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The Journal of the American Homebrewers Association®

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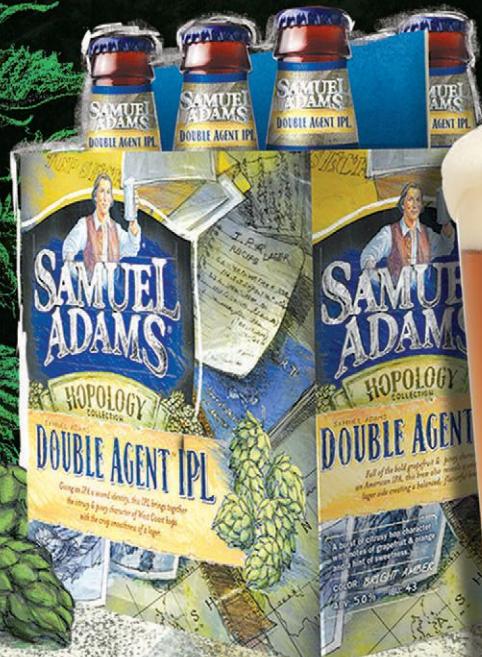
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2013 Beerdrinker of the Year



A HA member and "Beer Sensei" Warren Monteiro is sporting a new title these days: 2013 Beerdrinker of the Year. Monteiro, a three-time finalist of the competition at the Wynkoop Brewing Co. in Denver, outlasted worthy opponents Kevin Cox, a homebrewer from Muncie, Ind., and Jen Schwertman, a bartender and beer evangelist at the Blind Tiger Ale House in New York City.

Monteiro, a homebrewer since 1991, wowed the judges and the crowd with his homebrewed version of Russian River's Pliny the Elder. He's brewed at least 46 BJCP styles and keeps a brew kit in his overseas base of London to "whip up American IPAs for my pals there."

"People tell me I'm living their fantasy life," said Monteiro, who writes the Beer Sensei column for the *Ale Street News*. "I've been hunting and gathering beers for 40 years."

Held in February each year, the Beerdrinker of the Year competition attracts diverse candidates from across the nation to vie for the coveted title. The winner receives free beer for life at the Wynkoop; \$250 worth of beer at a hometown pub of choice (Blind Tiger Ale House for Monteiro); recognition on a trophy on display at the Wynkoop; and Beerdrinker of the Year apparel. A panel of judges wearing white wigs and robes grills the finalists with tough beer-related questions, and the

competition also features a weighing-in, a brew ha ha (a beery joke, song, or anecdote), a beer whispering (Monteiro won this one hands-down with his steamy conversation with a bottle of Cantillon), and a bribing of the judges.

Some sample questions:

- What beer style is known for its use of coriander and salt?
- What's wrong with craft beer today and how would you fix it? (Cox's response: "I didn't realize there was a problem with craft beer.")
- What beer-centric sport should replace wrestling in the Olympics? (Monteiro's response: "Hurling.")
- What's the best brewery we've never heard of? (The Bier Brewery and Flat 12 Bierwerks in Indianapolis; Vermont's Hill Farmstead Brewery and Lawson's Finest Liquids; and The Kernel in London).

Judge Ginger Johnson of Women Enjoying Beer challenged each of the finalists to do a 30-second interpretive dance about beer, much to the delight of the crowd.

The finalists also had a blind tasting of three beers (Hoegaarden Wit, Fuller's ESB, and Odell Woodcut #5), in which they had to guess the style, the brand, and ideally the name of the driver who delivered the beer. ("Earl" was Monteiro's guess on that one).

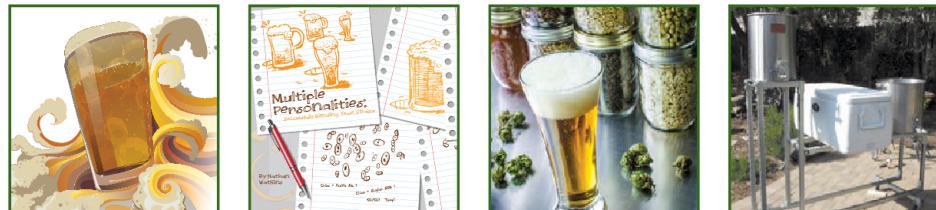
Monteiro, who was also a finalist in 2006 and 2012, said his friends have joked that he's the "Susan Lucci of beer" for his near-misses with the competition title. But he likens himself more to Alec Baldwin, stating, "I'm fatter, older, and somehow still in the game."

Jill Redding is editor-in-chief of *Zymurgy*.

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**Two Row vs. Six Row Barley**

By Elspeth Payne

To read this special, online-only feature, go to the *Zymurgy* page on HomebrewersAssociation.org.**QUICK RECIPE GUIDE**

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>> GET THERE!

AMERICAN CRAFT BEER WEEK

What are your local breweries, brewpubs, and beer retailers doing to celebrate American Craft Beer Week?

For the eighth consecutive year, the Brewers Association presents American Craft Beer Week® (ACBW), a celebration of U.S. craft brewers across the country. Last year, ACBW was celebrated by breweries, brewpubs, and retailers in all 50 states with more than 1,300 official events. More than 47,000 beer lovers have joined the Facebook community for American Craft Beer Week, and 2013 will undoubtedly be the largest celebration yet.

From May 13-19, ACBW will provide an opportunity for small and independent brewers, craft beer enthusiasts, and the community of better beer retailers to celebrate the ever-advancing beer culture in the U.S. Events will include exclusive brewery tours, special beer releases, beer and food pairing dinners, collaboration beers, retail promotions, and much more. To find events near you, go to CraftBeer.com/acbw.

May 3-4

St. Louis Microfest

St. Louis, MO

stlmicrofest.org

May 4

Wild West Brew Fest

Katy, TX

www.katybrewfest.com

May 11

Beer, Bourbon & BBQ Festival

Charlotte, NC

www.beerandbourbon.com

May 11-18

Frederick Beer Week

Frederick, MD

www.frederickbeer.com

May 17-18

Brewer's Memorial Ale Fest

Newport, OR

www.rogue.com

May 18

West Coast Brew Fest

Sacramento, CA

www.westcoastbrewfest.com

May 18

Maui Brewers Festival

Maui, HI

www.mauiarts.org

May 25-June 1

Asheville Beer Week

Asheville, N.C.

www.facebook.com/AVLBrewWeek

May 29-June 2

Mondial de la Biere

Montreal, Quebec.

<http://festivalmondialbiere.qc.ca/>

June 1

Firestone Walker Invitational Beer Fest

Paso Robles, CA

www.firestonebeerpfest.com

June 8

Boulder SourFest

Boulder, CO

wwwaverybrewing.com

June 14-15

SAVOR: An American Craft Beer & Food Experience

New York, NY

www.savorcraftbeer.com

June 27-30

North American Organic Brewers Festival

Portland, OR

www.naobf.org

For more craft brewing events, go to CraftBeer.com



>> BREW NEWS

SIERRA NEVADA, DOGFISH CREATE IPA GLASS

Sierra Nevada and Dogfish Head have teamed up with glassware maker Spiegelau USA to develop a new glass aimed at enhancing the enjoyment of IPAs.

"Hop-forward beers are close to our hearts, and we've had fun figuring out how to best highlight an IPA's nuances," said Sierra Nevada founder Ken Grossman. "We imagine hopheads will enjoy giving the glass a try."

The new glass is designed to showcase varying aromatic profiles for "hop forward" beers. Described as the "go-to vessel for IPA beers," characteristics of the glass include:

- Thin, round walls to maintain proper temperature longer.
- Slender, bowed shape to amplify hop aromas.
- Wave-like ridges to aerate beer on its way in and out of the glass.
- Wide mouth, allowing drinkers to "nose" the beer.
- Laser-etched logo on the bottom of the bowl to sustain carbonation and head.

The glass retails for \$9 and is available at www.sierranevada.com and www.dogfish.com, etched with each brewery's respective logo; or at www.riedelusa.net.

>> GREAT NEW PRODUCT: FROM FLYING DOG BREWERY

STOVE TOPPERS

Giving homebrewers a chance to brew Flying Dog beers at home, Maryland's largest brewery is launching Stove Toppers, a line of clone homebrew kits. Stove Toppers are all-grain kits designed for advanced homebrewers that include the brewery's exact ingredients and brewmaster's recipe, scaled down to a 5-gallon home brewery.

"Like many brewmasters, I started out homebrewing," said Flying Dog brewmaster Matt Brophy. "Homebrewers spread the gospel of craft beer through their craft and ours, so I think breweries have a responsibility to foster and inspire the homebrewing community."

Flying Dog will launch one kit per month in 2013 and each kit will be on sale for that month only. Here's the lineup for the remainder of the year:

- April: Woody Creek Belgian White
- May: Single Hop Imperial IPA with Citra
- June: Snake Dog IPA
- July: Dogtoberfest Marzen

- August: The Fear Imperial Pumpkin Ale
- September: Single Hop Imperial IPA with Sorachi Ace
- October: Pearl Necklace Oyster Stout
- November: Single Hop Imperial IPA with Simcoe
- December: Barrel-Aged Gonzo Imperial Porter

At this time, the kits are available only at the Flying Dog Brewery gift shop or The Flying Barrel Home Brew Shop, both in Frederick, Md. To learn more, go to www.flyingdogales.com.



Yak & Yeti Chai Milk Stout

Note: This recipe originally appeared in the January/February 2011 *Zymurgy* and is being reprinted here in correlation with the Last Drop on page 72.

Brewer Chris Kennedy says, "The milk stout base is very milky and chocolatey, and you want to let those characteristics shine through just as strongly as the chai spice. I like to drink the chai stout and not be entirely sure whether the flavors are from the chai spices or from the milk stout base."

INGREDIENTS

for 5 U.S. gallons (19 liters) at 70% efficiency

8.8 lb	(4 kg) English pale ale malt
1.1 lb	(500 g) Crisp Crystal 80°L
7.0 oz	(200 g) Crisp Chocolate Malt 475°L
7.0 oz	(200 g) Crisp Pale Chocolate Malt 200°L
7.0 oz	(200 g) Crisp Roasted Barley 575°L
1.0 lb	(450 g) lactose
0.4 oz	(12 g) Warrior pellet hops, 16% alpha acid (60 min.)

Wyeast 1728 Scottish Ale Yeast

Original Gravity: 1.067 (16.4 °P)

Final Gravity: 1.024 (6.1 °P)

IBU: 31

SRM: 43

ABV: 5.7%

DIRECTIONS

Mill the grains and dough-in, targeting a mash of around 1.5 quarts of water to 1 pound of grain (a liquor-to-grist ratio of about 3:1 by weight) and a temperature of 151° F (66° C). Hold the mash at 151° F (66° C) until enzymatic conversion is complete. Infuse the mash with

near boiling water while stirring, or with a recirculating mash system raise the temperature to mash out at 168° F (76° C). Sparge slowly with 170° F (77° C) water, collecting wort until the pre-boil kettle volume is around 6.5 gallons (24.6 L) and the gravity is 1.052 (12.9°P).

The total wort boil time is 90 minutes. Add the bittering hops with 60 minutes remaining in the boil. Add lactose and Irish moss or other kettle finings with 15 minutes left. Chill the wort to 68° F (20° C) and aerate thoroughly. Use 2 packages of liquid yeast or 1 package of liquid yeast in a 2.5 liter starter.

Ferment at 68° F (20° C) until the yeast drops clear. With healthy yeast, fermentation should be complete in a week or less. Allow the lees to settle and the brew to mature without pressure for another two days after fermentation appears finished. At this point you have an excellent milk stout. To make the chai milk stout you will need to add a tincture of chai spices. Chris explains, "For the chai spice, I simply take a cheap vodka and soak our house chai spice mixture in it, then add small doses to a keg until it tastes right. I try to make a very strong spice tincture so there is only a negligible amount of vodka added to the beer. Usually it only takes 0.4 oz of tincture to spice 5 gallons of beer. Frankly, I am not certain what is in our chai spice mixture, but I am sure your favorite chai spice mix will work great. Make additions slowly and taste as you go so you can hit it just right."

Extract version: Substitute 6.5 lb (2.9 kg) English liquid malt extract for the pale ale malt. Steep the other grains for 30 minutes in 158° F (70° C) water, drain, add liquid extract, bring to boil, and proceed with recipe as stated.

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>> CRAFT BREWER PROFILE: JAY WINCE

BY GORDON STRONG

Tell the truth—what homebrewer hasn't dreamed of turning pro and winning a gold medal at the Great American Beer Festival? For Jay Wince of Zanesville, Ohio, that dream came true last October when his Anastasia Russian Imperial Stout won the Imperial Stout category.

Wince had quite a bit of success with this beer as a homebrewer. It was the first all-grain recipe he developed on his own in 2002, and it went on to win numerous awards including medals in the 2003 and 2005 National Homebrew Competition.

In 2006, Jay and his wife Lori opened a 7-barrel brewpub, Weasel Boy Brewing Company (named after their pet ferrets) on the banks of the Muskingum River. They won their first GABF medal in 2010, a bronze they display proudly on the wall behind the bar.

Recently I had a chance to sit down with Jay and Lori and ask them about this beer. Jay laughed and said that it was "simplicity at its finest" and contained only three malts and two hops. He said the beer has "more complexity than the



ingredients suggest" and that the character comes from the heavy use of English dark malts and grains, the character of his house yeast (Wyeast 1318 London III), and patient conditioning.

Jay said he had played around with the

dark grains quite a bit before settling on varieties from Thomas Fawcett. He said they are lighter in Lovibond (color) than some other grains, so he can use more of them without getting acrid characteristics. He likes late hopping with Centennial but says that bitterness can be "68 IBUs of anything." He has used different yeast strains with good results but prefers a warm ferment with his house yeast, which does not produce too much fruit flavor or higher alcohols at the warmer temperatures.

Anastasia Russian Imperial Stout

ALL-GRAIN RECIPE

Recipe provided by Weasel Boy Brewing Company (www.weaselboybrewing.com).

INGREDIENTS

for 5 U.S. gallons (19 liters)
14.5 lb (6.6 kg) Canadian two-row malt
1.6 lb (737 g) UK chocolate malt
1.6 lb (737 g) UK roasted barley
1.4 oz (40 g) Columbus hops, 16.8% a.a. (60 min)
0.5 oz (14 g) Centennial hops, 8.5% a.a. (10 min)
0.5 oz (14 g) Centennial hops, 8.5% a.a. (knockout)
Wyeast 1318 London III yeast

Original Gravity: 1.087 (70% efficiency)

Final Gravity: 1.028

ABV: 8%

IBU: 69 (Tinseth)

DIRECTIONS

Mash all grains at 152° F (67° C). Collect 6.5 gallons (25 L), boiling for one hour, finishing with 5.25 gallons (20 L). Transfer 5 gallons (19 L) to fermenter. Ferment at 70-73° F (21-23° C). Cold condition 3-4 weeks before carbonating. Age 10 months for best flavor.

Extract Version: Substitute 10.2 lb (4.6 kg) light liquid malt extract for the two-row. Steep the specialty grains for 30 minutes at 158° F (70° C), add malt extract, bring to a boil, and proceed with recipe as written.

They brew the beer once a year in November, so the GABF winning version was about 10 months old. I was on hand for the Beer for Boobs competition at their brewery last November, where Jay was tapping a cask-conditioned firkin of their winning beer for eager and thirsty customers. Lucky visitors might also get a chance to try their bourbon barrel-aged version too.

The simplicity of this recipe makes it well suited to brewers of any level. Believe me, the hardest part of the recipe is letting it age!

Three-time Ninkasi winner Gordon Strong is president of the Beer Judge Certification Program and author of *Brewing Better Beer*.



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By Gary Glass



Bolling Joins AHA Staff

Longtime AHA Events & Membership Coordinator Kathryn Porter Drapeau has changed positions within the American Homebrewers Association's parent organization, the Brewers Association, and is now an Event Manager in the Brewers Association Events Department. Thankfully, Kathryn will continue her excellent work on the National Homebrewers Conference in her new role.



Stepping into the AHA Events & Membership Coordinator role is Matt Bolling. Matt is an established homebrewer and AHA member with commercial brewing experience. His key responsibilities at the AHA will be organizing AHA Rallies, Big Brew, and Learn to Homebrew Day, as well as taking the lead amongst AHA staff on membership-related issues. Welcome, Matt!

Homebrew Legalization Update

We currently sit on the verge of having homebrew legalized in all 50 states for the first time since Prohibition. Mississippi

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recently passed a homebrew legalization bill and Alabama has homebrew bills awaiting votes in the House and Senate as of late March.

The Mississippi legislative session started January 8 with three homebrew bills filed in the House and one in the Senate. The Senate bill quickly moved through an Economic Development and Tourism committee hearing and was passed by the full Senate on February 7 by a large majority. Due to the swift passage of the Senate bill, the House bills were never brought up before committee, since they would have been redundant to the Senate bill. The Senate bill won approval of the House Economic Development and Tourism committee and was passed by the full House on March 6. Gov. Phil Bryant signed the bill March 18, and it will go into effect as law July 1, 2013.

The movement to legalize homebrewing in Mississippi has been spearheaded by the Raise Your Pints (RYP) organization that has championed beer-related measures over the past few years. With the passage of a bill to increase the allowable alcohol in beer sold in the state last year, RYP focused on homebrew legalization as its top priority. Earlier this year, I was invited to attend a special homebrew tasting for state legislators and other government officials organized by RYP to educate legislators about homebrewing and introduce them to some of the state's fine homebrewers. It turned out to be a great event, despite having to move the location at the last minute from a brewpub to a local Episcopal church.

Mississippi homebrewers, who came from all across the state to share their brews, represented the state well with exceptionally tasty beers offered in a wide range of styles. It was a great turnout of legislators and government officials—probably 40-50 in attendance. The event offered me the opportunity to discuss homebrewing with bill sponsors Sen. John Horhn and Rep. Scott Delano, and offer them assistance from the AHA. Many thanks to RYP president Craig Hendry, all of the officers of RYP, and the Mississippi homebrewers involved for their dedication to legalizing homebrewing in the state.

In Alabama, bills identical to last year's homebrew bill were pre-filed in both the House and Senate this year. Last year's bill was passed by the House and made it through a Senate committee vote before dying when the legislative session ran out before it could be brought to a vote before the full Senate. It likely had the votes to pass the Senate in 2012. There was no state legislature election in 2012, so the same representatives and senators who voted on last year's bill will hear this year's bills. All of that bodes well for passage this year. As of March 22, both the House and Senate bills had cleared committee hearing and were waiting on votes before their respective chambers.

Leading the effort to legalize homebrewing in Alabama is a coalition of homebrewers called Right To Brew (www.alahomebrewing.org). In advance of this year's legislative session, the members of Right To Brew had pint glasses made with the Right To Brew logo and a QR code that directs people to the Right To Brew website. They distributed the glasses to brewpubs and beer bars around the state that are friendly to the homebrewing cause, helping to generate awareness for homebrew legalization across the state. Right To Brew has also generated a lot of positive press for homebrew legalization, helping build the momentum needed to get the homebrew bills passed this year.

The AHA is also working with homebrewers in Illinois, Kansas, and Ohio on bills to allow for transportation of homebrew for competitions and club meetings. Illinois also has a bill to allow homebrew supply shops to offer samples of homemade beer and wine to their customers, similar to a bill passed in Wisconsin last year. There is also a homebrew bill in the Missouri legislature aimed at allowing homebrewers to legally transport homebrew for competitions, club meetings, and other events that originated with Dan Kopman, co-founder of The Saint Louis Brewery. A bill to allow transport of homebrew for events like competitions (that have filed for a \$50 permit) has been passed by the State House of Representatives in Georgia, where transport of homebrew outside the home is technically illegal.

The AHA will continue to monitor homebrew legislation throughout the country and support local grassroots movements to change laws where change is needed.

2013 AHA National Homebrewers Conference

Philadelphia is preparing for a homebrew invasion in June, with more than 3,400 homebrewers registered for the 2013 National Homebrewers Conference, themed "Brewing up a Revolution." That's 1,500 more attendees than the record set in San Diego in 2011 and nearly double the 1,800 attendees at last year's conference in Bellevue, Wash.

Back in 2010, when we signed the contract for the 2013 conference, we were just wrapping up the 1,300-attendee conference in Minneapolis. Never in my wildest dreams would I have imagined that we would increase attendance by more than 2,000 in just three years! Thankfully we were able to work with the hotel and the attached convention center to create a new registration option that allowed us to accommodate additional attendees.

This year's conference will feature 42 seminars. All six of the Thursday seminars will be repeated later in the week to ensure that all of those registered for the "Full Conference Almost" package that does not include the Thursday seminars have the opportunity to pick from the full slate of seminars offered this year. The roster of speakers includes a great mix of homebrewers, professional brewers, university professors, and more from all over the country.

As is custom for the conference, Friday night is Club Night and this year we have 92 homebrew clubs signed up to participate. Homebrew Chef Sean Paxton will once again be crafting a meal made and paired with beer from Rogue Ales for the grand banquet, but this time for a crowd of 2,200 (no pressure, Sean!).

