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The Journal of the American Homebrewers Association®

8th Annual Gadgets Issue

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Homebrewer
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Published by the American Homebrewers Association, a division of the Brewers Association, a not-for-profit organization located at 736 Pearl Street, Boulder, CO 80302-5006 USA. Membership is open to everyone. *Zymurgy* (ISSN 0196-5921, USPS 018-212) is the bi-monthly journal of the American Homebrewers Association and is published six times per year. Periodicals Postage Paid at Boulder, CO and additional mailing offices. Canada Post Agreement Number 41197537. Annual memberships are \$43 U.S., and \$52 International and include a \$35 subscription to *Zymurgy*.

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

Zymurgy welcomes letters, opinions, ideas, article queries and information in general from its readers. Correspondence and advertising inquiries should be directed to *Zymurgy*, PO Box 1679, Boulder, CO 80306-1679, (303) 447-0816, FAX (303) 447-2825, www.homebrewersassociation.org. All material ©2013, American Homebrewers Association. No material may be reproduced without written permission from the AHA.

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

POSTMASTER: Send address changes to:

Zymurgy, 736 Pearl Street, Boulder, CO 80302-5006

Printed in the USA.



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

Vol. 37 * No. 1 | January/February 2014

zymurgy®

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>> GET THERE!

KEY LARGO BREW ON THE BAY

Rotary Club of Key Largo is hosting the 3rd annual Brew on the Bay January 11 from 2-6 p.m. in Key Largo, Fla.

More than 100 craft beers will be featured for an unlimited tasting on the waterfront at the Rowell's Marina property. Enjoy live music, specialty vendors, food, and fun.

Tickets are \$35 in advance or \$40 at the gate. VIP passes (includes early admission, priority parking, and a VIP tent with appetizers) are \$60. All net proceeds from Brew on the Bay will go toward scholarships in the local community.

A homebrew competition takes place the day before the festival. For more information go to keylargobrewonthebay.com

January 9-11
Big Beers, Belgians and Barleywines Festival

Vail, CO
bigbeersfestival.com

January 11-18
Kalamazoo Beer Week

Kalamazoo, MI
www.kalamazoobeerweek.com

January 17-18
Great Alaska Beer & Barley Wine Festival

Anchorage, AK
<http://auroraproductions.net>

January 25
Atlanta Cask Ale Tasting

Atlanta, GA
Classiccitybrew.com/acat.html

February 1
Queen City Brewers Festival

Charlotte, N.C.
www.qcbrewfest.com

February 7-16
San Francisco Beer Week

San Francisco, CA
www.sfbeerweek.org

February 15-22
Arizona Beer Week

Arizonabeerweek.com

February 21-March 2
New York City Beer Week

www.newyorkcitybrewersguild.com

For more craft brewing events,
go to CraftBeer.com

>> BEER POEM



MAKING ALE (FOR OUR 20TH ANNIVERSARY)

We sense it before the boil begins,
the cauldron hissing, breathing heat.
We pour the malt and honey in,
stirring with the wooden spoon
we've trusted for these twenty years.
Before the brew can over-boil
we temper down the burn instead
and settle for equilibrium.

The bittering hops foam steeple green,
lupulin to hold dreams home.
We add the finishing flowers in hopes
of floral and citrus nuptials,
the Irish Moss for clarity
now locked beneath a familiar lid.

Not anxious when the wort cools down,
we don't even bother trying to flirt.
The mixture we've negotiated
to a specific gravity
is funneled to ferment in glass.
We pitch a thick slurry of yeast
harvested from batches gone by,
from regeneration and compromise.
By morning there's a veil alive,
another cycle to respect.

We siphon off a copper ale,
salvage the yield of dormant yeast,
add sugar and seal the keg with care.
Rinsing and stowing the instruments,
we dry the drops and recall the times
we've followed these deliberate steps
to ensure delicate bubbles rise
with each sip that graces our lips.

Darius Degher's poems have appeared in magazines and journals on both sides of the Atlantic. This poem is included in his first collection, *To See the Sound*, which will be published in February by David Robert Books. He lives in North San Diego County with his wife and two daughters.

>> BREW NEWS: THE LONG ROAD TO GABF

Davis Tucker's 14-day, 1,400-mile road trip to the Great American Beer Festival® (GABF) wasn't the farthest a brewer traveled to attend this year's event, but it certainly might be the hardest. Tucker tackled a circuitous route—by bike—from Austin, Texas to Denver.

Maybe the connection between a strenuous solo bike tour and the beer industry isn't immediately apparent, but for Davis, "1400 Miles" combined two of his passions. As a competitive cyclist and former racer, he knows what it's like to spend countless hours in the saddle. In addition to hills and headwinds, Tucker has a taste for hops, having started two Texas brewpubs, Copper Tank and North by Northwest.

Having seen Don Thompson, his close friend of nearly 30 years from the craft brewing industry, survive prostate cancer, Tucker dedicated the ride's proceeds to Pints for Prostates. The 1400 Miles campaign hosted events in seven cities between Austin and Denver, where

donated food and beer were sold to raise money for Pints for Prostates.

For Tucker, the ride's struggles were worthwhile. "I went over to the Denny's in Albuquerque. I'm eating my eggs and bacon, and this gentleman next to me was a 12-year survivor of prostate cancer. We've probably had 20 or 30 of those stories, just running into people."

When it comes to both the ride and prostate cancer awareness, "quitting is not an option at all," said Tucker, who rolled into Boulder's Upslope Brewery on October 7, three days before the GABF started. He's already working with his team to plan 2014's ride. And for the second year, he's hoping to get Thompson on the bike to join him.

Reported by Spencer Powlison



BEER QUOTE

"If you love what you're doing, the beer will speak for itself."

—Chris Fish, proprietor,
Telluride Brewing Co.

>> YOU'VE GOTTA DRINK THIS

VICTORY STORM KING

How dark and viscous Storm King pours. You would think you were about to drink motor oil, but this black gold doesn't spring from a well but from Pennsylvania's Victory Brewing Company. This imperial stout is an elixir of chocolate and espresso with some residual sweetness and a healthy hop kick. The first thing your palate notices is the sharpness of the hops, which mellows to a bitter sweetness and finishes in thick notes of coffee and dark chocolate. The tan head sits loftily, as a crowned king's should, as we are reminded of the round bourbon-esque notes by the legs forming on the glass. The high ABV isn't the only intoxicating thing about this ale. I love it so much that I forgave the traditional bachelor party shenanigans and enjoyed the sensuous curves of a Storm King growler instead.

Reviewed by Tyler Hutchinson, Jersey City, N.J.



If you've had a beer you just have to tell the world about, send your description, in 150 words or fewer, to zymurgy@brewersassociation.org.

>> CRAFT BREWER PROFILE KRISTEN ENGLAND

BY GORDON STRONG

This past August, Kristen England and I were invited to be speakers and judges at the Chile Beer Cup in Santiago—sort of the Chilean GABF. One of the talks we gave was on “Brewing with Local Ingredients,” which led us to think about all the indigenous Chilean ingredients and how they might pair with classic beer styles. Kristen had a great idea about using local ingredients in a collaboration recipe with local brewers based on a drink he had in a Chilean café. This is the story of how that beer was created.

England, of Saint Paul, Minn., was an award-winning homebrewer, winning multiple NHC gold medals and numerous other competitions before opening his own brewery in 2012. He’s now the head brewer at Pour Decisions Brewing Company in Roseville, Minn., where he brews a wide range of historical and experimental styles. Where else can you go to try Berliner weisse, Grodziskie (Grätzer), gose, Lichtenhainer, Burton ale, tripel with three Brett strains, Belgian golden strong ale with white grape must, and other oddities? Their flagship beers are a golden, hoppy Trappist single-style beer, and a soon-to-be-released dark, malty, hoppy, low-alcohol, historical Scottish session IPA. Unusual, indeed.

One of the things I like best about this concept is that it celebrates little-known historical styles, produced after detailed research, rather than just making something goofy. When an interesting ingredient or process is used, it’s a twist based on



the anticipation of a pleasant flavor combination rather than following the crowd with whatever is popular at the moment. Just to put an exclamation point on that theme, Kristen was proud to declare that their lineup had “no double IPAs.”

Given that experience in creating historical and experimental beers, the idea for the Chilean beer developed quite naturally. The concept for this collaboration beer

came from Llamarada, a wonderful coffee drink made in Viña del Mar, Chile. Into an espresso glass, they put some local honey, a shot of espresso, and finally a pinch of Merkén—the ubiquitous smoked pepper spice mix of the indigenous Mapuche of southern Chile. The play on the sweet, bitter, and spicy-hot was marvelous, and something entirely Chilean. Many successful specialty beers start with a simple concept like this: a food or beverage that

has a particularly interesting flavor profile. To produce a beer with this concept while using the theme of using local ingredients was too good an opportunity to pass up.

England chose a rich foreign export-type stout as the base style for the beer recipe that evoked the café drink while paying respect to the local ingredients—something substantial, malty, and dark that could stand up to the strongly-flavored coffee and pepper components without dominating them. This seems to be a theme to many of his recipes—choosing a classic style and putting a twist on it without making the base beer unrecognizable. It also uses a flavor combination that enhances and complements those already present in the base beer; a lesson for the formulation of any specialty beer.

The base beer has coffee flavors of its own from the malts, but the espresso character is reinforced with South American coffee. Toasty notes come from toasting oats and quinoa, a native South American grain. The honey and Merkén are used as accent flavors, added near the end of the boil. South Americans traditionally use dry yeast, since liquid yeast is typically not imported. An English-style yeast fermented warm will produce complementary fruity esters. Local Cascade hops (which taste more herbal and earthy than U.S. Cascade) provide the bitterness, while Patagonia malts are most authentic (English and Belgian malts are a good substitute).

Along with one of the other speakers at the conference, Chris Kay of the Bristol Beer Factory in the UK, and the many local brewers we met, we each decided to independently brew the collaboration recipe. We hope to judge the beers next year in their own competition when we return for the next conference.

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

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Colaboración Llamarada Stout

ALL-GRAIN RECIPE

Pour Decisions Brewing Company (www.pourdecisionsbrewery.com)



DIRECTIONS

Mash all grains at 158° F (70° C) for 45 minutes in high carbonate water. Add hops to kettle. Sparge with 168° F (76° C) water, collecting 6.75 gallons (25.6L). Boil for 60 minutes. Add honey, coffee and spice at indicated times. Steep coffee (bagged) for 10 minutes post-boil, then remove. Chill, pitch yeast, ferment at 72° F (22° C), and carbonate to 2.3 volumes (4.7 oz/133 g corn sugar, or force carbonate).

Note: Argentine Cascades aren't very similar to U.S. Cascades; they are earthy and herbal, with a coarser profile. U.S. Willamette might be a good substitute.

Note: Toast quinoa and oats in a 350° F (177° C) oven until golden brown and noticeably aromatic, stirring occasionally. Do not burn. Allow to cool before using.

Note: Merkén is a specialty smoked hot pepper mix, ranging from mild to hot. Can be approximated using anything from an equal mix of chipotle and Aleppo peppers to all chipotle. To this pepper base, add 10% salt and 10% toasted coriander seeds (for 100 g mix, use 10 g salt, 10 g coriander, and 80 g peppers).

EXTRACT VERSION

Substitute 6.5 lb (3 kg) liquid Pilsner malt extract for the Pilsner malt. Steep grains for 30 minutes in 158 °F (70 °C) water, drain and remove. Add extract, bring to a boil, and follow main recipe.

MINI-MASH VERSION

Substitute 4.5 lb (2.04 kg) liquid Pilsner malt extract for 6.5 lb (2.95) of the Pilsner malt. Mash the remaining 2.5 lb (1.13 kg) Pilsner malt with the brown and crystal malts, flaked oats and toasted quinoa at 155° F (68° C) for 45 minutes. Add the crushed black and chocolate malts to steep with the other grains for the last 15 minutes of the mini-mash. Rinse grains thoroughly, dissolve extract, and proceed with boil.

By Gary Glass



What's On Tap for 2014



Happy New Beer! I'm sure you are as excited as I am to greet a new year full of homebrewed goodness. You'll want to be sure to fill the important homebrew dates below into that brand new calendar on your wall (or electronic device).

Late January – early February
National Homebrew Competition
Entry Registration

Late February
National Homebrewers Conference
Registration

March 21-April 13
National Homebrew Competition First Round Judging

March 31
Deadline for entry submission for the AHA Radegast Club of the Year Award
(see Community section of HomebrewersAssociation.org for details)

May 3
Big Brew/National Homebrew Day

June 12-14
National Homebrewers Conference
Grand Rapids, Mich.

August 2
Mead Day

October 2-4
Great American Beer Festival
Denver, Colo.

November 1
Learn To Homebrew Day

Hop & Brew School

In September, I was fortunate to once again be a speaker for the annual Hopunion Hop & Brew School. The event takes place in Yakima, Wash. in the midst of the hop harvest (which is really kind of crazy when you think about putting on a major

event during the busiest time of the year for Hopunion). The two-day homebrewer session had space for 120 attendees and quickly sold out.

One interesting tidbit homebrewers might find useful (there's not enough room in this column to cover all of them) came during a Q&A with Tom Nielsen, Technical Lead–Raw Materials for Sierra Nevada Brewing Co. In his day job, Tom gets to play with really cool lab equipment to gain a better understanding of how hops, malt, and yeast contribute to the flavor, aroma, and stability of beer. Answering a question about dry hopping techniques, Tom explained that dry hops added during fermentation will have a more subtle, but completely different, effect than dry hopping after fermentation is complete. Yeast will absorb much of the hop oils introduced by dry hopping, thus stripping out much of the hop character



Hops from the 2013 harvest will find their way into your glass this year.

when the yeast drop out of suspension. However, the presence of yeast also leads to changes in hop aroma and flavor compounds, with the resulting dry hop character exhibiting stone fruit aromas. Dry hopping post fermentation contributes more overall hop oil to the finished beer and is more in line with the citrusy, floral, pine, etc. notes that you get when rubbing fresh hops.

Hopunion staff, along with Jason Perrault from Perrault Farms, the Hop Breeding Company, and Select Botanicals Group,

led attendees through a hop sensory training session. First we were asked to sniff 15 different isolated hop aroma samples, including cedar, pine, earthy/tobacco, grassy, herbal, floral 1 (geranium), floral 2 (rose), spicy 1 (black pepper), spicy 2 (curry), stone fruit, tropical fruit, onion/garlic, sweaty, and fruity. We then sniffed unlabeled vials and had to identify which of the standard aromas each represented (I could have used a week to do this!). Then we went on to apply the sensory training on actual hops. Hopunion set out nine different unidentified hop



varieties, including several experimental varieties, for us to smell and rank the level of each of the 15 standard aromas we detected (again, I could have used a week to do this).

In addition to educational seminars and sensory training, attendees got to tour the Hopunion facilities from which something like 12 million pounds of 2013 harvest hops will be shipped all over the world. Attendees also got to tour a test plot at Perrault Farms and witness hops being harvested at Loftus Ranches. Harvesting hops is an intensive business, involving cutting the bines, separating the hops from the bines and leaves, kilning, and baling. It is quite an experience to witness all of the people and machinery involved in getting hops from the vine to a form usable by brewers.

Home Beer and Wine Maker Survey

In August 2013, the AHA conducted a nationwide survey of home beer and wine makers. The response was tremendous, with more than 18,000 individuals completing the survey including 25 percent of the AHA membership. Here are some highlights of what we learned:

- There are approximately 1.2 million homebrewers in the United States—that's more than 1 per every 200 adults aged 21 or higher.

 An advertisement for White Labs Yeast. It features a clear plastic vial with a black cap containing a yellowish liquid. The vial has a white label with a gold border. The label includes the text "WHITE LABS HOME BREWING", "WHITE LABS", "PURE YEAST AND FERMENTATION", "CALIFORNIA ALE YEAST", and "Instructions For Use". The label also contains small print about yeast viability and storage. The background is a dark blue grid pattern. Overlaid on the image are several text boxes with arrows pointing to specific parts of the vial or label:

- TAMPER EVIDENT CAP** (points to the black cap)
- INSULATED COLD SHIPPED WORLDWIDE** (points to the top of the vial)
- CONCENTRATED YEAST YOU CAN SEE** (points to the yellow liquid in the vial)
- YEAST MADE FRESH WEEKLY IN SMALL BATCHES** (points to the label area)
- TRACEABLE QA RESULTS FOR EVERY VIAL** (points to the label area)
- 70 STRAINS OF YEAST, BRETTANOMYCES AND BACTERIA AVAILABLE** (points to the bottom right of the vial)

 Below the vial, the text reads:

- BLUEPRINT OF -
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- Homebrewers are making 65.3 million gallons of homebrew per year.
- AHA members tend to brew more frequently (10 times per year for members versus eight times per year for non-members) and in larger volumes than non-members (69 gallons per year for members versus 54 gallons per year for non-members).
- In a single year, the average homebrewer is shopping at two local homebrew supply stores and three online homebrew stores, though buying more frequently from their local shops.
- Seventy-four percent of homebrewers started brewing within the last eight years and more than half started within the last five years.
- The number one reason cited for participation in the hobby is the creative/artistic aspects of homebrewing.
- Nearly 60 percent of homebrewers are between the ages of 30 and 49. Those under 30 make up almost a quarter of the homebrewer population.
- Homebrewers are highly educated, with 63.5 percent (72.0 percent for AHA members) having a bachelor's or higher degree.

Everyone who completed the survey was entered into a drawing for one of five \$200 gift certificates and one \$1,000 gift certificate to the homebrew shop of the winner's choice. Congratulations to James Bain of Wabash, Ind., Joe Jonas of Jackson, Mich., Ryan Whirlow of Lodi, Calif., Greg Montgomery of Eldersburg, Md., Chris Massad of Washington, D.C., and grand prize winner Andrew Gibson of Hamden, Conn.

2014 National Homebrew Competition

The AHA Governing Committee's Competition Subcommittee has finalized changes to the National Homebrew Competition (NHC) for 2014. The most notable changes deal with registration. Here are some of the changes for the 2014 competition:

Lottery-Style Registration

With the 2013 NHC filling up in a matter of a couple of hours and system problems caused by the high volume of people attempting to register all at once, the AHA will be using a lottery-style registration system for the 2014 competition that will give prospective entrants a week to register. This open registration period eliminates the need to be available at a particular time of day and compete with thousands of others attempting to register at the same time, facing possible server and software problems. After the

open enrollment period, entrants will be selected at random and offered an opportunity to pay for their entries until each of the first round judge centers are filled to their 750-entry capacity.

Entry Limit

In 2014, entrants will be limited to a maximum of six entries. This is a drop from the 15-entry limit instated for the 2013 competition—the first entry limit in the competition's history. The purpose of the entry limit is to allow more entrants an opportunity to compete. The

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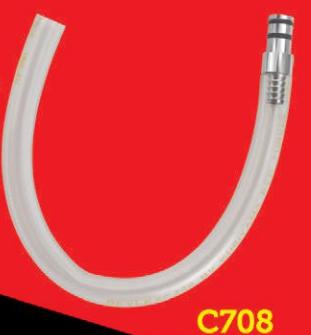
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actual entry limit may ultimately be lower than six depending on the number of entrants and entries that are registered for the lottery.

AHA Members-Only

In 2014, only members of the American Homebrewers Association will be eligible to enter the National Homebrew Competition.

2013 Judges, Stewards, and Competition Organizers Guaranteed Entries

Recognizing the crucial role of the judges, stewards, site directors, judge coordinators, and other competition volunteers, the NHC will be guaranteeing those people who helped make last year's competition happen an opportunity to submit entries to this year's competition. This is something we intend to continue in the future, so this year's judges, stewards and competition volunteers can expect guaranteed entries in the 2015 competition. Those interested in volunteering to judge or steward for the 2014 competition can check out the National Homebrew Competition pages

on HomebrewersAssociation.org for more information.

BJCP Check List Scoresheets

First round judging will be using the same Beer Judge Certification Program checklist scoresheets that have been used in the final round for the last several years. These scoresheets provide a similar level of feedback to entrants while speeding up the judging process. The hope is that the use of these scoresheets may allow for more entries to be judged at first round sites in the future, thus allowing more total entrants to compete.

Future of the NHC

The Competition Subcommittee will continue to look at further changes for future competitions with an eye to addressing the rapid growth in the competition, while maintaining the quality of judging and the goal of allowing the best homebrewed beers, meads, and ciders to compete in this unique competition. For more information on the 2014 competition, check out the NHC pages on HomebrewersAssociation.org.



2014 National Homebrewers Conference Registration

The 2014 National Homebrewers Conference heads to Grand Rapids, Mich. June 12-14. As with the National Homebrew Competition, the conference has seen rapid growth in attendance over the last several years. The 2013 attendance exceeded the previous record by more than 1,000 attendees! Despite the much greater capacity, it still sold out in hours and caused a server crash. This year's conference can handle over 20 percent more attendees, with an anticipated 4,000 total conference goers. For this year's conference registration, to avoid the anxiety of a quick sellout and the risk of technical issues, we will be using lottery style registration, allowing AHA members interested in attending to pre-register themselves over an extended period of time. It is very likely that this year's conference will sell out, thus we will use a lottery style drawing to finalize registration. Anyone not selected in the lottery would be eligible for registrations that become available due to cancellations, which always occur.

An advertisement for Monster Brewing Hardware. It features a large image of a stainless steel brewing equipment component with a central adjustment knob. To the left is a circular badge with the text "New IMPROVED ADJUSTMENT KNOB" surrounded by a laurel wreath. Below the badge is a small illustration of a growling monster. To the right of the badge is the text "MONSTER BREWING HARDWARE". At the bottom, there is a banner with the website "WWW.MONSTERBREWINGHARDWARE.COM" and a quote: "IT'S ALWAYS BETTER TO HAVE A BIGGER TOOL THAN YOU NEED" -MONSTER MACHINIST".

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Okay, that's enough from me for now! Grab a winter warmer, get cozy, and enjoy the rest of this issue of Zymurgy.

Until next time, happy homebrewing!

Gary Glass is director of the American Homebrewers Association.

by Our Readers

A Tip of the Hat



Dear Zymurgy,
I'm currently deployed to Afghanistan on a humanitarian mission. We supply local villages with water, generators, and fuel for their vehicles. Whenever we break wire (leave the security of the base), we hang up our ball caps and strap our helmets on until we return. When we come back behind friendly lines, we put our caps back on. I find the ball cap ritual to be a sign of good luck. Some like to wear the contractor hat with the American flag on the front, while others wear their favorite baseball team or the college they graduated from.

I was sitting in my truck a week or so ago thinking about a hat that I could wear. I was torn between an Oregon State University cap or asking my wife to send my Oakland A's hat to me from home. Then, it dawned on me. Why not a hat to show my love and support for homebrewing? Duh! So, I ordered an American Homebrewers Association hat. I just received it in the mail, and I love it!

I was introduced to homebrewing when I was about 7 years old. My dad would make beer and soda in the kitchen, and when his beer was fermenting I would sit and watch it in awe. After I moved out

I started homebrewing, too. I had a few great recipes and a bunch of not-so-great ones, but the pleased looks on everyone's faces when they tried one that really turned out well was worth every effort to find that recipe. When I joined the military, homebrewing was put on the back burner, but after three years I have decided that when I get home from this deployment I'm going to get back to it. I'm so excited!

Thank you for all that you do for America's greatest hobby!

Sincerely,
Brent "Hoff" Hoffhines

Historical and Heavenly Brew

Dear Zymurgy,
Just got my Zymurgy in the mail (September/October 2013) and went straight to the Czech Dark Lager article by Amahl Turczyn Scheppach. Czech Dark Lager has long been one of my favorite styles; it was my grandfather's favorite, hands down.

Gramps joined the U.S. Army's 97th Amphibious Inf. Div. and landed in France during WWII. Having destroyed

all but six buildings in Dusseldorf near the end of the war, and arguably some of the most flavorful beer production in Europe, Patton ordered the 97th to quickly march to Plzen to save Pilsner beer for the free world (true story). The Americans got to Plzen a few days before VE day and met the Soviets east of the city. The townspeople were so happy the Americans got there first, the brewery rolled out huge kegs of beer and the whole town put on a two-day drunk.

Gramps, recalling the occasion often, described in great detail the beautiful Czech girls who stuffed lilacs in the GIs' shirts as they marched through town. He described with even greater detail the two elixirs that awaited him at the end of his long and difficult journey. The "golden" was the Pilsner we all know and love today, although more like the unfiltered version currently available only at the brewery restaurant and museum in Plzen. But it was the "dark" he recalled with special fondness—malty, rich, soft, heavenly. These were the descriptors he used for his favorite beer in the whole world. Gramps was a devout man; I don't recall too many other worldly pleasures attaining such high praise as heavenly!

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Thank you, Amahl, for transporting me back to that heavenly brew available at U Fleku, and to earlier, fonder memories.

Chad Stevens
QUAFF, San Diego

Food Grade Plastics

Dear Zymurgy,

I have been brewing for over five years now and have been an AHA member for the last three. Can't wait to attend my first AHA conference when it comes to Michigan in 2014.

I just finished reading the July/August issue and I wanted to respond to John in Colorado's warning of using plastic components in brewing equipment.

Food contact materials such as plastics used in homebrewing systems are highly regulated, and all of these materials are heavily scrutinized before they are approved for use. Governmental agencies (such as the FDA) review all available data before determining that a plastic is appropriate for food use, including both data from the manufacturers as well as

data that is generated by the consumer interest groups (which should be pointed out are not without bias since they are funded through donations generated in response to causes that they can convince donors are important). Many of the food grade plastics will indicate a maximum temperature to which their use is appropriate (275° F for some high temperature tubing, for example).

