BELGIAN BREWING SECRETS: EXPERT TIPS ON YEAST, FERMENTATION AND MORE

BrewYour Own®

JULY-AUGUST 2006, VOL.12, NO.4

THE HOW-TO HOME

FORECAST: MOSTLY CLOUDY!

brew a tasty **HEFEWEIZEN** for summer

yeast al fresco: build an **OPEN FERMENTER**

LABEL CONTEST **WINNERS!**

the **RIGHT FOOD MATCH** for your **HOMEBREW**

PLUS: Make your own Dampfbier already!

www.byo.com
U.S. $4.99 • CAN. $6.99

$4.99US $6.99CAN

0 74 70 02485 9 08

Brew with
style
Muntons
To brew the world's most celebrated beerstyles you need quality ingredients you can trust. And when it comes to quality ingredients, you can't buy better than Muntons.
English maltsters Muntons produce a range of specialist kits and brewer's malts to help you make authentic, stylish beers and ales of distinction. Use a kit for ease and speed or select a Muntons grain malt for the ultimate personal touch.
Remember, whatever beerstyle and method you choose, there's always a Muntons product to suit your needs.
Experience all the taste and style of the world's finest beers. Ask your homebrew store about Muntons.
Muntons pilsner • bitter • lager • stout • ipa • kits • improvers • malts • and more...
Muntons homebrew products are made in England.
For more information contact: Muntons plc, Cedars Maltings, Stowmarket, Suffolk England IP14 2AG. 0044 14 49 61 83 00
www.muntons.com

Brew Your Own
THE HOW-TO HOMEBREW BEER MAGAZINE

BeerTrips.com

Brew Your Own Magazine
& BeerTrips.com
have teamed up to offer the
ultimate beer travel experience:

Brew Your Own BeerTrips!

BYO is taking Homebrewers on the Road!

Pick your favorite style, and see how it's brewed in the place it was born!
2 great trips to choose from in 2006! Each with special homebrewer events, brewery visits, beer meals, city tours, beer festivals, travel on the Beer Bus, and an all around good time.

Fine Farmhouse Ales, Saisons & Trappist Tripels

Homebrewer's Best of Belgium
September 21 - October 1
$2495, $565

Fresh Kolsch in Cologne; & 10 other styles in 3 countries and 4 cities

ABCD's of Beer: Amsterdam, Brussels, Cologne & Dusseldorf
November 9 - 19
$2445, $505

Visit www.beertrips.com/byo for complete details

These trips are offered in conjunction with and operated by BeerTrips.com.
PO Box 7892 Missoula, Montana, USA 59807 (406) 531 9109

Great Trips... Made Better with Beer, since 1999

JULY-AUGUST 2006
Volume 12 Number 4

Brew Your Own

THE HOW-TO HOMEBREW BEER MAGAZINE

Departments

5 Mail
Where to find invert sugar, what is chalk and Ancho versus Poblano peppers — "it's a dried heat." **Plus:** a question about quantities.

7 Contributors
A real beer (or Realbeer) guy, an author hits 50 and our editor reaches 75 (articles, not beers).

8 Homebrew Nation
A huge stout from Kentucky and a beer bubbler from Michigan. And, we show you how to keep it cool this summer. **Plus:** the Replicator clones Sea Dog's Blue Paw Wheat Ale

13 Tips from the Pros
Randy Thiel (Ommegang), Rob Tod (Allagash) and Steven Pauwels (Boulevard) discuss brewing the Belgian way.

15 Mr. Wizard
The Wiz helps a reader put the "I" in his IBUs, discusses bubbles from Beano and answers an out-of-this-world question.

19 Style Profile
You can't get it in North America, so why not brew it? Get the downlow on Dampfbier, Germany's steam beer.

48 Techniques
More on making the most of your mashes. **Plus:** a fine (decimal) point about extraction efficiency

51 Projects
Buckets and carboys are the most common homebrew fermenters. For those open to experimentation, however, we present our open fermenter project, in which we prove that it's hip to be square.

55 Advanced Brewing
To brew like a Belgian, you sometimes need to break the (English and German) rules. Learn the basic techniques for brewing Belgian-style beers.

59 Brewer's Log
An infrared thermometer and a new book for beginners.

64 Last Call
A self-described "schmo" goes pro — would you take the plunge if you had a chance?

COVER PHOTO:
CHARLES A. PARKER/IMAGES PLUS

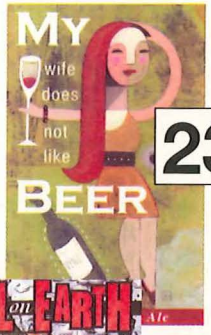
Features

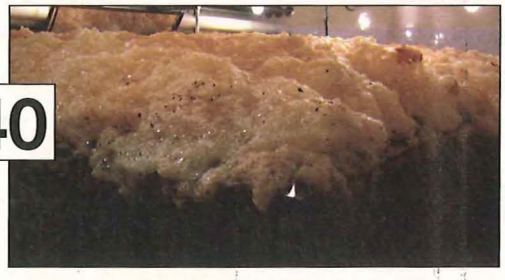
23 BYO's 2006 Label Contest Winners
You can't judge a book by its cover, but once a year we judge some beers by their labels. The winners of our 11th annual contest show us that sometimes, it is what's on the outside that counts.

28 Food and Beer Pairing *by Kristin Grant*
Food comes in a wide variety of flavors. Beer comes in a wide variety of flavors. And, if you pair them correctly, the whole is greater than the sum of its parts. From our interview with Garrett Oliver — Brewmaster of the Brooklyn Brewery and author of the book "The Brewmaster's Table" — learn how to analyze the flavors in food and beer to make a harmonious pairing.

34 Weissbier *by Horst Dornbusch*
Germany is the land of lagers, but in Bavaria an ale is king. With the help of Herr Hans-Peter Drexler — Brewmaster and Technical Manager of Private Weissbierbrauerei Georg Schneider & Sohn GmbHA — we'll show you how to brew this wheat ale, including how to capture its signature phenolic character. **Plus:** a weissbier recipe inspired by Schneider Weisse Original and a recreation of Thomas Jerfferson's colonial wheat beer.

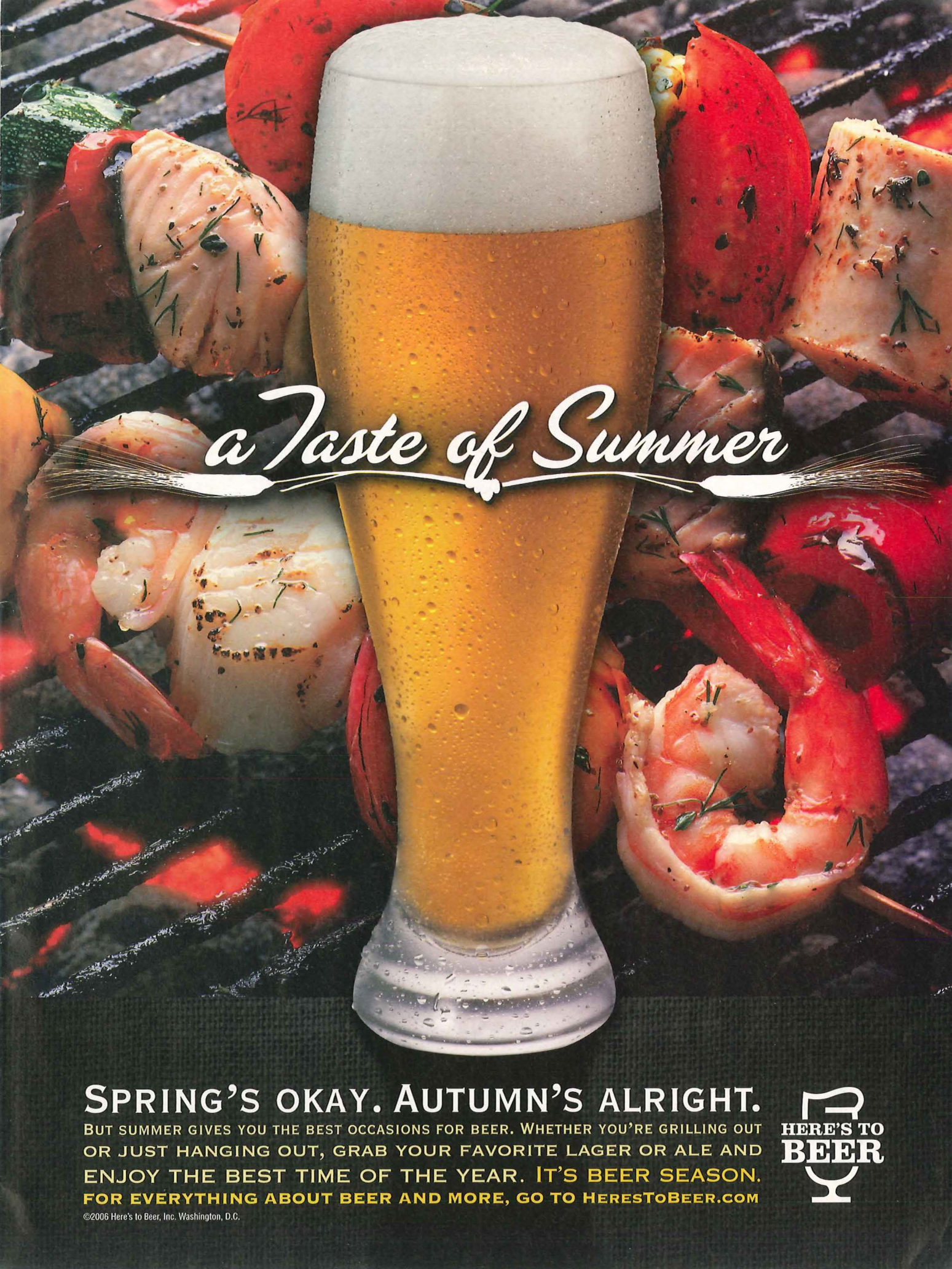
40 Fermenting Belgian-Style Beers *by Stan Hieronymus*
Belgian yeasts *are* different than other ale yeasts and the author of "Brew Like a Monk" teaches us how to tame these wild beasts and brew heavenly Belgian-inspired beers at home.