In addition to all of the homebrew available at the conference, attendees will be treated to local and regional craft beers poured at Pro-Brewers Night. Should anyone wish to venture beyond the confines of the conference, there are many great

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2013 National Homebrew Competition

The 2013 National Homebrew Competition had a record 8,275 entries registered from 2,188 entrants. The last of those first-round entries are being judged as this issue works its way through the mail. With the growth in this year's competition came some growing pains. The

new online registration system we used did not work as intended, causing multiple problems for entrants. The staff of the AHA and Brewers Association worked very hard to correct those issues over the days following the launch of registration. I am deeply sorry for the frustration the new system caused those who attempted to enter the competition.

The AHA Governing Committee Competition Subcommittee is already looking into options for an alternative registration process to be used in 2014,

and I am confident that we will be able to find a solution that will be a far more satisfactory experience for all members.

Good luck to all of the entrants! Perhaps I will be announcing your name as a medalist from the grand banquet and awards ceremony during the National Homebrewers Conference in Philadelphia.

Big Brew

Every year on the first Saturday in May, which this year falls on May 4, the AHA celebrates National Homebrew Day (recognized by the U.S. Congress as May 7 back in 1988) with Big Brew—a worldwide brew-in. Thousands of homebrewers from around the globe will gather at registered sites and brew the official Big Brew recipes all at the same time. You can find the recipes and register your site for this year's 16th annual Big Brew on HomebrewersAssociation.org. Be sure you are ready for the simultaneous toast that takes place at noon Central Time.

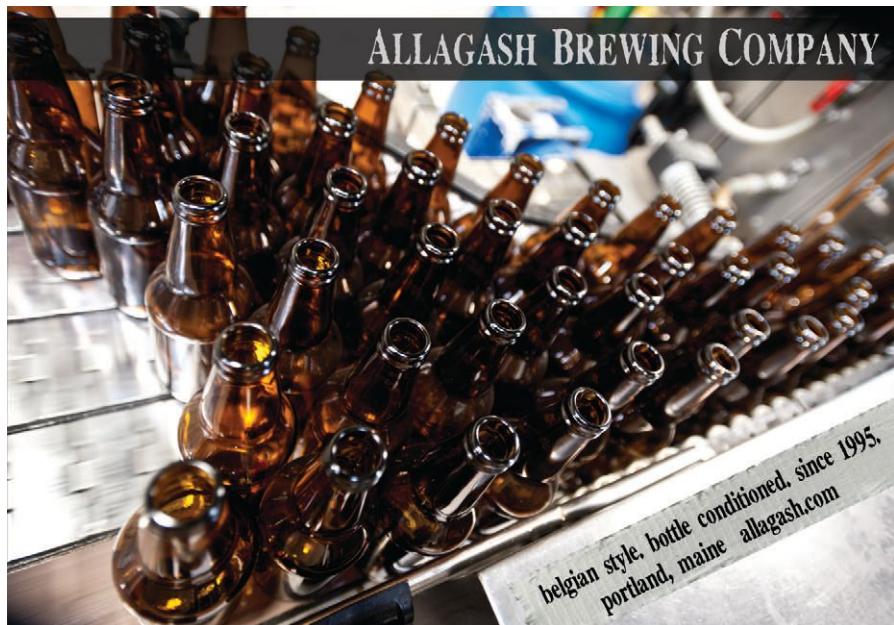
Southern California Homebrewers Festival

I will be toasting this year's Big Brew from the Southern California Homebrewers Festival at Lake Casitas in Ventura County. This event has been a Southern California tradition since 1991, when the first Southern California Homebrewers Festival was held at the Cilurzo Winery (the winery owned by the family of Vinnie Cilurzo of Russian River Brewing Company). Last year's fest drew 1,800 homebrewers. The festival organizers, the California Homebrewers Association, graciously requested that I come out to this year's fest to speak. I eagerly accepted the offer and am excited to join this gathering of fellow homebrewers in what looks to be a great time.

The Southern California Homebrewers Festival is open exclusively to members of the California Homebrewers Association and attendance is free for members. To learn more, see www.cal-homebrewers.org.

Until next time, happy homebrewing!

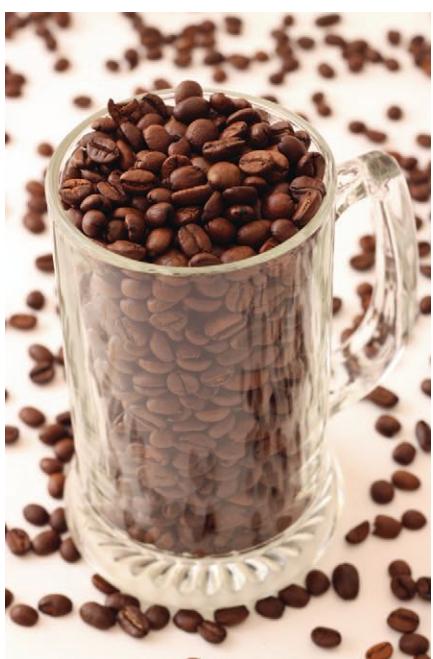
Gary Glass is director of the American Homebrewers Association.



by Our Readers

Adding Coffee to Beer

Dear Zymurgy,
I'd like to pass along some comments regarding a Dear Professor letter in the January/February 2013 Zymurgy. Justin Rice asked about fermenting with coffee. I brew with a homebrew club in Stockton, Calif. and have been making coffee brews for several years. I make what I call a mocha stout.



Years ago, I purchased a commercial product called Toddy Cold Brew Coffee System. It makes a coffee extract by cold-soaking coffee grounds overnight. I like it because it provides a quick way to have one cup of coffee and you can dilute the extract to your taste.

When I was developing the mocha stout recipe, the coffee extract seemed like the obvious choice. It has worked out well and solves a lot of problems. You can make it in advance at your leisure. There

is no cleanup on brew or bottling day. It is very easy to adjust flavor. It's easy to consistently make the same extract. And the stuff is pretty decent to drink as regular coffee!

The coffee extract is trivial—one pound drip grind coffee soaked in nine cups of water. I use the same filtered water that I do for brewing. Drain after a day or two and the yield should be about eight cups (two quarts). The Toddy expedites the process as the device is designed to ease the straining and cleanup. To make coffee, cut with half water for a strong cup

or more for a weak cup. A good afternoon wake-up is to add a package of dry hot chocolate mix to a full-strength solution—it really gets you going.

For the beer addition, I use one quart for a 5-gallon batch. I add the extract at flameout and have never had an infection problem. Adding it late helps retain the coffee aroma. It would seem reasonable to add to the secondary or even at kegging time, but I have not tried that.

The mocha stout is a great party beer. It's a basic oatmeal stout on the high alcohol

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side for the style. I boost it with a couple pounds of corn sugar, one pound of powdered baking chocolate (the brown can from the grocery store), one quart of coffee extract, and one-half pound of lactose. (I don't care too much for the lactose flavor, so I use just enough to balance the bitterness that the chocolate and coffee bring.)

I am trying to add a vanilla flavor, but vanilla extract isn't doing the job, plus it is expensive. I am considering some brief aging with dark toasted American

oak cubes. I'm still working on that little problem.

I enjoy the magazine, and especially the Professor's comments.

Rick Reineman
Stockton, Calif.

Support for Buffalo Wild Wings

Dear Zymurgy,
Jason Holland's letter (January/February 2013) was critical of Buffalo Wild Wings' television commercial featuring a home-

brewer gone crazy. Contrary to Jason's view, the BWW ad makes me laugh whenever I see it. It is funny, and one of the reasons it's funny to me is that it hits pretty close to home (hoses hanging everywhere, and a homebrewer who is crazy-enthusiastic about his hobby).

It also is worth mentioning that Buffalo Wild Wings, at least here in Maryland, has introduced an excellent craft beer menu, which they rotate every three months. And I have noticed their servers getting more beer-knowledgeable than they used to be. Your results may vary.

BWW has embraced homebrewing in Maryland. They sponsor a statewide homebrew competition that our club organizes, and their restaurants in Maryland are the exclusive draft outlets for the commercial version of the winning homebrewer's recipe from the competition every year. They have donated additional prizes for our competition, and have also generously contributed to an annual charitable fund-raising event of the Free State Homebrew Guild, a group encompassing most homebrew clubs in Maryland.

Even though they are a large bar and grill restaurant chain, Buffalo Wild Wings in Maryland has been a surprisingly accommodating partner of the homebrewing community. For these reasons, I suggest a somewhat more lenient view of their Home Brew commercial. They are not the enemy.

Steve Kranz
Midnight Homebrewers' League
www.midnighthomebrewers.org

Dear Zymurgy,
I read with interest Jason Holland's letter about the BWW ad lampooning homebrewers. Ever since first viewing this ad, I wondered what others thought of it, although I personally formed my opinion immediately. At first I was offended by the characterization, but at the same time I realized that the homebrewer depicted in the ad was just an exaggerated composite of me and other homebrewers I have met, from the perspective of someone who has not homebrewed. So I decided to not be offended, to not



take myself (or our craft) so seriously, and to laugh with BWW rather than rail against them. There is a kernel of truth in their caricature of the homebrewer, and partial truths are the basis of good comedy and satire.

That being said, I support Jason's suggestions that Zymurgy publish an article countering such a negative portrayal of homebrewing. We have so much more to offer than this ad suggests, despite our quest to push the envelope of craft beer by continually concocting new beer flavors using non-traditional ingredients, both fermentable and not so fermentable.

Lighten up, relax, and have a homebrew.

Jon Antonson
Las Vegas, Nev.

Chiming In on Dear Professor

Dear Zymurgy,
I read The Professor's answer to the questions posed under the heading "Tank Temperature Query" in the January/February 2013 issue. I was disappointed in the response because Justin requested scientific proof of whether his understanding of gas temperatures is correct. Both answers given were qualitative, one of which didn't directly relate to the questions.

I think Justin asked two questions, which I summarize as follows:

1. Does the temperature of a CO₂ tank affect the amount (and therefore the pressure) of gas given the same pressure setting on the regulator?
2. Does lowering the temperature of the gas increase the pressure?

The quick answer to each is 1) if I know why he's asking this question, it has little effect, but this gets more into the hardware and 2) the pressure actually decreases with lower temperature.

Both questions can be answered scientifically by applying the ideal gas law. This law holds true for gases that behave "ideally" and CO₂ is certainly one of those gases. The formula is:

$$PV=nRT$$

where:

P = Absolute pressure
V = Volume
n = Moles of gas
R = Ideal Gas constant
T = Absolute temperature

Keep in mind most people are used to speaking about pressures and temperatures on relative scales. For homebrewers, this is psig for pressure and degrees F or C for temperature. These must be converted to absolute measures for use in the formulas above.

Now to answer these questions: I'll start with the second one because it is more straightforward. If you take a constant volume and moles (therefore a constant mass) of gas and cool it down, one can figure out what will happen to the pressure based on the equation above. Rearranging the formula, we get:

$$P/T = nR/V$$

Given that n and V are being held constant and R is a constant, the ratio P/T has to remain constant. If we take two temperatures, T₁ and T₂ where T₂ < T₁, the relationship above gives us:

$$P_2 = P_1 * T_2 / T_1$$

FROM OUR READERS

Homebrew label from AHA member Jason Hall, made in honor of a couple of rescue dogs he used to have.

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Since T₂ is less than T₁, cooling a gas will lead to a decrease in pressure.

On the first question, I'll answer this more as a thought experiment. Imagine the CO₂ tank is outside the fridge and delivers gas to an evacuated volume inside the fridge at a regulated pressure, then the gas is shut off to that volume on the inside of the fridge. Ignoring transport and thermodynamic effects that may affect temperature coming from the CO₂ tank (effects I

believe are likely negligible, anyway), this leads to the answer given for the second question. Obviously, changing that CO₂ tank to the inside of the fridge and repeating will see no decrease in pressure.

However, my suspicion is that the reason the question was asked was to determine the best place to keep the CO₂ tank to deliver gas to beer. In that case, it doesn't make much of a difference. When one initially turns on the gas, warm gas will

be delivered at a regulated psig and that initial pressure would drop over time if not regulated. That said, the regulator will continue to deliver gas to the headspace of the keg until all gas from the start of the regulator through the headspace volume is at the set regulated pressure, regardless of temperature. While initially differing amounts of gas might be delivered, gas will cool quickly and the regulator will continue to deliver gas to maintain the regulated pressure.

Patrick Mousaw
Granger, Ind.

Cold Brew

Dear Zymurgy,
I thought I'd share a photo of a recent brew session with you. This is my garage in Denver where the air inside was hovering around 5° F! This made for one seriously steamy saison!



Keep up the good work! I love the AHA and Zymurgy more than in-ground swimming pools. Seriously.

James Kunz
Denver, Colo.

Send your Dear Zymurgy letters to zymurgy@brewersassociation.org. Letters may be edited for length and/or clarity. Hey homebrewers! If you have a homebrew label that you would like to see in our magazine, send it to art director Allison Seymour at allison@brewersassociation.org.

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by Professor Surfeit



Gluten-Reducing Enzymes

Dear Professor,

I have followed Charlie Papazian's articles about brewing gluten-reduced beer (November/December 2009 Zymurgy) with great interest and have used the Clarity-Ferm enzyme in a couple of batches.

I have good friends with celiac disease and one is fairly sensitive. I have been researching making a sorghum beer for them but heard these beers usually don't taste very good and are fairly expensive to make, if you can find all the ingredients. Papazian's articles really caught my attention and I began to search where I could find the gluten-reducing enzyme so I could give it a try.

I called White Labs and had a good talk with them about Clarity-Ferm and its possible effects. As it turns out, I was able to get two samples. I brewed a robust porter and a Belgian tripel and used one vial (5ml) in each batch. I gave a bottle of each style to my friend who is fairly sensitive with the warning that "you are the experiment"! She drank a bottle of each style and had no problems, neither when she drank it nor the next morning. She even had a couple bottles of the porter at our Super Bowl party. My other friend had the tripel and also had no effect from it at all, except maybe a little effect from the alcohol. I also gave a bottle of the tripel to a friend who gave it to someone they know who is a celiac. No problem! She didn't like the style but drank it anyway to see if it had any effect.

I just wanted to share with you the experiences I have had so far with the Clarity-Ferm. These folks love it because now

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they can have a beer that has flavor and body, and in a variety of styles. It certainly beats sorghum beer.

Thanks for the articles and the research Papazian has done. This is a very huge move forward for folks who have celiac disease and love good beer!

Dave Hrdlicka
Christiansburg, Va.

Dear Dave,
I've passed on your comments to Charlie, who says he continues to get positive notes and thanks from others who have dared. He continues to make the point that every person out there diagnosed with celiac disease is an individual and generalizations about safety with such products are not applicable to all. One needs to carefully assess the success of using such products as Clarity-Ferm.

I feel fortunate not to have celiac-related issues, but if I did, I know that there is hope with products such as these for some individuals who want to enjoy beer as they have known it.

Gluten freely,
The Professor, Hb.D.

To Scrub or Not to Scrub

Dear Professor,
I was reading an article about the importance of cleaning your corny keg's draw tube. Recently, I purchased some keg cleaner tubing and I've been, in essence, auto-cleaning my kegs with a sump pump.

I was just wondering if you think this process will get rid of any buildup or residue that might accumulate, or if I should also ream and scrub the inside of the tubes as well. I haven't noticed any unusual bitterness or harsh phenolic flavor; however, I've only been using the kegs for a few months.

Regards,
Milan J. Bull
Stamford, CT

Dear Mr. Bull,
When it comes to draft line and plumbing cleaners and sanitizers, there are many. All of them promote that they "do the job."

There are many extenuating circumstances involved with whether a cleaner will actually do the job it says it will. Some do and some don't. Your safest and best bet is always to physically scrub it. You can also do a chemical treatment before or after, but also brush-reaming the short pieces of plumbing most homebrewers deal with can help assure you get it clean.

I use a powdered chlorinated kitchen cleanser such as Ajax or Comet with water. Sometimes I'll dip my brush into some high-proof alcohol to get stuff that is more alcohol-soluble than water-soluble.

Keeping it clean,
The Professor, Hb.D.

Liquid vs. Dry Malt Extract

Dear Professor,
I'm sure the question has been asked before, but what is the difference between liquid malt extract [LME] and dry malt extract [DME] other than moisture content? I know that DME is easier to measure than LME.

I'll sometimes see a recipe that calls for both light LME and light DME. If there are different brand names in the recipe I assume there is a flavor difference. Generally speaking, don't light DME and LME have the same flavor?

Cheers,
John Kelley

Dear John,
People love to generalize. But you can't make great beer by always believing generalizations. Simply speaking, it's not easy to generalize except that the difference is moisture content.

Dry malt tends to stay "fresher" than syrup. Malt syrups can change over time due to water content and storage conditions.

One particular brand of dry malt will be different than another brand of dry malt. The same thing is true of brands of syrups. Different ingredients and different manufacturing processes all influence quality. You know this from making your own beer. Malt manufacturers use different qualities and varieties of malt. They also may use different

equipment and different processes to produce their malt extracts.

Fresh 100-percent malt extract syrup is usually excellent quality and produces terrific beer. The same is true of dry malt extract, which keeps its freshness longer if kept under cool, dry conditions. But always remember "quality" is subjective.

Syrup can be substituted for dry extract and vice versa. The conversion factor is to use 85 percent of dry when substituting for syrup.

Recipes are one person's preferences based on individual experiences and sometimes don't really equate to useful generalizations.

Vaguely,
The Professor, Hb.D.

Keeping Beer Arrogantly Hoppy

Dear Professor,
I have a really big beer that I want to brew and I really do not want to mess this up. This beer is very big, very hoppy, and somewhat arrogant. I want to use late hop additions to this brew.

Specifications:

IBUs: 65-69
OG: 1.081-1.085
ABV: 8.0-8.5%

I want to get as much flavor and aroma as I can from this brew. When should I add these hops?

1.0 oz Columbus bittering hops, 14.4% a.a.
1.0 oz Columbus aroma hops, 13.9% a.a.
1.0 oz Columbus flavor hops, 14.4% a.a.

Should I cut back on the bittering hops? I have been told that I have to double the amount of hops to make a beer of this gravity.

Thanks in advance,
Larry Sims

Dear Larry,
As the gravity of the boil increases, the utilization or extraction of hop bitterness is inhibited. For a given volume of boiling wort, if you use X amount of hops for Y amount of

hop bitterness, it does not follow that doubling X amount of hops for a recipe with twice the gravity will give you the same Y bitterness. In fact, because of the increased density, you'd have to use more than double the hops to begin approaching the same measured/calculated bitterness.

But bitterness is all perception. Contrary to what most brewers assume, bitterness is not measured by calculation. All calculations and measurements do is determine the amount of isomerized alpha acids in beer. They don't measure the perception of the bitterness. The perception of bitterness varies with the individual who is enjoying the beer and the circumstances in which it is enjoyed.



Now, to answer your questions. It's best to add the flavor hops at either the final one minute of the boil or the steep after boiling is complete. It's best to put the aroma hops in during the secondary fermentation, when most of the ferment is already complete. It's also best to keep the secondary ale ferment at cellar temperatures (60° F or 15° C) and the dry hops in contact with the ale for five to 10 days. For lagers (33-38° F or 0.5-3° C), add the dry hops during the final five to 10 days of the lagering period.

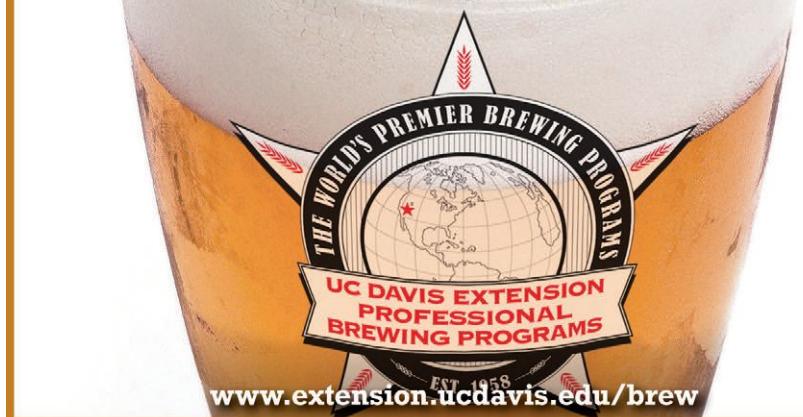
Late hopping in the wort and dry hopping will increase the perceived bitter flavor of the beer, but it will not increase the measure of bitterness units very much. The flavors and aromas can trick the mind into believing the beer is more bitter. It may be more bitter, but slightly so and not as a result of isomerized alpha acid bitterness.

Arrogantly,
The Professor, Hb.D.