I have been a toxicologist for as long as I have been a homebrewer and this isn't the first time I have seen cautionary advice that goes against the conclusions that can be drawn from evaluation of the overall weight of evidence. I encourage all homebrewers to only use food grade plastics in their homebrew systems. If they ever have a question about whether a plastic is food grade or not, I encourage them to ask the vendor to confirm that the materials are food grade. Once they are sure they are using food grade materials, then relax and have a homebrew.

Paul Hanlon
Columbus, Ohio

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Dear Zymurgy,
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Barrett Meckel
Walton, N.Y.

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.

by Professor Surfeit



More Questions than Answers

Dear Professor,

I brewed two great extract beers, took a gravity reading, let them ferment a week, transferred to the secondary, waited a week, took a gravity reading. Final gravity was fine and I drank the rest of what I tested with the hydrometer. Both beers tasted great, warm and uncarbonated. Couldn't wait for the real thing.

I siphoned to the corny kegs, then forced oxygen off the head space with a CO₂ connection and the pressure release on the keg immediately after kegging. Then I chilled and let them carbonate at 20 psi for three days. Reduced the psi, and poured the beer. Both beers did not taste good—a hollow grabbing taste/feel in the back of the throat. Very disappointed. The kegs were fully cleaned and sanitized including inside the valves. What went wrong to change the flavor during the course of chilling/carbonating?

Steve in Cincinnati

Steve, Steve, Steve,

You've certainly got a problem, but there's not enough information to figure out why you got "did not taste good" beer. Great beer in the secondary can turn wrong in the corny kegs for many reasons. The detail that's missing is how it tasted, besides "bad."

Did the beer turn sour? That's a contamination problem. Could be the siphon hose, improper cleaning of everything, or latent bacteria that simply took off once transferred.

Did the beer taste phenolic like band-aids or plastic? That could be wild yeast that finally took off. But it also could be your length of output tube within the corny. Simply sanitiz-



ing the tube will not get the built-up crud that lingers within the tube. If it's phenolic, then you need to get a long-stemmed brush that can ream the inside of your tube. Use of a kitchen cleanser like Ajax or Comet is very helpful. Also a run of high proof alcohol through the tube while scrubbing with the brush will also help dissolve oils/resins lingering within.

Did your beer taste kind of metallic and tinny? I don't know the best way to describe it, but

sometimes crappy quality CO₂ gas can totally destroy your beer. Top quality breweries have high standards for the quality of their CO₂. Some of the gas out there is contaminated with backfills from other sources or improper plumbing on the way into the cylinders. If that's the case, I can easily taste it in force carbonated beers. Sometimes CO₂ cylinder gas can pick up other nasty flavors and aromas.

Here's a rare problem: If you've ever had an overfilled keg and the pressure inside forces



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the beer up through the gas tubing and into your pressure valves, you're in big trouble. Not only are your pressure gauge and tubing fouled, but it's going to harbor taste-killing bacteria every time you force CO₂ into any keg of beer.

Did the beer taste oxidized? You say you forced oxygen off the head space...after kegging. You might want to consider forcing the oxygen out of the keg when it is empty. If you do this, then when you siphon and there's splashing at the bottom of the keg, it is splashing in an environment of mostly CO₂ and not devastating oxygen.

Well Steve, I hope I've at least hit the dart board. It was kind of hard figuring out an answer being blindfolded.

Trying to shed some light,
The Professor, Hb.D.

A Celiac in Denial

Dear Professor,

As with many Zymurgy readers, I'm a little insulted when people call brewing "a cool hobby." A cool hobby? It pretty much made civilization what it is! A hobby, indeed. I brew, therefore I am. I'm a harvester of hops, and sidekick to

Saccharomyces cerevisiae. With brewing, I can be the bookworm that I am and the engineer that I'm not. We're all tapped into something that is spiritual, humanistic, and intensely social, which is why I'm so distressed.

A quick rundown: after a year of feeling not quite right, I decided to have some blood work done and, lo and behold, I may have celiac disease. I wasn't crushed when the doctor told me I have to stop drinking beer because, really, I thought something had to be amiss. Maybe I'm in complete denial, but it strikes me as a wee bit odd that after a lifetime of good health and great beer, I suddenly have some reaction to gluten in my 33rd year.

Naturally, I started doing some digging. The first piece I came across was a conversation between Dr. Oz and Dr. Neil Barnard. Dr. Barnard suggests that we're seeing an increase in diagnoses for several reasons, one of which is that, "decades ago... [bread]... would have a long leavening process and, during that process, the gluten ends up being broken up." He then suggests that because so much bread is made as quickly as possible in a factory, there "may be more gluten in the final product" than in years past.

So, I thought to myself, "Wouldn't this be the case with beer as well?" After all, isn't that why we mash and have a protein rest, in order for proteolytic enzymes to do their work on those long protein chains? I'm not a chemist, so I'm basing that idea only on what I've read and not a deep understanding of what types of proteins break down. Maybe gluten isn't one of those.

Then I came across a relatively well-documented article called "Celiac Disease, Beer, and Brewing" by Dr. Michael J. Lewis from around 2004 (no date listed, but he mentions a "recent passage [July 2004] of the Federal Allergic Labeling and Consumer Protection Act"). He states, "Malting barleys used for brewing are low-protein barleys; they contain roughly one-third less protein than wheat for baking, and much less of the protein is in the prolamin fraction. Barley contains no true 'gluten.'" Furthermore, Dr. Lewis mentions that, because barley is malted, there is a "consid-

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erable destruction of proteins to the extent of 40 to 50 percent (the Kolbach Index)." Dr. Lewis suggests that, with these ideas in mind, the beer brewing community work closely with Congress because, while the FDA adopted a strict "no-tolerance" policy for gluten, beer may actually fall into a safe zone under European guidelines and, therefore, be dubbed safe for those with celiac if there is truly no gluten in beer.

So, my dilemma, dear professor: I'm having trouble finding peer-reviewed research that grapples with this idea head-on. Is there really that much gluten in beer? I mean, this could be a major boon to the brewing community both financially and spiritually if our brothers and sisters who have been avoiding beer like the plague are actually able to drink it, but are afraid to do so based on restrictions that are, well...a little too strict.

Slainté,
Tim Campbell
Pitman, N.J.

P.S. Please understand that I'm not, in any way, belittling those who have a severe reaction to gluten and feel better on a gluten-free diet. My case, I think, is not nearly as severe as some others I've heard of, so I have the ability (and insanely strong desire!) to delve into the topic a bit more deeply.

Dear Tim,

Charlie Papazian wrote a story a few years back in Zymurgy (November/December 2009, available to AHA members via eZymurgy and Zymurgy apps) on gluten-free beer made with enzymes that remove the gluten. A short version of that story is here: www.examiner.com/article/gluten-free-beer-reduced-gluten-beer-offers-real-beer-taste-for-celiac-impaired.

Depending on your particular circumstances, I believe there is still hope for people like yourself.

Keep the faith,
The Professor, Hb.D.

Revisiting Stuck Fermentations

Dear Professor,

I agree with your assessment of Bret Burge's problem (September/October

2013) with under-attenuated beer: he's probably under pitching. Still, I just finished reading the book *Yeast* and I had a few thoughts on his problem.

The first thing I would do is assess residual sweetness. WLP 001 is a very dry yeast, and despite what you sometimes hear, a warm mash won't make a dry fermenting yeast leave residual sugars. So, if a beer fermented with WLP001 has a lot of residual sweetness, there's a problem with the yeast not completing fermentation. (There are other sources of residual sweetness that WLP001 won't eliminate, such as crystal malts or high OG, but if you're brewing relatively normal recipes, you won't perceive a lot of residual sweetness.)

There are two factors besides pitching rate that could be causing stuck fermentation. One is that the yeast is getting too hot. With a 20+ gallon fermentation volume, this is not unlikely without some source of cooling; yeast makes heat when it ferments, so your fermenter is usually hotter than the surrounding air, especially during vigorous fermentation, and in the summer. If the yeast is reaching 80 degrees or more and then cooling, it may go dormant from temperature shock. If it is reaching 90, it may die. Check the temperature of the wort by sticking a sanitized thermometer in it, and check it at least twice a day, once in the morning and once in the late afternoon or evening. If temperature is your problem,

a damp towel and a fan will help, though I confess that with 20+ gallons, keeping things cool will be harder than in my 5-gallon setup. Another potential factor is unhealthy yeast. If you haven't gotten a fresh vial of WLP 001 and built that up lately, this could be the culprit, in which case, get some good, fresh yeast before your next batch.

If the beer does not have residual sweetness, then you're probably having a wort fermentability issue. Honestly, a 152° F one-hour rest should produce a nicely fermentable wort, so I don't think temperature is the thing to adjust. A more likely problem could be pH. That's a fairly complicated topic that you can research online. A very thin mash (more than 2 quarts per pound) could also be a problem, though that would surprise me a little.

Good luck and happy brewing,
Stephen Lenhart

Dear Stephen,

Thanks for the follow-up with more insightful information about stuck fermentations.

No longer stuck,
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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By Amahl Turczyn Scheppach

Australian Sparkling Ale



Some of the most intriguing beer styles across the globe have come from innovative Old World brewers trying to make the best of harsh or impoverished conditions in new surroundings. Such is the case with the sparkling ales of South Australia, sometimes referred to as Adelaide Sparkling Ales. These were early attempts by British immigrants to that city to brew British pale ales in a hot environment, using locally sourced ingredients. Popular Burton imports of the day, notably from Bass, Allsopp, and Ind Coope, were well-traveled pales, but relatively expensive.

Australian colonists craved something familiar, but with a more attractive price, so local brewers worked to create a product to fill that market. The result of their attempts bloomed into a specialty beer style unique from its original model, but nonetheless deserving of placement as a classic world beer style.

The original version of Sparkling Ale is widely attributed to Methodist preacher Thomas Cooper, an immigrant from Yorkshire who settled in South Australia in 1852. Ten years later, after dabbling in various professions and brewing ale for friends and family, Cooper started a brewery in Leabrook, a suburb of Adelaide. His beer was bottle conditioned, and the brewery sold only bottles; none was sold to pubs. According to Michael Jackson in his seminal *Beer Companion*, this was due to Cooper's religious views: while Methodists tolerated the enjoyment of beer in moderation at home, pubs (along with wine and spirits) were frowned upon.

Without the extra income of pub draft accounts, Cooper's brewery did not grow as fast as it might have, but this had the eventual advantage of keeping it independent; larger breweries were not as interested in buying up breweries that weren't affiliated with a network of pubs.

Because of the slow growth, Cooper relocated his brewery to a then-inexpensive site on the edge of the city, where it still stands. Since that time, the brewery has retained its fierce independence, continuing to produce ales after World War II in spite of the popularity of lager beers and their necessary refrigeration technology. (Coopers finally added a lager to its lineup in 1969, and only released a keg-conditioned draft ale in 1988.)

Several factors contributed to Sparkling Ale's unique profile. The beer is light and dry due to the low mash temperature, an addition of highly fermentable sugar to the grain bill, and the high attenuation of its unique yeast. Its high carbonation adds to the sensation of dryness, and releases loads of complex fruity esters from the brew upon pouring. Those include apples and pears primarily, with a touch of banana and caramel from the 60L. There is also a breadiness from both malt



MAKING YOUR OWN INVERT SUGAR SYRUP

Start with a relatively unprocessed cane sugar for maximum flavor. Turbinado, demerara, sugar in the raw, evaporated cane juice, even Sucanat; these all work well, and each will contribute a slightly different character. Plain white cane or beet sugars tend to disappear in the beer; too much can lead to a harsh, hot character.

This recipe may be doubled or tripled. Boil 1 pint of water. Remove from heat and stir in 21.5 oz raw cane sugar and 1 oz corn syrup or golden treacle. This will prevent crystallization during the inversion process. Dissolve and heat until the syrup begins to simmer; add 3 ml 88 percent liquid lactic acid. Stir to blend, then try not to stir the syrup until it's finished. If dry sugar deposits form on the sides of the pan, you can spray them down with a plant mister, or wipe them with a wet pastry brush. Use a candy thermometer and monitor the temperature until it hits 240-245° F (115-118° C). Keep the syrup at this temperature by ramping down the heat. Once you've simmered it at 240° F for 20 minutes, remove from heat, allow the syrup to cool to around 100° F (38° C), divide into two equal portions (a digital kitchen scale works well for this) and then divide one of those portions into two more equal portions.

21.5 oz • 0.75 = 16 oz

Three-quarters of the total amount of syrup should contain one pound of dry cane sugar. Seal this portion into a jar and allow it to cool. This should be added to your boil on brew day. The remaining quarter of syrup should contain 5.37 ounces dry sugar, or just over 0.75 cup (5.29 dry ounce). Use this for priming your Sparkling Ale after fermentation is complete. As always, make sure the heavy priming syrup is blended completely and evenly into your fermented beer before bottling.

Higher color invert brewing syrups may be made this way by continuing to simmer at 240° F for up to three hours. The syrup will darken as it cooks. Remove from heat when it reaches your desired color.

and yeast, and a wild spicy, herbal hint from the Pride of Ringwood hops. Hop bitterness doesn't intrude much; too much hop bitterness seems to interfere with the malty, fruity, dry balance that's such a part of this beer's sensory profile, so err on the side of caution if your brew system gets good hop utilization. Achieving this fresh, delicate and awesomely refreshing balance is tricky, but with a little patience and good sanitation technique, this somewhat quirky beer can be made perfectly at home.

Probably the most important factor is the yeast, and it potentially presents the biggest challenge to the homebrewer. That's because it is best cultured from bottles of commercial beer, and while Coopers Sparkling Ale is widely available, it is expensive, and once purchased it has probably travelled a long way from its maker. So this is a beer that requires lots of planning ahead, but if you get it right, your homebrew will taste significantly better than the bottles of beer you cultured your yeast from! Aussie Sparkling Ales taste best fresh and local, and while Coopers goes to great lengths to ensure you get the freshest and cleanest product possible, it still will probably be weeks or even months old by the time it reaches your local bottle shop. And that obviously has a negative impact on yeast viability.

There are several Australian Ale pure culture yeasts available from your local homebrew shop, as well as the dry yeast that Coopers itself sells with its extract kits. They will make a perfectly acceptable pale ale: malty, bready, and clean. But they do not contain the blend of strains that is used to ferment (and fortunately also bottle condition) Coopers Sparkling Ale. Coopers is a brewery that has supported homebrewers for a long, long time, but neither they nor any yeast company I know has found a way to package and distribute the same yeast blend found in the bottle. Perhaps this is intentional, but at any rate, culturing is fairly easy with sufficient preparation. Oddly enough, once you have built up your starter of bottle-cultured yeast and have brewed with it for two or three generations, it undergoes subtle changes. The bready, malty yeast strains tend to out-compete the fruitier

and better-attenuating strains, and you'll find your sparkling ales becoming more like bready British ales similar to those brewed from the single-strain Australian yeast types. If this happens, it's time to culture another multi-strain starter!

Bottle Culturing 101

There's a lot of information about culturing from the bottle (I recommend the Brewers Publications book *Yeast* by Jamil Zainasheff and Chris White) so I will just give a quick overview here. Many Aussie homebrewers do this very successfully with a simple dextrose solution rather than malt wort, but they have the luxury of starting with much fresher bottle samples. I always like to keep fresh wort around for just this sort of thing, and I also think the higher nutrient content of a malt-based diet produces healthier yeast.

You'll need a portable flame source. I like the butane canister torches available from Asian supermarkets, but a crème brûlée torch or even a butane grill-type lighter stick will work.

You'll also need two pint and one quart mason jars of 10° P (1.040 starting gravity) sterile culturing wort collected from a previous brew, or prepared separately. Hopped wort isn't necessary. One pound of light dry malt extract boiled with one gallon of water for 10 to 15 minutes and sealed boiling hot into the appropriate sized jars will answer nicely. Cool your sealed, labeled jars and store them in the fridge, letting them come up to room temperature before use.

If you are a lab ware geek, get out the magnetic stir plate, and sanitize, steam (better) or autoclave (best) your stir bar, 4 liter flask, or beaker, and a cover. This yeast blend can ride high on the beer, so leave yourself lots of room, both in the beaker and the fermenter.

If you have a Bunsen burner available, grab that too; it's great to work near an updraft. If not, no worries, mate. You really don't need a stir plate or a beaker either...bottles re-fitted with the screw-off cap work just as well, though you'll probably need a larger sanitized and airlocked vessel as your yeast culture grows to the

target 2L size. (Per Chris White, a piece of sanitized aluminum foil works great for a flask lid.)

A spray bottle filled with a fresh solution of no-rinse sanitizer is a beautiful thing; have one on hand if possible, if only for countertops. If not, you can go torch happy and flame all at-risk surfaces; just don't burn down the lab.

Finally, you'll need a six-pack of Coopers Sparkling Ale. Any of the bottle conditioned Coopers ales should work. Theoretically the pale ale is ideal because it has the lowest original gravity, but the Sparkling Ale works fine. Buy it as fresh as possible. There is a "best after" date on the bottles rather than a "best before," to make sure the beer has reached prime condition by the time it reaches the consumer. Coopers claims the Pale, Stout, and Sparkling ales continue to develop and mature for over a year after their release date if they are stored in a cool and dark location; hopefully this suggests the bottling yeast remains viable that long, but fresh is obviously best. Let the bottles settle to consolidate the somewhat fluffy yeast sediment at the bottom of each. Get a glass pitcher and a bottle opener ready. Wash your hands. When everything is clean and sanitary, twist open each bottle one at a time, and pour the beer quickly and smoothly into the glass pitcher until you see sediment begin to exit along with it. Then flame the mouth of the bottle and the underside of the cap briefly, and screw each cap back on loosely.

Next, remove the ring from a pint jar of wort, flame the lid and rim, and pour roughly half of the jar into each of two bottles, flaming the mouth and bottle cap each time. Shake and pour two bottles' worth of dregs into each of the wort-filled bottles and torque down the caps on those two. Shake each bottle vigorously to mix and aerate wort and dregs.

At this point, you can untwist the caps, flame the bottle mouths, dump each culture into your sterile beaker, cover, and set the stir plate to an appropriate speed. Or, simply keep those two bottles for the first propagation stage; just make sure you loosen those caps to allow gas to seep out

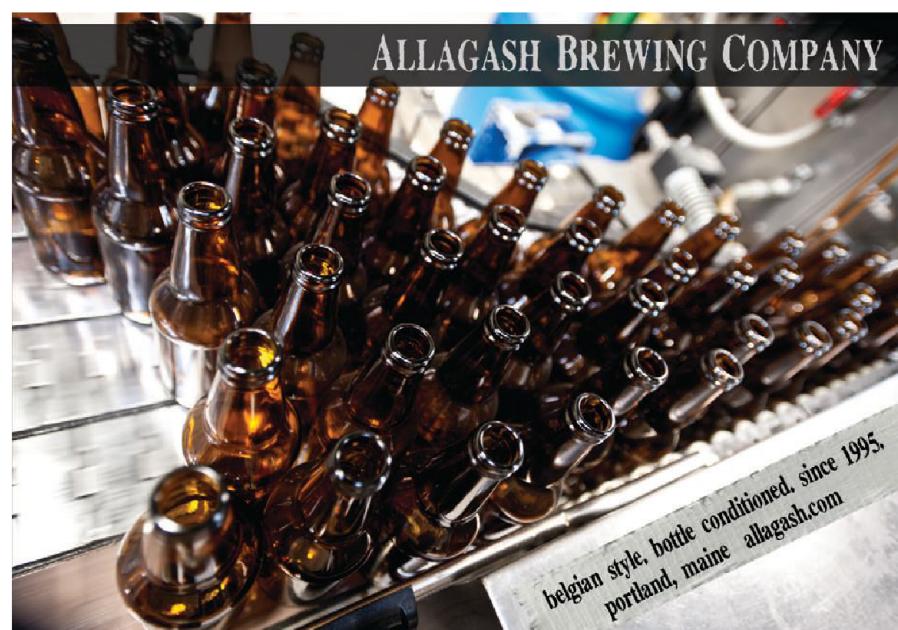
once the yeast begins to wake up. Don't forget to drink the contents of the pitcher.

You will need to be patient now; it can take up to three or even four days for the culture to get going. At that point, use your nose. If it smells fruity and bready, you're in luck; add the next pint of wort, wait another 24 hours, and then add the quart jar. Plan on brewing the next day; by then you should have a pitchable starter for a 5.5-gallon batch. It never hurts to taste the culture as well as smell it, as long as you can do it in a sanitary fashion. It may not taste stellar, but you should

be able to tell immediately if something has gone wrong. If you have any doubts, it's probably best to dump it and start over. At least you get another pitcher of Coopers!

Hops are also important. Pride of Ringwood plays a subtle role in the beer, but other hop varieties can really throw things off. About the only other hop you could get away with using would be Hallertauer or a similar German noble.

Malt is probably the next most critical factor. But at least here, you have a few



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Dry Creek Sparkling Ale

INGREDIENTS

for 5.5 U.S. gallons (20.82 L)

8.0 lb	(2.38 kg) pale two-row malt (86.5%)
1.0 lb	(0.45 kg) invert cane sugar (10.8%)
4.0 oz	(113 g) 60° L crystal malt (2.7%)
1.0 oz	(28 g) Pride of Ringwood pellets, 9% a.a. (60 min)
cultured Coopers Sparkling ale yeast (not kit dry yeast packet) – 2L starter	
0.75 to 1 cup	cane sugar (5.29 to 7.06 dry oz) for bottle conditioning

Original Gravity: 1.052

Finishing Gravity: 1.006

IBUs: 31

SRM: 4.8

ABV: 5.9%

Boil Time: 90 minutes

DIRECTIONS

Mash for one hour at 150° F (66° C). Sparge until wort gravity reaches 1.008 (2 P) or pH 5.8 (whichever comes first). Ferment three to five days, or until terminal gravity is reached. Prime and condition one week at 70° F (21° C), then store at cellar temperatures (52-57° F or 11-14° C) for two more weeks or until bottles clear.

EXTRACT VERSION

Substitute 5.75 lb (2.61 kg) Coopers pale malt extract syrup for pale malt. Steep crystal malt in 160° F (71° C) water for 30 minutes; rinse, dissolve extract completely and proceed with boil. Expect a slightly darker brew (7.6 SRM) with extract.

In my experience, beer made with invert sugar seems to finish drier and cleaner, and by inverting raw cane sugar, you get subtle fruity, rummy flavors that are difficult to obtain elsewhere. The whole topic of why invert brewing sugar is necessary to certain styles is somewhat controversial; many very accomplished brewers maintain that sugar is sugar, while others swear there is no other way to brew true British ale. But if you'd like to see for yourself, see the sidebar on page 20 for how to make your own raw invert syrup.

If you choose to skip the invert sugar step, simply add 1 lb dry raw cane sugar in the boil and prime the finished beer with three-fourths to 1 cup raw cane sugar. Your yeast will do the rest.

Packaging

If ever there was a beer that deserved the extra work of bottling, this is it. High carbonation is what makes this ale sparkle. That said, there's no reason one couldn't produce a force carbonated draft version; in this case, add the full 21.5 ounces of invert syrup (or raw granulated cane sugar) at the beginning of the boil. Three volumes of forced CO₂ should be sufficient, and will still be pourable from the average home dispense system.

This beer might require a bit more finesse to pour, much as a Bavarian wheat does. Use clean, preferably borosilicate glassware, chill the beer thoroughly before pouring, and tilt the glass with minimal splashing. A quick cold water rinse of the glass right before pouring also helps minimize foaming.

Resources

Jackson, Michael. *Michael Jackson's Beer Companion*, Duncan Baird Publishers, 1993, 166-9.

Zainasheff, Jamil and Chris White. *Yeast: The Practical Guide to Beer Fermentation*, Brewers Publications, 2010.

www.coopers.com.au/about-us/history

Amahl 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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1



2

10 HOMEBREW GADGETS

BY ZYMURGY READERS

The Zymurgy Gadgets issue is an annual celebration of the innovative creativity of homebrewers. If a piece of equipment isn't working for them, they'll often tweak it, build something of their own from scratch, or find an innovative homebrew-related use for common kitchen (or other) appliances or parts.

As we do each year, we asked *Zymurgy* readers to submit their homebrewing contraptions or solutions for the eighth annual Gadgets issue, and here's what they've been working on.



7



8





1.

Ladder Brewing System: "Brakeman's Ladder"

My son and I recently moved into all-grain brewing, and we designed and constructed a compact, portable brewing system using an aluminum ladder. It was very easy to construct and relatively inexpensive. We have used it several times now, and while it is most at home with 5-gallon batches, we were able to make 10 gallons of a very passable saison with it as well.

When we decided it was time to begin all-grain brewing, my son and brewing partner, Stephen, first suggested using a ladder to construct our brewing system. I wanted a simple, efficient, and relatively low-cost structure. After reviewing a few articles and doing some measuring, I decided a five-foot ladder would work best. I planned on using 10-gallon Igloo coolers for the mash tun and the hot liquor tank. A six-foot ladder was too high to safely add the hot water for lautering. Likewise, perching a 10-gallon cooler on the top of a four-foot ladder seemed too precarious for my taste. A five-foot ladder fit the bill perfectly.

I ordered the ladder from Lowe's. I mounted the hot liquor tank by simply placing it on the plastic paint bucket tray and holding it to the top of the lad-

der with a bungee strap. I anticipated having to reinforce the tray, but this did not prove necessary. The mash tun sits on a shelf made by bolting a piece of $\frac{3}{4}$ inch plywood to two one-inch aluminum bars that run the length of the ladder. I installed a 3/8 inch diameter threaded rod across the backside of the ladder, mounted so the aluminum rods are level while sitting on the step and sliding under the threaded rod. The weight of the mash tun holds this securely, although I usually secure it with a C-clamp. Another bungee strap holds the mash tun to the ladder. I added another threaded rod across from the third step and cut a shelf from $\frac{3}{4}$ inch plywood that sits on the step and the rod.