Where to find it

6 Recipe Index
58 Reader Service
59 Classifieds & Brewer's Marketplace
60 Homebrew Directory



SPRING'S OKAY. AUTUMN'S ALRIGHT.

BUT SUMMER GIVES YOU THE BEST OCCASIONS FOR BEER. WHETHER YOU'RE GRILLING OUT OR JUST HANGING OUT, GRAB YOUR FAVORITE LAGER OR ALE AND ENJOY THE BEST TIME OF THE YEAR. IT'S BEER SEASON.

FOR EVERYTHING ABOUT BEER AND MORE, GO TO HERESTOBEER.COM

HERE'S TO BEER

©2006 Here's to Beer, Inc. Washington, D.C.

VISIT
the online home of Brew Your Own!

byo.com

- ✔ **Online Guides to:**
  - **Hops**
  - **Yeast Strains**
  - **Grains and Other Ingredients**
  - **Retailers**
- ✔ **Question of the Week with Mr. Wizard**
- ✔ **Recipe of the Week from the BYO Archives**
- ✔ **Complete BYO Story Index**
- ✔ **Search the BYO Database**
- ✔ **Label Contest Gallery**
- ✔ **Downloadable Brewing Spreadsheet**
- ✔ **Learn How to Brew**
- ✔ **Online Subscription Services for:**
  - **Trial Issues**
  - **Renewals**
  - **Gift Subscriptions**
  - **Change of Address**
  - **Account Questions**

Brew Your Own

THE HOW-TO HOMEBREW BEER MAGAZINE

EDITOR
Chris Colby

ART DIRECTOR
Coleen Jewett Heingartner

ASSOCIATE EDITOR
Garrett Heaney

TECHNICAL EDITOR
Ashton Lewis

EDITORIAL INTERNS
Michael Parker, Andrew Boyer

CONTRIBUTING WRITERS
Steve Bader, Thom Cannell, Horst Dornbusch, Bill Pierce, Marc Martin, Terry Foster, Glenn BurnSilver, Kristin Grant, Paul Zocco

CONTRIBUTING ARTISTS
Don Martin, Ian Mackenzie, Shawn Turner, Jim Woodward

CONTRIBUTING PHOTOGRAPHER
Charles A. Parker

CANINE ASSISTANT
Heidi

PUBLISHER
Brad Ring

ASSOCIATE PUBLISHER & ADVERTISING DIRECTOR
Kiev Rattee

ADVERTISING SALES COORDINATOR
John Ragozzine

BOOKKEEPER
Jim Moulton

NEWSSTAND DIRECTOR
Carl Kopf

EDITORIAL REVIEW BOARD
Matt Cole • Rocky River (Ohio) Brewing Co.
Horst Dornbusch • Beer Author
Mark Garetz • Homebrew Consultant
Chris Graham • Beer, Beer and More Beer
Craig Hartinger • Merchant du Vin
Anita Johnson • Great Fermentations (IN)
Marlon Lang • Homebrew Consultant
John Maier • Rogue Ales
Paul Manzo • Homebrew Consultant
Kirby Nelson • Capital Brewing Co.
Greg Noonan • Vermont Pub & Brewery
Ralph Olson • Hopunion USA Inc.
Mark Szamatulski • Maltose Express
Tess Szamatulski • Maltose Express
John Weerts • Homebrew Consultant
Chris White • White Labs
Anne Whyte • Vermont Homebrew Supply

How to reach us

Editorial and Advertising Office
Brew Your Own
5053 Main Street, Suite A
Manchester Center, VT 05255

Tel: (802) 362-3981
Fax: (802) 362-2377
E-Mail: BYO@byo.com

Advertising Contact
Kiev Rattee
kiev@byo.com

Editorial Contact
Chris Colby
chris@byo.com

Subscriptions Only
Brew Your Own
P.O. Box 469121
Escondido, CA 92046

Tel: (800) 900-7594
M-F 8:30-5:00 PST
E-mail: byo@pcspublink.com
Fax: (760) 738-4805

Special Subscription Offer
8 issues for $24.95

Web Site
www.byo.com

Brew Your Own (ISSN 1081-826X) is published monthly except February, April, June and August for $24.95 per year by Battenkill Communications, 5053 Main Street, Suite A, Manchester Center, VT 05255; tel: (802) 362-3981; fax: (802) 362-2377; e-mail: BYO@byo.com. Periodicals postage rate paid at Manchester Center, VT and additional mailing offices. Canada Post International Publications Mail Agreement No. 40025970. Return undeliverable Canadian addresses to Express Messenger International, P.O. Box 25058, London BC, Ontario, Canada N6C6A8. POSTMASTER: Send address changes to *Brew Your Own,* P.O. Box 469121, Escondido, CA 92046-9121. Customer Service: For subscription orders call 1-800-900-7594. For subscription inquiries or address changes, write *Brew Your Own,* P.O. Box 469121, Escondido, CA 92046-9121. Tel: (800) 900-7594. Fax: (760) 738-4805. Foreign and Canadian orders must be payable in U.S. dollars plus postage. The subscription rate to Canada and Mexico is $30; for all other countries the subscription rate is $40.

All contents of *Brew Your Own* are Copyright © 2006 by Battenkill Communications, unless otherwise noted. Brew Your Own is a registered trademark owned by Battenkill Communications, a Vermont corporation. Unsolicited manuscripts will not be returned, and no responsibility can be assumed for such material. All "Letters to the Editor" should be sent to the editor at the Vermont office address. All rights in letters sent to *Brew Your Own* will be treated as unconditionally assigned for publication and copyright purposes and subject to *Brew Your Own's* unrestricted right to edit. Although all reasonable attempts are made to ensure accuracy, the publisher does not assume any liability for errors or omissions anywhere in the publication.

All rights reserved. Reproduction in part or in whole without written permission is strictly prohibited. Printed in the United States of America. Volume 12, Number 4: July-August 2006.

Turning the Net Upside Down in Search of Invert Sugar

I read through the "British Clones" article in my May-June 2006 issue of *BYO*. I want to make the Young's Double Chocolate stout recipe. My only problem is with the invert sugar. I cannot find it anywhere. Is there a certain place out there in the vastness of the world wide web that I cannot conjure up on Google? Is there a substitute I can use that is a bit more readily available at the local supermarket?

I know through my study of "The New Complete Joy of Home Brewing" that honey is a form of invert sugar, but it contains traces of sucrose and maltose. Could honey be my missing link?

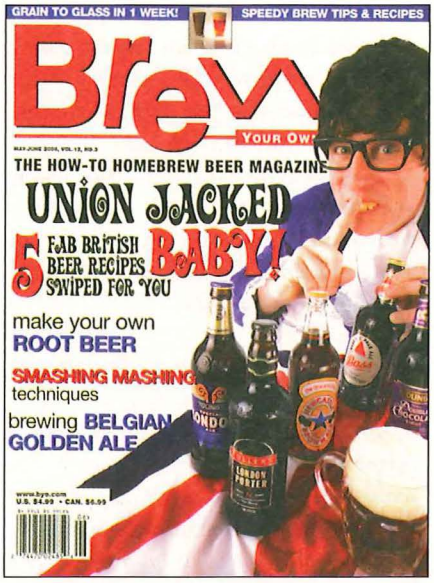
James Hoshauer
Taylorville, Illinois

Invert sugar is sucrose (table sugar) that has been treated with the enzyme invertase or an acid. The treatment splits the sucrose into its component parts, glucose and fructose. The term "invert sugar" is used because, when a beam of polarized light is passed through a sucrose solution, the light gets rotated to the right. When sucrose is "inverted," the direction of the rotation shifts to the left.

