winner. The convenience factor (along with not having to buy bags of ice) was great—set it up and check on it a week or two later. The only disadvantage is the cost. But since the Lindr can be used as a kegerator or jockey box replacement, whenever you're not cooling a lager, you can use the Lindr for serving beer instead.

To set up any of the discussed systems, refer to Table 5 for components, prices, and sources. MoreBeer.com is listed as a convenience so that you can review part numbers and prices, but also be sure to check your local homebrew store.

Happy lagering!

Nelson Crowle is a BJCP National beer, mead, and cider judge. He is the author of the ReggieBeer.com homebrew competition software, runs the annual Chili Pepper Extravaganza homebrew competition, and has been homebrewing since 1975.



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Relax, Don't Worry, Have a Homebrew!

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

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



ON THE WEB

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

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.

BREWING WITH ZYMURGY

MAKING WORT

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

Brew Lingo

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

AA – alpha acid

ABV – alcohol by volume

AHA – American Homebrewers Association

BBL – 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

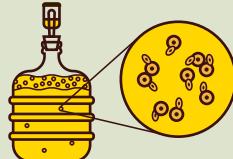
SMM – S-methyl methionine, precursor to dimethyl sulfide (DMS)

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

BUZZ

Brewers United for Zany Zymurgy

**By Patrick Lauleta**

Homebrew clubs come in many different sizes, with members of different backgrounds, interests, experience levels, etc. Our club, Brewers United for Zany Zymurgy (BUZZ), has a wide range of experience. We all feed off each other's energy, and we learn a lot every time we get together. Some clubs are super competitive, and other clubs are filled with wacky characters (we've all seen them at Homebrew Con). Each one is great in its own way, because it meets the needs of its participants.

I envy the specific things each club excels at that maybe we don't do as well. However, in my eyes, we are the envy of

Southeastern Pennsylvania homebrewing when it comes to the level of education and collaboration our events and activities offer in our monthly meetings and other get-togethers. We may not coordinate our outfits for Club Night or try to win gold at the National Homebrew Competition (NHC), although we have qualified many times, but I believe what we do is more valuable. Our most recent activity/friendly competition was called March Mashness.

At our January 2024 meeting at Braeloch Brewing in Kennett Square, Pa., we randomly paired up to brew by playing a round of Beer Styles Memory. Each homebrewer blindly chose a card with a beer style category written on the other side.

Each beer style category had two cards, so everyone had a partner. We chose styles from the BJCP 2021 Beer Style Guidelines for their ability to be turned around in a two-month time period. The styles were:

- 11. British Bitter
- 13. Brown British Beer
- 14. Scottish Ale
- 15. Irish Beer
- 16. Dark British Beer
- 19. Amber and Brown American Beer
- 21B. Specialty IPA
- 24. Belgian Ale
- 25. Strong Belgian Ale
- 26. Monastic Ale

Brew
This!



March Mashness

Best Bitter

Recipe courtesy of
Robert Purrenhaege & Pat DiLello

Batch Volume: 11 gal (41.6 L)

Original Gravity: 1.045 (11.2°P)

Final Gravity: 1.013 (3.2°P)

Alcohol: 4.2% by volume

Color: 15 SRM

Bitterness: 35 IBUs (Tinseth)

Efficiency: 78%

MALTS

17 lb.	(7.7 kg) 4.5°L Maris Otter malt (88.6%)
1 lb.	(454 g) 17.2°L biscuit malt (5.2%)
1 lb.	(454 g) 120°L caramel malt (5.2%)
3 oz.	(85 g) 400°L debittered black malt (1%)

HOPS

1.25 oz.	(35 g) Phoenix, 10.8% a.a. @ 60 min
2 oz.	(57 g) East Kent Goldings, 5.4% a.a. @ 15 min
2 oz.	(57 g) Styrian Celeia, 3.9% a.a. @ 0 min

OTHER INGREDIENTS

11 tsp.	Cellar Science FermFed yeast nutrient @ 15 min
1 tablet	Whirlfloc @ 15 min

YEAST

500 mL Wyeast 1469 West Yorkshire Ale Yeast
500 mL White Labs WLP002 English Ale Yeast

WATER

Treat total volume of water with 27 g calcium chloride and 2 g calcium sulfate.

BREWING NOTES

Strike at 160°F (71°C). Mash at 151°F (66°C) for 1 hour. Mash out at 167°F (75°C) for 1 minute. Sparge and transfer wort to boil kettle. Boil wort for 60 minutes. Add hops at stated intervals. Chill to 68°F (20°C), oxygenate and pitch yeast. Allow to ferment for 14 days. Carbonate to 2.4 volumes of CO₂.



March Mashness sample pours.

