

FOR THE HOMEBREWER & BEER LOVER

zymurgy®

The Journal of the American Homebrewers Association®

THE BIG 4

MALT, HOPS,
WATER, AND
YEAST REVISITED

HomeBrewersAssociation.org

\$5.50 US / \$8.00 CAN

11 RECIPES
YOU CAN
BREWVote for
Your AHA
RepresentativesDOGFISH HEAD'S
SAM CALAGIONEUp Your
Brewing
Mind Game

PLUS BREWING LOCALLY WITH STAN HIERONYMUS

Introducing the **QUICK DRAFT** faucet from CMBecker

The world's fastest and most advanced faucet



SCAN HERE TO SEE THE
QUICK DRAFT IN ACTION

PLUS

We offer complete control over your pour with all of our other Flow Control solutions! With our specially designed shanks, you can easily implement our faucets into your kegerator or keezer build.

Pour your pint in less than **2 seconds** with complete control over the pour and foam. If seeing is believing, go to QuickDraftFaucet.com or scan the QR code to see our Quick Draft in action!



CMB BEER GUN
(PERFECT FOR PARTIES)



CMB V10



**INLINE FLOW
CONTROL**



CMB X1

Made in Germany



CMBecker
INTERNATIONAL, LLC

cmbecker.com

Assembled in USA



Publisher.....	Brewers Association™
Editor-in-Chief.....	Dave Carpenter
Associate Editor.....	Amahl Turczyn
Technical Editor	Gordon Strong
Art Director.....	Jason Smith
Graphic Designers.....	Ashley Peck & Kelli Gomez
Operations Director.....	Stephanie Johnson Martin
Sales & Marketing Director	Barbara Fusco barbara@brewersassociation.org
Business Development Manager for Advertising & Sponsorship (East).....	Tom McCrory mccrory@brewersassociation.org
Business Development Manager for Advertising & Sponsorship (West) ...	Kari Harrington kari@brewersassociation.org
Advertising & Sponsorship Associate.....	Joe Damgaard
Marketing Managers.....	Jeb Foster & Rachel Staats
Member Services/Circulation Manager	Dan Goloback

American Homebrewers Association

Director.....	Gary Glass
Assistant Director.....	Steve Parr
Web Editor	Duncan Bryant
Events & Membership Coordinator	Matt Bolling
Competition Coordinator	John Moorhead
Administrative Assistant	Millie Shamburger

AHA Governing Committee Members

Drew Beechum, Fred Bonjour, Martin Brungard, Debbie Cerdá, Sandy Cockerham, Denny Conn, Chris P. Frey*, Aimee Garlit, Jake Keeler, Jeff Rankert, Susan Ruud, Tom Schmidlin, Chip Walton, Roxanne Westendorf*, Kim Wood.

*Indicates representative to the BA Board of Directors.

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

Changing your address? Let us know in writing or e-mail your address changes to info@brewersassociation.org.

Zymurgy® welcomes letters, opinions, ideas, article queries and information in general from its readers. Correspondence and advertising inquiries should be directed to *Zymurgy*, PO Box 1679, Boulder, CO 80306-1679, (303) 447-0816, zymurgy@brewersassociation.org, www.homebrewersassociation.org. All material ©2016, American Homebrewers Association. No material may be reproduced without written permission from the AHA. Reg. U.S. Pat. & TM Off.

The opinions and views expressed in articles are not necessarily those of the American Homebrewers Association and its magazine, *Zymurgy*.



Get out the Vote

It's time to vote! I know, I know, you've had it up to here with elections (picture a hand at approximately eye height), but I'm asking you to summon a bit of extra fortitude and cast two more ballots for a deserving cause—beer!

The first levers I'd like you to pull are for members of your **American Homebrewers Association Governing Committee (AHAGC)**. These are the dedicated homebrewers who steer the AHA ship along the right course, help it avoid choppy seas, and ensure it remains safely afloat (regrettably, they do not veto nautical metaphors). The AHAGC is your body of elected representatives. Vote now for the candidates you feel will best advocate for you at the AHA. Gary Glass fills in the details in his column on page 11.

Your second zymurgical duty is to name your favorite beers in *Zymurgy*'s 15th annual **Best Beers in America Survey**. Even the most dedicated homebrewer enjoys commercial beer from time to time, and we want to know what you turn to when the keg has run dry. What do you buy when you need a fresh supply of pre-filled bottles? What do you go out of your way to taste on vacation, and what do you purchase over and over at the corner store? What's the best beer you've ever tasted? Inquiring minds want to know.

I encourage every AHA member to get online and vote for at least one beer. Our organization is 46,000 strong, but beyond that number lies something even greater. We're an especially *beer literate* group, and our opinions matter. We'll publish the results in the July/August issue of *Zymurgy*, but your votes travel well beyond these 96 pages. Past surveys have been covered by CNBC, the *Huffington Post*, *Business Insider*, the *San Diego Union-Tribune*, the *Denver Post*, and other media

outlets. Even *Time* and *Today* have talked about it. It's an opportunity for homebrewers' voices to be heard around the world.

It's easy to be heard. All you have to do is visit HomebrewersAssociation.org/zym-best-beers, log in with your AHA credentials, and name up to 20 (or as few as one) of your favorite commercial beers. The more members who participate, the bigger the sample size. And the bigger the sample size, the more questions we can ask our resident economist and statistician, Dr. Watson (yes, we have one, and yes, that's his real name). He loves nothing more than to dig into spreadsheets full of beer data and make sense of it all.

On to the issue you're holding in your hand or viewing on your preferred electronic device (I'm a paper guy myself). In this installment of *Zymurgy*, we revisit the classic ingredients of beer. Virtually every batch we brew is a result of the magic alchemy of combining just four elements, and we still have much to learn about malt, hops, water, and yeast. We examine them here with new eyes.

Beyond the big four, Stan Hieronymus offers a delightful guide to a few ingredients you might not have thought to include in your homebrew. Ever brew a beer with dandelions or mushrooms? Now's your chance. And we have an interview with none other than Sam Calagione, founder of Dogfish Head Craft Brewery and eminent homebrewing advocate. He's even shared a couple of his recipes. I hope he inspires you to be creative and playful as you brew.

Until next time, keep brewing. (And vote!)

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



POSTMASTER:
Send address changes to:
Zymurgy, 1327 Spruce Street;
Boulder, CO 80302.
Printed in the USA.



AUBURN
UNIVERSITY

Graduate Certificate Program in

Brewing Science & Operations

Developed with the Craft Brewing Industry in Mind

Fusing traditional educational approaches
with real-world application for a
state-of-the-art interactive learning experience.

brewing.auburn.edu

Michelle Forsythe '15
Singin River Brewing

"Deciding to be a part of the Brewing Science program allowed me to accelerate in my brewing knowledge and make informed decisions for our brewing operations. I can now easily have a conversation with our head brewer, who has over 20 years commercial experience, as well as make sound, time-sensitive choices for my business."



Robert E. Lee '15
Omaha Brewing

"It was intense at times, but it was exactly what I needed to succeed in my role. Everything I learned from the program gives me a competitive edge in sales. I'm a brewer that can talk to potential customers about anything they want to know about our brands, no matter how technical, and build the relationships that are so crucial to the success of a craft brewery."



zymurgy®

COLUMNS —

FEATURES

I | EDITOR'S DESK

Get out the Vote

By Dave Carpenter

II | FROM THE GLASS

AHA Governing Committee Election

By Gary Glass

93 | WORLD OF WORTS

Sweden '95: The Friends of the Wort

By Charlie Papazian

96 | LAST DROP

Become a Mentally Tough Homebrewer

By Clint Cherepa

30 | Malt: What's Small is Big Again

Homebrewers love hops, but craft malts from small producers are increasingly popular. Learn what up-and-coming, small-scale maltsters have to offer you and your beer.

By Michael Piorunski

38 | Hops for Triceratops?

Humulus lupulus survived mass extinctions and ice ages to land in your IPA. The history of hops spans millions of years, but Dr. Farke squeezed it into six pages just for you.

By Andy Farke

46 | Water: Identify Your Sources

How do you know if the water that pours from your faucet is good? Knowing where your water comes from and how to evaluate it are critical steps to making great beer.

By Debbie Cerdá

54 | Yeast: More Choice Than Ever Before

Homebrewers' yeast options have been multiplying. Tony Rau, who manages cultures for Odell Brewing Company, clues us in on what's new from yeast labs large and small.

By Tony Rau

60 | Brewing Locally

Grab your basket and get ready to forage the forest. In this excerpt from his latest book, *Brewing Local*, Stan Hieronymus offers helpful hints for brewing with botanicals.

By Stan Hieronymus



Nitro: Let Us Count the Ways

We tried several nitro methods in the name of science. Here's what we found.

By the editors of Zymurgy

To read this special, members-only online feature,
go to HomebrewersAssociation.org/ma17

QUICK RECIPE GUIDE

Garage Ninja	6	Our Mother the Meadow	63
Draught Dublin-Style Stout.....	26	"Bluish" Blueberry Double IPA.....	67
Uncommon Taste of Place.....	35	Dema-Goddess Ale.....	74
Stone-Faced IPA.....	45	Sour Cherry Ale	76
Yeast Playground.....	58	Ginger Dinger 2017 - All-grain.....	94
		Ginger Dinger 2017 - Malt Extract	95



Find more homebrewing recipes on our website @ HomebrewersAssociation.org/homebrew-recipes



>> GET THERE! VICTORIA BEER WEEK

Americans and Canadians do things a little differently. Those north of the 49th parallel use sensible measurements like kilograms and liters, while those of us south of the border cling to archaic bushels and slugs. Point, Canada. On the other hand, Americans can open a container of milk without the aid of a pitcher and a Snippit. Point, U.S. (We'll steer clear of the relative merits of Tim Hortons and Dunkin' Donuts.)

One thing we can all agree on, though, is that seven days aren't nearly enough for a proper craft beer week, which is why the brilliant folks behind Victoria Beer Week have tacked on two more. From March 3 to March 11, Victorians will enjoy British Columbia's craft beer scene with events to suit every taste and preference. Highlights include celebrations of cask-conditioned and barrel-aged ales, cheese and beer pairing, a sour beer showcase, and a good, old-fashioned crab boil. There's even a homebrewing workshop led by Michael Kuzyk of Category 12 Brewing, held in conjunction with Victoria's own BrewVIC homebrew club.

Our favorite bit? At press time, the festival's online shop offered a T-shirt proclaiming that "Craft Beer is F—ing Delicious." We love you, Canada.

All events are ticketed, and several packages are available for guests who want to mix and match. For more information, go to victoriabeerweek.com

March 4

Bock Fest

New Ulm, MN

schellsbrewery.com/events/02-bockfest

March 4

Real Ale, Real Love Firkin Festival

Loveland, CO

realalereallove.com

March 11

Kona Brewers Festival

Kailua-Kona, HI

konabrewersfestival.com

March 18–19

Gastro Cervecería Festival

Uruapan, Mexico

gastrocervecerio.com

March 31 to April 1

A.C. Beer and Music Festival

Atlantic City, NJ

acbeerfest.com

March 31 to April 1

Big Texas Beer Fest

Dallas, TX

bigtexasbeerfest.com

April 3–9

Athens Beer Week

Athens, GA

classiccitybrew.com/abw.html

April 8

Beer & Bacon Fest

Cary, NC

beerandbacon.com

April 14–15

Seattle Scotch & Beer Fest

Seattle, WA

scotchbeefest.com

April 22–23

Zythos Bier Festival

Leuven, Belgium

zbf.be

April 29–30

TAP® New York

Hunter, NY

tap-ny.com

For more craft brewing

events, go to CraftBeer.com

>> GET SCHOoled

SAN DIEGO STATE UNIVERSITY CRAFT BEER CAMP

The Business of Craft Beer program at San Diego State University is now offering summer camp for beer lovers. But SDSU's grownup opportunities aren't the awkward lakeside cabin camps of your childhood. These are rigorous educational programs in which you'll learn about your favorite beverage and even get solid advice if going pro is in your future.



SAN DIEGO STATE UNIVERSITY



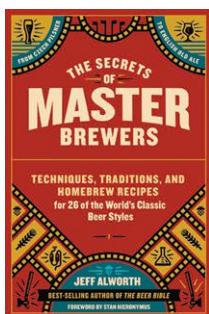
The SDSU Craft Beer Connoisseur Camp covers brewing basics like beer history, beer styles, off-flavors, and food pairing. Those interested in starting their own breweries can enroll in the Brewery Start-Up Camp, highlights of which include sessions on equipment, regulatory considerations, distribution, and draft systems. Classes are limited to 40 students, and special lodging rates are available. Early-bird registration ends April 14, and early applicants get an appreciable tuition discount.

We've linked to SDSU's program on our website. To learn more, just head over to HomebrewersAssociation.org/ma17

>> GREAT BOOKS

THE SECRETS OF MASTER BREWERS

BY JEFF ALWORTH



In *The Secrets of Master Brewers*, Jeff Alworth takes readers on a beerific trip around the world and shares the collective wisdom of brewers large and small. Learn about weissbier from Hans-Peter Drexler of G. Schneider & Sohn, let Craig Bennett of Greene King teach you the ins and outs of British cask ale, and discover the keys to wit from Brewery Ommegang's Phil Leinhart. With tips on technique and a generous serving of homebrew recipes, *The Secrets of Master Brewers* gives you front row access to some of the world's most accomplished professional brewers.

Craft Obsession: The Social Rhetorics of Beer
By Jeff Rice

Are you constantly sharing your craft beer accomplishments on social media? Do you rate your favorite (and least favorite) beers online? Do you open rare bottles with new friends while you wait in line for the latest beer release? If so, you recognize that today's craft beer scene can be as much about those with whom we drink as it is about the beer itself. In this fascinating sociological treatise, Prof. Jeff Rice of the University of Kentucky examines how our increasingly connected lives and the popularity of ever-rarer craft beer have cultivated a culture of obsession.

>> BAKE IT!

SPENT GRAIN COOKIES

All of us at the AHA and our parent organization, the Brewers Association, share a love of great beer, so much so that several of us brew together every month. We generate a lot of spent grain in the process, and this recipe for spent grain cookies has been a big hit in our office. The original recipe is from Barbara Fusco, our sales and marketing director. Events administrative assistant Ashlee Clark bakes hers with a blend of chocolate chips and caramel chips, while member services specialist Jennie Olson likes to use butterscotch chips. We strongly recommend trying all three variations because with cookies, as with beer, one can never be too sure.

Makes approx. 4 dozen cookies:

- 2 cups (250 g) all-purpose flour
- 0.5 tsp. (2 g) baking soda
- 0.5 tsp. (2 g) baking powder
- 0.5 tsp. (3 g) salt
- 0.5 cup (113 g) unsalted butter, softened
- 0.5 cup (110 g) lightly packed brown sugar
- 0.5 cup (100 g) granulated sugar
- 1 large egg
- 1 tsp. (5 mL) vanilla extract
- 1 cup (240 mL) spent grain
- 1 cup (90 g) oats
- 1.5 cups (263 g) chocolate chips
- 0.5 cup (60 g) chopped walnuts or pecans, if desired

1. Whisk together flour, baking soda, baking powder, and salt in a small bowl. Beat butter and sugars in a large bowl until creamy. Add egg and vanilla; beat to combine. Add the dry ingredients and mix until just combined. Mix in oats, spent grain, and chocolate chips until just incorporated. Chill dough 30 minutes.

2. Preheat the oven to 350° F (177° C or gas mark 4). Line two baking sheets with nonstick baking mats or parchment paper, or coat with cooking spray.

3. With damp hands, drop rounded tablespoons of dough onto prepared baking sheets. Bake until lightly browned, 12 to 15 minutes. Let stand for two minutes, then transfer to wire racks to cool.



>> BAKE IT 2!

SPENT GRAIN BREAD

Reader Dale Meech (see Dear Zymurgy on page 15) was kind enough to share his spent grain bread recipe with us. Let a bread machine do the heavy lifting: simply add the ingredients, select the dough cycle, and wait. When the dough is ready, plunk it into a bread pan and let it rise until doubled in volume before baking for 25 minutes at 350° F (177° C or gas mark 4). Let your spent grain bread cool for a bit before enjoying the fruits of your brewing and baking labor with butter and honey.

- 1.5 cups (204 g) bread flour
- 1.5 cups (204 g) whole wheat flour
- 1.5 cups (204 g) spent-grain flour
- 1 Tbsp. (8 g) wheat germ
- 2 Tbsp. (16 g) wheat gluten
- 1 tsp. (6 g) salt
- 2 tsp. (8 g) instant yeast
- 2 Tbsp. (42 g) honey
- 2 Tbsp. (27 g) peanut oil
- 1.25 cups (296 mL) 120° F (49° C) water



>> PARALLEL WORT PROCESSING

Last November, The Unknown Brewing Company in Charlotte, N.C. invited area homebrewers to team up for the ultimate brewing collaboration. Thirty homebrewers descended on the brewery to brew 20 batches of Garage Ninja, a Japanese-inspired red ale that included pearl rice, Sorachi Ace hops, and Fuji plums. All 20 batches were brewed on different homebrew systems and added to the brewery's own batch in the whirlpool. The Frankenbeer was then fermented at the brewery and aged for three months in oak barrels.

Garage Ninja is available for a limited time in The Unknown's Charlotte taproom and in 16-oz. cans in North Carolina. The unique crowdsourced nature of this brew means it's unlikely to be recreated, but if you'd like to try your hand at it, the brewers were kind enough to give us some hints on the recipe. To learn more about The Unknown Brewing Company and the Garage Ninja collaboration, visit UnknownBrewing.com.

GARAGE NINJA

Japanese-inspired red ale

Here are some guidelines on how to brew Garage Ninja. You'll need to experiment to make it your own, but that's part of the fun of homebrewing, right?

Batch Volume: 10 U.S. gallons (37.9 L)
Original Gravity: 1.063 (15.5° P)

MALTS

- | | |
|-----------------|---------------------------|
| 10.5 lb. | (4.76 kg) 2-row pale malt |
| 4.5 lb. | (2.04 kg) flaked rice |
| 3.2 lb. | (1.45 kg) melanoidin malt |
| 2.2 lb. | (1 kg) 60° L crystal malt |
| 0.5 lb. | (227 g) acidulated malt |

HOPS

- | | |
|----------------|---------------------------------------|
| 0.2 oz. | (6 g) Columbus/Tomahawk/Zeus @ 60 min |
| 0.4 oz. | (11 g) Jarrylo @ 30 min |
| 0.4 oz. | (11 g) Mandarina Bavaria @ 20 min |
| 0.5 oz. | (14 g) Sorachi Ace @ 10 min |

YEAST

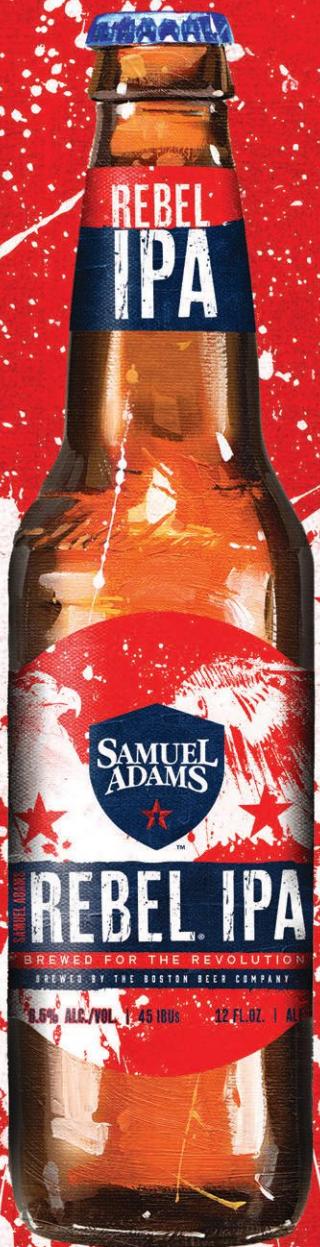
American ale
(Wyeast 1056, White Labs WLP001, Safale US-05, etc.)

OTHER INGREDIENTS

1 gallon (3.8 L) plum juice
Your preferred type of oak (cubes, spirals, etc.)

BREWING NOTES

Add plum juice when fermentation is roughly 75 percent complete. Age on oak before bottling or kegging.



A REBEL REBORN

NEW LOOK · NEW TASTE

A REBEL NEVER SETTLES, ALWAYS REIMAGINING AND REINVENTING.

That's why we added experimental hop HBC566 to Rebel IPA. Its bright notes of lemon-lime and eucalyptus join Rebel's citrus and piney character for a crisp, clean, and distinctly rebellious IPA.

STRIKE NOW WHILE IT'S HOT

NEW PRODUCTS NOW AVAILABLE



ANVIL
BREWING EQUIPMENT®



ANVILBREWING.COM



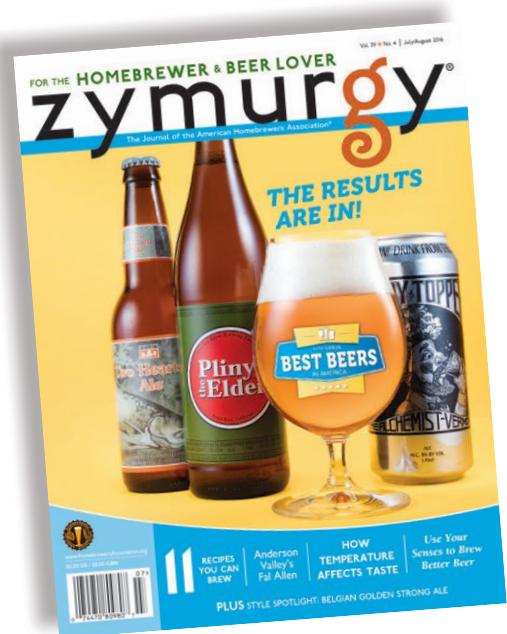
FB.COM/ANVILBREWINGEQUIPMENT



@ANVILBREWING



A BLICHMANN ENGINEERING COMPANY



>> BREW NEWS

BEST BEERS IN AMERICA

It's time once again for Zymurgy's Best Commercial Beers in America Survey! As homebrewers and beer lovers, Zymurgy readers have the most educated and adventurous palates on the planet. So, for the 15th year, we're asking you, "Which breweries brew the best beers in the land?"

Voting is open to AHA members only. Just go to HomebrewersAssociation.org/zym-best-beers, log in, and type in your favorite beers. You can vote for both domestic and imported beers, but they must be available for purchase in the United States. Voting ends March 10. We will tabulate the results and present them, along with clone recipes for some of the top beers, in the July/August issue of Zymurgy.

While you're voting, please take a minute to review one of your top beers, in 150 words or fewer, and include it in the comments field (this is appreciated but not mandatory). We'll include some of your reviews in the July/August issue, as well as in future installments of "You've Gotta Drink This" in Beeroscope.

Thanks for voting!



CELEBRATING
30 YEARS
OF CREATING PREMIUM LIQUID YEAST
AND FERMENTATION PRODUCTS

Wyeast altered the course of brewing history in 1986 when we introduced the Wyeast Culture Collection™. We provide the industry with the freshest quality products for beer, cider, wine, and more. Professionals and home enthusiasts alike have the latitude to brew their best and be part of the thriving craft beverage community.

Explore our strains at:

WYEASTLAB.COM



MALTING COMPANY OF IRELAND, LTD

SINCE 1858

The Malting Company of Ireland has been malting quality barley since 1858. In fact, their Stout Malt has provided the backbone for top tier Irish stout brands. Stout Malt is a light-colored base malt characterized by plump kernels with very low protein and high extract. The kilning temperature is kept low resulting in a lighter wort with higher enzyme levels. Stout Malt isn't a one-trick pony either, it's actually a workhorse of base malt that's versatile for a number of styles of beer. Ask for Malting Company of Ireland Stout Malt at your local homebrew shop. Sláinte!



BSG HandCraft is a proud distributor of Malting Company of Ireland products in the U.S.

bsghandcraft.com

@bsghandcraft
 @bsghandcraft
 @bsgcraft

By Gary Glass



AHA Governing Committee Election

The online ballot for the 2017 American Homebrewers Association Governing Committee (GC) election is open through March 31. I highly encourage all members of the AHA to review the candidate statements, found on HomebrewersAssociation.org under the Membership section and linked from the Governing Committee pages. Then cast your votes for the candidates that you feel will best represent you, our members.

The AHA Governing Committee and its various subcommittees provide critical guidance for the AHA staff and determine the future course for your association. As such, the members of the Governing Committee play a vital role for the AHA.

This year, six of the 15 Governing Committee seats are up for election. There are 14 candidates, including just two incumbents, vying for those seats. In addition to the candidate statements, we have interviews of each of the candidates courtesy of The Brewing Network available on HomebrewersAssociation.org to help you decide how to vote.

My sincere thanks go to our outgoing Governing Committee members Aimee Garlit, Susan Ruud, Tom Schmidlin, and Jake Keeler, all of whom have "gone pro," so to speak, since their original election to the Governing Committee.



Aimee Garlit has served two terms on the AHA Governing Committee and has taken a microbiologist position with Dogfish Head Craft Brewery during her time of service. Aimee's science background as a PhD microbiologist has been of tremendous help in contributing to the AHA's

Research and Education Fund subcommittee, which has advised and provided funding for AHA member-driven homebrew-related research projects.



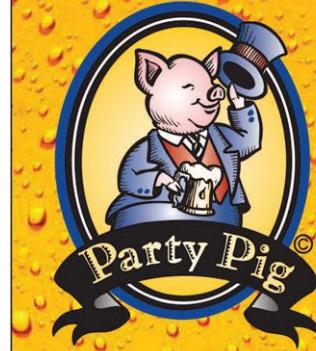
Susan Ruud joined the AHA Governing Committee back in 2001. Susan has served as chair and secretary of the Governing Committee, and she represented the AHA on the Brewers Association (the AHA's parent organization) Board of Directors. In 2015, Susan launched the Prairie Rose Meadery in Fargo, N.D. with her husband Bob. Understandably, being a new business owner has taken up much of Susan's time, making it more challenging to serve on the Governing Committee. We wish Susan the best of luck with the meadery (and if you get a chance to try some of her fabulous meads, you won't regret it).



Like Susan, AHA Governing Committee member Tom Schmidlin has chosen not to seek reelection after six years on the GC after opening Postdoc Brewing Company in Redmond, Wash. Miraculously, Tom had somehow found time to devote to the GC even while working on his PhD in biochemistry. In his time on the Governing Committee, Tom has been active on the Competition Subcommittee, which is primarily focused on the AHA National Homebrew Competition and is one of the most active subcommittees of the GC. Tom lent his significant competition organizer knowledge and pragmatic leadership in his time as Competition Subcommittee chair. Tom is also a totally kickass homebrewer, so I'm excited that he has taken his skills to the pro level, where he can share them with a wider audience.



**2 Party Pigs
= 48 bottles
= 1 corny keg**



Using the **Party Pig** beer package makes home brewing easy! **2 Party Pig** containers equal 48 bottles or 1 corny keg. Less mess and no kegging equipment required.

Order yours today!

www.partypig.beer

"Press, Pour and Enjoy!"





Hogtown Brewers were the 2016 Radegast Club of the Year award winners.



When Jake Keeler was first elected to the Governing Committee, he was working for the homebrew supplier Northern Brewer. Jake later took on the role of Director of Marketing for Brewers Supply Group, a major supplier of ingredients for both the professional brewing and homebrewing industries. Jake has ably served the AHA membership as Governing Committee chair and vice chair, and he was one of two Governing Committee members elected to represent the AHA on the Brewers Association Board of Directors. Jake was instrumental in launching the Industry Subcommittee of the AHA Governing Committee, which has grown to help support the homebrewing industry by providing vital statistical data and an industry track of seminars for homebrew supply retailers at Homebrew Con. By helping homebrew supply retailers succeed, the AHA can ensure that the businesses providing us with home-

brewing ingredients, equipment, and advice will continue to thrive.

I will miss the contributions of Aimee, Susan, Tom, and Jake on the Governing Committee, but I know we can count on their continued support of the homebrewing community and the AHA. I also look forward to working with a new class of Governing Committee members. It's always a good thing to have new blood and new perspectives on the GC.

Thank you for taking the time to vote in this year's Governing Committee election!

Radegast Club of the Year Award

Originally conceived as the "Awesome Club of Awesomeness" award by long-time AHA Governing Committee member Drew Beechum, the Radegast Club of the Year Award highlights what makes homebrew clubs awesome.

The March 31 deadline for submitting a club nomination in the fourth

annual Radegast Club of the Year Award is quickly approaching. Entries can be submitted via the nomination form in the Community section of HomebrewersAssociation.org. Through your nomination, you can tell us what your club does to promote the hobby, educate your members, support your community, and have fun. The nomination form allows for uploads of documents, PowerPoint presentations, videos, or whatever you have to support your submission.

Entries will be judged by members of the AHA Governing Committee. The winner of the 2017 Radegast Club of the Year Award will be announced June 17 at the AHA Homebrew Con in Minneapolis.

Homebrew Con 2017

Registration for Homebrew Con Minneapolis, which takes place June 15–17 at the Minneapolis Convention Center in downtown Minneapolis, opens March 7. The central location will grant Homebrew Con attendees convenient access to hundreds of restaurants, beer bars, and breweries. The Minneapolis Convention Center even has its own craft beer bar, with a wide selection of local craft beers selected by the Minnesota Craft Brewers Guild. While we are in town for Homebrew Con, the Minnesota Twins will host the Seattle Mariners and the 2016 American League Champion Cleveland Indians at Target Field. A commuter rail stop just a few blocks from the Minneapolis Convention Center offers transportation to and from the Minneapolis airport, as well as easy access to numerous beer destinations throughout the area.

This year's Homebrew Con includes 49 different speaker sessions to choose from, covering a vast array of homebrew-related topics. We'll be recording all of the sessions, which will be posted as AHA members-only content on HomebrewersAssociation.org after the conference concludes. At Homebrew Con, as you might expect, there will be beer—lots and lots of beer. The annual Craft Beer Kickoff Party on Thursday night will include a wide selection of beers from local craft breweries. On Friday night,



JUNE 15-17

MINNEAPOLIS

scores of clubs will try to outdo each other by serving up their best brews from elaborately decorated booths during Club Night. Throughout Homebrew Con, you can visit the Homebrew Expo, where nearly 100 different vendors will show off the newest ingredients, homebrew equipment, and more.

Omar Ansari, former homebrewer and founder and owner of Minneapolis' Surly Brewing Company, will deliver this year's keynote address. Surly is brewing the Homebrew Con commemorative beer, a tart saison called "Whalezbrah!" The only way to get your hands on this white whale beer is to attend the conference. Back on February 12, Surly hosted an AHA Rally at which 500 attendees each took away 5 gallons of Whalezbrah! wort to ferment at home. Hopefully, some of them will bring their renditions to Homebrew Con so we can all compare the homebrewed versions to Surly's.

New for this year's Homebrew Con, we are conducting the National Homebrew Competition awards ceremony in an auditorium instead of at a banquet. With the growth of the conference and the awards ceremony, the banquet is no longer logistically feasible, and banquet seating had meant limiting the number of attendees who could participate in the awards ceremony. The new arrangement means we can open the awards ceremony to all conference attendees, and the auditorium venue will allow for an improved audiovisual experience. The awards ceremony will take place Saturday afternoon, with a couple of speaker sessions going on simultaneously for those who are not interested in the awards.

Immediately following the awards ceremony, we will have a new event to close out the conference, and all attendees are invited. This new send-off

event, the Knockout Party, will include beer, snacks, entertainment, and a raffle drawing. After Homebrew Con draws to a close, attendees can venture out into Minneapolis, where multiple locally organized events aimed at Homebrew Con attendees will be taking place.

Homebrew Con is an event that words alone just can't quite describe. Simply put, it is the most fun event any homebrewer could possibly imagine. Check out the video on HomebrewCon.org to get a small taste of what attendees think about Homebrew Con. Don't miss out—space is limited, so be sure to register early!

AHA Promoting Homebrew Experimentation

For the past several years, the AHA has funded homebrew-related research projects. In 2017, we are stepping up our research game by partnering with the creators of the Brulosophy.com website. Since AHA member Marshall Schott launched Brulosophy in 2014, he and his fellow contributors have been running "exBEERiments" to test out theories about beer

production and potentially debunk some of the brewing myths that homebrewers harbor. The Brulosophy contributors have developed excellent methods for running their experiments and have gained a large following for their contributions to homebrewer knowledge. By partnering with Brulosophy, the AHA plans to bring their work to a larger audience. Look for Brulosophy's contributions to HomebrewersAssociation.org, Zymurgy, and Homebrew Con now and in the future.

In addition to working with Brulosophy, the AHA is proud to sponsor Denny Conn and Drew Beechum's *Experimental Brewing* podcast, which also advances homebrew knowledge through relevant experiments. In the May/June issue of Zymurgy, look for the results of an experiment inspired by yours truly, in which Denny and Drew compare calculated IBUs with IBUs measured in the laboratory.

Until next time, happy homebrewing!

Gary Glass is director of the American Homebrewers Association.

GET STARTED
TODAY
FOR ONLY
\$44.99

**EverBru Kombucha™
STARTER KIT**

Everything you need to create great Kombucha
Including Fresh SCODY!

SCODY INCLUDED!

Featuring The Little Big Mouth Bubbler

MIDWESTSUPPLIES.COM

ROGUE®

Newport Heights

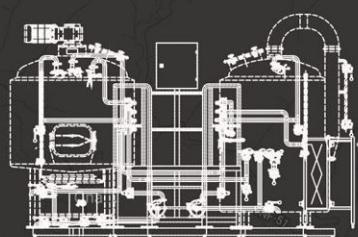
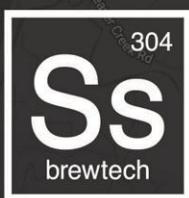
Ss Brewtech 5bbl Pilot System

Working with John Maier and the entire team from Rogue Ales on the 'Mojo' brewhouse was an amazing experience! Through a collaborative effort, we were able to prototype some exciting new technologies with them such as a rotatable racking arm on the boil kettle and a new sparge acidification system for the mash tun. John will use his Ss Brewtech Brewhouse to prototype future Rogue beers at their world headquarters in Newport, Oregon.

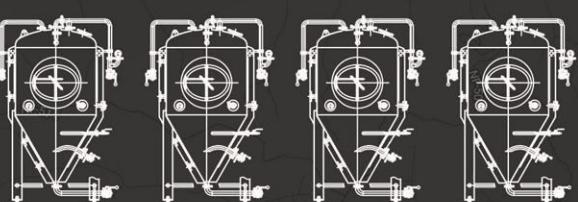
www.SsBrewtech.com/Pro



Rogue's 5bbl Pilot System



5bbl Steam Brewhouse



5bbl Unitank Fermenters

By Our Readers

Bar Raised

Dear *Zymurgy*,

I am pleased to read *Zymurgy*. It gives me great ideas, tips, and recipes for all my homebrewing adventures. I have just completed my monument to beer and have attached some pictures (right). All are welcome to come pour a draft...or two, or three! Enjoy!

Sam Mussomeli
Rockville, Md.

Dear *Zymurgy*,

I just received my Jan/Feb edition and enjoyed seeing the bar on the front cover, which was similar to one I just built (below). Thanks for a great magazine, and keep up the good work.

Tim Reilly
Shirley, N.Y.



Spent Grain Goodies

Dear *Zymurgy*,

I'm a homebrewer as well as a home baker. I recently visited a microbrewery-restaurant and noticed a trailer of recently spent grains, which smelled delicious. My imagination was piqued, and after brewing a Russian imperial stout, I put some of my own spent grains in the dehydrator. I ground the grains into flour and added



a portion to my favorite bread recipe. The result was a magnificent loaf of sweet, nutty bread. I wanted to pass this idea on to others for their own experimentation.