When a homebrew recipe calls for invert sugar, you can use Lyle's Golden Syrup, which is invert sugar blended with sucrose. It is available at many homebrew shops. Alternatively, you can make your own invert sugar by heating a thick sucrose solution with a small amount of citric acid for 20 minutes. (Add acid at the rate of 1 g acid per kilogram of sugar — a small "pinch" per pound. This is not enough to make the sugar solution sour or tart.) Heat this mixture for about 20 minutes and the sugar should invert. (Commercial producers of invert sugars use stronger acids, sometimes in conjunction with an enzyme preparation, and likely get a larger percentage of the sucrose molecules split; but the above is fine for homebrew use. See also how to make caramelized invert sugar on page 55 of this issue.)

Realistically, you could try substituting plain sugar (either cane or corn) for invert sugar in homebrew recipes. Lyle's syrup is fairly expensive and making a homemade preparation of invert sugar is somewhat time-consuming. We're not really sure if you would be able to taste the difference under all of the chocolate and roast flavors.

Honey is similar to invert sugar, but has other flavors and aromas associated with it as well. We would avoid honey in the Young's Double Chocolate clone.



Chalk It Up to Experience

In the "British Clones" article in the May-June 2006 issue, Chris Colby talks about using "chalk" for Bass Ale clones. What is the "chalk" to which he refers?

John Evans
Springfield, Ohio

Author, and BYO *editor, Chris Colby responds: "Chalk is a sedimentary rock composed of calcite (calcium carbonate, $CaCO_3$). The most famous deposit of chalk is the White Cliffs of Dover, in Kent, England. Of course, you don't have to have to hop a flight to get some; most homebrew shops carry calcium carbonate in their water additives section. (Why didn't I just say 'calcium carbonate' in the story? I don't know. The terms are used fairly interchangeably.)*

"Interestingly enough, the 'chalk' used on blackboards is actually gypsum (calcium sulfate, $CaSO_4$), a common homebrew water treatment."

It's a Dried Heat

I want to brew up a batch of Wynkoop's Patty's Chili Brew (Replicator, May-June 2006), but before I get going I need a little help with one part of recipe. It calls for ½ Ancho pepper roasted over an open flame. An Ancho is a dried Poblano chili. Should I take the dried Ancho and roast it until charred?

Frank Beebe
via email

The Replicator, Marc Martin, responds: "Frank, Thanks for the question regarding the recipe for Patty's Chili Beer. I plan to brew that same batch in the next few weeks and would have needed the same clarification. As you may know, Ancho chilis are already dried and appear to be already charred. They are very dark brown or almost black. They have, in fact, been dried and smoked at fairly high heat. The brewers at Wynkoop cut these peppers in half and de-seed them then just 'lightly' toast them over an open flame in order to re-release the flavor. The brewer did say you could substitute Poblanos that had been "charred" over an open flame and then the blackened skin is peeled off. By the way he talked, I suspect that they have done this a time or two when Anchos may not have been available in the quantities they would need."

Qwazy Quantities

As much as I love your magazine, your recipes would be more useful if they were somehow adjusted to use more manageable quantities of liquid malt extract (LME). Consider, for instance, your Young's Double Chocolate Stout recipe on p. 39 of your May-June edition. The extract version calls for "4 lb., 2 oz. John Bull Plain Light liquid malt extract." I'm not exactly sure how I would measure out such a quantity of LME, or, more importantly, what I would do with the remaining ⅔ of a can. This is just one example. Many of your clone recipes present the same problem. Why not offer

RECIPE INDEX

Page

Jack Ass Stout 9

Sea Dog Brewing Co's
Blue Paw Wheat Ale 11

A Steamy Bavarian Brew
(all-grain) 19

A Steamy Bavarian Brew
(extract w/ grains) 20

A Steamy Bavarian Brew
(extract only) 20

Kelheim Weissbier (all-grain) 37

Kelheim Weissbier (extract) 37

Thomas Jefferson's
"Dunkelhefecornweizen" 38

BYO RECIPE STANDARDIZATION

Extract efficiency: 65%
(i.e. — 1 pound of 2-row malt, which has a potential extract value of 1.037 in one gallon of water, would yield a wort of 1.024.)

Extract values for malt extract:
liquid malt extract (LME) = 1.033–1.037
dried malt extract (DME) = 1.045

Potential extract for grains:
2-row base malts = 1.037–1.038
wheat malt = 1.037
6-row base malts = 1.035
Munich malt = 1.035
Vienna malt = 1.035
crystal malts = 1.033–1.035
chocolate malts = 1.034
dark roasted grains = 1.024–1.026
flaked maize and rice = 1.037–1.038

Hops:
We calculate IBUs based on 25% hop utilization for a one hour boil of hop pellets at specific gravities less than 1.050.

extract recipes that call for LME amounts in the quantities in which they are normally sold — 3.3 lbs., 6 lbs., 6.6 lbs., etc., with any additional extract amounts to be made up with a proper quantity of dried malt extract (DME)? Despite the expense of DME, it is easier to measure, store, and use in future recipes. Maybe what I'm suggesting wouldn't work with clone beers, since you're trying to make an authentic copy of a commercial beer. Just a thought. Keep up the good work.

Frank Dale
Manassas, Virginia

Our first concern in presenting a recipe is that it makes good beer. The amount of LME in most of our "extract-late" recipes is roughly equal to half the amount of fermentables in the beer, with the other half coming from DME and any grains that are steeped or partial mashed. As such, the amount of LME frequently does not equal 3.3 lbs. (1.5 kg), the size that many canned extracts are available in.

Many homebrew shops sell liquid malt extract from drums and you can ask for any amount and they will weigh it out for you. If you use extract from cans, just weigh the extract on a large kitchen scale — extra extract can be used for yeast starters or other beers. Just store the LME in a sealed container in your refrigerator. (Some homebrewers put a splash of vodka on the surface of the extract, if they don't expect to use it soon. This inhibits mold growth.)

If you perform a full-wort boil, you can convert the amount of LME into DME and add all the DME at the beginning of the boil. However, it's better to use LME for late extract additions — late DME additions cause foaming and can lead to cloudy beer.

Clearing the Air on Aeration

Garrett Heaney's article in the May-June issue (Beginner's Block. "Aeration 101") gives times for oxygenating wort with an oxygen tank and aeration stone ranging from one minute to eight minutes depending on the gravity. I purchased an oxygenation system that says to do one 15–20 second shot for gravities lower that 1.060 and for higher gravities to give it time for the foam to die down and then give it a second 15–20 second shot. The company no longer sells the oxygen tanks, but I purchase similar oxygen tanks from a hardware store. These ranges are wildly different. Which is correct, or what do you recommend?

James Roth
Hastings, Minnesota

The times appearing in the Beginner's Block column are a good starting point for beginning brewers. It is very hard to actually bubble a harmful amount of oxygen into wort with a typical homebrew oxygenation setup, so our times are maybe a bit generous at the top end. If you get good results with shorter oxygenation times, feel free to adjust your schedule accordingly. However, they should work well for most beginners.

We also got letters from homebrewers who thought the times given for aquarium pump aeration should be extended. Some advanced brewers extend their aquarium pump aeration time to an hour. We suspect, however, this may be something most beginners will not want to do (for time considerations and because of the large volume of foam generated).

Given that a fair amount of oxygen is present in an extract brewer's topping up water, we don't feel those long times need to be recommended to beginners for most beers.

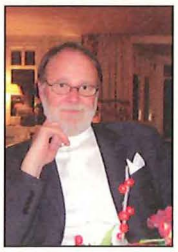
Advanced brewers, however, will want to use information from their brewing — including time until fermentation starts, attenuation, ester production and, of course, beer flavor — as a guide to adjust their aeration times upwards or downward.

For high gravity beers or beers in which a high degree of attenuation is expected, you may need to experiment with your aeration schedules. The amount of time you aerate is not as critical as the yeast actually getting the oxygen and lot of variables play a role in oxygen solubility, including wort temperature, pore size of your aeration stone and how long it takes the bubbles to rise through the liquid.

Long story short: if you are a beginner, these times are a good jumping off point. Monitor your fermentation and beer and adjust the times, if needed.

Chris Colby, editor of *Brew Your Own*, has been homebrewing since 1991. Most of his first brews were attempts at American pale ales. "In college in South Dakota, my favorite beer was Old Milwaukee, mostly because it was five bucks a case," he says. "When I moved to Boston, I discovered beers such as Harpoon Ale, Sam Adams Boston Ale and Dock Street Amber Ale. The hop flavor and aroma of these beers were awesome and the first thing I tried to brew was something with a big hop nose." Now living in Texas, he still brews hoppy pale ales, but also enjoys making porters, dry stouts, amber lagers, sour beers and "weird, unique creations."