To make the system as complete as possible, I added several amenities. I mounted a broom and mop holder from Lowe's to one side of the ladder near the top. Mounting this rack was a little challenging, since it wasn't centered and tipped whenever anything was hung on it. I solved the problem by placing a binder clip on the rack and securing it like a hinge to the ladder using a bolt and a wing-nut. I hung the mash rake, stirring spoon and paddle, measuring sticks, thermometer, measuring spoon, small flashlight, and StarSan spray bottle on this rack. I also attached a Leatherman tool. For fun, I added a small bottle opener on a 12-inch chain.

I drilled a series of holes in one of the aluminum rods and placed my lighter, a screwdriver, a pair of pliers, and a pair of scissors in these holes. On the other side, I mounted a small plastic kitchen basket to store my dish soap, a small bowl, and a small brush. I installed an eyebolt to one of the spacer bars on the backside of the ladder and suspended a 5-gallon bucket to hold my wort cooler. The bucket has numerous holes drilled in the bottom and sits on the threaded rod that supports the mash tun shelf. I added a paper towel holder on the end of the plywood shelf. I applied strips of Velcro along the top of the ladder and attached a timer, calculator, and outdoor thermometer. Finally, I installed a brass picture hanger on the front of the ladder to hang a clipboard for my recipes and/or brewing instructions.

Using the ladder system is straightforward. I heat the water for the mash and for lautering in my 15-gallon brew pot. I add the water to the hot liquor tank using a pitcher while standing on a small stool (I'm not very tall). Gravity takes care of the lautering. The wort is transferred using a small pot to the brew pot. The only pump I use is to pump ice-water through my coil wort chiller to help speed up cooling after the boil.

The cost of the ladder and associated hardware (not counting the actual brewing equipment) was around \$15. My son named our brewery Brakeman's Best Brewing Company, which explains the name, "Brakeman's Ladder." No one appreciates me shortening the name to "B-Ladder."

Dean Smith

2.

Gas Grill Brew System

I wanted to go all-grain and thought it would be great to use my old grill as a gravity-fed system. I proceeded to cut the top off the grill and begin building the false bottom, hot liquor tank, and support system. My daughter helped me with the entire project. I spent a total of \$300 including keggle, parts, cooler, bolts, chains, two-by-fours, copper, etc. The only piece I already had was the kettle. It was a fun project and has made some great beers already.





Materials

- one sheet pressure-treated plywood (1/2 sheet is plenty)
- three 2x4x8s
- eight 3.5" bolts with nuts and washers (size may differ with different grills)
- 3" screws, small box
- four eye hooks
- two 3' pieces small gauge chain
- two cans Rustoleum spray paint
- eight 2.5" brackets
- two propane burners
- small drill to tap the metal

Assembly

1. Find a beat-up old grill, preferably one with well-functioning wheels as it is nice to have a mobile homebrew system.
2. Using a grinding wheel with a metal cutting blade, remove the top portion (cover) of the grill.
3. Remove the grates and everything inside. Measure the size of the opening you have created and cut a piece of plywood to fit that opening snug.

4. Measure your mash tun and mark the dimensions on the piece of plywood cut in step three. Depending on the type of cooler you are using, the 2x4s cut length may vary. Cut them into small (say 6") pieces. You will need eight of these. Mount two vertically in each corner of the dimensions you drew. The purpose of this is to just hold your mash tun snugly in place during the brewing process. Screw them to the plywood prior to setting it in the opening. Once it's set in the opening you can drive a couple screws down in a couple places to secure it. (Mine was so snug this was not needed.)

5. Using 2x4s in the same way you did it in step four, create a platform for your hot liquor tank (HLT). Measurements will differ depending on which burner you own. I used an old turkey burner, so my platform was wider than most would be. The idea here is to get the HLT elevated above the top of the mash tun. Use small brackets to anchor the burner to the platform. Use a drill bit smaller than your screws to tap holes in the grill so you can drill screws up through the 2x4s.

6. Drink a homebrew.

7. Measure the distance from the floor up to the top of the platform you built in step five. Cut the two 2x4s to this length and attach them with the screws. I removed the handle from my grill first so it would sit flush and attached the handle to the outside of the supports after.

8. Measure the space down between the supports you just built and the grill frame. Cut a piece of plywood to fit this space and attach it using the 3" screws. This is now a platform for a propane tank, chiller, or whatever else you want to use it for. (I use it for a tank.)

9. Measure your second burner. Use these dimensions and cut another piece of plywood to support it. Cut two pieces 4" wide and 3" longer than the platform. Mount these vertically on the long side under the platform, leaving 3" hanging out. Drill holes for your bolts in the 3" overhang and the frame of the grill and attach it. Attach the eye hooks to the frame and the farthest point away on the

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platform. Use the chain to go from hook to hook. (This step is just a precaution in case the wort is too heavy). While mounting this part, be sure the top of your kettle will be below the mash-tun spout. Mount the burner using small brackets.

10. Spray paint it whatever color you want.

11. Start brewing with your new gravity fed brew-grill.

Thomas Trombly

3.

Blowoff Yeast Collector

When I am brewing multiple batches, this little yeast collector has been awesome. It is inexpensive and easy to build using just the supplies shown. To make the holes for the grommets, I just heated up the rear portion of a half-inch drill bit and once hot enough it just melts right through, leaving a perfect opening. Shave the excess and the grommets go right on.

I was inspired by the Burton system but only for capturing the most yeast possible so the drainage aspect wasn't a concern. I set up my collector after adding my oxygen and let it blow off at high krausen for about two days. Once I have collected around two to three vials' worth of beau-



tiful creamy yeast, I replace my collector setup with a standard blow-off tube in a pitcher of StarSan. I don't have any issues with clogging due to the short period of time that I am collecting. The yeast is coming out with such force it pushes through quite easily, as you can see in the photo. Additionally, by only collecting for two days or less, this allows me to get the best yeast possible. I primarily use Wyeast 1056, 1187, and 1469. Some behave better than others but they all produce fantastic results. The containers can be salvaged LME containers or Walmart has them for \$7.

Troy Faircloth

4.

Better Stainless Hop Spider

For my hop spider, I started with a standard two-quart stainless dog pail. I cut off the bottom with an angle grinder. I then cut slits to bend tabs for holding the clamp in place. Next I attached stainless steel eye bolts to form the legs of the spider. I used a 6" stainless worm clamp to secure a nylon paint strainer bag and I was done. This hop spider is solid as



a rock. I've been brewing with it for two years and it's worked perfectly.

Scott Bieber
Middletown, Del.



5.

Yoga Mat Thermowrap

This is my 8-gallon stainless mash tun with a thermowrap made from my wife's old yoga mat. At ambient temps around 50° F (10° C) it will only lose two or three degrees in an hour. I used a box cutter to cut it to size, then attached the pieces with wire. It isn't flame proof, but it works great as soon as the vessel hit its target temperature and the burner goes off. If



it is very cold out and the temperature drops too much, I just remove the insulator and hit the mash tun with low flame for a few minutes. The key is to flame out a few degrees below target, because the false bottom holds heat at the bottom and the temp can overshoot the target. This might also work well for insulating a hot liquor tank.

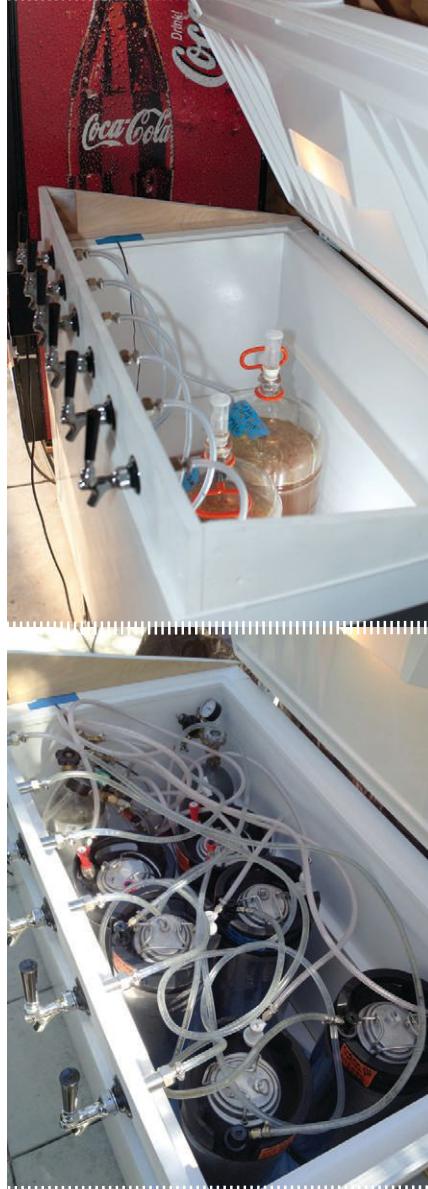
Jim Leininger
Goldendale, Wash.

6.

Keezer Wedge

I put together a “wedge” for a chest freezer. It is a temporary version of a collar for a keezer. It functions simply by opening the lid a bit and putting it in. It is great for big freezers that are deep enough to not require a collar. We use our freezers (we have two) mostly for fermenting. We provide a lot of beer to one very big Oktoberfest party to benefit the Children’s Hospital of Los Angeles. We developed the method so we would have a nice, clean and easy way to keep the beer cold and ready to serve. This year we upgraded the wedge from a hose through a hole picnic tap arrangement to one using real shanks and faucets.

Sean Johnson
Maltose Falcons

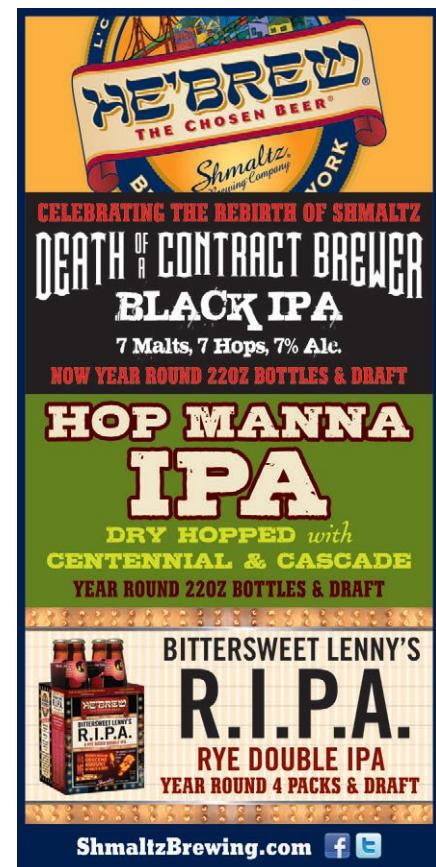


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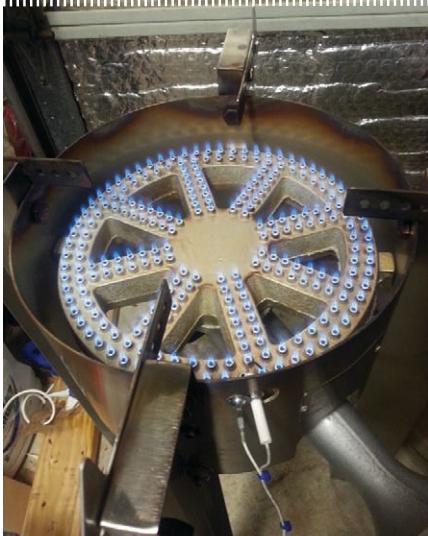
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7.

Gas Burner Igniter

I got tired of having to stick an Aim 'n Flame underneath my burner, along with constantly misplacing it on brew day, so I built this igniter setup. It's made from a replacement push-button spark and electrode used for gas grills, mounted into a small project box. A small laminated flame adds the cool factor to the install.

Mike McMonagle



a lockable kid-safe storage that's perfect for a work surface and power-tool cabinet. Undo the lock and the sides pop off one at a time.

Mike Gleeson
Montara, Calif.
Devil's Slide Brew Club

9.

Son of a Fermentation Chamber

This is basically a foam box made out of one 4x8 piece of 2" foam. The box is partitioned inside. On one side of the partition sits frozen water bottles, on the other, the fermenter. A small computer fan is hooked up to a temp controller and the fan cycles cool air toward the fermenter when the temp gets too high. This is what I use as a poor homebrewer who can't afford to buy a fridge. This is very handy for the intermediate homebrewer who values the importance of managing

8.

Do-It-Yourself Mash Paddles and Storage Cabinet

I use three sizes of mash paddles depending on the mash tun I happen to be using. These are cut from some beautiful storm-felled oak from North Carolina, which were leftover scraps from a kitchen project. I use a small one for doing SMaSH (Single Malt and Single Hop) brews in the kitchen, a taller one for 10-gallon (37.85 L) cooler mashes, and a wide one for the house IPAs made in 70-quart (66.24 L) cooler mashes.

Of note is the cheapo Harbor Freight cart boarded up mindfully with plywood. It's



fermentation temps, but doesn't want to buy chest freezers and all that fun (expensive) stuff. It can make a big difference in the beer quality.

Editor's Note: This was also featured in the Pimp My System section on HomebrewersAssociation.org. For more, go to www.homebrewersassociation.org/pages/community/pimp-my-system/show?title=pimp-my-system-son-of-a-fermentation-chiller.

Ken Schwartz

10. Homebrew Party Setup



I made this system out of an eBay two-product cold plate, an old drink cooler (a gin bucket container from my college days!), some extra Reflectix I had lying around, and a bunch of other repurposed parts. Total cost of new-to-me parts was around \$80.

This has been a great system for me. The Reflectix around the two kegs can keep them under 40° F (4° C) for over 24 hours. This keeps foaming to almost nil. It is easily broken down, stored, put back together, and transported. It has made it very easy to serve my homebrew at a lot of events without bringing a four- or five-tap jockey box.

Amanda Kertz
Kansas, Mo.
Kansas City Brewmeisters

Readers, if you have an idea for the 2015 Zymurgy Gadgets issue, please send it along to zymurgy@brewersassociation.org.

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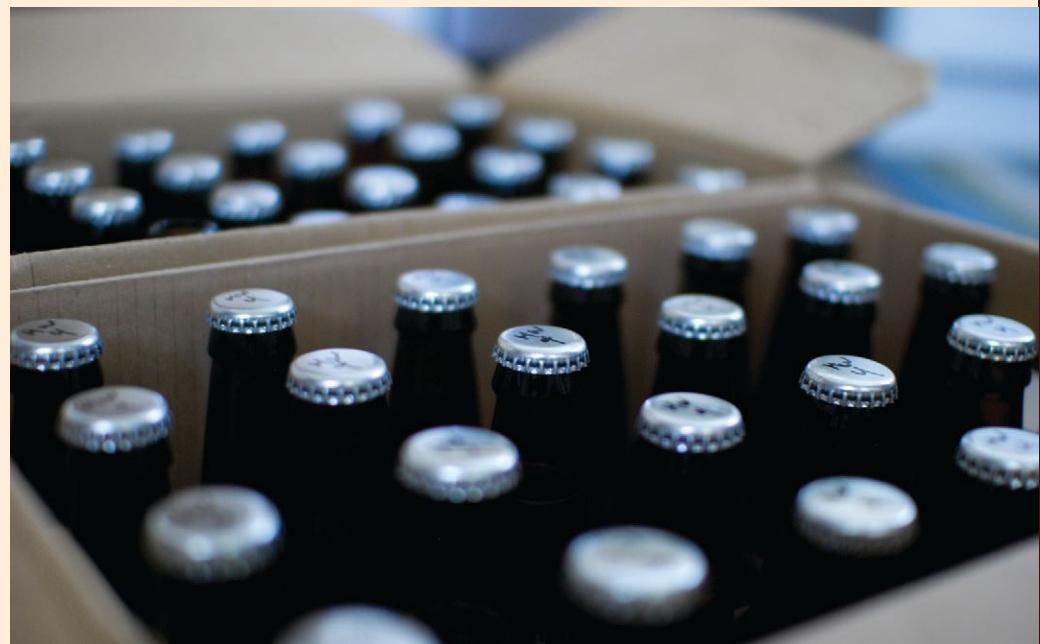
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Bottling and carbonating 101

With great anticipation,

you take a sample from the carboy. The final gravity is perfect; the color is right on spec. Time for a taste: sheer ambrosia. This is the culmination of months of research and dozens of test batches. All that remains is to transfer the homebrew to a bucket, bottle, and carbonate.

In theory, this seems simple—a given. But transfer, packaging, and carbonation are the steps where many homebrewers run awry. They either rush the process, or commit an error due to lack of knowledge, negating all their hard work and short-circuiting an otherwise outstanding beer.

she blinded me with science

Carbonation is the final piece of the puzzle—the missing dimension that ties everything together, like The Dude's rug from *The Big Lebowski*. Effervescence can release delicate aromas of malt in an English pale ale or an assault of hops in a double IPA. It's also responsible for the satisfying acidic tang at the finish that rounds out the malt sweetness of beer.



by
**mark
pasquinielli**



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Carbonation is achieved by dissolving carbon dioxide in water. Carbon dioxide in solution produces carbonic acid—the weak acid that's responsible for beer's finishing bite. These three compounds co-exist in an ever-shifting dynamic equilibrium.

Carbonation is measured in volumes of CO₂. One gallon of CO₂ dissolved in one gallon of water at a pressure of one atmosphere is equal to one volume of CO₂. Achieving the proper level of carbonation isn't difficult. Beer is already

Fermentation is an organic process. It knows nothing about time, nor cares about your schedule. Beer is the boss; it will tell you when it's ready.

partially carbonated by fermentation. It wants to be carbonated. The addition of a measured amount of a fermentable, usually dextrose (corn sugar), in the closed environment of the bottle awakens the yeast and restarts a controlled fermentation that takes the carbonation to the desired level. It's not rocket science. However, scientific principles combined with measurements and simple math must be followed to get the right results.

Patience, Grasshopper

Fermentation is an organic process. It knows nothing about time, nor cares about your schedule. Beer is the boss; it will tell you when it's ready. Conditioning and wringing out those final gravity points could take only a few days, as with a hefeweizen, or several weeks for a Russian imperial stout. I wait for almost all visible signs of fermentation to cease and take a gravity reading, just to be sure. Still, I admit to being guilty of a common transgression: the rush to get the beer to the glass. Patience is not one of my virtues, and I constantly have to fight the urge.

The type of yeast used can be another reason to wait. Strains like White Labs WLP004 Irish Ale may appear to have finished fermenting, but they often need

a few extra days of contact with the beer to absorb the diacetyl that causes a buttery off-flavor. Classic saison strains like WLP 565 and Wyeast 3724 are notorious for stalling for several days—or longer. If bottled too soon, they'll be gushers or, worst case scenario, bottle bombs.

The RACK

The first step in the bottling process is to rack the beer off the yeast and trub and into a sanitized bottling bucket. If ambient temperatures are amenable, I prep the carboy the day before by moving it to higher ground to ready it for siphoning. This allows time for the yeast and trub to re-settle and gives me an extra day to be sure fermentation is complete. I prefer to use the 5/16" Auto Siphon for racking. It's standard equipment for most homebrewers and is available at almost every local homebrew store (LHBS). As I do with hard plastic buckets, I avoid cleaning the siphon with abrasive scrub pads, and replace it yearly to be sure it doesn't become contaminated. I also replace my 3/8" I.D. siphon tubing on a regular basis for the same reason. The sanitized siphon is inserted into the beer, given a few pumps to start the flow, and gently placed at the bottom of the carboy. Be sure that the tip is on so that the siphon's intake is elevated above the yeast level.

Afterward, I cover the emptied carboy and harvest the yeast later that day.

Exposure to oxygen during racking should be kept to a minimum, since oxygen is the enemy at this point of the game. It's responsible for stale, paper-like flavors and will greatly diminish the quality of any hoppy beer. So try not to splash during transfer. For this reason, I've gone away from racking to a secondary fermentation vessel, unless there's a lot of sediment, such as in a fruit beer. If I must rack to a secondary, I first purge the oxygen from the carboy with a healthy dose of CO₂.

Some beer loss is inevitable during transfer. This is why I design my recipes for six gallons, knowing that if I want five gallons' worth of bottled homebrew, I need to compensate for the wort loss at the bottom of the boil kettle and beer loss incurred during racking.

Bottling

I live near the Yuengling brewery in Pottsville, Pa. One of my enduring memories of a tour there is not the production facility or the ultra-cool storage caves, but a mural depicting the women on the bottling line. The dour, hopeless expressions on their faces say it all: bottling beer is labor intensive.

This is where it's great to have a homebrewing partner or a homebrew-curious friend who can be recruited with the promise of a six-pack. If you have a significant other who will assist you in this task, he or she is a keeper. An extra person has a synergistic effect and can more than double the speed of the operation—or so it seems.

It takes approximately 50 12-ounce bottles per 5-gallon batch of homebrew, but that number can be lessened dramatically by including some 22-ounce bomber bottles in the mix. Bombers are great for gifts, taking to parties or homebrew club meetings, or for cellaring high gravity brews for a special occasion. I always include several in my bottling runs.

Bottling in plastic PET bottles is another option. They're reusable, unbreakable,

and lightweight—although I'm leery about using them for any beer meant for aging because the plastic isn't impervious to oxygen.

The job can also be made easier by prepping beforehand. Don't make it harder by having to clean dozens of dirty, yeast-encrusted bottles at one time. I clean as I go: empty a bottle, rinse it, wash it, and set it aside where it will stay clean. I'll then sanitize the bottles with Star-San and cover the openings with aluminum foil. This is probably a throwback to my college laboratory days when I prepped beakers and flasks for the autoclave by covering them with aluminum foil. Covered with foil, the bottles will remain sanitary indefinitely. I've used bottles that were sanitized in this manner months prior with no contamination problems. This method allows me to keep several cases of bottles ready, so I can package at my convenience without losing an entire day to prepping.

Of course, there's always the ubiquitous bottle tree for storing bottles in preparation for filling. The uncovered bottles



The author's wife, Karol, capping the bottles.

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	Belgian Ales	2.0 - 4.5
	European Lagers	2.2 - 2.7
	American Lagers	2.5 - 2.7

will stay sanitary as long as they stay inverted since bacteria can't go uphill, so to speak. However, this option seems better suited for day-of bottling because the tree takes up a good deal of vertical space and doesn't fit under counters. Bottle trees are designed for stability, but for someone as clumsy as I am (and with six marauding cats lurking about), the bottle tree seems like an accident waiting to happen.

Another interesting product is beer bottle racks, in which bottles are stored upside-down in rectangular racks that drain into a bottom tray. Most of these assemblies can be stacked, so it's sanitary and space-efficient. I'll probably add a few of these to my equipment collection in the near future.

The business of carbonation

Once the beer is in the bottling bucket, check the side markings to determine the approximate volume. The volume factors into the calculations to determine how much corn sugar primer is needed. In the early days of homebrewing, the adage was to add $\frac{3}{4}$ cup of corn sugar to carbonate five gallons of beer. This will re-start fermentation and naturally bottle-carbonate the beer. It isn't bad advice. It will work well with some but not all styles of beer. But I homebrew so I can drink the best beer possible. Over-carbonated beer can be harsh and mask subtle flavors. Under-carbonated beer can be sweet and bland—no one likes flat beer. My beer

deserves the proper carbonation level, not an approximation.

One of the easiest ways to determine the amount of priming sugar needed is by using brewing software, such as BeerSmith or ProMash. Either version is affordable and is a must for any serious homebrewer. The carbonation calculation takes into account the volume of beer and the degree of carbonation desired (in volumes of CO₂), while compensating for the CO₂ already dissolved from fermentation. Enter the volume and the highest temperature at which the beer was fermented. Homebrew fermented at lower temperatures will retain more residual CO₂ since gas dissolves more readily at lower temperatures (it's one of those gas laws that make me wish I'd paid more attention in chemistry class), and will therefore require less priming sugar.

But what is the appropriate level of carbonation? Luckily, charts are available. As a rule, traditional English ales are carbonated at lower levels. American ales tend to fall in the middle range for ales. Beers like Belgian ales and German weizens are carbonated at a much higher level as shown by the chart above.

Homebrews that are carbonated at the higher end of the scale shouldn't be packaged in regular bottles, as they can't withstand the pressure. Instead, thicker Belgian-style bottles are required. In many instances, these bottles are corked and caged as if they contained champagne. Dogfish Head pack-

ages some of its beer in heavy glass bottles that are perfect for these styles. They accept the regular size crown caps, too.

Notice that once the numbers are entered in brewing software, the amount of sugar required is in either grams or ounces. Measuring by cups is notoriously inaccurate. Most homebrewers have a small scale for weighing hops, anyway. Put it to use and get the most accurate answer. Remember, measuring by weight is more accurate than measuring by volume.

All is not lost for those without software. An online carbonation calculator can be accessed by Googling "carbonation calculator beer." Several sites will appear. They work virtually the same as BeerSmith or ProMash.

Dissolve the priming sugar into a small volume of boiled water, add it to the boiling vessel, and rack the fermented beer onto it for even dispersal. If a normal gravity beer is being bottled (and an adequate cell count was pitched at the beginning), there will be more than enough yeast in solution to restart fermentation and carbonate the beer. A higher gravity beer, however, will need some help. Extra yeast must be added because the remaining cell population isn't viable after a grueling high-gravity fermentation. Dry yeast, like Safale US-05, is excellent for this task. It's alcohol tolerant and has a neutral flavor profile. Don't pitch the pack of yeast directly into the bucket. It will clump and not disperse evenly. Instead, rehydrate the yeast in a few ounces of 100° F (38° C) water for about 10 minutes and then stir into the racked, primed beer with a sanitized spoon.