Sincerely,
Dale Meech

Zymurgy editor-in-chief Dave Carpenter responds:

Thanks, Dale! We're huge fans of spent grain treats over here at the American Homebrewers Association. Our staff brew days leave us with buckets of barley each month, and some of our colleagues are kind enough to transform those grains into delectable cookies. Have a go at the recipe on page 5 and let us know what you think. We hope you enjoy them as much as we do!

Brew Day Furry Friends

Dear *Zymurgy*,

This is Brody (1), a ten-year-old pit bull and lab mix we rescued three years ago. He very quickly became intensely loyal to us, and he follows me everywhere I go. He has figured out that his most important job is guarding the brewery, especially when I'm making my Guard Dog imperial stout.

Scott Hercher
Jefferson Township, Pa.

Dear *Zymurgy*,

Here's our brew dog, Slade (2), helping "guard" our Belgian quad!

Kim Medise
Pine, Colo.

Dear *Zymurgy*,

This is Beau Dog (3) the brew dog, watching over our Oktoberfest. (He didn't singe himself this time!)

Randall Burdett
Stafford, Va.

Dear *Zymurgy*,

This is my brewing companion, Ivy (4). She is an eight-month-old Doberman. She thoroughly enjoys hanging out with me on brew day, and she keeps the wort thieves away!

Cheers,
Mike Archibeck
Albuquerque, N.M.

Dear *Zymurgy*,

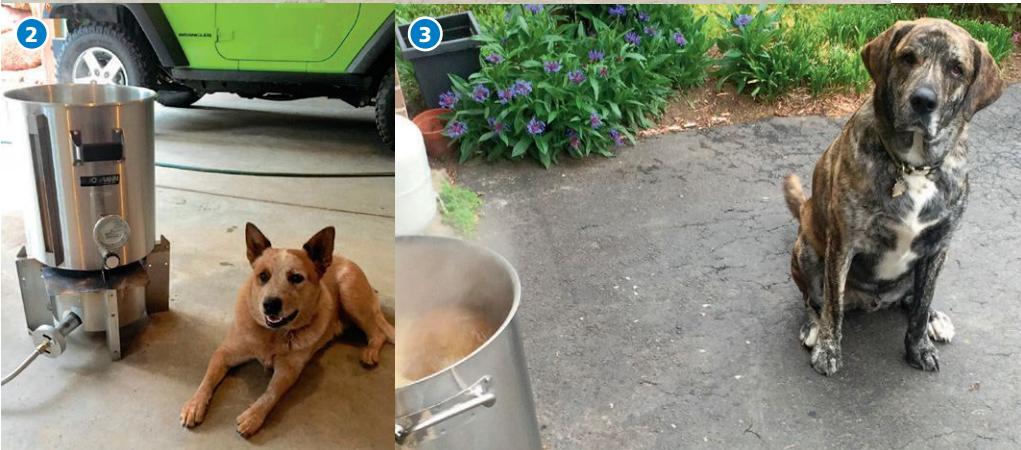
I've been homebrewing for seven years now and have been an AHA member for five. Tobias (5) is a new member of the family, and this was the first time he brewed (I think he liked it!).

Regards,
Gilberto Figueroa
Mexico City, Mexico

Dear *Zymurgy*,

My dog Ruby (6) makes sure I don't miss a step. Love reading *Zymurgy* each month.

Eric Schlorff
Midland, Mich.



READER-SUBMITTED HOMEBREW LABELS

This is my homebrewery logo. My dear friend Geoff Allen, who does the design work for Ratio Beerworks in Denver, designed it for me after tasting some of my homebrew. Hopefully, one day it will be the logo for a professional brewery if I am lucky enough to open one.

I started my brewing journey with a Mr. Beer kit from Bed Bath & Beyond about eight years ago when I turned 21. It was a pale ale recipe that I bottled in 2-liter root beer bottles. I ended up taking the beer to a friend's house for a Super Bowl party, and it was actually a big hit. Since then, I've taken the leap to all-grain brewing and haven't looked back.

In September, I won my first homebrew best-in-show award at Pints in the Park in Louisville, Colo. for a coconut cream ale that I call "Found Paradise." I was beyond thrilled that I achieved that in my brewing career. I have been an AHA member for two years, and I just renewed for three more!

Cheers,
Steven Mondragon
Westminster, Colo.

Here is an English-inspired stout brewed with ingredients found in the Yorkshire parkin recipe in *Michael Jackson's Beer Companion*, oatmeal and treacle. This stout won first place in the Alternate Fermentables category at the Lunar Rendebrew 23. I have been homebrewing for five years, and I mashed this beer in a cooler on Halloween during a rain storm that flooded large parts of the local area.

The label is one of the winter scenes my mother painted for her annual Christmas card. She signed her paintings with her given name, Solange, but she was known in Texas as Sally. The winter scenes she painted were inspired by her Canadian homeland.

Paul Smith
Houston, Texas
Foam Rangers

Hey homebrewers! If you have a homebrew label that you'd like to submit for the Dear Zymurgy section, send it to magazine art director Jason Smith at jason@brewersassociation.org.



Dear Zymurgy,
This was my brew partner, Hunter (7), who was always present for brew day. I would mash in then take him for a long walk. He had a knack for wanting attention as the wort was about to come to a boil or when a hop addition was due. He enjoyed the treats I made with spent grain the most. Brew days won't be the same without him.

Cheers,
Lester Foldi
Nutley, N.J.

Dear Zymurgy,
This is my pal, Lilly Mae (8). She is a rescue dog we took into our home about a year ago. Now that she has fully acclimated to our house, my goal is to get her comfortable with the garage brew haus. She's a work in progress but will soon be a great sidekick on brew day!

Chad Zscherny
Clive, Iowa

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

Extra Special.

"For that classic ESB flavor you need look no further than London ESB yeast from Lallemand - all the characteristics of a classic ESB strain in a convenient dry form"

John Keeling

Head Brewer
Fullers Brewery, London



Say hello to London ESB dry yeast, a true English ale strain selected for reliable fermentation performance and moderate ester production that lets the delicacies of the malt and hop aromas shine through. London ESB is a brilliant choice not only for brewing Extra Special Bitter but for other authentic heritage UK styles like Pale Ale, Bitter and Mild. Like all our other brewing yeasts, Lallemand offers the unmatched purity, performance and ease-of-use that only dry yeast can deliver.

Bring out the best in your next English ale with new London ESB premium yeast from Lallemand Brewing. Visit our web site at www.LallemandYeast.com for complete information on London ESB and our entire line of brewing products. Cheers!

WWW.LALLEMANDBREWING.COM



ALL THE RIGHT FAUCETS

(866) 291-5756
MICROMATIC.COM



By Professor Surfeit



Tend to Your Gray Matter

Dear Professor Surfeit,

I've made a lot of great malt extract beers during my first couple of years of homebrewing. It's been a lot of fun. Now I'm mixing it up with some partial-mash and all-grain beers. I love spending time homebrewing, so time isn't an issue. I have a question for you. I usually brew 5.5 to 6 gallons at a time in order to assure a final yield of 5 gallons into my Cornelius kegs. I usually crush between 7 and 12 pounds of grains for my all-grain brews. One thing that I've noticed is a settling of gray, mud-like material on the top of my grain bed when I lauter and sparge the mash. What is that stuff? Should I do something about it?

Relaxed and not worried,
Lee Jensen
Elizabeth City, N.C.

Hiya Lee,

Glad you're enjoying the journey! Indeed it is a great and rewarding adventure. Millions are in the know, like yourself. If only the rest of the world would brew, perhaps the world would be a better place.

Meanwhile, let's talk about your gray matter. Yep, I've encountered the same thing, so I have some experiential thoughts on what's up with that stuff. What is it? I don't know exactly for sure, but I suppose it's a combination of malt dust and other extraneous dust that settles on malt during malting and packaging. The amount of gray mud on top of my lautered mash seems to vary a bit. This could be due to the malt itself, or it could be how finely I crush that malt. I probably grind my malt a bit more finely than most homebrewers. By that, I mean the gap between my mill's two grinding wheels is narrower and, thus, my crushed malt is finer. Consequently, I end up with a bit more dust.

I usually get 75 to 90 percent yield (hard to believe, but it seems pretty consistent on the higher end). I realize there is a higher risk of stuck runoffs, so I regularly add 5 or 6 good handfuls of rice hulls to my mash. I haven't had a stuck runoff in years.

But back to that gray matter and muddy frosting of our mashes. In my earlier days of lautering, I sometimes got stuck or very slow runoff, but I learned from observing what professionals do. Many commercial mash tuns have rakes that rotate through the top layer of the grain bed. What a great idea! Now, after I've lautered the first gallon of wort from my mash, I take a long knife and cut the surface of the grain bed in various directions to break

up that gray mud and disperse it throughout the top 3 inches (7.6 cm) of the grain bed. Knifing the gray matter mixes it into the mash, improves flow, and will put an end to your slow runoffs.

Here's to dispersing your gray matter and to your continued enjoyment of homebrewing.

I love my beer, too,
The Professor, Hb.D.

Phenols in Your Plumbing

Dear Professor,

What's up with my homebrew? For years, my beers were turning out great, but recently they've developed a consistent

Gotta-Brew.com

Control Fermentation Temps Like the Pros!



- ✓ Add a Cooling Jacket to your Conical!
- ✓ Fits Conicals, Carboys, Buckets, Kegs, Jugs, Variable Volume Tanks, just about any fermenter!
- ✓ Easy to use!
- ✓ Flexible and removable!
- ✓ No risk of contamination!

Our Jackets fit a wide range of fermenters!
Visit Gotta-Brew.com for more info.



MUNTONS GREAT BRITISH MALT

EST. 1921

*I say old chap...
why not give our
spiffingly good
malts a try?*

A broad portfolio of the Best British Malt varieties including Maris Otter®
BARLEY MALTS
PALE MALTS
ROASTED MALTS
CRYSTAL MALTS
WHEAT MALTS
SPECIALTY MALTS
SPRAYMALTS
MALT EXTRACTS
LAGER MALTS



Muntons Malted Ingredients... Best Barley = Better Brewing.

Ask your local homebrew retailer about our malts



and annoying phenolic, plastic-like vinyl flavor. I've tasted this phenolic flavor in other beers, and I thought it came from wild yeast. My beer tastes great when I put it into kegs, but this flavor creeps in when I serve it.

I've tried everything and have sanitized my equipment meticulously, but I'm getting all steamed up about this development. Do you have any advice?

James Richardson
Houston, Texas



Hello James,
I'm on it! I had a similar problem years ago, and I even recall writing about this previously. It's worth revisiting and divulging my former problem and your current problem. Let's make it your former problem, too.

You're right. I did a lot of head scratching in earlier days. Damn, I was making some great beers, and then whamo-shebang! The beer turned phenolic. I don't recall how I ever figured it out, but I did. It was in the plumbing. Yes, literally. I'm assuming that you are using Cornelius type kegs. There's a long dip tube that extends from the "Out" post to the bottom of the keg. Sanitizing this tube is NOT enough.

You need to get a skinny, long-handled brush that will fit into the tube. I found one at my local hardware store. Wet the brush and roll it around in some gritty household cleanser (for sinks and bathroom fixtures) such as Ajax® or Comet®. Then insert the brush into the tube and scrub the inside. If you haven't done this before, you'll be amazed at how much "dark" stuff resides within. As an added measure, I also dip the brush into some grain alcohol (or cheap, high-proof vodka), and that helps dissolve away some normally water insoluble matter.

I assume you're hand-scouring the inside of your Cornelius kegs with cleanser and a sponge. Sanitizing is not enough. You need to clean it first. Oh, and don't forget to clean

and sanitize the beverage lines that transfer your beer from the keg to your glass.

There you have it. Good beer is back again.

Let the good times roll,
The Professor, Hb.D.



Hops in the mash?

Dear Professor,

Why do some brewers add hops to the mash? The longer you subject hops to heat—both in the mash and in the boil—the more you lose hop flavor and aroma, right? And there's only so much hop bitterness you can get into your beer, so why do it other than to do something crazy?

Liz Caldera
Santa Clara, Calif.

Hi Liz,

I used to wonder about this myself, but I didn't lose any sleep over it. I've never tried mash hopping because I told myself, "Why bother?" But, I recently had a conversation with a learned professor and colleague of mine, whom I consider an expert on the extraction of herb and other plant flavors. He's more knowledgeable about flavor chemistry than I am. I've learned a lot from him—not enough to fully understand, but I've realized the potential his wisdom may offer for brewing better beer.

Recently, over a beer, we discussed enzymes and their contribution to flavor stability. After we'd had a couple of rounds, I put two and two together and asked about putting hops in the mash. Specifically, I was curious about whether malt enzymes would have any effect on hop character if hops were added to the mash.

His reply was that yes, unequivocally mash enzymes could affect the structure of hop oils and stabilize their flavors and aromas. But the problem with this is that those stabilized hop oils get totally compromised

from the high heat of wort boiling, so the effort is lost.

But, as the conversation went on, he revealed an answer to another question I had about hop proteins. Mash enzymes can break down hop proteins to the type that contribute umami character in the flavor of beer. In other words, mash enzymes can promote the development of shorter, more stable molecular chains of glutamic acid type proteins that are heat stable and may actually enhance the flavor of beer.

We finished our beer. While we didn't know of any research that measured this effect, I can't help but wonder what the future might reveal. Hops and the ways in which we use them contribute endless possibilities to the flavor and aroma of beer.

What's next with hops?
The Professor, Hb.D.

Have a question for The Professor?
Send it to professor@brewersassociation.org.



Keep your beer safe & hygienic



PART # C545 Hygiene plug

(Fits almost all beer tap types)
Helps keep beer taps clean.
Protects taps from fruit flies and contamination when not in use.
Eliminates the time and waste of wrapping beer taps overnight, as required by health codes.
Stainless Steel 304 brush wire for long life.



C545

PART # C708 JUG -GROWLER FILLER

When jugs won't fit under the faucet, this apparatus allows beer to be filled from the bottom up, generating less foam. Perfect for filling jugs or growlers with beer. One end fits over your beer faucet and the other end goes into your growler



C708

To know more visit our website
www.kromedispense.com



info@kromedispense.com

krome dispense

A VIKING Group Company

WELCOME TO THE FUTURE

TV TAP™
LCD TAP HANDLES



- ♥ DISPLAYS PICTURES AND VIDEOS
- ♥ EASY TO USE TOUCHSCREEN
- ♥ SINGLE PICTURES OR SLIDESHOPS
- ♥ EASY TO CLEAN AND MAINTAIN
- ♥ SHARE YOUR BREW SHARE YOUR STORY

EXCLUSIVELY AVAILABLE AT

 **love2brew**
Homebrew Supply

love2brew.com



THE PATH TO GOOD BEER.

Locate 1,500+ Member Deal locations
using the Brew Guru™ app and
display your digital membership
card to save!

 Download on the
App Store

 GET IT ON
Google Play



By Amahl Turczyn



Dry Irish Stout

Several beer writers have weighed in on the intertwined histories of porter and stout. Some contend that “stout” was merely a reference to any strong beer; others suggest it’s equally plausible that stout may have existed as its own style in parallel with porter as early as the late 17th century. Where historians agree is that Guinness was founded in Dublin by Arthur Guinness when he leased a brewery at St. James’s Gate, and that the company he founded was directly responsible for eventually bringing dry stout to the world.

Several factors contributed to the success of Guinness. One was the brewery’s proximity to Dublin’s Grand Canal, which was perfect for shipping out casks of beer and receiving brewing supplies. Grain grown in the center of Ireland was also accessible and readily available. Another advantage was a consistent source of excellent brewing water, which at the time also came from the canal.

The market took a favorable turn for the company in 1777. Guinness had been producing porter to compete with imported London-brewed porter, but because

“GUINNESS RELIES ON A HIGH PROPORTION OF UNMALTHED BARLEY AND ROAST BARLEY, YIELDING A VERY DRY, BITTER STOUT.”

The final, and perhaps most important, factor contributing to the company’s success was the business acumen of its founders. A tradition of savvy management and far-reaching vision for expansion, begun by founder Arthur Guinness, was then taken up by three of his sons upon his death in 1803. By 1890, the St. James’s Gate brewery in Dublin was the largest of its kind and used sophisticated, large-scale mechanical brewing equipment to keep up with demand. Export expanded too, with the brewery’s stout reaching the Americas, Africa, and Australia by the end of the 19th century.

of the existing excise duty, Dublin brewers were taxed at a much higher rate. In 1777, that duty was lifted, and the import of London porters declined, allowing Guinness to see higher profits and expand the business. The company was able to begin exporting its own porter thereafter, with accounts as far away as the West Indies. Michael J. Lewis writes in *Stout* that the beer exported to the Caribbean at that time was probably the origin of what would one day become Guinness Foreign Extra Stout.

The term *vertical integration* is familiar to many large, modern, successful companies, including breweries like New Belgium and Oskar Blues, but Guinness was one of the first large breweries to use the strategy: taking ownership of the supply chain of raw brewing materials all the way to ownership of the pubs selling the finished product pretty much guaranteed success. I wouldn’t be surprised if the Guinness family had friends in government to ensure favorable tax and trade legislation as it pertained to beer sales.

Guinness evolved through many variations on its formula throughout the years, often dictated by advances in materials processing. Black patent malt, a product introduced by Daniel Wheeler in 1819, allowed brewers to forgo the use of brown and amber malt, and just use pale with the new black malt. Guinness reformulated what would become its eminently exportable Extra Stout using black patent in 1821. Another evolution took place in the early 1930s when cheaper roast barley replaced the patent malt, and then again in the 1950s when the company began using a proportion of flaked barley.

While the Guinness brand has remained the most ubiquitous of Irish stouts, other Irish brewers made their mark on the world with the style. The current Guinness formula relies on a high proportion of flaked, unmalted barley and roast barley, in addition to pale base malt, yielding a very dry, bitter stout. Beamish and Murphy's, both of Cork, have their own variations on the style, though.

Murphy's uses a small proportion of chocolate malt in addition to roast, with Target hops rather than Guinness' emphasis on Goldings. The resulting beer is dry, but not as dry as the Dublin standard. Beamish replaces roast barley entirely in favor of chocolate malt and a bit of malted wheat, and Challenger, Goldings, and Hersbrucker hops, for a somewhat softer, creamier stout. From a brewing perspective, note that when considering the finished beer's appearance, chocolate malt can result in a somewhat darker foam color than just roast barley, which produces a near-white head.

Of the many variations, we'll target a Guinness-like Dublin draught version. Let's look at raw materials, beginning with the water profile. Many porter and stout styles require high alkalinity water to balance grain acidity in the mash. However, for dry stout, low-mineral, low alkalinity water is preferred. This has to do as much with process, in which milled roast barley is steeped separately from the main mash, as it does with the desirable acidic twang resulting from roast barley's low pH. This crisp, finishing acidity is a hallmark of the Dublin dry stout flavor profile.

The original source of water for the brewery, by all accounts, was very soft; and in fact, brewing water expert Martin Brungard notes the modern brewery makes use of reverse osmosis (RO) filtration to maintain this softness from the various water sources it currently taps (see Brungard's "Brewing Water Series: Ireland" in the Nov/Dec 2012 issue of *Zymurgy* for more information). So there's little reason to try to reformulate a Dublin water profile with mineral salts; RO filtered water should suffice, or if your local supply is fairly soft, it should work fine.

Pale malt with high diastatic power (as nearly all pale malts have these days) is really the only requirement for dry stout. It's debatable if the extra flavor and distinct character one might get from using Maris Otter, Optic, Pearl, or Golden Promise malts would actually come through in such a high-flavor, high-bitterness style, if one were to use UK-sourced malt purely in the name of authenticity. I tend to prefer domestic pale malt for dry stout and have had excellent results.

Roast barley, however, is another matter. Domestic roasted barley in the 300° to 400° L range may not achieve the "proper" 30-SRM black color. (The BJCP allows a color range of 25 to 40 SRM for the style.) Seek out a high-quality, 500° L roast specifically for dry stout, sometimes referred to as "black barley" or "stout barley." I usually go with a UK brand, but US maltings like Briess also make a fine black barley of the requisite 500° L color.

Very good dry stout can be made with US-grown hops, but since the style relies so heavily on hop presence, I feel it's best to go with Target, Challenger, Goldings, or some combination of the three, even though only early additions are called for in the recipe. Guinness is said to add a small amount of hop extract to its finished beer, so perhaps there is a signature hop note lurking in the beer's complex aroma.

Irish ale yeast is clean and attenuative, but it can throw some fruity esters at high temperatures. Guinness' well-documented fermentation schedule begins at 63° F (17° C) but is then allowed to rise to anywhere between 74 and 80° F (23 to 27° C), ensuring a rapid fermentation of three to four days. This makes sense for a high-volume, high-turnaround business, but for the homebrewer, be forewarned that fruitiness may get out of hand above 74° F (23° C). Most yeast labs recommend no warmer than 72° F (22° C) for the strain. Anecdotally, I've found the strain to perform strongly and cleanly at 68° F (20° C), so that's what I recommend.

For the mash, temperatures that will produce a highly fermentable wort are desirable. A 70-minute mash at 148° F (64° C) was the standard procedure at Guinness according to Lewis, followed by a mash-out and sparge at 176° F (80° C). For our recipe, especially using higher-diastatic malt, 60 minutes is sufficient, but the high-temperature sparge is still recommended, as the high percentage of flaked barley can really gum up the mash with beta glucans. (If your brew system is prone to stuck mashes, it's best to have some rice hulls on hand just in case.) A steep of finely milled roast barley separate from the main mash of pale malt and flaked barley keeps the pH from getting too low during starch con-

CLEAR BEER DRAUGHT SYSTEM

A
STAINLESS
STEEL
SCREEN
FILTER IS
NOW
AVAILABLE
FOR DRY
HOPPING
RIGHT IN
THE KEG!



DESIGNED SPECIFICALLY FOR HOMEBREW KEGS
SIMPLE, EFFECTIVE, AFFORDABLE, EASY TO
INSTALL, MADE IN THE USA

PATENTED
REPLACES
YOUR KEGS
LONG DIP
TUBE SO
YOU DRINK
BEER FROM
THE TOP OF
THE KEG,
NOT THE
BOTTOM!

clearbeerdraughtsystem.com

**"A STEEP OF ROAST
BARLEY SEPARATE
FROM THE MAIN MASH
KEEPS THE PH FROM
GETTING TOO LOW."**

version. That's not to say you can't make a decent dry stout by simply mashing everything together, but the separate steep produces a noticeably smoother, better-integrated end result.

Adding the roast grains and steep water after an hour of conversion will drive the mash pH down during the sparge, but by then, most enzymatic action will have ceased anyway, and the sparge will merely serve to rinse all remaining flavor from the roast. Curiously, Lewis notes that the London-based Park Royal Guinness brewery and the original Dublin St. James's Gate brewery differed in their mash procedures: Park Royal at one point mashed at least some roast grain along with the pale malt and flaked barley; St. James's Gate used a separate steep for the roast and added the resulting extract to the pale wort in the kettle!

One would think modern standards of product consistency would have since been applied to find some consensus between the two locations' procedures, but by adding the roast barley late in the mash, we are somewhere between the two procedures. To take the steep procedure to an extreme, you could even do a cold steep of the milled roast a couple of days in advance and then add the roast extract post-boil for an even smoother result—this is a common method for using roast coffee in beer—but this suggestion for stout is purely theoretical.

When packaging dry stout, I personally feel that kegging is better than bottling, but by all means, do whatever you have the resources for. Guinness, and indeed all dry

NEW

BREWVISION™

STEP-BY-STEP BREWING INSTRUCTION
REAL-TIME UPDATES AND ALERTS
BEERSMITH™ RECIPE INTEGRATION
RECORDABLE RESULTS

Available on the App Store COMING SOON TO Google play

WHAT IF THE MORE YOU KNEW, THE BETTER YOU COULD BREW?

Our latest innovation, the BrewVision® Thermometer, brings real-time data to the palm of your hand. Eliminate the guesswork from your brewing, and focus on what matters most – *your beer*.

BREWING INNOVATION



blichmannengineering.com



The world's best malt is not created simply by algorithms or recipes. It takes a knowing, an intuition and an instinct that we call *soul*.

**GREAT
WESTERN
MALT**
THE HEART OF YOUR CRAFT

greatwesternmalt.com

DRAUGHT DUBLIN-STYLE STOUT

Recipe by Amahl Turczyn

Batch Volume: 5.5 U.S. gallons (20.82 L)

Original Gravity: 1.041 (10.3° P)

Final Gravity: 1.009 (2.3° P)

Bitterness:

43 IBU

Color:

31 SRM

Alcohol:

4.2% by volume

MALTS

5.5 lb. (2.49 kg) UK pale malt

2.25 lb. (1.02 kg) flaked barley

1 lb. (0.45 kg) 500° L UK roast barley

HOPS

1.75 oz. (49 g) East Kent Goldings @ 60 min (30 IBU)

0.5 oz. (14 g) Challenger@ 60 min (15 IBU)

YEAST

Wyeast 1084 or White Labs WLP004 Irish ale yeast (1 liter starter)

WATER

Reverse osmosis (RO) water treated with 2 g/gal. (0.5 g/L) calcium sulfate

BREWING NOTES

Mash pale and flaked barley at 148° F (64° C) and allow to rest one hour. Steep milled roast barley in a separate container in 2 qt. (2 L) 155° F (68° C) water. Apply heat or boiling water to mash out at 168° F (76° C), and hold 10 minutes. After recirculating wort for clarity, begin running into the kettle. At this point, add the roast barley along with its steeping water to your mash tun, and fly sparge at 176° F (80° C). When wort gravity approaches 1.008 (2° P), stop sparging. Top off kettle with reverse osmosis water if necessary. Boil 90 minutes, and add hops at stated intervals. Chill to 67° F (19° C) and oxygenate. Pitch a strong starter of yeast and ferment at 68° F (20° C). To maximize attenuation, ensure specific gravity has stabilized at or near 1.009 (2.3° P) before racking.

PARTIAL-MASH VERSION

Reduce flaked barley to 2 lb. (0.9 kg) and pale malt to 3 lb. (1.36 kg). Mash these together at 150° F (66° C) for one hour. Steep milled roast barley in a separate container in 2 qt. (2 L) 155° F (68° C) water. Drain, rinse grains from steep and mash, and dissolve 2 lb. (0.9 kg) pale liquid malt extract into wort. Sparge grains at 176° F (80° C) to desired boil volume with RO water, then proceed as above.

stouts, have become known for the famous “nitro pour,” whereby a relatively low-carbonated finished beer is forced through a perforated plate at dispense, resulting in cascades of tiny bubbles; these rise to the surface as a rich carpet of fine, creamy foam that often lasts to the bottom of the glass. Obviously, a dedicated nitro draught system, including the proper blend of gases and the restrictor plate faucet, is the best way to achieve this beautiful and smooth-drinking result in the glass, but with a little practice, even homebrewers using Corny

kegs and cobra-head taps can come up with a fair approximation.

By carbonating the stout to somewhere around 2 volumes (4 grams per liter) CO₂ and applying a head pressure (using normal CO₂) of 25 to 30 pounds per square inch (172 to 207 kPa), one can use the cobra head dispenser as the restriction point. As homebrewers, we are used to dispensing with the tap wide open to achieve a relatively foam-free glass of carbonated beer. But by just

barely squeezing the handle to force your stout through a narrow aperture at high pressure, you can mimic the cascading Irish stout pour. If the carbonation of the beer is too high, this method will result in a glass of foam; too low, and you won't get much foam at all (from your flat beer). But get the balance right, and you'll be surprised how good that pint of homebrewed stout can look and taste! Oh, and don't forget to reduce the head pressure on the keg after you are finished pouring pints—otherwise you'll overcarbonate the beer. Then it will be Foam City regardless. *Sláinte!*

Resources

1. Lewis, Michael J. *Classic Beer Style Series: Stout*. Brewers Publications, 1995.
2. Jackson, Michael. *Michael Jackson's Beer Companion*, Duncan Baird Publishers, 1993.
3. Kemp, Florian. "The Evolution of Dry Stout," *All About Beer*, Vol. 35, Issue 6, March 17, 2015.

Amahl Turczyn is associate editor of *Zymurgy*.



ONE VESSEL

FERMENT CARBONATE SERVE

The NEW Cornical™

A unique fermentation and kegging system unlike anything on the market. The patent pending Cornical™ features a modular keg system with a removable bottom. Add a fermentation kit to convert to a conical fermentor. A revolutionary and modular design, not only saves you money, but allows you to be as creative with your equipment as you are with your brewing.

BREWING INNOVATION

BLICHHMANN
ENGINEERING

blichmannengineering.com

When homebrewing is your passion, start here.



GROWING



MALTING



INGREDIENTS



**Because here in the fields of Wyoming and Montana,
some of the world's finest malting barley is grown.**

It's here that generations of our growers have taken pride in their yield of bright, plump crops. It's here that the malting process really begins, at the harvest of the golden grain that will be handcrafted into Briess high-quality specialty malts and extracts. It's here that the seeds of your passion take root. Could your homebrew ask for a better start?



Ask for fine handcrafted Briess malts and malt extracts at your local homebrew store!

Pictured above: Growers Dennis & Glen Reed | Reed Farms Inc. | Cody, WY

[f](#) [in](#) [o](#) [t](#) [w](#) | Briess.com/blog

©2017 Briess Industries, Inc.

A graphic featuring four test tubes standing upright. From left to right, the colors of the tubes are brown, green, light blue, and orange. Each tube has its name printed vertically on it in white capital letters: 'MALT' on the brown tube, 'HOPS' on the green tube, 'WATER' on the light blue tube, and 'YEAST' on the orange tube.

MALT

HOPS

WATER

YEAST

THE BIG 4

ELEMENTS OF BEER

Once upon a time, in a faraway land, a duke issued a decree proclaiming that beer could only be brewed from three ingredients: malt, hops, and water. Somewhat later, brewing science caught up to royal edict and let yeast join the party, too. The distant land was Bavaria, the duke was Wilhelm IV, and the year was 1516.

Homebrewers have never been bound by the the Reinheitsgebot, and we relish infusing everything from agave nectar to zest of lemon into our homemade libations. But, fundamentally, nearly everything we brew is still built around these four primal components.

In this issue of *Zymurgy*, we revisit the foundational ingredients of ale and lager in search of things we don't already know. And it turns out there's never been a better time to be a brewer.



MALT

WHAT'S SMALL IS BIG AGAIN

By Michael Piorunski

Todd Olander has barley in his blood. His family has farmed in northwestern Colorado since 1929 and grew barley for Coors for 40 years. The fifth-generation farmer has only spent one summer off the farm—long enough to realize malt was his calling. It seems appropriate, then, that Olander, planted in the heartland of American craft beer, would go on to supply Colorado's craft brewers and homebrewers with malt of his own.

Olander is one member of a growing wave of entrepreneurs who aren't just crafting truly local ingredients for homebrewers and small, independent brewers, but also creating a taste of place. These self-described craft maltsters are closing the gap between grain and glass, sourcing barley, wheat, and rye from local farmers, even growing it themselves.

"THE BARLEY VARIETY HAS HAD QUITE AN IMPACT ON FLAVOR."

Todd Olander, owner

Root Shoot Malting, Loveland, Colo.

The malting industry is experiencing a revolution paralleling that of craft beer. Small malt is big, and brewers are reaping the benefits of more choice, more character, and more possibilities to brew truly local beer.

ROOT SHOOT MALTING

Olander cut his teeth on his family's Loveland, Colo. farm, learning the trade from his father and grandfather. Although he graduated college with a degree in construction management in 2006, Olander, 35, quickly realized he longed to be back on the farm.

He broke ground on Root Shoot Malting in November 2015—a culmination of two and a half years of planning and research. And despite a wet year, which is less than ideal for growing barley, Olander began malting the following August.

Olander took notice of Colorado's burgeoning craft beer scene and wanted to find a new market for his family's agricultural skill. "We are surrounded by breweries," he explains, "and we wanted to change course."



"MALT, BY WEIGHT, HAS POTENTIALLY THE GREATEST IMPACT ON THE BEER!"

Brent Manning, co-owner
Riverbend Malt House, Asheville, NC



Left to right: Bryan Brushmiller, Burley Oak Brewing Company founder; Mashout at Burley Oak.

The family grows 1,500 acres of mixed feed crops with 300 acres now dedicated to growing two-row malting barley—predominantly European varieties.

"The barley variety has had quite an impact on flavor," Olander says, adding that local brewers have preferred the malts he has produced from European barley varieties.

Outfitted with a German-manufactured Kaspar-Schulz malting system, Root Shoot is turning out Pilsner, pale ale, Munich, and Vienna-style malts in 10-metric-ton batch sizes (22,046 pounds). As a new maltster, Olander's main focus is consistency in both process and product. While his farming heritage helps to ensure a quality malting barley at harvest, the key

moving forward is refining his process to achieve consistent, high-quality malt.

"Everything that makes malt better is a breakthrough," he says.

RIVERBEND MALT HOUSE

Eight years ago, Brent Manning was also looking to change course. His path toward malt began with a seemingly simple question: was it possible to craft a truly local beer?

He and business partner Brian Simpson thought the North Carolina brewery scene seemed crowded. In 2009, there were nearly 1,800 craft breweries in the US—about 50 of which were in North Carolina—according to the Brewers

Association. In 2016, the BA recorded more than 5,000 craft brewers.

When the pair launched Asheville-based Riverbend Malt House in 2010, North Carolina brewers weren't making beer with barley grown in the Tar Heel State. North Carolina farmers, though, are familiar with barley, planting nearly 20,000 acres annually. Winter wheat is even more abundant in the state, with 650,000 acres planted in 2015, according to the USDA.¹

When Riverbend began production, there were few resources for folks like Manning, who wanted to produce craft malt from local barley. "On paper, none of this should have worked," Manning joked. "There were a lot of mountains to climb."

Those mountains included identifying barley varieties suitable for malting and surviving the Southeast's climate, and sourcing equipment for malt production. Not to mention dialing in a process to produce brewing-quality malt.

"We [grow] six-row barley in the Southeast," Manning explained. Thoroughbred, in particular, is the most prevalent variety grown in the South Atlantic region. It's generally considered a feed variety, but grown under the right conditions, the winter six-row barley can produce high-quality malt.

Riverbend produces mostly Pilsner and pale ale malt, using Carolina-grown two- and six-row barley. Most notable among their offerings is Heritage Malt, a rich and complex Munich-type malt, kilned to 6–8° Lovibond, that was a result of the low and slow heating from their previously undersized kiln.

The craft malt pioneer has nearly doubled capacity year over year up to 2015, with plans for additional expansion in 2017. Its North Carolina malt house now boasts 600,000 pounds of annual production.

Some of the country's most notable craft brewers have brewed with Riverbend malt, including Wicked Weed and Sierra Nevada. New Belgium used Riverbend's Carolina Rye, produced from a 200-year old Southern heirloom variety, in their nationally distributed RyePA.

For Manning, Riverbend has enabled him to achieve two goals: establish a more sustainable raw materials supply chain for brewers, and develop a distinctly Southern style of beer.

"IPA may always be king, but I think there's a lot of room for malt to come back into the conversation," he says.

PILOT MALT HOUSE

Five years ago, Erik May was driving down Michigan's country roads, looking for combines, and knocking on doors. He was searching for farmers to grow barley at a time when corn and soybean prices were at an all-time high. He did find one farmer to grow 10 acres in 2012, the first

growing year for the Grand Rapids-based maltster. In 2016, farmers harvested just over 3,000 acres destined for his kiln.

Pilot Malt House began production in 2013, two years after the birth of May's first child. Malting offered the 15-year military veteran an opportunity to pursue an encore career and be closer to his family. For May, malting is as much learning about the barley as it is learning about the process.

"If you're not looking into the dirt, you're missing half the boat," he says. Barley, says May, is a good rotational crop

between soy and corn for Michigan farmers. He's been working with growers to trial European varieties.

"We want to create unique flavor profiles that brewers haven't had in front of them," May says.