Chris's first *BYO* article, which discussed high-gravity brewing, appeared in the February 2000 issue. In this issue, his 75th article for *BYO* appears on page 48. It covers variables and issues relating to mashing efficiency.



Horst Dornbusch left the corporate world in 1995 and started a microbrewery, which won him a medal at the Great American Beer Festival in 2000, but then succumbed to the industry's fierce down-turn at that time. Since then he has concentrated on his new venture, Cerevisia Communications, a PR and consulting firm in the international beverage industry.

Of late, Horst has been working to create the only English-language consumer website devoted entirely to German beers. Check it out at http://www.GermanBeerInstitute.com.

Horst's Style Profile column (p. 19), discussing the relatively obscure style of Dampfbier, is the 50th article Horst has contributed to *Brew Your Own* magazine. His 51st article is our cover story on Hefeweizen that can be found on page 34 along with a sidebar on Thomas Jefferson's colonial wheat beer.

Stan Hieronymus has been an amateur brewer since 1989 and never once was tempted to go pro. He's been a professional journalist since he started working at his local newspaper while in high school, and more than once has been called amateur.

He began writing about beer in 1993, since authoring hundreds of articles for glossy journals, beer publications and daily newspapers. He and his wife, Daria Labinsky, also wrote the "Microbreweries You Never Heard Of" column for *BYO* for two years. Since 1998 he's been the editor of RealBeer.com.

Stan went solo for his book, "Brew Like a Monk" (2005, Brewers Publications), which examines the history of monastic brewing as well as how modern brewers in both Belgium and the United States brew Belgian-style beers. His article on page 40 covers fermenting Belgian-syle beers.

Fermenator™
Stainless Fermentor

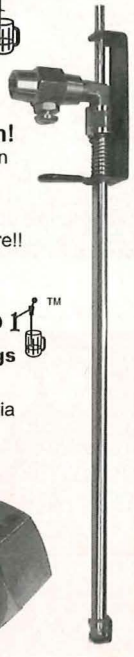
- More capacity!
- Pressurizeable for CO_2 pumping
- 3pc ball valves
- Folding handles

7, 14.5 & 27 gal sizes!

ThruMometer™
In-line Thermometer

- Set your counterflow chiller to ideal fermentation temp.
- Super easy to sanitize
- Saves water!

BeerGun™
Bottle Filler



Revolutionary design!
- One hand intuitive operation
- Low foaming
- Easy to clean
- Stainless construction
- Superior to counter-pressure!!

BLICHMANN™
engineering

www.BLICHMANNENGINEERING.com

BrewMometer™
Brewing Thermometer

- Unique "made-for-brewing" dial face
- Best weldless design available
- 1/2" NPT connection available too!

Therminator™
Stainless Wort Chiller

Fast! - chill 10 gal in 5 min!
- Fastest and smallest chiller available!
- Ultra low restriction
- Ideal for southern climates!

QuickConnector™
Stainless Quick Connect Fittings

- No tools reqd to install !
- No crevices to hide bacteria
- Fits all 1/2" NPT fittings
- 3/8 and 1/2" hose sizes

homebrew CLUB

Star City Brewer's Guild • Roanoke Valley, Virginia

"Why should I join a homebrew club?" This question was asked on the *Home Brew Digest* forum years ago and one of our members decided to reply. The following are some excerpts from his reply: "As far as I am concerned it is one of the best things about home brewing. Our little group (15 members at the time) is fairly diverse when it comes to walks of life. We have never had lessons, but members usually announce their brew sessions via our Webpage, and non-members are always welcome. I'm not so sure I would've stuck with brewing without the club. I've learned more about brewing from club members than I believe I would have without them."

(top): The Star City Brewer's Guild gather for a group photo at "Big Brew." (bottom): Members brew and camp together for Big Brew once a year.

This was written around 6–7 years ago. If you asked any one of new members that same question, I am pretty sure their response would be the same today.

We are the Star City Brewers Guild, located in the Roanoke Valley of south-central Virginia. Our membership has increased to around 40 members since that long ago post to the *HBD*. Our club has meetings once a month at a member's house.

We generally discuss our club business (which is thankfully expanding) first and then get down to the business of tasting homebrew and fine food. We have quarterly club-only competitions which are judged by BJCP standards. For a full listing of styles and scores, visit our website at www.starcitybrewers.org.

In addition to our monthly meeting and quarterly competitions, we as a club celebrate "Big Brew" each year. It has always been in the format of a camp-out at the home of two of our long-time members, Kelly and Esther King. The spot is beautiful! Camping out along the south fork of the Roanoke River after a long day of brewing!

homebrew CALENDAR

July 21
Southern California Regional Homebrew Championship
Corona, California

The deadline for entries to the Southern California Regional Homebrew Championship is July 21. The competition itself will be held on July 30 at Main Street Brewery in Corona, where entries should also be delivered. For more information visit www.hopheads.com.

July 22
2006 Mountain Brewer Open
Huntington, West Virginia

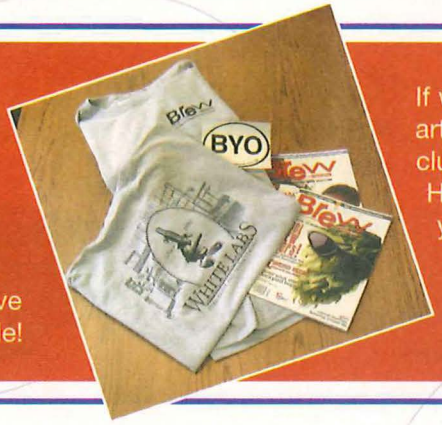
This event will be held on July 29 at the Huntingtonized Federal Credit Union in Huntington. Entries will be accepted July 10–22 and the cost is $5 per entry. For more information visit www.hbd.org/ghha.

August 4
2006 New England Regional Home Brew Competition
Manchester, New Hampshire

Deadline for entries is August 4. Please submit 3 bottles per entry and fees are $6 per entry. Judging will be August 12th at Milly's Tavern. For more information visit www.bfd.org/NEHBC.

we want you

Do you have a system or a gadget that will make our readers drool? How about a killer recipe or tip? Email a description and photos to **edit@byo.com** and you too may have a claim to fame in your brewing circle!

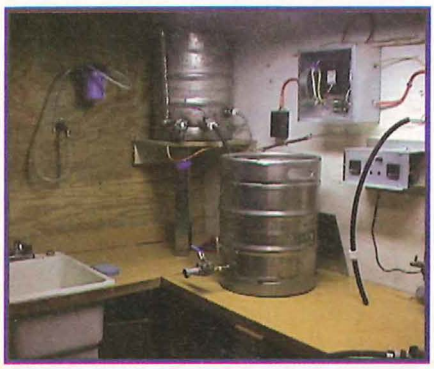


If we publish your article, recipe, photos, club news or tip in Homebrew Nation, you'll get a cool t-shirt (courtesy of White Labs) and a *BYO* Euro sticker.

brewer PROFILE

Eric Marcoux – written by Ty Ming • College Park, Maryland

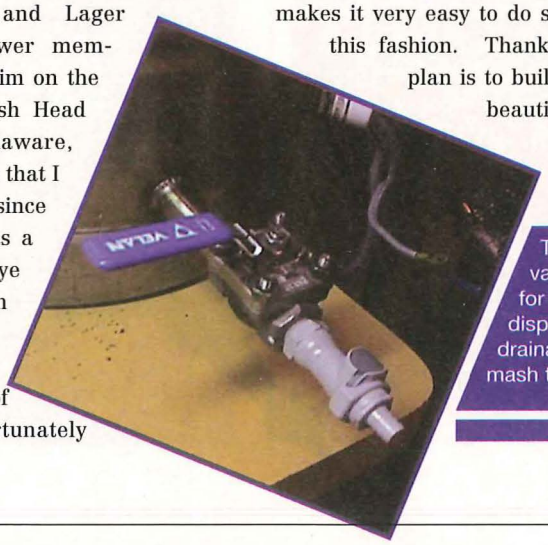
Eric recently invited me over to his brewery mainly because I was interested in seeing his electric RIMS or Recirculating Infusion Mash System and only slightly because he wanted to do a Midas Touch clone from Dogfish Head Brewery. Being that I had done more than a couple of these clones, this arrangement looked like it was going to work out nicely. I have to say that it was one of the most pleasurable experiences that I have ever had brewing. Being that it is an electric RIMS, heated with 240 volt water heater elements, it was very quiet, so much so that I had to keep checking the boil kettle because I couldn't believe it was boiling. We started about 4 pm after work and finished about 8:45pm, 4 hrs and 45 minutes only, talk about quick.