It's finally time to bottle. Many bottling guides show a bucket on a table or a counter with rubber tubing extending from the spigot to the bottling cane at floor level. My legs aren't what they used to be; I can barely walk after a bottling session on the floor. Instead, I use a short length of tubing, only a few inches, to link the spigot and the bottling cane, allowing me to sit comfortably in a chair.

I take a bottle, remove the foil, drain any Star-San remaining, fill the bottle, and

pass it to my wife Karol for capping. Any capper will work for this task, and sometimes simplest is best. I'm still using the same Red Baron capper that I got with my first homebrew kit in 1995. Aside from carboys, I think it's the only original piece of equipment I have.

I use oxygen-absorbing bottle caps. The price difference between them and regular caps is negligible, and I'm all for anything that reduces oxidation. The oxygen-absorbing layer is activated by water, so I don't sanitize them. Like the long-term sanitized bottles, I've never had a problem with contamination.

Near the end of the run, I tilt the bucket toward me to keep oxygen out of the spigot and try to drain the bucket as close to dry as possible. I mark those last few bottles for testing and drink them first to determine if proper carbonation has been reached. Normal gravity homebrew will need a week or so at room temperature to carbonate. Big beers will need longer, often a couple of months. These beers are usually cellared anyway, giving the yeast time to work its magic.

Once carbonated, refrigerate as many bottles as possible or put them somewhere cool. Cold storage will allow the yeast to drop out and help the beer to clear quicker. It also increases shelf life and allows the homebrew to condition, further improving the flavor.

There's always a little fanfare in our house for the first bottles from a batch. Karol and I get the proper glasses ready, turn off the television, and make sure there's no music playing. All falls silent so we can hear that first *phfffft* from an opened bottle. With a steady hand befitting a neurosurgeon, we pour two perfectly carbonated homebrews with a smooth motion, leaving just a bit of yeast sediment in the bottle. We tap our glasses together and drink. It's good to be a homebrewer.

Mark Pasquinelli resides in Elysburg, Pa. with his wife Karol. He somehow finds time to homebrew between his responsibilities as husband and manservant for their six cats.

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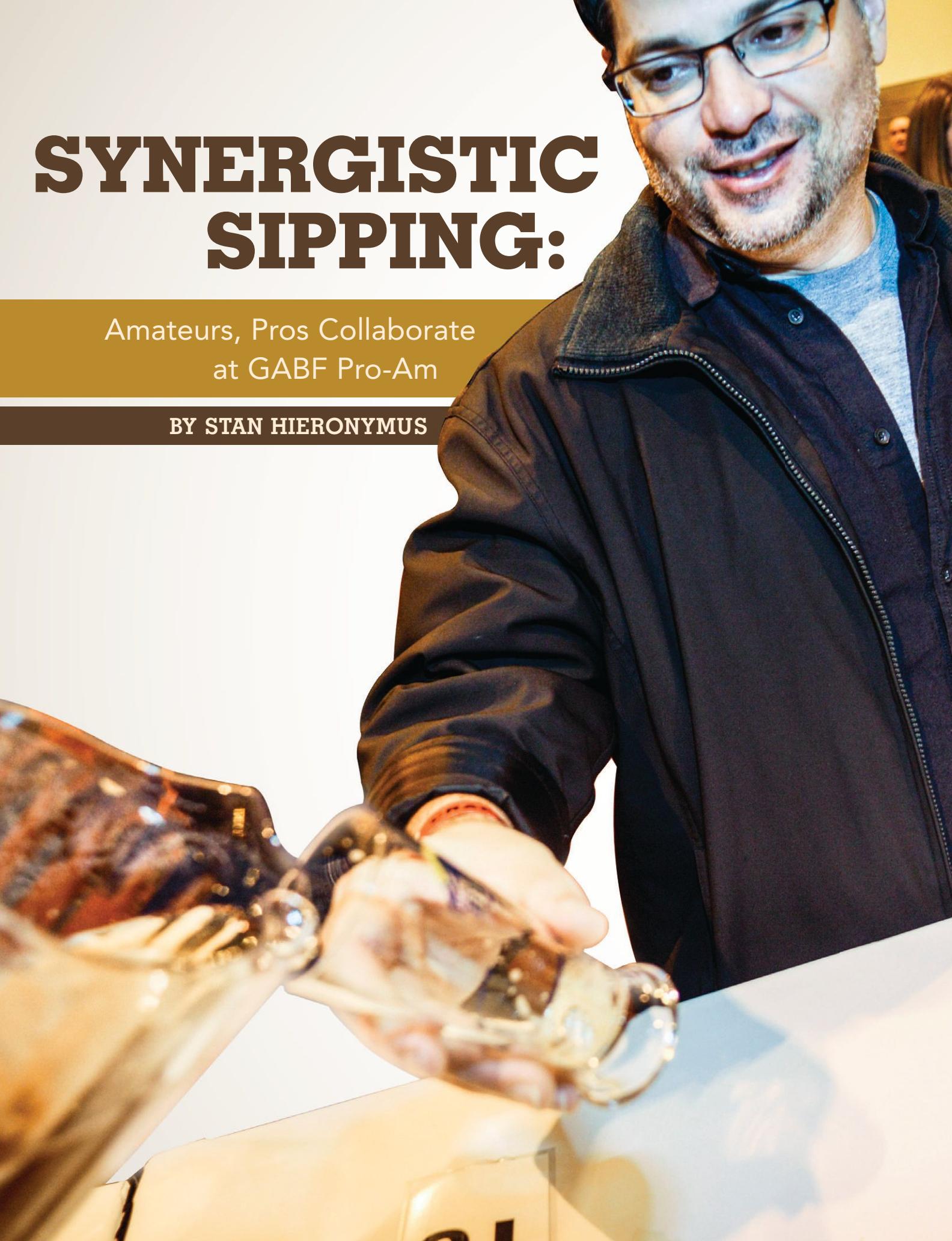
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SYNERGISTIC SIPPING:

Amateurs, Pros Collaborate
at GABF Pro-Am

BY STAN HIERONYMUS





CALL IT A LESSON IN COLLABORATION.

Florida homebrewer Jeff Gladish knows a little about brewing beers with chile peppers. He figures he holds the record for most pepper beers judged in one day: 28 of them at the Dunedin Pepper Extravaganza. He's been brewing his Poblano Wit since 2001. It has reached the point that almost every beer judge in Florida can recognize it. "Either I need to get more people to brew Poblano Wit or retire it," he said.

Nonetheless, after Cigar City Brewing brewmaster Wayne Wambles tasted the version of Poblano Wit he and Gladish collaborated on for the Great American Beer Festival Pro-Am competition and decided it needed more pepper flavor, Gladish roasted and prepared another half crate of poblanos for the 15-barrel batch.

"We bickered a bit over this beer," Wambles said candidly, "but in the end we couldn't have asked for better results."

The GABF professional judge panel members obviously agreed, awarding Poblano Wit gold in the Pro-Am on October 12 at the GABF awards stage at the Colorado Convention Center in Denver. This contest is officially separate from the GABF competition, but is judged by the same professional panel as the entries in 84 commercial categories. Craft breweries begin by selecting award-winning homebrew recipes from American Homebrewers Association members. The professional brewers then scale up those

winning recipes, making them available commercially, to be served at GABF and to be judged.

There were 35 entries when the Pro-Am began in 2006 and 100 in 2013. Winning a medal in collaboration has become just as challenging as it is on the commercial side and celebrated just as enthusiastically. When AHA director Gary Glass announced that homebrewer Derek Ordway and Upslope Brewing had won bronze for Oatmeal Stout, 10 members of the Upslope brewing team bounded happily to the stage along with Ordway.

It was the second time Upslope has medaled in the Pro-Am. Likewise, New Belgium Brewing won its second Pro-Am medal, capturing silver in partnership with homebrewer Mike Formisano. Research and development occupies most of the time of NBB pilot brewery coordinator Cody Reif, so working with Formisano was a pleasant diversion. "(It is) nice to have somebody there to bounce ideas off of, to make it a collaboration," Reif said.

We bickered a bit over this beer, but in the end we couldn't have asked for better results.

Persistence Pays Off

Formisano won gold with his recipe at the 2011 National Homebrew Competition, but it didn't place as Oskar Blues' Pro-Am entry in 2012. "Even though it won gold, I wasn't thrilled with it," Formisano said. He thought it needed a nuttier profile, so he added golden naked oats to the recipe for a Northern English brown ale.

I would do it every year; it would be great to give somebody the opportunity I was given.

He would have abandoned the recipe after the first batch if not for his wife, Kara. The first time he brewed what would become Charlie's Brown, the beer became infected. It was the first batch he ever had to dump. His wife told him to try again. He said he didn't plan to. "She said, 'Give it a shot again,'" he recalled.

He already understood the wisdom of listening to her. Formisano, 40, works in customer service at the Denver Police Department, but both he and his wife were laid off in 2008, which is when she suggested he pursue his interest in brewing. He'd brewed from a kit in 2005, then quit. They'd moved from Long Island to Denver and bought a house before they got caught in the economic downdraft.

Formisano explained they were sitting in their garage—which was a way of “getting out” after they lost their jobs—when she suggested he buy equipment for all-grain brewing. He said they should wait.

“We'll find a way,” she said.

He scavenged for equipment, locating most of it on Craig's List, and soon began brewing German-style lagers. “I ran out of refrigerator space (to properly lager his beers),”



Poblano Wit

Jeff Gladish, Gold Medal, 2013 GABF Pro-Am



INGREDIENTS

for 10 U.S. gallons (37.85 L)

Efficiency: 75%

10.5 lb (4.76 kg) Weyermann® Pilsner malt
12.0 lb (5.44 kg) flaked wheat
1.5 lb (0.68 kg) flaked oats
1 quart rice hulls
1.5 oz (42 g) Cascade pellets, 5.5% a.a. (60 min)
1.5 oz (42 g) Indian coriander (10 min)
0.5 oz (14 g) zest of citrus peel from backyard sour tangerine tree (10 min)
0.5 oz (14 g) chamomile (10 min)
5 poblano peppers (see directions)
1 habanero pepper (see directions)
Wyeast 3944 Belgian Wit ale yeast

Original Specific Gravity: 1.065

Final Specific Gravity: 1.010

Boiling time: 60 minutes

IBUs: 13-14

SRM: 3-4

ABV: 7.2%

Primary fermentation: 14 days at 60-65° F (16-19° C)

he said. “I looked around and thought, What can I do now? I'll brew ales.”

His first award-winning beers were a Vienna lager, an eisbock, and a schwarzbiere, but now he has medals for an imperial stout and, of course, an English brown ale. He and Kara also have aspirations to open their own brewery. “She is editing the busi-

DIRECTIONS

Single infusion mash at 148-150° F (64-66° C) for 90 minutes. Note: Mash will likely stick without the generous addition of a lautering aid like rice hulls.

After fermentation is complete, roast five poblano peppers and one habanero until the skins are charred black, then peel, seed, and stem them. Put into a low heat oven (200° F) for 20 minutes. Add to fermenter. Package beer after another five days.

MINI-MASH VERSION

Reduce Pilsner malt amount to 2 lb (0.9 kg) and substitute 7.75 lb Pilsner malt extract syrup for remaining Pilsner malt. Substitute 7.75 lb wheat malt extract syrup for flaked wheat. Mash 2 lb Pilsner malt with 1.5 lb flaked oats at 148-150° F (64-66° C) for 60 minutes. Drain, rinse grains, dissolve extracts completely, and proceed with boil. Note that while this version's gravity should closely match the all-grain recipe's, color and texture will differ.



ness plan right now,” Formisano said a few days after stepping onto the stage at GABF.

They have three small children and would like to return to New York, perhaps taking advantage of the state's new “Farm Brewery” license that provides benefits for breweries using local ingredients. He considers his experience making Pro-Am

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Charlie's Brown

Mike Formisano, Silver Medal, 2013 GABF Pro-Am



INGREDIENTS

for 5.25 U.S. gallons (19.87 L)

8.0 lb	(3.6 kg) Crisp Maris Otter malt
1.0 lb	(0.45 kg) Cara-Pils/dextrine malt
8.0 oz	(226 g) Weyermann Munich II malt
8.0 oz	(226 g) Baird's brown malt
8.0 oz	(226 g) biscuit malt
8.0 oz	(226 g) Briess Special Roast malt
4.0 oz	(113 g) chocolate malt
4.0 oz	(113 g) Victory malt
4.0 oz	(113 g) Simpson's Golden Naked Oats
1.0 oz	(28 g) Northern Brewer pellets, 8 % a.a. (60 min)
1.0 oz	(28 g) Willamette pellets, 4% a.a. (30 min)

1.0 oz (28 g) UK Fuggle pellets, 5% a.a. (15 min)

1.0 oz (28 g) UK Golding 6% a.a. (5 min)

1 tablet Whirlfloc (15 min)

0.25 tsp Super Moss (15 min)
White Labs WLP002 English Ale Yeast
Force carbonated to 2 vol.

Original Specific Gravity: 1.058

Final Specific Gravity: 1.018

Boiling Time: 90 minutes

SRM: 19 SRM

ABV: 5.2 %

Primary Fermentation: 14 days at 68° F (20° C)

Secondary Fermentation: 14 days at 38° F (3.5° C)

DIRECTIONS

R/O water with with ½ tsp gypsum and 1 tsp calcium chloride per 5 gallons. Step-infusion mash (20 minutes at 122° F/50° C, 30 minutes at 143° F/62° C, 60 minutes at 152° F/67° C).

MINI-MASH VERSION

Reduce Maris Otter malt to 1 lb (0.45 kg) and substitute 5.3 lb (2.41 kg) Maris Otter pale malt extract syrup for the remainder. Mash remaining grains with the 1 lb of pale malt at 152° F (67° C) for one hour. Drain, rinse grains, dissolve extracts completely and proceed with boil.



beers at New Belgium and Oskar Blues, combined with a similar chance to brew on the Rock Bottom Brewing system in Westminster, invaluable, doubly so because he emerged “knowing I have a lot more to learn.”

He’s already certain that if he ends up running a brewery, he’ll try the Pro-Am from the pro side. “I would do it every year,” he said. “It would be great to give somebody the opportunity I was given.”

Pro-Am Pride

Bronze medal winner Derek Ordway, 27 and also originally from New York, gets the “Do you plan to go pro?” question a lot. He works at Hops and Berries, a Fort Collins, Colo. homebrew shop that shares a building with Equinox Brewing. “Maybe one day” is his basic answer. “I really enjoy being a homebrewer. I really enjoy helping other people be homebrewers.”

Upslope Brewing, in Boulder, first participated in the Pro-Am in 2009, winning a bronze that year with a Belgian pale ale that the brewery since turned into its own beer, modifying the recipe a bit because it is packaged, as all Upslope beers are, in a can. “We take just as much pride in the Pro-Am as any of our entries,” Upslope head brewer Alex Violette said.

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Violette and other brewers sat in on the best of show table at the Reggale and DredHop Homebrew Competition in Boulder. "Every single one of them was a great beer," Violette said. The brewers picked their favorite, "something we really wanted to do" and were struck by the creamy/roasty quality of Ordway's oatmeal stout. He started with a recipe from *Brewing Classic Styles: 80 Winning Recipes Anyone Can Brew* (Brewers Publications), tweaking it to make it his own.

"It is one of my favorite styles," Ordway said. "I usually have one somewhere in the house, on tap, fermenting." Ordway helped brew the beer on Upslope's original seven-barrel system, now reserved for R&D since Upslope expanded into a 30-barrel brewhouse with 120-barrel fermentation tanks.

"We scaled back on the roasted malts," Ordway said. He found the resulting beer a little smoother than his. It was two months old when judged at GABF, the same age as Ordway's DredHop entry when Upslope first tried it—and that attention to detail may have helped the beer medal. "Even brewing it a lot, something changes every time," Ordway said. "The grain bill is very complex."

Although it is a beer "you really have to have a pint of" to appreciate, it made a distinct impression served in one-ounce pours at the Pro-Am booth. By chance, all three beers were available on Saturday (one-third of the entries were served each day). Not surprisingly, the smoky Poblano Wit, more chile-flavored than hot, also stood out.

Picking a Pepper

"Sometimes you'll get a pepperhead judging them and sometimes not," said Gladish, who has seen plenty of scoresheets for Poblano Wit. "I want to please the people who want to drink a couple of pints."

Gladish came upon the idea to brew with poblano peppers in 1999 when he tried Cerveza Chilbeso from Great Basin Brewing in Nevada at GABF right after it won gold for the third time. Although Gladish thought he tasted poblanos and

the person pouring the beer confirmed they were in the beer, Great Basin has always made it with jalapeños only. Nonetheless, Gladish had a plan to brew with the pepper.

Gladish, 61, began homebrewing in 1990, and is one of the better-known homebrewers in Florida. He organized the judging when Florida hosted the 2006 National Homebrewers Conference and National Homebrew Competition. After making two batches of altbier with poblanos, he made his first Poblano Wit in

I really enjoy being a homebrewer.
I really enjoy helping other people be homebrewers.



Oatmeal Stout

Derek Ordway, Bronze Medal, 2013 GABF Pro-Am



INGREDIENTS

for 6 U.S. gallons (22.7 liters)

Efficiency: 75%

8.0 lb (3.63 kg) Maris Otter (Crisp or Glen Eagle)
 1.5 lb (0.68 kg) flaked oats (Briess)
 12.0 oz (340 g) chocolate malt (Briess)
 12.0 oz (340 g) Victory malt (Briess)
 8.0 oz (226 g) black barley (Briess)
 8.0 oz (226 g) British roasted barley
 675° L (Crisp)
 8.0 oz (226 g) 77° L crystal malt
 (Crisp)
 2.0 oz (56 g) East Kent Golding pellets, 5.6% a.a. (60 min)
 1.0 oz (28 g) East Kent Golding pellets, 5.6% a.a. (10 min)
 2.0 tsp calcium chloride (mash)
 1.0 tsp calcium carbonate (mash)
 White Labs 007 Dry English or Wyeast 1098 British Ale (repitch from previous batch)
 Northern Colorado water

Original Gravity: 1.056

Target Gravity: 1.018

Boiling time: 90 minutes

ABV: 4.9% ABV

IBUs: 32

Primary Fermentation: 7 days at 68° F (20° C)

Secondary Fermentation: 7 days and force carbonate

DIRECTIONS

Mash at 158° F (70° C) for 60 minutes, 1.25 qts/lb, batch sparge.

MINI-MASH VERSION

Reduce Maris Otter malt to 1 lb (0.45 kg) and substitute 5.5 lb (2.49 kg) Maris Otter pale malt extract syrup for the remainder. Mash flaked oats, Victory malt, and crystal malt with the 1 lb of pale malt at 152° F (67° C) for 45 minutes. Add chocolate malt, black barley, and roast barley for an additional 15 minutes. Drain, rinse grains, dissolve extracts completely, and proceed with boil.

July 2000. He brewed his 14th Poblano Wit last March. He'll change the recipe from time to time, based on what sort of wheat he can get, but has the pepper part down pat.

Since Cigar City began selling beer in 2009, Wambles has established a national reputation for outstanding beers made with less-than-traditional ingredients. His Hunahpu's Imperial Stout is brewed with what he calls the "holy trinity" of peppers—anchos, guajillos, and pasillas—as well as Peruvian cacao nibs, Madagascar vanilla beans, and Ceylon cinnamon. He warms quickly to any conversation that turns to Scoville heat units.

Even though Gladish and Wambles also discussed brewing a doppelbock from a recipe Gladish had recently won a medal with, the fact that they settled on Poblano Wit seemed to make perfect sense to people tasting the beer at the Pro-Am booth. Scaling it up presented more of challenge than it would for, say, oatmeal stout. It's not just that the 15-barrel batch at Cigar City required more than 1,100 pounds of grain, or a half pound of chamomile, more than four pounds of ground coriander, and a pound and a half of bitter Curaçao. There were also the poblanos.

For a 10-gallon batch, Gladish roasts five poblano peppers and one habanero until the skins are charred black. He peels, seeds, and stems them before adding them to his beer post fermentation. About 12 pounds of peppers takes a little more work. He figured there were about 200 peppers in three-and-a-half crates. He and Wambles hung them from the spray ball in the fermentation tank for five days. After Wambles tasted the beer—the aroma was fine, but he wanted more fresh pepper flavor—Gladish roasted that other half crate.

"My wife would like some credit for putting up with that," Gladish said.

Stan Hieronymus is the author of *For the Love of Hops: The Practical Guide to Aroma, Bitterness and the Culture of Hops.*



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BREWING WATER SERIES:

BURTON
upon
TRENT

BY MARTIN BRUNGARD

EDITOR'S NOTE: This ongoing series explores the water quality from famous brewing centers, its effects on beer styles, and the relevance to modern day homebrewing.

IN A QUEST TO MAKE PERFECT PALE ALES, BREWERS HAVE LONG TRIED TO DUPLICATE THE WATER PROFILE OF BURTON UPON TRENT, ENGLAND.

Burton upon Trent (also known as Burton-on-Trent or simply Burton) is a small town in the middle of England that has been a brewing center since the 11th century. Starting in the 1820s, pale ales were brewed in Burton. Notable Burton breweries have included Bass, Marston, Allsopp, and Salt. Those breweries have now been overtaken by industrial brewing conglomerates or have faded into history. At the peak of popularity in the 1880s, Burton breweries employed more than 8,200 workers, providing a glimpse into how much beer was once brewed in the town.

The River Trent flows through the town and, in typical English fashion, the river and town names are tied together. The town has long been noted for its mineral-rich water character. Beers brewed in

Burton have been revered for their excellent clarity and crisp, dry finish.

Even today, some groundwater drawn from wells in Burton is highly mineralized, but that is not necessarily the case for all groundwater in the area. This article will explore the likely conditions of waters used in Burton to brew its famous ales.

GEOLOGY

Since the brewing water used in Burton breweries is groundwater, geology has a direct effect on its water quality. Like much of England, the Burton area is underlain by a variety of sedimentary rock and deposits. These include limestone, gypsum, rock salt, coal, sandstone, and siltstone. Many of those deposits can mineralize groundwater that flows through them.

Burton is located in the British Midlands, between Birmingham and Nottingham, which is rolling terrain with numerous hills and valleys. The town is located in the River Trent valley, about 150 feet below the surrounding hills. Figure 1 shows the Burton area along with its rivers, canals, and hills. Geologic maps produced by the British Geological Survey show that the valleys have thick deposits of sand and gravel. The river valleys in Figure 1 are typically underlain by the sand and gravel deposits. An important fact from the geologic map shows that large gypsum and rock salt deposits are located in the highland area immediately west of Burton. A large gypsum deposit is located adjacent to Burton covering approximately 14 square miles (36 square kilometers) of the highlands. The nearest rock salt deposit is located about

TABLE I. HISTORIC AND CURRENT BURTON WATER QUALITY

Ion	Concentration (mg/L)						
	Historic			Current			
	Worthington Deep	Worthington Shallow	Allsopp Shallow	Coors Deep	Coors Shallow	Marston Deep	Marston Shallow
Calcium	350	210	168	230	151	123	344
Magnesium	60	37	36	54	35	28	80
Sodium	113	91	57	877	53	229	39
Chloride	86	102	87	1534	68	235	64
Sulfate	985	329	364	347	208	312	822
Bicarbonate	278	501	304	273	369	298	380

7 miles (11 km) west of Burton. A notable finding from the geologic map is that these gypsum and rock salt deposits are unique to this area and are not otherwise found in the region.

Figure 2 shows a generalized cross-section of the hills and river valley in Burton. The highland areas contain gypsum and the Mercia Mudstone deposits. Sandstone lies beneath the gypsum and mudstone. In the

valleys, sand and gravel have built up over the mudstone. The gypsum deposits are moderately permeable, meaning that they do not pass water as well as sand, but they aren't as impermeable (tight) as clay. The gypsum deposits are reported to include limestone and alabaster seams. Mercia Mudstone is a fairly tight rock formation that contains a significant percentage of clay. Along with the clay, it includes seams of limestone and gypsum.

The sandstone that lies below the gypsum and mudstone is moderately permeable and is used for water supply. The clay-containing Mercia Mudstone does not produce much water. However its impermeability separates the groundwater into two distinct zones (aquifers): the deep aquifer in the sandstone and the shallow aquifer in the sand and gravel layer.

FIGURE 1.