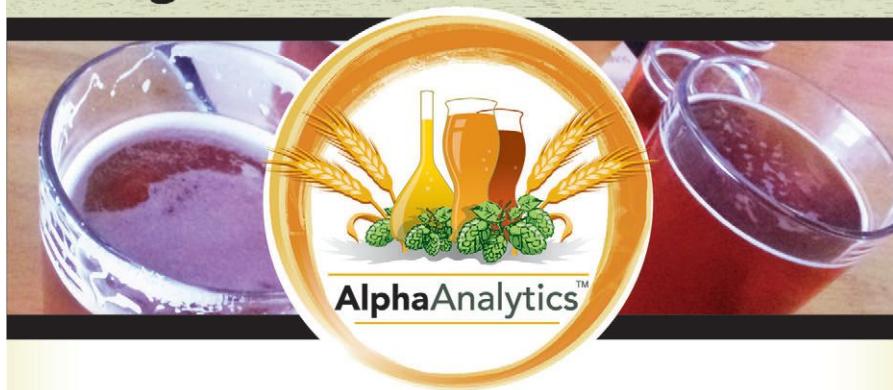
Hey homebrewers! If you have a brewing-related question for Professor Surfeit, e-mail professor@brewersassociation.org.

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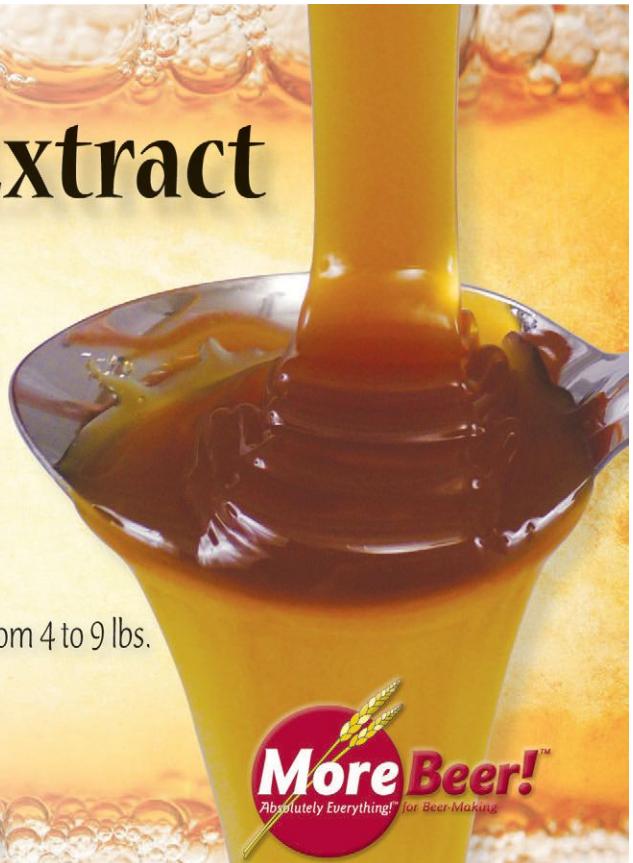
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By Amahl Turczyn Scheppach



Malt Extract: Late Addition Brewing



Certain beer styles benefit from high sugar concentrations in the kettle. The inevitable Maillard reactions between amino acids and a dense sugar solution will add color, body, and complexity to heavier, less-fermentable beer styles like old ales and Scottish wee heavies. So if this is your goal, adding all your malt extract at the beginning of a full-wort boil works well.

In a partial-volume boil, say with a 2-gallon brew pot on the stove, to be topped up to 5 gallons with cold water after the boil, the darkening, thickening, and sweetening effects are even more pronounced. And with a thin-bottomed kettle, further darkening can occur as settled sugars adhere to the superheated lower surface and scorch. This darkening and thickening (since the resulting wort will be less fermentable) may be great for a barleywine, but if you are brewing an all-extract Pilsner, you may be looking for an alternative.

Fortunately, there is a possible solution to achieve a light color as well as better hop utilization: late addition extract brewing. This method has the brewer add only a portion of the total extract bill at the beginning of the boil. This partial-strength wort is boiled with the kettle hops, then the remainder of the extract is added 15 to 20 minutes from the end of the boil. At first, better utilization may seem counterintuitive with this method—after all, there is less malt present for the hop compounds to bind with during the boil. But it turns out that low wort density is critical to extracting the most bitterness from hops. OK, you counter, then why not just boil the hops in plain water to extract bitterness, then add the full amount of malt extract toward

the end? Your utilization would certainly be very high that way; you'd essentially be making a hop tea, then adding the malt component later. But pH becomes a factor here. Decoction mashers know that a full-strength mash can safely be boiled without fear of extracting harsh tannins from the grain because the pH is sufficiently low to provide a buffer. For much the same reason, a 5.2-pH wort will not extract harsh-tasting, vegetal, or astringent polyphenols, but 7-pH water certainly would. Proteins from a malt-based wort also play a role in bonding with and removing some of those harsh compounds, as well as some bitterness.

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Before Capone (Classic American Pilsner)

PARTIAL MASH RECIPE

This recipe is based on Tom Gardner's gold-medal winning recipe in the 2011 Great American Beer Festival (GABF) Pro-Am Competition. The 11 gallon (41.6 L) all-grain recipe is found in the January/February 2012 issue of *Zymurgy*.

INGREDIENTS

for 5 U.S. gallons (19 liters) using a 3.7-gallon (14-liter) boil
2 cans (6.6 lb or 3 kg) Coopers Pale Liquid Malt Extract
1.0 lb (0.45 kg) pale malt (six row)
1.0 lb (0.45 kg) flaked maize
1.75 oz (50 g) Tettnang pellets, 4.5% a.a. (FWH*)
1.5 oz (42.5 g) Tettnang pellets, 4.5% a.a. (60 min)
0.5 oz (14 g) Tettnang pellets, 4.5% a.a. (1 min)
0.75 tsp (3.75 g) Irish moss (15 min)
4 packages Wyeast 2035 American Lager Yeast or 4 packages White Labs WLP840 American Lager Yeast, or an equivalent size yeast starter

*FWH=first wort hopping

Original Gravity: 1.058

Final Gravity: 1.015

IBU: 38

SRM: 7

DIRECTIONS

Use a smaller pot with a grain bag to hold all of the crushed grain and flaked maize. Heat 3 quarts of water (2.8 L) to 122° F (50° C) and immerse the grain in the bag. Gently stir the grain to make sure there are no dry lumps. Once the temperature has been stable at the protein rest temperature for 20 minutes, raise the temperature to 144° F (62° C) and hold for 30 minutes. Raise the temperature to 158° F (70° C) and hold for 30 minutes for the saccharification rest. In a larger pot (your boil kettle), heat 2 gallons (7.6 liters) of water to 168° F (76 °C). Remove the grain bag from the small pot allowing the water to drain from the grain, and then move the bag to the larger pot. Swirl the bag in the larger pot and allow the grains to steep at that temperature for 10 minutes. Remove the grain bag from the larger pot, allowing it to drain, and then compost or discard the grains.

We'll talk more about how proteins and hot break affect utilization a bit later on.

Alpha acids isomerize and then become soluble in wort during the boil; the conversion of humulone to isohumulone is a fairly inefficient process even under ideal conditions, as only about 30 percent of alpha acids become isomerized and then solubilized. But it represents the most desirable kind of hop bitterness. Other bittering reactions occur, but they are less desirable. For example, beta acid oxidation during the boil also contributes to perceived bitterness in the finished beer, but it's a comparatively harsh one.

So how can we maximize hop utilization? Having an optimal gravity helps—regardless of your kettle volume, dissolve enough malt extract into your initial wort to achieve a gravity right around 1.048. Depending upon the style you are brewing and the size of your kettle, that could mean only 20 percent of your total extract bill goes in first. If you are using a two-gallon kettle on your stovetop, you might consider investing in a second one for a side-by-side boil. Boiling 4 gallons of medium-strength wort with a later extract addition will further increase your hop utilization efficiency, and can certainly help with those super-light, super-strong

Add the wort from the small pot to the larger boil kettle, and then stir in the extract before bringing it to a boil. The total boil volume will be 3.7 gallons (14 liters). Add the first hop addition just after the extract addition while the wort is heating to a boil. At the beginning of the 60-minute boil, add the second hop addition. Boil for 45 minutes then add the Irish moss. Boil for 14 more minutes and add the last hop addition for a minute. After the 60-minute boil, remove the hops and cool the wort. Transfer the wort to a fermenter with 2 to 3 gallons (7.6 to 11.4 liters) of cold water and top-up to 5 gallons (19 L), if necessary. Take a specific gravity reading. Pitch the yeast and aerate well. Ferment at 50° F (10° C) for two weeks. Rack to secondary and let sit for a day at 65-68° F (18-20° C) for a diacetyl rest. Lower the temperature gradually to 36° F (2° C) and store for three weeks. To carbonate, use Coopers Carbonation Drops; bottle condition using 2.5 oz (70 g) corn sugar; or force carbonate at 2.5-3.0 volumes of CO₂.

LATE EXTRACT ADDITION PROCEDURE

By adding one 3.3 lb can of pale Cooper's malt extract at the beginning of your boil (along with the extract from your mini mash), and the remaining 3.3 lb can 15 minutes from flameout, you can see the benefits of a late extract addition. Your initial gravity for the 3.7-gallon boil should be right around 1.045 during the first 45 minutes of boil time, allowing for maximum utilization. However, you will need to reduce the amount of kettle hops to retain the IBUs of the original recipe. Using 1.5 oz Tettnang for your first wort addition instead of 1.75 oz and 1 oz for your 60-minute addition instead of 1.5 oz should keep your total IBUs to just under 40. Your final hop addition can remain the same. Dissolve the first can of syrup completely in your mini-mash water, and remember to remove the kettle from heat when adding the second can of extract at 15 minutes to avoid scorching. Experimental types may want to brew this recipe twice; once with a late extract addition and once with all the extract at the beginning. Then you can make up your own mind if the flavor and color benefits of this technique (along with saving 0.75 ounce of hops) are worth it.

extract beers. But if you don't want the added investment, a single 2-gallon boil should suffice for most mid-weight styles.

A lengthy boil also helps: 60 minutes of boil time will get the most bitterness from your hops. If you are aiming for a higher gravity than 1.048, add your remaining extract 15 to 20 minutes before flameout. The extract has already been boiled once during its manufacture, so you needn't worry about quick-boil defects like dimethyl sulfate (DMS), but you should make sure it undergoes a brief boil for sanitation's sake. This is particularly true for dry malt extracts and bulk

syrups. With (presumably sterile) canned extract and necessary sanitary precautions, a careful brewer might be able to get away with adding it at flameout. Naturally, for mid-boil additions, make sure you remove the kettle from your heat source first, then make sure all extract is completely dissolved before it goes back on the burner. Just one little lump of maltose concentrate smoldering on the bottom of the pot can make a big impact on color and flavor.

Boil intensity also affects utilization. Make sure you have enough room in your kettle(s) to get a sustained, rolling boil going. This is especially important for whole hops. Pellet hops generally contribute more bitterness faster, and don't require as violent a boil for maximum hop bitterness extraction.

Other things that can affect hop utilization include pH and protein break. Isomerization is slightly better with a more alkaline wort; however, there are some positive benefits of lower boil pH that may outweigh the slight increase in utilization. Most beer wort pH falls naturally during the boil from around 5.6 to around 5.3. Taking it down closer to 5.0, however, results in less wort darkening, cleaner hop bitterness, and better protein removal from hot break. In fact, some pro brewers add a few grams of calcium (usually gypsum or calcium chloride) during the boil for this very purpose. A bit of lactic or phosphoric acid will achieve the same thing.

And speaking of hot break, with all due respect to Dr. Fix's first wort hopping technique, if hops are added to the kettle before hot break has a chance to form, utilization will decrease. Bittering hop compounds involved in the isomerization process bond with the same proteins that precipitate out of solution during the boil, as we saw above—the proteins remove harsh compounds like tannins, but they steal some bitterness too. So for maximum utilization, wait until hot break starts and then throw in your 60-minute hops. For a cleaner but slightly lower bitterness, pull a George Fix and get your hops into the wort before hot break forms. You'll lose a bit of

bite, but theoretically you'll end up with a smoother beer.

So how much more bitterness can you expect to get from your hops by using the late extract addition technique? Some brewers have reported increases of 20 percent or so, but without careful calculations, there are just too many variables to judge with any accuracy. One would have to calculate IBUs based on changing wort gravity and volume at each hop addition, then come up with a total IBU for the full

batch. With multiple kettles and evaporation rates, this can become even more of a headache. Fortunately at least one maker of brewing software, BeerSmith, has included a late extract addition option for those who want to give this method a shot but don't necessarily want to do the math themselves.

Amael Turczyn Scheppach is the associate editor for Zymurgy. He is a former professional brewer who now brews at home in Lafayette, Colo.

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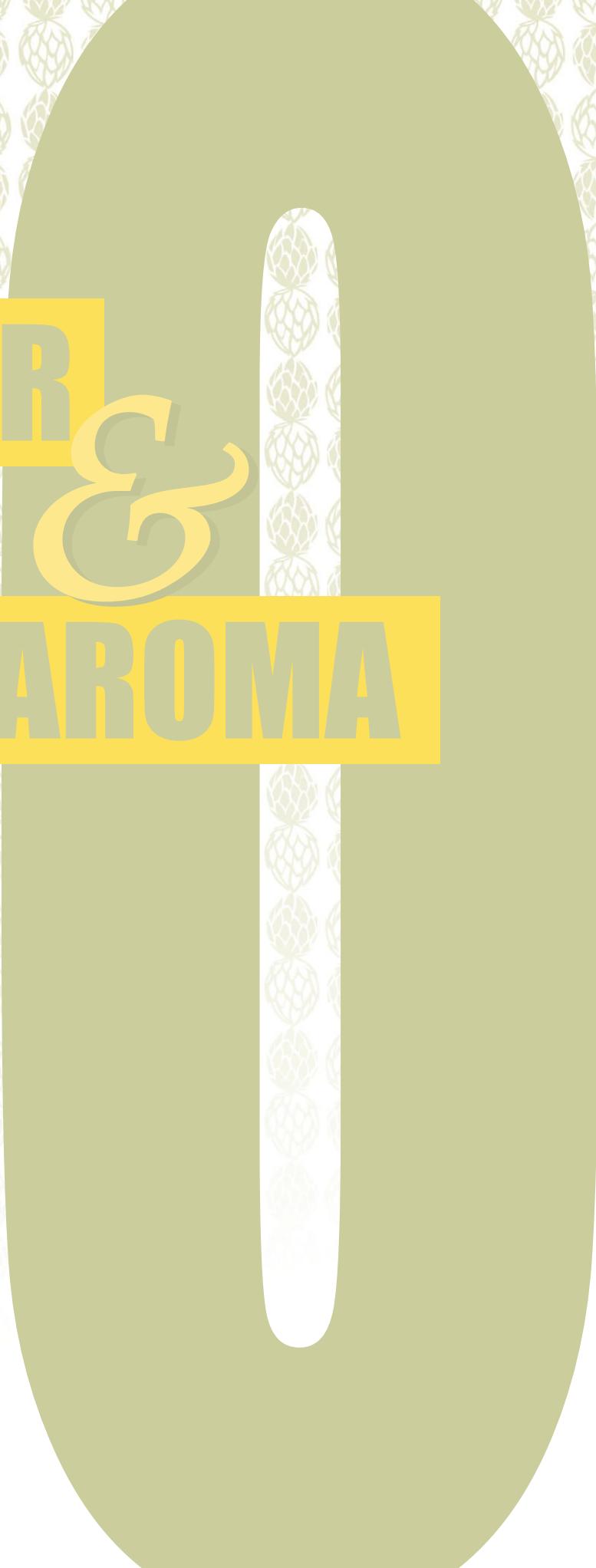
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FLAVOR & AROMA

BY STAN HIERONYMUS

A simple experiment illustrates the underlying complexity of hop aroma.

Steve Parkes, owner/lead instructor at the American Brewers Guild and a brewer himself for nearly 30 years, has guild students fill two growlers. One contains nearly finished beer with yeast present, and the other has no yeast. “Then toss in some Cascade,” he said. “Should I dry hop before I filter or after I filter? The result will be different.”

When Parkes conducted the experiment at Otter Creek Brewing, where he was the brewmaster before leaving in 2012 to start the Drop In Brewing Company, the growler that had no yeast produced a beer with grapefruit aroma and flavor closely associated with Cascade hops, while the beer with yeast had a rose water/geraniol (or geranium) aroma.¹

(WHY YEAST MIGHT BE THE SECRET INGREDIENT)



Why? That's the complicated part.

The chemistry related to bitterness derived from hop iso-alpha acids is relatively well understood. However, a recently published academic paper explains that, despite decades of intensive research, "because of the very complex chemical composition of hop essential oil itself and insufficient knowledge of the many (bio)chemical conversions of hop oil components during the brewing process, the chemical background of hoppy aroma is still ill defined."¹ That particular overview from Belgium detailed the need for more studies that examine the influence of yeast, *under brewery conditions*, on hop aroma.

The lack of earlier research did not keep Parkes from recognizing the value of finding a way to evaluate the impact of yeast on dry-hop aroma. The idea for the experiment resulted in part from

hearing David Ryder, vice president for brewing and research at MillerCoors, talk about the potential role that glycosides, likely facilitated by the presence of yeast, play in hop aroma. Parkes also drew from conversations with Sean Franklin of Roosters Brewing in England. Franklin talked about how yeast "reconfigured" the aroma profile of hops in his beers. Parkes allowed that his observations and Franklin's were anecdotal, but "seemed real nonetheless."

Scientists have since firmly established a variety of instances where yeast plays a key role in the transformation of hop oil-derived compounds into distinctive "hoppy" aromas.

A Bit of Background

Hop oils, also known as essential oils, constitute up to 4 percent of the hop cone. They include 50 to 80 percent

hydrocarbons, 20 to 50 percent oxygenated hydrocarbons, and less than 1 percent sulfur compounds. Hydrocarbons are highly volatile, not very soluble, and are perceptible in finished beer only when added very late in the boil or post-fermentation. The oxygenated compounds are more soluble and aromatic. Their aromas, or new ones resulting from the fermentation process, are more likely to show up in finished beer.

Myrcene, caryophyllene, humulene, and farnesene are the four most prominent oils. The first is a monoterpen, meaning it consists of 10 carbon units, while the latter are sesquiterpenes (15 carbon units). Myrcene has a green, herbaceous, resinous aroma associated with fresh hops and is not always considered desirable. It often constitutes 50 percent or more of the oils in American cultivars but is volatile, and most of its aroma is lost during boiling. In their oxygenated form, sesquiterpenes are more likely to survive into finished beer, their resulting aromas often described as "fine" or "noble." Many other sesquiterpenes occur only in some varieties; for instance, Hersbrucker contains several not present in other cultivars.

As a hop ripens, other monoterpenes form along with myrcene, their presence often measured in tenths of a percent—minuscule when compared to myrcene levels in some American cultivars. The compounds include linalool, geraniol, nerol, citronellol, isobutyl isobutyrate, and limonene. They produce the citrus, fruity, floral, and woody aromas that many popular new hop varieties share.

These are not new discoveries. In 1992, Gail Nickerson of Oregon State University and Earl Van Engel of Blitz-Weinhard Brewing proposed establishing an Aroma Unit (AU) comparable to the International Bitterness Unit (IBU). They intended that brewers would use their Hop Aroma Component Profiles along with the AU, much as they would use the alpha acid content of a particular variety to adjust hopping rates. "(Since the 1960s) scientists have tried to identify the compound responsible for hoppy character in beer without success. Hoppy aroma in beer is probably not attributable to a single com-

**"HOP AROMA in beer is probably
NOT ATTRIBUTABLE to a SINGLE COMPONENT
but rather to the SYNERGISTIC EFFECT OF
SEVERAL COMPOUNDS."**

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10 Hops to Look For

In Germany, the hop breeding program at the Hop Research Center in Hüll previously focused on maintaining the aroma quality of traditional hops such as Hallertau Mittelfrüh or finding new varieties with similar character. Now its mission includes a search for “unhoppy, fruity, exotic flavors derived from hops” and developing hops with those aroma traits. The Germans freely credit American craft brewers with popularizing such aromas and flavors.

New hop varieties are constantly being explored and developed in the U.S. as well by the Hop Breeding Company among others, and by farmers such as Eric Desmarais, who owns one of the hot proprietary varieties, El Dorado; and Todd Bates, who collected various plants growing wild in northern New Mexico then cross-pollinated some of them with each other.

Here's a list of 10 new hops to watch for.

Calypso (12-14% AA): Not as tropical as the name might imply, but rich in both stone fruits (pears and peaches, notes of cherry) and citrus.

El Dorado (14-16% AA): Available in quantity for the first time. Intense aromas: stone fruits (pear, cherries), candy (Lifesavers).

Hallertau Blanc (9-12% AA): As the name implies, this new German release has some muscat/wine qualities. Also passion fruit and gooseberry.