Pilot produces staple malts including Pilsner and pale ale, as well as a few standouts. PB Toast, a Munich-like offering, was born out of a kiln malfunction. Instead of tossing the mistaken malt, May took it to the brewers at New Holland Brewing, who found its flavors pleasant

Professional Quality Temperature Control

Dual Heating & Cooling

BREW JACKET

BrewJacket.com

Lager Without a Refrigerator

Warm or cool to any temp up to 35° F above / below room temperature

**THE WORLD'S BEST
COUNTER-PRESSURE
BOTTLE FILLER**

- * Very easy to use.
- * True counter-pressure filling without any spillage or loss of carbonation.
- * Adjustable height for up to 14½ inch bottles.
- * Now takes growlers up to 5.9 inches in diameter.
- * Bottle a fully carbonated 5 gallon Cornelius keg in under 30 minutes.

Available at [amazon](#)

FOR MORE INFO VISIT US AT [WILLIAMSWARN.COM](#)



The production facility at Root Shoot Malting in Loveland, Colo.

and peanut-buttery. Pilot also partnered with Goose Island to produce a smoked malt from Bourbon County barrel staves.

May takes as much pride in the malt he produces as he does in his proprietary production equipment. Pilot's malting equipment was designed and fabricated from the ground up in a way that, according to May, enables the maltster to scale and replicate. Pilot runs one-ton batch sizes, but can scale to five tons for base malt production.

Pilot is planning a second facility in Virginia, where the population of craft brewers is rapidly expanding, with more growth on the horizon. Country Malt Group, a supplier of raw materials to the craft brewing industry, has begun to carry Pilot's products.

"Accessibility to producers is why we exist," says May, adding a few words of encouragement for his fellow craft maltsters. "We can't suck worse than guys in caves hundreds of years ago."

MALTING MOVING FORWARD

Proximity Malt is another new player entering the malt supply chain. The startup maltster is headquartered in Milwaukee, Wis. and is building out malt houses in Laurel, Del. and Monte Vista, Colo. to serve brewers in the region.

Small, independent maltsters aren't the only ones who are on a path for growth. With more than 5,000 licensed brewers across the US, larger maltsters like Rahr Malting are positioning themselves to supply brewers for the long term.

According to Peter Hoey, Western Regional Sales Director at Brewers Supply Group, Rahr recently commissioned the world's largest single-site malting facility in Shakopee, Minn. With six malt houses and batch sizes that can approach 290 metric tons (639,341 pounds), the facility has an annual capacity of 455,000 metric tons.

But if the growth of craft malting is any indication, craft brewers and homebrewers increasingly want to include local ingredients in their beer. That's why Bryan Butler, extension agent with the University of Maryland Extension, is working with farmers across Maryland to trial malting barley varieties.

Universities and extension programs across the country are jumping in on malting barley variety trials and research. Michigan State University, University of Vermont, Penn State Extension, North Carolina State University, and Virginia Tech are among the many institutions racing to research and develop two- and six-row barley vari-

etals suitable for malting and brewing. And the Brewers Association (the American Homebrewers Association's parent organization) is funding grants that promote the research and development of malting barley.

Differences in climate and soil composition are driving researchers and maltsters in non-traditional malting barley growing regions to trial European varieties. At the University of Maryland Extension, Butler says their trials are all winter barley varieties.

"We want to demonstrate [to farmers] there is a practical way this can be done and replicated," says Butler, adding that Maryland's climate isn't well suited for spring small grain production.

Some craft brewers like Bryan Brushmiller, founder of Burley Oak Brewing Company in Berlin, Md. are working directly with farmers and craft maltsters to incorporate local malt into their beers. The relationship he's developed with both farmer and maltster contributes to his brewery's local ethos and closes the gap from grain to glass.

Brushmiller takes pride in offering beers with winter wheat, rye, and six-row barley grown just a 10-minute drive from the brewery.

LET THE MALT SHINE: INSIGHTS FROM THE PROS

Malt is still the backbone of all beer styles, not just to provide sugars for yeast metabolism and alcohol production, but also for color, texture, and flavor. Ale or lager, bitter or balanced, a well-developed malt character elevates beer from good to great.

"I love American-style ales made with Simpson's Golden Promise®," says

TABLE 1: VARIATIONS IN ENGLISH MARIS OTTER PALE ALE MALT

Maltings	Color (ASBC)	Extract Percent (Coarse Grind Minimum)	Total Protein by Weight
Simpson's	2.2–3.0°L	81%	8.13–9.69%
Bairds	2–3°L	81%	9.7% max
Thomas Fawcett	2.3–3.0°L	80%	8.5–10%
Crisp	2.5–3.5°L	81.5%	8.8–10%

UNCOMMON TASTE OF PLACE

Recipe by the editors of Zymurgy

This recipe is designed to highlight quality craft malt and is ripe for experimentation. A single light-to-moderately kilned base malt is all you need for the foundation. The only technical aspect to consider is diastatic power to ensure your chosen malt has enough enzymatic strength to convert itself. Anything with a DP higher than 35° Lintner or so will be fine.

Use the freshest locally crafted base malt you can find. Some good choices from around the country include

- Heritage Malt (5.4° L) from Riverbend Malt House, Asheville, N.C.
- Genie Vienna Malt (6° L) from Root Shoot Malting, Loveland, Colo.
- Pale Ale Malt (3.5° L) from Pilot Malt House, Grand Rapids, Mich.
- Vanora Malt (6° L) from Mecca Grade Estate Malt, Madras, Ore.
- Pale 2-Row Malt (3° L) from Valley Malt, Hadley, Mass.

We've suggested Cascade hops here to add citrus complexity, but feel free to substitute to your heart's content. California common yeast contributes a clean, lager-like fermentation profile without lots of esters to distract, and you don't even need lagering equipment!

Batch volume: 5 U.S. gallons (19 L)

Color: 5–8 SRM

Original gravity: 1.052 (12.8° P)

Bitterness: 30 IBU

Final gravity: 1.011 (2.6° P)

Alcohol: 5.4% by volume

MALTS

10 lb. (4.54 kg) Your choice of craft base malt

HOPS

1 oz. (28 g) Cascade, 5.5% a.a. @ 60 min

1 oz. (28 g) Cascade, 5.5% a.a. @ 10 min

YEAST

White Labs WLP810 San Francisco Lager or Wyeast 2112 California Lager

ADDITIONAL ITEMS

1 Whirlfloc tablet added 10 minutes before end of boil

BREWING NOTES

Mash 60 minutes at 152° F (67° C), lauter, and sparge. Collect approximately 6.5 gallons (24.6 L) of wort and boil 90 minutes, adding hops and Whirlfloc per the indicated schedule. Chill as rapidly as possible to 60° F (16° C) and pitch yeast. Ferment for 10 days or until specific gravity stabilizes at or near 1.011 (2.6° P). Carbonate to 2.8 volumes (5.6 g/L) CO₂.

The purpose of this recipe is to experiment with new base malts, so there is no extract formulation.

BSG's Hoey. A particularly memorable example, he recalled, was an IPA from Societe Brewing Company in San Diego, boasting a large portion of the Scottish malt in the grist bill. Surly Brewing Company's decadently hopped Todd the

Axe Man IPA, is made exclusively with Golden Promise®.

"It's a heritage (barley) variety," Hoey explains, "[which] allows brewers to produce intensely hoppy beers with a full

UNCAP YOUR HOMEBREW BRAND



CUSTOM BOTTLES,
GLASSWARE, GEAR
AND MORE

LOW MINIMUMS

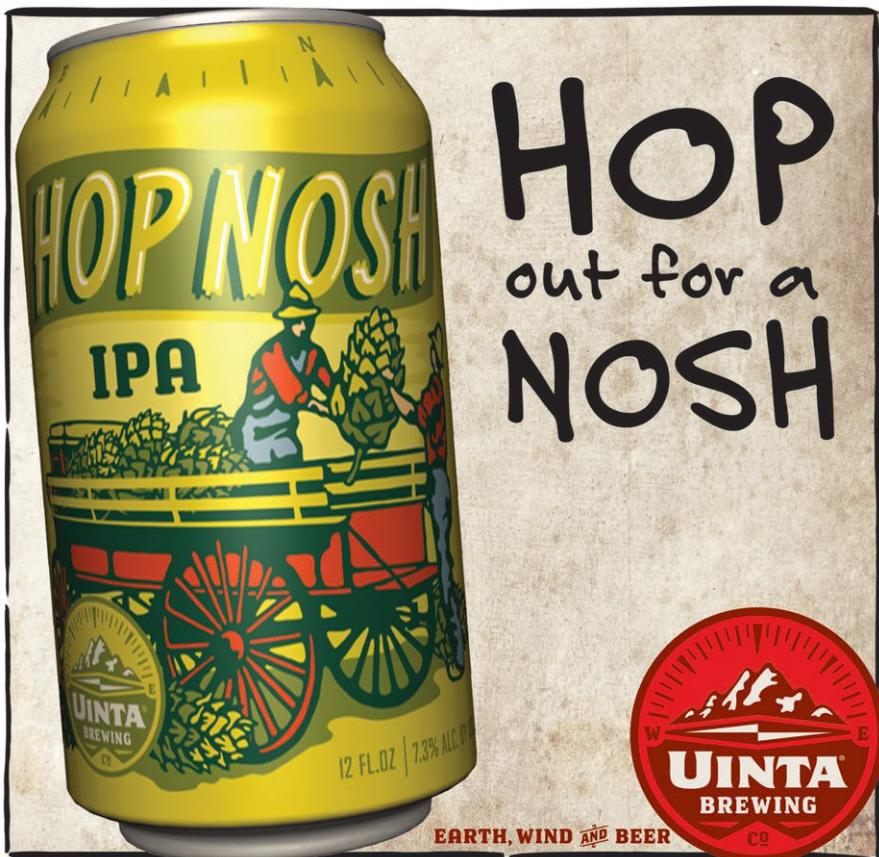
WIDE SELECTION

G GRANDSTAND
GLASSWARE + APPAREL

see more at
eGRANDSTAND.COM



Learn more about malt with the
Brewers Publications Brewing
Elements Series of books.
BrewersPublications.com



HOP NOSH
IPA
12 FL.OZ | 7.3% ALC/VOL
EARTH, WIND AND BEER CO

HOP
out for a
NOSH

UINTA BREWING CO.

malty mouthfeel that doesn't get in the way of the hops."

The Scottish spring barley variety is typically kilned to 2 to 3° Lovibond and was a favorite among brewers and distillers alike in the mid-twentieth century, but production declined in favor of higher-yielding barleys. Many brewers in the US and the UK still seek out the barley for its flavor.

Hoey suggests brewers get to know their raw materials, and for nearly a decade he's been educating brewers at the American Brewers Guild and UC San Diego Diploma Brewers Program on the topic.

A starting place is to learn more about the Pilsner and two-row base malts at your local homebrew store. "Knowing where [the malt] comes from is important," Hoey explains. "Who's two-row is it?"

He also encourages brewers to access and learn about the malt analysis for their preferred supplier. Different malts offer differences in color, total protein, extract, and other specifications like diastatic power. These differences can tell the brewer quite a bit about the malt from field to bag.

Two-row barleys grown in the northern US, for example, typically have a higher protein content and lower extract than Canadian-grown two-row. And the nutty richness and toasty flavors normally associated with British Maris Otter pale ale malts have less to do with the eponymous winter barley variety than they do with time spent in the kiln, which results in additional color and flavor development. Selection in the field and treatment of the prized English barley across malt houses results in variations in key malt specifications (see table on page 34).

Tim Bubser remembers discovering Maris Otter pale malt at Brew Your Own Bottle in Westmont, New Jersey.

"That was one of my favorite malts to use," he says about the English variety. Now a brewer at Kane Brewing in Ocean



ATLANTIC BREW SUPPLY

Over 80 malts and extracts, and 70 hop varieties, all available by the ounce!
Award-winning recipe kits created by pro brewers!
Select homebrew kits 30% off each month!
Unique ingredients and products from NC farmers, malsters and more!
Full stock of keg and cask supplies!

use code ZYM15 for 15% off @
ATLANTICBREWSUPPLY.COM

Township, New Jersey, Bubser discovered homebrewing four years before landing his first professional brewing position in 2014.

Clay Baines, lead brewer at Jailbreak Brewing Company in Laurel, Md., looks for malt character in hop-forward beers. "Sierra Nevada's Celebration Ale is one of my favorites," he says. "Without the awesome malt backbone it would not be as fantastic a beer."

Baines, who has brewed professionally for six years, including a stint at Dogfish Head, says that any beer with a good hop profile must have an equally good malt character.

A homebrewer for eight years before turning pro, Baines points to Special B as a favorite for Belgian-style beers. "I love the rounded, almost raisin-like character it gives to darker Belgian-style beers," he explains. (Special B, coincidentally, made an appearance in Charlie Papazian's Perfect IPA, featured in the Jul/Aug 2014 issue of *Zymurgy*).

As a homebrewer, Casey Brooks focused her brewing on sorting out how small portions of specialty malts would improve or influence her beers. Now a brewer at The Alchemist in Waterbury, Vt., she says brown malt emerged as a favorite for its ability to contribute velvety, dark fruit flavors and red hues. She explains that malt complexity across a variety of beer styles can be achieved in many ways, pointing to the use of certain roasted malts, for example, to lend bitterness and dryness, therefore balance to darker, richer styles.

"Malts are malleable in that they don't just have to solely contribute flavor to a beer," says Brooks. "They can contribute other perceivable [sensory] attributes as well if you know how to work them."

Controlling alpha-amylase activity is a technique brewers can use to influence the terminal gravity, body, and mouthfeel of a beer. Mash temperatures between 140 and 150° F (60–65° C) favor beta-amylase, thereby creating a greater share of simple malt sugars resulting in a more fermentable wort. Mashes between 151 and 163° F (66–73° C), however, favor alpha-amylase which degrades malt starches into a less fermentable complex of carbohydrates, including dextrins. This creates increased body and mouthfeel.

Wheat and adjuncts like flaked oats can add protein and beta-glucans to a mash, which can also influence body and mouthfeel in the final beer. Brooks cautions brewers to avoid relying on too many specialty malts in a grist bill. "More often it comes down to quality," she explains. "I've found less variety is often best in most cases."

If that be the case, then homebrewers will have to exercise restraint when working with these new craft malts. Because the variety from which we can choose is unparalleled and shows few signs of slowing down.

RESOURCES

1. USDA/ NASS 2015 State Agriculture Overview for North Carolina. http://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NORTH%20CAROLINA

Michael Piorunski is a brewer at Evolution Craft Brewing in Salisbury, Md. He is a graduate of the American Brewers Guild and an avid coffee consumer. His favorite malts are Malteries Franco-Belges Kiln Coffee and Dingemans Aromatic. 

Hopsteiner
est. 1845

HOP VARIETIES

EUREKA!™

Alpha-Acid %: 17 – 19.9
Beta-Acid %: 4.6 – 6
Total Oils (ml/100g): 2.5 – 4.4

Aroma Specification:
Black Currant, Dark Fruits,
Strong Herbal Notes, Pine Tree

**"Holy hop aroma Batman...
this is a seriously aromatic hop."**
– A Ph.D in Beer



Lemondrop™

Alpha-Acid %: 5 – 7
Beta-Acid %: 4 – 6
Total Oils (ml/100g): 1.5 – 2

Aroma Specification:
Lemon, Mint, Green Tea, Melon

**"Unique lemon-citrus
character with a
pleasant aroma..."**



X07270

Alpha-Acid %: 15 – 18.5
Beta-Acid %: 4 – 5.2
Total Oils (ml/100g): 3 – 4.4

Aroma Specification:
Spicy, Resinous, Tangerine,
Hints of Tropical Fruit

**"Big hop for big beers, bursting
at the seams with flavor!"**



DENALI™

Alpha-Acid %: 13 – 15
Beta-Acid %: 4 – 5
Total Oils (ml/100g): 2.5 – 4

Aroma Specification:
Pineapple, Pine, Bright Citrus

**"Beautiful, honestly like
no hop I'd smelled before."
– Brûlosophy.com**



The Proof is in the Pour™

Ask your local homebrew supply shop
for these exciting new hop varieties.

hopsteiner.com    



HOPS

FOR TRICERATOPS?

THE REVOLUTIONARY EVOLUTION OF MY FAVORITE BREWING INGREDIENT

By Andrew A. Farke, Ph.D.

Hops have history. The version we usually hear starts when they were first regularly added into beer recipes during the Middle Ages, ending up at today's breeding programs for intense aroma hops. But, limiting the hop story to their use by humans is like watching only the last 10 seconds of *Star Wars*. You're missing most of the plot!

Let's dig deep. Really deep, through 125 million years of time, to uncover the real history of hops. We'll ride along on this epic journey with my fellow paleontologists, a few of whom happen to be homebrewers. As we begin our trek, I had to ask them—why does it matter?

Jurassic fossil expert, homebrewer, and BJCP judge Kelli Trujillo responded: "The prehistoric history of hops is all a part of where hops are today—how far they've come has to do with where they started in the first place." Another home-

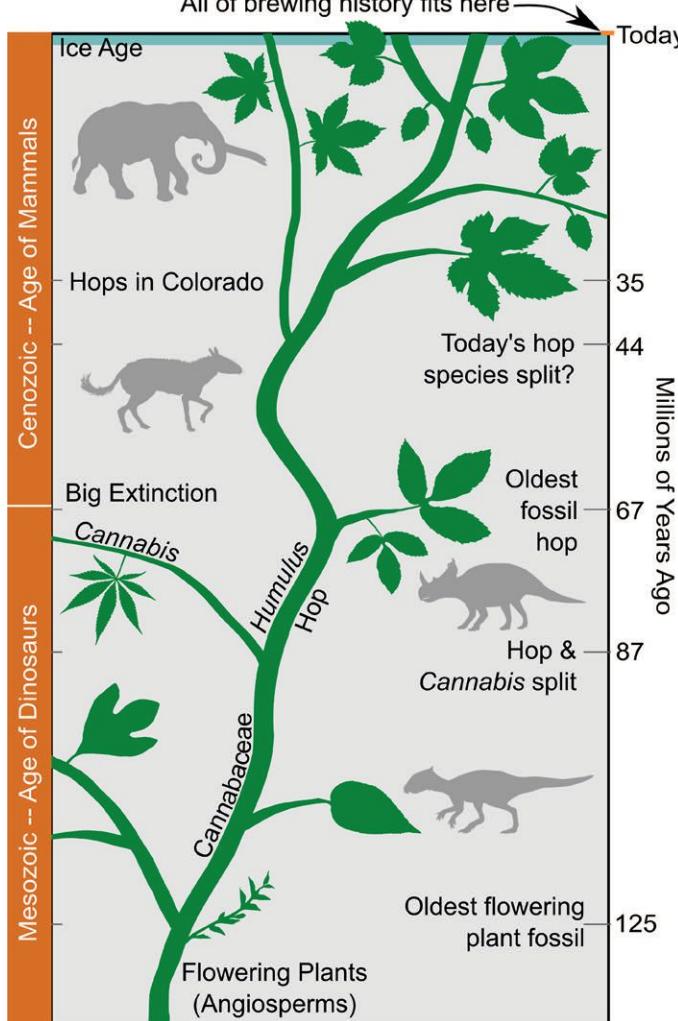
brewing paleontologist, Joe Peterson, had similar thoughts. "It is why we care about the prehistory of anything we study. Understanding these origins helps to put our practices, cultures, and biology into a broader context with our planet and its history."

BRANCHING OUT

Hops belong to the genus *Humulus* and are just one little twig on life's family tree. It's up to scientists to figure out the tree's branching patterns during the evolution of life. Plant anatomy is our first line of evidence: more closely related plants tend to share similar features in their leaves, seeds, and flowers, which can be used to identify close cousins on the family tree. Second is genetics. Just as with visible traits, the DNA code in cells is more similar in closely related organisms than in distantly related ones. Finally, fossils capture the changes in organisms over time and document the timing and location of hop origins.

If you go back far enough, all life on earth (hops and humans alike) shares a common ancestry. Because the first two billion years or so mostly entails squishy, single-celled organisms, we'll limit our discussion to just one relatively recently evolved group of plants, the angiosperms. They're also known as flowering plants, for hopefully obvious reasons. You know the hop flower pretty well already—it's the "cone" we use in brewing. The first angiosperms evolved right alongside dinosaurs, with the oldest undisputed fossil flowers popping up around 125 million years ago in China.

The many different sub-groups of angiosperms must have diverged from their common ancestor around this time, but we don't have enough of a fossil record to know the specifics. Anatomy and DNA fill in the details. It turns out that hops are just one member of a larger angiosperm group called Cannabaceae. This suggestive name acknowledges another famous



A family tree (or is that a family bine?) for hops (*Humulus*) and their relatives, showing the timing for milestones in hop evolution. Hop leaf silhouettes represent specimens known in the fossil record or today. The animal silhouettes show some herbivores from each time period.

member of the group—*Cannabis*, also known as hemp, also known as marijuana. But, it would be overly sensationalistic to ignore lesser-known members of Cannabaceae, such as hackberry trees. This seemingly random amalgamation of species is identified as close family by attributes inherited from their common ancestor—numerous shared stretches of DNA, the shape of the embryo contained in their seeds, and other features of the seeds and flowers.

Genetic and anatomical evidence further shows that *Cannabis* is the closest living relative to our humble hop, *Humulus*. Beyond a ton of shared DNA, the two plants also have roughly similar leaf types, similar seeds, pollen, and even similar

flowers at the microscopic level. Some proto-hop/marijuana gave rise to both types of plants, but where and when did this happen? If we could get our hands on fossil *Humulus*, that would be a pretty awesome way to resolve the conundrum.

DINO DINNER

The Hell Creek Formation is best known for its dinosaurs—*Triceratops* and *Tyrannosaurus* were the last of their kind to stalk ancient western North America. Yet, it also has an excellent fossil plant record. A single 67-million-year-old site in North Dakota produced numerous fossil leaves with a shape and veination pattern suspiciously like those of hops. Identification as *Humulus* is bolstered by the stolons (horizontal

"THE PREHISTORIC HISTORY OF HOPS IS ALL A PART OF WHERE HOPS ARE TODAY!"

Kelli Trujillo

Jurassic fossil expert, homebrewer, and BJCP judge



The three-horned dinosaur *Triceratops* lived alongside the oldest known hops, and may have even munched on them.

Credit: Photo courtesy Doug Connell/Engine Studio.

runners that create new plants) that accompany some of the leaves—anyone who grows hops is familiar with these side-runners that can rapidly take over a patch of ground. Hell Creek *Humulus* grew in open patches near rivers, where frequent floods would have disturbed the soil and made way for fast-growing plants like hops to cover the ground and perhaps crawl up tree trunks.

Triceratops, whose bones are quite common in the Hell Creek Formation, may well have munched on these hops. Even if dinosaurs didn't specifically target hops as a food source, some were pretty indiscriminate eaters, shown by their big mouths as well as fossil gut contents and fossil poo that contain a mélange of



Above: A slab of rock with 67-million-year-old hop leaves from North Dakota—the oldest known hops in the world.

Right: Modern domesticated hop leaves, not that different from those in the fossil record.



Learn more about hops with the
Brewers Publications Brewing
Elements Series of books.
BrewersPublications.com

Mesozoic plants. As a homebrewing paleontologist, I had to know: did dinosaurs influence hop evolution in any way? Can I thank a Triceratops for my IPA?

I posed this question to Ian Miller, a paleobotanist who specializes in fossil plants of western North America. Ian speculated that the vast appetites of giant dinosaurs might have put quite a bit of pressure on hops and other plants. How could hops deal with that? “They’re gonna grow fast, grow all over the place, regenerate from partial plants... very weed-like behavior! The weediness that is the hallmark of [hops and other flowering plants] would be selected for in a landscape

where plants are consumed quickly,” Ian told me. Knowing that we haven’t yet found a fossil hop plant gripped in the jaws of a *Triceratops* skull or inside dinosaur droppings, he emphasized the speculative nature of this scenario. But, it’s certainly food (and beverage) for thought!

HOPS ON THE MOVE

Even though this earliest fossil record is slim, it tells us a lot about hop origins. Because the oldest known hops lived in North America, the first *Humulus* probably evolved on this continent and spread into Europe and Asia from there. Using that fossil record in concert with data from modern

species, botanist Jeffrey Boutain estimates that *Humulus* and *Cannabis* parted evolutionary paths around 87 million years ago (give or take a few million years).

The big dinosaurs (with the exception of their bird descendants) and many other organisms died out 66 million years ago, due in large part to a massive asteroid impact in what is now Mexico. Ian Miller finds the survival of hops through that catastrophe pretty amazing. “This plant survived a meteor impact, shockwave, firestorm, thermal pulse, acid rain...and then the effects of nuclear winter. This wonderful plant that we know and love today squeaked through



Modern hop flowers ("cones") and leaves.

that window, when 60 percent of the plants in North America went extinct."

Our next fossil hop pops up in 35 million year old rocks in Colorado, at Florissant Fossil Beds National Monument. Given

the name *Humulus florissantella*, these hops grew among the ancestors of today's horses as well as extinct rhinoceros-like and sheep-like animals. Fossil seeds from western Siberia, around 10 million years old, document the oldest known hops in Asia. Around 3 million years ago, we have fossil hops in Germany. But, despite all of our interest in hops, the fossil record is somewhat slim.

Genetics rounds out our knowledge of today's living hop species (or subspecies, or varieties, depending on which botanist you ask). Using the rate of genetic mutations as a kind of clock, the branch with today's brewer's hop species (*Humulus lupulus*) probably originated in Asia and diverged from its relatives (such as the wild hop *Humulus scandens*) as far back as 44 million years ago or as "recently" as 6 million years ago. The sparseness of the fossil record—and somewhat surprisingly, the scarcity of data for modern wild hops in museum collections—contributes to this uncertainty. It's time for botanists and paleobotanists to collect more specimens and do more research!

COLD PRESERVATION

The diversification of modern hop species was followed by another major global event: the Ice Age. Much of the northern latitudes were buried by thick ice sheets, rendering the land uninhabitable by hops or most any other plant. Where did they go during this time?

The most detailed fossil record of hops during the Ice Age comes from a surprising place: pollen. Pollen contains a plant's male gamete (a fancy word for "sperm cell"), surrounded by a protective covering. Many of us are familiar with the allergenic side of pollen, especially when the air is thick with the stuff during plant mating season. This abundance is a boon for paleontologists, though, because pollen grains are durable and fossilize fairly easily. A handful of ancient lake sediment might contain thousands of individual pollen fossils from dozens of different plants. Pollen can be matched with its plant type in many cases, allowing researchers to track the rise, fall, and distribution of a plant in an area.

As one example of hop pollen in action, scientists sampled ancient Polish lake

High Gravity Homebrewing & Winemaking Supplies

WORT HOG

info@worthog.net
WORTHOG.NET
wholesale inquiries welcome

No Payments + No Interest if paid in full in 6 months on purchases of \$99 or more
Check out with PayPal and choose PayPal Credit
Subject to credit approval. See terms. US customers only.

PayPal CREDIT

EBC-130
EBC-330
EBC-350

Electric Brewing Controllers for Homebrewers
It's a whole new animal...

918-461-2605
www.highgravitybrew.com



CLEAN BEER? START HERE!



**Five Star Chemicals
& Supply, Inc.**

www.fivestarchemicals.com
support@fivestarchemicals.com



Find us on
Facebook

facebook.com/FiveStarChemicals

(303) 287 - 0186 | (800) 782 - 7019 | 4915 E 52nd Ave. Commerce City, CO 80022

beds dated between 480,000 and 620,000 years ago (smack in the middle of the Ice Age, when *Homo erectus* still walked the planet). Today's hops in that region prefer relatively mild climates. Thus, changes in the abundance of *Humulus* pollen through time track how the plant was pushed from and pulled back into the area during warming and cooling intervals.

Within North America, native hops (including the vaunted *neomexicanus*, variously considered their own species

in *Humulus* or a subspecies/variety of *Humulus lupulus*) were hit hard by the Ice Age. Although today's "wild" hops are found as far north as Saskatchewan, thick ice sheets would have excluded them from that region up until around 10,000 years ago. Those in the southwestern United States dodged that icy bullet, and thus have a deep and diverse genetic heritage. This heritage is now being investigated by hop breeders who search for the unique flavor and aroma characters locked up in the *neomexicanus* genetic code. Additionally, native hop

varieties are often resistant to blights and pests that affect cultivated varieties. Thus, the diversity in native hops, which evolved in response to a variety of environmental changes, could ensure the continued success of hop horticulture. By studying past responses of native hops to climate change in the fossil record, conservation botanists can also help predict where that genetic library of wild plants may best survive in the face of future climate change and other human impacts, and where preservation efforts need to be intensified.

DON'T BREW WITH OLD HOPS

Homebrewing paleontologist and geologist Alyson Brink raises an important final question: could we have brewed with dinosaur era hops? "I think about the ancestral hops growing alongside the small mammals of the Late Cretaceous [during the time of *Triceratops*]. Was the piney aroma of fresh hops as appealing to them as our fantastically fragrant Citra IPA is to me?" Unfortunately, no fossil hop cones are known so far. But, today's living hop species suggest that aromatic hops rich in alpha acids are a recent evolutionary development.

Wild hop cousins (*H. scandens* and *H. yunnanensis*) to the line including brewing hops are non-aromatic and have minimal alpha acids—in other words, they're not terribly useful for brewing. This suggests that ancestral *Humulus*, including that alongside *Triceratops*, also would have been a brew kettle and dry hop dud. As much as I would love to visit the Mesozoic, it would not be a good place to set up a brewery.

What a journey! Our humble hop plants were munched by dinosaurs, weathered global extinctions, and tracked the ebb and flow of giant ice sheets across the northern hemisphere. Now, thanks to a relationship with beer brewers, hops have an even greater spread and a bigger future than ever before. Every sip of your homebrew retells the story.

Andy Farke is a paleontologist and homebrewer based in Claremont, Calif. He blogs about his brewing adventures at andybrews.com.

GREAT BEER GROWS HERE.

VAN HORN FARMS, MOXEE, WA



HOPUNION LLC IS NOW YCH HOPS.

NEW NAME. NEW LOOK.
SAME PREMIUM QUALITY HOPS.

Beginning in early 2016, look for the new YCH HOPS packaging and connect with growers like Rich Van Horn of Van Horn Farms, Inc. For more than 40 years, Rich has been committed to the craft brewing community. His dedication to providing a premium product has led Van Horn Farms to earn top industry honors, including the Hop Quality Group's first-ever Cascade Cup in 2013. To learn more about how our growers' dedication to world-class quality and service is benefiting you, visit ychhops.com.

Phone: 509.453.4792 | Fax: 509.453.1551 | Email: hops@ychhops.com | Web: www.ychhops.com

STONE-FACED IPA

Recipe by the editors of *Zymurgy*

Most of the hops we use for brewing are of the variety *Humulus lupulus* var. *lupulus*, but strains of *H. lupulus* var. *neomexicanus* are gaining in popularity among those open to experimentation. One strain of *H. lupulus* var. *neomexicanus*, Medusa, has appeared in at least two commercial beers: Sierra Nevada's Harvest Wild Hop IPA and Crazy Mountain Brewing Company's *Neomexicanus* Native Pale Ale. And the experimental variety HBC 438, nicknamed Ron Mexico, was made available to homebrewers in 2014.

Stone-Faced IPA is built around Medusa, but any variety of *neomexicanus* should work just as well and may be easier to source, HBC 438 in particular. The monks of the Benedictine Monastery of Christ in the Desert in New Mexico (holyhops.biz) grow five other varieties—Chama, Latir, Tierra, Amalia, and Mintras—which have sold out quickly in the past, but more and more farms are devoting acreage to these uniquely North American varieties.

Keep your eyes peeled for *neomexicanus*. And when you find some, whip up a batch of Stone-Faced IPA.

Batch volume: 5 U.S. gallons (19 L)

Original gravity: 1.063 (15.4° P)

Final gravity: 1.012 (3° P)

Color: 7 SRM

Bitterness: 52 IBU

Alcohol: 6.7% by volume

MALTS

12 lb. (5.44 kg) pale 2-row malt

4 oz. (113 g) crystal 40° L malt

HOPS

1 oz. (28 g) Magnum, 12% a.a. @ 60 min

1 oz. (28 g) Medusa, 4.5% a.a. @ 10 min

1 oz. (28 g) Medusa, 4.5% a.a. @ 0 min

1 oz. (28 g) Medusa, 4.5% a.a. whirlpool 10 min

1 oz. (28 g) Medusa, 4.5% a.a. dry hop 5 days

YEAST

Wyeast 1056 American Ale, White Labs WLP001 California Ale, or Safale US-05

ADDITIONAL ITEMS

1 Whirlfloc tablet added 10 minutes before end of boil

BREWING NOTES

Mash 60 minutes at 152° F (67° C), lauter, and sparge. Collect approximately 6.5 gallons (24.6 L) of wort and boil 60 minutes, adding hops and Whirlfloc per the indicated schedule. Whirlpool (or steep whirlpool hops in hot wort before chilling) 10 minutes, then chill to 64° F (18° C) and pitch yeast. Ferment for 10 days or until specific gravity stabilizes at or near 1.012 (3° P). Rack to secondary and add dry hops. Allow to condition on dry hops for 5 days before packaging with 2.6 volumes (5.2 g/L) CO₂.

MALT EXTRACT VERSION

Steep crystal malt for 30 minutes at 155° F (68° C), substitute 8.75 lb. (4 kg) pale malt extract syrup for 2-row, and proceed with boil as above.

Castle Malting®

PREMIUM-QUALITY MALTS

More than 70 types of Base and Specialty Malts
TRADITIONAL malting process
Revolutionary Roasting Technology
100% TRACEABILITY of malt – from the field up to the beer glass

ORGANIC MALTS

Full Range

TECHNICAL SUPPORT

Free counselling
Pilot microbrewery
State-of-the-art laboratory
Assistance in creating new recipes

www.castlemalting.com/us

BSG™ HandCraft

www.brewerssupplygroup.com

brew malt

The easiest way to order your favourite malts



WATER

IDENTIFY YOUR SOURCES

By Debbie Cerdá

“Ever-newer waters flow on those who step into the same rivers.”

—Heraclitus of Ephesus (c. 535 – c. 475 BCE)

Water is the main ingredient in a pint of beer, representing more than 90 percent of its mass. It has a tremendous effect on the quality of the final product, but many homebrewers and professional brewers don't devote enough time to understanding basic technical information about the water that flows from our faucets. It's pointless to add salts and adjust ions if you don't know the nature of your source water.

Water is always changing. Natural and human-caused conditions affect our water, not just seasonally, but even daily and hourly. Stormwater flow and drought conditions affect water sources, and treatment processes must be revised to address these changes and ensure our tap water meets regulatory standards.

The water that makes up most of your beer isn't a static ingredient neatly characterized by a single water profile table. It's an ever-changing resource whose ebb and flow can be tasted in the glass.

WATER SOURCES

The water that reaches your tap can come from a single source or a combination of several sources. Groundwater (GW) comes from wells that draw from aquifers, while surface water (SW) comes from rivers, streams, creeks, lakes, and reservoirs. Some groundwater, like the water from springs, can be affected by surface water and is known as groundwater under the influence of surface water (commonly abbreviated GUI or GWUDI).

Alternate sources often used in combination with surface water and groundwater can include designated rainwater harvest, desalination of brackish groundwater, and even seawater desalination, thanks to innovative technology. Some water systems are even participating in aquifer storage and recovery to ensure adequate water capacity.

Groundwater varies greatly, and its composition depends on location (geology) and land use. As water moves underground and erodes away rock, it picks up minerals. The most common dissolved substances include sodium, cal-

cium, magnesium, potassium, chloride, bicarbonate, and sulfate. From a brewing standpoint, those of greatest concern include the following:

- **Iron and manganese** (Fe and Mn^{2+} , respectively) are naturally occurring but can be increased by iron-accumulating bacteria.
- **Chloride** (Cl^-) is particularly aggressive on stainless steel.
- **Calcium, carbonate, and bicarbonate** (Ca^{2+} , CO_3^{2-} , and HCO_3^- , respectively) are important for brewing but can foul hot water tanks at high concentrations.
- **Sulfate** (SO_4^{2-}) accentuates hop bitterness but can impart a sulfur-like aroma and flavor in large amounts.
- **Total dissolved solids** (TDS) are collectively considered a secondary water contaminant. These are a combination of dissolved organic material, as well as common salts including sodium, chloride, calcium, magnesium, potassium, sulfates, and bicarbonates. TDS in groundwater come mostly from the weathering of sedimentary rock.