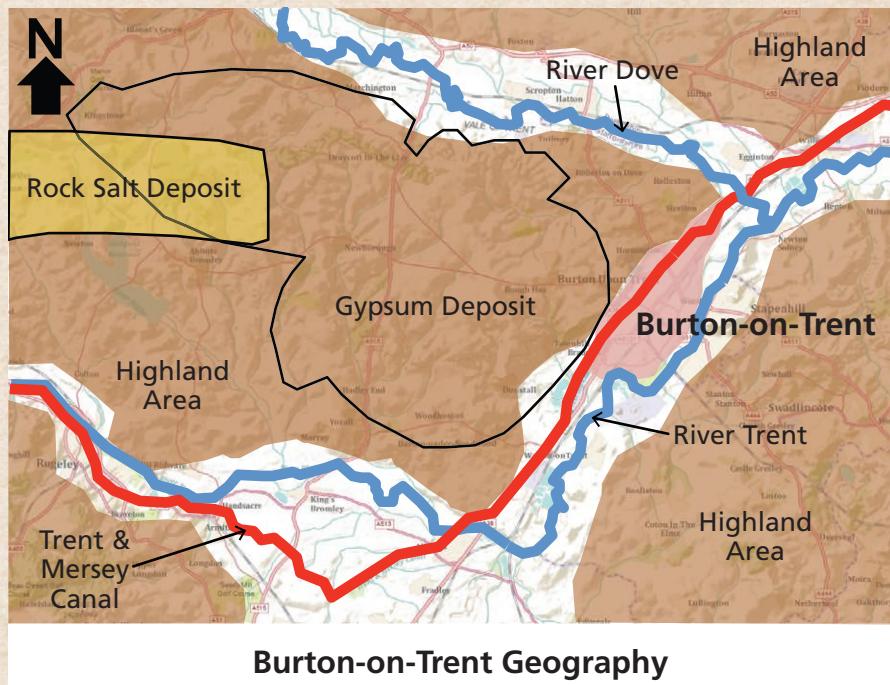
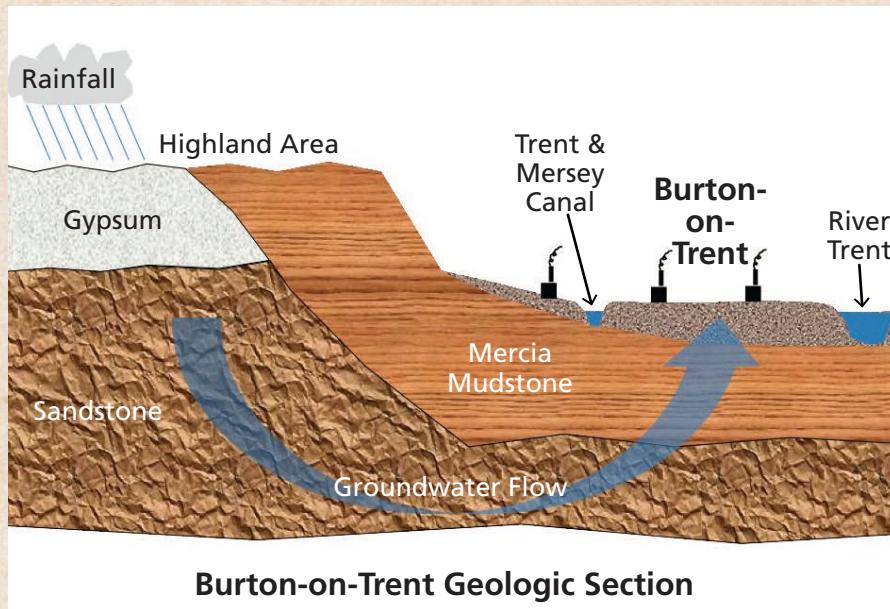


FIGURE 2



The multiple deposits of gypsum, limestone, dolomite, and rock salt in the ground contribute to high mineralization in the groundwater. Gypsum contributes calcium and sulfate. Limestone contributes calcium and bicarbonate. Dolomite contributes calcium, magnesium, and bicarbonate. Rock salt contributes sodium and chloride. This collection of ions is prevalent in Burton water.

The hilly land drives groundwater movement around Burton. Some of the rain and snow falling on the highland areas soaks into the ground. Since there is up to 150 feet (50 meters) of elevation difference between the hills and valley, the water building up in the hills drives groundwater toward the river valley. That groundwater flow brings mineral-rich water from the deep aquifer through the mudstone into the shallow sand and gravel aquifer. Wells drilled into the sandstone can be artesian, which means that water flows out of them freely.

WATER QUALITY

A summary of historic and current water quality analyses for groundwater in the deep and shallow zones is presented in Table 1. The historic water quality data was derived from William Molyneux's book *Burton-on-Trent: Its Waters and Its Breweries*. The current water quality data was provided by the UK Environmental Agency, Midlands Region, 2010. The Coors brewery in Burton, owned by Molson Coors, is the former Bass brewery. Please note that mg/L is also referred to as "parts per million" or ppm.

Notable in Table 1 is the variation in the water quality. In addition, some sources have high sodium and chloride, which is likely a product of the regional rock salt deposit. The variation in water quality from wells in Burton was widely

reported in historic books about the town. There are cases in which Burton breweries installed wells that did not produce acceptably mineralized water for brewing. The relatively small size of the gypsum deposit west of Burton could be responsible for the variation in groundwater quality. Locating wells too far from that gypsum deposit may reduce the mineralization.

Since the shallow groundwater is no longer used in Burton due to contamination concerns, the current shallow groundwater quality results are likely more mineralized than they were historically. The shallow groundwater was the initial water resource in Burton since it was most accessible. Therefore, the shallow groundwater quality is more likely responsible for the reputation that Burton

beers earned. As the popularity of Burton beers increased and brewing expanded in the town, the shallow groundwater resource could not supply enough mineralized water. It was at that point that deep wells were constructed to supply a more reliable supply of mineralized water. Table 1 shows that the deep groundwater is highly mineralized.

BRU'N GOLD

The English IPA style is enhanced by the right water character. A moderately high sulfate content helps dry the beer's finish and the high concentration of calcium helps clarify the beer. Because the high calcium concentration can drive the mash's residual alkalinity very low, some alkalinity may be needed in the mashing water to avoid an overly low mash pH. Therefore, if starting with low alkalinity water like RO, a small addition of pickling lime or baking soda may be needed to neutralize the acidic mash conditions created by a large gypsum addition. If starting with alkaline water, a small acid or acid malt addition may be needed to push the mash pH into a proper range.

The malt bill for English pale ales and IPAs is similar: two-row pale malt, crystal malt, and either biscuit, victory, or special roast malt. This malt bill is blended with English hops to create a flavorful and classic beer that displays malt, hop, and yeast character on a dry palate. In this version, the fruity, black currant character of Brewers Gold hops are on center stage in this single-hopped beer.

Ingredients for 5.5 U.S. gallons (21 L)

11.0 lb	(5 kg) two-row pale malt
0.5 lb	(226 g) biscuit malt
0.6 lb	(270 g) crystal 60°L
0.25 lb	(113 g) flaked wheat
1.3 oz	(37 g) Brewers Gold pellets, 8% a.a. (first wort hop)
1.0 oz	(28 g) Brewers Gold pellets, 8% a.a. (15 min)
1.0 oz	(28 g) Brewers Gold pellets, 8% a.a. (0 min)
	English Ale yeast

Original Gravity: 1.064

Final Gravity: 1.014

SRM: 10

IBU: 48

Assumed Efficiency: 76%

Directions

Mash all malts and flaked wheat in gypsum-infused water (acidify as necessary to produce a mash pH of 5.3 to 5.5) at a temperature between 150 and 154° F (65 to 68° C) for 60 minutes. A mash out step to 168° F (76° C) is helpful, but optional. Sparge the mash with low-alkalinity water acidified to a pH between 5.2 and 5.7.

Boil the wort for 60 minutes. Significant sulfate content is desirable in the water. To produce a modest mineralization when using RO or distilled water, add 1.5 tsp of gypsum and ½ tsp of calcium chloride per 8.5 gallons (32 L) of water or use a program such as Bru'n Water to guide the mineral and acid additions needed to produce the brewing liquor. To produce a mineralization level popular in Burton pale ales, increase the additions to 4 tsp of gypsum and 1 tsp of calcium chloride in 8.5 gallons of water.

Extract Version: Substitute 8 lb (3.63 kg) of liquid pale malt extract for the pale malt in the recipe. Flaked wheat can be omitted if desired. Steep biscuit and crystal malts in 150° F (65° C) brewing liquor. Rinse the malts with brewing liquor. Boil as indicated above.

Note: Since most malt extracts already contain appropriate brewing salts in concentrated form, be sure to account for additional salts in your dilution water, and adjust any further salt additions accordingly when brewing this extract version.

From those various shallow water quality results, an estimation of an average Burton water profile was developed and is presented in Table 2.

With that estimate of an average Burton water profile, the question remains: Did they brew with that water?

HOW THEY BREWED

Burton beers were noted for high clarity, pleasing bitterness quality, and a crisp, dry finish. These qualities are due to the mineralization of the Burton water. The high calcium content improves yeast health and flocculation, which enhances the fermentation vigor and the clearing of yeast from the beer. The high sulfate content

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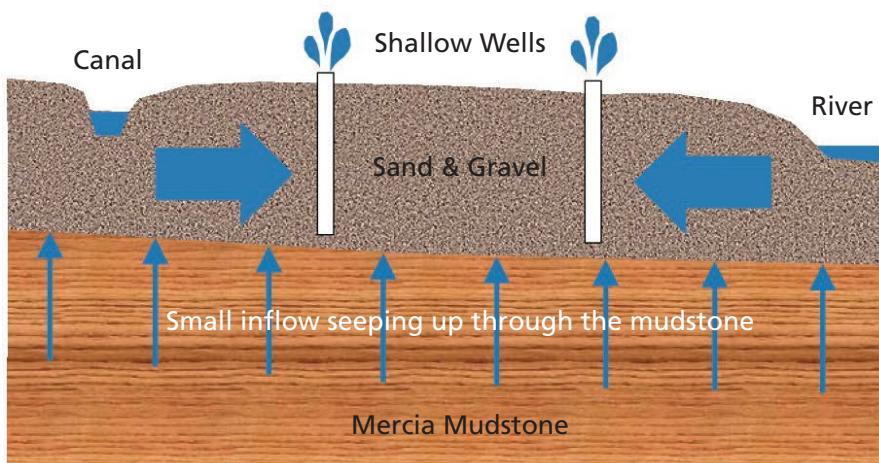
TABLE 2. ESTIMATED AVERAGE BURTON WATER PROFILE

Ion	Concentration (mg/L)
Calcium	275
Magnesium	40
Sodium	25
Chloride	35
Sulfate	610
Bicarbonate	270

enhances the dryness of the beer's finish, making bitterness more prominent. The modest magnesium content helps enhance the quality and character of the beer bitterness. The relatively low sodium and chloride content avoids producing an overly mineralized flavor in the finished beer. These features of the water profile help produce the beers that made Burton famous.

The water quality results from the various wells suggest that the various Burton breweries used differing waters for brewing. In addition, the shallow sand and

FIGURE 3



Burton Shallow Groundwater System

gravel layer that the town sits on is a factor further clouding the "true" water quality Burton brewers used.

As noted previously, Burton is located on the sand and gravel deposits of the River Trent valley. Early in the town's history, shallow wells were constructed in the sand and gravel layer to supply the breweries. Figure 3 presents a schematic view

of the shallow groundwater system in Burton. The sand and gravel layer is up to 30 feet (10 meters) thick and the underlying mudstone layer is over 100 feet (30 meters) thick. The distance between the Trent and Mersey Canal and River Trent is about 1.3 miles (2 kilometers). At one time in Burton, more than 30 breweries were located there and the groundwater demand was high. As the water demand on the shallow aquifer grew due to the increasing number of breweries, it could not provide sufficient mineral-laden water desired for brewing.

A review of the hydraulic conductivity of the various layers beneath the town provides a clue as to the resulting quality of water extracted from the shallow groundwater system. The clay-laden Mercia Mudstone has a very low hydraulic conductivity where a molecule of water may travel 1 foot (0.3 meter) in 10 years. That's compared to the high hydraulic conductivity of the sand and gravel where a water molecule may travel 1 to 30 feet (0.3 to 10 meters) per day.

A simplified model of groundwater flow, in which inflow to shallow wells is from upwelling from the mudstone and seepage from the river, shows that mineral-rich water inflow is about 10 percent of the inflow from river seepage when large quantities of shallow groundwater are pumped from those wells. Since the builders of the canal would have wanted to reduce leakage from their canal, it is

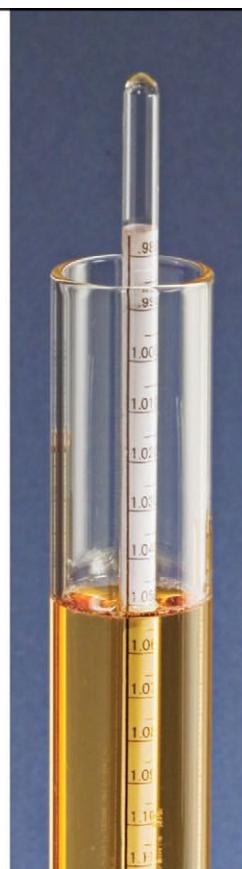
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prudent to assume that the canal was lined with clay and the canal may not contribute much seepage into the shallow groundwater aquifer. Therefore, the percentage of mineral-rich water from shallow wells may increase slightly in wells located farther from the river and decrease in wells closer to the river. When little water is pumped from the shallow aquifer, the percentage of mineral-rich water would increase sharply. The high mineralization currently shown for the shallow aquifer is due to the lack of pumping withdrawal.

The River Trent drains almost 200 square miles (500 square kilometers) and mineral deposits are only a minor component of that total area. Therefore, the degree of mineralization in the river water is far lower than the deep groundwater below Burton. The dilution from river water inflow in the shallow aquifer would significantly reduce the water's mineralization. The low mineralization of the river water is highlighted in a passage by Dr. Darwin from the 1700s: "I appeal to the brewers of Burton for the fact, who have the soft water of the Trent running on one side of their brewhouses, and yet prefer, universally, the harder calcareous water supplied by their pumps."

The shallow aquifer dilution indicates that early in Burton's brewing history, brewers would have obtained fairly mineral-rich water from their shallow wells. With their locations near the river, the dilution of the brewer's well water was more likely. With the expansion of brewing in the town, the shallow aquifer was probably overused and the shallow groundwater quality became increasingly diluted, lacking mineralization.

To meet the increased demand, deep wells were constructed into the sandstone layer beneath the mudstone. Brewers found that deep groundwater had the mineralization they were looking for. In fact, it was more mineral-laden than necessary for their brewing. Fortunately, their shallow groundwater wells could supply low-mineralized water that could be used to dilute their deep groundwater supply. Due to the large human population in Burton and the ease with which contaminants could

permeate the sand and gravel aquifer, that aquifer was eventually abandoned and the deep aquifer employed. In some cases, breweries drew water directly from the Trent for their cleaning and dilution needs.

Given the high mineralization of the deep aquifer, it is apparent that dilution would be required to produce quality beers. The historic and current results from the deep aquifer can show very high sodium, sulfate, or chloride. Current brewing practice confirms that brewing with ion concentrations that high would adversely affect

the resulting beer. Dilution was necessary and easily achieved with the river water. Analytical testing was not readily available to those historic brewers; however, their palate should have been sufficient in guiding their dilution needs.

While tasty ales can be brewed with sulfate levels as high as shown in Table 2, the fact is that some consumers cannot tolerate high sulfate in their beer or water. The U.S. Environmental Protection Agency has established a voluntary sulfate limit of 250 ppm in drinking water based on taste



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and odor concerns. Studies on consuming high sulfate water indicate that gastric distress becomes prevalent at sulfate levels greater than 600 ppm. Therefore, it appears that moderating the sulfate content of brewing water is desirable.

These findings strongly imply that Burton brewers did not brew with water as highly mineralized as the estimated profile shown in Table 2. Although it may be impossible to know what a particular Burton brewery's preferred brewing water quality was, trial and error by modern-day brewers has led to a guide for an accept-

able water profile, one that avoids excessive, beer quality-degrading ion concentrations. A Burton Pale Ale water profile is presented in Table 3. The reader should note that the resulting profile appears to be a diluted version of the average Burton profile shown in Table 2.

The Burton groundwater quality includes significant bicarbonate content that contributes the water's alkalinity. This degree of alkalinity would be too high for brewing pale beers with other brewing waters. However, the very high hardness from the water's calcium and magnesium content

TABLE 3. BURTON PALE ALE PROFILE

Ion	Concentration (mg/L)
Calcium	140
Magnesium	18
Sodium	25
Chloride	55
Sulfate	300
Bicarbonate	110
Residual Alkalinity (RA)	-20

reduces the effect of the high alkalinity through residual alkalinity (RA). RA is the phenomenon where phytins from the malt react with the hardness ions in the mashing water and produce acids that neutralize the water's alkalinity. Burton water typically has an RA value near or below zero, which makes this alkaline water suited to brew pale beers. Brewers who use a low-alkalinity water supply may need to add alkalinity to their mashing water when the calcium and magnesium concentrations are elevated as shown for the Pale Ale profile in Table 3. Producing wort with an overly low pH can reduce the beer's hop expression and bitterness. A wort pH between 5.3 and 5.4 is recommended.

WHAT IS AUTHENTIC?

Many resources portray Burton water as very mineralized with some ions at levels that are known to produce poor quality beer. It is important to recognize that dilution from the River Trent played an important factor in moderating those excessive ion concentrations. This is especially true for brewing pale ales that display the signature characteristics of Burton beers without being overly mineralized or off-tasting. A number of points to consider in the quest for authentic Burton beers are presented below.

- Avoid the excessive ion concentrations depicted for Burton waters. Water dilution was a factor in Burton brewing.
- Keep magnesium concentration below 40 ppm or the beer flavor is likely to be harsh or astringent.

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- Good pale ale brewing requires elevated sulfate concentration in brewing water. A minimum of 100 ppm is recommended, but 300 to 350 ppm will provide better hop expression and “pop.” Exceeding 350 ppm sulfate may create sulfury or other off-flavor perceptions in the beer.
- Keep chloride concentration around 50 ppm to avoid clashing with the desirable high sulfate content. The beer may become mineral tasting if the chloride level is greater than 100 ppm and the sulfate level is high.
- A kettle wort pH of 5.3 to 5.4 is recommended for pale ale brewing to improve hop expression and bitterness.
- When creating a high sulfate level in brewing water with gypsum and Epsom salts, the resulting high hardness may drive the mash pH below 5.2. Alkalinity is likely needed in the mashing water in order to avoid an overly low mash pH. Low alkalinity water like RO or distilled water may not be ideal for pale ale brewing unless the brewer adds alkalinity.

As in life, moderation is key, and a diluted Burton water is key to pale ale brewing success.

Martin Brungard is a recognized expert in brewing water chemistry and an engineer specializing in water treatment. He is the author of the Bru'n Water software for brewing water adjustment. He was also a technical editor for Brewers Publications' book *Water: A Comprehensive Guide for Brewers* by John Palmer and Colin Kaminski.

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BURTON'S BREWING FORTUNES

The Trent and Mersey Canal was an important component in expanding the popularity of Burton ales. With the canal's completion in 1777, Burton ales could be more readily exported across England and Europe. The Russian imperial court was the first to prefer Burton ales, even before the English court in London. The development of exports to India further enhanced Burton's brewing fortunes. With the adoption of the India pale ale (IPA) style by London brewers, the rest is history.

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NEW HOP VARIETIES AND DEVELOPMENTS

BY STAN HIERONYMUS

[Editor's Note: A version of this article originally appeared in the November/December 2013 issue of *The New Brewer*.]

Late last spring and into summer, nearly 50 breweries and brewpubs across the country served beers with names like Iron Horse IPA, The Cure, and, most often, Ales for ALS. The beers had two things in common—a portion of sales of each one sold went to research to develop treatments for amyotrophic lateral sclerosis, also known as Lou Gehrig's disease, and every one of them was made with the same hop blend.

"We wanted to do something to make it special," said Mike Smith of Loftus Ranches in Washington's Yakima Valley, talking about the hops that went into the blend. Loftus and Hopunion offered participating breweries the proprietary mix free of charge, and had to turn many away after running out of hops allocated for the project. The final tally of donations was not complete at press time, but Smith estimated Ales for ALS raised \$150,000 for the ALS Therapy Development Institute. His goal is to eventually have 300 to 400 breweries participate and raise \$1 million.

That would take a lot of hops. "I don't care. I'll donate them," Smith said. Loftus

owns a part of Select Botanicals Group and the Hop Breeding Company, which has developed varieties such as Simcoe, Citra, and now Mosaic. HBC tests potential new varieties in multiple locations, including on hills just beyond the massive Loftus drying kilns. Loftus grows all the most popular HBC releases.

Vinnie Cilurzo of Russian River Brewing and John Mallett of Bell's Brewery chose the blend for the 2013 campaign, mixing four hops: HBC 462, Mosaic (which was simply known as HBC 369 until last year), HBC 344, and HBC 366, which may well be the next HBC variety to get a name. The 2014 mix will be something entirely new, and must come from varieties far enough along in the selection process that they are planted on more than just a few hills.

Smith sees the interest in new varieties every time a brewer walks through the plots where experimental varieties grow. Smith will grab one that smells of pepper or show off another with a distinct vanilla note. He

understands the appeal of the unusual aromas, but also that there's something special about brewing with a hop known just by a number.

They are the future, or at least they might be the future. Brewers should remember there's a reason these hops don't yet have names and are classified as experimental. It takes just as long as ever for a new variety to get to market and for farmers to determine demand and expand acreage. In the May/June 2012 Zymurgy, Jason Perrault at HBC detailed what occurs on a year-to-year basis after two plants are cross-pollinated and a seedling is selected, a process that usually lasts more than 10 years.

"Not until
you have
enough creative
brewers using
them do you
find out what a
hop can do"

Hop dealers are no happier about the wait than brewers. "It is frustrating for us... (but) we can't contract with farmers or grow them on our own ranches until we know they work (agronomically)," said Bill Elkins at Hopsteiner in Washington, which has its own breeding program. "Some hops will not show their flaws for several years."



Obviously, nothing says “new” quite like a hop simply known by its number, and the race is still on for what Peter Darby at Wye Hops Ltd. in England describes as “impact” hops, meaning those with bold, exotic aromas. However, they are only part of what’s developing in both the United States and other, sometimes surprising, hop growing regions.

The Numbers Game

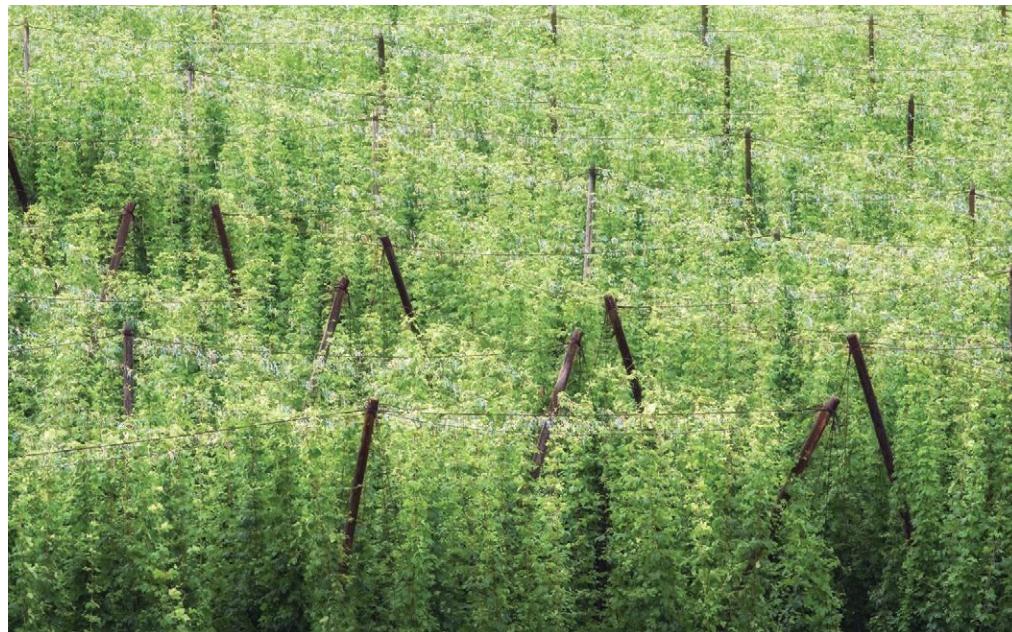
Brewers are looking at two sets of numbers these days, and are often more interested in how many acres farmers are planting of the popular varieties than attributes of numbered hops under development.

“We are expanding Citra as rapidly as possible but the demand is still outpacing the supply,” said Gene Probasco, vice president in charge of farm and agronomic services at John I. Haas who shares HBC breeding duties with Perrault. Citra acreage increased to 1,375 in 2013. Farmers grew 370 acres of newcomer Mosaic, but that also didn’t meet demand. (For a bit of perspective, there were only 258 acres of Centennial as recently as 2008, and 1,859 in 2013).

Because Citra and Mosaic are proprietary hops, they are grown on a select number of farms, but what slows expansion is that nature limits how quickly farmers can propagate new hop plants. By making numbered hops available, breeding programs not only measure their popularity but in some cases may speed expansion. “The more a new variety gets used the better, because brewers talk and word gets out about what’s new and then this promotes the new variety and customers start asking about it,” Probasco wrote in an email.

Jim Solberg at Indie Hops in Oregon—which began a breeding program in 2009 and will soon have hops for field trials—points out another advantage. “Not until you have enough creative brewers using them do you find out what a hop can do,” he said.

Probasco indicates that HBC 366 will likely be the next release from Hop Breeding Company. Several large breweries—Sierra Nevada Brewing, Brooklyn Brewery, and Lagunitas Brewing—have



already used the “dual purpose” hop, which has alpha acids ranging from 11.5 to 13.5 percent, and exhibits many of the aromas and flavors currently in vogue, like citrus, tropical fruit, and pine. Brewers are particularly drawn to it because of its high oil content, between 2 and 4.3 percent.

Likewise, brewers have focused on one of Hopsteiner’s newest experimentals, 05256, because it has 3.1 percent essentials oils. With high alpha hops from both America and Germany in its background, 05256 has 18 to 19 percent alpha acids and is full of pungent aromas, including black currant, grapefruit rind, pine, and tangerine. Two other hops, 06300 (14 to 15 percent alpha acid) and 02120 (5.5 to 7 percent alpha acid), have attracted the same sort of attention that Calypso, Hopsteiner’s last release, did. Hopsteiner pelletizes a variety after it is planted on five acres, and ran out of 06300 in 2012 before Christmas. “People were putting it into their dark beers,” Elkins said. It has an unusual combination of fruity flavors, coconut, and chocolate.

‘Found’ Hops

Amarillo is the best known of hops relatively recently found growing in a

“It takes just as long as ever for a new variety to get to market and for farmers to determine demand and expand acreage.”

hop yard and entirely different than anything previously known, but it is not the only one. Belma from Puterbaugh Farms in Washington and Meridian from Indie Hops in Oregon both provide “something different.”