The partners had to agree on a subcategory to brew and then come up with a list of ingredients together. Some pairs came up with a recipe from scratch, based on BJCP guidelines, while others started with a published recipe and then adjusted it to their liking. Once a basic recipe was finalized, the real fun began.

Each brewer went separate ways and brewed their beers individually on their own systems, with their own desired processes (mash temperature, etc.). The only ingredient that could differ from one another's was the yeast, so that brewers could use some they already had on hand, or that they were more familiar with. Another reason to use different strains was to easily contrast fermentation characteristics between the two.

A few other flexibilities: brewers could scale their recipes up or down to meet their volume requirements and choose between extract or all-grain methods. Process variables such as water-to-grain ratio, water chemistry adjustments, mash time, boil time, fermentation temperature, etc. all were up to each individual brewer's discretion. Then everyone would reunite at the March meeting for a showdown.

During the showdown, the conversation was not focused on who did it better or who "won," but more around why the beers were different. Out of the six pairs of beers we evaluated at our meeting, four of them were a coin flip as to which one was preferred. One of them was noticeably different due to the type of yeast used and water treatment differences, and one was different for reasons we couldn't really ascertain—but it was fun, informative, and interesting for all.

BUZZ

BUZZ Homebrew Club started as a very loose group of homebrewers who met at their local homebrew supply store, Brewers Unlimited, and shared their experiences, knowledge, and beverages with each other. Unfortunately, that shop had to close its doors, but the group wanted to keep things going and officially started BUZZ, named in homage to Brewers Unlimited. The origins of the club date back to the early '90s. After the pandemic, club members started to roam around to different brewpubs in Chester County, Pa. on the third Monday of each month.

They've all been very generous, especially—the original spot at Iron Hill in West Chester. BUZZ can't thank them enough for their hospitality! They never cease to amaze with their willingness to participate and support club adventures.

Much thanks to the other supporting breweries: Artillery Brewing, Braeloch Brewing, Animated Brewing Company, and the soon-to-open Dublin Brewing Company in Downingtown, Pa.

Contact BUZZ at PrimaryFermenters@bzuhomeworkclub.com, or check out their website at bzuhomeworkclub.com.

The leadership team for our club, affectionately coined The Primary Fermenters, get together a few times a year to plan out meeting topics and activities. Our goal for 2024 is to get members brewing as often as possible, so a lot of 2024 activities ask members to brew and bring their finished products back to a future club meeting. In doing so, we are encouraging our members to be active, learn, engage with each other, and most importantly, have a blast with some healthy competition.

We are always looking for new projects, too. Does your club do anything particularly well? Something that encourages members to brew together, expands their knowledge, and allows them to become better homebrewers? We would love to hear some of your ideas, or even join you in a project sometime. Reach out to us with any ideas!

Patrick Lauletta is a high school teacher in Chester County, Pa. He started brewing after making a couple of successful wine batches in the spring of 2004. His first beer, Raspberry Red Ale, was brewed with a kit from Midwest Supplies. That first delicious pour opened the door to an amazing hobby and lifestyle. Contact him at ptlaulet@comcast.net.



BUZZ members enjoying beers at Braeloch Brewing.



Brew
This!

March Mashness

19A American Amber Ale

Recipe courtesy of Patrick Lauletta and Mark Prior

Batch Volume: 5 gal [18.9 L]

Original Gravity: 1.060 [14.7°P]

Final Gravity: 1.014 [3.5°P]

Alcohol: 6.1% by volume

Color: 14 SRM

Bitterness: 43 IBUs (Tinseth)

Efficiency: 80%

MALTS

12 lb. [5.4 kg] 1.8°L American 2-row malt [85.3%]

1 lb. [454 g] 9.7°L Munich malt [7.1%]

1 lb. [454 g] 60°L Caramel malt [7.1%]

1 oz. [28 g] 350°L Chocolate malt [0.5%]

HOPS

1 oz. [28 g] Centennial, 9.3% a.a. @ 60 min

1.5 oz. [42 g] Cascade, 5.4% a.a. @ 10 min

1 oz. [28 g] Amarillo, 7.4% a.a. @ 10 min

1.5 oz. [42 g] Cascade, 5.4% a.a. @ 0 min

(whirlpool at flameout for 15 minutes before chilling)

1 oz. [28 g] Amarillo, 7.4% a.a. @ 0 min

(whirlpool at flameout for 15 minutes before chilling)

OTHER INGREDIENTS

Clarifying agent of your choice, as needed.

YEAST

2 11-gram packs Fermentis W-34/70 Yeast (Pat Lauletta's yeast choice)

2L starter Wyeast 1764 Pacman Yeast (Mark Prior's yeast choice)

WATER

Treat total volume of water to meet your needs based on your water profile. (Pat didn't do any water adjustment and Mark did very little to adjust pH and hardness.)