Eric's system is an electric RIMS and utilizes 240-volt water heater elements.

To give a little background information, Eric is one of MALT's, (Maryland Ale and Lager Technicians), newer members; I first met him on the bus trip to Dogfish Head brewpub in Delaware, last year. It seems that I hadn't seen him since however. Eric has a degenerative eye disease which keeps him from behind the steering column of a car and unfortunately from a lot of our club events as well. I remember asking Eric how he managed to build his system with all the electric heater elements, digital temperature displays, PID controllers and thermocouples. His answer was that his Dad, Rock, who is an electrician, built it for him. To which I replied, "Your Dad sure loves you".

Eric has a 3 keg system, each keg is outfitted with a 240 volt heater element, all on a work bench in his basement on the same level. The mash tun and boil kettle are outfitted with a Sabco false bottom. There are two separate temperature control loops; one for the sparge water and the other for the recirculation system. His mash temperature controller is a 240 volt water heater element in a copper pipe, called a manifold or RIMS chamber, it is hooked up to his beer pump from MoreBeer. The beer pump is mounted below the work bench to aid in priming. After mashing he recirculates the wort through his temperature controlled manifold system. The wort travels from the kettle to the pump, up through the RIMS manifold where the heater element is located and then past the temperature sensor before going back to the mash tun. Because the temperature sensor is directly after the heating element, there is no chance for the temperature to get too high and possibly denature those enzymes from effective starch conversion. The temperature display is located above the kettle next to another display which shows the set temperature or cut off temperature for the heating element. It also makes it very easy to do step mashes in this fashion. Thanks to Eric, my plan is to build one of these beauties myself.



The release valve makes for easy dispense and drainage of the mash tun.

reader RECIPE

For those looking to make a big batch of beer, alone or with friends, here's a 70-gallon (266-L) stout recipe to take on! Courtesy of Jeremy Klein, Nashville, Tennessee

JACK ASS STOUT

(70 gallons/266 L)
extract-with grain
OG = 1.104 FG=1.028 IBU=99

Ingredients

33 lbs.(14.9 kg) Briess Gold liquid malt extract
55 lbs. (25 kg) Muntons light dry malt extract
75 lbs. (33.8 kg) pale malt (2-row)
2 lbs. (0.9 kg) Black Patent malt
6 lbs. (2.7 kg) roasted barley
4 lbs. (1.8 kg) chocolate malt
5 lbs. (2.3 kg) Carapils
5 lbs. (2.3 kg) Weyermann Caramunich®
336 AAU Centennial whole hops (32 oz of 10.5% alpha acid)
American Ale (Wyeast 1056) (See Step by Step for amount. The brewers in this case used 2 liters of yeast slurry, but you can refer to manufacturer's instruction for other amounts.

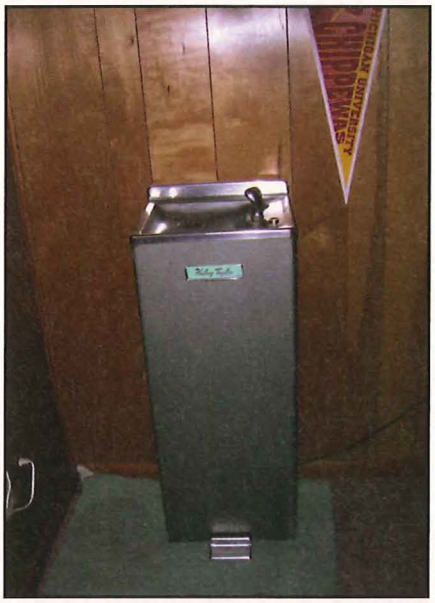
Step by step:

This brew requires a single infusion mash at 153 °F (67 °C). Sparge, add dry malt extract and liquid malt extract, then top up with water to hit 70 gallons (266 L) and bring to boil. Add hops and boil for 60 minutes. Chill, aerate and pitch plenty of yeast. We used two liter containers of yeast slurry.

Ferment at 68 °F (20 °C) for 10 days or until yeast drops out. Rack into a barrel if possible. Reserve 5 gallons (19 L) in a keg to top up barrel evaporation. Age a minimum of 6 months and keg. Or, bottle and prime with a packet of dried yeast and ⅔ cup of corn sugar per 5 gallons (19 L).

homebrew systems that will make you DROOL

Brent Wood • East Lansing, Michigan



As you approach the water fountain, you expect a nice refreshing sip of H_2O to quench your thirst . . .

But lo and behold . . . she bubbles beer! Brent Wood assembled this device to dispense beer at his annual championship football bash. It was a success, as they went through seven kegs of homebrew through this beautiful bubbler. *Cheers guys*!

Your "Projects" department is where I got the idea to build this gadget. I am part of a local micro group called the Mid-Michigan Malt Meisters. Every year I have a championship football party and invite the crew over. Each year I try to outdo the previous year. So, this year we purchased a bubbler over E-bay and converted it to a beer dispenser. It was a party favorite, along with the seven different kegs of my homebrew.

We got the idea from the "Great Taste of the Midwest." I believe it was New Holland Brewing Company out of Michigan who had one. With the bubbler, we basically gutted the machine and added fittings to the in-valve. We drained the dispensed beer into a bucket and put the keg into a container with ice. The bubbler is designed for a party, not for a long-term beer fridge. We try to keep the keg at about 6 PSI. As Frank the Tank from the movie *Old School* put it, "It taste so good when it hits your lips!" P.S. – Pale Ale is a good beer on tap for the bubbler.

Brewer's dictionary

W is for . . .

wallop: a slang British term used for mild beers with low alcohol.

weissbier: the German term for wheat beer. Weiss literally means white and wheat beers are very pale in color.

weizenbier: the German term for top-fermented wheat beers.

wild yeast: yeast that is naturally airborne. Originally, all beers were fermented with wild yeast.

wort: the sweet solution created by boiling malt, hops and water. It is high in sugar and ferments when yeast is added.

Beer Without Borders!

Proclaim your citizenship in the Homebrew Nation by ordering t-shirts, sweats, hats, mugs and more. All feature the BYO Euro sticker design.

To order go to:
www.cafepress.com/brewyourown

replicator

by **Marc Martin**

Dear Replicator,

Several years ago, upon her return home to Pennsylvania, my mother brought me back a six pack of Blue Paw Wheat Ale from the Sea Dog Brewing Company in Maine. To be honest, I wasn't sure how I would like the beer at first. But, this beer was absolutely delicious and the six pack didn't last long at all. Unfortunately, I was unable to find a place to purchase this beer locally. I've tried on several occasions to clone this recipe but haven't had any success. I would really appreciate your help on cloning this great beer.

Matt Hearn
Alexandria, Pennsylvania

You are in luck on several counts. The good folks at Sea Dog Brewing were very helpful and flattered with the interest. I was able to reach Jason Silevinac, the brew house manager, and he was very happy to discuss the details of this beer. Jason started like many of us with no formal brewing education. He was exposed to the joy of brewing while working as a cook at Gritty McDuff's Brewpub. Beer production began to intrigue him. He landed a job at Sea Dog Brewing and worked his way up from the bottom as a keg washer and apprentice. That was six years ago and he now oversees all brew house operations.

Jason says that Blue Paw Wheat Ale has been a mainstay beer for them for many years. He describes it as a dry American Wheat Ale with a pronounced blueberry finish. It is a relatively simple beer with some unique characteristics. Jason reports that it is very important that a fairly low finishing gravity be achieved in order to accentuate the berry profile. He also recommends a cool, slow fermentation to reduce the production of unwanted esters. Their use of British ale yeast is decidedly unusual for the style, but this allows them to maintain just one "house" yeast.

The blueberry flavor is imparted by using berry extract instead of whole fruit. This is added at the end of fermentation. Jason reports that their brewery layout does not lend itself to having real berries present as lambic beers are not part of their future plans. Finally, he doesn't recommend any finishing hop addition to compete with that wonderful berry aroma.

For further information visit the Website www.seadogbrewing.com. Or, you could call them up at (207) 761-0807.