WATER IS ALWAYS CHANGING. NATURAL AND HUMAN-CAUSED CONDITIONS AFFECT OUR WATER, NOT JUST SEASONALLY, BUT EVEN DAILY AND HOURLY.

- Water hardness falls into two categories. Temporary hardness refers to the amount of calcium carbonate in the water. It's called temporary because boiling water causes calcium carbonate to precipitate out of solution. Permanent hardness is indicative of chlorides and sulfates—boiling doesn't affect these ions.

(You can read more about the impact of chloride, sodium, sulfate, and several other flavor ions on brewing in the AHA article “Understanding Water for Homebrewing” [HomebrewersAssociation.org/how-to-brew/understanding-water-for-homebrewing](#).)

[org/how-to-brew/understanding-water-for-homebrewing](#).)

Surface water sources include creeks, rivers, and lakes: natural water that remains above ground and does not penetrate the ground surface. As surface water collects within a watershed—the area where water falls in and drains off into a common outlet—it picks up natural and artificial contaminants.

Surface water typically contains high amounts of naturally occurring organic matter (NOM), total dissolved solids (TDS),

total organic carbon (TOC), and synthetic organic chemicals (SOCs) from pollution. These contaminants are removed during the surface water treatment process long before the water reaches your home.

Many states require that public water systems that use surface water or groundwater under the influence (GWUDI) as a source must monitor and treat for TOC, alkalinity, and pH. pH is a measure of the hydrogen ion concentration and has a federal secondary standard of 6.5 to 8.5. Levels less than 7.0 (neutral) can be corrosive and degrade lead and copper pipes

and fixtures, while a pH greater than 8.5 can lend a slippery feel and soda-like taste to water.

Public water systems are required to measure pH and alkalinity because they affect corrosion. pH also determines the dose of disinfectant required to inactivate waterborne microorganisms. And because all surface water contains bacteria (and possibly protozoa and viruses), disinfection is of tremendous importance to our brewing water.

THE ROLE OF DISINFECTION

Imagine you live in a place where waterborne diseases are rampant. Your local water source is contaminated, and major flooding can cause typhoid outbreaks when sewage and contaminants enter your water supply. Thousands fall ill, many die, and there are no trained water staff to effectively treat water and protect human health.

This was the state of America's water supply just over a century ago. It was the introduction of disinfectants in the early 1900s

that drastically reduced the number of waterborne disease outbreaks. The first use of chlorine in drinking water in the United States was in Jersey City, N.J. in 1908.

The two main disinfection types used in the United States are *chlorination* and *chloramination*. Chlorination is measured as "free chlorine," and for many states, the minimum concentration is 0.2 mg/L at the farthest reaches of the distribution system. Chloramination, on the other hand, is measured as "total chlorine." Where chloramination is required, the concentration should be at least 0.5 mg/L at the farthest reach of the system. The maximum allowable concentration of both chlorine and chloramine is 4 mg/L, based on a running annual average across a distribution system.

Chlorine forms disinfection byproducts, including harmful carcinogenic compounds when combined with organic matter and/or bromide from saltwater intrusions. Chlorine is an exceptionally effective disinfectant, but chloramine is more persistent, more stable, and

longer-lasting throughout the distribution system to inhibit microbial growth. Chloramine is, however, a weaker oxidant which can cause taste, color, odor, and staining issues.

Chloramine's most common impact on brewing is chlorophenol formation, which happens when chlorine reacts with phenols in beer. Chlorophenols have a very low taste threshold and remind tasters of antiseptic mouthwash or plastic adhesive bandages. In fact, one way to tune your palate to chlorophenols is to add Chloraseptic® to a light-colored, light-bodied beer (you only need a very small amount).

But not all chloramine is necessarily converted to chlorophenol, and some residual disinfectant may remain. This leftover chloramine retains its biocidal properties and can degrade yeast. In addition to promoting unhealthy fermentations, dead and dying yeast cells can cause myriad soapy, cheesy, and even rancid off-flavors. Some professional brewers have also anecdotally expressed concerns that disinfec-

MINIBREW[®]
QUALITY BREWING EQUIPMENT

AFFORDABLE QUALITY BREWING EQUIPMENT

1 F6.5x Conical Fermenter

- Half the cost of stainless
- Ships ready to brew
- All stainless steel fittings and valves included
- Easily fits in a chest freezer
- Perfect for 5 gallon batches

2 15 Gallon Mash Tun

- Hold up to 35 lbs. of grain
- Retains heat better than stainless
- Comes with false bottom
- Optional sparge arm available

3 Easy Seal Stainless Steel Weldless Bulkhead

- Installs in seconds
- Liquid tight and food grade
- Easy to remove and clean
- Threaded on both ends

ORDER NOW & SAVE 10%

USE PROMO CODE:
JFZYM
WHEN YOU ORDER!

951.676.2337

www.minibrew.com

tant residual can affect malt conversion, hop utilization, and attenuation.

COMMON MYTHS ABOUT WATER DISINFECTION AND BREWING

A few persistent rumors remain widely circulated about chlorine and chloramine, and being a good brewer means understanding what's true and what's not. Here are some of the most common.

Myth: All water contains disinfectant.

Fact: While the EPA sets a maximum residual level for disinfectants, not all water is required to be disinfected. However, many states require disinfectant residual minimums to protect the public from waterborne diseases.

Myth: Chlorine kills all pathogens on contact.

Fact: The rate of inactivation of pathogens relies on several factors, including chlorine concentration, contact time, water temperature, pH, and even the type of pathogen (bacterium, protozoan, or virus). Bacteria and viruses are easily inactivated, but *Giardia* is much tougher to inactivate and requires longer contact

time and/or higher disinfectant residual. Chlorine is not very effective at inactivating *Cryptosporidium*, which exists as an oocyte with a hardened shell.

Myth: Chlorine and chloramine treatment are the same.

Fact: Chlorine is more effective with decreasing pH and increasing temperature. However, higher temperatures can also mean higher formation of carcinogenic disinfection byproducts. Monochloramine is a more stable and persistent disinfectant than chlorine. Chlorine is a stronger oxidant than monochloramine, but it dissipates quickly due to disinfectant demand.

Myth: All disinfectant can be boiled out.

Fact: Only chlorine can be boiled out. Monochloramine does not boil out and must be removed by adding potassium metabisulfite or other dechlorinating agents to your brewing water. Carbon filtration can also remove monochloramine from water, but it's important to have an effective contact time to reduce the residual to an insignificant level. The contact time depends on the initial disinfectant residual, the flow rate, and the type of filter medium.

Myth: You can tell the difference between chlorine and chloramine treatment by the water tint.

Fact: An oft-stated rumor posits that chloraminated water has a bluish tint, while chlorinated water appears yellowish. Completely untrue! Both chlorine and chloramine are colorless. Color in water may indicate constituents such as iron and manganese, or the coagulant used in the water treatment process (e.g., bluish from alum or yellowish from ferric sulfate), but color is not an indicator of disinfectant.

DRINKING WATER STANDARDS

Most developed countries provide water to consumers through municipal water supplies, which receive water from various sources, maintain the water distribution systems, and provide results of routine and special testing to regulatory agency and the public. These activities help public water systems (PWS) ensure that their customers are provided safe, affordable, quality water. Water is processed and treated to meet drinking water standards which were set forth by the federal legislation of the Safe Drinking Water Act (SDWA) and its amendments. The initial National

SMART BREW® WATER TESTING

eXact iDip® TEST SMARTER, BREW BETTER

The Smart Brew® Water Testing Kit incorporates a revolutionary photometer system which is the first and only to integrate 2-way wireless communication with a smartphone. The multilingual app is the brain of the system which allows limitless possibilities including lab accuracy, free upgrades, test customization (over 40 available), mobile sharing, and more. Smart Brew® allows you to focus on what's important, the taste of your beer!

The Smart Brew® Kit includes tests for:

- Chloride
- Calcium Hardness
- pH
- Total Alkalinity
- Sulfate
- Magnesium Hardness*
- Residual Alkalinity*
- Sodium*

* The first meter designed for the craft brew market that directly calculates these values with no math or calculations required.

SmartPhone is not included. eXact iDip® is a registered trademark of Industrial Test Systems, Inc. Rock Hill, SC 29730 USA ©2016 ZY10716 App Store is a service mark of Apple, Inc. "SAMSUNG" is a trademark of Samsung in the United States or other countries. Android and Google Play are service marks of Google, Inc. Facebook and Twitter are registered trademarks in the United States or other countries.

R&D 100 Winner 2014 eXact iDip

Smart Brew Advanced™ Kit

8008619712 | SENSAFE.COM
SENSAFE SMARTBREWKIT ITSSSENSAFE

Primary Drinking Water Regulations (NPDWR)—known as the “primary standards”—were adopted in 1976 and are legally enforceable standards that apply to all public water systems in the United States. Primary standards protect public health by limiting the levels of both naturally occurring and artificial contaminants in drinking water referred to as “regulated contaminants.” Primary contaminants have health impacts that can be acute or chronic.

The National Secondary Drinking Water Regulations (NSDWR) are referred to as “secondary standards” and are federally non-enforceable guidelines regulating 15 contaminants that do not pose a risk to health, but may cause other effects. These contaminants are most relevant to the brewing process, and their effects include:

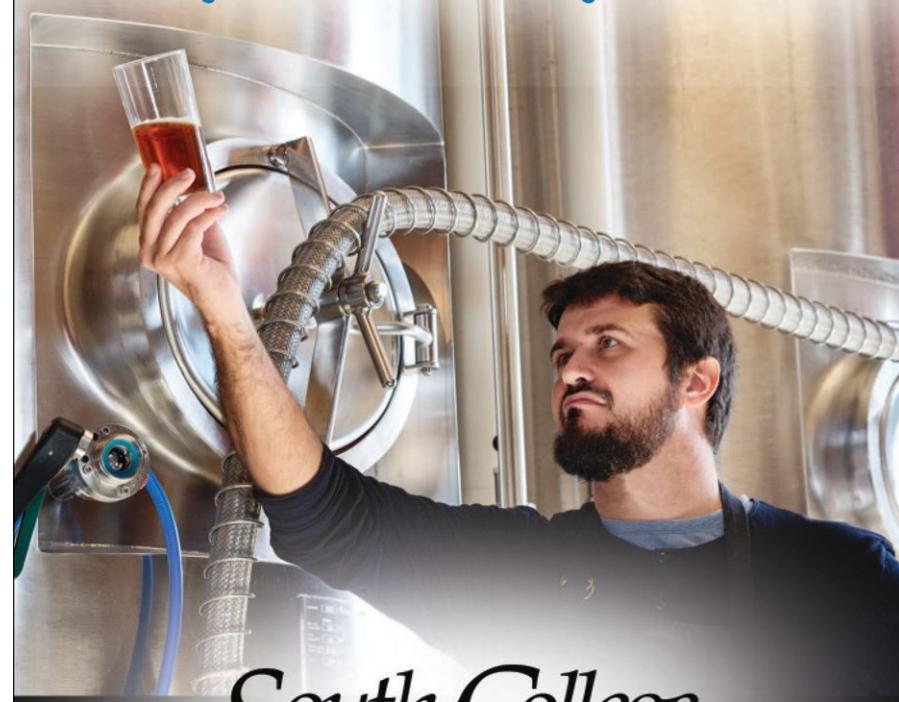
- **Cosmetic effects:** skin or tooth discoloration (example: secondary fluoride)
- **Aesthetic effects:** such as taste, odor, or color
- **Technical effects:** corrosivity and staining related to corrosion (chloride, copper, iron, manganese, pH, total dissolved solids, zinc)

The Environmental Protection Agency (EPA) recommends secondary standards to water systems but does not require that systems comply. However, agencies in many states, including Texas and California, have chosen to adopt them as enforceable standards. Agencies are also free to adopt their own standards as long as they are no less stringent than the federal regulations.

Drinking water standards can change based on advances in technology and scientific knowledge, as well as occurrence of water quality issues. For example, in response to the recent lead and copper issues in Flint, Mich., several states including Texas are taking a much closer look at the water quality conditions that can impact corrosivity.

Amendments to the SDWA have established the Unregulated Contaminant Monitoring Rule, which requires that data be collected for contaminants—including chemicals and

Not your ordinary career.



Not your ordinary school.

South College
Asheville

If you've ever thought about becoming a brewer, here's your chance. South College now offers the Professional Brewing Science program, a nine-month program that will give you the skills you need to become a professional brewer.

**LEARN MORE ABOUT THE CAREER OPPORTUNITY THAT'S BREWING
AT SOUTH COLLEGE. CALL OR CLICK FOR DETAILS TODAY.**

(828) 398-2500
SOUTHCOLLEGENC.EDU

140 SWEETEN CREEK RD | ASHEVILLE, NC 28803

For more information on graduation rates, median debt of graduates and other important information, visit <http://www.southcollegenc.edu>. South College-Asheville is accredited by the Accrediting Council for Independent Colleges and Schools (ACICS) to award BS degrees, AAS degrees and certificates.

Fast FREE Shipping

(Lower 48 only, please, and not big things like wine presses.)



Maryland Homebrew is your complete source for homebrew supplies for beer, wine, mead, cider, cheese, spirits and much more.

Our well-stocked, warehouse-style store is conveniently located in central Maryland.

You'll find freezers full of hops, refrigerators full of liquid and dry yeast, shelves upon shelves of brewing kits and ingredients, an entire room dedicated to malts, wine kits, fruit presses for rent, kegs, kettles, brewing hardware, burners

If you need it, we've got it.

Our friendly staff loves to answer questions and help you with your own homebrewing adventure. We also offer beginner and intermediate classes.

Marylandhomebrew.com

The difference is service

**6770 Oak Hall Ln.
Suite #108
Columbia, MD 21045
(888)-BREW-NOW**

microbes—that are suspected to be present in drinking water yet do not currently have health-based standards. Such monitoring activities help the EPA assess exposure levels within our population and make regulatory decisions for emerging contaminants.

The SDWA is a separate set of statutes from the Clean Water Act (CWA), which ensures the protection of surface water quality to support “the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water” but does not address groundwater or water availability.

YOUR RIGHT TO KNOW YOUR WATER

The Consumer Confidence Report (CCR) Rule was adopted in 1998 as part of “right to know” legislation and is an amendment to the SDWA. The intent of the CCR rule was to improve public health protection by providing consumers important information on their drinking water quality so that they can make practical, informed decisions regarding any potential health risks associated with the quality, treatment, and management of their drinking water supply.

The annual CCR is most often referenced as the “drinking water quality report” and must be made available by every public water system. The report, which must be delivered by July 1 every year, describes the results of the *prior year's data sample*. However, if a water system is on a three-year routine monitoring sampling period, as is the case with most groundwater systems, the data may include sampling from several years prior. The lack of data for a particular contaminant does not mean that it was not sampled, but rather that it was below detection limit and therefore is not required to be reported.

Your water supplier's CCR contains extensive information about your tap water, including where it comes from and what it contains. The annual report must include any detections of contaminants that are

Learn more about water with the Brewers Publications Brewing Elements Series of books.
BrewersPublications.com

identified within the EPA's National Primary Drinking Water Regulations (NPDWR) as having an acute or chronic risk to health. In support of the EPA's Public Notification Rule, the report must also include any violations of drinking water standards that do not have a direct impact on human health.

Public water systems are required to monitor additional contaminants which are not considered to present a risk to human health but can have an aesthetic effect including taste, odor and color as well as cosmetic and technical effects. These secondary standards are of the greatest interest to both home and professional brewers.

There is much useful information in your water quality report, but it's important to keep in mind that it is only a “snapshot” of your drinking water quality, and it does not necessarily provide a complete profile of your water quality.

HOW TO GET THE INFORMATION YOU NEED

Get to know your water system's environmental compliance managers and process control engineers. Routine water quality reports can be found online, requested informally, or obtained through a public information request. You can do your own process sampling by using test kits including pH meters, which offer greater accuracy than test strips, or by sending samples for analysis to a reputable lab like Ward Laboratories, White Labs, and facilities accredited by the National Environmental Laboratory Accreditation Program (NELAP) with drinking water (DW) certification.

Be cognizant of changes to source and changes to treatment. Remember, you are a customer—it's your right to be informed and your responsibility to report any detected changes of concern. Your beer will thank you.

Debbie Cerda is a water consultant for small and public water systems in Texas. She has worked as a surface water operator for the City of Austin and as a drinking water quality specialist for the State of Texas. She works for Jester King Brewery and serves on the AHA Governing Committee.

SIERRA NEVADA BREWING CO., CHICO, CA & MILLS RIVER, NC

WE RISE TOGETHER



BEER CAMP 2017

When you're independent, you brew for fun with your friends. No style or ingredient is off limits. And you celebrate your craft with the community.

Arriving soon!



BREWERS YEAST

MORE CHOICE THAN EVER BEFORE

By Tony Rau

Craft beer is an evolving creature that continues to grow on all fronts. Comparing today's landscape to that of even just 10 years ago, we find remarkable differences, not just in terms of the sheer number of breweries (the US passed the 5,000 mark in December), but also the number of unique brands available on store shelves and in tap rooms. As craft beer has grown, small and independent brewers dedicated to making quality products have kept their attention not just on the end goal, but also on the stepping stones to achieving it: great ingredients.

Hops have been and continue to be a major focus. New varieties offer flavors and aromas that range from massively fruity to earthy and piney, while others are bred mainly for their bitterness qualities. Water remains the backbone of every beer, with its power to dictate mash chemistry and influence the perceived bitterness of the final product. Quality malt has been readily available for some time, but the last few years have seen an explosion in craft malt, which increasingly packs more flavor into every kernel.

Malt, hops, and water are critical, of course, but brewers know that great beer can't be made without great yeast. And from that perspective, there's never been a better time to be a brewer.

EXPANDED SUPPLY

Yeast has continued to evolve alongside craft beer. Strains mutate from one generation to the next, of course, but the yeast industry itself has evolved even more noticeably. There had been just a select few yeast suppliers in the past, but the last couple of years have seen tremendous growth in smaller companies. The demand for more suppliers and diversity appears to have stemmed from a general improvement of our collective knowledge of the organism, at both the commercial and homebrew levels. Brewers want to dial in distinctive flavors and experiment with new taste combinations, and they're demanding more from their yeast to make that happen.

The yeast market has historically been dominated by well-known, established brands: Wyeast and White Labs for liquid cultures (plus Brewing Science Institute—BSI—for commercial brewers) and

Lallemand and Fermentis for dry strains. These labs propagate pitchable quantities of yeast for anything from 5 gallons (18.9 L) of homebrew to 50 or more barrels (58.7 hL or more) of commercial beer. The success of these industry stalwarts has paved the way for new suppliers to launch smaller, more regional brands like Omega Yeast Labs (Chicago), GigaYeast and The Yeast Bay (Bay Area), Inland Island Yeast (Denver), and East Coast Yeast (New Jersey), among others.

For brewers, such an abundant selection is exciting. A diverse yeast marketplace means more opportunities for customization, and brewers and homebrew supply shops have even better access to fresh yeast. The established yeast labs produce a diverse offering of viable, healthy yeast strains, but as with craft breweries themselves, access to additional sources means more brewers are within easier reach of the microbes they need.

IMPROVED SELECTION

Expanded selection is good, but having access to so many great strains from so many great suppliers means homebrewers and professionals alike may have a



BREWERS KNOW THAT GREAT BEER CAN'T BE MADE WITHOUT GREAT YEAST.



Learn more about yeast with the Brewers Publications Brewing Elements Series of books.

BrewersPublications.com



harder time choosing just the right strain from such a large field. It helps to have a specific end goal in mind.

Think about the nuances of yeast as you might the nuances of hops. It's no longer enough to simply say, "Oh, I want fruit character in my pale ale." With today's incredible selection, you can narrow that generic fruitiness down to more specific notes like pineapple-dominant, with a nice clementine aftertaste. Improved yeast selection means more control and more specificity.

Let's say you've always had a go-to hefeweizen on tap at home, but lately you've been wanting a little less clove and a little more banana. You can manipulate temperature, of course, but you can also explore strains. If you've stuck with the same hefe strain from one supplier, try the allegedly "same" strain from another. Even strains that purportedly come from the same source undergo mutations in the lab.

EXTENDED MIXES

In addition to yeast monocultures, suppliers increasingly offer their own proprietary blends of mixed cultures. Brettanomyces, lactobacillus, and pediococcus are becoming ever-more popular among brewers, and these once-avoided bugs are now valued tools for long-term aging, and even as primary fermentation cultures.

Mixed cultures are a hot item right now, and they allow brewers to have fun conducting experiments that were unthinkable in the not-so-distant past. As recently as five years ago, such blends were hard to find, but the diversity on offer from so many suppliers has transformed the landscape to the point that most labs maintain at least five different strains or blends now.

Professionally propagated bug blends remove much of the frustration that brewers used to experience with wild and sour

cultures. In the past, achieving a certain profile might have meant harvesting the dregs of your favorite Belgian-style ale, followed by lots of trial and error and a bit of luck. Today, if you know what you're looking for, you can use one of these time-saving, ready-made concoctions—it will deliver more stable and predictable results since you're assured of healthy pitches going into your wort or beer.

A consequence of healthier blends is improved flavor and complexity. Brett beers can exhibit funky farmhouse and barnyard characters, but they just as often include prominent fruit esters. This is especially the case when a combination of cultures acts as one to create a complex and balanced flavor profile. Yeast suppliers have done the hard work of dialing in the flavors their cultures produce and providing clear descriptions of what we can expect from them as brewers.

Explore Local Flavor Using Cultivated and Foraged Ingredients

BREWING LOCAL
AMERICAN-GROWN BEER

B BREWERS PUBLICATIONS

Get a copy for only \$19.95

BA BREWERS ASSOCIATION

MAKE
THE BEST CHOICE
FOR YOUR BEER!

THE OBVIOUS CHOICE FOR BEVERAGE FERMENTATION

ACTIVE DRY YEAST FERMENTATION AIDS FUNCTIONAL PRODUCTS ENZYMES

Powered by Lesaffre, one of the world's largest yeast and yeast derivatives manufacturer, we offer you the highest quality standard of products for beer manufacturing. Through a dedicated range of active dry yeasts and fermentation aids, we deliver innovative solutions to give you the ability to create the beer you dream about.



www.fermentis.com



Fermentis

LESAFFRE FOR BEVERAGES

This gives us confidence to use these unique cultures, fostering a creative brewing environment with a lower risk of producing an unsatisfactory product. Using the culture, whether yeast, bacteria, or a mix, to complement other ingredients at such a high level adds a new layer of complexity. Brewers have always chosen yeast strains carefully, but usually in an attempt to recreate the predictable. These new mixed cultures make it possible to, for example, coax pineapple notes from a Brett strain that fully complement citrusy hops while also delivering a dry finish.

From a consumer standpoint, this is huge. The demand for mixed-fermentation beer is higher than ever, and it's giving rise to new boundary-pushing styles such as Brett IPA and sour IPA.

BETTER KNOWLEDGE MEANS BETTER BEER

Our expanded understanding and the improved availability of yeasts have brought new attention to the importance of yeast health and sanitation. All of us have had at least one batch go south, and we can usually trace the problem to a single step in the brewing process. Maybe something got introduced that shouldn't have been, or perhaps we didn't adequately sanitize our equipment. Some might prefer to remain silent about their batches of bad beer, but as more brewers discuss fermentation health, these shared stories help others to learn from their mistakes. That means better beer for everyone.

Newcomers to homebrewing might find today's incredibly diverse yeast selections daunting. But so much more choice means more creativity and more experimentation with more predictable results. The yeast industry's growth over the last decade, and especially the increased availability of wild and sour cultures, should make us all excited to see where homebrewing goes next.

Tony is the lab lead and Yeast Beast at Odell Brewing Co. in Fort Collins, Colo. Having started out as a homebrewer, he now aids in maintaining the yeast and bacteria at Odell and brews on their 5-barrel pilot system. Whether Tony is brewing at work or home, experimentation is the name of the game.

YEAST PLAYGROUND

Recipe courtesy Tony Rau, Odell Brewing Company

This is an experimental base beer for exploring new microbes. I always prefer something basic for yeast projects. Stepping up the wheat allows for a couple of different things. It helps keep a little more body in solution in the final product, but, more importantly, it leaves some long-chain food in solution for the Brett to eat in secondary. This is also why I go with a higher mash temperature—leaving more unfermentables in solution means more food for secondary.

I find *Brettanomyces* plays with phenols a bit in secondary, so a saison yeast strain makes for a nice backbone. Wyeast 3711 just happens to be the one I enjoy the most. I tend to go with *B. clausenii* over *B. bruxellensis* because I enjoy the nice pineapple notes it gives, with lower barnyard flavors.

Using a toasted oak dowel, spiral, or wood chips helps mimic barrel character, lending nice tannins and vanilla notes, depending on the toast level. This also helps maintain the microbe culture if you reuse the wood in another beer! This recipe is designed for experimentation. Keep the malt the same, but use whatever hops you have on hand to target 17 IBU (the variety is unimportant). Then play with the primary or secondary yeast to see what kinds of combinations yield flavors you like!

Batch Volume: 5 U.S. gallons (18.93 L)

Original Gravity: 1.053 (13° P)

Final Gravity: Varies, but typically less than 1.008

Bitterness: 17 IBU

Color: 4 SRM

Alcohol: 5–6% by volume

MALTS

5 lb. (2.27 kg) pale malt

5 lb. (2.27 kg) wheat malt

HOPS

0.4 oz. (11 g) Magnum, 12% a.a. @ 60 min (17 IBU)

YEAST

Wyeast 3711 French Saison (primary)

Brettanomyces clausenii (secondary)

OPTIONAL

Oak chips or wooden dowel for wood-aging

BREWING NOTES

Mash at 154–157°F (68–69°C). Ferment with primary yeast strain and then inoculate with secondary microbes and wait for gravity to stabilize before bottling or kegging.

MALT EXTRACT VERSION

Substitute 7.4 lb. (3.4 kg) wheat malt extract syrup for pale and wheat malts.



FASTFERMENT™

7.9 G Conical Fermenter
Over 300 5-Star Ratings



New Accessory!
**Stainless Steel
Thermowell**



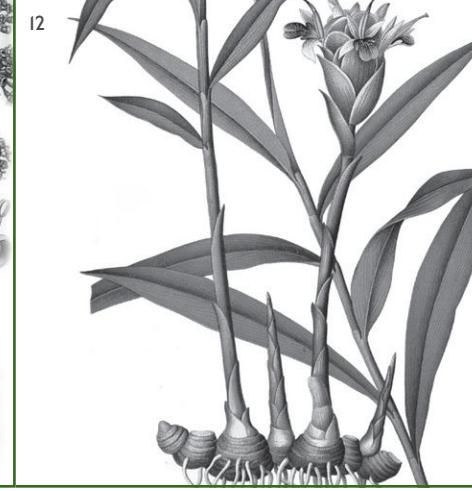
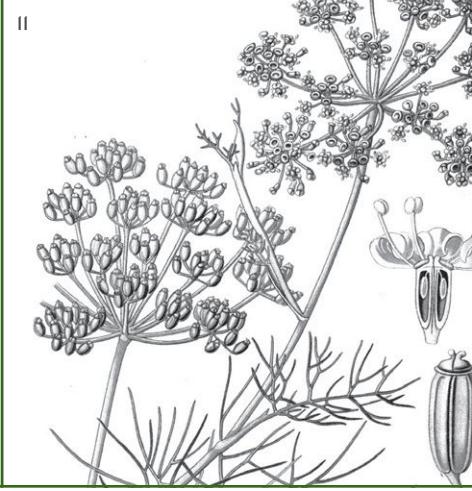
MSRP \$12.99

You Asked, We Listened
14 G FastFerment
Coming Soon!



Sign Up for
the Presale
FastBrewing.com





BREWING LOCALLY

SEEING BEER INGREDIENTS WHERE OTHERS SEE WEEDS

BY STAN HIERONYMUS

Editor's Note:

This article is adapted from Brewing Local: American-Grown Beer, by Stan Hieronymus, available from Brewers Publications.

Randy Mosher, author of *Radical Brewing* and one who's quite familiar with using unusual ingredients to make beer, had just spent several hours trading stories with the founder of Scratch Brewing in Southern Illinois. "It's amazing how they can look at a tree and see a beer," he said as our car departed the woods that surround the brewery.

A couple of months before, each of the five beers the founders of Scratch had poured at the Great American Beer Festival had been flavored with various trees' parts. They weren't the first to use tree parts in beer. After all, spruce beers date back to the Vikings, and in the eighteenth century, members of the British navy were given spruce beers to combat scurvy (although scientists have

since determined the vitamin C in spruce tips does not survive into finished beer).

In California, Brian Hunt at Moonlight Brewing has earned something of a reputation for his beers made with tree parts. "I realized that I needed to make an herbal beer that tasted like beer, to pave the way for people to make unhopped beers," he said. That beer is Working for Tips, which he has made with redwood tips every year since 2007. Hunt was aware of the history of brewing with spruce, but he had to look for other trees because spruce trees don't grow around Santa Rosa.

"My intention was not to make tree beers (he has since used different varieties of other local trees in various beers), but to make really good beer, relevant beer," he said. "I don't try to go make these beers for a novelty. I cannot stand beers that are

made for novelty. When I pick an ingredient, it's not because it's cool. It's because it provides a flavor I want."

What ingredients he might use next is less important than how he will use them. "I want to try making different combinations of things. Kind of what it is like is learning a language," he said. "What it means to be fluent. When you are learning a language, you have to think about every word. When you are fluent in a language, it flows through you. So think about redwood by itself, this herb on itself, apricot on itself, but how does it all fit?"

Part III of *Brewing Local*—which is basically a catalog of potential ingredients—is organized with such experiences in mind. Brewers have been flavoring beer with flora either cultivated or found growing in the wild for thousands of years. However



the reset button was pushed when it came to using ingredients that flunked the Reinheitsgebot, the 500-year-old German beer purity law that specified only water, malted barley, hops, and (later) yeast could be used to make beer.

Now, rather than simply consider cherries as a potential ingredient, a brewer might look at the whole tree and recognize that cherry stems provide a somewhat different cherry-like character, or that cherry-smoked malt adds a still different take on cherry flavor, as well as a becoming pink hue. Unfortunately it is also necessary to be aware the tree produces chemicals that metabolize into cyanide. Those are most concentrated in the wilted or fallen leaves.

Thus, I have created structure and signposts that categorize floral and fungal ingredients as grains, trees, plants, roots, mushrooms, and chiles. Symbols include a warning about ingredients that may contain compounds that could make a drinker sick, or worse. Other ingredients are flagged if they have a potentially harmful lookalike. The other basics included are:

- If it adds fermentables;
- If it adds flavor, including fruity, floral, umami, nutty, and more;
- If it has spicy, bitter, balancing character similar to hops;
- If it grows in the wild; and
- If it is cultivated.

Also listed are the primary parts of flora useful to a brewer. Quite often, more parts may be used as well (such as dead leaves for bittering). Prominent aroma and flavor attributes are listed, but will vary depending on when ingredients are added and the amount used.

Occasionally, other information is included, such as when plants have essential oils similar to hops. There is much research being done related to the interaction of these oils with yeast—along with hundreds of other compounds—and the unique odor compounds that may result. There is no doubt they are relevant to hop aroma, and studies have shown similar bio-transformations may result with plants.

CLEAVERS

(*Galium aparine*)

Use: Leaves, stems, seedpods

Aroma/flavor: Herbal, coffee



Rightly known as “sticky weed” because of the small hooks that cover the plant, but also as “goosegrass” because geese feast on it. It has been used medicinally for centuries, but research does not support claims cleavers might cure cancerous lumps. Cleavers are extremely high in vitamin C, but this nutrient does not survive the brewing process. The leaves and stems may be used in beer to add herbal notes, but the seedpods provide the most interesting flavor. Technically fruits, they develop from flowers on the plant into small seeds that are dispersed by hooked bristles that catch on to animals and clothing. Dried and roasted,



Get your printed or e-book copy of *Brewing Local* by Stan Hieronymus today @ BrewersPublications.com

they have been used as a coffee substitute, and they will provide the same flavors to beer. Cleavers look much like sweet woodruff, which is a dark green and has sticky hairs on its seeds. Sweet woodruff contains substances that can be poisonous in large doses.

DANDELION



(*Taraxacum officinale*)

Use: All parts

Aroma/flavor: Earthy, coffee



Although any respectable yard service will treat dandelion as a weed, some varieties are cultivated for consumption.

Victorian gentry considered them a delicacy and consumed them in salads and sandwiches. Brewers make use of all parts of the plant, including the flowers (also used in dandelion wine), the stems, and the roots, which are generally bitter. The calyx (the green “collar” around the base of the flower) is very bitter and is usually removed when using the flowers to make wine, tea, or jellies. Roasted roots can be used to make dandelion coffee. When Tobias Schock at Agrarian Ales in Oregon toasted dandelions in his oven to use in a brown porter, his daughter decided they smelled like chocolate potatoes. A soft drink made from dandelion and burdock remains popular in England.

LAVENDER



(*Lavandula angustifolia*)

Use: Flowers

Aroma/flavors: Floral, spice, cinnamon

The essential oils in lavender create a floral, fresh, sweet, herbaceous and sometimes slightly fruity aroma in beer that does not necessarily mimic the flower itself.



Overused, it can smell soapy. Although many brewers often wait until the end of the boil to add the flowers, putting them in during the boil changes the impression from perfume to cinnamon and spice.

Aroma essentials: middle notes; contains geraniol, linalool, caryophyllene, limonene, pinene.

MEADOW SWEET

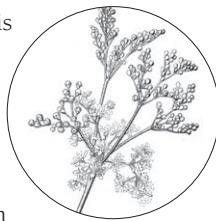


(*Filipendula ulmaria*)

Use: Flowers

Primary flavors: Wintergreen, almond

The wild flower is known both for its sweet wintergreen and almond flavors, and because it is rich in salicylic acid. Isolating that from meadow sweet led to the creation of aspirin. It was considered a sacred herb, used both in rituals and medicine, taking its name from the fact it was used to flavor mead. Archeological evidence indicates it was used to flavor beer perhaps 5,000 years ago, and all parts of the plant can be used in brewing. It is also an ingredient in a variety of spirits and adds a subtle almond note to jams. Also known as mead wort, pride of the meadow, meadow queen, and lady of the meadow. Note: A drinker who shouldn't have aspirin shouldn't have meadow sweet, either.



YARROW



(*Achillea millefolium*)

Use: Leaves, flowers

Aroma/flavor: Pine, citrus

The plant has quite a past and many names, among them nose bleed, soldier's

OUR MOTHER THE MEADOW

Recipe courtesy Right Proper Brewing, Washington, D.C.

City dwellers have access to more ingredients growing outside of gardens than they may realize. "Every vacant house has blue chicory flowers right now. There's mugwort in every lot," said Nathan Zeender. "These are the kind of beers our mixed culture is happy making," he said, talking about hopless beers, now often simply called gruits by American brewers. His affection for what grows around him is obvious. "I don't make the same connection with hops I do with trees," he said. This beer will have a small wild side when young and, if left to develop at cellar temperature after packaging, will become increasingly lean and aromatic from the Brett. By four to six months it should have an expressive "wild" character that should work well with the herbs. *Note: Many botanical ingredients, including wormwood, are toxic in high doses! Don't use more than the amounts called for below.*

Batch Volume:	5 U.S. gallons (18.9 L)	Bitterness:	0 IBU
Original Gravity:	1.037 (9.3° P)	Color:	3 SRM
Final Gravity:	1.003 (0.8° P)	Alcohol:	4.5% by volume

MALTS

- 5 lb.** (2.27 kg) Pilsner malt
- 1.5 lb.** (680 g) malted wheat
- 12 oz.** (340 g) flaked oats

BOTANICALS

- 0.7 oz.** (20g) blue vervain @ 15 min
- 0.4 oz.** (10g) wormwood @ 15 min
- 0.5 oz.** (15g) hyssop @ 5 min
- 0.5 oz.** (15g) yarrow @ 5 min
- 0.5 oz.** (15g) mugwort @ 5 min
- 1.1 oz.** (30g) heather @ 0 min

YEAST

A blend of French Saison and your favorite *Brett bruxellensis* strain should make a good team for this fermentation, using a vial of each for a 5.5-gallon batch. The French Saison strain plays well with botanicals and generally ferments out in just a few days. The Brett will be out-competed at first, but will then get to work metabolizing the more complex sugars left behind and creating some nice fruity esters.