BREWING NOTES

Mash in with 5.25 gallons [20 L] of water at 160°F (71°C) and stabilize at 149°F (65°C) for 1 hour. Mash out at 167°F (75°C). Sparge and transfer wort to boil kettle. Boil wort for 60 minutes. Add hops at stated intervals. Chill to 68°F (20°C), oxygenate, and pitch yeast. Allow to ferment for 14 days. Carbonate to 2.4 volumes of CO₂.

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A NEW HOP

How We Created Star Wars Beers

This year the AHA's Big Brew Day fell on May the Fourth, which, to many people out there, is also known as May the Force, or Star Wars Day, so it only made sense for the recipes to be inspired by the iconic film series. I was extremely honored when the AHA reached out and asked if they could use recipes created by me and my brewing buddies, recipes inspired by the original *Star Wars* trilogy.

In the September/October 2022 issue of *Zymurgy* (Last Drop, "Storytelling Through Beer"), I wrote about how my friends and I brew beers inspired by pop culture. For the most part, we brew a one-off beer inspired by a movie, but when it came to *Star Wars*, one beer wasn't enough. We wanted to create a trilogy of beers.

I must admit, I am a *Star Wars* nerd. I have watched the epic movies more times than I can count, I have a collection of lightsabers, and I find reasons to quote the films every day. As I write this article, the soundtrack is playing in the background. Turning these movies into beers was sure going to be fun.

When my friends and I got together to discuss the challenge ahead, we first broke down the trilogy. Each movie in the series is a classic in its own right, but together, they tell one cohesive story in three acts. They all share common elements: exciting action, strange lands and lifeforms, lightsaber fights, space battles, and the sweeping score by John Williams (seriously, how many movies have multiple pieces of music the general public can identify outside of the main theme?). But each one is thematically different.

The first is the classic hero story: a boy discovers he has powers and goes off on an adventure led by his mentor. The second deals with themes of spirituality, temptation, betrayal, darkness, and the triumph of evil. The third explores friendship, loyalty, redemption, and features Ewoks! Each film tonally differs from the previous one, which is why this particular space opera continues



to be praised nearly 50 years after the original movie was released.

After breaking down the trilogy, we decided to create a beer for the first movie, *A New Hope*, that we could then build upon and change for *The Empire Strikes Back* and *Return of the Jedi* to represent the common aspects of each movie, and also reflect the shifting themes.

A New Hope is a fun movie. When it was released, it wasn't tied to any existing mythology the audience had to know going in, so it was an accessible adventure that captured the imagination of the audience. We thought a pale ale would be a great way to honor that—crushable and hoppy, but not dank. We wanted it to shine brightly like the twin suns of Tatooine, and perhaps quench the thirst of someone from that desert planet. We created a 4.5 percent ABV pale ale that used everyone's favorite hop, Citra.

The Empire Strikes Back is a dark movie, but there is some lightness in it too. We wanted to express that darkness without taking away the fun. The one pound of Carafa III in the grist makes

this beer look like Darth Vader in a glass. The roastiness of the grain adds to the beer's complexity, in the same way that *Empire* added to the complexity of *Star Wars*. It's a movie where the bad guys win, but it finishes with a glimmer of hope. The darkness can never completely drown out the light, which is a sentiment symbolized in the beer by using bright Citra hops to counter the way the roastiness of the specialty malts strike back.

Return of the Jedi emerges from the dark and back into the light. Beginning with a heist on Tatooine and ending on the forest moon of Endor, where our heroes team up with a race of tiny bears called the Ewoks to fight the Empire, it is an all-out escapade. Evil is defeated, Darth Vader finds redemption, and balance is restored. While the Ewoks can be a controversial topic, there's no denying their impact, so we wanted to highlight them in the final beer. Using the same grain bill as *A New Hope*, we kept the Citra boil additions, but substituted the dry hops with Simcoe and Chinook, which gave the beer an earthy, piney finish. It's another crushable beer perfect for partying in an Ewok village.

Star Wars has now expanded way beyond the original trilogy of movies, creating a deep lore where even minor background characters receive names and backstories. This means there are countless beers that could be inspired by the fictional universe. And remember, as you create and brew these beers, may the force be with you, always.

Andrew Sanders lives in Denver and spends an inordinate amount of time trying to combine pop culture and beer. You can find him on socials @thehomebrewpub.



Watch AHA Committee Member Roxanne Westendorf and Executive Director Julia Herz brew the Empire Strikes Back Dark Ale in the May 2024 edition of *Zymurgy* Live. HomebrewersAssociation.org/presentations/zymurgy-live

Find the recipes on page 8.

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