Sea Dog Brewing Company Blue Paw Wheat Ale

(5 Gallons/ 19 L extract-with-grain)

OG = 1.050 FG = 1.012
IBUs = 20 SRM = 6 (with slight blue tint)
ABV = 5.0 %

Ingredients

6.6 lbs. (3.0 kg) Muntons unhopped wheat malt extract (50% wheat)
12 oz. (0.34 kg) 2-row pale malt
4 oz. (0.11 kg) wheat malt
2 oz. (57g) Munich malt
0.5 tsp. yeast nutrient (25 min.)
4 AAU Hallertau hop pellets (60 min.) (1 oz./28 g of 4.0% alpha acid)
2.5 AAU Willamette hop pellets (25 min.) (0.5 oz /14 g of 5.0% alpha acid)
White Labs WLP005 (English Ale) or Wyeast 1187 (Ringwood ale) yeast
2 oz. (57 mL) concentrated liquid blueberry extract
0.75 cup (150g) of corn sugar (for priming)

Step by Step

Steep the 3 crushed grains in 3 gallons (11.4L) of water at 155° F (68°C) for 30 minutes. Remove grains from the wort, add the liquid extract and bring to a boil. Add the first addition of Hallertau hops and boil for 60 minutes. During the boil, use this time to thoroughly sanitize a fermenter. Add the second addition of Willamette hops and yeast nutrient for the last 25 minutes of the boil. Now add the wort to 2 gallons (7.6L) of cold water in a sanitized fermenter and top off with cold water up to 5 gallons (22.7L).

Cool the wort to 75° F (24° C). Pitch your yeast and aerate the wort heavily. Allow the beer to cool over the next few hours to 66° F (19° C) and hold at this temperature until the beer has finished fermenting. Transfer to a carboy and add the berry extract while stirring very slowly. This is to avoid aerating the beer. Condition for 1 week and then bottle or keg. Allow to carbonate for 2 weeks and enjoy!

All-grain option:

This is a single step infusion mash. Replace the malt syrup with 6.5 lbs. (~3 kg) 2-row pale malt. Increase the wheat malt to 3.5 lbs. (1.6 kg) and the Munich malt to 4 oz. (0.11 kg). Mix the 3 crushed grains with 3.2 gallons (13.3 L) of 168 °F (76 °C) water to stabilize at 152 °F (67 °C) for 60 minutes. Sparge slowly with 175 °F (79 °C) water.

Collect approximately 6 gallons (23 L) of wort runoff to boil for 60 minutes. Reduce the first addition (60 minute) of Hallertau hops to 4.0 AAU (0.75 oz./21 g) due to the higher utilization factor for a full wort boil. The remainder of this recipe is the same as the extract recipe.

Note: to help prevent a stuck run off add 4 ozs. (0.11 kg) rice hulls to the bottom of your mash tun prior to adding grains and water.

Summertime Blues

Keeping your fermentation cool

by Garrett Heaney

It's hard enough to keep yourself cool during the summer, never mind your carboys. Summer heat can lead to problems when it comes to fermentation, as overly hot conditions can lead to off flavors, off aromas or worse — fusel alcohols. Fusel alcohols differ from the primary alcohol formed during beer fermentations (i.e. ethyl alcohol or ethanol) in that they contain more carbon atoms. In beer, they smell like nail polish or other solvents. Your body handles fusels differently than ethanol and they can cause headaches, more severe hangovers and other adverse effects. However, rather than give up brewing during the hot summer months, here are some tips to keep your carboys cool.

Don't forget your towel

The wet towel trick is perhaps the most common method for taking the edge off a hot fermentation. It's simple and works under the scientific principle that as water evaporates from a surface, the temperature of the water left behind drops. This is why body temperature decreases when we get wet.

To cool a carboy using evaporative cooling, all you need is a towel, a basin and a bungee cord to hold the towel in place. Find a basin (bathtub, large picnic cooler, garbage can), fill it with a few inches of water and set the carboy inside. Wet the towel, wrap it around the carboy and fasten it tight with your bungee cord (or rope). (You can also use a sweatshirt or a T-shirt.) Make sure the bottom of the towel touches the water in the basin so that it works as a wick to continually soak up the water as the water evaporates. Believe it or not, this little trick can cool your carboy by 5-10 °F (~3–5 °C), depending on humidity and airflow over the evaporative cooling surface (the towel).

You will need to change the towel every few days to prevent it from mildewing. Likewise, if you don't have pets (or kids) that might drink the water, you may want to add a splash of bleach to the water in the basin to prevent mold. The towel will get bleached, of course, so use an old one.

A "temperature strip" stuck to the outside of your carboy will tell you the temperature of the beer (OK, the glass right next to the beer). However, you will need to protect the strip from the soggy towel by covering it with clear packing tape.

Ice bath

If your basin is deep enough, you can create an ice bath containing enough water to surround most or all of your fermenter. Periodically adding ice (or frozen cooler blocks) that will keep the bath cool. This is a simple method, but it does require some testing to determine how often you'll need to replenish your ice to maintain your target temperature. When using the ice bath method, avoid subjecting your wort to large temperature swings.

It's better to ferment steadily a few degrees above your planned temperature than to put your fermentation on a thermal roller coaster. The degree to which you can cool your wort with this method is limited only by the amount of ice you have access to.

Ice box

The ice box is an age old device dating back before electricity. You don't need to go out and find an antique ice box, but you can steal the concept and create your own. There are basically two components to this contraption: ice and a box. OK, it is a little more complicated than that, but not much. The box needs to be insulated to a degree where it will be able to hold the cool air generated from ice blocks (milk jugs or 2 or 3 L soda bottles filled with water and then frozen work great). You can construct the box out of cardboard and line it with a few inches of styrofoam or build it out of plywood and line it with builder's insulation. It all depends on how much time, money and energy you want to invest. Once you've got your box, gather your ice blocks and put them inside the box with your carboy and monitor the temperature every few hours to see how the temperature holds. This will give you an idea of how often you should rotate your blocks.

You will need to have a pan to catch water dripping from the frozen blocks and should check your box periodically for the presence of mold or mildew.

The fan and AC

If you have central air or window air conditioning units, you can effectively lower the temperature of your fermentation ten degrees (°F) or more. Make it your goal to route the cold air from the AC directly to your carboy. You can accomplish this by building makeshift barriers out of cardboard to direct the cool air. You can even expedite the airflow from the AC with a fan, to drop the temperature more efficiently.

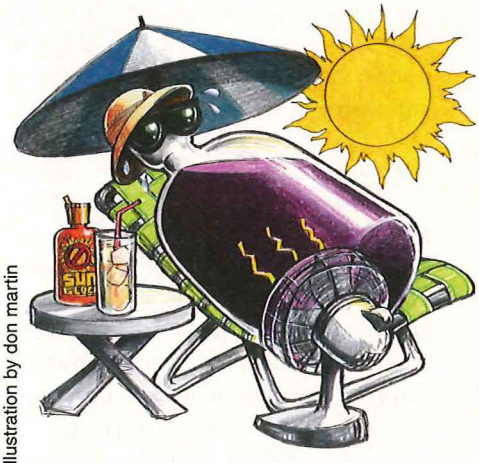


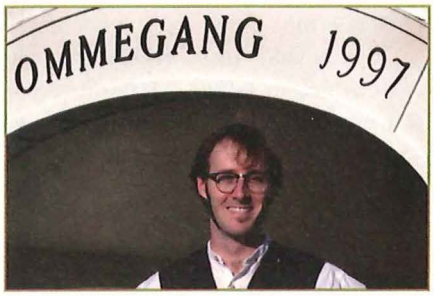
illustration by don martin

Belgian-Style Beers

Where the yeast make all the difference

by Garrett Heaney

Belgian-style beers are a difficult breed to put your brewing thumb on. For one, the array of ingredients and resulting flavors vary widely across the spectrum, making for an even wider array of actual Belgian beer styles. One consistent attribute across the board with Belgian brewing is the distinctive utilization of yeast as a flavor contributor. In fact, some would argue that yeast is the foremost flavor indicator, moreso than malt or hops. Take it from the pros!



Randy Thiel is Brewmaster at Brewery Ommegang. He has been with the brewery since its inception in 1997. He is a graduate of the UC-Davis Master Brewers Program, Siebel Institute's Microbiology of Brewing coursework, and holds a B.S. in Bacteriology from the University of Wisconsin-Madison.

Yeast plays a primary role in the flavor profile of most Belgian beers. The flavor peculiarities of specific strains are allowed to take center stage by keeping a leash on other ingredients — that is, keeping a balance on hop, malt and spice contributions allows the impact of the yeast to be noticed. Beyond full attenuation of the wort, the aspect that most brewers look at with these yeasts is the quality and quantity of ester formation.

Depending on the yeast, this can be affected by pitching rates, fermentation temperature, yeast health and level of oxygen (i.e. aeration) at the start of fermentation. These are all very strain-specific parameters and, as such, a technique utilized for one strain may have a completely different effect on a different strain. So embrace the creative joy of homebrewing and start experimenting!

Temperature and inoculation techniques have a big impact on your resulting artwork, mostly with regard to ester formation. Most of the literature suggests that any parameter that forces faster and more quantitative growth of yeast will also increase ester production. Higher fermentation temps and low pitching rates would fit into this scheme. But, this seems a bit too simplistic. Often, these same parameters have a direct effect on fusel alcohol formation, which should be kept to a minimum.