BREWING NOTES

Single infusion mash at 155° F (68° C) for one hour with no special sparging or water treatment instructions. We want to build dextrins for the *Brettanomyces* to metabolize over time. Boil for 75 minutes. Use the vervain and wormwood leaf and stem; the yarrow, mugwort, and hyssop leaf; and the heather flower. Cool to 70° F (21° C), pitch yeast, and let free rise to the mid-80s °F (upper-20s °C).

Make sure the specific gravity is below 1.005 before packaging as the *Brettanomyces* will continue to ferment, drying out and aromatizing the beer over time. Racking a portion of the beer onto 1 to 2 pounds per gallon (230–240 g/L) of white wine grapes for 3 months would be an interesting experiment, giving it a dry vermouth feel. Keg or bottle with 2.5 volumes (5 g/L) CO₂.

EXTRACT VERSION

Omit wheat malt. Mash 1 lb. (0.45 kg) Pilsner malt with 12 oz. (340 g) of oats at 155° F (68° C) for one hour. Drain, rinse grains, and dissolve 1.25 lb. (0.57 kg) Pilsner malt extract syrup and 3 lb. (1.36 kg) wheat malt extract syrup into the wort. Top up to desired boil volume with reverse osmosis water and proceed as above.



SAN FRANCISCO HERB CO.

* Since 1973 *

Wholesale
Supplier of
Quality Spices
& Aromatic
Botanicals

800.227.4530
sfherb.com



woundwort, blood-wort, devil's nettle, bad man's plaything and, in Sweden, field hop. It grows everywhere and can become an invasive weed. It is one of the herbs most often listed as an essential ingredient in gruit ale, noted for its preservative powers and its bitterness. Brewers use the entire sweet and spicy plant for the same purposes today. It is also collected for essential oils used in aroma therapy. Although often added early in the boil to extract bitterness, an addition of flowers (which contain the essential oils) at knockout produces fruity, piney aromas.

Fragrance essentials: top notes; contains limonene, pinene.

CHANTERELLE



(*Cantharellus cibarius*)

Found almost exclusively in the wild, golden yellow to bright orange, these are easily spotted. They taste peppery and apricot-like. They can be found during summer and fall east of the Mississippi, from September to February on the West Coast, and May to June in the South. Chanterelles form symbiotic relationships with oak roots but will occasionally be found around spruce and pine.



Do not mistake them for the jack-o'-lantern mushroom, which is bright orange east of the Rocky Mountains. The jack-o'-lantern mushroom has olive shades mixed in with it where it grows in southern to central California. Jack-o'-lanterns can be found in urban settings in large clusters at the base of trees, on stumps or on buried wood. There are two primary differences between chanterelles and jack-o'-lanterns. The jack-o'-lantern has sharp, non-forking gills that descend the stalk, whereas chanterelles have blunt, gill-like ridges on the cap to the stem. When the stem of a jack-o'-lantern is peeled, the inside is orange. In chanterelles, the interior of the stem is paler than the exterior.



“When I pick an ingredient, it’s not because it’s cool. It’s because it provides a flavor I want.”

— Brian Hunt,
Moonlight Brewing Company,
Santa Rosa, CA

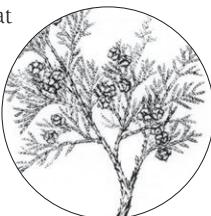
CEDAR



(*Cedrus*)

Use: Needle-like leaves

Aroma/flavor: Musk, earthy, cedar



When Brian Hunt at Moonlight Brewing make beers with parts of a tree—he's used many varieties, including incense-cedar—he thinks in terms of the role astringency plays rather than bitterness. “It's an irritant, a foil for sweetness. That's what gives you the desire to have another beer,” he said. He's also interested in maximizing the aroma, so he adds branches about 20 minutes before the end of the boil. “I wait until I smell them boil off into steam. They have been extracted into the liquid; now I am starting to lose it. Turn off the boil,” he said. His decision is not controlled by a clock. “There are many factors. What is the boil like? The difference is everything,” he said.

Stan Hieronymus is a frequent contributor to Zymurgy and the author of Brewing Local, For the Love of Hops, and Brew Like a Monk, all available from Brewers Publications.

By Amahl Turczyn

The Third Annual Lafayette Homebrew Supply Pro-Am Competition Fundraiser

For the last three years, homebrew shop Lafayette Homebrew Supply, in conjunction with local craft breweries, has organized a fundraising homebrew competition to benefit local charity the Sister Carmen Community Center. A \$25 minimum donation is required for the first entry, and the second is \$15; only two entries per person or brew team are allowed, and 100% of these entry fee proceeds go to the charity. The non-profit Sister Carmen organization has helped those in need in the East Boulder County area with food and goods for the last 30 years. The 2014 event was run with Front Range Brewing Company, and Liquid Mechanics Brewing volunteered for the 2015 competition.

Lafayette Homebrew shop owner and competition organizer George Otteni said the event changes year to year depending upon how each brewery wants to organize judging and prizes for the event. This year the competition was run with Odd13 Brewing, and the number of entries was capped at 50. Meads and ciders were not allowed, but the competition for best of show encompassed two main categories: clean barley-based beers (*saccharomyces* only), and mixed/sour/funky beers.

"Everything went well, I think," Otteni said. "We raised over \$1200 for Sister Carmen Community Center." He had a lot of praise for this year's brewery participant. Odd13 has been growing by leaps and bounds, and the competition's allowance of mixed fermentation and sour beers was definitely a nod to the host brewery's lineup of funky and



Above left to right: Odd13 staff judging the final round (Nicole Reiman, Ryan Scott, Brandon Boldt, and Eric Larson) and the BJCP judges who donated their time (Gerry Gladu, Greg Toothaker, Don Blake, and Ryan Thomas).

Below: Travis Trembly won the grand prize for clean beer with his Northeast Pale Ale.





GRAINFATHER CONNECT*

-AVAILABLE NOW-



- + ADVANCED HEAT CONTROL
- + MOBILE DEVICE REMOTE CONTROL
- + AUTOMATION - PROGRAMMABLE BREW STEPS
- + LARGE 20 LB GRAIN BILL CAPACITY
- + ELECTRIC - INDOOR & OUTDOOR USE
- + MASH, SPARGE, BOIL, COOL ALL IN ONE

**ADDED AUTOMATION WITHOUT REMOVING
THE FUN OF BREWING**

www.grainfather.com



experimental brews. "We did the judging at their new 30-barrel production brewery," Otteni continued. The brewery staff and brew crew also jumped in to help out with competition proceedings. "We had four Odd13 staff, two of which are BJCP certified judges, and we had four additional BJCP judges."

The brewery also had some incredible prizes on offer. Grand prize for best of show was nothing less than the opportunity to brew the winning beer on Odd13's new 30-barrel system with their brewing staff, with the beer going into stores for sale. It would also be entered in the 2017 Great American Beer Festival Pro-Am competition—at which Odd13 won a silver medal in 2015. Second prize was only slightly less amazing: to have the runner-up brewer brew his or her recipe on the brewery's 10-barrel system, to then go on tap at the Odd13 taproom. The grand prize winner also received a brewery t-shirt and a couple of six-packs of the winning canned beer.

Second prize came with two Lafayette Homebrew Supply 16-oz. tulip glasses, and Odd13 t-shirt and three growler fills of the runner-up beer at the taproom. Third place winners received \$25 gift cards to Lafayette Homebrew Supply, a 16-oz tulip glass, and a 32-oz growler filled with their choice of Odd13 beer.

At the awards announcement party following judging, also held at the Odd13 taproom, the lucky and highly skilled winners were announced. Dustin Swales took third place in the funky/sour category for his Sour Blonde with Cherries. Michael Frith took third place in the clean beer category for his Blueberry double IPA. Then Dustin Swales struck again with two for two on the funky side, taking 2nd place with his Dark Sour with Cherries and Oak beer, which he'll brew with Odd13 on their 10-barrel brewhouse. And finally, Travis Trembly won the grand prize for clean beer with his Northeast Pale Ale, to be brewed on Odd13's 30-barrel production brewery, then canned and sold. He'll also be allowed some creative input on the beer's label!

"BLUISH" BLUEBERRY DOUBLE IPA

Recipe courtesy of Michael Frith

Batch Volume:	5.5 U.S. gallons (20.82 L)
Original Gravity:	1.079 (19° P) before fruit addition
Final Gravity:	1.010–1.005 (2.5–1.25° P) (Blueberries may cause re-fermentation, resulting in lower final gravity)
Bitterness:	96 IBU
Color:	5.2 SRM before fruit addition
Alcohol:	9.2% by volume before fruit addition

MALTS

13 lb.	(5.9 kg) Rahr 2-row pale malt
1 lb.	(0.45 kg) flaked oats
8 oz.	(225 g) dextrin malt
8 oz.	(225 g) 20° L crystal malt
1 lb.	(0.45 kg) dextrose @ 15 min

HOPS

1 oz.	(28 g) Magnum hop pellets, 13.3% a.a., @ 60 min
2 oz.	(57 g) Citra hop pellets, 13.4% a.a., whirlpool 15 min
2 oz.	(57 g) Mosaic hop pellets, 12.3% a.a., whirlpool 15 min
2 oz.	(57 g) Nelson Sauvin hop pellets, 11.1% a.a., whirlpool 15 min
3 oz.	(85 g) Mosaic hop pellets, 12.3% a.a., dry hop 7 days
3 oz.	(85 g) Nelson Sauvin hop pellets, 11.1% a.a., dry hop 7 days

FRUIT

3 lb.	(1.36 kg) frozen organic blueberries after 7th day of fermentation
--------------	--

OTHER ADDITIONS

1 tsp.	(5 g) yeast nutrient @ 15 min
1 tab	Whirlfloc @ 15 min

YEAST

White Labs WLP001 California Ale yeast

BREWING NOTES

Mash at 148° F (64° C) for 60 minutes. Boil 60 minutes. Mash out at 168° F (76° C). After boil, remove from heat, whirlpool hops for 15 minutes, and let rest for at least 20 minutes. Chill and aerate. Ferment at 65° F (18° C) for about 1 week until fermentation stops. Raise slowly to about 72° F (22° C) and add dry hops and blueberries; hold for 1 week. Cold crash and keg or bottle.

PARTIAL-MASH VERSION

Mash 3 lb. (1.36 kg) pale malt with the oats, dextrin, and crystal malts at 150° F (66° C) for 45 minutes. Drain, rinse grains, and dissolve 7.25 lb. (3.29 kg) pale malt extract syrup completely in the resulting wort. Sparge grains with reverse osmosis water to desired boil volume and proceed as above.

Michael Frith's award-winning recipe is printed above. Readers will find Travis Trembly's best-of-show recipe by logging on to HomebrewersAssociation.org/mal7.

Amahl Turczyn is associate editor of Zymurgy.

KUDOS—BEST OF SHOW

AHA/BJCP Sanctioned Competition Program

October 2016

Ozapft Is!, 124 entries—Aaron Edrington, *Humble, TX.*

BD Oktoberfest Homebrew Competition, 7 entries—Corey Magers, *Oceanside, CA.*

Australian Amateur Brewing Championship, 361 entries—Mikko Pludra, *Victoria.*

2016 BrewUnited Challenge, 440 entries—Louis Thiery, *San Francisco, CA.*

Copa Peruana de Cervezas Artesanales, 178 entries—Alberto Reyna, *Lima, Peru.*

Winnipeg Brew Bombers Pro/Am Challenge, 359 entries—Michal Foniok, *Calgary, AB.*

Jacktoberfest, 90 entries—Shtarkbier, Daniel Lack, *Gluckstadt, MS.*

Dixie Cup XXXIII - Come and Take It, 849 entries—Kevin Foster, *Kevin Foster, TX.*

Southeast Alaska's Autumn Pour Homebrew Competition, 18 entries—Alec Venechuk, *Juneau, AK.*

Queen of Beer, 60 entries—Jaclyn Rothberg, *Clearwater, Florida.*

4th Annual O'Connor's Home Brew Competition, 92 entries—Nick Rodammer, *Grand Rapids, MI.*

The Great Quintessential Ales Competition, 28 entries—Ciaran Doyle, *Belfast, Northern Ireland.*

Columbia Trails Homebrew Competition, 58 entries—Michael Germany, *Troy, IL.*

National Organic Brewing Challenge - Homebrew Round, 71 entries—John Magliato & Jeff Matlock, *Santa Cruz, CA.*

Pride of Southside Homebrew Invitational, 8 entries—Randy Zorn.

November 2016

Fall Brew Review, 14 entries—Kevin Meintsma, *Wayzata, MN.*

Konkurs Piw Rzemieślniczych Kraft Roku 2016, 324 entries—Piotrek z Bagien Wisnia, Olbracht, Krzysztof Juszczak, *Poland.*

Competencia Amateur Cerveza Mexico 2016 (Ronda Final), 187 entries—Jugo de Piña, *San Diego, CA.*

SA National Homebrew North Round, 61 entries—Quinton Haywood, *Johannesburg, South Africa.*

California State Homebrew Competition, 336 entries—Jonathan MacDonald, *Los Altos Hills, CA.*

Autauga Creek Homebrew Competition, 11 entries—Scott Askins, *Prattville, AL.*

Oregon Brew Crew Fall Classic, 337 entries—Peter Hemmingsen, *Lewisville, TX.*

MALT Turkey Shoot XII, 143 entries—Trevor Rose, *Clarksville, MD.*

The Skirmish in the Triad, 210 entries—Joe Domm, *Charlotte, NC.*

Bayside Brewers Oktoberfest, 98 entries—Bryce van Denderen.

Music City Brew Off, 215 entries—Brian Sommers, *White House, TN.*

I Concurso de Cervejas Opa Bier, 34 entries—Lúcio Rogério Botelho, *Rio de Janeiro, Brazil.*

Monster Competition, 28 entries—Robert Kapusinski, *Austin, TX.*

Battle of the Brews, 124 entries—Michael Neville, *Dearborn, MI.*

Saveurs de Genie, 2 entries—GeniAle, Guillaume Ducasse, *Québec.*

22nd Annual Land of the Muddy Waters, 278 entries—Randy Pratt, *Waynesville, MO.*

FOAM Cup, 491 entries—Matt Conner, *Edmond, OK.*

IV NONECO, 75 entries—Frederico Fonseca, *Natal, Brazil.*

Beer for Boobs VI, 273 entries—Anthony Vaccani, *Massillon, OH.*

2016 Brew Dat Homebrew Competition, 51 entries—Keith Primeaux, *Baton Rouge, LA.*

The Bru Route Challenge, 22 entries—Joel Piazza, *Havertown, PA.*

29th Annual Southern California Regional Homebrew Competition, 314 entries—Jason Dunn, *Corona, CA.*

Op Bravo, 15 entries—James Lallande, *Hurst, TX.*

Uy Beer - Primera Copa Uruguaya Cervezas, 148 entries—Barbot BrewPub, *Colonia, Uruguay.*

Long Island Beer and Malt Enthusiast's 4th Annual, 250 entries—John Dispirito.

Forest City Beer Bout, 107 entries—Scott Morrison, *London, ON.*

Africa Brew BJCP, 13 entries—Robin Marsden, *Johannesburg, South Africa.*

Campeonato Centro de Cata de Cerveza, 80 entries—Martin Polidoro.

Black Friday Homebrew Competition, 121 entries—Chocolate Imperial Stout, Jeremiah Peterson, *London, UK.*

2nd Hebei Homebrew Competition, 43 entries—Yu Kun, *Hebei, China.*

Copa Garage UC, 112 entries—Matías Chávez, *Santiago, Chile.*

Big Spruce Home Brew Challenge, 57 entries—David Pepper, *NS.*

December 2016

Monk Melee, 42 entries—Nick Less, *Philadelphia, PA.*

I Concurso de Cervezas Caseras de El Bierzo, 21 entries—Juan Picón López, *Almería, Spain.*

CiderDays Amateur Cider Competition, 102 entries—Daniel Haykin, *Denver, CO.*

Copa Puebla Beer Fest 2016, 32 entries—Oscar Peregrina, Patrick Petterson, *Mexico.*

18th Annual Palmetto State Brewer's Open, 260 entries—David Holaday, *Summerville, SC.*

Humpy's Big Fish Homebrew Competition, 54 entries—Alec Venechuk, *Juneau, AK.*

2016 THIRSTY Classic, 143 entries—Andrew Laidlaw, *Golden Eagle, IL.*

Goddesses of beer, 45 entries—Lucia Carrillo, *Mexico City, Mexico.*

Concurso Leandro Lafferiere 4ta edición, 15 entries—Enrique Pudda, *Santa Fe, Argentina.*

Ferment. Drink. Repeat. Iron Brewer Competition, 33 entries—Luis Castro, David Jacoby, and Gordon Mauger, *Walnut Creek, CA.*

Happy Holidays Homebrew Competition, 561 entries—Michael Wilcox, *Wichita, KS.*

Concurso Casa OLEC 3 Anos, 125 entries—Lucas Alexandre da Silva/ Marcelo Morado, *Belo Horizonte, Minas Gerais, Brazil.*

Piracicaba Beer Cup 2016, 30 entries—Camilo Cazonatto, *Rio Claro SP, Brazil.*

Pennsylvania Homebrew Open Competition, 129 entries—Jordan Williams.

3er Concurso Nacional del Club de Cerveceros Caseros del Uruguay, 112 entries—Alfredo Sandoval, Montevideo, *Uruguay.*

ASH HBOY Coffee Beers, 14 entries—Darrin Umbaugh.

The 5th Master Cup China, 433 entries—Liu Zhenyu, *Taiyuan, Shanxi, China.*

Big Belgian and Barelywines, 34 entries—Mike & Stephanie Butler, *Olathe, KS.*

Belgian Strong Ale Challenge, 22 entries—Kevin Teel, *Santa Rosa, CA.*

III Concurso Estadual da Acerva Baiana, 20 entries—Osvaldo Dalben Junior, *Salvador, Brazil.*

January 2017

Troubled Monk Open Road Clone Competition, 10 entries—Amanda Scott, *Edmonton, AB.*



**AHA/BJCP SANCTIONED
COMPETITION PROGRAM CALENDAR**

For complete calendar, competition and judging information go to
HomebrewersAssociation.org/pages/competitions



March 2, 2017

Garrison Brewing Home Brew Off

Halifax, NS

Entry Deadline: 2/12/2017

March 3, 2017

Concurso HomeBrew ACCE B17

Burgos, Spain

Entry Deadline: 1/1/2017

congreso.cerveceros-caseros.com

March 4, 2017

Shamrock Open XXII

Raleigh, NC

Entry Deadline: 2/18/2017

carboyclub.com/shamrock-competition

March 4, 2017

The 18th Annual WertContest

Lethbridge, AB

Entry Deadline: 2/24/2017

March 4, 2017

2017 Peak-to-Peak ProAm

Longmont, CO

Entry Deadline: 2/24/2017

indianpeaksalers.org/index.php/mpeak-to-peak-proam

March 4, 2017

BABBLE Brew off

Gurnee, IL

brewoff.brewcomp.com

March 4/2017

Coconut Cup

Miami, FL

miami-homebrew.org/2017-coconut-cup

March 5, 2017

Ocean State Homebrew Competition

(OSHC)

Pawtucket, RI

Entry Deadline: 2/12/2017

oshc.brewcomp.com

March 10, 2017

Rocket Rod Kailua Kona Homebrew

Competition

Kailua Kona, HI

Entry Deadline: 2/26/2017

konabrewersfestival.com/schedule/auxiliary-events

March 11, 2017

March Mashness

St. Cloud, MN

Entry Deadline: 2/27/2017

cloudytownbrewers.org/competition

March 11, 2017

27th Annual Hudson Valley Homebrewers Competition

Poughkeepsie, NY

Entry Deadline: 3/5/2017

hvhb.brewcomp.com

March 11, 2017

3rd Annual Fermentationland Homebrew Competition

Richmond, ME

Entry Deadline: 3/1/2017

facebook.com/malthonhomebrewclub/?fref=ts

March 11, 2017

Spring Kick Off

Phoenix, OR

Entry Deadline: 3/9/2017

March 11, 2017

Sutter Buttes Brewer's Cup

Yuba City, CA

Entry Deadline: 2/23/2017

yubasutterbrewfest.com/brewer-s-cup.html

March 11, 2017

ISB - Harbour City Brew-Off

Sydney, NSW; AU

Entry Deadline: 2/25/2017

colbatt.wixsite.com/isbbrewcomp2017

March 11, 2017

Daegu Stout Smackdown

Daegu, Korea

Entry Deadline: 3/1/2017

March 17, 2017

AHA National Homebrew Competition

First Round - Indianapolis

Indianapolis, IN

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

March 18, 2017

Beer Week Cup

Querétaro, Mexico

Entry Deadline: 3/3/2017

facebook.com/beerweekACIQ

March 18, 2017

St Patrick's Day Homebrew Contest

Winona, MN

Entry Deadline: 3/14/2017

bluff.coop/homebrewcontest

March 18, 2017

Bozeman Brew Off

Bozeman, MT

Entry Deadline: 03/10/2017

bridgerbrewcrew.org/bozeman-brewoff-2017

March 18, 2017

Dogfish Alehouse Home Brewers Competition

Fairfax, VA

Entry Deadline: 3/5/2017

dogfishalehouse.com

March 18, 2017

Bataille des Bières

Lafayette, LA

Entry Deadline: 3/11/2017

March 18, 2017

Scorpion Homebrew Competition

Owings, MD

Entry Deadline: 3/11/2017

scorpion.brewcompetition.com

March 24, 2017

AHA National Homebrew Competition

First Round - Seattle

Tukwila, WA

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

March 24, 2017

AHA National Homebrew Competition

First Round - Tampa

Tampa, FL

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition



**AHA/BJCP SANCTIONED
COMPETITION PROGRAM CALENDAR**

For complete calendar, competition and judging information go to HomebrewersAssociation.org/pages/competitions



March 24, 2017

AHA National Homebrew Competition

First Round - New York

Brooklyn, NY

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

March 24, 2017

AHA National Homebrew Competition - St. Louis

Maryland Heights, MO

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

March 25, 2017

2017 Barrel House Z Lift Off Homebrew Competition

East Weymouth, MA

Entry Deadline: 3/18/2017

bhzmashholescomps.brewcomp.com

March 25, 2017

31st Annual Bluebonnet Brew-off

Irving, TX

Entry Deadline: 2/2/2017

bluebonnetbrewoff.org

March 25, 2017

IBD Young Members Home Brew Competition and Exhibition 2017

Edinburgh, Scotland

Entry Deadline: 3/18/2017

facebook.com/ibdhomebrewcompetitionexhibition

March 25, 2017

The Charlie Orr Memorial Chicago Cup Challenge

Crest Hill, IL

Entry Deadline: 03/10/2017

bossbeer.org/ChicagoCup

March 25, 2017

DC Homebrewers 4th Annual Cherry Blossom Competition

Washington, DC

Entry Deadline: 3/16/2017

dchbcompetition.com

March 25, 2017

California State Fair Homebrew Competition

Sacramento, CA

Entry Deadline: 2/11/2017

castatefair.beer

March 25, 2017

Wizard of Saaz X

Akron, OH

Entry Deadline: 3/4/2017

saazakron.com/wos

March 26, 2017

Los Angeles Belgian Brew Challenge

Los Angeles, CA

Entry Deadline: 3/17/2017

belgianbrewchallenge.com

March 26, 2017

Cowtown Yeast Wranglers Homebrew Roundup 2017

Calgary, AB

Entry Deadline: 3/22/2017

March 31, 2017

AHA National Homebrew Competition

First Round - San Diego

San Diego, CA

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

March 31, 2017

AHA National Homebrew Competition

First Round - Philadelphia

Montgomeryville, PA

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

March 31, 2017

IMAS Night at the Brew-seum Battle of the Brew

Mcallen, TX

Entry Deadline: 3/18/2017

brew-seum.com/category/brew-competition

April 1, 2017

World Cup of Beer

Alameda, CA

Entry Deadline: 3/9/2017

worldcupofbeer.com

April 7, 2017

AHA National Homebrew Competition

First Round - Milwaukee

Milwaukee, WI

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

April 7, 2017

AHA National Homebrew Competition

First Round - Austin

Austin, TX

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

April 8, 2017

South Shore Brewoff 2017

Mansfield, RI

Entry Deadline: 3/25/2017

southshorebrewclub.org

April 8, 2017

Between the Bluffs - Homebrew Competition

La Crosse, WI

Entry Deadline: 3/25/2017

explorelacrosse.com/bluffs-beer-wine-cheese-festival

April 8, 2017

TRASH XXVII

Oakdale, PA

Entry Deadline: 3/24/2017

trashcompetition.org



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



**AHA/BJCP SANCTIONED
COMPETITION PROGRAM CALENDAR**

For complete calendar, competition and judging information go to
HomebrewersAssociation.org/pages/competitions



April 8, 2017

25th Spirit of Free Beer Homebrew Competition

Beltsville, MD

Entry Deadline: 03/30/2017

sofb.brewcomp.com

April 8, 2017

Battle of the Brews

Santa Rosa, CA

Entry Deadline: 3/29/2017

April 17, 2017

ALES Open

Regina, SK

April 19, 2017

Great Lakes International Cider and Perry Competition (GLINTCAP)

Grand Rapids, MI

Entry Deadline: 4/7, 2017

glintcap.org

April 21, 2017

Spring Fling

Bend, OR

Entry Deadline: 4/14/2017

cohomebrewers.org

April 21, 2017

AHA National Homebrew Competition

First Round - Denver

Denver, CO

Entry Deadline: 3/8/2017

homebrewersassociation.org/national-homebrew-competition

April 21, 2017

Abierto Michoacano de Cerveza 2017

Morelia, Michoacán; MX

Entry Deadline: 4/7/2017

gastrocervecero.com/convocatoria-amc-2016

April 22, 2017

Ark-La-Tex Brewoff

Shreveport, LA

Entry Deadline: 4/1/2017

reggiebeer.com/ReggieEntry.php?CompetitionID=PDCOBL1000209

April 22, 2017

Fourteenth Annual Siciliano's Homebrew Competition

Grand Rapids, MI

Entry Deadline: 4/9/2017

reggiebeer.com

April 23, 2017

Nebraska Shootout 2017

Plattsmouth, NE

Entry Deadline: 4/21/2017

shootout.railroadersbrewclub.com

April 23, 2017

21st Annual Chico Homebrew Competition Chico, CA

Entry Deadline: 4/15/2017

chicohomebrewclub.com

April 29, 2017

Titletown Open XXIII

Green Bay, WI

Entry Deadline: 04/20/2017

titletownopenhomebrewcontest.info

April 29, 2017

Eight Seconds of Froth

Cheyenne, WY

Entry Deadline: 4/14/2017

competition.highplainsdrafters.com

April 29, 2017

San Mateo County Fair Home Brew Competition

San Mateo, CA

Entry Deadline: 3/31/2017

sanmateocountyfair.com

April 29, 2017

The Best of West Virginia Craft Beer

Lewisburg, WV

Entry Deadline: 4/7/2017

statefairofwv.com

April 29/2017

TippyBrew (And All Styles Too)

Lafayette, IN

Entry Deadline: 4/15/2017

tippyhomebrewers.org/tippybrew-2017

April 29, 2017

Upland Brewing Co. UpCup

Bloomington, IN

Entry Deadline: 4/22/2017

uplandbeer.com

April 29, 2017

First Annual Rochester Cinco de Mayo

Rochester, MN

Entry Deadline: 4/22/2017

April 29, 2017

Cascade Brewers Cup

Woodinville, WA

Entry Deadline: 4/23, 2017

cascadebrewersguild.com/competition

April 29, 2017

Bridging the Gap 2017

Davis, CA

Entry Deadline: 4/15/2017

greenbeltbrewers.org/bridgingthegap

April 30, 2017

Fraser Coast Home Brew Competition

Hervey Bay, Queensland, Australia

Entry Deadline: 4/22/2017

frasercoastbrewers.com

AMERICAN CRAFT BEER WEEK

MAY 15-21, 2017

Craft
BEER.com

SAVE THE DATE!

FIND US!



FACEBOOK.COM/
AMERICANCRAFTBEERWEEK



#ACBW

MoreBeer!
Absolutely Everything™ for Beer-Making

FAST & FREE SHIPPING

Free shipping on orders over \$59.

1 to 2 day ground shipping to 88% of U.S. residents.

WHAT'S NEW AT MOREBEER.COM



\$69.99



\$129.99



\$99.99



\$49.99



\$69.99



\$99.99

NEW! MKII High Temp Magnetic Drive Pump

NEW! The Chillout 30 Plate Heat Exchanger

NEW! MaltMuncher 2 Roller Grain Mill

NEW! Keg King Dual Gauge CO2 Regulator

NEW! MKII Temp Controller

NEW! Blichmann BeerGun™ V2

By Emily Hutto

Pro Brewers Reflect on Their Homebrewing Roots

Sam Calagione, Dogfish Head Craft Brewery

Editor's Note: Many pro brewers continue to homebrew even after years or decades of brewing commercially. *Homebrew Homecoming* is a series in which we invite the professionals to reflect upon their early days as homebrewers, offering wisdom and recipes to Zymurgy readers along the way. We hope their stories inspire you to brew eagerly and brew often.

From day one, Sam Calagione—the infamous owner of Dogfish Head Craft Brewery in Milton, Del.—has been brewing renegade recipes that explore his culinary curiosities. It's not surprising that the first recipe he ever brewed wasn't a traditional beer style.

Calagione's first homebrew began as a basic 5-gallon pale ale extract kit that he purchased from Little Shop of Hops in New York City, the only homebrew shop in the city back in 1993. "I bought the equipment and a partial-grain recipe," he remembers, and "on my way back to my apartment, a bodega was having a sale on overly ripe cherries. I bought two bundles, and when I brewed the first batch, I squeezed the cherry juice into the beer post-boil. The beer turned out great! It felt good to break the rules and add that culinary ingredient."

Within weeks of brewing that cherry pale ale, Calagione was already writing the business plan for Dogfish Head while brewing partial-grain batches in his apartment—primary fermenting in plastic, and secondary fermenting in a glass carboy. That business plan had the "stated goal of giving the finger to the Reinheitsgebot and being the first brewery to make the majority of our beers with culinary ingredients," he says proudly.

As Sam's plan took shape, he continued to experiment in his kitchen. Out of those early, small-batch days came Dogfish



Head's Chicory Stout. "I began brewing [this beer] with coffee and chicory and licorice root 22 years ago because there were no other breakfast stouts available back then that I was aware of," Calagione recounts. "Chicory Stout became one of our original recipes when we opened Dogfish in 1995."

More of Calagione's homebrew recipes to make the lineup at Dogfish Head were Punkin Ale, a brown ale with added pumpkin, sugar, and spices; Aprihop, an India pale ale with added apricot juice that's dry hopped with "irresponsible amounts" of Amarillo hops; and Immort

Ale (which used to be called Booth Bay Barleywine), an 11-percent-ABV ale made with maple syrup, juniper berries, peat-smoked barley, and vanilla. "I still remember the first feedback card on Immort Ale," Calagione laughs. "This beer tastes like trees, but it got me f***ed up!... Feel free to block out some letters in that F-bomb." (Thanks, Sam, we did.)

Immort Ale, Chicory Stout, Punkin, and Aprihop were Calagione's only recipes before going pro, he says—or the successful ones, anyway. Some of Calagione's first five-gallon experiments didn't go as well as the others. "I added too much

lavender to an early wheat beer recipe," he remembers. "The feedback was, 'this beer tastes like tongue-kissing Laura Ashley.' It may have just been a beer before it's time. There are probably online communities today that bring people together over their desire to tongue-kiss Laura Ashley."

But in all seriousness, Calagione continues, "I have learned to make teas and tinctures with specialty ingredients (especially herbs like lavender and spices) before brewing with them so I gauge their intensity and throttle their intensity with more dexterity than I once had."

In case you were wondering, neither Calagione nor Zymurgy has yet confirmed or denied the existence of those Laura Ashley-loving cybernauts, but we can safely say that Dogfish Head has influenced many online homebrew communities. Calagione's envelope-pushing recipes can be found across the web, and there's even an unofficial Dogfish Head Sub-Reddit.

"I'VE LEARNED THAT BEER COULD BE AN AWESOME CATALYST FOR PERSONAL CREATIVE EXPRESSION AND A CATALYST TO BRING FRIENDS AND LOVED ONES TOGETHER."

—Sam Calagione,
Dogfish Head Craft Brewery

and thinking of turning pro, they should read Dick Cantwell's book *The Brewers Association's Guide to Starting Your Own Brewery*, Brooklyn Brewery's *Beer School*, Ken Grossman's *Beyond the Pale*, Jim Koch's *Quench Your Own Thirst*, and my book *Brewing Up a Business*...shameless plug."

Transitioning from homebrewing to professional brewing always come with challenges, be they lavender overdoses or legal hurdles. For Dogfish Head, that legal hurdle was the minor detail that commercial brewing was not yet legal in the state of Delaware. "I didn't know this until after we were under construction," Calagione says. "I had to rush to our state capitol and quickly work on drafting a brewpub statute to make commercial brewing legal in Delaware. I remember bringing bottles of my homebrew versions of Chicory Stout and Punkin Ale to the Senate and the House to grease the wheels of government."



For all-grain versions
of Sam's recipes, visit
HomebrewersAssociation.org/mal7

DEMA-GODDESS ALE

Recipe courtesy Sam Calagione, originally published in Extreme Brewing

To make this particular recipe, you will perform high-gravity brewing. White and light beet sugars are more highly fermentable than barley sugars, so dose in small amounts of sugar during fermentation. However, using too much of these sugars can make a beer overly dry, cidery, and "hot" (boozy with no body). To reduce this effect, high quality Demerara sugar is added during the boil, as well as intermittently during fermentation to enhance body and keep the beer from getting too dry.

With big beers, high volumes of hops need to be added just to counterbalance the sweetness that is inevitably left from unfermented sugars. To fully ferment this beer, two different yeast strains and a special aerating method are used. Boiling drives nearly all of the oxygen out of the beer as it's being made, but yeast works best in an oxygen-rich environment. Aerating your beer is therefore recommended at the start of fermentation. However, with strong beers, sometimes that isn't enough.

For this beer, and all beers with a target alcohol by volume of over 12 percent ABV, it's recommended to use an aquarium air pump, hose, and aeration stone to add high levels of oxygen just before pitching the primary yeast and just before adding the secondary yeast. This extreme aeration method can give your beer undesired, oxygenated, or "cardboard" flavors if done too late in the fermentation process. But huge beers require extended periods of time to properly ferment.

For primary and secondary fermentation periods lasting six to eight weeks combined, I would not recommend this method of aeration beyond the third week of total fermentation. Because you will add sugar repeatedly during fermentation, it will be difficult to gauge the initial and final specific gravities. However, it will be important to take hydrometer readings as you add sugars during fermentation, to make sure that the yeast is still performing optimally in the alcohol-rich environment.