Hüll Melon (6.9-7.5% AA): The fruitiest of the four new hops from Germany, most notably honeydew melon, then strawberry.

Kazbac (5-8% AA): Its strong, spicy aroma sets it apart from other Czech hops. Lineage includes wild Russian hops.

Mandarina Bavaria (7-10% AA): The most popular of the new German varieties in early tastings. Much like its mother, Cascade, but fruitier and more herbal.

Mosaic (11-13.5% AA): Previously known as HBC 369. Available in quantity for the first time. A daughter of Simcoe. Rich in mango, lemon, citrus, pine, and, notably, blueberry.

Polaris (19-23% AA): Fourth new release from Germany, with highest alpha acids yet. Striking oil level (4.4% in 2011) and ice candy/peppermint aroma.

Triskel (8-9% AA): Grown in Alsace region, a cross between French Strisselspalt and the English variety Yeoman. Mild enough to suit a pale lager but with an oil profile (floral, citrus) that fits American-style ales.

Wai-ti (3% AA): From New Zealand and in short supply. Intriguing low alpha/high oil (up to 4%) combination drawing attention for potential dry hopping cask beers.

For more information on how new hop varieties are developed, see the article “American Aroma Hop Breeding” by Jason Perrault in the May/June 2012 *Zymurgy*.

ponent but rather to the synergistic effect of several compounds,” they wrote.² The AU didn’t gain traction, in part because hop aroma proved so hard to quantify.

Synergy: A Constant Wild Card

The importance of synergy makes the contribution of individual compounds even more difficult to measure. For instance, German scientists reported that a mixture of caryophyllene and nerol had a flavor threshold of 170 parts per billion, compared to single thresholds of 210 parts and 1,200 parts per billion, respectively. The same was true of other mixtures, such as farnesene and linalool. The ratio of the blends also changed the threshold of perception.³

In Japan, researchers have investigated how geraniol and citronellol, in the presence of an excess of linalool, contribute to citrus aromas and flavors. The project, headed by Kiyoshi Takoi and supported by Sapporo Breweries, focused on the Citra hop in an effort to identify the key flavor compounds contributing to the aromas specific to the variety—including passion fruit, gooseberries, and lychee.

They focused on geraniol and linalool by brewing one beer with only Citra hops and another with Hallertau Tradition and coriander seeds. Both Citra and coriander are rich in geraniol and linalool. The finished Citra beer contained not only those two oils but also citronellol, which had been converted from geraniol during

fermentation. The same transformation from geraniol into citronellol occurred during fermentation of the beer made with coriander. Taste panels perceived the beers as relatively similar. The results suggested the importance of citronellol and an excess of linalool in the hop-derived citrus flavor of beer, but because

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there was little citronellol in raw hops, the generation of citronellol depended on the geraniol metabolism by yeast.⁴

Takoi and associates followed with another study that compared the composition of monoterpenic alcohols in various hops and examined the behavior of geraniol and citronellol under various hopping regimens, including the use of different hop blends.

They determined that the geraniol content in finished beer could be increased by delaying the final hop addition; that is, adding hops three days into fermentation or even at the end of fermentation rather than at the end of the boil. They also concluded that blending geraniol-rich hops increased the amount of geraniol and citronellol in beer, and that this enhanced citrus character.

For instance, a tasting panel found a beer made with Apollo and Bravo hops more flowery and citrusy than one brewed with Apollo alone. The same effect was achieved with a beer that included a combination of Simcoe and Bravo compared to Simcoe alone.

Analysis showed that Bravo, Cascade, Citra, Mosaic, and Chinook were particularly geraniol rich, and that varieties such as Amarillo and Apollo contained relatively high levels. In contrast, European cultivars such as Saaz, Hallertau Tradition, and Hallertau Mittelfruh contained almost no geraniol. Therefore, the researchers wrote, "We regarded that geraniol-rich profile is one of the important characters in the U.S. hops."⁵

Another recent study adds proof of the importance of yeast, specifically what scientists call biotransformation. Takako Inui at Suntory Liquors examined how hops change throughout the brewing process, including during fermentation. He used two different yeast strains, finding that although "the same cold wort was used for the fermentations, significant differences in hop aroma portraits were perceived. The obtained results thus are attributable to differences in metabolites generated from the components derived from hops by different yeasts."⁶

Tom Nielsen at Sierra Nevada Brewing explains that the bar in his job title, Technical Lead—Flavor | Raw Materials, reflects the balance between those two areas. It illustrates that the matrix that results in hop aroma is part of a larger complex enveloping beer aroma, something he deals with on a daily basis. Like other hop and flavor scientists, he uses the word “synergy” often and points to the importance of understanding the physical interactions and biotransformations that occur in the presence of yeast.

Nielsen provided multiple examples to brewers during a presentation at the 2008 Craft Brewers Conference. For instance, he isolated four desirable fruity esters that are not present in unhopped wort or hops themselves but result from the fermentation and aging of beer. In theory, they arise from the breakdown of alpha and beta acid side chains and the subsequent cheesy-smelling, short-chain fatty acids. The flavor implications are significant but complicated, because a larger concentration of those short-chain fatty acids creates a greater potential for pleasant, fruity odors more easily detected (in other words, at lower thresholds) than the unpleasant, cheesy acids. What at first seems a negative turns out to be a positive.

What's New is Old Again

Current research focuses first on New World aromas, such as lychee or mango, that commonly result from hops grown in the American Northwest, New Zealand, and Australia. It wasn't long ago that those attributes were considered undesirable. ". . . these (flavors) up to now were regarded in our program as not suitable for brewing," said Zdenek Rosa, manager of Hop Growers Union of the Czech Republic, speaking from a traditional perspective. "These are off-flavors for us."

It turns out that yeast also play a similar role in the Old World aromas, sometimes referred to as "noble." What's long been called "kettle hop flavor" is not easily described, and the chemistry resulting in it has not been fully established. "We knew we didn't know the answer," said Val Peacock, a former Anheuser-Busch hop scientist who now advises several

Hop 2 It

R&D single-hop brew, developed by Vinnie Cilurzo, Russian River Brewing Co.

Grain bill

74%	Two-row malt (domestic)
13%	Maris Otter malt (English)
10%	20° L Crystal malt (domestic)
3%	acidulated malt (German)

Original gravity: 1.052-1.056

(12.9-13.8° P)

Final gravity: 1.010-1.012

(2.6-3.1° P)

IBU: 30-40

ABV: 5.5%-5.8%

Instructions

Use the same malt bill each time. Keep the dry hop, final hop addition, and middle hop addition the same quantity each time. The only variable between each single-hop batch is the hop variety itself and the quantity of the first hop addition, which will be based on your calculations to hit the target IBUs. So, a lower alpha acid hop will have a higher 90-minute hop addition, and vice versa for a higher alpha hop.

Mashing

Single-infusion mash at 154° F
(68° C).

Hops

90 minutes (5 to 10 IBU)
30 minutes (20 IBU)
0 minutes (10 IBU)
Dry hop, 1 week at 68° F (20° C), variable
Boiling: 90 minutes
Yeast: California Ale
Fermentation: 68° F (20° C)
Packaging: Target 2.5 volumes CO ₂ (5 g/L)

Sample Hop 2 It Recipe

Adapted from Vinnie's recipe by Amahl Turczyn Scheppach

Ingredients

for 5 U.S. gallons (19 liters)

Single hop: Cascade pellet hops at
5.75% alpha acid

7.6 lb	(3.45 kg) pale two-row malt – 74.3%
1.3 lb	(594 g) Maris Otter pale malt – 12.8%
1.0 lb	(454 g) 20° L crystal malt – 9.8%
5.0 oz	(142 g) acidulated malt – 3.1%
0.25 oz	(7 g) Cascade pellets, 5.75% a.a. (90 min) – 6.2 IBU
1.5 oz	(43 g) Cascade pellets, 5.75% a.a. (30 min) – 21 IBU
2.0 oz	(57 g) Cascade pellets, 5.75% a.a. (steep 1 min) – 9.2 IBU
2.0 oz	(57 g) Cascade pellets, 5.75% a.a. (dry) – 0 IBU

California ale yeast

Efficiency: 75%

IBU: 36.5

OG: 1.055 (13.62° P)

Directions

Single-infusion mash at 154° F (68° C). Boil for 90 minutes. Ferment at 68° F (20° C). Target 2.5 volumes CO₂ (5 g/L) for packaging.

Extract version: Substitute 6.75 lb (3.06 kg) pale malt extract syrup for two-row, Maris Otter, and acid malt. Steep crystal malt in 160° F (71° C) water for 30 minutes. Drain, rinse grain, dissolve extract completely, and proceed with boil.

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Alt, Lemon, English-style Ales, Munich
Helles

US PERLE
Alpha: 8.7% Beta: 1.7%
Aroma - Slightly Spicy & Fruity
Typical Beer Styles - American Lager, American Pale Ale, American Strong Ale, Barley Wine, Kolsch

SUMMIT™
Alpha: 18.1% Beta: 5.5%
Aroma - Citrusy, Hops, Pineapple, Tropical Fruits
Typical Beer Styles - American Pale Ale, American Strong Ale, Barley Wine, Kolsch

UK FUGGLE
Alpha: 4.2% Beta: 2.5%
Aroma - Fruity, Citrusy, Hops, Pineapple, Tropical Fruits
Typical Beer Styles - British Pale Ale, British Strong Ale, Barley Wine, Kolsch

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CRAFT BREWING SPECIALISTS

craft breweries, discussing research that long ago focused on linking essential oils to kettle flavor.

Looking beyond the lupulin gland—and compounds that mostly evaporate during a vigorous boil—led to the discovery of glycosidically-bound flavor compounds in hops that contribute to the complex aroma and flavor matrix. Glycosides originate from a protective mechanism of plants and consist of two parts, one a carbohydrate molecule and the other a non-sugar component called aglycone. In hops, different aroma compounds act as aglycones and are variety dependent. Unlike essential oils, some of these glycosides survive the vigorous wort boiling process. Combined, their parts are odorless and nonvolatile (so they cannot be analyzed using gas chromatography), but various yeast strains cause individual cleavage of glycosides, freeing the aromatic component and adding to what is called kettle hop flavor.⁷

Much of the early research related to glycosides was conducted at Miller Brewing, now MillerCoors, which brews many of its beers using only hop extracts. Carbon dioxide extraction separates hops into the lupulin gland fraction and a lupulin-free solid. Miller discovered that a beer made with only CO₂ hop extract, which did not contain glycosides, lacked kettle flavor. "We think true kettle hop flavor is a product of yeast and hops," said Pat Ting, a chemist who began working at Miller in 1978 and retired in 2011. "Sometimes it can be similar to hop oil flavor, but it's not exactly the same."

Brewers struggle to find just the right adjective. "Crisper," Ting said. "People usually cannot describe a hoppy flavor. They associate hop flavor with hop oil content, but that is not what they describe." Ting explained that this flavor does not result simply from hydrolyzed glycosides but also from the subsequent bioconversion by yeast and perhaps even enzymes and microorganisms in the mouth.

Quite obviously, scientists have much more to learn about hops. But as Parkes and Franklin illustrated, brewers don't have to wait for the results to conduct their own experiments.

A Starting Place

Vinnie Cilurzo of Russian River Brewing in Santa Rosa, Calif., wrote his recipe for Hop 2 It when the brewery was still located in Guerneville. "You actually have to brew with hops to figure them out," he said. He still uses the recipe to evaluate new varieties, but it would also work to examine the impact of other variables.

"The idea behind the beer was to have the exact same malt bill and hop bill, where the only thing changing is the actual hop variety and the quantity of the first hop addition, which was changed only to match the bitterness from batch to batch. I started out brewing with lots of old-school varieties, Eroica, Bullion, Bramling Cross, Brewer's Gold, etc.," he said. "Then I moved into the more common hops, Cascade, Centennial, Chinook, CTZ, etc. From there I went to the new varieties and was lucky enough to brew with several hops that were in their experimental stage that are now in the trade. This included what became Palisade and Simcoe."

Simcoe, of course, became an essential part of Russian River's Pliny the Elder, and in turn Pliny the Elder helped make Simcoe a popular variety.

"Brewing with single hops rarely yields a beer that could be an actual ongoing recipe, but it does teach you what component of the hop works and does not work," he said. "For example, I remember brewing with Amarillo in Hop 2 It; it had an awful bitterness, but the flavor and aroma were just fantastic. I've never used it for bitterness since."

The key to any brewing experiment, of course, is to change only one variable at a time. Cilurzo does that with hop varieties. Parkes did that by using the same wort, filtered and unfiltered; researchers in Japan by using different yeast varieties; others in Japan by blending two different hops (perhaps one rich in geraniol and the other not) with a base hop; and still others by changing when they made hop additions.

The possibilities seem limitless, and could be a great project for a homebrew club or just a curious homebrewer.

Stan Hieronymus is the author of the recently published book *For the Love of Hops: The Practical Guide to Aroma, Bitterness and the Culture of Hops*, available from Brewers Publications. Much of the information for this standalone article is derived from the book.

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You've cooled the wort after a 60-minute boil. The hard part is done, right? Now all you need to do is transfer to a fermenter, get some oxygen in there, add your chosen yeast strain, and let the magic begin. Choosing the right yeast strain, though, is critical for a successful beer. Yeast is the personality of beer.

Most brewers will be perfectly happy using only one yeast strain for each beer they create. But for those who want an innovative way to achieve greater complexity, blending select strains can enhance the good and minimize the less desirable qualities of each. Blending yeasts, when done properly, can take your brewing to another level.

Blending Yeasts 101

Learning what yeasts contribute to a beer is a lot like learning what specialty

malts contribute to a beer. It does you no good to add 10 different malts to a beer and then try to decipher what each one does. The same goes for yeast. To understand the fermentation profile of each yeast, it's a great idea to experiment using single strains. At the very least, this will give you a good grasp of the strains you want to blend, so you can see what the other is contributing for better or worse. There are no shortcuts for learning how any of your ingredients affect the final beer.



Blending yeast strains can create a unique and compelling beer with layers of complexity. Blending can also make up for the shortcomings of certain strains—specifically attenuation (the degree and speed at which yeast eats sugars and creates alcohol) and also flocculation (the rate at which yeast falls out of solution). Regardless of the number of yeasts that are pitched, it should be done the same way you would pitch one strain—directly after the wort has cooled, and with proper oxygenation.

Our goal with blending yeast should be to create a better beer, not just a novel one. Essentially what we are doing when we approach yeast blending is playing matchmaker to the yeasts. We are first trying to find yeasts that will benefit from one another in regards to the flavor and aroma profile. Secondly, we are finding yeasts that can improve each other's performance.

Improved Fermentation Performance

Many professional breweries use Chico (White Labs California Ale/WLP001; Wyeast American Ale/WY1056) as their

house strain. Chico is popular with professional brewers as well as homebrewers because it quickly and efficiently ferments beer. Chico is also one of the “cleanest” strains available, meaning it’s a subtle yeast that lends little flavor and aroma contribution to the final beer.

Chico is a good example of a great yeast with one major shortcoming—it is slow to flocculate, meaning the beer will stay cloudy because the yeast will not fall out of solution quickly. It can take much longer than we would like, especially if we are racking our beer to Cornelius kegs.

Many professional breweries filter and fine, so they have no problem dealing with Chico’s flocculation issues. And as a homebrewer, if you are willing to take a month for secondary maturation, or if you don’t mind cloudy beer, you may not mind this slower flocculation rate, either.

But we can overcome Chico’s flocculation problem by blending with another yeast that flocculates quickly. Good examples are Pacific Ale yeast from White Labs (WLP041), or English ESB from Wyeast

(WY1968). Using a blend with one of these yeasts, the beer will achieve acceptable flocculation in a matter of days, instead of weeks or months, and will still maintain Chico’s powerful fermentation performance.

If you primarily want the performance advantages of a certain yeast, keep the percent you blend with it to only five to 10 percent of total yeast pitched. Increase this percentage in relation to how much of the strain’s profile you want present in the beer. Fifty-fifty blends are always fun, just to see which yeast provides the most dominant characteristics. You can adjust percentages up and down to suit your personal tastes.

See the sidebar “Weighing Out Yeast Percentages” to get a good estimation of the percentage and amounts (cell counts) of yeast to pitch.

“Side by Side” Saison

Ingredients

for 5 U.S. gallons (19 liters)

9.0 lb	(4.08 kg) Pilsner malt
1.5 lb	(0.68 kg) Munich malt
0.5 lb	(227 g) flaked wheat
1.0 oz	(28 g) Saaz hops (5% a.a.) 60 min
1.0 oz	(28 g) Saaz hops (5% a.a.) 15 min

Original Gravity: 1.055 (13° Plato)

IBU: 28

SRM: 4.3

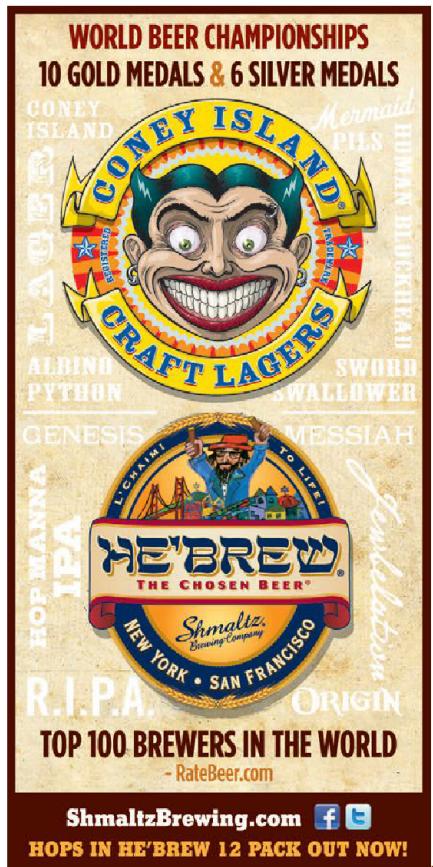
Brewhouse Efficiency: 71%

Directions

Mash at 148° F (64° C). Brew this recipe first with Saison Dupont (WLP565, WY3724) alone. Then brew this recipe again with another Belgian-style strain blended with Dupont. Compare the results.

Extract Version

Substitute 6 lb Pilsner malt extract for Pils malt. Steep 1.5 lb Munich malt and 0.5 lb flaked wheat at 150° F (66° C) for 45 minutes. Drain, rinse, dissolve extract completely, and proceed with boil.



The Importance of Temperatures

Keep yeast temperature tolerances in mind when considering what yeasts will blend well together. Search for yeasts that have similar recommended temperatures. Furthermore, make sure to keep a close eye on your fermentation temperatures, especially at the beginning of fermentation when the yeast is kicking out the majority of its phenolic contributions to the beer. When in doubt, always try to keep the temperature at the lower end of the suggested range.

With any yeast or yeast blend, I believe in raising the temperature incrementally from the colder to the higher end of the suggested range over successive brews. This will help you learn the flavor and aroma (phenolic) contributions, both of which will increase along with the fermentation temperature.

At the homebrew level, controlling temperature can be difficult, but maintaining proper fermentation temperature is a large part of what differentiates homebrewed beer from professional craft beer. Master temperature and sanitization with your homebrew system, and you can make beer every bit as good as your favorite professional brewery.

Considerations for Belgian-style Strains

Belgian-style yeast is truly the yeast of the homebrew artist. Different Belgian-style yeasts lend incredibly diverse phenolic contributions to beer. However, some Belgian-style yeasts that have great phenolic profiles can refuse to attenuate properly, and others flocculate poorly.

One Belgian-style strain notorious for sluggish fermentations is Saison Dupont (WLP565, WY3724). This yeast has a fantastic profile: earthy, spicy, rich, and crisp. To me, Dupont yeast exemplifies what farmhouse (saison)-style beer is all about. However, Dupont can take upwards of a month or more to fully attenuate! This is frustrating when you have thirsty friends and full carboys.

To increase attenuation speed, you can blend Dupont yeast with as little as five to

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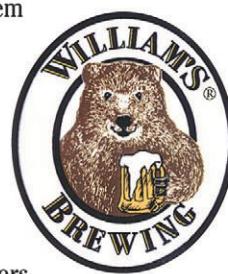
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Weighing Out Yeast Percentages

Requirements:

- 1- Small scale (good to the nearest tenth of a gram)
- 1- Calculator, pen, and paper
- 2- 500ml sanitized measuring cups for each yeast used (four cups with a two-yeast blend)

Although ideal pitching rates can vary with the type of yeast, a generally accepted rate for pitching most ale yeasts is:

$$1,000,000 \text{ cells yeast} \times (X) \text{ ml wort} \times \text{degree Plato of wort} = \text{number of total yeast cells needed}$$

For instance, 5 gallons (18,927 ml) of wort at 12 Plato (1.048 starting gravity) would require 220 billion yeast cells. Both Wyeast and White Labs suggest you approximate about 100 billion cells per pitchable package (Activator and vial respectively). Ideally, for this beer we will need a little more than two pitchable packages.