Since fermentations are very complex reactions that have numerous interactive variables (more than can be quantified!) the best approach is to experiment with specific strains, temperatures and yeast pitching rates. The truth is that "your mileage may vary" with your particular brewing, fermentation and bottling techniques. Get to know your artistic media (in this case, your brew system and ingredients) and tweak it accordingly to suit your muse.

Rob Tod started Allagash Brewing in 1995 as one of the first breweries in the United States exclusively dedicated to brewing Belgian style ales. The flagship Allagash White is now complemented by a series of experimental and wood barrel aged beers.

For us at Allagash, the key ingredient to obtaining the "traditional" Belgian character is the yeast strain used. This is a generalization, but if you were to brew any of our beers with a "non-Belgian" yeast strain, the beers would not have the classic Belgian character. However, if you were to brew a beer with a British bitter recipe, and ferment it with a Belgian yeast, it would taste distinctively Belgian. So yes, I would agree that despite the importance of an appropriate malt and hops bill, the yeast strain is the most critical factor in the overall flavor profile.

All of that being said, we are very careful about our malt and hops bill, and we try to make sure that the final beer is complex and balanced. The two really go hand-in-hand, if the beer is balanced, more of the subtle yeast, malt and hop characters are able to express themselves.

As a generalization (and there are exceptions to this with some of the beers we brew), we find our beers are better balanced with conservative amounts of the sweeter and roasted malts, and the use of the "less-bitter" or noble hop varieties. Sometimes the beers with the simplest malt and hops bills are the most complex beers after fermentation and conditioning.

If you are seeking more consistent results, I would recommend starting with a purchased yeast strain. By going this route, you know what you are getting, and you have more reassurance that your hard work in brewing the beer is going to yield good results. Again, make sure to get temperature ratings, and also, if you are brewing a high gravity beer, make sure that the yeast strain has good alcohol tolerance.

Steven Pauwels has been the head brewer of Boulevard Brewing Company since 1999. He graduated with a degree in fermentation technology from a school known as KAHO in Ghent, Belgium. After this, he worked for eight years in Belgium at InBev, Domus and Liefmans breweries before moving to Kansas City and starting at Boulevard.

Malt and hops might be a less determining factor in the final flavor of a brew, but they are important for the overall flavor profile of a Belgian-style beer. Traditionally no (or very low amounts of) roasted malts and only noble hops are used to pronounce the flavor contribution from the yeast. Nowadays there are some great examples that use American hops.

As for yeast, 1 million cells per mL per °Plato is commonly used as rule of thumb. Some brewers use only one third this amount, while others use up to three times the amount. This depends on your wort aeration, amount of trub in your wort, percentage sugar and of course the yeast strain.

Important is the ratio between higher alcohols and esters. It is essential to control the fermentation temperature during the first half to ⅔ of the fermentation to reduce the higher alcohols. Pitch the wort at a low temperature (64 °F or 18 °C). Also, a lot of Belgian yeast strains are very temperature sensitive and will stop working when the temperature difference between cooling liquid and fermentation temperature is too high.

Personally, I have never been able to culture yeast from a bottle. Maybe if you can find a very fresh bottle you might be able to. Attenuation is by far the most important spec that you need to keep in mind whether purchasing or culturing yeast. Belgian beers are dry. They might taste sweet and full, but that perception is usually from the alcohol. The Belgian style beers we brew at Boulevard have a higher attenuation than our pale ale for example. Also, follow the temperature recommendations. Most yeast strains make the best beers over 80 °F (27 °C), others should not go higher than 77 °F (25 °C).

Use healthy yeast. Kick start your yeast by putting it into a starter a couple of hours before pitching. With some of our yeasts we will add twice the yeast volume of wort (or sugar water less than 6 °Plato) to get the yeast active.

This will guarantee a rigorous fermentation and a nice ester profile. Spices can also help make the flavor profile of your beer more complex if dosed in such a quantity that it does not overwhelm.

WEYERMANN

Weyermann : Superb German Malts

Weyermann is Germany's oldest and finest maltster, producing a wide range of barley, wheat and rye malts to optimize every beer!

- **Superb quality Pilsner, Pale Ale, Vienna and Munich base malts**
- **Specialty malts to match just about any recipe**
- Weyermann crystal and roast malts are produced in rotary roasting drums rather than in the usual flatbed kilns, producing a more consistent, high quality end product
- **NEW** authentic Bavarian Pilsner malt
- **SINAMAR®** Liquid All-Malt beer coloring extract now available in 4 oz. bottles for the homebrewer!

Distributed in the United States by Crosby & Baker, from wholesale (strictly!) warehouses in:

- Westport, Massachusetts
- Atlanta, Georgia
- Salt Lake City, Utah
- Baltimore, Maryland
- Sacramento, California

Websites for more information Specs & other great stuff:
www.WeyermannMalt.com www.Crosby-Baker.com Email: Info@Crosby-Baker.com

CROSBY & BAKER LTD
Call us for great products and prices: 1.800.999.2440

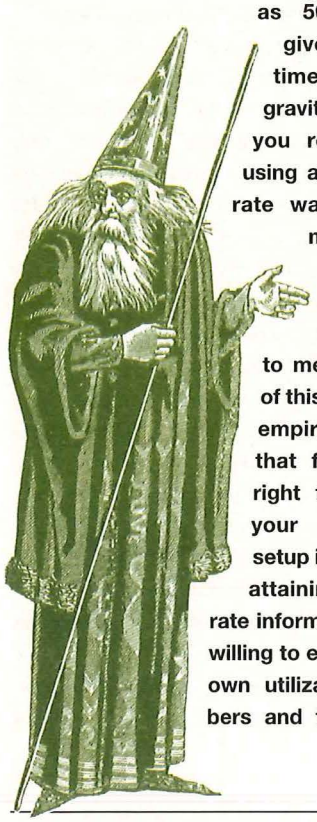
Universal Utilization?

The never-ending fermentation and notions from NASA

Conflicting reports

A friend and I have been homebrewing for about 8 months now. We first read about IBUs in Charlie Papazian's "Complete Joy of Homebrewing" and started to compute our IBU content based on the table and formula given in this book. The numbers seem reasonable. A hoppy pale ale that we brewed had about 42 IBUs and a strong IPA that we brewed had about 65 IBUs. This was consistent with taste, but I'd like to get more accuracy. We want to get control over the bitterness of our recipes so we can plan hopping schedules ahead of time. Computing IBUs and then tasting it in the beer that we make is very exciting for a quantitative type like me. Unfortunately, it seems that a lot of the variation in this computation is in hops utilization. I have a several part question regarding hops utilization:

1. I have found several utilization formulae on the web, including Jackie Rager's method, Glenn Tinseth's method and the short chart in Papazian's book. However, results from these different methods vary quite a bit, often as much as 50% for a given boiling time and boil gravity. What do you recommend using as an accurate way to estimate my hops utilization?



2. It seems to me that a lot of this process is empirical and that finding the right factors for your specific setup is crucial to attaining accurate information. I am willing to estimate my own utilization numbers and to find my own charts (and eventually fitting my own curves), but to do this, I'll have to find some way of measuring the IBUs of my batches and working backwards to estimate the "fudge factors" in the utilization formulae. Will the standard acidity testing kits that are used for wine work for beer?

3. What do people who submit to competitions and who have to report IBU numbers typically report? What methods are state of the art?

Chris Alvino
Allenwood, New Jersey

This is a rather weighty question about a topic that continues to spark interest and debate among the numerical brewers of the world. The key to calculating the contribution of bitterness from hops added during brewing is the illusive utilization. This efficiency term relates the amount of alpha acid added to the wort to the iso-alpha acid in the finished beer. Hop utilization ranges from nil to about 40% and depends on a whole multitude of factors. A short laundry list of contributing factors includes: wort gravity, boil duration, hop form (e.g., cone or pellet), wort pH, type of kettle (influences losses in foam among other things), wort protein and trub content, yeast type and krauesen formation during fermentation and method of beer clarification. That's quite the list of variables!

Calculating a hop charge is really simple and the equation using metric units is as follows:

$$\text{Hop Charge (grams)} = \frac{\text{(Liters of wort)} * \text{(Target Bitterness)}}{\text{(Hop Utilization)} * \text{(Alpha Acid Content)} * (1000)}$$

By the way, one International Bitterness Unit equals one milligram of iso-alpha acid per liter of beer and if you are into units you can see how the units cancel in the above equation.

When I formulate recipes I consider the percentage of the total bitterness from each hop addition and apply a different utilization to each addition. Almost every brewer who calculates recipes uses something akin to this method . . . it's simply the way it's done. One thing to note here is that the alpha acid content of hops is highest when harvested and hops lose alpha acid content with storage. Also, some hops store better than others. These factors may result in a beer that is less bitter than anticipated.