Batch Volume: 5 U.S. gallons (18.93 L)

Original Gravity: 1.100 (23.6° P) before post-boil
sugar additions

Final Gravity: Anybody's guess

Bitterness: 98 IBU

Color: 17 SRM

Alcohol: 14–16% by volume

Continued >

MALTS AND SUGARS

13.4 lb.	(6 kg) light malt extract syrup
OR	
11 lb.	(5 kg) dry light malt extract
8 oz.	(225 g) Cara-Munich malt
8 oz.	(225 g) Special B malt

HOPS

2 oz.	(57 g) Tomahawk hop pellets @ 60 min
2 oz.	(57 g) Chinook hop pellets @ 20 min
1 oz.	(28 g) Cascade hop pellets, dry hop on day 13

SUGAR ADDITIONS

8 oz.	(225 g) cane sugar @ 20 min
8 oz.	(225 g) Demerara sugar @ 10 min
1 oz.	(28 g) pure cane sugar, added on day 8
1 oz.	(28 g) Demerara sugar, added on day 9
1 oz.	(28 g) pure cane sugar, added on day 10
1 oz.	(28 g) Demerara sugar, added on day 11
1 oz.	(28 g) pure cane sugar, added on day 12
1 oz.	(28 g) pure cane sugar, added on day 13
1 oz.	(28 g) Demerara sugar, added on day 14
1 oz.	(28 g) pure cane sugar, added on day 15
1 oz.	(28 g) Demerara sugar, added on day 16
1 oz.	(28 g) pure cane sugar, added on day 17
5 oz.	(125 g) priming sugar for bottling

OTHER ADDITIONS

2 tsp.	(10 g) gypsum, added to steeping liquid
2 tsp.	(10 g) Irish moss @ 20 min
5 tsp.	(25 g) yeast nutrient (after cooling)

YEAST

Primary:	Wyeast 1214 Abbey Ale or White Labs WLP570 Belgian Golden Ale
Secondary:	Distiller's yeast (Day 13)
Bottling:	Champagne yeast

BREWING NOTES

Fill a grain bag with the crushed Cara-Munich and Special B barley malts. Tie off the top and place the bag in your brew kettle with 4 gallons (15 L) of cool water to which the gypsum has been added. Heat the kettle and stir the water and grain bag every 5 minutes. When the water reaches 170° F (77° C), remove the grain bag using a large stirring spoon. Hold the bag above the kettle for a minute and allow most of the liquid to drain into the pot. Do not squeeze the grain bag.

As the water begins to boil, remove from heat and add the light malt extract. Stir to prevent clumping and scorching on the bottom of the pot. Return to heat. Allow the wort to come to a boil. Boil for 5 minutes, add the Tomahawk hop pellets, and stir. Start timing your 1-hour boil when you make this first hop addition. When 20 minutes remain in the boil, add the Chinook hop pellets, 0.5 lb. (225 g) of cane sugar, and the Irish moss. Stir for 1 minute. With 10 minutes left in the boil, add 0.5 lb. (225 g) of Demerara sugar and stir for 1 minute.

When you reach the end of the 60-minute boil, turn off the heat. Stir wort clockwise for 2 minutes to create a whirlpool effect. Stop stirring, immediately place the kettle in a cold water-and-ice bath, and allow it to sit undisturbed until it reaches a temperature of 70–75° F (21–24° C). Transfer wort into a carboy. Add the yeast nutrient. Pitch primary strong ale yeast into carboy, and top up wort with water to the 5-gallon mark. Set up the aquarium pump, sanitized hose, and sanitized aeration stone, and oxygenate beer for 1 hour.

After vigorous primary fermentation slows down (around 8–10 days), the airlock will bubble less frequently. When this slowdown occurs, alternate 1-oz. (28-g) additions of pure cane sugar and Demerara sugar to the carboy every day for 5 days straight.

A few days after primary fermentation slows down, transfer your beer into another sanitized carboy. Leave behind the layer of dead yeast cells that have dropped to the bottom of the carboy as you transfer. Add the Cascade hop pellets to the beer in the new carboy and pitch your secondary super high gravity yeast (a yeast starter is a good idea). Set up your aquarium pump/hose/aerating stone unit once again and aerate the beer for 1 full hour.

Begin adding 1 ounce (28 g) alternating doses of pure cane sugar and Demerara sugar for 5 straight days. The difference here is that you begin the sugar additions the day you transfer and aerate the beer for secondary fermentation. Secondary fermentation should last 1–3 weeks. Two weeks after all fermentation activity subsides, your beer should be ready to package.

For this high-gravity beer, you need to add fresh yeast at bottling to aid with bottle conditioning. While transferring the beer to the bottling bucket, use a cup of the beer to dissolve the Champagne yeast. Add the Champagne yeast mixture to the bottling bucket and stir well. Now add the priming sugar dissolved in 1 cup (235 ml) boiling water to the bottling bucket and stir well before bottling.

In another 3 weeks your beer should be ready to drink. This is a long keeper and will mature well with age. It will be better after a year of aging, if you can wait that long.

Grease the wheels he did, so construction on Dogfish Head continued. It opened as the smallest commercial brewery in America in 1995. “I am proud to say we still do what we do today 21 years later as a

top-20 American craft brewery,” Calagione waxes. “I’ve learned that beer could be an awesome catalyst for personal creative expression and a catalyst to bring friends and loved ones together. I became an

evangelist and I am still happily handling snakes and shrieking my barbaric yawp. Only difference is I am now lucky enough to have 280-ish passionate and talented co-workers singing alongside me.”

SOUR CHERRY ALE

Recipe courtesy Sam Calagione,
originally published in Extreme Brewing
This recipe was inspired by Sam's first homebrew.

Batch Volume: 5 U.S. gallons (18.93 L)

Original Gravity: 1.053 (13° P) before post-boil sugar additions

Final Gravity: 1.018 (4.6° P)

Bitterness: 36 IBU

Color: 7 SRM before fruit addition

Alcohol: 4.6% by volume before fruit addition

MALTS

6.6 lb. (3 kg) light malt extract syrup

8 oz. (225 g) wheat malt

8 oz. (225 g) Munich malt

HOPS

1 oz. (28 g) Northern Brewer hop pellets @ 60 min

0.5 oz. (14 g) Fuggle hop pellets @ 20 min

0.5 oz. (14 g) Tettnanger hop pellets @ 10 min

FRUIT

10 lb. (4.54 kg) crushed sour red cherries

OR

7 lb. (3.2 kg) frozen cherries

OR

2 lb. (907 g) dried cherries

OTHER ADDITIONS

2 tsp. (10 g) gypsum, added to steeping liquid

1 tsp. (5 g) Irish moss @ 10 min

4 tsp. (20 g) pectic enzyme

5 oz. (125 g) priming sugar for bottling

YEAST

Wyeast 1968 ESB, White Labs WLP002 English Ale, or Safale S-04

BREWING NOTES

Fill a grain bag with the crushed grains. Tie the top and place the bag in the brew kettle with 4 gallons (15 L) of cool water and the gypsum. Heat the pot, and stir the water and grain bag every 5 minutes. When the water reaches 170° F (77° C), pull out the grain bag using a large stirring spoon. Hold the bag above the kettle for a minute, allowing most of the liquid to drain into the pot. Do not squeeze the grain bag.

As the water begins to boil, remove the pot from the heat. Add the light malt extract syrup. Stir to prevent slumping and scorching on the bottom of the pot. Return the pot to the heat. Allow the wort to come up to a boil. Boil for 3 minutes, add the Northern Brewer hop pellets, and stir. Start timing the 1-hour boil when you make this hop addition. Add the Fuggles hops 20 minutes before the end of the boil and stir for 1 minute. Add the Tettnanger hop pellets and the Irish moss 10 minutes before the end of the boil, and stir for 1 minute.

At the end of the boil, turn off the heat and let the wort cool down to below 170° F (77° C). Placing the kettle in a water bath will speed up the cooling time. Add your cherries of choice or availability. You don't want to add the fruit to boiling beer, as the high temperature will set the natural fruit pectin, which may adversely affect the taste and clarity of your beer. Stir the wort clockwise for 2 minutes as you build up a whirlpool effect. Stop stirring and allow the wort to sit for 10 minutes. Chill the wort in a cold water bath until it is below 75° F (24° C).

For the primary fermentation, a plastic bucket fermenter would be easier to use for this brew, as it will be difficult to get the cherries in and out of a carboy. To aerate, pour the wort back and forth between the plastic fermenter and your sanitized bottling bucket 4 or 5 times. Add the pectic enzyme. Pitch the yeast into the fermenter, and aerate for another minute. Top up with water to the 5-gallon mark.

After primary fermentation is over (your airlock has stopped bubbling), transfer your beer into a sanitized carboy, leaving behind all of the fruit, pits, and yeast solids that have settled to the bottom.

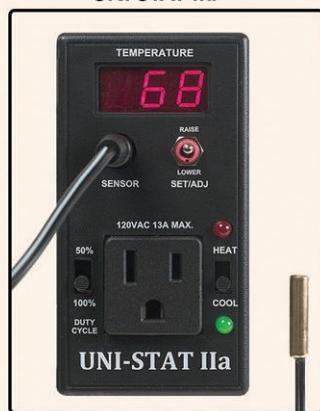
In about two weeks your beer should be ready to package. Rack your beer to a sanitized bottling bucket and leave all sediment behind in the carboy. Boil priming sugar in a cup of water and add to the racked beer. Stir gently to disperse sugar and bottle. Allow the beer to bottle-condition for another two weeks and it should be fully carbonated.

GREAT BREWING REQUIRES ACCURATE TEMPERATURE CONTROL

- Convenient switch-selectable COOL or HEAT mode
- Simple, intuitive operation; no programming required
- Unique Duty-Cycle feature for optimizing temperature stability
- 8' Plug-in replaceable sensor probe (optional bottle probe for storage)
- Adjustable from 10 – 220°F, with bright 3-digit LED display
- Load capacity @120VAC up to 13A (1500W for Heating)
- Built-in automatic temp and sensor alarms
- Produced in the USA, with 3-Year Factory Warranty

Dealer Inquiries Invited

UNI-STAT IIa



BH Enterprises • (800) 973-9707 • TempStatControls.com • Since 1984

"GIVING THE FINGER TO THE REINHEITSGEBOT."

—Sam Calagione,
Dogfish Head Craft Brewery

From humble homebrewing roots, Calagione has created an embassy. He continues trailblazing in the beer world, pursuing his culinary passions via off-centered beers, writing books about the beer industry, and offering the following advice to homebrewers: "Figure out a recipe for a beer that has never existed before, with unique ingredients and a unique process. Make it awesome and make it come to life—and it will be the liquid embodiment of yourself!"

Emily Hutto is the author of *Colorado's Top Brewers* and a contributing editor at *Craft Beer & Brewing* magazine, among many other craft beer storytelling projects. She's determined to spontaneously ferment a batch of saké in her garage in Denver, Colo. ☺

TRANSFER QUICK PUMP CONNECTOR KIT



**THE INDISPENSABLE
PUMP CONNECTOR KIT.
A MAGIC BULLET BUILT
FOR HOMEBREWING.**

NORTHERNBREWER.COM



American Homebrewers Association® 2017 Governing Committee Election

Your AHA Governing Committee representatives play a critical role in your Association. The Committee develops AHA benefits and programs, and provides direction for the organization.

PLEASE CAST YOUR VOTE TODAY!

All ballots must be submitted before midnight Pacific time, March 31, 2017

HomebrewersAssociation.org/vote

Candidates

Please read candidate statements at HomebrewersAssociation.org and cast your ballot online. For the 2017 election, there are fourteen candidates running for six open seats.



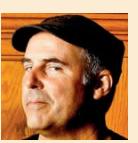
Martin Brungard



Garrett Dean



Lauren Domm



Phil Farrell



Bob Kapusinski



Jill Mariley



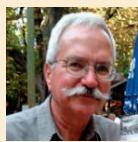
Ron Minkoff



Dennis Mitchell



Jesse Pringle



Jeff Rankert



Blair Richardson



Elmer 'Goose'
Steingass



George 'Stuart'
West



Kathy Yan Li

**HOME
BREW
CON
2017**

SAVE THE DATE!
June 15-17, 2017 • Minneapolis



Registration opens March 7
#HomebrewCon



HomebrewCon.org



COMMERCIAL CALIBRATION

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



Before there were double IPA, session IPA, white IPA, black IPA, red IPA, and Belgian IPA, there was good, old-fashioned American IPA. American IPA was, in turn, the stronger, bitterer, more hop-forward sibling of American pale ale (APA). APAs have traditionally showcased a pronounced citrusy, resinous hop character with a clean malt backbone that, while unobtrusive, isn't content to play second fiddle. Sierra Nevada's classic example continues to serve as the archetypal APA, with its signature Cascade hops atop a supportive caramel malt foundation.

But times are changing, and to meet consumers' demands for hops, hops, and more hops, brewers are blurring stylistic boundaries. Perhaps no stylistic boundary has been blurred more than that separating APA and IPA. The newest breeds push hops even further to the forefront, and those hops increasingly offer a sensory profile that is more Mai Tai than pine forest. This issue, our judges tackle two

new-school APAs that illustrate just how far the style has evolved in recent years.

Odell Brewing Company in Fort Collins, Colo. introduced Drumroll in spring 2016 as a year-round American pale ale. The brewery says, “Drumroll is an unfiltered American Pale Ale. A bold, juicy, citrus-inspired and tropically hop forward APA that looks and tastes like pineapple, orange, mango, and grapefruit. The complex fruit character is the result of the careful combination of our favorite current crop year hops with no fruit or juice addition necessary.”

Drumroll boasts 5.3 percent ABV and 43 IBUs. It's available in Arizona, Colorado, Idaho, Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, New Mexico, North Dakota, South Dakota, Texas, Wyoming, and selected locations in the British Isles.

Wyoming-based Melvin Brewing has exploded in popularity since its 2016 expansion, and the brewery's hop-bursted lineup is highly acclaimed. Hubert is the

OUR EXPERT PANEL David Houseman, a Grand Master VI level judge and competition director for the BJCP from Chester Springs, Pa.; Sandy Cockerham, a Grand Master III level judge from Indianapolis, Ind. and an associate exam director and Midwest Representative for the BJCP; Scott Bickham, a Grand Master III judge from Corning, N.Y., who has been exam director or associate exam director for the BJCP since 1995; and Gordon Strong, a Grand Master IX judge, principal author of the BJCP Style Guidelines, and president of the BJCP board who lives in Beavercreek, Ohio.



Odell Brewing Company
odellbrewing.com

Melvin Brewing Company
melvinbrewing.com

BJCP Style Guidelines
bjcp.org

Commercial Calibration Index
HomebrewersAssociation.org/pages/zymurgy/commercial-calibration

smallest in a series of hoppy American ales that also includes Melvin IPA and 2x4 DIPA. Of Hubert, Melvin says, “Most you connoisseurs would just call him an IPA, but we call him an MPA. The Melvin Pale Ale. A welcomed hand shake to your taste buds. Light, crisp, fresh and a little bitty bitter. Let's just say he won't be that jerk that leaves you at the bar at 2 a.m. He's low in alcohol. What a nice guy...that Hubert.”

Melvin's Hubert MPA (Melvin Pale Ale) is 6 percent ABV (“low in alcohol?”) and can be found in British Columbia, Colorado, Idaho, Oregon, Utah, Washington, Wyoming, and—soon, we hear—Vermont.

Are these pale ales, session IPAs, or something else altogether? Who knows? And, really, who cares? When the hops are this fresh, nomenclature is just a pesky afterthought.

THE SCORES



Drumroll—Odell Brewing Company, Fort Collins, Colo.
BJCP Category: 18B, American Pale Ale



DAVE HOUSEMAN

THE JUDGES' SCORES FOR DRUMROLL



SANDY COCKERHAM



SCOTT BICKHAM



GORDON STRONG

Aroma: Balanced, low citrus hop and grainy Pils-like malt aroma with a bit of noticeable alcohol. Fruity esters are a collage of pear, apple, orange, and mango—a regular fruit salad of pleasantness. No DMS or diacetyl. Very much as expected for an American pale ale. (10/12)

Appearance: Golden color is fine. The beer is quite cloudy, similar to a wheat beer, resulting in a darker gold presence. Beige head is thick and rocky with adequate retention. (2/3)

Flavor: Citrus hop flavor up front with moderate but dominant hop bitterness. Pils-like malt sweetness nearly balances the bitterness. Malt presence trails off quickly while the hops linger in the aftertaste. There is a bit of lingering tang in the aftertaste as well with a metallic element—not bad but a little distracting. A low alcohol flavor is neither hot nor harsh. No DMS or diacetyl. There are some fruity esters from both hops and fermentation. (15/20)

Mouthfeel: Medium body with a soft palate. Initially spritzy from the carbonation. Low alcohol warmth. Lingering bitterness in mouthfeel and aftertaste. (4/5)

Overall Impression: This is a quite drinkable beer that I sense as a session IPA rather than as an APA. The malt character is not balanced with the hop presence. Additional specialty malts, like crystal, would add malt complexity to bring this more rightfully into the APA style. Still, this is very enjoyable, especially with bar food such as onion rings, calamari, nachos, or on its own. (7/10)

Total Score: (38/50)

Aroma: Medium-high fruity hop aroma starts this one off with peach, mango, a burst of strawberry, and some indistinct tropical fruit notes. The fruitiness is followed by some moderate grassy, dank, herbal tones. Moderate bready malt character has a lightly sweet edge to it. Fermentation profile is clean—no esters—but there is a slight tart note that pops out as the beer warms. (10/12)

Appearance: Yellow-gold in color with medium-high haziness. Moderate light ivory head is finely beaded and had very good retention. (3/3)

Flavor: Hop flavor falls just a bit short of medium-high intensity and is more about the grassy, herbal aspect than is the aroma, but it does have some light tropical fruit tones, too. Medium-high bitterness intertwines with medium-low astringency to leave a dry, slightly coarse finish. Moderate maltiness comes across as a nicely rounded flavor, with bread and some grainy notes near the finish. Fermentation character is very clean, and I really don't perceive any esters. Only a trace of alcohol. (15/20)

Mouthfeel: Medium body with a medium level of carbonation. Medium-low astringency helps dry out the finish. There is very slight alcohol warming. Despite the astringency, it is lightly creamy in the mid-palate. (4/5)

Overall Impression: This is a very nice American pale ale with high drinkability due to the low perceived alcohol and the balance of the malt and hops (with a nod to the hops in the aroma, which is where they really shine). Definitely pint-able! (8/10)

Total Score: (40/50)

Aroma: Moderately high pine and citrus notes come through immediately, followed by low green-pepper notes. Light tropical fruits including melon are also part of the interesting mix. Malt is present but relegated to light grainy and cracker notes in the background. A little alcohol, but fermentation character is otherwise absent. The focus is on hops, as it should be for this style. (10/12)

Appearance: Deep gold color with a very slight haze, both appropriate for the style. It's well-conditioned, with a modest, persistent white head. (3/3)

Flavor: Malt is low, perhaps a little too subdued, contributing low levels of graininess and sweetness to the background. The hop flavor is more pronounced than in the aroma, with assertive lemon and pine notes, along with some tropical fruits that provide New World complexity. Hop bitterness is moderately high and lingers nicely into a fairly dry finish. As in the aroma, there is not much yeast character, which maintains focus on the interesting blend of hops. (15/20)

Mouthfeel: There is a nice creaminess from moderate carbonation, which helps soften low astringency that's noticeable but not harsh. Some alcohol warmth is also present at an acceptably low level. (4/5)

Overall Impression: This is a very nice example of an APA with a well-designed and complex blend of American and New World hop varieties. A little more malt backbone would lend some sweetness to accentuate the tropical fruit. Light grassy and grainy notes are acceptably low for this style. Well done and pleasant to drink! (8/10)

Total Score: (40/50)

Aroma: Moderate pine and resin hop aroma with a fresh edge, generally fairly subtle. Neutral malt and fermentation character. Not very fruity, but some light tropical fruit in background. Mostly piney and grassy, but fruitiness grows as it warms. A hint of alcohol. (8/12)

Appearance: Medium-yellow and lightly hazy. Moderate cream-colored head with large bubbles and good retention. (3/3)

Flavor: Medium bitterness with medium fruity, piney hops, some citrus, and melon. Full finish but still dry. Neutral grainy malt and neutral fermentation profile. Fresh hop taste in aftertaste with light grassiness. The balance is slightly bitter since there is such a full malt backbone. Neutral flavors, but hops are most prominent in the balance. (15/20)

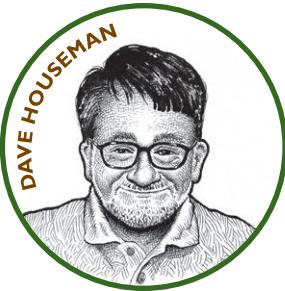
Mouthfeel: Medium-full body—seems a bit thick on the palate. Medium-high carbonation. Not astringent. Overall, has a heavy feel to it. (3/5)

Overall Impression: The body seems heavy, and the hops are a bit masked by the heaviness. A little subtle on the hops, but more than you'd expect from a subtler style like blonde ale. This beer is hoppy but has a fullness that makes it drink a bit slow. There are some citrusy and tropical notes, but they're in the background. A little less body and more late hops would improve this beer. (7/10)

Total Score: (36/50)



THE JUDGES' SCORES FOR HUBERT MPA



Aroma: Huge citrusy, orange-like aroma is very inviting. Thinly disguised malt aroma seems more Pils-like than pale ale-like but it complements the hops nicely. Moderately fruity fermentation esters. No overt alcohol, DMS, diacetyl, or other off-aromas. This beer presents more as an IPA than as an APA, but it's still a very inviting aroma. (9/12)

Appearance: Gold color, well-carbonated, and somewhat hazy with a large, dense, rocky, white head sporting very good retention. (3/3)

Flavor: High hop bitterness and citrusy hop flavor up front with moderate supporting malt sweetness. Certainly more hop-forward than malt-hops balanced, resulting in a beer that is more IPA than APA. The moderate alcohol flavor speaks to its 6-percent-ABV presence, at the high end of an APA's ABV range but sparely within IPA's. Fruity esters are moderate but overshadowed by high citrus hop flavor. No DMS or diacetyl—well crafted, just not as balanced as expected for an American pale ale. (15/20)

Mouthfeel: Medium body. A bit spritzy at first due to high carbonation that lightens the mouthfeel. A bit of alcohol warming. Not harsh or astringent, simply lingering bitterness in mouthfeel and aftertaste. (4/5)

Overall Impression: Very pleasant and highly drinkable. To judge this as an American pale ale doesn't do it justice—it's more IPA than APA. Crystal or other specialty malts to add malt character would have brought this to a more APA balance and improved its complexity from a hop bomb to a balanced APA. Still very enjoyable with jambalaya and similar spicy foods or just happy hour. (7/10)

Total Score: (38/50)

Aroma: This beer begins with a moderately high hop aroma that has resin, pineapple, tropical fruit, and light grassiness. Moderate malt lags behind a bit, presenting as biscuit and grain. Fermentation character is fairly clean, but a minor plastic, sweaty note nags in the background. I don't perceive any distinct esters—if present, they blend with the hop fruitiness. As the beer loses CO₂, hints of onion and garlic emerge. I also get an ever-so-slight note of alcohol. (9/12)

Appearance: Medium-gold in color and nearly clear, just a wee bit of haze from dry hopping. The thick, fine-bubbled, off-white head holds a long time and leaves lovely lacing on the glass. (3/3)

Flavor: Moderate biscuity malt is accompanied by sweet, candy-like notes. Moderate hop flavor packs a tropical, resinous punch. Medium-high bitterness is fairly smooth but has medium-low grassy astringency in the dry finish. The tropical fruit lingers on the palate enticingly. Malt is barely high enough keep this mostly balanced, but it is tilted towards the hops. (15/20)

Mouthfeel: Medium-bodied with medium-high carbonation. Light astringency helps to dry this one out. Just a low note of alcohol warmth. Elevated CO₂ creates a bit of creaminess as the bubbles burst on the tongue. (4/5)

Overall Impression: This APA acts like it wants to be an IPA. The malt presence tries to keep it in check but barely succeeds. With aggressive bitterness and a near off-balance finish, I'm unsure I'd make it to that second pint. Still, despite personal tastes, this is a well-crafted ale that is enjoyable to drink. (7/10)

Total Score: (38/50)

Aroma: Medium grainy maltiness and light caramel notes give way to moderate earthy, citrusy hops. A little grassiness in the background and a hint of isovaleric acid. Balance is to the hops, but there's enough malt for support. Citrus becomes tangerine and pineapple as it warms. Fermentation character is neutral, with very low pear esters and a hint of ethanol. (10/12)

Appearance: Medium-gold color with a white, tightly-beaded head that lasts. There is slight haze, but that is not uncommon in a well-hopped beer. (3/3)

Flavor: This is a well-balanced beer that leans towards hops in accordance to style. The malt is pleasant, with light bready and grainy notes, plus background caramel sweetness. Moderate hop flavor is earthy and underpinned by citrus and lemongrass. Appropriately high bitterness cuts the sweetness and lingers in a dry, refreshing finish. Fermentation character is low.

The grassy notes are a little too prominent, but it's still a pleasant beer to quaff. (15/20)

Mouthfeel: Moderately high CO₂ lends creaminess, and a little alcohol warmth lingers after swallowing. Some husky notes leave light astringency and a chalky sensation after swallowing. (3/5)

Overall Impression: This is a well-crafted American pale ale with a clear focus on the hops, but enough malt to keep it from being one-dimensional. It seems a bit strong for a session beer, but it's a flavorful pale ale that doesn't attempt to stray into IPA territory. Grassy, husky notes are a little high, but this is only a minor distraction in an excellent beer. (7/10)

Total Score: (38/50)

Aroma: Moderately strong citrus and pine hop aroma with a fresh, dry-hop character. Complex mix of hops is moderately fruity, with stone fruit and light tropical notes. Neutral grainy malt way in the background gives a light impression of sweetness. Clean, neutral fermentation character, nothing off. (11/12)

Appearance: Medium-yellow color. Light haze, unfiltered. Effervescent. Moderate-sized frothy white head with fair retention. (3/3)

Flavor: Neutral grainy-sweet malt up front, but immediately overcome with hops. Medium-high bitterness. Strong hop flavor with citrus, grapefruit, pine, melon, and apricot flavors. Mild grassiness. Finishes hoppy with supporting malt. Mostly dry, with a hint of malt sweetness. Definitely balanced to the bittering hop, but there's enough malt to make it an APA. (17/20)

Mouthfeel: Fluffy mouthfeel, high carbonation. Medium body. Lightly creamy-smooth, hints of hop-based astringency. Barest hint of warmth. (4/5)

Overall Impression: On the big side for a pale ale but not so bitter as to suggest an IPA (or session IPA). Complex and balanced hop characteristics provide quite a bit of interest. Has a dry hop freshness and seems clean overall. The mouthfeel is rather full, but it still drinks well. The carbonation seems to lighten the body. There's a fair amount of alcohol, but it's well-hidden. (8/10)

Total Score: (43/50)



Your source for homebrew supplies

To list here and on HomebrewersAssociation.org, call 303.447.0816 ext. 178 or email steve@brewersassociation.org.

Alabama

Werner's Trading Co.
1115 4th St SW
Cullman, AL 35055-3329
(800) 965-8796
rob@wernerstradingco.com
wernerstradingco.com
Come visit a unique store.

The Wine Smith

6800A Moffett Rd, US Hwy 98
Mobile, AL 36618
(251) 645-5554
Winesmith@bellsouth.net
thewinesmith.biz
Brewing ingredients and equipment from "no boil" to "all grain." Serving central gulf coast brewers since 2001.

Arizona

Brew Your Own Brew (Gilbert)
525 E Baseline Rd Ste 108
Gilbert, AZ 85233-1225
(480) 497-0011
gilbertstore@brewyourownbrew.com
brewyourownbrew.com
Southwest's largest homebrew supply stores. Supplies for beer, wine, sodas, liquor, and cheesemaking. Where the art of homebrewing starts.

What Ales Ya Homebrew
6363 W Bell Rd Ste 2
Glendale, AZ 85308-3639
(623) 486-8016
way2brew@mindspring.com
whatalesya.com

Brew Your Own Brew (Scottsdale)

8230 E Raintree Dr Ste 103
Scottsdale, AZ 85260-2565
(480) 625-4200
scottsdale@brewyourownbrew.com
brewyourownbrew.com
Southwest's largest homebrew supply stores. Supplies for beer, wine, sodas, liquor, and cheesemaking. Where the art of homebrewing starts.

Brewers Connection

1425 E University Dr # B-103
Tempe, AZ 85281-8412
(480) 449-3720
azhomebrewing@brewersconnection.com
brewersconnection.com
The valley's full service fermentation station. Open 7 days a week!

Brew Your Own Brew (Tucson)

2564 N Campbell Ave Ste 106
Tucson, AZ 85719-3363
(888) 322-5049
info@brewyourownbrew.com
brewyourownbrew.com
Where the art of homebrewing starts.

Arkansas

Steve's Brew Shop
455 E Township St.
Fayetteville, AR 72703
(479) 587-1440
stevesbrewshop@gmail.com
facebook.com/pg/stevesbrewshop
Steve's Brew Shop offers the quality ingredients, equipment, and educational resources for beer, wine, mead, cider, and cheese to the home enthusiast in Northwest Arkansas.

Fermentables Homebrew and Winemakers Supply

3915 Crutcher St
North Little Rock, AR 72118-4278
(501) 758-6261
mike@fermentables.com
fermentables.com
Fermentables offers an extensive line of beer-, wine-, and cheesemaking supplies.

California

O'Hara Brew House Supply

1478 Grass Valley Hwy
Auburn, CA 95603
(916) 402-4227
patrick@brewhousesupply.com
brewhousesupply.com

A welcome greeting, followed by our helpful customer service will make your adventure here one that you'll always want to come back to.

Fermentation Solutions

2507 Winchester Blvd
Campbell, CA 95008-5311
(408) 871-1400
contact1@fermentationsolutions.com
fermentationsolutions.com
Full line of ingredients and equipment for small scale production of beer, wine, cider, mead, vinegar, cheese, and more!

MoreBeer! & MoreWine!

995 Detroit Ave Unit G
Concord, CA 94518
(925) 939-2337
concord@morebeer.com
morebeer.com

Huge selection of homebrewing and winemaking supplies with stores in Concord, Los Altos, San Leandro, and Riverside, CA

Hi-Time Wine Cellars

250 Ogle St
Costa Mesa, CA 92627-3808
(800) 331-3005
info@hitimewine.net
hitimewine.net
Hi-Time carries 1,000-plus beers (craft beers & imports; kegs, bottles, cans), proper stemware, and a vast selection of wine, spirits, and cigars.

Windsor Homebrew Supply Co

743 W. Baker Suite D
Costa Mesa, CA 92626
(714) 668-9850
info@windsorhomebrewsupply.com
windsorhomebrewsupply.com
Modern homebrew shop focusing on community and friendly expertise. Certified draft specialist on hand for all things kegging. Great prices, classes, and good times all around.

HopTech Homebrewing Supplies

6398 Dougherty Rd Ste 7
Dublin, CA 94568-2645
(800) DRY-HOPS
orders@hoptech.com
hoptech.com
We make, live, and travel for beer! We have more than 60 grains and 60 hops. Dry & liquid extract. Dry & liquid yeast.

Sierra Moonshine Homebrew

12535 Loma Rica Dr # 3
Grass Valley, CA 95945-9069
(530) 274-9227
sierramoondshine@sbcglobal.net
sierramoondshine.com
Daily initiating the eager do-it-yourselfer into humanity's ancient craft of homebrewing alchemy!

Bear Valley Hydroponics & Homebrew

17455 Bear Valley Rd
Hesperia, CA 92345-1813
(760) 949-3400
info@bvhydro.com
bvhydro.com

O'Shea Brewing Company

28142 Camino Capistrano Ste 107
Laguna Niguel, CA 92677-1105
(949) 364-4440
jeff@osheabrewing.com
osheabrewing.com
Southern California's largest and oldest homebrew shop. We also carry hundreds of hard-to-find bottled beers from around the world.

Stein Fillers

4160 Norse Way
Long Beach, CA 90808-1533
(562) 425-0588
brew@steinfillers.com
steinfillers.com

Your complete homebrew store, serving the community since 1994. Home of the Long Beach Homebrewers.

Unrestricted Brewing

24002 Via Fabricate #5020
Mission Viejo, CA 92691
(949) 305-1904
jim@unrestrictedbrewing.com

unrestrictedbrewing.com
For all your homebrewing needs.
Unleash your homebrew!

Monrovia Homebrew Shop

1945 South Myrtle Ave
Monrovia, CA 91016
(626) 531-0825
Monrovia.homebrew@gmail.com
monroviahomebrewshop.com
For your brewing needs. We carry a large selection of beer, wine, and cider supplies. Imported and domestic grains, hops, and yeast. CO₂ Refills

Napa Fermentation Supplies

575 3rd St Ste A
Napa, CA 94559-2701
(707) 255-6372
napafermentation@aol.com
napafermentation.com
Serving all of your homebrew needs since 1983!

Tavern Service Company

18228 Parthenia St
Northridge, CA 91325-3391
(818) 349-0287
info@tavernservice.com
tavernservice.com
Complete range of homebrew supplies & equipment. Keg beer, draft beer, and coffee supplies for over 30 years.

J&M Brewing Supplies

101 Roblar Dr Ste C
Novato, CA 94949-6138
(415) 883 7300
info@jmbrew.com
jmbrew.com
We can meet all your fermentation needs. Best selection of beer-, cheese-, and winemaking supplies. Open weekdays 10-7 and weekends 10-5. Open Sundays!

Hydrobrew

1319 S Coast Hwy
Oceanside, CA 92054-5121
(760) 966-1885
info@hydrobrew.com
hydrobrew.com
North County San Diego's oldest homebrew shop and still the best! Top-notch customer service, knowledgeable advice, and prices that can't be beat.

Homebrew Mart

5401 Linda Vista Road, Suite 406
San Diego, CA 92110
(619) 295-2337
invoices@ballastpoint.com
homebrewmart.com

Doc's Cellar

855 Capitolio Way Ste 2
San Luis Obispo, CA 93401-7175
(805) 781-9974
email@docscellar.com
docscellar.com

Seven Bridges Organic Homebrew Supply

325 River St Ste A
Santa Cruz, CA 95060-2733
(800) 768-4409



Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru App!



7bridges@breworganic.com
breworganic.com
The only all-organic brew supply shop in the world! A full-service online and in-store shop for all your fermentation needs.

Beverage People, The
1845 Piner Rd Ste D
Santa Rosa, CA 95403-1911
(707) 544-2520
bevpeo@sonic.net
thebeveragepeople.com
Teaching homebrewing in California's wine country for over 30 years, we pride ourselves on depth and breadth of our stock. Also full lines for cheesemaking and winemaking.

Beer Designs
5574 Everglades St Suite D
Ventura, CA 93003
(805) 308-2337
sales@beeravenue.com
beeravenue.com
Bringing your ideas to life by creating custom beer tap handles for home, office, or restaurant use! A selection of homebrewing supplies also available.

Beer Belly Fermentation Supply
371A Windsor River Rd
Windsor, CA 95492-9528
(707) 837-5750
info@beerbellybrewingsupplies.com
beerbellybrewingfermentation.com
Beer Belly Fermentation Supply store located in Sonoma County, where great beer is always brewing. The BIGGER the belly, the BETTER the brew.

Colorado
The Brew Hut
15120 E Hampden Ave
Aurora, CO 80014-3906
(303) 680-8898
brewmaster@thebrewhut.com
thebrewhut.com
Colorado's largest homebrew shop is expanding! The Brew Hut will soon offer educational classes and a larger supply of beer, wine, mead, cheese and soda supplies

Boulder Fermentation Supply
2510 47th St Ste I
Boulder, CO 80301-2301
(303) 578-0041
fermentationsupply@gmail.com
boulderfermentationsupply.com
Open 7 days! Unique selection of ingredients and equipment, including local Colorado products. Also offering classes for all skill levels, custom fabrication, kegerators, and more!