If you want to play with the percentages, simply measure out in grams on your scale into a sanitized container directly before pitching. Both White Labs and Wyeast estimate about a gram per ml of yeast slurry:

$$1g \text{ yeast slurry} = 1\text{ml yeast slurry}$$

Weigh out the total pitchable package and divide by 100 billion. This will give the number of yeast cells in each gram of yeast slurry. If each smack pack weighs 120 grams and we estimate each pack contains 100 billion cells, then:

$$100 \text{ billion yeast cells} \div 120 \text{ g yeast slurry} = 0.83 \text{ g per billion cells yeast}$$

As an example, let's say we want to make a 12 Plato beer with 80 percent WY1056 (American Ale yeast) and 20 percent WY1968 (English ESB):

$$220 \text{ billion cells total: } 44 \text{ billion cells WY1968, } 176 \text{ billion cells WY1056}$$

$$44 \text{ billion cells WY1968} \times 0.83 \text{ g per billion cells} = 36 \text{ grams (WY1968)}$$

$$176 \text{ billion cells WY1056} \times 0.83 \text{ g per billion cells} = 146 \text{ grams (WY1056)}$$

Use your scale and measuring cups to weigh out each yeast. Then pitch and enjoy.

If this seems too complicated, just throw in about a quarter of one pitchable package and three-quarters of the other. Chances are it will get you close to this, and it will still be a lot fun to drink.

10 percent of another yeast that attenuates quickly. Good examples are Westmalle (WLP530, WY3787), Achouffe (WLP550, WY3522), and French Saison (WY3711). Blending with one of these yeasts can greatly speed up the fermentation time of Dupont. What may have been a month-long fermentation can be whittled down to about a week.

Blend Dupont with Westmalle when you want to maintain the deeper, earthier flavors. Blend with Achouffe if you want a bit more of a light fruit character in the beer. Blending Dupont with French Saison also works well to speed fermentation, though from experience the French Saison yeast tends to dominate the overall yeast profile with its aggressive passion fruit character.

Even though many professional brewers use Chico for Belgian-style blending applications like this, I wouldn't recommend it to most homebrewers. Heat (over 74° F [23° C], the temperature at which Dupont properly ferments) can do bad things to Chico. Chico at five percent of the total yeast pitched wouldn't be noticeable in the final beer, but at 25 percent or more it will be. Unless you feel confident you can blend Chico precisely, use another Belgian-style strain and enjoy the unique phenolic contributions and layered profile it will provide to your beer.

Another delicious, but problematic, Belgian-style strain is Duvel (WLP570, WY1338). Although this yeast finishes aggressively, it is a poor flocculator. Again,

if you blend Duvel with a yeast that flocculates well like Achouffe or Westmalle, the beer will clear up much more rapidly. Both Achouffe and Westmalle, even in percentages as low as five to 10 percent of the total yeast pitched, will greatly assist a Duvel yeast-dominant beer with quicker flocculation (and most other poorly flocculating Belgian-style strains for that matter). These yeasts also provide additional layers of phenolic depth to enhance Duvel's crisp apple punchiness.

Because they have wide temperature tolerances and powerfully diverse phenolic contributions, Belgian-style yeasts have endless blending potential and are usually very forgiving to the temperature-challenged homebrewer.

A Final Word on Blending

Remember that with all yeast blending, our goal is to make a better beer, not to compromise the flavor and aroma of the beer for production speed. Blending yeast strains can create unique depth to your beer. Envision your ideal yeast profile and blend accordingly. Using charts from Wyeast and White Labs is a great way to get ideas about the potential compatibility of different yeasts.

Blending is still largely uncharted territory in the brewing world, available to homebrewers (and professional brewers for that matter) only in the last few decades. Although there are already endless options for potential yeast blends, more continue to be available through companies like Wyeast, White Labs, and the Brewing Science Institute who are always banking additional strains.

So go ahead, take some risks with your brewing and blend away. There is no right or wrong here; it's your beer. Why not make it your ideal beer?

Nathan Watkins was previously the head brewer for Southern Sun Pub and Brewery in Boulder, Colo. He has created beers that have won awards at the Great American Beer Festival and the World Beer Cup. He authored the "Making Great Coffee Beer" article in the September/October 2012 Zymurgy.



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Nanomashing:

Investigating Specialty Grains on a Small Scale

In the depths of an Indiana winter, when it becomes unpleasant to brew in the garage (as I usually do), it's time to work on something that doesn't involve trying to keep your propane tank warm enough to stay gaseous and actually flow, while simultaneously trying not to get frostbite. As a result, I started doing what I call exbeeriments in my warm, toasty kitchen. These involve anything from small-scale fermentations to examine the characteristics of various yeast strains, to the technique I'm about to describe for performing grain experiments.

By Agatha Feltus

• •

A year or so ago, I started thinking about how to do recipe formulation on a small scale. Typically I brew in 5- to 10-gallon batches, but, again, these are fermented in a refrigerator in the garage and I'm too cheap to spring for a dual-stage controller and a hot rock.

So, instead of freezing to death one February, I sat down and figured out this interesting fact: 100 g of grain mashed in 400 mL water is pretty close to 1.055 O.G. at reasonable efficiency. Coincidentally, this volume fits really well into a one-pint mason jar. So, if you put 5 grams of 20° L crystal malt (for example) in a jar of water filled to about the bottom of the threads, this is theoretically what a 5-percent contribution of a specialty grain would taste like in your full-scale batch.

I've done this several times now and find that these nanomashes help me in two ways. First, I get an accurate example of what a particular specialty grain will taste like to my palate and in my water, which is important because Central Indiana water is notoriously hard (for any given style, I have to choose between using hard, alkaline well water or building up from RO). Second, recipe formulation for malty, complex beers is much less wasteful.

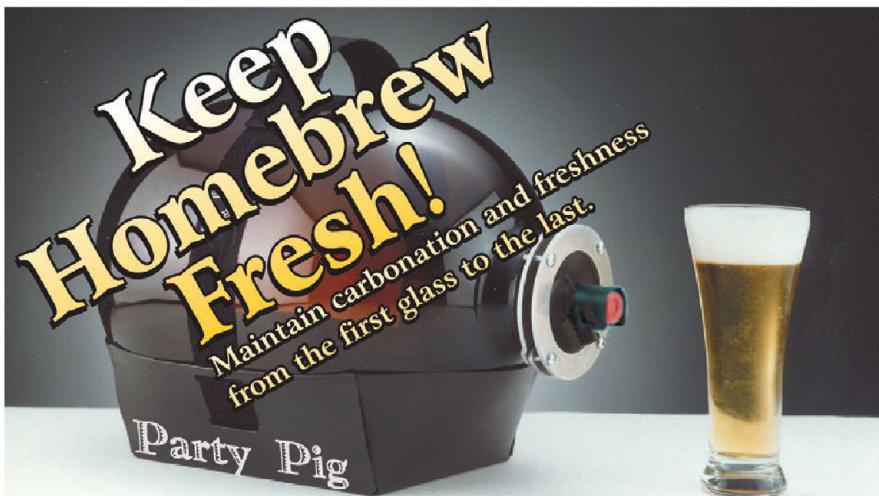
Let's say you want to find out exactly what 10° L crystal malt tastes like. (Aside from helping your own recipe formulation, if you are a BJCP judge, this can be a nice piece of feedback for a brewer to help them tweak a recipe.) You have some options: you can look it up on the maltster's website, or you can go to your local homebrew shop and sample some. If you go for the virtual approach, what you will find is that Crystal 10's flavor is described as "candy-like sweetness, mild caramel" on the Briess website, which is nice, but how intense is it? How much is too much for your pale ale? Three percent? Six percent? I'd rather not blow a full brew day only to find out that 5 percent is too much for what I was going for.

The Exbeeriments

Here's a third option. I came home one day with a box full of specialty malts and grains in 3-ounce bags. I heated some water to about 155° F (68° C) and



The first crystal malt experiment, lined up on my stove. From left to right they are (3 grams each, plus 97 grams of base malt): Briess Crystal 10, Briess Crystal 20, Briess Crystal 40, Briess Crystal 60, Briess Crystal 80, Briess Crystal 120, Castle Special B (120L), and Simpson's Extra Dark Crystal (150-160L).



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Mild Ale #3

Ingredients

for 6 U.S. gallons (22.7 liters)
(assumes 70% mash efficiency)

6.75 lb (3.06 kg) Maris Otter pale malt
9.0 oz (255 g) 60°L British crystal malt
9.0 oz (255 g) 120°L British crystal malt
4.0 oz (113 g) British chocolate malt
1.25 oz (35 g) debittered black malt
1.0 oz (28 g) UK Fuggle whole hops,
4.5% a.a. (60 min)
White Labs WLP002 or WLP023

Original Gravity: 1.035

Boil time: 60 min

IBU: 16

SRM: 17

ABV: 3.3%

Directions

Mash the grains at 152° F (67° C) for 60 minutes. You may have to adjust the pH depending on your water to compensate for the high percentage of crystal and roasted malts. Collect enough sparge volume to allow for a 60-minute boil, adding the hops at the start. Ferment at 62° F (17° C) for about two weeks, or until fermentation is complete. [Ed. note: Warm it up slightly if fermentation is sluggish or delayed.] Package to obtain about 2.5 volumes of CO₂.

Extract version: Substitute 4.7 lb (2.1 kg) liquid Maris Otter extract for the Maris Otter malt. Steep remaining grains per the recipe, add the extract, bring to a boil, and follow the recipe as indicated.

This is a versatile recipe that can be scaled up to make a brown ale. Choose your favorite British yeast strain to personalize the flavor.

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carefully weighed out 3 grams of each crystal malt stocked by my local homebrew store into a series of mason jars. I also added 97 grams of base malt (optional). I filled each jar with water and let it steep for an hour (my typical mash time). I then tasted each and took careful notes. As you can see from the photo, it was a very pretty experiment as well.

Here are my perceptions of each as captured in my brewing notebook:

Briess Crystal 10: light sweetness on the back of the tongue
 Briess Crystal 20: light caramel, lingers longer than C10
 Briess Crystal 40: more intense caramel, less sweet than 20L
 Briess Crystal 60: still less sweet, starting to get toffee
 Briess Crystal 80: less sweet than 60L, starting to get raisiny
 Briess Crystal 120: prune-like, definite toffee, lingers
 Simpson's Extra Dark Crystal (150-160): not sweet at all, raisiny
 Castle Special B (120L): same color as 80-120L Crystal, a lot sweeter, a little more acidic; reminds me more of riper fruit, rather than C120, which is more toffee-like

I threw in the last one to prove a point to myself, which is that while Belgian Special B may have the same *color* contribution as American Crystal 120, the *flavor* profile is completely different, and trying to substitute one for the other will ultimately be unsuccessful. Try this yourself if you are not convinced that country of origin is important for the fidelity of your grain bill. Now that I've tried this, I will never think it's OK to throw some Crystal 20 into an Oktoberfest instead of Cara-Vienne.

As a further trial, I mixed equal portions of all of them to taste. The resulting color was similar to 60L, but the taste was more complex and layered, making 60L seem one-dimensional. This was also true if I mixed 10L and 160L. The color was also very similar to C60, but the flavor was completely different, having the 160L's raisiny character with a sweet lift from the 10L that was very pleasant.

I considered this so successful that I moved on to roasted malts. In this case, I wasn't trying to taste each individually, but formulate a recipe. The nanomashes were conducted at 10 percent (10 grams in a 1-pint mason jar) in 152° F (67° C) water. This is way too much for everyday use for most roasted grains, of course, but I was just trying to get an idea of what the grain tastes like.

Here are my tasting notes:

Crisp amber: very pale straw, a little roasty/biscuity, not caramelly at all
 Crisp brown: a little malty, no caramel, pale yellow

Franco-Belges kiln coffee: tastes like cheap coffee, a little oxidized and papery, leaves lingering coffee flavor and aroma

Fawcett pale chocolate: more chocolate taste than chocolate malt

Fawcett chocolate: tastes more like coffee to me at first, but the more you drink, the more cocoa-like it becomes

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UK black patent: not much flavor, leaves dryness as most noticeable characteristic; almost charcoal-like burnt character; more pronounced “burnt” flavor than roasted barley

Weyermann Carafa III: not much there other than the color

Muntons roasted barley: similar to black patent but a somewhat rounder flavor and sweeter

Castle debitterized black: actually tastes the most like coffee to me

I was a little surprised at the lack of color on the amber and brown malts, and also on their relative lack of flavor. Perhaps their contribution is more apparent in the final fermented product, since a few ounces of either in a 5-gallon batch is quite noticeable. I also think the coffee malt might have been on the older side. On its own, it was nothing special, but in combination (33/33/33) with brown and chocolate malt, it produced a nice rounded chocolate flavor. Likewise, a 50/50 mixture

of coffee malt and chocolate malt tasted more like chocolate than chocolate malt alone. As a baker, I find this interesting since chocolate flavor in a cake is almost always enhanced by adding coffee to the recipe. The same seems to be true for beer.

Further mixtures produced some more interesting findings. A 50/50 mixture of debittered black and chocolate works very well together; pale chocolate does not, as it's a little acrid. A 50/50 mixture of brown and pale chocolate malt is quite nutty. A 50/50 mixture of brown and chocolate malt is coffee-like. A 33/33/33 mixture of amber, brown, and pale chocolate malt is very biscuity. A 33/33/33 mixture of amber, brown, and chocolate malt is biscuity and nutty. A 50/50 mixture of chocolate malt and roasted barley is astringent and coffee-like with underlying nuttiness, but strangely lacking in chocolate character.

Formulating a Recipe

So, what does this mean to you? As the above experiments show, it can be difficult to predict how grains will combine in your final beer. Let's say you want to formulate a grain bill for a malty-complex beer like a mild ale. Before you go into the grain room of your local homebrew store and stare blankly at the bins, wondering how to mix malts to get the “malty, sweet, caramel, toffee, toast, nutty, chocolate, coffee, roast, vinous, fruit, licorice, molasses, plum, raisin” character of the BJCP style guidelines, consider using a nano-mash for further experimentation.

Keeping to Ray Daniels' formula in *Designing Great Beers*, a good place to start for a dark mild is 10-15 percent crystal malt plus 2-3 percent chocolate malt and 1 percent black malt. From my first experiment, I knew that I did not want the character of any crystal malt less than 40° L, as it would be too sweet. I also knew from the roasted grain experiment that I preferred the combination of chocolate malt with debittered black. To me, it produces a far more pleasant chocolate character than chocolate with black patent. So, I came up with the following mixtures:

Recipe 1: A little harsh, unbalanced; flavor, very similar to Recipe 3.

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- Recipe 2: Easy, sweet chocolate and lingering toffee.
- Recipe 3: Sweeter than #5 with more toffee and less chocolate (favorite so far).
- Recipe 4: Even sweeter, slightly raisiny, with lingering chocolate (not so much).
- Recipe 5: Toffee and chocolate but gets unpleasant fairly quickly.

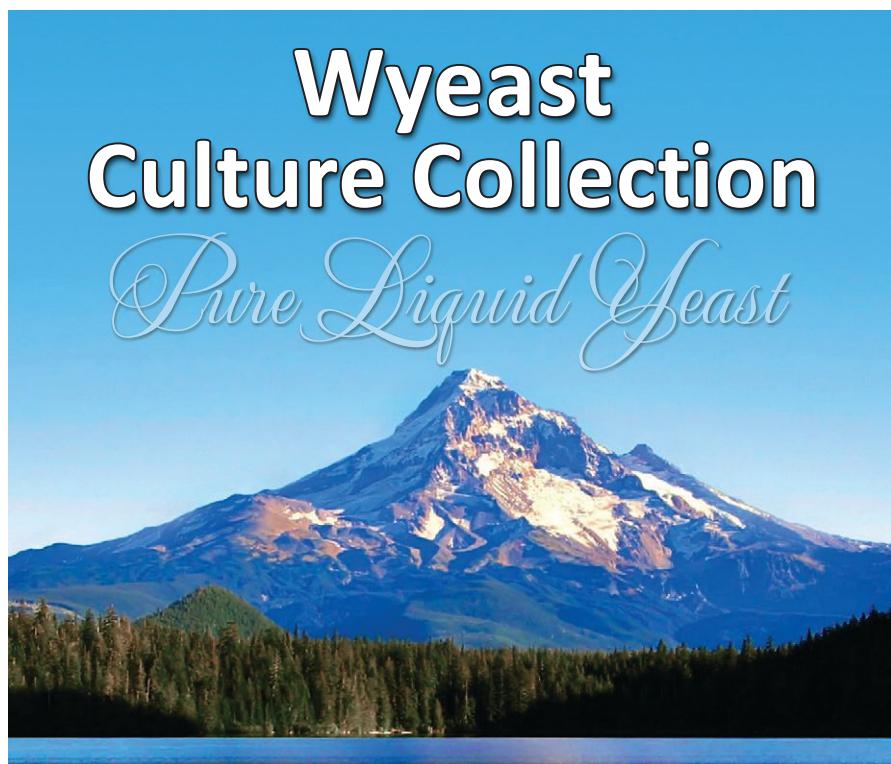
Grain	Mixture (%)				
	1	2	3	4	5
Crystal 40				7	
Crystal 60	7		7		5
Crystal 80		7			
Crystal 120	7		7		10
Crystal 160		7		7	
Chocolate	3	3	3	3	3
Black patent	1				
Debittered black		1	1	1	1

The percentages from Recipe 3, my favorite, became my grain bill for mild ale. It's that simple! In this way I've learned a lot of very useful information about the characteristics of each specialty grain without having to brew a 5-gallon batch of (potentially unsuccessful) beer.

If I were to refine this process to any extent, it would be to scale up the grains to a liter or so and use dried malt extract to mash and get a fermentable wort in which I could then pitch the proper yeast. This approach would better demonstrate the contributions of each grain in a finished beer, and whether there are any significant differences between the wort flavors and their counterparts in beer. If a neutral base malt was fermented separately, the resulting fermented samples could be blended in different proportions to approximate a final recipe.

So far, I've successfully used this method to adjust the grain bill on several beers and have been very happy with the result. Try it yourself and see where it takes you.

Agatha Feltus has been brewing for almost a decade and is a National-ranked BJCP judge. By training, she is an analytical chemist and tends to bring a scientific approach to her brewing. She lives in Noblesville, Ind.



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**STRUT
YOUR
STUFF.**

**BUILDING A
BREW STAND**

BY DREW BEECHUM

ING

Brewsters and brewers! Isn't it time you stood tall? Isn't it time you put away those wobbly, haphazard ziggurats of hastily assembled supports? Don't you want to look and feel like a "real" brewer with gleaming metal assuring you that your pots of scalding liquid aren't going to crash about your ears anytime soon?

And how would you like to do it with all the mechanical skill of a box tortoise? Then step right up to Brewgyver's Traveling Show of Wonder Materials for your answer!

I've written before about my complete lack of mechanical skill. I consider replacing a broken switch plate a notable task worthy of trumpeted fanfare. Kent Fletcher ("Fletch"), the Brewgyver of the Maltose Falcons, on the other hand, doesn't consider it a brew day until something's been disassembled and reassembled and possibly once more just for good measure. Fortunately, Fletch forgives me my shortcomings and helps me out.

Like many of you, I've stared longingly at the highly polished turnkey systems that sit at the high end of the market, but until the day that someone decides I'm a great guy who deserves a free system, the lust will have to remain in my heart. Also, let's face it, to many homebrewers you're cheating if you're buying instead of building.

STANDING CONCERN

The primary concerns of any would-be stand builder are stability and weight management. Water is dense and heavy to the tune of 8.3 pounds per gallon. That means you're supporting roughly 120 pounds of liquid weight plus all of your gear for a typical 5-gallon batch. It only gets worse as you increase volume. There are lots of ways of getting a stand together, so let's explore some of the more popular ones.

I've seen people build stands out of screw-together metal tube frames that wobble with the lightest touch and that's frightening! If a weakling like me can

push the frame sideways, then it has no business holding up your pots.

Some folks go left to the lumber section of their hardware store (if it's not left at yours, my apologies). While wood and lag screws can provide the strength necessary to hold your beer, I have ethical problems recommending combustible organic matter to be used near a source of both moisture and flame. It seems you're headed for either rot city or a pyro special!

If you turn to the garage section, you'll find premade sturdy storage racks like Gorilla Racks or baker's racks. If braced properly, they'll hold your gear safely, but they don't lend themselves to customization and your money goes to a kinda-sorta solution.



Then you have the supreme option—welded square steel tubing. The ultimate in security and initial customization, it can make the prettiest stand in the world—look online for awesome Brutus 10 builds. But you have to pay for the stock, have a tight plan, and find a welder to cut and join the stand.

STRUT YOUR STUFF

Over in the electrical aisle is a lesser-known material in the homebrew community—Unistrut, SuperStrut, FlexStrut, or, more generically, strut channel. You pass by things constructed with strut channel every day and probably never notice. It's usually a thick (12 gauge) three-sided steel tube with slots and holes opposite the open side. We want the "half slotted" variant for ease of use. The open side is lipped to strengthen the sticks and help secure mounting accessories. The stock comes either galvanized, powder coated, or painted, all for the low, low price of roughly \$19 for 10 feet.