Stacy Puterbaugh discovered Belma growing on the side of the kiln. It is a daughter of Kitamodori, a hop first bred by Kirin in Japan and added to the USDA repository in Oregon in 1992, and Magnum. Puterbaugh doesn’t grow either on its farm. Named for the “Belma Community” in Mabton, where the Puterbaugh farm is located, it is classified as “dual purpose” and has 12.1 percent alpha acids. Various breweries, including Stone and Dogfish Head, have used it in beers, describing aromas and flavors of berries, citrus, grape, and melon.

Indie Hops planned to resurrect the Columbia variety, a sister of Willamette that wasn’t grown after Anheuser-Busch chose the latter as a Fuggle replacement in the 1970s. What was thought to be Columbia was located on the Goschie Farms in Oregon and released in the fall of 2011. After harvest it was obvious the hop was not Columbia, and further

research indicated it is unique. Indie renamed the hop Meridian and has sold it for three years. BridgePort uses it to dry hop BridgePort Long Ball, brewed first for the Hillsboro Hops baseball team. Summit Brewing in Minnesota brews its 4.5 percent Meridian Session Ale, and Spoetzl Brewing in Texas featured it in Shiner FM 966 Farmhouse Ale. "One brewer called it the MSG of hops," Solberg said. "It works well with others."

From Across the Atlantic

- In England, the British Hop Association is working with Darby at Wye Hops Ltd. to "rediscover" various heritage varieties in the British Hop Collection, including Keyworth's Midseason, Bullion, OZ97a, GP75, and several others. About 10 of those selected have advanced far enough to be evaluated in brewing trials. The BHA is also actively promoting "previously-sold-as-alpha" varieties for their aroma value. Included are Admiral (dark orange, citrus), Target (sage, citrus, spice), Phoenix (molasses, chocolate, spicy), and Pilgrim (spice, citrus, pear). Of recently released hops, Endeavour—which has both Cascade and British hops in its lineage—has attracted the most attention for its distinctive oil composition.

British hop merchant Charles Faram, which imports English hops and other continental hops into the United States, as well as buying American hops to sell in other parts of the world, also has a breeding program. The company made three varieties available for trial brewing in 2012 and the 2013 crop is still very limited, but increases are planned for 2014. Those three are: Archer, first called CF 108, with aromas of apricot, peach, floral, and lime; Minstrel (CF 101), which is fruity, sweet, orange, spicy; and Jester (CF 120), with grapefruit, gooseberry, and tangerine notes.

- Although poor weather conditions lowered yields in France, two recently released offspring of Strisselpalt, Aramis (7.9 to 8.3 percent alpha acid) and Triskel (8 to 9 percent), remain available. New Belgium made French Aramis India Pale Ale as part of its Hop

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Kitchen series last summer, while St. Louis breweries Schlafly and Urban Chestnut featured single-hopped beers brewed with each of the two hops. Curiously, the hop aroma of the UCB Triskel was prominently floral with peach overtones, while the Schlafly beer had richer fruity notes and hinted of grapes—indicating the role different yeast strains may play in hop aroma development.

- Horrible growing conditions on the continent will delay the opportunity to fully evaluate the four varieties released by the Society of Hop Research in 2012. Farmers strung less than 120 acres each of high alpha/high oil Polaris and Mandarina Bavaria in 2013 and less than 70 acres each of Hüll Melon and Hallertau Blanc. The last three are all offspring of Cascade bred for their aroma. Most of the plants in the ground were “babies” and won’t provide a crop until 2014. “It is still difficult to forecast in which ‘niche’ the varieties will settle in the craft brewing world,” Carlos Ruiz, international sales manager for the German Hop Growers, wrote via email.

Going Local

Hops have become a local story—“I don’t think there is a better one,” Elkins said. “Everybody is so into localvore.”—but

sometimes one with international connections. Three examples:

- Hop Head Farms in Michigan installed a German-made three-level kiln to dry its own hops and is importing bales of the newest German hop varieties, which it will process into pellets and distribute. Co-founder Jeff Steinman said the farm has become an international member of the Society of Hop Research and would like to grow the new cultivars if and when they are licensed outside of Germany.

Hop Head boosted its acreage from 15 to 30 acres this year, making it about the size of an average German farm and less than one-twentieth the size of an average farm in the Yakima Valley. When the company went shopping for a hop picker, which strips the cones from the bines and leaves before a series of conveyor belts and fans separate the leaves from the cones, Steinman and his partners settled on a drying system from the same German vendor as its picker. “We thought it made the most sense to match the scale,” he said.

In America and most other hop growing regions, farmers dry hops in large, relatively shallow kilns, spreading hops between 24 inches and 36 inches deep, using heated air, forced through the bed from the bottom. The three-tier system has louvered floors so the hops can be dropped from one layer to the next as drying proceeds. It’s an effective, and many argue gentler, way to dry hops on a smaller scale.

Although the system is German, Hop Head has focused on American hops such as Chinook, Cascade, and Centennial, with plans to add other, less widely grown varieties available from the USDA germplasm bank in Oregon. It contracted with four German hop growers—Steinman said about a dozen overall have licenses to grow the new varieties—to deliver a rather small quantity from the 2013 harvest. In September, he wasn’t sure if that would be enough, given the terrible growing season in Germany, to fulfill all the orders Hop Head took earlier this year. He expects larger quantities in 2014.

- Gorst Valley Hops in Wisconsin is also importing bales from the continent, in this case grown in the Czech Republic, that it will process into pellets and offer for sale.

Once again, special drying techniques are part of the partnership. Gorst has developed a single batch dryer that uses no heat and is designed to retain more essential oils and aromatics. “Some brewers don’t like that,” Gorst co-founder James Altwies said candidly. “(However) it can be unique without chasing the next big (aroma).”

Altwies has pointed out since Gorst opened that Midwest hop farmers cannot compete based on price, but must add apparent value. Although, Czech hop growers—who will use the Gorst technology before shipping bales to Wisconsin—are interested first in preserving particular oils that the pharmaceutical industry wants,

“I can’t imagine that somebody would smell these and say I’ve smelled that in 20 other hops.”

this partnership will also gauge the interest brewers (and drinkers) have in traditional varieties with higher levels of essential oils.

- Hops imported from South Africa suggest that “impact” hops might be grown successfully inside the 35th parallel, which has positive implications for would-be hop farmers in the American South. Hops need 15 hours of daylight during growing season and six to eight weeks of dormant time with temperatures below 40° F in the offseason to thrive, which is why they don’t grow well near the equator.

Greg Crum lived in South Africa from 2006 until 2010, and helped start a brewery there before he and his wife moved to a town outside of Albuquerque, N.M. He is a consulting engineer, but also operates Furthur Brewing and has imported a limited amount of experimental hops bred at SAB Hop Farms. He hopes to have more after the 2014 harvest, which occurs in spring in the Southern Hemisphere.

Many of the hops bred at SAB Hop Farms, which is located at 34°, are not particularly distinctive, but ones called Southern Passion (US478 until recently) and J17 have the bold aromas, including passion fruit and berries, that brewers are looking for. “They are unique and compelling, like Nelson Sauvin,” said Jeff Erway at La Cumbre Brewing in Albuquerque, N.M., whose Elevated IPA won the gold medal at the Great American Beer Festival. “I can’t imagine that somebody would smell these and say ‘I’ve smelled that in 20 other hops.’”

Crum said he thought J17 resulted from varieties cross-pollinated about 15 years ago. The good news for farmers in the American South is that such hops can be developed. The frustrating news is the breeding process takes just as long north of the equator.

Stan Hieronymus is the author of *For the Love of Hops: The Practical Guide to Aroma, Bitterness and the Culture of Hops*.

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by Amahl Turczyn Scheppach

Commander SAAZ Interplanetary Homebrew Blastoff

For more than 20 years, SpaceCoast Associates for the Advancement of Zymurgy (SAAZ) has been Brevard County's (Fla.) AHA homebrew club dedicated to the search for better beer. Founded in 1992, SAAZ has grown throughout the years and become actively involved in its community with homebrewing beer, wine, and mead; member meetings, demonstrations, education, member trips, and their annual competition.



The Commander SAAZ homebrew competition is the galaxy's only known "interplanetary" competition where fermented entries are encouraged throughout the known, or even unknown, universe. The competition's tagline, "Have your beer judged by rocket scientists," stems from the fact that many of the past and current members are doctors, engineers, and scientists working on the Space Coast for many scientific and research-based companies, including NASA.

The inaugural Commander SAAZ homebrew competition was held in 1995 and had nearly 100 entries, impressive for a first-year competition. This year marked the 19th annual and largest Commander SAAZ competition, with 636 entries from across the nation. This makes it one of the largest BJCP homebrew competitions in the state of Florida and will

be a Masters Championship of Amateur Brewing (MCAB) qualifier competition in 2014, promising to bring in even more earthly entries.

Commander SAAZ allows entries from all 28 BJCP styles and their own special category, Rocket Fuel, which is any beer over 10 percent ABV, brewed on the extreme end for its style and capable of "sending the Commander into orbit." That category was won by Bryan Barrett, who submitted a double IPA (12 percent ABV) called Jet Fuel.

At the awards ceremony, dinner, and Splashdown Party, attendees had the chance to enjoy the commemorative beer brewed for the occasion, called Epic Stout.

BOS Beer: Nelson Crowle

Nelson Crowle has been homebrewing off and on for 40 years, and is a BJCP Beer and Mead judge. He is one sub-style away from completing his quest to brew all 98 BJCP sub-styles, but also likes to brew historical and unique styles (like brewing a pumpkin beer using the pumpkin as the fermenter).

Epic Stout

The Commander SAAZ Interplanetary Homebrew Blastoff commemorative beer was brewed "in the style of Chuck Norris," requiring 63 pounds of grain for 10 gallons of huge, thick, roasty, chocolatey awesomeness. "The goal was that when you open one, the beer is so dark that it actually absorbs light and makes it darker around you." The competition organizers brewed 20 gallons total, splitting one 10-gallon batch and aging 5 gallons on Laird's Apple Brandy-soaked French oak cubes (medium toast), and the other on California brandy-soaked French oak cubes.

INGREDIENTS

for 10 U.S. gallons (38 L)

36.0 lb	(16.32 kg) pale two-row malt (57.1%)	1.0 lb	(0.45 kg) rye malt (1.6%)
4.0 lb	(1.81 kg) roast barley (6.3%)	1.0 lb	(0.45 kg) white wheat malt (1.6%)
2.0 lb	(0.9 kg) Carafa II malt (3.2%)	3.0 lb	(1.36 kg) light dry malt extract (4.8%)
2.0 lb	(0.9 kg) 120° L crystal malt (3.2%)	6.0 oz	(170 g) Magnum 2012, 13.70% a.a, (60 min) 87.7 IBUs
2.0 lb	(0.9 kg) chocolate malt (3.2%)		
2.0 lb	(0.9 kg) flaked oats (3.2%)		
2.0 lb	(0.9 kg) Special B malt (3.2%)		
2.0 lb	(0.9 kg) Victory malt (3.2%)		
2.0 lb	(0.9 kg) roast wheat (3.2%)		
1.0 lb	(0.45 kg) flaked barley (1.6%)		
1.0 lb	(0.45 kg) black patent malt (1.6%)		
1.0 lb	(0.45 kg) 60° L crystal malt (1.6%)		
1.0 lb	(0.45 kg) pale chocolate malt (1.6%)		

Est Original Gravity: 1.119 SG

Est Final Gravity: 1.029 SG

Est ABV: 12.1 %

Est IBU: 87.7 (calculated)

Est Color: 107.7 SRM (BLACK as a

moonless night)

DIRECTIONS

60 minute mash rest at 159° F (71° C) and 60 minute boil. Chill the wort post-boil, pitch the yeast, ferment, carbonate, and enjoy.

Lights Out (Eisbock)

RECIPE BY NELSON CROWLE

BEST OF SHOW, 2013 COMMANDER SAAZ COMPETITION

INGREDIENTS

for 5 U.S. gallons (19 L) (6 gallon boil)

10.0 lb (4.54 kg) Crisp EuroPils malt
3.3 lb (1.5 kg) Weyermann® Vienna malt
3.3 lb (1.5 kg) Briess 10° L Munich malt
0.82 lb (0.37 kg) Castle Special B malt
0.82 lb (0.37 kg) Briess caramel 60 malt
0.82 lb (0.37 kg) Briess caramel 80 malt
0.82 lb (0.37 kg) Briess caramel 120 malt
0.82 lb (0.37 kg) Weyermann® melanoidin malt
0.42 oz (12 g) 9.6 AAU Summit pellet hops (19% a.a.), (60 minutes)
2 packets Fermentis Saflager W-34/70 Weihenstephan Lager dry yeast, rehydrated with Go-Ferm

BUILD-A-BEER ESTIMATES

Original Gravity: 1.105

Final Gravity: 1.022

IBUs: 25

ABV: 10.9% (before concentration)

DIRECTIONS

"Single infusion mash at 149° F (65° C). Ferment at 48° F (9° C). After fermentation, rack to several 2-liter soda bottles, fill leaving a couple inches of air space at the top, then place on their side in freezer. Remove from freezer when hard slush and pour off the liquid as the eisbock. The remaining ice can be thawed and carbonated as a traditional bock. I used the 2-liter soda bottles because I could see the amount of ice compared to the amount of liquid. Carbonate the eisbock to stabilize at 12 psi."

MINI-MASH VERSION: Substitute 10 lb (4.54 kg) pale malt extract syrup for EuroPils and Vienna malts. Mash remaining malts at 155° F (68° C) for one hour. Drain, rinse, dissolve extract and proceed with boil.



Crowle has been an active member of the Dunedin (Florida) Brewers Guild for almost 10 years, including running and organizing several competitions. As a software engineer, he's usually either working on his WhatsOnTapAt.org beer menu display software for tap bars, or is improving the Reggie homebrew competition software that all Florida competitions use. Currently fermenting: Imperial pumpkin beer, Dortmunder export, and Dusseldorf alt. On deck: white stout, Munich helles (last one!), and English bitter for hand pump.

His best of show beer for this competition was an eisbock called Lights Out.

BOS Mead/Cider: Dave Clark

Dave Clark has been homebrewing since 2005 and began making cider in 2008. Of his 30 competition medals, 14 have come for his cider, including his win for Apple Corpse at the SAAZ competition. It was also the silver medalist in the National Homebrew Competition in 2010. Dave is originally from Cleveland, Ohio and now resides in Palm Harbor, Fla. with his wife, daughter, three dogs, and a six-tap kegerator filled with his own creations, currently a stout, porter, orange ale, hoppy red ale, a mead, and this best of show winning cider.

Clark provided these tips for creating a good base cider: "The key to producing a good cider is using fresh pressed juice. I get my juice unpasteurized and untreated

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so the yeast will be unaffected. I pitch the rehydrated champagne yeast the minute the juice warms up to the proper pitching temperatures. Champagne yeast will ferment your juice all the way, so you'll need to back-sweeten to taste. Again, use real cider; not concentrate! Of course, since you have finished fermentation at this point, you'll want to dose it with potassium metabisulfite and potassium sorbate to ensure that you eliminate any wild yeast and stop fermentation from reoccurring with the back-sweetening juice addition. (Note: it is completely fine, and even recommended, to use pasteurized juice for the back-sweetening since fermentation is over at this point.) For clarity, I use pectic enzyme each time I add juice and I lager the cider at 35-40° F (2-7° C) for at least three months. This gives the cider its brilliant clarity and gives the flavors time to meld. If you care to add any spices, add them in the lagering vessel."

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

Jet Fuel (Double IPA)

RECIPE BY BRYAN BARRETT

ROCKET TROPHY WINNER, 2013 COMMANDER SAAZ COMPETITION

INGREDIENTS

for 3 U.S. gallons (11.36 L)

15.0 lb	(6.8 kg) German two-row Pilsner malt (76.92%)
2.0 lb	(0.9 kg) Maris Otter pale malt (10.26%)
1.0 lb	(0.45 kg) 60° L crystal malt (5.13%)
1.0 lb	(0.45 kg) 10° L Munich malt (5.13%)
8.0 oz	(227 g) 20° L melanoidin malt (2.56%)
2.5 oz	(71 g) Warrior, 15% a.a. (90 min) 156.3 IBU
1.5 oz	(42 g) Chinook, 13% a.a. (30 min) 58.4 IBU
3.0 oz	(85 g) Amarillo Gold, 8.5% a.a., (10 min) 36.0 IBU
	Whirlfloc (5 min)
4.0 oz	(113 g) Warrior, 15% a.a. (dry hop 5 days)

2.5 oz (71 g) Chinook, 13% a.a.
(dry hop 5 days)

2.0 oz (57 g) Amarillo Gold, 8.5% a.a.
(dry hop 5 days)
American Ale II (Wyeast Labs #1272)

Original Gravity: 1.120

Final Gravity: 1.029

ABV: 12%

SRM: 18.3

IBU: 250.7 (calculated)

Boil Time: 120 Minutes

DIRECTIONS

60-minute single infusion at 154° F (68° C)
no mash out. Ferment at 65° F (18° C).

MINI-MASH VERSION: Substitute 11 lb (4.99 kg) pale malt extract syrup for Pilsner malt. Mash remaining malts at 155° F (68° C) for one hour. Drain, rinse, dissolve extract, and proceed with boil.

MICRO MATIC

The advertisement features a large glass filled with golden beer on the left, and a polished chrome faucet system with three handles on the right. The background is dark with light circular highlights.



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KUDOS—BEST OF SHOW

AHA/BJCP Sanctioned Competition Program

May 2013

British Ales, 41 entries—Richard Whitebrook, *Melbourne, Australia.*

July 2013

Brisbane Amateur Beer Brewers Annual Competition, 67 entries—*Kris Domagala, Brisbane, QLD, Australia.*

August 2013

NM State Fair Pro-Am, 420 entries—*Erway Jaramillo, La Cumbre Brewing Co., NM.*

Stapleton Beer Festival Homebrew Competition, 77 entries—*Douglas Westphal, Denver, CO.*

Minnesota State Fair Homebrew Competition, 710 entries—*Patrick Moran, Maple Grove, MN.*

Nebraska State Fair Beer and Wine Competition, 190 entries—*Tim Thomsen, Lincoln, NE.*

Castle Hill and Hills District (& NSW State) Homebrewing Competition, 556 entries—*Michael Wallace, Sydney, Australia.*

2013 Limbo Challenge, 222 entries—*Richard Harris, Carrollton, TX.*

Macon Beer Festival Homebrew Competition, 105 entries—*Brian A Whitley, Macon, GA.*

Byggvir's Big Beer Cup, 215 entries—*Ben Adair, Blaine, MN.*

Washington State Fair, 89 entries—*Jonathan Rabon, Vancouver, WA.*

Intervarsity Beer Brewing Competition 2013, 29 entries—*University of Pretoria, Pretoria, South Africa.*

Coconino County Fair Homebrew Competition, 21 entries—*Heath Haynes, Lake Havasu, AZ.*

September 2013

Competencia Amateur - Cerveza Mexico 2013, 249 entries—*Nayeli Bertado, Guadalajara, Mexico.*

Gemuetlichkeit Days Homebrew Competition, 19 entries—*Glenn Feit, Hellenville, WI.*

Santa Cruz County Fair Homebrew Competition, 121 entries—*Will Chernetsky, Santa Cruz, CA.*

Consumers Beverages 2nd Annual HomeBrew Comp, 100 entries—*Patrick Quinlan, Snyder, NY.*

Schooner Homebrew Championship, 482 entries—*Tim Minger, Milwaukee, WI.*

WA State Amateur Brewers Competition, 204 entries—*Scott Mundell, Perth, Western Australia.*

Tandil 2013, 102 entries—*De Prada Omar, Mar Del Plata, Argentina.*

The Great Frederick Fair, 99 entries—*Ed Moss, Frederick, MD.*

North Carolina Brewers' Cup, 395 entries—*Chris Creech, NC.*

Tulare County Fair Homebrew Contest, 34 entries—*Mauricio Macias, CA.*

Drink Good Mash Up, 17 entries—*Peter and Kimberly Mynar.*

Blue Ridge Brew Off, 584 entries—*Steve Morgan, Fletcher, NC.*

Tulsa State Fair Homebrew Competition, 34 entries—*Jon Sanford, Tulsa, OK.*

Lee's Summit Oktoberfest, 150 entries—*Amy Satterlund, Kansas City, MO.*

Brewfest, 256 entries—*Adam Burk, Greenwood, IN.*

Dayton Art Institute Oktoberfest Home Brew Contest, 128 entries—*Michael McCaffrey, Miami Springs, OH.*

Big TAP ChautauquaFest, 7 entries—*Jason Terry, Ashland, WI.*

UK National Homebrew Competition, 447 entries—*Ali Kocho-Williams, United Kingdom.*

2013 ACO Brewfest, 30 entries—*Steve Hunt, Longmont, CO.*

OC Fest of Ales Home Brew Challenge, 188 entries—*Darren Shelton, Rancho Santa Margarita, CA.*

Pacific Brewers Cup, 463 entries—*Kevin Margulieux, Anaheim, CA.*

Nez Perce County Fair, 51 entries—*Kyle Schmitt, Clarkston, WA.*

Roberts Cove Germanfest Homebrew Competition, 53 entries—*Kris Pault, Summit, MS.*

Southern Oregon Amateur Beer, Wine, Soda & Label Art Competition, 270 entries—*Jim Rainville, Mt. Shasta, CA.*

Long Island Beer and Malt Enthusiasts Beer Comp, 150 entries—*Daniel Oliva, Elk Grove, CA.*

H.A.Z.A.R.D. Haztoberfest, 137 entries—*David Heuser, Elyria, OH.*

Celestial Meads Equinox Mead Competition, 21 entries—*Karl Morgan, Anchorage, AK.*

Grace Lutheran Oktoberfest Bier Brauen, 96 entries—*Mike Horner, Salt Lake City, UT.*

Oktoberfest in the Country, 17 entries—*Adam Meyers, Rochester, MN.*

Keep Florence Beautiful Brew Fest, 9 entries—*Julian Buck, Florence, SC.*

The Art of Darkness, 81 entries—*Nathan Hopper, Kansas City, MO.*

Pale Ales Only Competition to Benefit Multiple Sclerosis, 50 entries—*Vincent Simboli, Portland, ME.*

7th Annual KROC Great American Beer Challenge, 150 entries—*Bryan Keas, Highlands Ranch, CO.*

The Big Fresno Fair Homebrew Competition, 108 entries—*Matthew Humann, Friant, CA.*

Rio Rancho Oktoberfest Homebrew Competition, 23 entries—*Jeff Jantz, Albuquerque, NM.*

Burgfest Home Brew Competition, 83 entries—*Nathan Briscoe, Holden, MO.*

Maryland Microbrewery Festival Homebrew Competition, 205 entries—*Derick McElhaney, Martinsburg, WV.*

Kingsport Oktoberfest- Black Forest Brewoff, 71 entries—*Pete Czornohus, Knoxville, TN.*

Cactus Challenge, 239 entries—*Matt Holley, Lubbock, TX.*

Orpheus Cup MeadFest, 20 entries—*Christopher Shinn, Highland Lakes, NJ.*

O'Zapft Is! German Homebrew Competition, 195 entries—*Sam George Daher, Katy, TX.*

Texas Mead Association 2013 Home Mead Maker Competition, 88 entries—*Shane Ferguson, Crosby, TX.*

October 2013

II Concurso Paranaense de Cerveja Feita en Casa, 76 entries—*Nelson Bakaus Junior, Curitiba – PR, Brazil.*

Mother Earth Rhythm & Brews Home Brew Competition, 68 entries—*Chris Barry, San Bruno, CA.*

West Texas Shootout, 51 entries—*Matthew Cogburn, Abilene, TX.*

Arizona Society of Homebrewers Oktoberfest Competition, 225 entries—*Bryan Myron, Gilbert, AZ.*

Figueroa Mountain Brewing Co. and Valley Brewers Pro Am, 106 entries—*Josh Ellis, Santa Barbara, CA.*

Oktoberfest, 74 entries—*Justin Vincent, Newark, CA.*

Ale Riders Homebrew Competition, 77 entries—*Andrew Ayers, South Jordan, UT.*

Beau's Oktoberfest & Members of Barleyment Annual Homebrew Competition - 2013, 182 entries—*Jared Carlberg, Winnipeg, MB, Canada.*

Big Muddy Monster Home Brew Competition, 82 entries—*Jack McKillip, Carbondale, IL.*

2013 Delafield Brewhaus Schnapp Hans Cup, 97 entries—*Ben Sattler, Hartland, WI.*

Tucson Homebrew Competition, 50 entries—*Matthew Covington, Tucson, AZ.*

Ames Oktoberfest Home Brew Contest, 43 entries—*Scott Nelson, Ames, IA.*

Queen of Beers, 75 entries—*Krysten Kellum & Ann McQuillen, Placerville, CA.*

Queensland Amateur Brewing Championships 2013, 351 entries—*Martin Rudge, Brisbane, QLD, Australia.*

NFBL Intra-Club Competition, 29 entries—*Corey Furbee, Tallahassee, FL.*

Southern New England Regional Homebrew Competition, 351 entries—*Rick Rocheleau, Danielson, CT.*

XBrew, 220 entries—*Jonathan Permen, Renton, WA.*

Jacktoberfest, 63 entries—*David Moore, Ocean Springs, MS.*

C.R.A.F.T. Invitational, 15 entries—*Kevin Paul, Royal Oak, MI.*

Montana Mashup Competition MMXIII, 129 entries—*Clint Nisson, Missoula, MT.*

Philly Homebrew Club Fall Ales Competition, 26 entries—*Corey Arrick, Philadelphia, PA.*

8th Annual New England Regional Homebrew Competition, 476 entries—*Joel LeFave, Hopkinton, MA.*

Beer Barons to Homebrewers, 8 entries—*Tyler Flynn, Ardmore, PA.*

Northeast Big River Homebrew Competition, 190 entries—*Tammy Cumminnes, Richfield, MN.*

National Organic Homebrew Challenge, 78 entries—*Jonathan Fuller, Davis, CA.*

Schleswig Wine & Bier Contest, 47 entries—*RJ Bumann, Ida Grove, IA.*

Delaware Wine and Beer Festival Homebrew Championship, 13 entries—*Russell Kalbach, Upper Darby, PA.*

2013 SNAFU Sheldon Jackson/Marvin Edgeworth Memorial Homebrew Competition, 71 entries—*Julian Tejedor, Las Vegas, NV.*

Spooky Brew, 272 entries—*Shaun Niemeyer, Chicago, IL.*

Southeast Alaska Autumn Pour, 52 entries—*Steve Pierce, Juneau, AK.*

AHA/BJCP SANCTIONED COMPETITION PROGRAM CALENDAR

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



January 10 *Big Beers, Belgians & Barleywines Homebrew Competition*

Vail, CO. Entry Deadline: 12/15/2013.
www.bigbeersfestival.com/big-beers-homebrew-competition.html

January 11 *Belle City Winter Warmer Homebrew Competition*

Racine, WI. Entry Deadline: 1/4/2014.