McGuckin Hardware
2525 Arapahoe Ave Unit D1
Boulder, CO 80302-6795
(303) 443-1822
info@mcguckin.com
McGuckin.com
Located in Boulder, Colorado since 1955, McGuckin Hardware has more than 200,000 items in 18 departments covering 60,000 square feet. We are "Colorado's Favorite Everything Store."

Castle Rock Homebrew Supply
1043 Park St
Castle Rock, CO 80109-1585
(303) 660-2275
eric@castlerockhomebrew.com
castlerockhomebrew.com
Open 7 days a week! Outstanding selection of brewing, winemaking, draft, and cheese supplies. Friendly and knowledgeable staff.

Altitude Brewing & Supply
2801 Walnut St Unit C
Denver, CO 80205-2235
(303) 292-2739
wigginton@bajaventures.com
altitudebrew.com
Come in for all your brewing needs or to brew on-site with our equipment and learn from our knowledgeable staff. Centrally located in Denver's RiNo district.

CO-Brew
1133 Broadway
Denver, CO 80203
(720) 485-4959
jamie@cobrewdenver.com
cobrewdenver.com
Beer and wine supplies, equipment, learn-to-brew, events, and brewery. Centrally located near downtown at 11th & Broadway. Experience a new way to brew!

Hops & Berries
1833 E Harmony Rd Unit 16
(directly Behind The Cinemark Theatre)
Fort Collins, CO 80528-3414
(970) 493-2484, x802
manager@hopsandberries.com
hopsandberries.com
Northern Colorado's homebrewing and winemaking supply shop! Also check out our cheesemaking kits, hot sauces, and coffee roasting supplies.

Mulberry MAX Beer/Wine/ Spirits
460 S. College Ave., Suite G
Fort Collins, CO 80524
(970) 484-8795
info@mulberrymax.com
mulberrymax.com
Everything you need to brew great beer and an incredible selection of craft beers to quaff while you brew! Open late seven days a week.

Lil' Ole Winemaker
516 Main St
Grand Junction, CO 81501-2608
(970) 242-3754
lilolewinemaker1@gmail.com
Serving Colorado and Utah brewers Since 1978.

Lafayette Homebrew Supply
400 W South Boulder Rd Ste 2500
Lafayette, CO 80026-2724
(720) 484-5756
george@lafayettehomebrew.com
lafayettehomebrew.com
Ever-expanding inventory of supplies and ingredients for making beer, wine, mead, cider, and cheese. CO₂ and kegging supplies. Classes. Open 7 days.

Tom's Brew Shop
883 Parfet St Ste J
Lakewood, CO 80215-5548
(303) 232-5347
kegs@tomsbrewshop.com
tomsbrewshop.com
Lakewood and Denver's choice keg, equipment, bottling & ingredient supplier. Online prices without shipping cost. AHA & club discounts. Open Mon-Fri 9-6, Sat 9-2.

Quirky Homebrew Supply
425 W 115th Ave Ste 6
Northglenn, CO 80234-4700
(303) 457-3555
quirky@quirkyhomebrew.com
quirkyhomebrew.com
Beer, wine, soda, cider, everything homebrew. Featuring 220+ grains, 100+ wine kits, bulk pricing. Walk-in cooler! 407+ hops, 6 liquid yeast companies and more!

Connecticut
Stomp N Crush
140 Killingworth Turnpike (Rt 81)
Clinton, CT 06413
(860) 552-4634
info@stompcrush.com
stompcrush.com
Carrying a full line of beer supplies, offering knowledgeable service, well stocked, and friendly atmosphere. 20+ years of brewing experience! Now selling cigars too!

Beer & Wine Makers Warehouse
290 Murphy Rd
Hartford, CT 06114-2107
(860) 247-2969
info@bwmwct.com
bwmwct.com
Full line of beer-, wine-, and cheesemaking supplies and equipment. Specializing in kegging setups and custom beer recipes. Beginner and advanced beer classes offered.

Maltose Express
246 Main St
Monroe, CT 06468-1171
(203) 452-7332
info@maltoseexpress.net
maltoseexpress.net
Connecticut's largest homebrew & winemaking supply store, owned by the authors of Clonebrews & Beer Captured. Buy pre-made kits for all 500 plus recipes in Szamatulski's books.

Delaware
Xtreme Brewing Supplies
11307 Trussum Pond Rd
Laurel, DE 19956-4520
(877) 556-9433
contact@xtremebrewing.com
xtremebrewing.com
Southern Delaware's oldest, largest store for homebrewers, winemakers, and distillers. Don't know how? See website for class schedule. Now offering coffees, teas, and cheesemaking supplies.

Xtreme Brewing Supplies
24608 Wiley Branch Rd
Millsboro, DE 19966-3537
(302) 934-8588
contact@xtremebrewing.com
xtremebrewing.com
The original Delmarva homebrew store helping brewers start brewing and stay brewing for almost 20 years.

Florida
HiFi Homebrew & BBQ Supply
1650 N Hercules Ave, Unit I
Clearwater, FL 33765
(727) 240-0804
info@hifihomebrewandbbq.com
hifihomebrewandbbq.com
The Suncoast's only homebrew store where you can brew on premises. Check out our classes and custom kits formulated by our owner, a Siebel Certified professional.

VetterBrew HomeBrew Supply
2705 Cypress Drive
Clearwater, FL 33763
(727) 330-3825
info@vetterbrew.com
vetterbrew.com
Pinellas County's newest complete homebrew supply store. Located in the Clearwater-Countryside-Dunedin area. We carry all your beer- and winemaking supplies and equipment.

Hangar 41 Winery & Brew Shop (Time To Make Wine, Inc.)
10970 S Cleveland Ave Ste 304
Fort Myers, FL 33907-2350
(239) 542-WINE (9463)
sandy@timetomakewine.com
timetomakewine.com
On-premises winery with a great selection of equipment and ingredients for home beer- and winemakers! Friendly and knowledgeable staff!

Brock's Homebrew Supply
7025 Industrial Road Unit A
Melbourne, FL 32904
(321) 473-3846
customerservice@brockshomebrew.com
BrocksHomebrew.com
Next-day delivery on all Florida orders. Retail store open 7 days a week. Code BREWFL for 10% off your first web order.

Orlando Homebrew Supplies
2230 Curry Ford Rd
Orlando, FL 32806
(407) 730-1850
orlandohomebrewsupplies@gmail.com
orlandohomebrewsupplies.com
Orlando Homebrew Supplies is your one-stop shop for all your homebrewing and winemaking needs. We carry a wide variety of equipment and ingredients. Cheers!



AHA MEMBER SHOPS

Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru App!



Gary's Homebrew Supply

3403 Gulf Beach Hwy
Pensacola, FL 32507-2721
(850) 723-2739
garyshomebrew@gmail.com
garysbrew.com
Open Monday thru Friday: 11AM to 5PM and Saturday: 10AM to 3PM.
5% off purchases for AHA members.

The Homebrew Store

1422 S Narcoossee Rd
Saint Cloud, FL 34771-7210
(407) 957-BEER
bacjet@aol.com
thehomebrewstorefl.com
We carry a wide variety of equipment and ingredients for beer-, wine- & cider making; reference books; fresh local honey; kegging supplies; Fever Tree products; and a wide variety of craft-brewed beer. We also offer one-to-one wine-, beer-, and cidermaking instruction.

Sanford Homebrew Shop

115 S Magnolia Ave
Sanford, FL 32771-1319
(407) 732-6931
sanfordhbs@gmail.com
sanfordhomebrewshop.com
Fresh ingredients & great advice!
Supplying everything for making beer, wine, cider, mead, cheese, and fermented foods at home. Check our website for class and workshop calendar.

Georgia

Brew Depot Home of Beer Necessities

10595 Old Alabama Rd.
Connector Ste 10
Alpharetta, GA 30022
(877) 450-BEER
beernec@aol.com
BeerNecessities.com
Georgia's largest brewing supply store! Providing supplies for all your wine & beer needs. Custom bar design/draft dispensing systems. Award-winning brewer & vintner on staff! Check out the class schedule online!

HopCity Beer and Wine

1000 Marietta St NW Ste 302
Atlanta, GA 30318-0685
(404) 350-9998
info@hopcitybeer.com
Carrying a full lineup of homebrew equipment and ingredients, wine, and the largest selection of beer in the Southeast.

Gravity Craft & Homebrew Supply

1136 Dogwood Dr SE Ste A
Conyers, GA 30012-5453
info@gravityhomebrew.com
gravityhomebrew.com
Your one-stop shop for wine & beer brewing supplies and genuine craft beer from around the world. You never had a hobby until now!

Operation Homebrew

1142 Athens Hwy
Suite 105
Grayson, GA 30017
(770) 638-8383
hq@operationhomebrew.com
operationhomebrew.com
Georgia's premier homebrew supply store. Operation Homebrew. No brew left behind. Veteran owned and operated. Est. 1994

Illinois

Brew & Grow (Bolingbrook)
181 W Crossroads Pkwy Ste A
Bolingbrook, IL 60440-3692
(630) 771-1410
website@brewandgrow.com
brewandgrow.com/brew
Show any current homebrew club membership card and get 10% off your brewing supplies.

Brew & Grow (Chicago - North)

3625 N Kedzie Ave
Chicago, IL 60618-4513
(773) 463-7430
website@brewandgrow.com
brewandgrow.com/brew/
Show any current homebrew club membership card and get 10% off your brewing supplies.

Chicagoland Winemakers

689 W North Ave
Elmhurst, IL 60126-2132
(630) 834-0507
info@chicagolandwinemakers.com
chicagolandwinemakers.com
Offering a complete selection of wine- and beermaking supplies and equipment.

Perfect Brewing Supply

619 E Park Ave
Libertyville, IL 60048-2904
(847) 816-7055
info@perfectbrewingsupply.com
perfectbrewsupply.com
We have an excellent selection of equipment and ingredients for beer, wine, cider, and more. Remember, great friends bring homebrew.

What's Brewing? Supply

335 W Northwest Hwy
Palatine, IL 60067-2414
(847) 359-2739
Info@WhatsBrewingSupply.com
WhatsBrewingSupply.com
We have the freshest home beer- and winemaking ingredients as well as all your equipment needs. CO₂ refills! 10% AHA member ingredient discount.

Chicago Brew Werks

14903 S Center St Unit 107
Plainfield, IL 60544-2177
(815) 531-5557
brews@chicagobrewwerks.com
chicagobrewwerks.com
Huge selection of grain, hops, and yeast! Show your homebrew club or AHA membership card for 10% off brewing ingredients!

Brew & Grow (Rockford)

3224 S Alpine Rd
Rockford, IL 61109-2603
(815) 874-5700
website@brewandgrow.com
brewandgrow.com/brew
Show any current homebrew club membership card and get 10% off your brewing supplies.

Brew & Grow (Roselle)

359 W Irving Park Rd Ste E
Roselle, IL 60172-1124
(630) 894-4885
website@brewandgrow.com
brewandgrow.com/brew
Show any current homebrew club membership card and get 10% off your brewing supplies.

Winchester Brewing Co.

131 Market St.
Willow Springs, IL 60480
(708) 365-9465
info@winchesterbrewco.com
winchesterbrewco.com
Come by for your homebrew supplies, or visit our taproom for a taste. We open early on Saturday for the weekend brewers out there.

Indiana

Great Fermentations West
7900 E US Highway 36 Ste D
NW Corner of US36 & Dan Jones Avon, IN 46123-7791
(317) 268-6776
info@greatfermentations.com
greatfermentations.com
A friendly neighborhood shop with a full line of fresh ingredients and equipment on the west side of Indianapolis. Brewers serving brewers.

Quality Wine and Ale Supply

530 E Lexington Ave Ste 115
Elkhart, IN 46516-3579
(574) 295-9975
info@Homebrewit.com
homebrewit.com
Beermaking supplies, winemaking supplies and cheesemaking supplies. Retail store located at 108 S Elkhart Ave, Elkhart, Indiana.

Great Fermentations

5127 E 65th St.
Indianapolis, IN 46220-4816
(317) 257-9463
info@greatfermentations.com
greatfermentations.com
Indiana's largest selection of FRESH ingredients! Extensive line of brewing and draft equipment. Beginning and advanced classes in our education center. Largest inventory of Blichmann replacement parts. Brewers serving brewers.

For You Brewing Supplies

1727 S. 7th St.
Terre Haute, IN 47802
(812) 244-2779
questions@
foryoubrewingsupplies.com
foryoubrewingsupplies.com
The Wabash Valley's only store dedicated to homebrewing and winemaking.

Iowa

Bluff Street Brew Haus

372 Bluff St
Dubuque, IA 52001-6920
(563) 582-5420
jerry@bluffbrewhaus.com
bluffbrewhaus.com
Proudly serving the Tri-State area since 2006 with a complete line of beer- and winemaking supplies.

Buck Creek Hops

206 E Main Street
Solon, IA 52333
(319) 331-3198
buckcreekhopsllc@gmail.com
buckcreekhops.com
Our 100+ acre family-owned hops farm is located near Iowa City, Iowa. We feature a state-of-the-art processing & packaging facility on site, with a large Wolfe harvester & Buskirk pellet mill for quality hops!

Beer Crazy

3908 NW Urbandale Dr. / 100th St.
Urbandale, IA 50322-7922
(515) 331-0587
info@beercrazy.com
beercrazy.com
Specialty beers by the bottle and a full line of beer- and winemaking supplies.

Kansas

Brew Bros Hops and Sprockets
1110 Laramie St.
Manhattan, KS 66502
(785) 537-3737
brewbroshs@gmail.com
facebook.com/
brewbroshopsandsprockets
We're your local homebrewing supply and bicycle repair emporium! Homebrewing supplies and bike repair? We DID know we couldn't do that.

Homebrew Pro Shoppe

2061 E Santa Fe St
Olathe, KS 66062-1608
(913) 768-1090
charlie@HomebrewProShoppe.com
HomebrewProShoppe.com
For all your brewing equipment and supply needs!

Bacchus and Barleycorn Ltd

6633 Nieman Rd
Shawnee, KS 66203-3329
(913) 962-2501
alberta@bacchus-barleycorn.com
bacchus-barleycorn.com
Fast, friendly, personalized service since 1968. Full line of fresh ingredients for home beer-, wine-, mead-, cider-, and cheesemakers. Your home fermentation specialists.

All Grain Brewing Specialists LLC

1235 NW 39th St
Topeka, KS 66618-1179
(785) 230-2145
info@allgrainbrewing.biz
allgrainbrewing.biz
As a new homebrew store, we have to try harder to get you what you want when you want it. Give us a try!



Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru App!



AHA MEMBER SHOPS

Kentucky

Lexington Beerworks

213 N Limestone
Lexington, KY 40507-1014
(859) 359-6747

homebrew@lexingtonbeerworks.com
kentuckyhomebrew.com
Visit the best and most experienced homebrew supply shop in the Bluegrass while enjoying artisanal pizza and great craft beer from our bar and restaurant.

Winemakers & Beermakers Supply Co.

9475 Westport Rd Ste 301
Louisville, KY 40241-2318
(502) 425-1692
winemakers@earthlink.net
winebeersupply.com
Complete beermaking and winemaking supplies. Premium malt from Briess, Muntons, and Avangard. Superior grade of wine juices. Family-owned store since 1972.

Louisiana

LA Homebrew

7987 Pecue Ln Ste #7-G
Baton Rouge, LA 70809-5195
(225) 773-9128
info@lahomebrew.com
lahomebrew.com
More than 120 types of brewing grains sold by the ounce or pound. Liquid and dry yeasts. Order online for in-store pickup or same-day shipping.

Brewstock Homebrewing Supplies

3800 Dryades St
New Orleans, LA 70115-5336
(504) 208-2788
kyle@brewstock.com
brewstock.com
Louisiana's largest homebrew selection in the heart of the Crescent City. Beer, wine, cheese, coffee, and more. Online ordering available.

Maryland

AleCraft Brewing Supply

140A North Bond Street
Bel Air, MD 21014-3704
(410) 420-5102
estreett@alecraftbrewing.com
alecraftbrewing.com
Free and private brewing classes available. Stop in for your beer, wine, and cheese ingredients and more!

Maryland Homebrew

6770 Oak Hall Ln Ste 108
Columbia, MD 21045-4768
(888) BREW-NOW
chrisanderson@mdhb.com
mdhb.com
For all your beer, winemaking, fermenting, and cheesemaking needs. Free shipping! AHA discounts!

Flying Barrel

1781 N Market St
Frederick, MD 21701-4305
(301) 663-4491
info@flyingbarrel.com
flyingbarrel.com

Supply shop and brew-on-premises. Large selection of ingredients, equipment, and supplies for homebrew, winemaking, and more.

Massachusetts

Boston Homebrew Supply

1378 Beacon St.
Brookline, MA 02446
(617) 879-9550
info@bostonhomebrewsupply.com
bostonhomebrewsupply.com
High-quality ingredients, supplies, and customer service.

Modern Homebrew Emporium

2304 Massachusetts Ave
Cambridge, MA 02140-1812
(617) 498-0400
mhe@beerbrew.com
www.beerbrew.com
Plenty of hops, 60+ grains, herbs and spices, kegging equipment, wine, cheesemaking, more. Open 7 days a week, staffed by brewers and winemakers. Visit us: M-W 10-7; Th & F 10-8; Sa 9-7; Su 10-6.

Independent Fermentations Supply

127 Camelot Dr.
Plymouth, MA 02360
(508) 746-2515
indiefermsupply@gmail.com
facebook.com/indiefermsupply
Plymouth's stop for homebrewing ingredients & supplies. We also carry a variety of items to fulfill your winemaking, cheesemaking, and other fermentation needs.

West Boylston Homebrew Emporium

45 Sterling St Ste 9
West Boylston, MA 01583-1268
(508) 835-3374
wbhe@beerbrew.com
www.beerbrew.com
Plenty of hops, 50+ grains, herbs and spices, a wide selection of kegging equipment, more. Open 7 days a week, staffed by brewers and winemakers.

South Shore Homebrew Emporium

58 Randolph St
Weymouth, MA 02190-1506
(781) 340-2739
SSHE@beerbrew.com
www.beerbrew.com
Huge store of hops, 60+ grains, herbs, spices, kegging, winemaking, cheesemaking equipment, more. Staffed by brewers and winemakers. M-W 11-6; Th, F 11-7; Sa 10-6; Su 12-5.

Michigan

Gravel Bottom Craft Brewery & Supply

418 Ada Dr SE
Ada, MI 49301-9105
(206) 403-8563
home.brewing@gmail.com
gravelbottom.com
Six frequently changing taps showcase different styles, including

recipes by homebrewers. Classes with a fully stocked homebrew shop provide everything to brew your own.

Adventures In Homebrewing

6071 Jackson Rd
Ann Arbor, MI 48103
(313) 277-2739
hops@homebrewing.org
Michigan's largest selection of homebrew supplies. Serving homebrewers since 1999.

Adventures In Homebrewing

23869 Van Born Rd
Taylor, MI 48180-1226
(313) 277-2739
homebrew@homebrewing.org
Michigan's largest selection of homebrew supplies. Serving homebrewers since 1999.

Minnesota

Duluth Homebrew Supply

600 East Superior St.
Duluth, MN 55802
(218) 464-0060
info@duluthhomebrew.com
duluthhomebrew.com
Locally owned and operated, Duluth Homebrew Supply provides the Northland's largest inventory of equipment and ingredients for beer, wine, cider, kombucha, and cheese. Classes available!

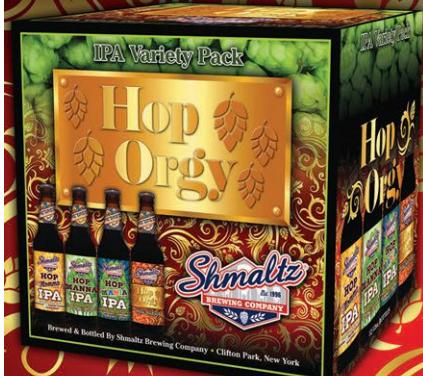
Midwest Supplies

5825 Excelsior Blvd
Minneapolis, MN 55416-5371
(952) 925-9854
service@midwestsupplies.com
midwestsupplies.com
Everything you need to make beer, wine, cheese, and coffee with an extensive selection of hydroponics paired with unmatched service at an affordable price.

NEW IPA VARIETY 12-PACK

Hop Orgy

Because 3-ways are for wine drinkers.



Includes:

HOP MANNA IPA

HOP MOMMA IPA

HOP MANIA IMPERIAL IPA

NEW! HOP ORGY IPA

ShmaltzBrewing.com • [f](https://www.facebook.com/ShmaltzBrewing) [@](https://www.twitter.com/ShmaltzBrewing) [i](https://www.instagram.com/ShmaltzBrewing) [y](https://www.youtube.com/ShmaltzBrewing) ShmaltzBrewing



AHA MEMBER SHOPS

Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru App!



Northern Brewer, LLC

6021 Lyndale Ave S
Minneapolis, MN 55419-2224
(651) 291-8849
info@northernbrewer.com
northernbrewer.com

Serving the Twin Cities and the nation since 1993. Stop in and chat with our staff of award-winning brewers, meadmakers, and BJCP certified judges.

The Hop Shop

3415 W. Division St. Suite 142A
Saint Cloud, MN 56301
(320) 774-1175
desihall@thehopshopbrew.com
thehopshopbrew.com
The Hop Shop beer-, wine-, cider-, and meadmaking supply. Facebook @ thehopshopbrew

Northern Brewer, LLC

1150 Grand Ave
Saint Paul, MN 55105-2628
(651) 223-6114
info@northernbrewer.com
northernbrewer.com

Serving the Twin Cities and the nation since 1993. Stop in and chat with our staff of award-winning brewers, meadmakers, and BJCP certified judges.

Brew and Grow- MN

8302 Highway 65 NE
Spring Lake Park, MN 55432-1311
(763) 780-8191
info@brewngrow.com
brewNgrow.com
Minnesota's best beer brewing supply store, giving superb customer service with inventory to please all levels of brewers. BrewNGrow is individually owned and operated.

Missouri

St. Louis Wine and Beer Making
231 Lamp and Lantern Vlg
Chesterfield, MO 63017-8209
(636) 230-8277
info@wineandbeermaking.com
wineandbeermaking.com
The complete source for beer-, wine- and meadmakers!

Missouri Malt Supply

2275 Cassens Dr Ste 130
Fenton, MO 63026-2574
(314) 779-6258
kent@momalt.com
momalt.com
Supermarket to the small-scale brewer. Fresh ingredients and quality brewing equipment at reasonable prices. Friendly service and expert advice.

Grains & Taps

10 SW 3rd Street
Lees Summit, MO 64063-2329
(816) 866-5827
info@grainsandtaps.com
grainsandtaps.com

Grains & Taps. Your home for homebrewing supplies. Lee's Summit, Missouri.

Design2Brew

9995 Winghaven Blvd
O Fallon, MO 63368-3623
(636) 265-0751
sdrilling@design2brew.com
design2brew.com
Eastern Missouri's largest selection of FRESH ingredients! Extensive line of brewing and draft equipment. Beginning and advanced classes in our education center. Brewers serving brewers.

Homebrewery (MO), The

1967 W Boat St
Ozark, MO 65721-6614
(417) 581-0963
brewery@homebrewery.com
homebrewery.com
Since 1984 The Homebrewery has been providing our customers with excellent customer service, selection, and prices. Everything you need for homebrewing, winemaking, cheesemaking, and more!

Montana

Rock Hand Hardware
2414 N Montana Ave
Helena, MT 59601-0899
(406) 442-7770
rockhandhardware@aol.com
rockhandacehardware.com

Nebraska

Patriot Homebrew Supply
2929 N 204th St # 107
Elkhorn, NE 68022-1201
(402) 515-1365
patriothomebrew@gmail.com
patriothomebrewsupply.com
Live free and brew! We provide high-quality ingredients, equipment, and services, including hands-on shopping, classes, social events, and demonstrations. Locally and veteran-owned.

Kirk's Brew

1150 Cornhusker Hwy
Lincoln, NE 68521-2336
(402) 476-7414
kirk@kirksbrew.com
kirksbrew.com
Serving beer- and winemakers since 1993!

Cornhusker Beverage

8510 K St
Omaha, NE 68127-1697
(402) 331-5404
info@cornhuskerbeverage.com
cornhuskerbeverage.com
Fast, friendly, family owned business for 5 generations. We know how to homebrew!

Fermenters Supply

and Equipment
8410 K Plaza, Suite #10
84th & J Sts,
BEHIND Just Good Meat
Omaha, NE 68127-1634
(402) 593-9171

contact@fermentersupply.com

fermentersupply.com
Since 1971, fresh beer- & winemaking supplies. Six different starter kits. We ship! Located at 84th & J sts, BEHIND Just Good Meat.

Nevada

BrewChatter
1275 Kleppe Ln Ste 21
Sparks, NV 89431-7200
(775) 358-0477
customerservice@brewchatter.com
brewchatter.com
Specializing in homebrewing ingredients, equipment, and craft beer! Come brew with us! Growler fills in store. Order online or come into the store! Brew!

New Hampshire

A&G Homebrew Supply
175 High St
Portsmouth, NH 03801-3777
(603) 767-8235
alex@aghomedbrewsupply.com
aghomedbrewsupply.com
Quality supplies for beer-, wine-, cheesemaking and more! Friendly service, CO₂ exchanges. Classes. Craft beer T-shirts, kegging, and gift items. Affiliated nanobrewery and pub in building.

Kettle To Keg

123 Main St
Suncook, NH 03275-1203
(603) 485-2054
info@kettletokeg.com
kettletokeg.com
New Hampshire's largest selection of homebrewing and winemaking supplies and equipment. Conveniently located between Concord and Manchester. Classes available.

New Jersey

Brewers Apprentice
865 State Route 33 Ste 4
Freehold, NJ 07728-8475
(732) 863-9411
Store@brewapp.com
brewapp.com
Specializing in customized recipes with the ingredients and quantities you want!

Love2Brew

1583 Livingston Ave Ste 2
North Brunswick, NJ 08902-1833
(732) 658-3550
l2b001@love2brew.com
love2brew.com
New Jersey's #1 homebrew supply: largest selection, best prices, friendly and knowledgeable staff. Open 7 days a week. Everything you need from beginners to advanced!

Love2Brew

27 E 33rd St Ste 2
Paterson, NJ 07514-1300
(201) 773-3678
l2b002@love2brew.com
love2brew.com
New Jersey's #1 homebrew supply: largest selection, best prices, friendly

and knowledgeable staff. Open 7 days a week. Everything you need from beginners to advanced!

New Mexico

Southwest Grape & Grain
2801 Eubank Blvd NE Ste N
Albuquerque, NM 87112-1300
(505) 332-BREW (2739)
southwestgrapeandgrain@gmail.com
southwestgrapeandgrain.com
New Mexico's largest homebrewing and winemaking store. Open 7 days a week, 10am to 6pm. Sundays Noon to 5pm. Soda making, cheesemaking, and kegging supplies too.

New York

Homebrews & Handgrenades
2378 Grand Ave
Baldwin, NY 11510-3111
(516) 223-9300
pete@brewgrenades.com
brewgrenades.com
We provide a friendly, approachable environment where homebrewers can purchase what they need to make great beer. Make the best beer you'll ever drink!

Bitter & Esters

700 Washington Ave
Brooklyn, NY 11238-2265
(917) 596-7261
contact@bitterandesters.com
bitterandesters.com

Brewshop At Cornell's Hardware

310 White Plains Rd
Eastchester, NY 10709-2802
(914) 961-2400
brewshop@cornells.com
brewshop.com
Westchester's complete home beer- and winemaking supply shop, located in Cornell's True Value Hardware. Easy to get to from the Tri-State area.

Pantano's Wine Grapes & Homebrew

249 Rte. 32 South
New Paltz, NY 12561
(845) 255-5201
pantanowineandbeer@yahoo.com
pantanosbeerwine.com
We carry a full line of wine-, beer-, and cidermaking equipment and supplies for all your needs. Wine kits in stock all year-round. Beer kits, hops, yeast, grains & malts at your convenience! We now carry distilling equipment.

Westchester Homebrew Emporium

550 North Ave
(914) 637-2337
nrhe@beerbrew.com
www.beerbrew.com
Plenty of hops, 50+ grains, herbs and spices, kegging, winemaking, cheesemaking equipment, more. Open 7 days a week, staffed by experienced brewers and winemakers.

Mistucky Creek Homebrew Inc.
682 County Rte 1
Pine Island, NY 10969
(845) 988-4677
info@mistuckycreek.com
mistuckycreek.com
All your homebrew & winemaking supplies under one roof.

Barley Hops and Grapes
16 E. Market Street
Red Hook, NY 12571
(845) 758-3378
info@barleyhopsandgrapes.com
barleyhopsandgrapes.com
We have a full line of homebrewing supplies for the beginner, advanced brewer, and professionals. Wine kits, too! Kegging and tapping equipment and repair parts.

Homebrew Emporium
470 N Greenbush Rd
(518) 283-7094
HENY@beerbrew.com
www.beerbrew.com
Huge store of hops, 60+ grains, herbs, spices, kegging, winemaking, cheesemaking equipment, more. Staffed by brewers and winemakers. M-W 11-6; Th, F 11-7; Sa 10-6; Su 12-5.

Talmage Farm Agway
1122 Osborn Ave
Riverhead, NY 11901-5207
(631) 727-3100
agway@talmagefarm.com
talmagefarm.com
East End's new source for homebrewing and winemaking supplies, as well as other "homesteading" items: beekeeping, poultry, canning, and gardening.

Saratoga Zymurgist
112 Excelsior Ave
Saratoga Springs, NY 12866-8550
(518) 580-9785
szymurgist@gmail.com
saratogaz.com
Let us be your guide into the world of zymurgy. Reaching the Adirondack Park, Capital District, Southern Vermont, and beyond! Great online store.

Brew It!
346 Route 202
Somers, NY 10589-3207
(914) 617-8399
bewitstore@gmail.com
Complete homebrew supply shop with all the equipment, ingredients, and instruction you need, from getting started to milling your own grain.

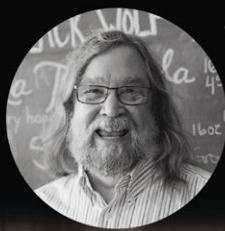
Niagara Tradition Homebrewing
1296 Sheridan Dr
Tonawanda, NY 14217-1208
(716) 877-8767
ntbrew@localnet.com
nthomebrew.com
Shipping daily from the region's largest in-stock inventory of beer, mead, cider, wine, and cheese. Convenient and secure online shopping. Knowledgeable staff.

PicoBrew

picobrew.com

Zymatic®

Quality. Repeatability. Precision.
Automation. Batch after Batch.



"The Zymatic is an incredible piece of technology that makes homebrewing simple, easy, and fun."

- Denny Conn
Co-author of *Homebrew All-Stars*



Get the world brewing your recipes!

Earn money from your recipes by selling them world-wide on BrewMarketplace. For more info visit:
www.picobrew.com/Pico/DevelopersProgram





AHA MEMBER SHOPS

Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru App!



North Carolina

Asheville Brewers Supply

712 Merrimon Ave Ste B
Asheville, NC 28804-2450
(828) 285-0515
avlbrewersupply@gmail.com
ashevillebrewers.com
The South's finest. Since 1994.
Stocking the best in malts, hops,
and yeast. Also carrying supplies for
mead, cider, sake, and kegging!

Bull City Homebrew

1906 E Nc Highway 54 Ste 200B
Durham, NC 27713-5298
(919) 682-0300
info@bulicityhomebrew.com
bullicityhomebrew.com
Beer- and winemaking equipment
and supplies.

Homecrafted

101 Tradition Trail
Holly Springs, NC 27540
(919) 372-8082
support@homecraftednc.com
homecraftednc.com
Homebrew and winemaking
ingredients and equipment. Soon to
be NC's only brew-on-premises and
on-site fermentation.

Atlantic Brew Supply

3709 Neil St
Raleigh, NC 27607-5415
(919) 670-4043
info@atlanticbrewsupply.com
atlanticbrewsupply.com
Atlantic Brew Supply is a one-stop
shop for all things homebrew, both
online and in-store. We're proud
to be the largest brew shop in the
Southeast!

Anastasia's Ales

428 Hazelwood Ave
Waynesville, NC 28726
(828) 246-9320
info@anastasiasonsales.com
anastasiasonsales.com

Ohio

Grape and Granary

915 Home Ave
Akron, OH 44310-4100
(330) 633-7223
info@grapeandgranary.com
grapeandgranary.com
Wide selection of supplies. Extract
and all-grain kits. Secure online
ordering. Fast shipping.

The Vine N Hop Shop

1327 N. Carpenter Rd.
Brunswick, OH 44212
(330) 623-6940
store@vinenhop.com
vinenhop.com
Winemaking, kegging, and cheese
supplies. Friendly and knowledgeable
staff. AHA member discounts
available.

Winemakers Shop

3517 N High St
Columbus, OH 43214-4042
(614) 263-1744
contact@winemakersshop.com
winemakersshop.com
Since 1974, we have been supplying
homebrewers and wine makers
in Columbus the supplies and
ingredients to make amazing craft
drinks.

HBYOB "Homebrew Your Own Beer"

123 N. Springboro Pike
Dayton, OH 45449
(937) 404-BREW
sales@hbyob.com
hbyob.com
The place to get everything you need
to homebrew your own beer, cider,
and wine.

Miami Valley BrewTensils

2617 S Smithville Rd
Dayton, OH 45420-2641
(937) 252-4724
chad@schwartzbeer.com
brewtensils.com

The PumpHouse Homebrew Shop

336 Elm St
Struthers, OH 44471-1837
(330) 755-3642
pumphouse@excite.com
pumphousehomebrew.com
Beer & winemaking equipment &
ingredients, classes, demos, local
brew club & taste nights.

Haynes Lubricants

24142 Detroit Rd
Westlake, OH 44145-1515
(440) 871-2188
sales@haynesmfg.com
haynesmfg.com
Haynes is the leading manufacturer
of premium food-grade lubricants.
Haynes lubricants can safely be
used on pump/valve assemblies,
o-rings, gaskets, kegs, and bottling
equipment.

Oklahoma

Learn To Brew- Oklahoma City

14300 N. Lincoln Blvd.
Suite 102
Edmond, OK 73013
(405) 286-9505
info@learntobrew.com
learntobrew.com
Learn To Brew is run by a
professionally trained brewer and
offers a complete line of beer, wine,
and draft dispense products and
equipment and also offers beer and
wine classes for all levels.

Learn to Brew

2307 S. I35 Frontage Rd
Moore, OK 73160
(405) 793-2337
info@learntobrew.com
learntobrew.com
Learn To Brew is run by a
professionally trained brewer and
offers a complete line of beer, wine,

and draft dispense products and
equipment and also offers beer and
wine classes for all levels.

High Gravity

7142 S Memorial Dr
Tulsa, OK 74133-2962
(918) 461-2605
store@highgravitybrew.com
highgravitybrew.com
Simple. On purpose. Brew electric.
\$7.99 Flat-rate shipping on most
items.

Oregon

Home Fermenter

123 Monroe St Ste A
Eugene, OR 97402-5077
(541) 485-6238
info@homefermenter.com
homefermenter.com
Providing equipment, supplies,
and advice to homebrewers and
winemakers for over 30 years.

The Hoppy Brewer

328 N Main Ave
Gresham, OR 97030-7210
(503) 328-8474
thehoppybrewer@gmail.com
oregonhoppyplace.com
Homebrew supplies, bottle shop,
brewery, and taproom, with outdoor
seating located in downtown
Gresham.

The Homebrew Exchange

6550 N Interstate Ave
Portland, OR 97217-4836
(503) 286-0343
info@homebrewexchange.net
homebrewexchange.net
DIY store of North Portland. We carry
supplies and ingredients for making
beer, wine, mead, soda, and cheese.
Also full line of canning supplies.
Check out our online store.

Salem Brew Supply

2250 Judson St. SE
Salem, OR 97302
(971) 701-4991
salembrewsupply@gmail.com
salembrewsupply.com

Pennsylvania

Keystone Homebrew Supply -

Bethlehem
128 E 3rd St
Bethlehem, PA 18015-1306
(610) 997-0911
infobeth@keystonehomebrew.com
keystonehomebrew.com
New location with expanded product
selection and services for your beer-
& winemaking needs.