Here's the best thing about strut—it's so easy to work with it makes everything

else, even rickety racks, look silly. All you need is a cutting implement and some wrenches. To cut strut, you'll need (hardest to easiest): a hacksaw, if you have the arms of Popeye and a minute or two per cut; a reciprocating saw (with appropriate blades); an angle grinder; or a chop saw, the best option. A chop saw makes precise 90-degree cuts, with the stock clamped in place, very quickly. If you don't have a chop saw handy (or a saw-wielding friend), your local tool rental shop has them plus the blades for cheap (~\$20 rental + \$6 for the disc). Another great reason to use a chop saw (aside from clean cuts)—the racket from cutting strut will be quieter than a rock concert, unlike your other powered options.

Since you're probably not a fan of sharp metal edges, take a moment to chamfer and soften the fresh-cut edges. Metal files can certainly do the trick, but a wire wheel on an angle grinder or drill knocks off the whole job in about 15 minutes.

Now that you know how to cut the stuff, you'll just need to join it. The construction

process is accessible to everyone who can wield a wrench. There are your usual nut and hex bolts arrangements of 1/2" bolts that will fasten the stand's corners. U-Bolts and conduit clamps can mount various gadgets. The heart and versatility of the strut system comes from a Willy Wonka-looking widget called the spring nut.

A standard spring nut (or channel nut) looks like a spring attached to a bar with tiny teeth, ridges, and a threaded hole for a bolt. Counterintuitively, the nut doesn't affix in the way it goes in easiest (nut against the channel's front edge). Instead, you install the nut by feeding the spring into the channel and compressing it until the bolt pops into the channel. Give it a twist to lock into the channel. Slide the nut into place, feed a bolt through your bracket and into the nut, and tighten. That's it! If a spring pops out of the slots, just tuck it back in. Once the nut is tightened, the spring's job is done.

Spring nuts may look floppy and silly, but they are stubborn mules when tightened into place. A fully operational and prop-



erly constructed Brewgyver Strut Stand will take the weight of a car. Rooftop a/c systems and electrical transformers are usually mounted using strut, so you'll have no worries about your brew.

You'll notice that most of the joints are constructed so that we join on the open channel instead of feeding through the slots. This allows us a little imprecision in our cuts and makes it easier to adjust the stand later.

When you get the hang of working with spring bolts and channel, you'll find putting the parts together to be amazingly fast. Once you break out the wrench or socket, don't be surprised if you can't disassemble the stand in a few minutes. Even if you're a complete mechanical doof like me, it just takes that wrench and a few minutes to move a tier.

A strut-built stand will probably never win a beauty pageant, but those aren't the awards I care about. Leave those to the beautifully welded stands. I want something flexible, strong, and durable.

THE BREWGYVER STRUT STAND PLAN

This version of the Brewgyver stand is approximately 6' long and 14.75" wide with two tiers to support a gravity-powered HLT and a mash tun/pump/boil kettle layout. The stand is longer than necessary because I have a monstrous cooler mash tun and a 26-gallon pot, so I'd like a little breathing room for heat dispersal and possible expansion. The height of the upper platform comes in at 4' for clearance out of my garage. The 50L HLT sets the width at 14.5" to support the pot over on the top stand.

Without the pump, burner, or wheels, the basic stand costs about \$250 in hardware from the big box store.

Materials

- 6 10' pieces 12-gauge strut channel
- 6 flat "L" brackets
- 10 4 hole corner brackets (these hold the exterior corners)
- 2 2 hole corner brackets (or 0 if you want to over-engineer and replace with 4 holers)
- 54 1/2" x 1.5" bolts

		<u>Strut Parts</u>
4	1/2" x 2" bolts	2 6' bottom rail
54	spring nuts	4 4' upper tier (HLT)
8	channel nuts (or spring nuts stripped of the spring)	vertical posts*
		2 11.5*** upper tier horizontal cross bar
<u>Tools</u>		2 11.0" upper tier horizontal rails
2	3/4" open/box wrenches (or socket driver, but a fixed wrench will be handy in some tight spots)	2 2' lower tier (MT/boil kettle) vertical posts
1	chop saw	2 55.625" lower tier horizontal rails
1	metal disc for chop saw	3 11.5*** cross bar rails
1	angle grinder with wire wheel (or files)	1 14.75" lower tier/HLT cross bar
1	drill with 1/2" metal bit	2 24" outriggers (optional)



Kettles | Brew Pots | Wort Chillers | Accessories



Cut List

2	6' bottom rail
4	4' upper tier vertical posts (HLT)
2	2' lower tier vertical posts (boil kettle end)
2	55.625" lower tier horizontal rails (MLT & boil kettle)
7***	12"** cross bar rails
1	15" lower tier/HLT cross bar
2	30" outriggers

Notes:

- * 2 of these posts need slots to bolt a 4 hole bracket level at the 24" mark.

** Dimension adjustable to support various kettle sizes and burners. Make sure to adjust your lower tier horizontal rails to offset the shorter or wider top level.

*** If using optional outriggers, only 6 crossbar rails are needed.

BUILDING INSTRUCTIONS

Cut the strut into pieces specified by the cut list. (Measure carefully.)

Clean up the cut edges with the wire wheel.

Line your parts up on the ground. This will help you verify you're not missing anything. (See photo on page 51).

Assembly

- Start with the bottom of one side (6' piece). Lay the strut channel side up.
- Add the rear post of the HLT.
 - > With a 4 hole bracket, affix the rear post (4') on top of the lower rail, aligned with the rear edge of the bottom horizontal rail.
 - > The easiest way to do this is to use a scrap piece of strut as your marker.
 - > Attach the bracket to the bottom support first.
- Using a 2 hole corner bracket, attach the (upper tier) front post to the bottom support by measuring and marking 12"*. (Channel faces the other support.)

*This distance changes if you've changed the size of the upper tier.

- On the outside of each HLT post, attach an "L" bracket with a bolt and a nut. On the inside of the posts attach a 4 hole corner bracket.
- Install a horizontal HLT rail between the two 4' posts.
- Add the front lower tier post to the other end of the bottom rail. Repeat the technique used with the rear HLT support.
- On the front HLT support, attach a 4 hole bracket, with the top of the L at 24", to support the lower tier rail. This will be on the slotted side of the channel. Use two of the stripped spring nuts, like you would a normal nut/bolt combination. The spring nuts provide extra surface area for grip and will still lock into place. No slot? Make your own by drilling a 1/2" hole where you need it.

- Attach the lower tier horizontal rail.
 - > Prep the horizontal bracket with two spring nuts and bolts.
 - > Place a scrap piece of strut across the bolt closest to the HLT vertical support. This reserves the space for the cross brace later.

The advertisement features a clear plastic vial of yeast with a black cap. A detailed label on the vial reads: "WHITE LABS HOME BREWING", "WHITE LABS", "PURE YEAST AND FERMENTATION", "CALIFORNIA ALE YEAST", "Instructions For Use: Use 1 vial per 5 gallons of beer, wine, mead or cider. Select a yeast strain best suited for your fermentation. Store in refrigerator, remove 3-6 hours prior to use. Shake yeast well, open cap carefully, add to 5 gallons of sterilized wort or must at 70-75°F. Keep at this temperature until fermentation begins. One vial will usually start fermentation in 5-15 days." At the bottom of the label, it says "White Labs Inc. 9495 Candler".

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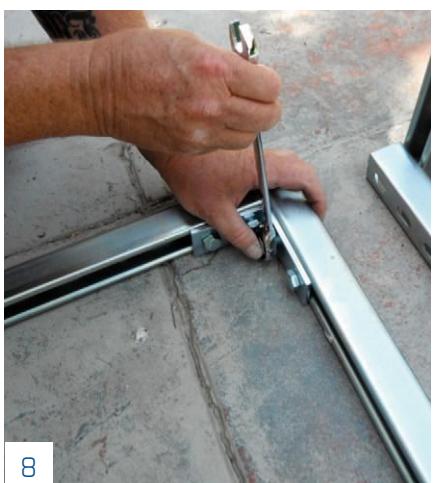
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1) Chop saw cutting the strut / 2) Three seconds later / 3) A messy cut

4) Angle grinder polishing / 5) Cleaned-up strut / 6) Using one piece to measure the next

7) Inserting a spring nut / 8) Building the stand with a wrench / 9) The stand laid out



1) Close up of the top of the HLT. Note the brackets are moved to the outside as opposed to the plan. This allowed us to keep the braces level. / 2) The HLT in place. / 3) The front of the stand. Note the bracket in place as in the drawing and the front crossbeam being below the level of the rails. / 4) How to attach your casters / 5) A shot of the fixed wheels (the narrower base required a different attachment). / 6) The HLT close up / 7) The rig in full (The cross riggers will eventually be placed on top of the bottom rail to lower the stand by 3") / 8) Without the mash tun / 9) The stand against the garage door for reference—and it actually fits with no problems!

- > Fix the bar with the end butted against the scrap piece, and bolt through the one hole in the bracket you just bolted to the HLT post.
- > Fix the other end to the front post with an "L" bracket and 4 hole corner bracket, stacked with the L bracket closer to the front.
- Congrats! One side down. Repeat for the second side!
- Join the two halves with cross bar rails.
 - > Attach first cross bar in the space between HLT front posts and lower horizontal rails; snug up bolts, but don't tighten them.
 - > Attach the front cross bar to the ends of the flat "L" brackets between the front posts.
 - > Attach the HLT cross bars to their respective flat "L" brackets.
 - > With the stand on a level surface, measure across from one side to the other at the upper and lower horizontals rails; make sure the bottom rails are the same distance apart, at both ends. Then measure diagonally from the top of the front right post to the left HLT post, then front left to HLT right. If they are not the same, adjust by moving one whole side front or back slightly, then re-measure. When the measurements are the same, perform the final tightening of all cross bar connections.
- Attach outriggers.
 - > Once all of the bolts are tightened, tip the frame over backward, so that it's resting on the rear HLT posts.
 - > Attach the two 30" outriggers using the four 2" long bolts and spring-less nuts. Mount with the strut slotted side down, centered on the width of the stand and square to the bottom rails.
 - > If not using outriggers, attach the remaining two cross bars in the same fashion.

Voilà!

MOUNTING OTHER GEAR

Most normal brewing accessories, like pumps, should mount to your various rails without using any technology more

complicated than a spring nut or U-bolt. Remember that the prime *raison d'être* of strut is mounting electrical gear and therefore a number of control panels easily mate to strut.

For your burners, use conduit clamps to affix piping and the burners into place.

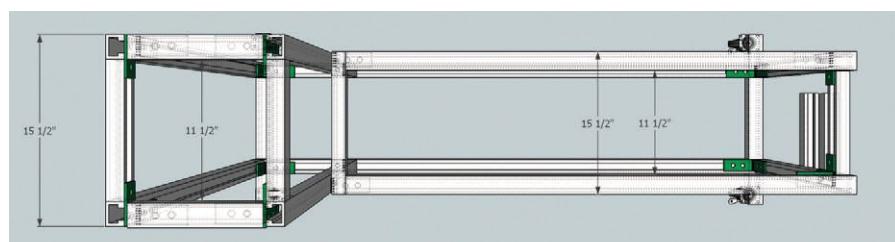
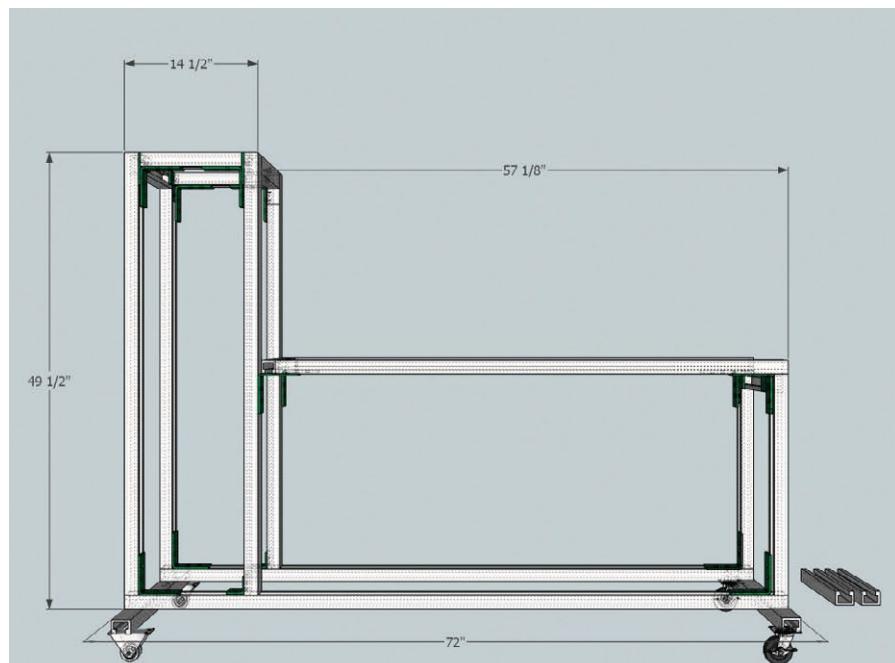
EXPANSION MODULES AND VARIATIONS

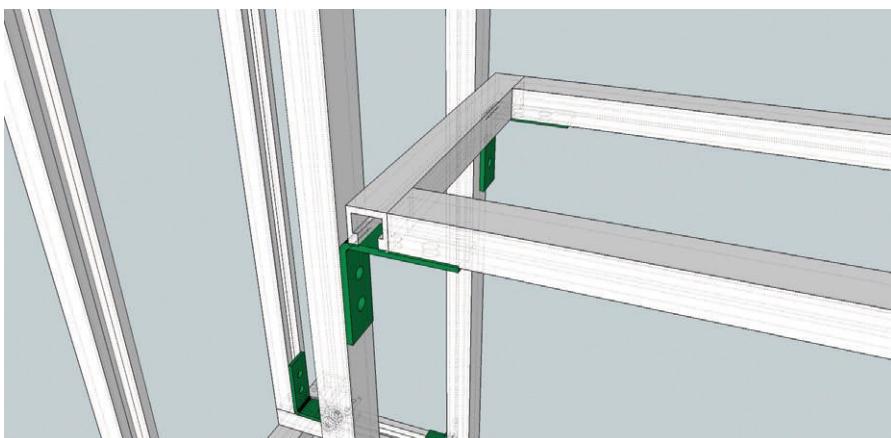
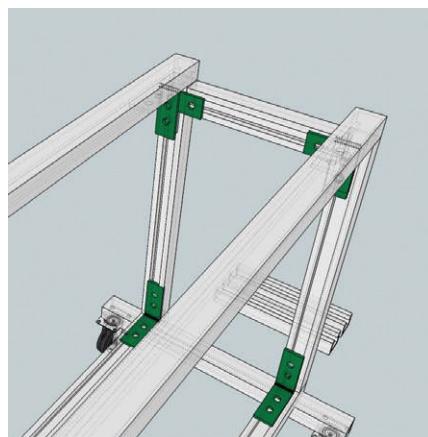
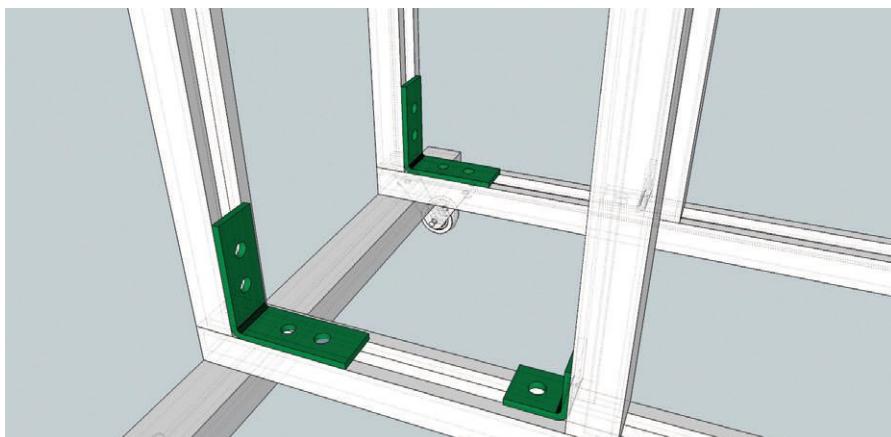
Now that you have the basic stand in place, you want more! The good news is there's plenty of ways to mix it up. Want a shorter footprint? Take a hint from the one-tier setups like the Brutus. You'll want to include a middle support to your layer since 6 feet is a long span to leave loaded and unsupported.

If you want wheels, grab a couple of cheap, big casters (3" or larger) and a couple of fixed wheels. Don't spend big money; the ones you find at Harbor Freight are sufficient. Attach them to your outriggers (fixed at one end, casters at the

GENERAL TIPS

- Measure twice, cut once.
- A Sharpie is very handy for marking cuts, bracket positions, etc.
- The channel side of the strut for each side of the frame faces "in" (meaning in toward the other pieces of that side).
- Hand-tighten the connections during the initial assembly, but don't torque them down. You'll need a little sway and give to get everything together.
- Pre-prep most of the corner brackets with bolts and spring nuts. The spring nuts will slide in and twist on their own.
- Keep some small scrap pieces of bracket handy to serve as measuring aids and place holders.





FLETCH'S BUILD TIPS

You can prep your brackets ahead of time by feeding a bolt through and twisting a nut (spring side out) a few turns.

- With most spring nuts, if you place the nut in the channel in parallel, it will turn and lock automatically.
- If you're using a chop saw and need to trim down a piece, line up the new cut and go slowly to prevent the cutting wheel from bending outward. Your first cut may have taken three seconds but expect the trim cut to take 30.

other) with a few U-bolts and now you have a rolling tower of brewing.

Want to make your mash tun super easy to clean? Add another cross bar between the two front HLT posts, and make a "bridge" structure with two short posts and a crossbar, bridging the right and left lower tier horizontal rails. Attach "pillow block" bushings to the center of the two new cross bars. Add two small "axle" pieces to the tun and slide into the blocks. Now you have a mash tun that tips on the side, making for easy cleanup. (Note: the strut portion of this mod is simple, and the pillow blocks can be had cheap, but adding the axle to your mash tun may require either creativity or a trip to your local TIG welder).

If you're running propane, but have natural gas piped to your property, call in a plumber and see if you can't run fuel to a

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Fletch demonstrates the strength of the struts.

set of natural gas burners and save a ton of money and potential empty propane tank heartache. (Seriously, get a real expert—messed up gas plumbing has messed up consequences.)

Want to make your system a HERMS? Add a copper coil to your HLT, and a Johnson or Ranco temp controller to switch your pump. Stick the controller's temp sensor through a stainless racking cane, secure with a compression fitting, and stick it into the mash. The controller will now switch on the pump when the mash needs heating.

Look for Fletch's 2012 NHC Presentation (on HomebrewersAssociation.org in the Let's Brew section) for examples of how to automate your HLT or build a grist gun as well.

Drew Beechum is a member of the Maltose Falcons and the AHA governing committee. He lives in Pasadena, Calif.

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by Amahl Turczyn Scheppach

Kansas City Bier Meisters Competition

The Kansas City Bier Meisters' 30th annual Home Brew Competition was held February 15-16 in Kansas City, Mo. The classic event, which received 446 entries, was this year dubbed "XXX Pushing the Boundaries," and this theme was encouraged for all entrants. There was also a special award given for the beer, mead, or cider that best reflected the theme and embodied what the organizers referred to as "American Awesome."

To this end, a special category was included: Category XXX. The Bier Meisters explained it this way: "'Awesome' is an ode to the American homebrewer and the passion, daring, and creativity they bring to the beer they brew! The foremost trait for the beers in Category XXX are best described as truly AWESOME. We are looking for those beers brewed for the enjoyment of drinking and that push the boundaries of alcohol, ingredients, and flavors."



So who achieved these lofty brewing goals? Category 30A had three winners: Tim Thomssen of the Lincoln Lagers won third place for his Smashed Out Of Your Gourd Pumpkin Ale; Duane Buscher nabbed second place with his Chocolate Milk Stout; and the most awesome of the three was Corey Wood of the #HeyCarboys with his Funk Tree Golden.