January 17 *The Big Woody*

Portland, OR. Entry Deadline: 12/17/2013.

www.woodybeer.com

January 17 *Big Bend Brewoff*

Tallahassee, FL. Entry Deadline: 1/10/2014.

www.nfbl.org

January 17 *Masters BeerFest*

Phoenix, AZ. Entry Deadline: 1/10/2014.

www.MastersBeerFest.com

January 18 *Moerlein Cup Homebrew Competition*

Cincinnati, OH. Entry Deadline: 1/15/2014.

January 18 *Winterbrew 2014*

Chicago, IL. Entry Deadline: 1/10/2014.

January 18 *The 20th Annual Boneyard Brew Off*

Urbana, IL. Entry Deadline: 1/7/2014.
www.buzzbrewclub.org/competition

January 19 *Kris Kringle Challenge*

Baker City, OR. Entry Deadline: 1/9/2014.
<https://sites.google.com/site/goodlibationshomebrewclub/>

January 25

Best of Craft Beer Awards

Bend, OR. Entry Deadline: 1/31/2013.
www.bestofcraftbeerawards.com

January 25

Upper Mississippi Mash-Out

St.Paul, MN. Entry Deadline: 1/11/2014.
www.mashout.org

January 25

The Ruck's Extreme Homebrewing Competition Winter Sixpack 2013

Troy, NY. Entry Deadline: 1/22/2014.
getrucked.com/site/?page_id=318572

January 25

Wet Your Whistle Homebrew Competition

Lebanon, PA. Entry Deadline: 1/20/2014.
www.wetylourwhistle.net

February 1

SABC Summer 2014 Amateur Brewing Challenge

Adelaide, SA, AU. Entry Deadline: 1/29/2014.

February 7

9th Annual Peterson AFB Homebrew

AHA SPECIAL EVENTS

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

January 25

AHA Rally – Mission Brewing Company

San Diego, CA

February 20

AHA Rally – SanTan Brewing Company

Chandler, AZ

Competition and Fest

Peterson AFB, CO. Entry Deadline: 1/24/2014.
pafb.brewcompetition.com/

February 7

Homebrew Alley VIII

New York, NY. Entry Deadline: 1/30/2014.
www.homebrewalley.org

February 8

Mad Monk's Mash-Up

DeLand, FL. Entry Deadline: 1/11/2014.
www.delandcraftbeefestival.com/p/hombrew-competition.html

February 8

Philly Homebrew Club Winter Ales Competition

Philadelphia, PA. Entry Deadline: 1/31/2014.

February 8

The Great Northern Brew-Ha-Ha!

Duluth, MN. Entry Deadline: 1/27/2014.
www.northernalestars.org/greatnorthernbrewhaha.html

February 8

Bataille des Bières

Lafayette, LA. Entry Deadline: 1/25/2014.
www.deadyeast.com/phpBB3/viewtopic.php?f=1&t=1363

February 15

Sweethearts Revenge Homebrew Competition

Loveland, CO. Entry Deadline: 2/7/2014.

February 22

2014 Midwinter Homebrew Competition

Milwaukee, WI. Entry Deadline: 2/8/2014.
www.midwinterhbc.com/

February 22

Best Florida Beer Championship

Tampa, FL. Entry Deadline: 1/31/2014.
www.bestfloridabeer.org

February 22

Kansas City Bier Meister's 31st Annual Competition

Kansas City, MO. Entry Deadline: 2/7/2014.
kcbiermeisters.org/comp/

February 22

3rd Annual Lucette Brewing Company Winter Home Brew Competition

Menomonie, WI. Entry Deadline: 2/21/2014.
www.facebook.com/LucetteBrewingCompanyWinterHomebrewCompetition

February 22

Dredhop & Regale

Boulder, CO. Entry Deadline: 2/6/2014.
hopbarley.org/dredreg/

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By Rick Blankemeier

An In-Depth Look at Chill Haze

Chill haze has been the bane of many homebrewers since the first hazy homebrew was poured from a cold bottle. Lucky for us, it's just an aesthetic issue and not a flavor one. Even so, most homebrewers would rather see a nice, bright beer and not a hazy mess. Let's take a look at what causes chill haze and how to avoid it.

On a simple level, chill haze is the haze that occurs when a beer is chilled below 40° F

(4° C). On a deeper level, chill haze is the formation of larger, haze-forming clumps called flocculants or flocs. These flocs consist of proteins and polyphenols complexing via hydrogen bonding when the temperature is low enough—we'll go into the details of the bonding in a little bit. When these big flocs form, they diffuse light through them and cause the signature haze that we know and loathe. Given enough time in the bottle or keg, these flocs will start growing bigger and bigger until they precipitate nasty-looking chunks. These chunks aren't harmful in any way, but they create a weird goop at the bottom of the bottle that looks a little like excessive yeast flocculating during bottle conditioning.

Polyphenols

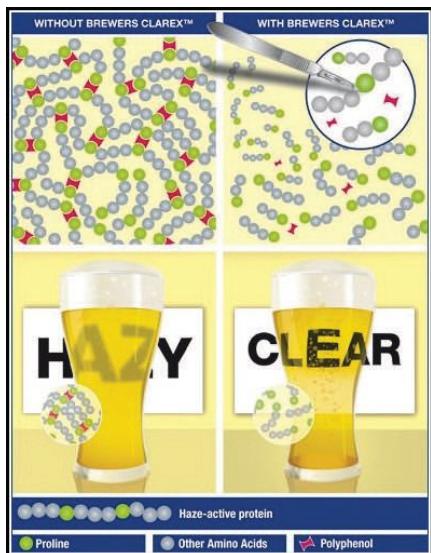
Also known as tannins, polyphenols are exactly what they sound like—huge macromolecules consisting of phenol groups. These compounds end up in beer from a

READER ADVISORY: Warning!

These pages are rated XG (eXtra Geeky) by the Bureau of Magazine Muckymucks. Items in this section may contain raw data, graphic functions, full statistics and undiluted biochemistry. Keep away from poebs, squeamish novices and others who may find the joyously technical nature of this prose to be mindbendingly conceptual or socially offensive. Also, because of the complex nature of brewing science, there is no guarantee that you will live longer, brew better or win any awards in the next homebrew competition based upon the conclusions presented here.

couple of different sources like hops and specialty malt. Wood is high in polyphenol content as well, so barrel-aged beers also have a large concentration of polyphenols that add the tannic flavor character to beer. Too many polyphenols in beer will create an astringent character that many people find harsh. Polyphenols are excellent antioxidants and have been purported to be cancer-fighting ingredients. Too bad they are complicit in forming haze.

Polyphenols have numerous hydroxyl (-OH) groups on the perimeter of the giant macromolecules that act as a weak, hydrogen-bonding “hook” that catches onto proteins when the temperature is cool



Above: Tannic acid, a type of polyphenol.
Below: Enzymes can reduce chill haze.

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enough to draw proteins and polyphenols together. Since these hydroxyl groups are all around the macromolecule, they act as connectors between proteins. When the temperature is low enough, they can start a chain reaction, grabbing proteins and forming haze-producing flocs.

Proteins

Proteins are made up of chains of polypeptides, which are in turn made up of amino acids. Proteins typically make their way into beer via base and specialty malt. One interesting amino acid that is the main perpetrator of chill haze is proline. Proline consists of a normal car-

boxylic acid backbone, but has a unique amide ring structure that is stereochemically rigid. This rigidity is important to how proteins form and fold. It also means that specific ring structure juts away from the main protein—creating another hook with that amide group to grab onto the hydroxyl group of polyphenols.

Each proline-rich protein has a great number of these hooks that will join up with polyphenols and zipper other proline-rich proteins together. The amide group will be a hydrogen bond acceptor from the hydroxyl group of polyphenols. This sort of chain reaction will occur

throughout prolonged cold storage, and the flocs will start growing larger and larger until they drop out of solution as congealed proteinaceous goo.

Chill Haze Prevention and Elimination

Pretty much all beer will develop chill haze at some point post-fermentation—especially if the beer was dry-hopped. With this in mind, there are a few steps you can take to either eliminate chill haze or prevent it from forming.

Most homebrewers are familiar with Irish moss or isinglass as clarifying agents. The idea is that these negatively-charged compounds are added during the last part of the boil and attract themselves to the positively charged proteins present in the wort. By clumping together, they will cause the haze-causing proteins to flocculate out as trub. These clarifying agents are tried and true, but sometimes they don't get all of the chill haze-causing proteins out of solution during the boil. Most proline-rich proteins have a reasonably neutral charge.

One way to prevent chill haze is to remove or inactivate the binding sites on proteins or polyphenols so they can't clump together and form chill haze. Enzymes can be used to cleave the proline-rich areas of proteins and thus prevent the ability of the protein to hydrogen bond with polyphenols. Brewers Clarex™ is a proprietary enzyme that hydrolyzes proline from the protein and denatures the proteins enough to prevent chill haze complexing. This enzyme is typically added during knockout since higher temperatures will denature and deactivate the enzyme. This additive isn't the cheapest option, but it's highly effective.

The second point in the brewing process where one can keep chill haze from forming is just after primary fermentation. Stripping out proteins in freshly fermented beer prevents polyphenols from complexing. In order to do this, a molecule has to be introduced to take the place of polyphenols that the proteins would otherwise hook onto. Polyvinylpolypyrrolidone or PVPP is a commonly used polymer compound in beer and wine making that prevents chill haze and is added right after primary fermentation. It's not

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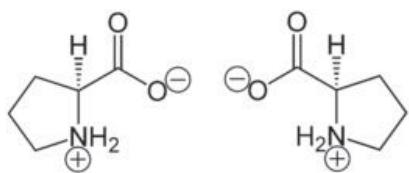
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**They all laughed
when I told them
I make my own beer...**

**until I poured
them a pint.**

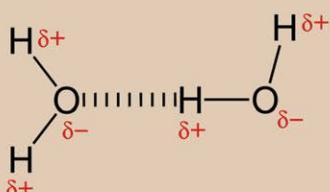
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PROLINE



water-soluble, so it will bind with proteins and then immediately drop out of solution and can be drawn off the bottom of the fermenter. This compound is typically added as slurry to a tank after primary fermentation or post dry hop in order to bind to the proteins present in solution.

A similar method to PVPP that homebrewers use is the addition of gelatin solution to the top of the carboy or fermenter. Gelatin is more indiscriminate than PVPP, and you have to add it after you chill your beer, but the results are usually great. The procedure I use is to add 1-3 teaspoons of flavorless gelatin to 70-80° F (21-27° C)



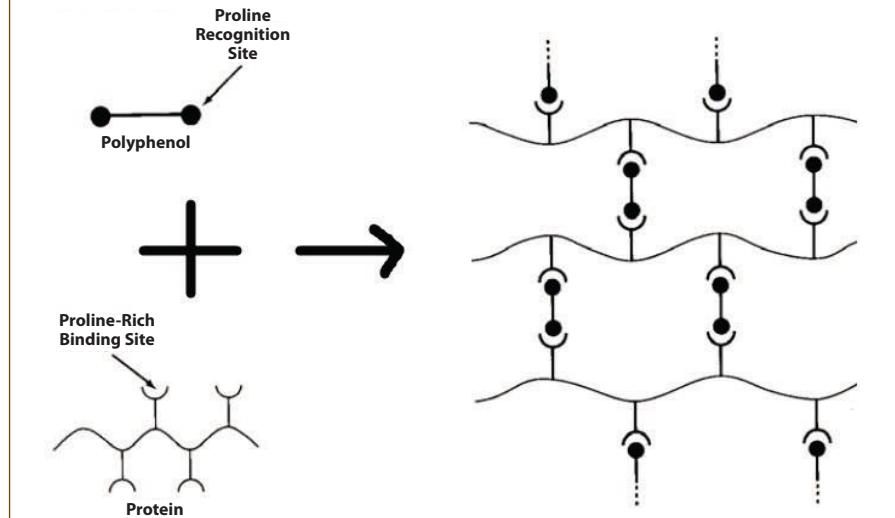
HYDROGEN BONDING

Hydrogen bonds are weak electrochemical attractions between hydrogen and a strong electronegative atom like oxygen or fluorine. It's not really a bond since no electrons are being shared between atoms, but rather a weak dipole-dipole attraction.

The quintessential example of hydrogen bonding in action is plain old water. Hydrogen bonds form between hydrogen and oxygen atoms and create surface tension in liquid form. Ice water is less dense than liquid water because of the crystal formation from hydrogen bonding that occurs when water freezes. Hydrogen bonds are the reason ice floats!

DNA wouldn't work without hydrogen bonding. Base pairs are weakly connected via hydrogen bonding. Guanine (G) is connected to cytosine (C) and adenine (A) and thymine (T) are associated because of these weak intermolecular bonds. They provide enough strength to maintain the alpha helix structure of DNA, but are weak enough to split apart during DNA replication.

SIEBERT'S MODEL



water and let it sit for about 20 minutes. I then swirl the mixture until it's uniform, and then microwave it for 1-2 minutes until the mixture is clear and its temperature is around 180° F (82° C). I then add that mixture to the top of the cold fermenter. The gelatin will start forming a uniform matrix when it cools and will grab onto and hold any chill haze flocs that form. The gelatin will drop out of solution just like PVPP and you can rack the beer off of it.

The final point where most professional brewers try to remove chill haze is during cold filtration. The idea is to intentionally cause chill haze by crashing the temperature of the beer in the fermenter down below 35° F (2° C) for a period of three

days or more. Chill haze will form and these bigger flocs (typically greater than 1 micron) are easier to remove via plate and frame filtration or DE (diatomaceous earth) filtration. Not chilling the beer below 35° F prior to filtration will allow the separate proteins and polyphenols to move right through the filter medium and complex in the bright or finishing tank.

Chill haze is an aesthetic issue, but there's nothing like serving crystal-clear beer to friends or family and having them say, "Wow! This doesn't look like a homebrew!" May all of your beer be bright.

Rick Blankemeier is the quality assurance analyst for Stone Brewing Co. and an avid homebrewer.

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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 beer/wine hybrids were sent to our judges this issue.

First up was Dogfish Head Sixty-One, a blend of 60 Minute IPA and Syrah grape must. It's the first new core beer for the brewery, based in Milton, Del., since 2007.

Beer/wine hybrids are not new for Dogfish Head, which has been experimenting with such offerings as Midas Touch (fresh off a silver medal at the Great American Beer Festival) and Raison D'Etre since the late 1990s, and also offers beers like Red & White (pinot noir grapes) and Noble Rot (Viognier grapes).

“Sixty-One was born from a ritual I have with my summer friends who come to Delaware,” said Dogfish Head founder Sam Calagione. “Memorial Day weekend we would meet up and order a round of 60 Minute pints and a single glass of Cali red wine, take a big sip of our pints, and pour equal portions of red wine in our pints. We liked it so much we did a year of R&D perfecting the bottled recipe.”

Calagione said the brewery found that the Syrah grape must worked best in the citrusy, hop-forward 60 Minute base.

“This is the Dogfish beer I am drinking the most of these days,” said Calagione.

Next up was Allagash Victoria Ale, a Belgian strong ale with crushed Chardonnay grapes added directly to the mash. The beer is part of Allagash’s Tribute Series, in which Allagash donates \$1 from every bottle sold to a designated group, organization, or fund. Money generated from sales of the ale will go to Victoria Mansion, a National Historic Landmark in Portland, Maine. (For more information, go to www.victoriamansion.org.) The 2013 batch, released in June, raised \$11,000.

Allagash founder Rob Tod said that Victoria Ale was inspired by a visit to Victoria Mansion and the numerous visual references to Bacchus, the god of wine, that appear throughout the house. The ale is fermented with wine yeast.

Victoria Ale’s aroma is fruity spice, and the taste presents subtle notes of green banana, black pepper, and fresh-crushed

mint. With a focus on the subtle, wine-like character of the grapes, the 9.0 percent ABV brew boasts a pale copper color, Belgian yeast influence, and a medium body with a long candied fruit finish with hints of honeydew melon, and, of course, white wine grapes.

Victoria’s Ale also has an alter ego, Victor Ale, brewed with over 100 pounds of cabernet franc grapes crushed on site and added to the mash.

ON THE WEB

Dogfish Head Craft Brewery
www.dogfish.com

Allagash Brewing Co.
www.allagash.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)

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.

THE SCORES



Sixty-One—Dogfish Head Craft Brewery, Milton, Del.
BJCP Category: 23 Specialty Beer

THE JUDGES' SCORES FOR DOGFISH HEAD SIXTY-ONE



DAVE HOUSEMAN



BETH ZANGARI



SCOTT BICKHAM



GORDON STRONG

Aroma: Complex aroma of grainy, biscuity malt, earthy/herbal hops, and hints of grapefruit fruitiness. No DMS. No diacetyl. Alcohol perceived at a low level. Fruitness is not specifically grape in nature to me. An inviting aroma. (10/12)

Appearance: Bright clarity. Red hue to the amber color. Thin, rocky, pinkish-white head with long retention. (3/3)

Flavor: Complex malt with a grainy, biscuit character. High, balancing hop bitterness and an earthy, herbal hop aroma. No DMS. No diacetyl. Fruity esters not so much grape-like as slightly vinous with grapefruit and pepper notes. More alcohol evident in flavor than aroma. More complexity than the 60 Minute IPA; still a fruity IPA. Balance more toward hops, esters, and alcohol than underlying malts. Somewhat drier than the classic 60 Minute IPA. (16/20)

Mouthfeel: Medium body and mouthfeel. Frizzy mouthfeel from carbonation. Noticeable alcohol warming, somewhat higher than expected in an IPA alone. (5/5)

Overall Impression: An interesting beer using Syrah grapes. Some malt still shines underneath and, as with any IPA, the hops are prominent. The grapes add a pinkish-red hue to the color and ferment out as a drying, vinous character with noticeable wine-like fruitiness in aroma and flavor. I don't know that I would have identified Syrah grapes without knowing what to look for, but this is a very tasty spin on a classic IPA and would accompany a burger and fries admirably. (7/10)

Total Score: (41/50)

Aroma: Pronounced and significant piney, peppery herbal, and woody hop aromas dominate. A low buttery note emerges on a swirl, with a more wine-like spicy pepper and raisin aroma coming forward. Fermentation is clean; low ale fruitiness. Malt is a toasty background component. (9/12)

Appearance: Reddish, burnished copper colored with brilliant clarity; creamy off-white foam falls to a thick, dense layer and rings the glass. Held to the light, brilliant fuchsia highlights shine. (3/3)

Flavor: Complex hop flavors dominate a toasty malt middle. Firm hop bitterness combines with firm malt backbone, with the flavors changing from spicy, to smoky, then to musky raisins and dried grass. Balance shifts among components—first hop aroma, then malt backbone, then the hop bitterness lingering post finish. (15/20)

Mouthfeel: Medium-full bodied, moderately creamy carbonation texture with low alcohol warmth. A tannic, lightly astringent finish amplifies the herbal hop character, the red grape tannins, and persistent alcohol warmth. Tannins linger on my teeth. (4/5)

Overall Impression: The first sips exhibit more Syrah wine/grape character in the flavor, giving way to an almost exclusively IPA malt and complex hop character. Syrah presents a hint of buttery diacetyl found in some robust reds—a reminder that grape must is present behind the big, brash beer. A good sipper on its own, this beer would also be a perfect accent to an old-fashioned beef pot roast with potatoes and carrots. (8/10)

Total Score: (39/50)

Aroma: Moderately high earthy aroma, with an autumn leaf character and notes of cranberries and raspberries. The hop character manifests as moderate grassy and grapefruit notes with a slight catty character that recalls tomato plants. Light peppery and spicy notes underneath are likely from the Syrah must. Malt is subtle with some light biscuit and caramel notes. (9/12)

Appearance: Beautiful burgundy color, with pristine clarity. White head with tightly beaded bubbles and very good retention. (3/3)

Flavor: Good malt support underneath, with light caramel notes but nothing too prominent—enough to provide some support for the flavors that follow. Fruit character is moderately high, with Syrah grapes, boysenberry, and a little plum. The hops lend a low to moderate citrus character and earthy notes that transition to a moderately bitter finish. Hop profile is pronounced but is softer than many IPAs and does not overpower the fruit. (16/20)

Mouthfeel: Moderate carbonation and body with some residual sugars that linger on the lips. Some tannins lend a slight mouth-puckering character just after the beer is swallowed. Moderate alcoholic warmth is appropriate for the IPA style. (4/5)

Overall Impression: A very interesting beer that was enjoyable to taste. The Syrah character could have conflicted with the hops, but the earthy components complement and even enhance each other. A little smoother finish would improve the drinkability. (8/10)

Total Score: (40/50)

Aroma: Strong aroma of fresh hops, caramelly malt, and fruit. The hops give a grassy, citrusy, green character. The malt adds sweetness and a honey-like note. The esters are apples and pears with citrus accents. Not much overtly associated with grapes. Clean. Enticing. The caramel character grows as it warms. (9/12)

Appearance: Beautiful pinkish-orange color, like a blush wine. Crystal clear. Tall pinkish-white head; frothy, persistent. (3/3)

Flavor: Grape/wine flavor blended with citrusy, herbal hops and a medium-light caramel sweetness. Medium-high hop bitterness with a dry finish accentuated by tannin. Balanced aftertaste with hops, grape, and malt all evident. Clean fermentation. The wine-like aftertaste is incredible; it works very well. Just a touch on the sweet side. (15/20)

Mouthfeel: High carbonation. Medium body. Moderate tannin astringency, like in a red wine. Moderately warming. (4/5)

Overall Impression: Super refreshing with the high carbonation and dry finish. Has almost a wine cooler flavor but not in a bad way. The caramel sweetness is on the high side and detracts from the overall balance, but the flavor combination is superb. The tannin accentuates the hop bitterness, giving it a drier, slightly harsh finish that helps offset the sweetness. Still, for an IPA, I'd like less of that sweetness in the way of the hops. (8/10)

Total Score: (39/50)



THE JUDGES' SCORES FOR ALLAGASH VICTORIA ALE



Aroma: Very light Pils-like malt nose. Very light spicy hop aroma. Alcohol is evident. No diacetyl. Light clove-like phenols. Very low sulphur/DMS-like aroma. Low fruity esters from fermentation or addition of grapes. Almost lager-like, clean aroma with enough esters to identify as an ale. (9/12)

Appearance: High carbonation. Golden yellow color. Bright clarity. Dense, thick, white, long-lasting head. Beautiful beer. (3/3)

Flavor: Clean, Pils-like malt up front with supporting and balancing hop bitterness. Very low spicy hop flavor. Alcohol is quite evident. Very low corn-like DMS notes add to overall complexity. Moderate clove phenols also add to complexity (Belgian yeast?). No diacetyl. Low to medium fruity esters but I don't associate these with grapes. Not vinous. Balanced malt sweetness, hop bitterness, and alcohol. Finishes balanced with some malt sweetness but then dries out with the alcohol and hops. (16/20)

Mouthfeel: Medium to medium-full body. Creamy, smooth mouthfeel. High carbonation lightens the mouthfeel. Good deal of alcohol warming. Lingering bitterness; no astringency. (5/5)

Overall Impression: Very drinkable. Complex malt, hops, clove, alcohol, and fruity esters. This beer could pass for a Belgian golden strong ale or tripel. The white grape character is lost to me in all the other flavors and aromas. However, the grapes have given the beer a lighter body for a big beer, much like adding candi sugar to a tripel. Great beer to have with a fish or shellfish dinner. (8/10)

Total Score: (41/50)



Aroma: Graham cracker Pils malt-like aromas dominate initial impression, with Chardonnay wine grape character following closely. No hop aroma. A low spicy, black pepper note blends with pears, grapes, and green melon. Lots of candy sugary character comes forward as the sample sits. (9/12)

Appearance: Burnished golden colored with brilliant clarity; a frothy white foam forms a thick, though not persistent, head. Foam falls to a thin layer on the surface of the beer, and rings the glass with a loose lacing on the sides. (3/3)

Flavor: Full, complex sweet graham maltiness hits the tongue first, followed by a crisp Chardonnay wine-like note as a background note. No hop flavor is present, but a moderately strong hop bitterness emerges mid-palate, balancing the overall, almost candy-like sweetness, along with notes of banana. From the first impression to the white pepper post finish, the wine grape component comes through almost like an afterthought, though a persistent one. (16/20)