Voelcker's Homebrew and Wine Supplies

346-352 Ferry St
Danville, PA 17821
(570) 275-2337
voelckerbeverage.com

Vite E Vino

124 E 1st Ave
Derry, PA 15627
(724) 309-9601

info@viteevino.com

viteevino.com

The Laurel Highlands one-stop
shop for all your homebrewing and
winemaking needs. Free milling.

Simply Homebrew

2 Honeyhole Rd
Drums, PA 18222-2510
(570) 788-2311
info@simplyhomebrew.com
simplyhomebrew.com

Wine, Barley & Hops

Homebrew Supply
248 Bustleton Pike
Feasterville Trevose, PA 19053-7820
(215) 322-4780
info@winebarleyandhops.com
winebarleyandhops.com
Your source for premium beer-, wine-
, mead- & cidermaking supplies, plus
knowledgeable advice. Complete line
of kegging equipment. Like us on
Facebook.

Fancy Camper LLC

Homebrew Supply
490 Lancaster Ave, Ste 16
Frazer, PA 19355
(610) 647-7200
info@fancycamperhomebrew.com
fancycamperhomebrew.com
Supplying quality homebrewing
ingredients, equipment, and support
for all brewing levels.

Keggle Brewing

Glenshaw, PA 15116-3117
(412) 443-8295
info@kegglebrewing.com
kegglebrewing.com
Your source for Cornelius kegs,
keggle, draft kits, and equipment.

Windsor Distributing Inc.

800 S 4th St
Hamburg, PA 19526-9205
(610) 562-2472
windsorinfo@windsordist.com
windsordist.com
Beer- and winemaking equipment,
books, and ingredients. Happy to
special order. Also have a large
selection of craft, imported, and
domestic beer for inspiration!

Hamlin Distributors

590 Hamlin Hwy
Hamlin, PA 18427
(570) 689-2891
hamlindistributors@gmail.com
hamlindistributors.com
Your homebrew HQ! Beer-, wine-
, and cidermaking supplies and
equipment. Grains milled at no
charge. Kegging supplies and parts.

Lancaster Homebrew

1920 Lincoln Hwy E Ste B
Lancaster, PA 17602-3327
(717) 517-8785
info@lancasterhomebrew.com
lancasterhomebrew.com
Lancaster Homebrew - Beer- and
winemaking supplies, 1920 Lincoln
Hwy E Ste. B



Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru App!

AHA MEMBER SHOPS



Keystone Homebrew Supply - Montgomeryville
435 Doylestown Rd.
Montgomeryville, PA 18936-9602
(215) 855-0100
info@keystonehomebrew.com
keystonehomebrew.com
Where winning brewers find quality ingredients and expert advice!

Philly Homebrew Outlet
1447 N American St
Philadelphia, PA 19122-3820
(215) 755-4556
info@phillyhomebrew.com
phillyhomebrew.com
Redefining Homebrew! Philly Homebrew Outlet specializes in Beer, Wine, Cheesemaking, Kegging and Bar Equipment for Homebrewers and Professionals alike with only the best customer service.

Philly Homebrew Outlet West
1314 S. 47th St.
Philadelphia, PA 19143
info@phillyhomebrew.com
phillyhomebrew.com
Redefining homebrew! Philly Homebrew Outlet specializes in beer, wine, cheesemaking, kegging and bar equipment for homebrewers and professionals alike with only the best customer service.

Weak Knee Homebrew Supply
1277 N Charlotte St
Pottstown, PA 19464-1902
(610) 327-1450
weakkneehomebrew@gmail.com
weakkneehomebrew.com
Wine, beer, cider, and mead ingredients & supplies; grapes and juices seasonally; instruction, Wine Club, Beer Club and our unique tasting bar.

The Grain Bill
623 Lombard Road
Red Lion, PA 17356
(717) 501-4741
sjporr@thegrainbill.comcastbiz.net
thegrainbill.net
Beer-, wine, cider, and meadmaking ingredients, equipment, and supplies. Engaging and knowledgeable staff. Home to the SJPorr Challenge Worldwide Homebrew Competition.

Bailee's Homebrew & Wine Supplies
3605 E. Market St.
York, PA 17402-2202
(717) 755-7599
info@baileeshomebrew.com
baileeshomebrew.com
Fully stocked homebrewing and winemaking supply store. We have beer and wine kits, ingredients, books, classes, and friendly expert advice!

Tennessee
The Grog
2060 STE 4 Ft Campbell Blvd
Clarksville, TN 37042
(931) 221-2818
thegroghomebrew@gmail.com
thegroghomebrew.com
The Grog homebrewing beer, wine, and sundry store. Supporting those who serve! 2060 FT Campbell BLVD, Clarksville, TN 37042, thegroghomebrew.com

Mid-South Malts Inc.
741 N White Station Rd
Memphis, TN 38122-4423
(901) 682-1293
midsouthmalts@bellsouth.net
[memphisbrews.com/](http://memphisbrews.com)
Full-service shop with beer, wine, and distilling supplies. As you brew, so shall you drink.

All Seasons Gardening & Brewing Supply
924 8th Ave S
Nashville, TN 37203-4720
(615) 214-5465
hydroplant@earthlink.net
allseasonsnashville.com
Large selection of homebrewing and winemaking supplies. Visit our store or shop online.

Texas
Austin Homebrew Supply
9129 Metric Blvd
Austin, TX 78758-5992
(512) 467-8427
info@austinhomebrew.com
AustinHomebrew.com
Make your own beer, wine, and cheese. America's favorite homebrew store since 1991. We're here for you!

SoCo Homebrew
4930 S Congress Ave Ste 307
Austin, TX 78745-2374
info@socohomebrew.com
socohomebrew.com
Your South Austin store for beer-, wine-, and cheesemaking supplies. Check us out on Facebook at facebook.com/SoCoHomebrew

Dallas Homebrew
1500 N Interstate 35e Ste 116
Carrollton, TX 75006-3880
(866) 417-1114
brian@finewinevines.com
DallasHomeBrew.com
Largest homebrew store in North Texas!

SHOW YOUR BREW COLORS

HomebrewersAssociation.org/store





AHA MEMBER SHOPS

Quickly find your local homebrew shop and see what discounts they offer with the FREE Bew Guru App!



Kegconnection.com

1800 Ede Pkwy
Comanche, TX 76442-2069

(512) 749-7713

info@kegconnection.com
kegconnection.com

Kegconnection.com specializes in homebrew draft beer equipment and homebrew supplies. We believe in fanatical customer service and high-quality products.

Baron's Brewwerks

1103 Dallas Dr.
Denton, TX 76205
(940) 381-5300
dennis@baronsbrewsupply.com

baronsbrewsupply.com
Your North Texas source for homebrew and winemaking supplies and equipment. Come by or visit us online today!

Stubby's Texas Brewing Inc.

5200 Airport Fwy Ste B
Haltom City, TX 76117-5926
(682) 647-1267
info@texasbrewinginc.com
txbrewing.com
Your fully stocked homebrew supply store. Great selection, great service. Same-day, flat-rate shipping, \$7.95.

Black Hawk Brewing Supply

582 E Central Texas Expy
Harker Heights, TX 76548-5606
(254) 393-0491

blackhawkbrewing@hotmail.com
blackhawkbrewing.com

Large selection of supplies and equipment for homebrewing, wine, cheese, mead, and cidermaking. Serving the greater Fort Hood area. Check us out on Facebook: facebook.com/BlackHawkBrewingSupply

DeFalcos Home Wine and Beer Supplies

16532 Sea Lark Rd.
Houston, TX 77062
(281) 486-1141
andy@defalcos.com
defalcos.com

Providing the best wine & beer supplies & equipment since 1971!

DeFalcos Home Wine and Beer Supplies

9223 Stella Link Rd
Houston, TX 77025-3902
(800) 216-2739
sales@defalcos.com
defalcos.com

Providing the best wine- & beermaking supplies & equipment since 1971!

Yellow House Canyon Brew Works - General Store

601 University Ave
Lubbock, TX 79401-2206
(806) 744-1917
brewer@yhcbrewworks.com
yhcbrewworks.com
Serving the South Plains with a large stock of ingredients and brewing supplies, including kegging and draft supplies. Check out our competitive prices in-store.

Homebrew Headquarters

300 N Coit Rd Ste 134
Richardson, TX 75080-6240
(972) 234-4411
brewmaster@homebrewhq.com
homebrewhq.com
Proudly serving the Dallas Metroplex for over 30 years!

All About Brew- Beer & Wine Homebrewing Supplies

1410 E Hwy 90A
Suite 300
Richmond, TX 77406
(832) 363-3133
info@allaboutbrew.com
allaboutbrew.com
All About Brew- Beer & Wine Homebrewing Supplies

Utah

Salt City Brew Supply
723 E Ft Union Blvd
Midvale, UT 84047-2347
(801) 849-0955
sales@saltcitybrewsupply.com
saltcitybrewsupply.com

Ogden City Brew Supply

2269 Grant Ave
Ogden, UT 84401
(385) 238-4995
info@ogdencitybrewsupply.com
ogdencitybrewsupply.com

The Beer Nut Inc

1200 S State St
Salt Lake City, UT 84111-4535
(801) 531-8182
sales@beernut.com
beernut.com

The Beer Nut, Inc. is committed to helping you brew the best beer possible.

Vermont

1st Republic Homebrew Shop
39 River Rd., Suite 6
Essex Junction, VT 05452
(802) 857-5318
shawn.trout@1streplicabrewingco.com
1streplicabrewingco.com
Vermont's best homebrew shop. Located in Essex Junction, VT. Stop in or order online.

LET'S RALLY!



FEBRUARY 25 Oskar Blues Brewery • Austin, TX

FEBRUARY 26 Saint Arnold Brewing Co. • Houston, TX

APRIL 29 Upland Brewing Company • Bloomington, IN

- Rallies are super fun celebrations of the homebrewing community hosted at breweries 'round the country.
- Enjoy tours, samples, swag, prizes and camaraderie!
- FREE to AHA members; non-members can join at the door at a discounted rate.



JOIN US!

HomebrewersAssociation.org

American Homebrewers Association®

BIG BREW

SATURDAY, MAY 6, 2017

Register your event on HomebrewersAssociation.org



Quickly find your local homebrew shop and see what discounts they offer with the FREE Brew Guru App!

AHA MEMBER SHOPS



Virginia

MyLocal Homebrew Shop
6201 Leesburg Pike Ste 3
Falls Church, VA 22044-2200
(703) 241-3874
info@mylhbs.com

Largest selection of ingredients and equipment in Virginia, all conveniently located just inside the Beltway. Check out our unique, rotating beer Kit-of-the-Month!

Brew LoCo

19382 Diamond Lake Dr
Leesburg, VA 20176-6574
brewloco@gmail.com
BrewLoCo.com
Indie coffee shop with full homebrew supply store located opposite Lansdowne Town Center green in the heart of Loudoun County. Homebrew club meetings, growler fills, brew classes, BOP & more!

Artisans Wine & Homebrew

13829 Village Place Dr
Midlothian, VA 23114-3503
(804) 379-1110
info@artisanswineandhomebrew.com
artisanswineandhomebrew.com
Located one mile east of Rte. 288 in Midlothian. Convenient to all of Central Virginia. Offering everything to make beer, wine, cheese, and soda.

Brew & Bottle LLC

304 Oyster Point Rd
Newport News, VA 23602-6902
(757) 881-9100
info@brewandbottlellc.com
brewandbottlellc.com
Complete line of beer- and winemaking equipment and ingredients with help when you need it. We are proud to be "Making Homebrewing Better."

Southern Hills Homebrew Supply

5342 Franklin Rd SW
Roanoke, VA 24014
(540) 400-0091
brew@southernhillshomebrew.com
southernhillshomebrew.com
Selling the supplies, ingredients, and equipment you need to make world-class beers and wines in your own home.

Washington

Northwest Brewers Supply
940 S Spruce St
Burlington, WA 98233-2834
(360) 293-0424
brew@nwbrewers.com
nwbrewers.com
All your brewing needs since 1987.

Micro Homebrew

17511 68th Ave NE
Kenmore, WA 98028
(425) 892-8425
microhomebrew@comcast.net
microhomebrew.com
Quality beer- and winemaking supplies. Friendly, knowledgeable staff. Open 7 days a week!

Beer Essentials, The

2624 112th St S Ste E1
Lakewood, WA 98499-8867
(253) 581-4288
order@thebeeressentials.com
thebeeressentials.com
South Puget Sound's largest homebrew retailer. Full line of beer- and winemaking equipment & supplies. Commercial and homebrew kegging supplies. Secure online ordering available.

Angeles Brewing Supplies

103 W 1st St
Port Angeles, WA 98362-2602
levi.liberty@angelesbrewing.com
angelesbrewing.com
Located in the heart of the beautiful Olympic Peninsula! We carry everything you need to make amazing beer, wine, cider, soda, and cheese. Come see us!

Cellar Homebrew

14320 Greenwood Ave N
Seattle, WA 98133-6813
(206) 365-7660
staff@cellar-homebrew.com
cellar-homebrew.com
Your one-stop shop for all your wine cellar and homebrewing needs. Since 1971.

Sound Homebrew Supply

6505 5th Pl S
Seattle, WA 98108-3435
(206) 743-8074
info@soundhomebrew.com
soundhomebrew.com
Knowledgeable staff. Great selection. We look forward to serving you.

Larry's Brewing Supply

790 Andover Park E
Tukwila, WA 98188
(800) 441-BREW
customerservice@larrysbrewsupply.com
larrysbrewsupply.com
Our family-owned supply shop has been your one-stop shop for both wholesale and retail since 1990. Come see what we have for you.

Bader Beer and Wine Supply, Inc.

711 Grand Blvd
Vancouver, WA 98661-4821
(800) 596-3610
sales@baderbrewing.com
baderbrewing.com
Sign up for our E-newsletter at baderbrewing.com Open 7 Days a week

Yakima Valley Hop Shop and Brew Supply

702 N 1st Ave Ste D
Yakima, WA 98902-2121
(208) 649-HOPS (4677)
info@yvhops.com
yvhops.com
Located in the heart of hop country, we carry more than 130 varieties in every increment.

Wisconsin

RiteBrew.com

1700 Lamers Dr
Little Chute, WI 54140-2515
(920) 687-2533
sales@ritebrew.com
RiteBrew.com

Quality homebrewing supplies at wholesale prices. Online orders ship same day.

Brew & Grow (Madison)

1525 Williamson St
Madison, WI 53703-3768
(608) 226-8910
website@brewandgrow.com
brewandgrow.com/brew/
Show any current homebrew club membership card and get 10% off your brewing supplies.

Wine and Hop Shop

1919 Monroe Street
Madison, WI 53711-2026
(608) 257-0099
wineandhop@gmail.com
wineandhop.com
Madison's locally-owned homebrewing and winemaking headquarters for over 40 years. We offer fresh ingredients, quality supplies, and friendly expert advice. Cheers!

Northern Brewer, LLC

1306 S 108th St
Milwaukee, WI 53214-2437
(414) 935-4099
info@northernbrewer.com
northernbrewer.com
The Milwaukee area's premier location for homebrewing supplies, equipment, and knowledge. The best location to get what you need to become a Milwaukee brewer.

The Purple Foot, Inc.

3167 S 92nd St
Milwaukee, WI 53227-4448
(414) 327-2130
wineandbeer@purplefootusa.com
purplefootusa.com

Milwaukee's only family-owned homebrew and winemaking supplier with over 40 years of experience. We offer high-quality products and ingredients and friendly expert advice to ensure your fermentation success.

Point Brew Supply

3038 Village Park Dr
Plover, WI 54467-4300
(715) 342-9535
osobrewing@gmail.com
pointbrewsupply.com
Point Brew Supply, central Wisconsin's largest homebrew supplier, and the only Wisconsin store where you can shop with a pint! Prost!

Brew & Grow (Waukesha)

2246 Bluemound Rd Ste B
Waukesha, WI 53186-2947
(262) 717-0666
website@brewandgrow.com
brewandgrow.com/brew/

Show any current homebrew club membership card and get 10% off your brewing supplies.

Australia

Grain and Grape

Unit 5 280 Whitehall Street
Yarraville, VIC 3013
+61 3968 70061
info@grainandgrape.com.au
grainandgrape.com.au
For over 25 years we have supplied brewing and winemaking products to homebrewers and craft brewers, including Speidel Braumeister products. Free weekly demonstrations.

Canada

Bosagrape Winery & Brew Supplies

6908 Palm Ave
Burnaby, BC V5J4M3
(604) 473-9463
info@bosagrape.com
bosagrape.com
Beermaking ingredients, labware & equipment. Blichmann, Five Star, FestaBrew, Monster Mill, White Labs, Wyeast, Fermentis, all grains & extracts, fruit puree, gas cylinders & kegging. GigaYeast and Imperial Yeast.

The Vineyard

Fermentation Centre

6025 Centre St South
Calgary, AB T2H 0C2
(403) 258-1580
beer@thevineyard.ca
thevineyard.ca
Southern Alberta's only full-service, one-stop brewing supply store. Fresh ingredients, quality hardware. Award-winning brewers, meadmakers, and vintners on staff for expert assistance.

United Kingdom

The Homebrew Shop

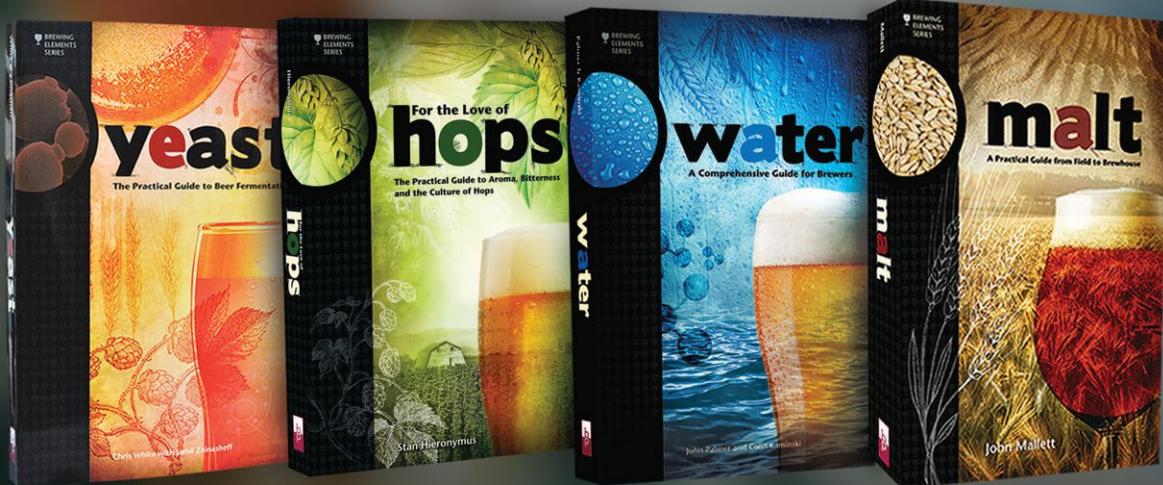
Unit 2, Blackwater Trading Estate
Blackwater Way, Aldershot
Hampshire GU12 4DJ, UK
+44 1252 338045
sales@the-home-brew-shop.co.uk



Find the most current list of AHA member shops online @ homebrewersassociation.org/supply-shops/

THE ELEMENTS OF STYLE.

Collect the entire Brewing Elements series



ADVERTISER INDEX

American Homebrewers Association	22, 72, 77, 78	Five Star Chemicals & Supply, Inc.	43	Muntons Malted Ingredients	20
www.HomebrewersAssociation.org	89, 90, 92	www.fivestarchemicals.com		www.muntons.com	
ANVIL Brewing Equipment	8	Gotta Brew, LLC	19	Northern Brewer, LLC	77
www.blichmannengineering.com		www.gottabrew.com		www.northernbrewer.com	
Atlantic Brewing Supply	36	Grainfather	66	Party Pig	11
www.atlanticbrewsupply.com		www.grainfather.com		www.partypig.com	
Auburn University	2	Grandstand Sportswear	35	PicoBrew	87
www.humsci.auburn.edu/brewing/		www.egrandstand.com		www.picobrew.com	
Ballast Point Brewing & Spirits	Cover 4	Great Western Malting Co.	26	Sam Adams	7
www.ballastpoint.com		www.greatwesternmalting.com		www.samadams.com	
BH Enterprises	76	Harper Collins	93	San Francisco Herb Co.	64
www.TempStatControls.com		www.harpercollections.com		www.sfherb.com	
Blichmann Engineering	25, 27	High Gravity	42	Shmaltz Brewing Co.	27, 85
www.blichmannengineering.com		www.highgravitybrew.com		www.shmaltzbrewing.com	
Brew Products, LLC.	24	Hobby Beverage Equipment Co.	49	Sierra Nevada Brewing Co.	53
www.clearbeerdeughtsystem.com		www.minibrew.com		www.sierranevada.com	
Brewers Publications	57, 92	Home Brewery (MO), The	95	South College - Asheville	51
www.BrewersPublications.com		www.homebrewery.com		www.SouthCollegeNC.edu	
Brewers Supply Group (BSG)	10	HOPSTEINER	37	Spike Brewing	Cover 3
www.brewersupplygroup.com		www.hopsteiner.com		www.spikebrewing.com	
BrewJacket	33	Industrial Test Systems, Inc.	50	Ss Brewing Technologies	14
www.brewjacket.com		www.sensafe.com		www.ssbrewtech.com	
Briess Malt & Ingredients Company	28	Krome Dispense Pvt. Ltd.	21	Uinta Brewing Co.	36
www.brewingwithbriess.com		www.kromedispense.com		www.uintabrewing.com	
Castle Malting	45	Love2Brew	22	WilliamsWarn Personal Brewery	33
www.castlemalting.com		www.love2brew.com		www.williamswarn.com	
CMBecker International, LLC	Cover 2	Maryland Homebrew	52	Wyeast Laboratories, Inc.	9
www.qualitypour.com		www.mdhb.com		www.wyeastlab.com	
Danstar	18	Micro Matic USA Inc.	18	YCH HOPS	44
www.lallemand.com		www.micromatic.com		www.ychhops.com	
FastBrewing & WineMaking	59	Midwest Supplies	13		
www.thefastrack.ca		www.midwestsupplies.com			
Fermentis	57	MoreBeer! & MoreWine!	72		
www.brewwithfermentis.com		www.morebeer.com			

By Charlie Papazian



Sweden '95: The Friends of the Wort

In 1995 I was exploring beer parts of Europe. I visited Sweden for several days. It was my first time there. I recently came across and reread my trip report and reflected. This typifies many of my experiences and captures a lot of what my life has been. I share here excerpts from my first-person account of adventures as a world beer explorer. This is the second of four parts of this story.

Vörtens Vänner means "The Friends of the Wort." I somehow magically appeared at their clubhouse after I heard Häcken proclaim, "It's time to go now, Charlie. We must go to see a homebrew club."

The traveling interlude was a soft whoosh. As usual, I found the front seat of the car (a Saab, of course) an exit to dream land, a brief interlude with sleep, dreams that took me far, far away to events, people, and places, some of which I knew and others of unknown origin.

Pulling into the parking lot of a warehouse complex, I wondered where I was being taken. I felt like the condemned being led to mysterious places for mysterious reasons—in a good way of course. Where were we? It appeared as though we were in the middle of nowhere. Well, actually we were. There were warehouse and office buildings and large parking lots surrounding us. Was this a Swedish joke? It didn't seem possible. As it turned out, they were dead serious.

We parked the car. I took my camera and note pad just in case there really was something here to see. Just around the

corner, at the entrance of the building, a few guys who looked like homebrewers (you can spot homebrewers by their ancient and well-documented mannerisms) were waiting and eating potato salad and sausage out of deli containers (hmmm, this sounds like a recurring dream to me). We had arrived and so had someone else. They had a key, or perhaps this was an official reception party. I never did quite understand why they were outside, when there was so much activity inside, as I soon discovered.

I walked through the door, and the first thing I saw was a sign that read LAGER 2. I wondered, "What the hell is this place all about?" There was no explanation given to me beforehand except that we were going to visit a Swedish homebrew club. We continued winding our way through the warehouse to the

ACTIVE ABOUT ONCE A WEEK, THE BREWHOUSE/CLUBHOUSE, SEEMED AN ESCAPE FROM OTHER FORMS OF LIFE DURING THE WEEK.

bottom corner of the building where there in front of me appeared the den of beerequity—approximately 600 to 700 square feet of space rented by six guys who called themselves the Friends of the Wort. But this was unlike any homebrew club I'd ever encountered

THE HOMEBREWER'S BIBLE:
The essential guide to making a full range of beer styles, including lagers, stouts, pilsners, dubbels, tripels, and specialty beers!

ALSO AVAILABLE!

FOR THE ADVANCED BREWER

ON THE ROAD WITH CHARLIE

anywhere else in the world. This bottom floor space had been converted into a “clubhouse” brewery for a monthly rental of about \$200 per month. I think the landlord also appreciated a good beer now and then. And good beer it certainly was!

This was a homebrewer’s retreat, a paradise lost. The friends had pooled their resources and skills to convert this once empty space into a palace of brewing, complete with a storage room for empty kegs and malt, a fermentation area, a bar, tables, a library, and an approximately 100-square-foot brewhouse area. They even had a pinball machine.

The first thing I seemed to really notice was the “Swedish style” beer engine. Of course there was a British beer engine alongside it, but it paled in comparison to the creativity of their specialty tap built from the engine of a Triumph T100. Mounted on the bar, the spark plug manifold had been replaced with a plumbing system worthy of the best porter in the house, which I had been quickly directed to. It was superbly outrageous.

Meanwhile, in the brewhouse, four or five guys were busy finishing the mash. The beer style seemed irrelevant at the time. I was in awe at the 75-liter (20 gallon) brew system built from old dairy and cafeteria stainless steel equipment perfectly suited for brewing beer. Everything was hard-plumbed, save for the occasional flexible hose—valves, pumps, sophisticated heat exchangers salvaged from dairies and home heating systems, temperature monitors. Everything was done with homebrew in hand. Operations went smoothly, and the ease of cleaning used equipment seemed as efficient as a cleaning-in-place (CIP) brewery, except this CIP system was made up of homebrewers, beer in hand, and cleaning in their own place. The hot liquor tank was an old cafeteria double boiler, jacketed with a circulating hot water system. The water was heated with electricity in a separate vessel.

Active about once a week, the brewhouse/clubhouse, seemed an escape from other forms of life during the

Since the preceding story takes place in 1995, I revisited what recipes I was offering in Zymurgy that year. Ginger Dinger was a humdinger of a good idea. I’ve reformulated the original recipe as an all-grain recipe, along with 2017 tweaks to the malt extract formulation. It has dark German lager character, the full flavor of ginger, a floral hint of crushed coriander seed, and subtle finishing-hop aroma and flavor.

GINGER DINGER 2017

All-grain recipe

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

Color: 24 SRM (48 EBC)

Original Gravity: 1.050 (12.4 B)

Bitterness: 31 IBU

Final Gravity: 1.015 (3.8 B)

Alcohol: 4.8% by volume

MALTS

7.5 lb. (3.4 kg) German Munich malt (about 10° L)

1 lb. (454 g) Crystal malt (10° L)

6 oz. (170 g) chocolate malt

6 oz. (170 g) Belgian Special B malt

HOPS

1.75 oz. (49 g) German Hallertauer hops, 4% a.a. (7 HBU/196 MBU) @ 60 min.

1 oz. (28 g) Mt Hood or Santiam hops @ 1 min.

YEAST

German- or Bavarian-type lager yeast. I use White Labs Cry Havoc yeast.

ADDITIONAL ITEMS

8 oz. (225 g) freshly grated ginger @ 10 min.

0.25 oz. (7 g) freshly crushed coriander seed @ 10 min.

1/4 tsp. (1 g) powdered Irish moss @ 10 min.

3/4 cup (175 ml) corn sugar for priming bottles
or 1/3 cup (80 ml) corn sugar for kegging

BREWING NOTES

A step infusion mash is employed to mash the grains. Add 9 quarts (8.6 L) of 140° F (60° C) water to the crushed grain, stir, stabilize and hold the temperature at 132° F (56° C) for 30 minutes. Add 4.5 quarts (4.3 L) of boiling water and add heat to bring temperature up to 155° F (68° C) and hold for about 30 minutes. Then raise temperature to 167° F (75° C), lauter, and sparge with 3.5 gallons (13.3 L) of 170° F (77° C) water. Collect about 5.5 gallons (21 L) of runoff. Add 60-minute hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes. When 10 minutes remain, add the Irish moss, grated ginger, and crushed coriander seeds. When 1 minute remains add the 1-minute hops. After a total wort boil of 60 minutes, turn off the heat and place the pot (with cover on) in a running cold-water bath for 30 minutes. Continue to chill in the immersion or use other methods to chill your wort. Then strain and sparge the wort into a sanitized fermenter. Bring the total volume to 5.5 gallons (21 L) with additional cold water if necessary. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident ferment at temperatures of about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary. If you have the capability, “lager” the beer at temperatures between 35° and 45° F (1.5–7° C) for 3 to 6 weeks.

Prime with sugar and bottle or keg when complete.

GINGER DINGER 2017

Malt Extract recipe

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

Original Gravity: 1.050 (12.4 B)

Final Gravity: 1.015 (3.8 B)

Color: 24 SRM (48 EBC)

Bitterness: 31 IBU

Alcohol: 4.8% by volume

MALTS

5.75 lb. (2.6 kg) light malt extract syrup

OR

4.75 lb. (2.2 kg) light dry malt extract

1 lb. (454 g) Crystal malt (10° L)

6 oz. (168 g) chocolate malt

6 oz. (168 g) Belgian Special B malt

HOPS

2 oz. (56 g) German Hallertauer hops, 4% a.a. (7 HBU/196 MBU)

@ 60 min.

1 oz. (28 g) Mt Hood or Santiam hops @ 1 min.

YEAST

German- or Bavarian-type lager yeast. I use White Labs Cry Havoc yeast.

ADDITIONAL ITEMS

8 oz. (225 g) freshly grated ginger @ 10 min.

0.25 oz. (7 g) freshly crushed coriander seed @ 10 min.

1/4 tsp. (1 g) powdered Irish moss @ 10 min.

3/4 cup (175 ml) corn sugar for priming bottles
or 1/3 cup (80 ml) corn sugar for kegging

BREWING NOTES

Place crushed grains in 2 gallons (7.6 L) of 155° F (68° C) water and steep for 30 minutes. Then strain out, rinse with 3 quarts (3 L) hot water, and discard the crushed grains, reserving the approximately 2.5 gallons (9.5 L) of liquid to which you will now add malt extract and 60 minute hops. Bring to a boil.

The total boil time will be 60 minutes. When 10 minutes remain, add the Irish moss, grated ginger and crushed coriander seeds. When 1 minute remains add the 1-minute hops. After a total wort boil of 60 minutes turn off the heat and then immerse the covered pot of wort in a cold water bath and let sit for 15-30 minutes or the time it takes to have a couple of homebrews.

Strain out and sparge hops, and direct the hot wort into a sanitized fermenter to which 2.5 gallons (9.5 L) of cold water have been added. If necessary, add additional cold water to achieve a 5.5 gallon (21 L) batch size. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident ferment at temperatures of about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary. If you have the capability, "lager" the beer at temperatures between 35° and 45° F (1.5–7° C) for 3 to 6 weeks.

Prime with sugar and bottle or keg when complete.

week. Today it seemed bustling with energy. LAGER 2? Oh, yes, remember, we're in Sweden where *infart* and *outfart* guide you in the correct direction. *Lager* means warehouse.

"Charlie it is time to go now. We must get ready to visit a homebrewer. It is about an hour's drive. You will go to my house first. Then pack your bags for three nights because we spend the night there, and then you will stay in jail in Stockholm." Nothing fazed me. I packed for three days, leaving behind kilos of Belgian and Dutch beers and paperwork.

Beyond the shuck and jive here's this issue's recipe.

To be continued in the May/June 2017 issue of Zymurgy: Perpetually awake and dreaming in Uddala.

Charlie Papazian is founder of the American Homebrewers Association and the author of *The Complete Joy of Homebrewing*.

www.homebrewery.com

THE HOME BREWERY Since 1984

Serving You for Over 30 Years

BEER • WINE • CHEESE
CIDER • MEAD • SPIRITS

Supplies • Equipment • Advice
Let us help you make your own!

www.homebrewery.com

Ozark, Missouri
800-321-BREW • (417) 581-0963

Become a Mentally Tough Homebrewer

I am your mind, and I am stronger than your body. I decide when you have reached your limits, and I tell you when to stop. I am tough—that is, if you have trained me to be tough. Train me well, and I will help you be the best homebrewer you can be. Here's how.

List the reasons you're mentally tough. Everyone has the potential to be mentally tough, but not everyone decides to train their brain. Your list should include what you have accomplished as a homebrewer and the goals you would like to achieve.

Stay away from weak goals. Instead, set goals around things you are not good at. If you are a natural at extract brewing, set your sites on an all-grain brewing session. Have you found yourself failing with specific homebrewing techniques? Don't give up. Focus on your weaknesses, and soon you will turn them into strengths.

Show me five of your closest friends and I will tell you who you are. *Surround yourself with mentally tough role models*, and you'll be well on your way to mental toughness. The world is full of mentally strong homebrewers. Find them, study their habits, observe their mindsets, and follow their leads.

Learn when to *redirect your efforts instead of quitting*. There will be times when you feel like quitting. Don't. When you have been boiling wort for hours and you feel you can't go on, redirect your efforts. Focus on the finish line, not on your pain. Imagine the joy of finishing.

Do something every day that you have been putting off. If you can't stand organiz-



ing your brewing area, organize it today. Are you putting off signing up for your first homebrew competition? Don't wait any longer. Flex your brain and sign up.

To get things done successfully, you need to *control your environment by minimizing distractions*. In this technology-glutted world, find a balance between utility and overuse. There are days when you should leave the tech at home and brew old-school.

Going minimal will allow you to *practice mindfulness and breathing techniques*. While homebrewing, try to laser focus on the here and now. Don't worry if your brew will be stellar. Are you breathing short and heavy? Take some deep breaths and crack open a homebrew.

Bottling is not easy. It takes focus, persistence, and discipline. Trust me: it's worth it when you *visualize successful outcomes for difficult tasks*. Do you have a hard bottling session scheduled? See yourself feeling strong at the finish.

Is your body telling you that you can't go on, and that you need to slow down and possibly stop? *Stop listening to yourself and start talking to yourself.* Tell yourself you can go on, because you can. Tell yourself there is no need to slow down.

Everybody has advice, so *listen to all feedback but take action selectively*. Some feedback is worth its weight in imperial IPA, but not all of it is worth acting on. You are an individual, so figure out what works for you to become mentally tough.

Clint Cherepa lives in Nicaragua with his wife, Kate. He keeps himself busy volunteering, trying to get his hands on homebrewing supplies, and training for footraces.

Inspiration for this essay came from Dr. Duncan Simpson, Assistant Professor in Sport, Exercise, and Performance Psychology at Barry University, and from Adam Morris, on Twitter at @BelievePerform.



SPIKE SYSTEM™ TURN KEY BREWERY

AVAILABLE NOW

• SYSTEM SIZES •

10 GALLON 15 GALLON 20 GALLON 30 GALLON 50 GALLON



SPIKEBREWING.COM/SPIKESYSTEM



IMPERIAL INDIA
PALE ALE

GOLD AWARD 2016



THIS NEW IPA RISES ABOVE THE REST

Introducing Manta Ray Double IPA. Developed in our R&D program, this brew has aromas of fresh, citrusy tangerine, melon and light pine that leap from the beer and linger over a smooth finish. Like its namesake, this brew can sneak up on you – a big beer without a bite.



BALLASTPOINT.COM

Crafted in San Diego, California

Please Explore Responsibly®