Quest for Utopia Rauchbier

ALL-GRAIN RECIPE

INGREDIENTS

for 5 U.S. gallons (19 liters)

9.0 lb	(4.08 kg) rauch malt
3.0 lb	(1.36 kg) Munich malt
2.0 oz	(57 g) Carafa I malt (mashout)
1.0 oz	(28 g) Mt. Hood hops, 6.1% a.a. (90 min)
0.5 oz	(14 g) Tettnang hops, 7.6% a.a. (5 min)
0.5 tsp	(2.46 g) calcium chloride
1.0 tsp	(5 g) Irish moss Wyeast Oktoberfest lager yeast (starter)

Boil: 90 minutes

Target Original Gravity: 1.071

Approximate Final Gravity: 1.016

Approximate color: 16 SRM

IBUs: 26

DIRECTIONS

Use a decoction mash with 12 quarts (11.4 L) 145° F (63° C) water. Mash in at 131° F (55° C). Remove 1/3 of the mash. Raise to 158° F (70° C) for 10 minutes, then bring to a boil. Boil 20 minutes, then recombine with main mash. Hold main mash at 156° F (69° C) for one hour. Remove 1/3 of the mash again and boil for 20 minutes. Recombine with main mash and hold at 168° F (76° C) for a 10-minute mash-out. Sparge with 5 gallons (19 L) of 170° F (77° C) water. Ferment at 50° F (10° C) for seven days. Raise to 65° F (18° C) for a three-day diacetyl rest, lower temperature to 36° F (2° C) and hold for 30 days. Package.

Mini-Mash Version (Note: will not be as smoky as all-grain recipe): Mash 3.5 lb (1.59 kg) rauch malt with 8 oz (226 g) biscuit malt and 2 oz (57 g) Carafa malt at 156° F (69° C) for one hour. Rinse grains, dissolve 3.25 lb (1.47 kg) amber malt extract syrup and 3.25 lb (1.47 kg) light malt extract syrup in kettle; proceed with boil.

But the event had regular Best of Show winners as well: Todd Rock's Pineappleño mead took top honors for BOS mead, doing his Homebrew Zoo club proud; and Patrick Schneider earned the BOS beer award for his classic rauchbier, Quest for Utopia. Schneider was considerate enough to share his old school smoked lager recipe, as well as some details on this well-deserved victory.

Like so many other now-successful brewers, Schneider first got started with a Mr. Beer kit: "a Christmas gift from my

wonderful wife," he explained. One batch later, after a run to his local homebrew supply store, he was hooked.

"After the first batch I couldn't find the extract cans, so I contacted a homebrew supply store (Lubbock Homebrew Supply) and received invaluable advice from an amazing brewer, Jason Courtney, as well as ingredients for my next brew," he said. "It went from there. I began reading everything I could get my hands on. There was a lot of trial and error, contamination, astringency, flat beer..."



AHA SPECIAL EVENTS

Visit the Events section of HomebrewersAssociation.org for more information.

April 21

**AHA Rally - Summit Brewing Company
St. Paul, MN**

May 4

AHA Big Brew - A Celebration of National Homebrew Day

May 13-19

American Craft Beer Week

June 14-15

**SAVOR: An American Craft Beer & Food Experience
New York, NY**

June 27-29

**AHA National Homebrewers Conference
Philadelphia, PA**

June 27

**AHA National Homebrew Competition - Final Round
Philadelphia, PA**

July 13

**AHA Rally - Left Hand Brewing Co.
Longmont, CO**

After the inevitable switch to all-grain brewing, things improved, but Schneider remains modest about his brewing: "I still have these problems, just not nearly as often."

His favorite styles to brew tend to be German lagers, American ales, and a few Belgians. When it comes to German lagers, he is very particular about technique. "I feel decoction mashing is essential to the character of German lagers," he asserted. "You just don't get the true lager flavor with infusion mashing."

Rauchbiers are particularly difficult to perfect due in part to variability in the smoke component. "I originally brewed a rauchbier because I wanted to taste one and couldn't find a commercial example. It's hard to get the smoke balance right because you never know how much smoke the malt has." Schneider also points to the freshness and age of the

smoked malt as critical factors to rauchbier success.

As for the name, it may still be a work in progress. Says Schneider, "Quest for Utopia Rauchbier should really be called 'Quest for Beeratopia' because it was an attempt to brew the perfect rauchbier." His own quest for brewing knowledge has led him to BJCP certification and hopefully, at some point, involvement in a brew club. "I passed the BJCP exam in 2005, and am currently a Certified judge, working toward my National certification. I regularly judge in the Bluebonnet and other local competitions (local being a relative term—within 500 miles)."

Therein lies the problem with club involvement. "I have always been an independent brewer—there are not a lot of homebrewers in the Big Bend of Texas (Alpine), so I haven't been able to get enough people together for a club yet."



KUDOS—BEST OF SHOW

AHA/BJCP Sanctioned Competition Program

December 2012

Partnership Brewing Challenge – Brewer's Choice, 9 entries—Corey Clayton and Markus Ebner, *Calgary, AB*.

Dickens Fair Best-of-Brew Competition, 47 entries—Daniel Langmaid, *Oakland, CA*.

The Max Lager Challenge, 100 entries—Monkey Wrench Brewing Club, *Snellville, GA*.

January 2013

Winterbrew Homebrew Competition, 201 entries—Paul Kreiner, *Chicago, IL*.

Stout-Only Homebrew Competition, 15 entries—Matt DeGuise, *Pagosa Springs, CO*.

Big Beers, Belgians & Barleywines Homebrew Competition, 396 entries—Charlie Gottenkieny, *Littleton, CO*.

2nd Annual Coal Country Brewer's Cup, 28 entries—William Metz, *Oakland, MD*.

Belle City Winter Warmer Homebrew Competition, 74 entries—Bruce Buerger, *Milwaukee, WI*.

19th Annual Boneyard Brew Off, 182 entries—Fred Warner, *Rochester, NY*.

Wee Three Beers of Lager and Ale Christmas Beer Competition, 4 entries—John Lucey, *Bend, OR*.

AHA Club-Only Competition, Un-Session Beers (OG>1.040), 73 entries—Adam Fulmer, *Augusta, GA*.

2013 Doug King Memorial Homebrew Competition, 139 entries—Craig Wickham, *Arleta, CA*.

VIBE ProAm Competition 2013, 21 entries—Marcus Wunderle, *Ventura, CA*.

Thirsty Boy, 71 entries—John Salerno, *Henderson, NV*.

February 2013

Winter Carnival Beer Dabbler Home Brew Contest, 116 entries—Matt Weide, *Minneapolis, MN*.

GEBL IPA Bracket Challenge, 154 entries—Mike Floyd, *Everett, WA*.

15th Annual Domras Cup Mead Competition, 75 entries—Vern Wolff, *New Market, AL*.

Beer Quest Spring Ale, 20 entries—Jason Davis, *Lincoln, NE*.

Homebrew Alley 7, 763 entries—Robert Slanzi, *Yonkers, NY*.

Lucette Brewing Company's Winter Homebrew Competition, 44 entries—Matt Appel, *Eau Claire, WI*.

The Great Northern Brew-Ha-Ha!, 329 entries—Walt Pittack, *Duluth, MN*.

Fur Rondy Homebrew Competition, 39 entries—Ted Rosenzweig, *Anchorage, AK*.

Philly Homebrew Club Holiday Ales Competition, 26 entries—Michael Konrad, *Philadelphia, PA*.

Kansas City Bier Meister 30th Annual Homebrew Competition, 466 entries—Patrick Schneider, *Alpine, TX*.

MMXIII Midwinter Home Brew Competition, 794 entries—David Merz, *Marquette, MI*.

Beerfest 2013, 245 entries—Mikko Pludra, *Melbourne, Australia*.

All-American Competition, 314 entries—Philip Meyer, *Cincinnati, OH*.

Groundhog Day Homebrew Competition, 62 entries—Chuck Warner, *South Portland, ME*.

Wizard of SAAZ VI, 449 entries—Paul Shick, *Cleveland Hts. OH*.

CowTown Yeast Wranglers Homebrew Roundup, 314 entries—Mark Whitehead, *Lethbridge, AB*.

8th Annual Peterson AFB Homebrew Competition, 479 entries—Michael Barnhart, *Fort Collins, CO*.

Flying Bike Pale Ale Competition, 13 entries—Bob Yew, *Seattle, WA*.

War of the Worts XVIII, 861 entries—Lee Kexel, *Cockeysville, MD*.

Pro-Am Strong Beer Competition, 102 entries—Hamp Covington, *Atlanta, GA*.

Bluff City Brewers and Connoisseurs Homebrew Extravaganza, 286 entries—Jeff Bergman, *Nashville, TN*.

Babble Brew-Off 2013, 277 entries—Brian Phad, *Lockport, IL*.

Romancing the Beer Homebrew Contest, 69 entries—Randy Hays, *Camarillo, CA*.

March 2013

Lethbridge Werthogs WertContest, 161 entries—John Folinsbee, *Garibaldi Highlands, BC*.

Beans and Brews, 13 entries—Rob Knighton, *Columbia, PA*.

Brew Masters Competition, 61 entries—John Rugotzke, *Rhineland, WI*.

AHA/BJCP SANCTIONED COMPETITION PROGRAM CALENDAR

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

May 4

17th Annual Celtic Brew-Off

Arlington, TX. Entry Deadline: 4/4/2013
www.kobb.org/celticbrewoff

May 4

Moerlein Cup Homebrew Competition

Cincinnati, OH. Entry Deadline: 5/1/2013

May 4

Dark Days of Winter

Garden City, ID. Entry Deadline: 4/26/2013

May 4

Fourth Annual Greg Noonan Memorial

South Burlington, VT. Entry Deadline: 4/19/2013
www.mashers.org/comp_2013/comp_page1.html

May 4

Spring Beer & Sausage Fest

Philadelphia, PA. Entry Deadline: 4/27/2013
www.bob.brewcomp.com

May 10

Santa Clara de Asis 5th Annual BrewFest

Yorba Linda, CA. Entry Deadline: 5/5/2013
www.scdayl.org

May 10

2013 Wisconsin State Fair

West Allis, WI. Entry Deadline: 4/17/2013

May 11

19th Annual Eight Seconds of Froth

Cheyenne, WY. Entry Deadline: 4/27/2013
www.highplainsdrafters.com

May 11

Spirit of Free Beer

Falls Church, VA. Entry Deadline: 5/2/2013
www.burp.org/Events/SpiritofFreeBeer2013.aspx

May 11

BrewFest at Mount Hope Homebrew Competition

Manheim, PA. Entry Deadline: 5/4/2013
www.parenfaire.com/brewfest/main.php

May 11

Hangar 24 Craft Brewery 4th Annual Homebrew Competition

Redlands, CA. Entry Deadline: 5/5/2013
www.hangar24brewery.com/homebrew.htm

May 11

King of the Mountain

Willoughby, OH. Entry Deadline: 4/28/2013
www.lmhb.com/kingofthemountain.htm

May 11

Alameda County Fair Homebrew Competition (BABO)

Pleasanton, CA. Entry Deadline: 4/27/2013
www.beercomps.org/babo

May 11

COHO Spring Fling Homebrew Competition

Bend, OR. Entry Deadline: 5/4/2013
cohohomebrewers.org/SpringFling

May 11

Grumpy Troll Challenge

Mount Horeb, WI. Entry Deadline: 5/5/2013
mhtg.brewcompetition.com

May 17

31st Annual Oregon Homebrew Festival

Albany, OR. Entry Deadline: 5/3/2013
www.hotv.org

May 18

War of the Wort

Starkville, MS. Entry Deadline: 4/26/2013
warofthewort.gtrbrewers.org

May 18

AHA Club-Only Competition, Extract Beers

Camino, CA. Entry Deadline: 5/13/2013
www.homebrewersassociation.org/pages/competitions/club-only-competitions

May 18

Arvada Beer Company Pro Am Homebrewing Comp

Arvada, CO. Entry Deadline: 5/1/2013
www.arvadabeer.com

May 18

Charlotte US Open

Charlotte, NC. Entry Deadline: 5/3/2013
www.charlotteusopen.com

May 18

OC Fair & Event Center Homemade Beer Competition

Costa Mesa, CA. Entry Deadline: 5/3/2013
www.ocfair.com/competitions

May 18

San Diego International Beer Competition

Del Mar, CA. Entry Deadline: 4/12/2013
www.sdfair.com

May 18

Brewer's East End Revival (B.E.E.R.) 17th Annual Brew-Off

Saint James, NY. Entry Deadline: 5/10/2013
beerhbc.org

May 18

Hopfest Homebrew Competition

Kansas City, MO. Entry Deadline: 5/10/2013
www.lewsgrillandbar.com

May 19

Big Batch Brew Bash

Houston, TX. Entry Deadline: 5/10/2013
www.thekgb.org/bigbatchbrewbash/currentnews.aspx

May 24

Great Alaskan Craft Beer & Homebrew Festival

Haines, AK. Entry Deadline: 5/21/2013
www.seakfair.org/beer-fest

May 25

Aurora Brewing Challenge

Edmonton, AB, Canada. Entry Deadline: 5/17/2013
ehg.ca

May 28

North American Beer Awards

Idaho Falls, ID. Entry Deadline: 5/14/2013
Northamericanbrewers.org



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With his newfound success, hopefully this will not be a problem for Schneider much longer! Now without further ado, we present his Best of Show rauchbier recipe; while it's a bit over the specified maximum gravity for the style, it was nonetheless entered as, and won as, a Classic Rauchbier.

Amahl Turczyn is associate editor for Zymurgy. He is a former professional brewer who now brews at home in Lafayette, Colo.

AHA/BJCP SANCTIONED COMPETITION PROGRAM CALENDAR

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

May 30

8 Concurso Nacional das Acervas

Curitiba, Paraná, Brazil. Entry Deadline: 5/24/2013
www.acervapr.com.br

June 1

2nd Annual MVHBC Competition

Lowell, MA. Entry Deadline: 5/18/2013
www.mvhbc.com

June 1

Upstate Brewers Cup

Greenville, SC. Entry Deadline: 5/29/2013
upstatebrewerscup.com

June 1

New York State Fair Homebrew Competition

Syracuse, NY. Entry Deadline: 5/16/2013
saltycitybrew.org/wordpress/nys-fair-homebrew-competition

June 1

Drugo hrvatsko homebrew natjecanje

Zagreb, NULL, Croatia. Entry Deadline: 6/1/2013
www.pivarstvo.info/forum/viewtopic.php?t=3193

June 2

6th Annual Liquid Poetry Slam Homebrew Competition

Fort Collins, CO. Entry Deadline: 5/24/2013
www.slam.liquidpoets.com

June 8

San Mateo County Fair

San Mateo, CA. Entry Deadline: 5/24/2013
www.beercomps.org/smcf

June 8

Hop Blossom Homebrew Competition

Winchester, VA. Entry Deadline: 5/31/2013
www.valleyhomebrew.com/hop-blossom.html

June 8

Animas Alers - Ska Brewing Pro-Am

Durango, CO. Entry Deadline: 6/4/2013
www.durangohomebrew.com

June 8

Meadlennium

Sanford, FL.
www.cfhb.org/meadlennium

June 8

Black & Tan Competition

Peoria, IL. Entry Deadline: 6/1/2013
blackandtan.brewcomp.com

June 15

Ohio State Fair Homebrew Competition

Columbus, OH. Entry Deadline: 5/28/2013
ohiostatefair.com

June 15

Door County Beer Festival Homebrew Competition

Baileys Harbor, WI. Entry Deadline: 6/8/2013
doorcountybeer.com

June 15

Battle of the Homebrews

Central Point, OR. Entry Deadline: 6/8/2013
www.BattleoftheBones.com

June 22

Ohio Brew Week Homebrew Competition

Athens, OH. Entry Deadline: 6/7/2013
obw.brewcomp.com

June 29

Alabama Brew Off

Birmingham, AL. Entry Deadline: 6/14/2013
alabamabrewoff.com

June 30

San Diego County Fair Homebrew Competition

Del Mar, CA. Entry Deadline: 5/22/2013
www.sdfair.com/entry



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July 13 | Left Hand Brewing Co. | Longmont, CO

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for an up-to-date calendar

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HomebrewersAssociation.org

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



Two Dusseldorf-style altbiers painstakingly brewed in the U.S. were sent to our judges this issue.

First up was OMB Copper from The Olde Mecklenburg Brewery in Charlotte, N.C. OMB Copper, the brewery's flagship, accounts for 70 percent of the brewery's sales, according to brewery founder John Marrino.

“I lived in Germany for four years and fell in love with altbier,” said Marrino. “Upon returning to the U.S., I was disappointed in the dearth of authentic-tasting altbiers on the U.S. market.”

It was Marrino’s plan for OMB Copper to be the brewery’s flagship from the beginning. All of the malt used in OMB Copper is from Germany (premium Pilsner, Munich, and Carafla), as are the hops (Hallertau, Magnum, and Perle). The brewing process is authentic and intensive, including a protein rest and two saccharification rests in addition to a decoction boil of a portion of the mash.

Since OMB strictly follows the Reinheitsgebot, the beer is naturally carbonated during the secondary fermentation/lagering stage by bunging up the tank and raising the pressure to force the CO₂ into solution. The beer checks in at 4.8 percent ABV.

Next up was Headless Man from Tyranena Brewing Co. in Lake Mills, Wis. The

beer is named after two effigy mounds preserved on the floor of Rock Lake—a Headless Man and a Turtle. As the legend goes, since the Turtle can survive both on land and in water, its spirit helped guide the Headless Man into the afterlife.

Headless Man, part of the brewery’s original lineup since it started brewing in 1999, is brewed with two-row, pale, aromatic, and caramel malt, and hopped with Perle, Liberty, and Tettnanger. Notes of “sweet, toasted hazelnuts and succulent sourdough” are hallmarks of the beer’s signature nutty, malty aroma.

It checks in at 5.25 percent ABV and 25 IBU, and the brewery suggests pairing the smooth, drinkable beer with hearty foods such as roast pork, smoked sausage, grilled salmon, and aged Gouda cheese.

OUR EXPERT PANEL includes David Houseman, a Grand Master IV judge and competition director for the BJCP from Chester Springs, Pa.; Beth Zangari, a Grand Master level judge from Placerville, Calif. and founding member of Hangtown Association of Zymurgy Enthusiasts (H.A.Z.E.); 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 VII judge, principal author of the 2004 BJCP Style Guidelines and president of the BJCP board who lives in Beavercreek, Ohio.