Mouthfeel: Medium bodied with an at-first creamy, then spritzy, carbonation, perhaps an amplified effect of tangy grape acidity and tannins with a carbonic bite. Alcohol warming tickles the tongue, and lingers at the finish and post finish. (5/5)

Overall Impression: The dominant impression from this beer is of a well-crafted golden strong, lovingly coupled with a hearty, fruity white wine. The beer begs for a cheese plate, with ripe pears and melon, hard cheeses, and almonds. (8/10)

Total Score: (41/50)



Aroma: Bready and biscuit malt notes at the forefront followed by light to moderate tropical fruit esters reminiscent of banana and pineapple. I pick up some green pepper and black peppercorn notes, with a faint clove-like spiciness. Alcohol is apparent but is clean without any harsh, solvent character. (10/12)

Appearance: Straw color with light yeast haze. The head forms nicely and lasts a surprisingly long time, forming a creamy white head that leaves lace on the sides of the glass as it dissipates. (3/3)

Flavor: Very well-balanced with initial soft bready malt notes, moderate yeast and grape esters in the middle, and a modest hop bitterness that is just enough to dry out the finish. The malt components include light biscuit and caramel, while the esters are tropical in nature with pineapple, a little banana, and some citrus. A bit of sharpness with some green pepper character adds complexity and brightness. The finish is soft with low to moderate lingering alcohol. (17/20)

Mouthfeel: Carbonation is moderately high. A lingering astringency, perhaps from tannins extracted from the grape skins, gives a little harshness that is not unpleasant. Moderate alcoholic warmth is pleasant and not hot. (3/5)

Overall Impression: The grapes add some subtle notes that complement the Belgian yeast character, and a really nice malt backbone underneath supports without stealing the show. The conditioning and carbonation really pull everything together, making this a memorable tasting experience. (9/10)

Total Score: (42/50)



Aroma: Fresh hoppy nose, spicy-herbal-floral. Has a fresh dry hop aroma. Subtle alcohol, neutral grain character. Very light white grape esters, blends well with the yeast and hops. Malt is unobtrusive. Very clean. (10/12)

Appearance: Attractive golden color. Crystal clear. Moderate-sized off-white head, moderately persistent. (3/3)

Flavor: Bready-rich malt, like a big maibock with a hoppy-bitter finish. Medium bitterness. Herbal-spicy hop flavor accentuated by the malt. White grape ester blends in seamlessly. Honey-like malt flavor. Dry finish with a hoppy-bitter, estery-malty aftertaste. (17/20)

Mouthfeel: High carbonation. Medium-full body. Rich, creamy mouthfeel. Some tannin astringency. Warming alcohol, not hot. (4/5)

Overall Impression: Extremely well-integrated beer. Very enjoyable to drink. High carbonation lightens the body. Hoppy bitterness character blends perfectly with the malt. The grape is subtle but fits in well; it adds a light estery note that I otherwise would have assumed came from the yeast. Very well balanced. Could use more grape/wine character. Has a Belgian-like feel, not like a tripel or golden strong ale, but more like a hoppy Stille Nacht with that honey character. I'd like to know more about this beer; the description doesn't do it justice. (9/10)

Total Score: (43/50)



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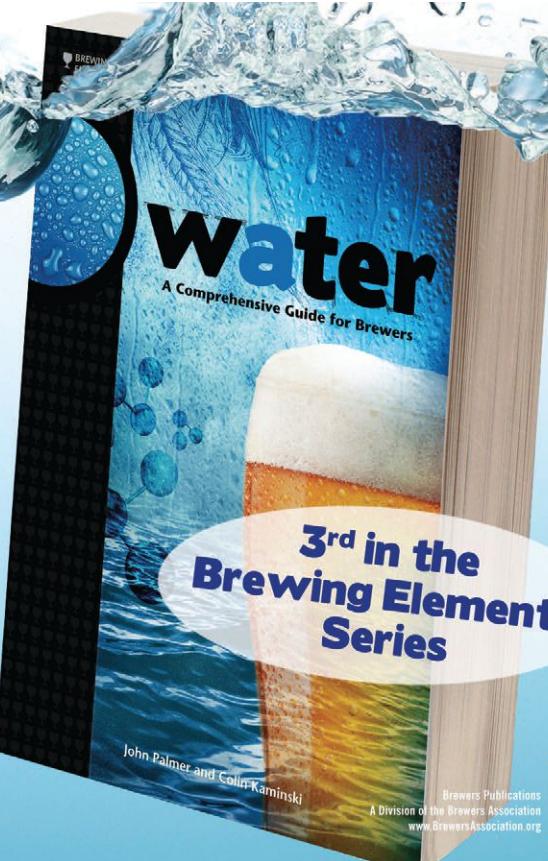


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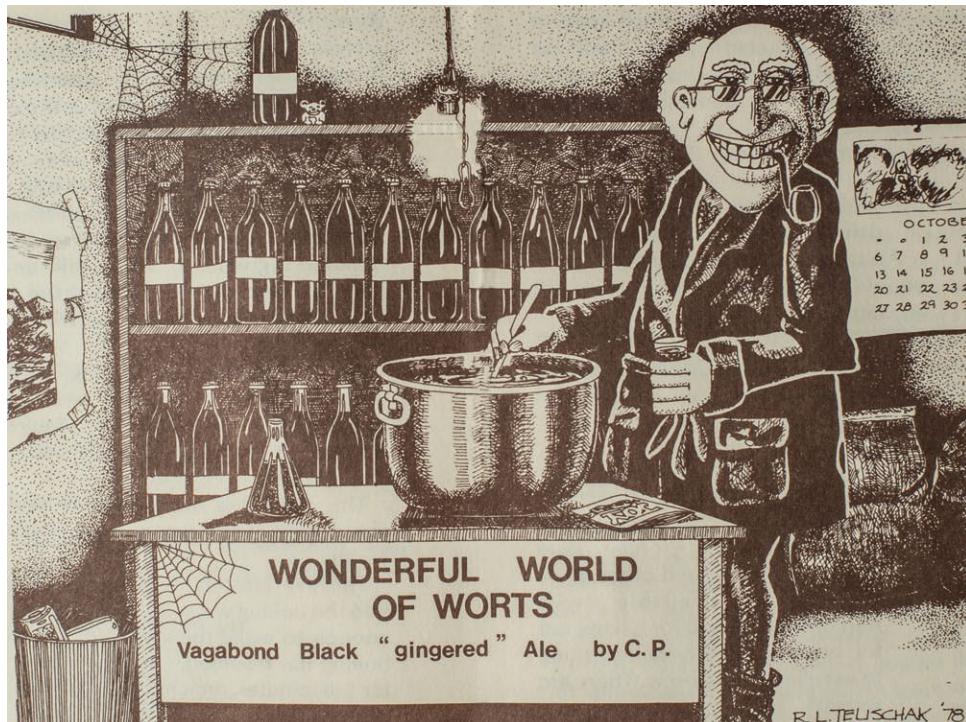
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by Charlie Papazian



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In the story, I hype my original self-published 1976 book, *The Joy of Brewing*, a 40-page basic how-to publication I sold for \$2.50. Now the fourth edition of *The Complete Joy of Homebrewing* (not including the first two self-published editions) and the second edition of *Homebrewers Companion* are set to be released March 2014 with a foundation of 1.3 million copies in print and hundreds of millions of batches of homebrew down the good hatch. We have distanced ourselves from the days when the legacy of homebrew was Prohibition-style, bathtub-brewed

It all began with the first issue of *Zymurgy*. Volume 1, Number 1 hit the homebrew scene on December 7, 1978. Thirty five years ago, this "World of Worts" column featured a recipe for a specialty beer that certainly was, at the time, on the fringe of credibility. Vagabond Black "gingered" Ale helped set the tone that has represented the innovative spirit of homebrewing, now for more than 35 zymurgic years. Note: The column was then called "Wonderful World of Worts," a play on the then-popular ABC network show, "Wide World of Sports."

The first-ever Worts begins, "Direct to you from basements, kitchens, sheds and cellars from all over the free and not so free world... In this column, we'll bring to members of the American Homebrewers

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Vagabond Black Gingered Ale ALL GRAIN RECIPE

INGREDIENTS

for 5 U.S. gallons (19 L)

8.25 lb	(3.7 kg) pale malt
0.75 lb	(340 g) 8-15° L crystal malt
0.5 lb	(226 g) chocolate malt
1.5 oz	(42 g) Cascade hops
	5.5% a.a. (8.3 HBU/232 MBU) 60 min
1.0 oz	(28 g) Australian Galaxy or New Zealand Nelson Sauvin hop pellets (dry hop)
8.0 oz	(226 g) freshly grated ginger root (5 min)
0.25 tsp	(1.25 g) powdered Irish moss (10 min)
0.75 cup	American ale-type yeast (175 ml) corn sugar

Target Original Gravity: 1.052 (13 B)

Target Extraction Efficiency: 78%

Approximate Final Gravity: 1.014 (3.5 B)

IBUs: about 32

Approximate Color: 16 SRM (32 EBC)

Alcohol: 5% by volume

DIRECTIONS

A step infusion mash is employed to mash the grains. Add 9.5 quarts (9 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 4.75 quarts (4.5 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

exploding bottles of beer. We've established a legacy of quality and this is the age we live in now.

In 1978, I began the first recipe with, "Let's cut the shuck and jive and get on with a recipe." That recipe for Vagabond Black "gingered" Ale was for 7 gallons as such:

For starters, invite some friends over. Then . . . Boil for 1-2 hours in an enameled or stainless steel 4-5 gallon pot:

- 2 gallons of water
- 7 lbs. (2 cans) Munton & Fison dark plain barley malt extract

gallons (13.25 liters) of 170° F (77° C) water. Collect about 5.5 gallons (21 liters) of runoff. Add 60-minute hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes. When 10 minutes remain add the Irish moss. When 5 minutes remain, add the freshly grated ginger. 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.

Pitch the yeast when temperature of wort is about 70° F (21° C). Ferment at about 70° F (21° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the hop pellets for dry hopping. If you have the capability "cellar" the beer at about 55° F (12.5° C) for about one week. Prime with sugar and bottle or keg when complete.

Relax. Don't worry. Have a homebrew, natch.

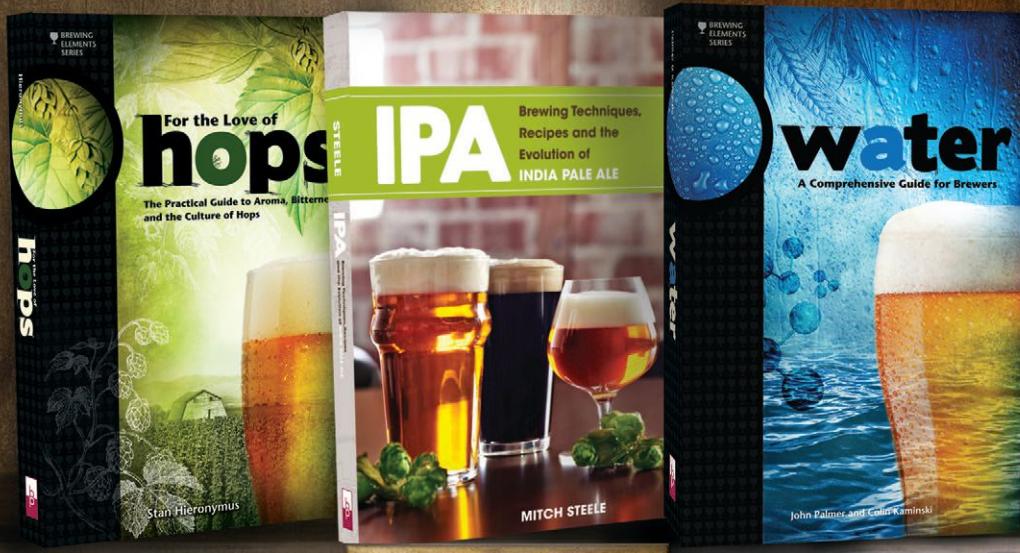
EXTRACT VERSION

Substitute 6.5 lb (2.95 kg) pale malt extract syrup for the pale malt. Steep remaining specialty grains in 160° F (71° C) water for 30 minutes. Drain, rinse grains, dissolve extract completely and proceed with boil.

- 1 lb. Crystal Malt (in grain form—must be cracked, easily done with rolling pin)
- 2 oz. good brewing Hops
- 1/3 lb. Black Patent Malt (grain form—must be cracked) no sugar content—aids flavor and dark color
- 2 teas. gypsum—a mineral found naturally in many water sources—produces "hard water"—aids in clarification, taste and yeast environment.
- 1 teas. pure salt (sea salt or pickling salt)
- 1 1/2 lbs. Corn Sugar (dextrose/invert sugar)—a less expensive form of fermentable sugar than barley malt—Do Not Use Cane Sugar



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Zymurgy (ISSN 0196-5921, USPS 018-212) is published bi-monthly by the American Homebrewers Association, a division of the Brewers Association, with headquarters at 736 Pearl Street; Boulder, Colorado 80302. The Editor is Jill Redding with address same as above. The annual subscription price is \$35.00 and \$43.00 with a membership to the American Homebrewers Association. The publication is wholly owned by the Brewers Association, a not-for-profit corporation. The purpose, function and not-for-profit status has not changed during the preceding twelve months, and the average number of copies of each issue during the preceding twelve and the actual number of copies published nearest to the filing date (September/October 2013 issue) are noted below.

This information taken from PS Form 3526, signed by Stephanie Martin, Graphics/Production Director, and filed with the United States Postal Service in Boulder, Colorado.

Item No. from PS Form 3526	Extent and Nature of Circulation	Avg No. Copies each Issue in past 12 months	Actual No. Copies Of Single Issue Publishing Nearest to Filing Date
a.	Total No. Copies (Net Press Run)	41,253	44,544
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	(4) Other Classes Mailed Through USPS	1,021	1,112
c.	Total Paid and/or Requested Circulation (Sum of b)	37,280	40,525
d.	Distribution by Mail (Samples, Complimentary and other free)		
	(1) Outside-country as stated on Form 3541	1,033	1,087
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	(3) Other classes mailed through USPS	20	22
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e.	Total Free Distribution (Sum of d)	1,161	1,379
f.	Total Distribution (Sum of c & e)	38,441	41,904
g.	Copies Not Distributed	2,812	2,640
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- 7 oz. grated fresh Gingerroot—Available at many supermarkets and oriental food outlets—do not use powdered ginger from spice cans. If chunked dried ginger is used, use only 3 1/2 oz. after coarsely grinding.

While this wort is boiling at a gently rolling boil in a covered pot, clean one plastic (garbage) pail suitable for the brewing of 7 gallons of ale. This will be where primary fermentation occurs. Next, have a beer. Get relaxed. After this concentrated wort has boiled for two hours, turn the heat source off and allow the wort to cool for 1/2 hour. Have another beer. . . .

**IT'S WORTH NOTING
THAT THE PROCEDURES
INCLUDED INSTRUCTIONS
ON HOW TO ADD
“FINISHING HOPS,”
INDICATING THAT THIS
CONCEPT WAS ALIVE
AND WELL AMONGST
HOMEBREWERS IN 1978!**

The procedures continue with the best wisdom available at the time. It's worth noting that the procedures included instructions on how to add "finishing hops," indicating that this concept was alive and well amongst homebrewers in 1978! The recipe ends with these words of advice:

While in storage, you may become somewhat depressed at the sight of all that ale just sitting there not ready to drink. Do not lament. Keep yourself busy. Chop wood, cook an extravagant dinner, BAKE PIES, fix your automobile, jog. If you begin to foam at the mouth and drool, get a bib. But DON'T WORRY!

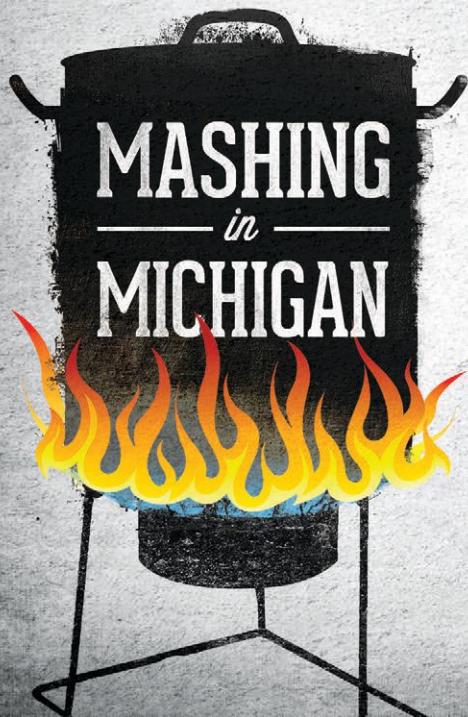
OK, looking back I admit it may have been the best wisdom I could muster at the time, but did I really have to include 1 teaspoon of salt in the recipe? Still, I recall the beer was fantastic and salt may merit your personal experimentation.

So for the 35th consecutive year, let's cut the shuck and jive and get on with the recipe. Here's a 2013 revamped all-grain recipe for a Vagabond Black Gingered Ale.

**Charlie Papazian is founder of the
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Brewing for Old-Timers



Ah, the auspicious moments in a man's life: hitting double-digit years means you're a big boy now; getting to 16 means getting a driver's license; turning 21 means your first (legal) beer, hopefully a craft brew; and hitting 40 means you've attained a level of maturity not possible at a younger age. (I'm still eagerly awaiting that last one.)

On the other hand, some milestones are approached with trepidation, like the big one directly following middle-age maturity. No, not the deluge of mailings you get from AARP at 50; strangely enough, now that I'm actually retired, not even a penny postcard. I mean the other big milestone: I'm a half step, maybe less, from becoming an old-timer.

An increasing number of things just aren't as easy as they used to be: bending over

to tie my shoes, getting out of an easy chair without grunting noises, and, most importantly, brewing batches of my delicious homebrew (or not-so-delicious, as the case may be).

I've already made some compromises and sooner or later, I'll be making more. Recently I've spent a lot of time thinking, and once the headache passed I came up with a few ideas on how to make homebrewing easier with wobbly knees, a stiffening back, and a wandering mind.

Where was I? Oh yeah, you can brew less often. When I got hijacked by the recession I reduced the frequency of my brewing to cut back on unnecessary (?) expenses. This also saved me a lot of effort and energy, two things that are harder to come by with every birthday.

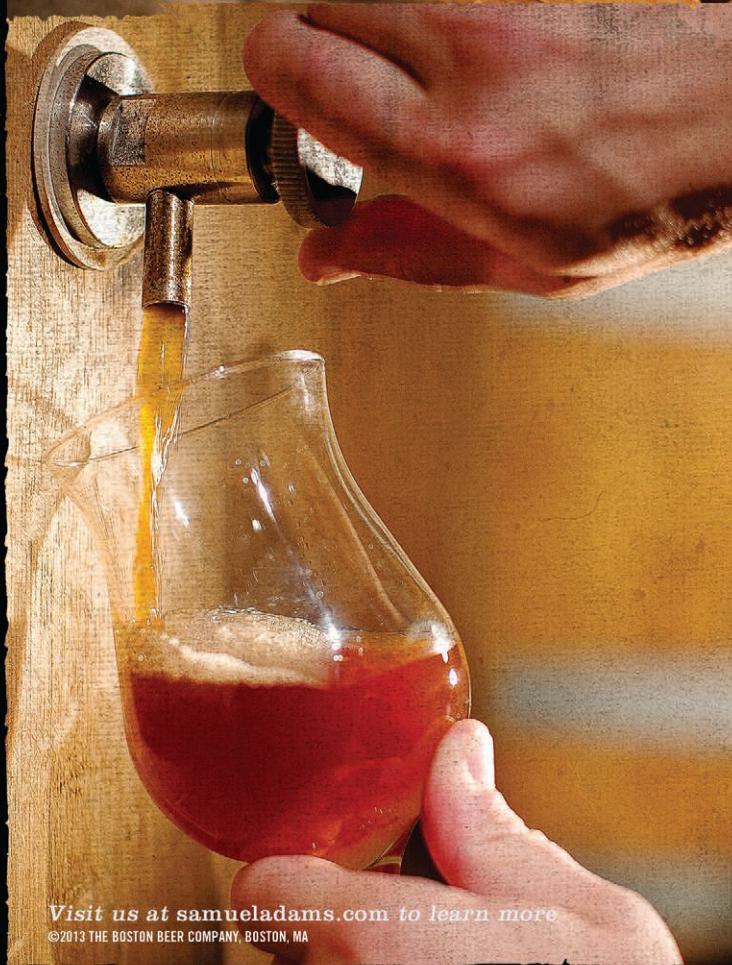
I'm not a big drinker, but I do like variety; switching to 3-gallon batches covered both requirements with the benefit of less weight to hoist. And I've started taking shortcuts that don't compromise the quality of my beer. My hand-cranked grain mill is packed away and I started getting my grains milled at my local homebrew store. Two blocks from my house, I can catch a bus that drops me off across the street from Bader Homebrew Supply in Vancouver less than 20 minutes later. By brewing 3-gallon batches, I can fit all the ingredients I need in a backpack.

The more I simplify my recipes, the easier they are to remember. I always take detailed notes...unless I forget. Switching back to extracts is a possibility; I mostly use dry yeasts, and while a 2-quart starter isn't a heavy lift, it does take up time. Additional time savings can be had by shorter mashes and boils. The older I get, the less time I have to spend waiting for beer to finish.

I now siphon from kettle to carboy (plastic = lighter) instead of manhandling it and slowly pouring the wort through a funnel. During my last bottling session, I raised the bottling bucket up so I could keep my back straight. I also lined up the bottling wand with a countertop so I wouldn't have to hold each bottle as it filled.

Of course, the most important thing for brewers of any age to remember is relax, don't worry, have a homebrew.

Steve Ruch lives in Vancouver, Wash., with his wife, daughter, son-in-law, and the four most beautiful grandkids in the world. He has been homebrewing for 15 years.



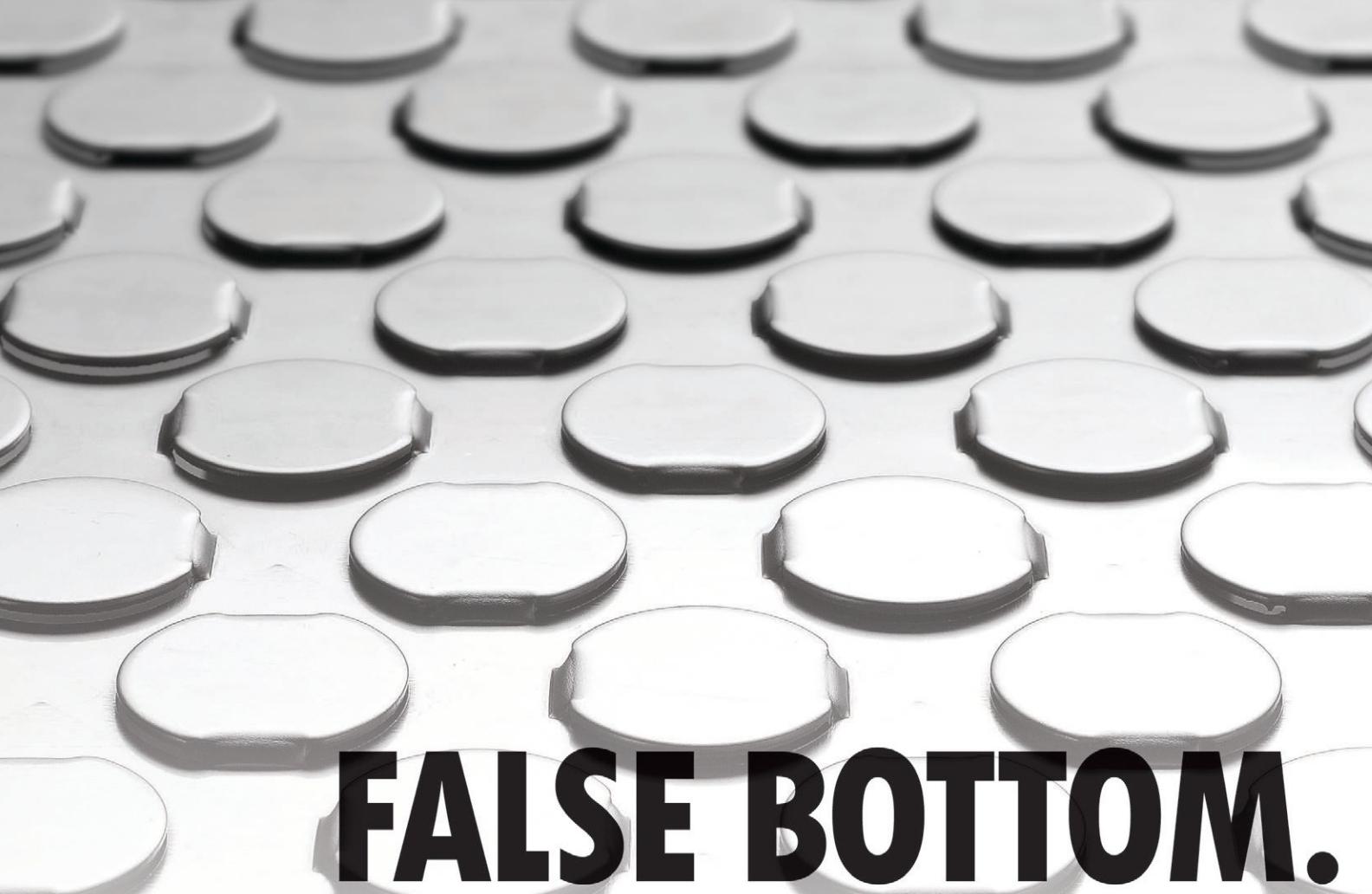
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