ON THE WEB

Tyranena Brewing Co.
www.tyranena.com

The Olde Mecklenburg Brewery
www.oldemeckbrew.com

BJCP Style Guidelines
www.bjcp.org

Commercial Calibration
HomebrewersAssociation.org/pages/zymurgy/commercial-calibration
(Note: This is a Members Only area of the website)

THE SCORES



OMB Copper—The Olde Mecklenburg Brewery, Charlotte, N.C.
BJCP Category: 7C Dusseldorf Altbier

THE JUDGES' SCORES FOR OMB COPPER



DAVE HOUSEMAN



BETH ZANGARI



SCOTT BICKHAM



GORDON STRONG

Aroma: Complex malty aroma with hints of bready, grainy malts and roastiness. No hop aroma. No fruity esters. No diacetyl. No DMS. No apparent alcohol aroma. Clean fermentation. (10/12)

Appearance: Copper color. Large, white, rocky head with good retention. Slight chill haze. (3/3)

Flavor: Malt forward with chewy, bready, grainy malt and hints of roast and caramel/Munich-like malts. Balanced with high, but not overly assertive, bitterness. Very low hop flavor. No diacetyl, DMS, or fruity fermentation esters. Finishes balanced with lingering bitterness. Alcohol is very subtle. (18/20)

Mouthfeel: Medium body and mouthfeel. Well attenuated. Smooth, not creamy. No alcohol warming. Bitterness present in mouthfeel with a touch of astringency. Good, moderate level of carbonation. (4/5)

Overall Impression: Very true-to-style, fresh Dusseldorf altbier. Additional finishing hops in aroma and flavor would add to overall complexity. Light enough to be a session beer. Great with a soft pretzel, wiener schnitzel, or just enjoying with friends. (9/10)

Total Score: (44/50)

Aroma: Moderate caramel malt is the first note, with a low accent of black pepper hop and mostly clean fermentation—no sulfur or fruitiness. A ghost of diacetyl seems to materialize, but vanishes before it is certain. Malt profile becomes a bit grainier and more biscuity as the sample warms, which adds depth. (9/12)

Appearance: Light coppery golden brown, brilliant clarity. Fine, white foam persists, with a pearly sheen on the surface and lace on the sides of the glass. (3/3)

Flavor: Pronounced clean, lightly grainy caramel toasted malt dominates the first impression, gives way to low caramel depth and light sweetness, and is then balanced by a fairly assertive hop bitterness and peppery spice flavor. Well balanced between rich malt, spicy hop flavor, and bitterness. A faint smoky note sneaks in mid-palate, but gives way to black peppery hop, then a crisp finish. Fermentation is clean; no fruity esters. Bitterness defines the finish, pleasantly lingering on and on... (17/20)

Mouthfeel: Medium-light bodied with moderate carbonation. Smooth texture, though not creamy. Low alcohol warmth emerges as if an afterthought, lasting into the finish. (5/5)

Overall Impression: The rich malt profile quite lovingly supports the spicy hop character and smooth clean fermentation. The smoky note is beguiling, though fleeting, and might be distracting to some. It gave the faintest suggestion of a rauchbier rather than an off-flavor. An elegant, quaffable session beer. (8/10)

Total Score: (42/50)

Aroma: Malt-forward with a pleasant, nutty Munich malt presence. I pick up caramel and toffee notes in the background that have a bit of worty character. No roast malt. The ester profile is clean enough for this hybrid style, adding very low pear and floral esters. Earthy character and spiciness in the background from hops, along with a light alcohol presence. (11/12)

Appearance: Brilliantly clear with a copperish brown color. The head is white in color with tight white beading and excellent retention. (3/3)

Flavor: The malt starts softly with the same qualities noted in the aroma—caramel, toffee, and nutty melanoidins. All are at a low-medium intensity, providing a backbone without dominating the flavor. Some worty, unfermented malt character, not typical of the style, could point to an excessive amount of caramel malts. It does add a nice roundness, though. Not much hop presence or fermentation character other than light floral notes. The bitterness is moderately high, in balance with the malt and lingering nicely after the beer is swallowed. (16/20)

Mouthfeel: Medium creaminess from both residual sugars (malt backbone) and excellent conditioning. A hint of mineral/sulfur, not uncommon in the Dusseldorf examples. (5/5)

Overall Impression: Nice example of a craft-brewed altbier, with good malt complexity that is not overpowering. The above-noted "worty" character muddies the flavor and prevents it from being as crisp as the classic examples. Otherwise, great job on the balance and fermentation. More flavor hops would enhance the complexity. (8/10)

Total Score: (43/50)

Aroma: Moderate hop aroma—spicy/floral and fresh. Mild malt with light grainy notes, developing richer caramel and toast components as it warms. Hops dominate initially with the backing malt; both have a very "German" character. Clean fermentation character. More malt complexity and richness emerge as time goes on; after a few minutes, the malt dominates and really does have a classic altbier aroma. (10/12)

Appearance: Light copper color with a reddish tint. Tall, rocky white head with excellent retention. Crystal clear. (3/3)

Flavor: Deep grainy-toasty malt dominates the initial taste. High bitterness asserts itself in the palate, finishing dry with lingering bitterness and malt flavor in the aftertaste. Super clean fermentation character; smooth palate. Grainy richness but with deep toast overtones. Medium-low spicy-floral hop flavor. Great balance. (18/20)

Mouthfeel: Medium-light to medium body. Medium carbonation. Smooth. Not warming. Quite easy drinking. (5/5)

Overall Impression: Exceptionally well-balanced with a classic flavor profile that really does remind me of a visit to the Altstadt. Bravo. The bitterness is assertive and the grainy-toasty malt adds dryness and complexity while not being heavy. A very nice noble hop character is a plus. This was a very fresh example (less than a month old) and is a joy to drink. I'll have to look for this in stores; it's got to be much cheaper than a plane ticket to Germany... (9/10)

Total Score: (45/50)



THE JUDGES' SCORES FOR TYRANENA HEADLESS MAN



Aroma: Light bready malt aroma with a touch of sulfur. Slight alcohol note. No hop aroma. No roast or caramel malt aroma. No fruity esters, diacetyl, or DMS. (9/12)

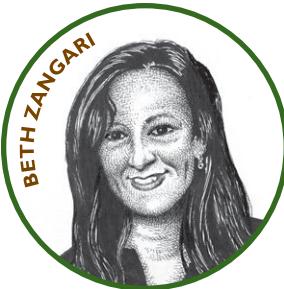
Appearance: Light amber with orange tint. Slight chill haze. Rocky, tan head with good retention. (3/3)

Flavor: Malt forward with hints of bready, grainy roasting and slight caramel notes from crystal or Munich-like malts. Bare hint of yeasty sulfur. Assertive bitterness is well-balanced with the malt. No hop flavor. No fruity esters, diacetyl, or DMS. Finish is on the bitter side and dry, well-attenuated, with a lingering bitterness. (17/20)

Mouthfeel: Medium bodied with a thinner mouthfeel. Smooth, not creamy. No alcohol warming. Bitterness present in the mouthfeel without astringency. Undercarbonated for an alt. (4/5)

Overall Impression: Very good example of the Dusseldorf alt style. This style can vary but additional hop aroma and flavor would add depth and complexity to this alt. Light and attenuated enough to be a very drinkable session beer. Malt complexity makes for a quite interesting beer. Excellent with a crusty soft pretzel. (8/10)

Total Score: (41/50)



Aroma: Moderate caramel malt dominates first impression; no hop aroma at beginning or later. Clean fermentation, though as the beer warms, a low pear ester emerges fleetingly. (8/12)

Appearance: Golden copper with brilliant clarity. Pearly off-white foam forms, but doesn't persist. A fine layer of foam sits in a spiral on the surface of the glass. (2/3)

Flavor: Full, rich, lightly caramel maltiness supports a pronounced hop bitterness that comes forward mid-palate, gains strength and accentuates a crisp, rather dry finish. Balance between rich malt and bitterness leans toward the assertive hop character, with a low black pepper spice flavor. Faint ripe plum ester emerges as the beer warms a bit; otherwise very clean fermentation. Bitterness lingers into the dry finish. (17/20)

Mouthfeel: Medium light bodied with a prickly assertive carbonation that dances on the tongue. Finish is quite dry, though not astringent. Low alcohol warmth. (4/5)

Overall Impression: Deceptively rich caramel malt character with medium light body is surprisingly complex, with an assertive hop bitterness to provide balance. The hop presence is big enough to satisfy the IBU craving with the malt backbone to support. The dry finish and low alcohol presence make this a first-class session beer. (8/10)

Total Score: (39/50)



Aroma: The aroma emphasizes the malts, with a blend of toasted bagel, toffee, and melanoidins. A hint of roast does not interfere with the other aroma elements. Low to moderate fruitiness with pear esters and a little sweet apple. Some graininess blossoms as the beer warms. Hop aroma is weak, but acceptable for the style. (9/12)

Appearance: Coppery in color with an off-white head that beads tightly. Excellent clarity, which is more evidence of great conditioning. (3/3)

Flavor: The malt backbone falls a little short of my expectations from the aroma. Biscuit and melanoidin components are roughened by a grainy character that detracts from the smoothness. Low to moderate fruitiness that is appropriate in this hybrid style, followed by low earthy and spicy notes from Spalt or other noble hops. The finish is moderately bitter, though perhaps toward the low end for the Dusseldorf style and more in line with the Northern German interpretation. The balance is good, which is important for this style. (13/20)

Mouthfeel: The beer does not fill the palate as well as the classic examples and comes across a little watery, even for a German session beer. The carbonation adds a nice creaminess but is not quite enough to pull the mouthfeel together. A little more malt roundness without the astringency and graininess would enhance the aftertaste. (3/5)

Overall Impression: A good example of the altbier style, with an aroma that brings back memories of summer afternoons in the Altstadt. The flavor, however, falls a little short of the depth and complexity of classic examples. I commend the conditioning, appearance, and head retention—key elements of most German beer styles that many craft brewers have difficulty mastering. (6/10)

Total Score: (34/50)



Aroma: Strong toasty-grainy malt aroma. Has a "dry" impression. Light spicy hop aroma. Clean, neutral fermentation character. Light caramel develops as it warms, with a slight butterscotch note. Hints of dark fruit but more like the kind from malt than yeast. (9/12)

Appearance: Amber-orange color with a distinctive reddish hue; on the line between amber and copper. Crystal clear. Moderate-sized off-white head, settled very fast. (2/3)

Flavor: Strong toasty-caramelly malt flavor. Medium-high bitterness. Dry finish. Moderate spicy hop flavor. Grainy but lightly caramelly finish. Lingering toast-grainy malt and hop bitterness/flavor in the aftertaste. Very clean fermentation character. Caramel has a slight burnt sugar note. Bitterness slightly edges out malt in the balance, but the intensity of both is pretty high. (16/20)

Mouthfeel: Medium to medium-full body—has some "weight" to it, a bit much for me. Medium-high carbonation. Slightly warming but smooth. (4/5)

Overall Impression: Strong but clean flavors. The malt has a nice grainy-toasty flavor with a slightly odd burnt sugar-caramel note. Hop aroma and flavor are a bit higher than classic examples but complement the malt nicely. The dry grainy finish and strong bitterness are great—classic characteristics. Clean and smooth palate—very appropriate. (8/10)

Total Score: (39/50)



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by Charlie Papazian



Paint it Black

Black is Back Tripel

ALL-GRAIN RECIPE

INGREDIENTS

for 5 U.S. gallons (19 liters)

12.0 lb	(5.4 kg) pale malt
1.0 lb	(454 g) debittered black malt or black wheat malt
1.5 lb	(680 g) cane sugar (sucrose; Belgian candy sugar)
1.5 oz	(42 g) Styrian Goldings, Fuggles, or Willamette hops, 5% a.a. (60 min)
1.0 oz	(28 g) American Mt. Hood, Santiam, or German Saphir hops (1 min)
0.25 tsp	(1.25 g) powdered Irish moss
	Strong Belgian-style ale yeast
0.75 cup	(175 ml) corn sugar or 1.25 cup. (300 ml) dried malt extract (for bottling)

Target Original Gravity: 1.082**Target Extraction Efficiency:** 77%**Approximate Final Gravity:** 1.018**IBUs:** about 27**Approximate color:** 30+ SRM (60+ EBC)**Alcohol:** 8.4% by volume

DIRECTIONS

A step infusion mash is employed to mash the grains. Add 13 quarts (12.3 liters) 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 6.5 quarts (6.2 liters) of boiling water and add heat to bring temperature up to 155° F (68° C) and hold for about 30 minutes. Raise temperature to 167° F (75° C), lauter and sparge with 3.5 gallons (13.3 liters) of 170° F (77° C) water. Collect about 5.5 gallons (21 liters) of runoff. Add sugar and 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. When one minute remains, add the one-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. Strain and sparge the wort into a sanitized fermenter. Bring the total volume to 5 gallons (19 liters) with additional cold water if necessary. Aerate the wort very well.

Add the yeast when cool and ferment to completion. Bottle when fermentation is complete. Although this brew will be ready for your enjoyable indulgence three weeks after bottling, it ages well. With two to 12 months' aging in a quiet, dark and cool environment, you will find that the complexity of this brew evolves. If you find that you like this beer with age, better get to brewing a second batch right away—don't say I didn't warn you.

“What's next?” This is probably the most popular beer question asked of me. The initial emergence of American lighter lagers in the 1950s was followed by the popularization of English-style ales in the early-80s. From there, we've seen migrations to and through several other trends. Belgian ales, American wheat beers, fruit beers, sour beers, wild beers, barrel-aged beers, seasonal beers (and the world's most popular seasonal brew, pumpkin beer), extreme beers (alcohol or hops), and Brett beers.

Of course, the continuing trend these days is the growing popularity of hoppy India pale ale styles of beer. Right now, there's no end in sight for hops in beer. Hopheads are blessed by the innovative creativity of brewers worldwide. But still, the question beckons.

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Black is Back Tripel

MALT EXTRACT RECIPE

INGREDIENTS

for 5 U.S. gallons (19 liters)

9.0 lb	(4.08 kg) dark malt extract syrup or 7.45 lb (3.4 kg) dried dark malt extract
8.0 oz	(227 g) debittered black malt or black wheat malt
1.5 lb	(680 g) cane sugar (sucrose; Belgian candy sugar)
2.0 oz	(56 g) Styrian Goldings, Fuggles, or Willamette hops, 5% a.a. (60 min)
1.0 oz	(28 g) American Mt. Hood, Santiam, or German Saphir hops (1 min)

0.25 tsp

(1.25 g) powdered Irish moss

0.75 cup

Strong Belgian-style ale yeast
(175 ml) corn sugar or 1.25 cup (300 ml) dried malt extract (for bottling)

Target Original Gravity: 1.082

Target Extraction Efficiency: 77%

Approximate Final Gravity: 1.018

IBUs: about 27

Approximate color: 30+ SRM (60+ EBC)

Alcohol: 8.4% by volume

DIRECTIONS

Place crushed grains in 2 gallons (7.6 l) of 150° F (66° C) water and let steep for 30 minutes. Strain out (and rinse with 3 quarts [2.8 liters] hot water) and discard the crushed grains, reserving the approximately 2.5 gallons (9.5 liters) of liquid to which you will now add malt extract, sugar, and 60 minute hops. Bring to a boil.

The total boil time will be 60 minutes. When 10 minutes remain, add Irish moss. When one minute remains, add the one-minute hops. After a total wort boil of 60 minutes, turn off the heat. 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 and sparge hops and direct the hot wort into a sanitized fermenter to which 1.5 gallons (5.7 liters) of cold water has been added. If necessary, add cold water to achieve a 5-gallon (19-liter) batch size. Aerate the wort very well.

Add the yeast when cool and ferment to completion. Bottle when fermentation is complete. Although this brew will be ready for your enjoyable indulgence three weeks after bottling, it ages well. With two to 12 months' aging in a quiet, dark and cool environment, you will find that the complexity of this brew evolves. If you find that you like this beer with age, better get to brewing a second batch right away—don't say I didn't warn you.

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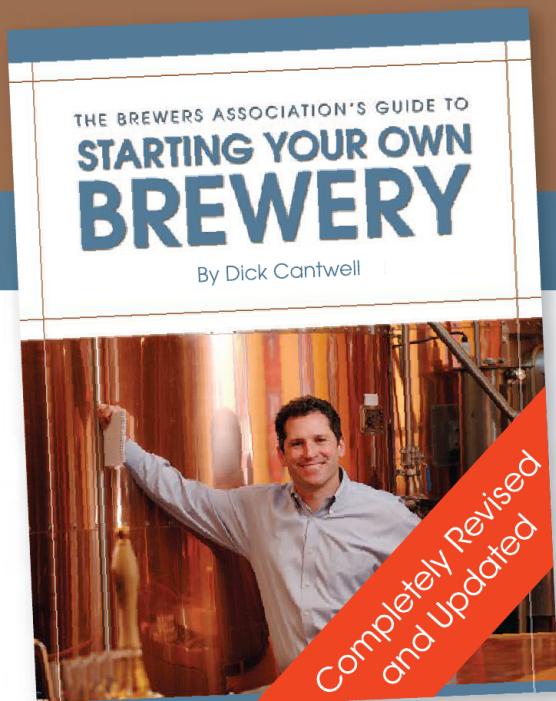
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With no data or trending statistics available, I might take a guess at what may be just beyond the horizon. What have the trends so far been based on? Hops, alcohol, wood, acidity, specialty ingredients, yeast and other microorganisms, and international beer traditions on the verge

of extinction. What other major theme is out there to be confiscated and harnessed into a new trend?

After a lot of drinking and thinking, there's one obvious area that has not yet been explored. Color! It sounds simple

but seems overlooked. Over a century ago, the world's most popular beer was stout. Glassware, refrigeration, and malt processing helped introduce changes that inspired new directions in beer. Today we have the relatively recent introduction of dark and roasted malt with not only unique character, but also the choice of diminished "burnt" malt character. In other words, we have access to dark and black malts that lend themselves to smoother balance and, for many, enhanced drinkability, without the harshness of "old-style" robust, carbonized malt characters.



One idea that I don't think has any substance is black beers by virtue of caramel or other coloring ingredients that lend no roast character. There's a long history of "dark" beers colored by caramel or other weak-tasting ingredients that have languished in the backwaters of beer choice.

With the integration of true roast malt and grain character, the opportunities seem infinite. We've already seen the emergence of American-style black and hoppy ales. What would happen if we took all of the world's light, gold, straw, amber, copper, and brown ales and lagers, painted them black, and balanced them to appeal to today's adventurous beer drinkers?

How about a black tripel? Would I call it a Black Belgian-style Tripel? Never; there's neither such a style nor a tradition, but the very idea of this confluence is pure and delightful speculation, worthy of your thoughts and thirst. So let's cut the shuck and jive and get on with the recipe.

Charlie Papazian is founder of the American Homebrewers Association and author of *The Complete Joy of Homebrewing*.

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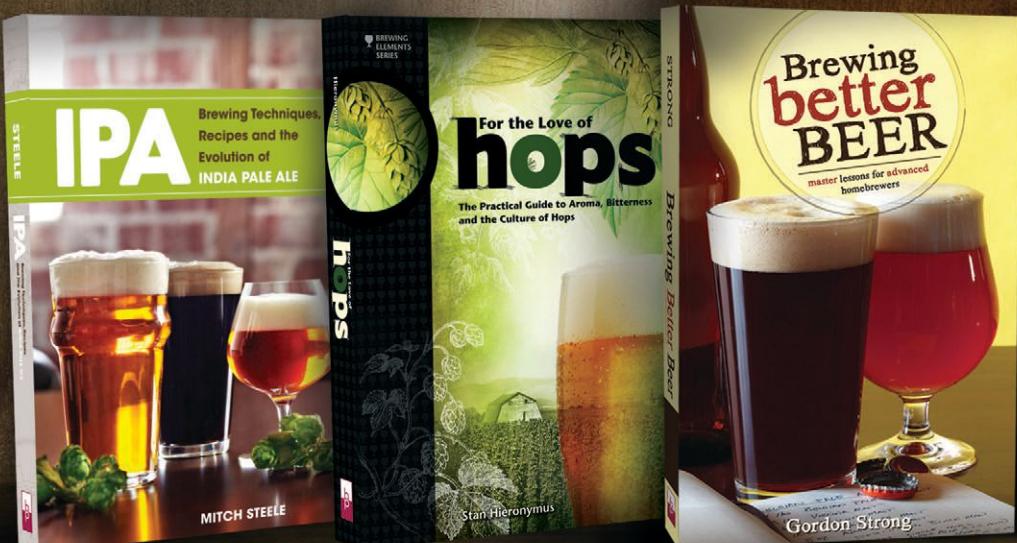
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Chai Milk Stout Soap



Although beer soap is nothing new, the Chai Milk Stout soap idea came to me as I was emptying the mash tun after brewing a batch. I have been making bar soap at home for a few months now and friends and family really like my creations. Apparently my soap holds up well, is long-lasting, and keeps the skin well moisturized. Until recently, all the soaps I've made have had no abrasive additives. But for my latest soap, instead of the usual recommendation of steel-cut oats, I decided to add spent grains.

Soap making isn't difficult and the time commitment is less than brewing a batch of beer. The spent-grain soap didn't turn out as perfectly as my other batches, but it has a pleasant spice aroma. I realize now that I didn't dry the spent grain as

Chai Milk Stout Soap

INGREDIENTS

8.0 fl oz	(236 ml) Chai Milk Stout* or other homebrew
2.82 oz	(80 g) sodium hydroxide (100% lye, found in hardware stores or online)
10.5 fl oz	(310 ml) canola oil
10.5 fl oz	(310 ml) coconut oil
0.25 cup	(60 g) spent grain (mostly dried) (<i>optional abrasive additive</i>)

*The Yak & Yeti Chai Milk Stout recipe from the January/February 2011 *Zymurgy* has been reprinted in the Beeroscope section of this issue.

DIRECTIONS

1. Pre-measure ingredients and lay them out on a clean workstation.
2. Melt the coconut oil in a saucepan until clear; remove from heat.
3. While wearing safety gear and preferably outside or in a well-ventilated area, add the lye to the beer in a heat-resistant container preferably with a handle (such as a Pyrex measuring cup). An exothermic reaction occurs and it off-gasses hazardously. Monitor with a thermometer until temp is around 80° F (26.5° C). (Do not breathe fumes!)

thoroughly as I should have. Next time I'll blot them dry with paper towels, or maybe hold them in the oven for 20 minutes.

If you want to give beer soap a try, above is a list of ingredients and instructions. Be creative and try other beer styles. Barrel-aged framboise soap? Whole hop IPA soap? The possibilities are endless.

4. When coconut oil has cooled to 85-95° F (29.5-35° C), add the canola oil, which will drop the temperature slightly.
5. Mix the oils and the beer/lye mixture in a blender and **close the lid**.
6. Blend well. Stop periodically to watch for saponification (the chemical reaction that creates soap). You'll know when you are done if you spoon some liquid and try to pour it back in the solution. If it quickly sinks, you are not done blending; if it makes drops and indentations that linger, you are done. (It should be approximately the consistency of ketchup). The mixture will start to get warm.
7. Add the optional dried spent grain and blend uniformly; do not puree the husks too long.
8. Pour mixture into a clean 1-quart milk carton and close the top.
9. Wrap the carton in several hand towels to keep it insulated.
10. Wait 24-48 hours; peel back the carton using rubber gloves.
11. Place soap on cutting board and cut into 8-10 bars. Set bars vertically and slightly spaced so they can air dry.
12. After 3-4 weeks, the soap will have cured, transforming the lye from caustic to neutralized and thus safe for the skin. Enjoy!

Safety Warning: Like most basic soap recipes, this recipe uses lye, which is caustic and produces a hazardous gas. Please use safety gear and caution, and consult an online source such as www.soap-made-easy.com/safe-soap-making.html for basic safety tips!

Adam Draeger is head brewer at The Yak & Yeti Brewpub in Arvada, Colo. 



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