Simple charts like those in Charlie Papazian's books are a good start and some brewers don't venture beyond these rules of thumb. Other more "sophisticated" methods to estimate utilization based upon curves are also found in homebrewing literature. The curves first postulated by Jackie Rager in 1990 and later by Glenn Tinseth and Mark Garetz are the ones that I have seen cited the most.

These curves focus on wort gravity and boil duration, the most obvious factors affecting utilization. Garetz's approach added multiple factors to the equation including hopping rate, temperature (elevation), yeast, filtration, hop type (pellet or cone) and whether the hops are in a bag. You are correct that these methods do not give the same answer and I honestly do not know which curve is the most accurate. Rager's numbers offer the highest utilization estimates, Garetz's has the lowest and Tinseth's is between the two.

"Why?" you may ask. Well, to my knowledge, these tables were developed without actually measuring the resulting bitterness. This resulted in much debate, lasting now for more than 10 years, about whose method is best. The real discussion ender would be to take a beer brewed using these estimates and analyze it in a lab. Instead, there are countless postings to bulletin boards and bantering in book reviews about who has the best utilization estimates.

Lab analysis is the state of the art today and commercial breweries have

been analyzing beer to quantify hop bitterness for decades. In the old days the analysis was performed using organic solvents and spectrophotometers. While many breweries still use this method, the current high tech method uses high performance liquid chromatographic separation (or HPLC in lab jargon) followed by quantification using an in-line spectrophotometer. Unfortunately, acid test kits do not work for measuring beer bitterness and there are no easy lab-type methods to measure bitterness in beer at home. That's why the above models were likely never rigorously tested.

The bottom line is that hop utilization is something that is empirically determined and a method to determine the hop bitterness is an absolute must. I strongly believe that sensory evaluation is a great way to do this. You can simply compare homebrewed beers to similar commercial beers with a known bitterness. The utilization table that Rager published has values in line with those I have used as utilization estimates and range from 2–5% on the low end for hops added towards the end of the boil up to about 30% for hops boiled for an hour or more, with a deflation factor added in when wort gravity goes above 1.050. My experience is mainly based on using pellet hops in normal gravity beers (12–14 °Plato or 1.048–1.056). I work in a small brewery and we do not have analytical equipment to measure our bitterness, but I have had our beer analyzed by outside labs and the analytical bitterness is pretty darn close to our targets.

I cannot hide my bias on this subject. While I calculate bitterness and have my quirky ways of tweaking numbers and abstracting what the beer recipe on my spreadsheet will taste like, I personally don't put much stake in numerical bitterness. The beer consumer perceives bitterness in a more complex way than an analytical instrument. The instrument measures bitterness without influence from the surrounding world. The perception of bitterness by the beer drinker is influenced by other variables such as malt character, sweetness, mineral composition, carbonation level and alcohol content.

I use hop calculations to maintain consistency of bitterness for a given recipe and use sensory evaluation to critique and fine-tune the result of the brewer's art. That's what it's all about in my view. I can't speak for how other brewers fill out paperwork for competitions and can only speculate that most use calculations to estimate color, alcohol and bitterness. The only thing most homebrewers know for certain is the original gravity and the final gravity.

The bottom line is that hop utilization is something that is empirically determined and a method to determine the hop bitterness is an absolute must.

My suggestion to you at this early stage of your hobby is to put as much focus on developing your sensory skills as you do to your calculation skills. A brewer who is balanced can lean on their technical knowledge when required and their strong sensory skills to evaluate and improve their brews. You will soon discover what target bitterness numbers and utilization rates you can choose in order to make brews that fall within the flavor profile that suits your taste.

Fermentation frequency

I am an extract and partial mash brewer and I've encountered an odd phenomenon on a couple of occasions, the most striking example of which came this week. I started out to brew a brown porter, though my creativeness got out of hand and I ended up with an OG of 1.084, pretty high for anything that I typically brew. I often use the yeast from a previous batch, and this time, I used the yeast from a batch of pale ale, along with good doses of yeast energizer and nutrient, since the gravity was so high. The airlock started bubbling away about an hour later, which is typical when I reuse yeast. However, after three days, the activity slowed considerably, to one or two gurgles per half hour. Because I knew this is a pretty weighty beer, and because I was out of town, I left the beer in the primary fermenter. It has now been 18 days. I was ready to transfer to the secondary fermenter, when I noticed that the activity had picked up considerably. It's now bubbling three to four times per minute, what I would expect on day four or five in a typical brew cycle. On a related note, the pale ale in the secondary fermenter had a resurgence of activity, as well. I've been monitoring the temperature, and there aren't any changes from what my brews normally experience. Do you have any idea what might cause such a wide ebb and flow? How common is this? Is it an indication of a problem with fermentation?

Michael George
Decatur, Illinois

I have seen this type of unusual behavior before. Most of the cases I have personally noted have been due to underpitching yeast. Most brewers agree that pitching rate should proportionally follow wort gravity and the ratio most often cited is 1 million yeast cells per liter of wort per degree Plato. Yeast slurry harvested from a previous batch is pretty dense stuff and right at 250 mL or 1 cup of slurry will give you about the right amount of yeast for five gallons (19 L) of 12 °Plato wort (1.048). Your King Kong Porter weighed in at around 21 °Plato and should have been pitched with nearly double the yeast as a normal batch. You may have done this and under pitching may not have been your problem.

Other contributors to the problem may have included poor aeration, old yeast, highly flocculent yeast strain or a contaminating organism. While a successful fermentation cycle is by no means a guarantee, if you pitch enough viable, healthy yeast into aerated all-malt wort and conduct the fermentation in the temperature range recommended for your chosen yeast strain, things normally go just fine. A contaminating microbe, either a second yeast strain or some type of bacteria, could cause an apparent resurgence of activity late in the game.

These are all pretty generic guesses because I haven't been given much information to digest. While bubble watching is an indicator of fermentation, it doesn't give one very important piece of data . . . gravity.

There is no way to know if a fermentation has halted early ("stuck

fermentation") or cranked down to finish gravity faster than expected without taking a sample for testing. I know that grabbing samples is something that small-batch brewers really like to minimize or even avoid because the sample is lost. After all, two to three decent samples add up to about two bottles of beer.

If you have a sluggish or hanging fermentation, rousing, adding more yeast or kräusening can rejuvenate the fermentation. I have found that kräusening high gravity lagers, specifically doppel bocks, is an especially effective way of fermenting to completion. I have had lager fermentations that seem like they will finish a little higher than normal and then begin to pick back up and move down to their finish gravity by doing nothing. I cannot explain why that happens but have several fermentation curves plotted over the years that demonstrate this trend. We made changes to how we handle our lager yeast at Springfield Brewing Company and have solved this problem.

The only other thing that comes to my mind is that you may have some other yeast strain or bacterial contaminant that is showing up late in fermentation and producing carbon dioxide. This is probably not your problem, but it is a possibility. Some yeast strains are known as super attenuators and are able to metabolize dextrins that brewing yeast cannot. The same is true with certain bacterial species. The fact that your pale ale and the porter both exhibited the same pattern may suggest that you have a contaminant in the yeast.

I would recommend taking a sample at least once and preferably twice when you think fermentation is nearing completion, because if you do have a stuck fermentation, you can do something about it before you bottle beer that is not completely fermented. Just a suggestion!

Back to the Beano

I have recently tried a few different recipes using Beano (as described in *BYO* a few years back) and Splenda to flavor. I have made three batches in the last 8 months. I make a batch as normal, once even split a Blue Moon clone in half (half to bottle as "normal" ale and the other half to receive Beano and continue to ferment). I wait until primary fermentation stops and then add a couple crushed tablets of Beano. In a few days, the airlock starts bubbling again (maybe once every 5 minutes) and it will bubble for a couple weeks (it does slow down). Then I take a hydrometer reading, and usually end up pretty low, around 1.006. I then add about 2 cups of Splenda to give the beer a little body and no added carbs. Then, I mix a priming sugar solution, boil and bottle the product. In a week or two I try one of the brews and get a very high foaming beer . . . one that needs a huge glass to pour into, and then come back in ten minutes or so when the foam sinks back into liquid. Literally, when you pour, you get about an inch of liquid and the rest foam. The beer itself has a little off taste, but not horrible. I attribute the flavor to the Splenda.

Adam Puzerewski
Charleston, South Carolina

I often ask myself what I started with an article that was intended as a science humor piece. The problem with Beano Bräu is that it actually works and you can definitely make bone dry beer with this over the counter digestive aid. Then, Chris Colby fueled the flame by balancing the dryness of Beano beers with Splenda. If you think that an off-flavor is associated with Splenda, you should quit using the stuff and determine if it is the cause of the off-flavor.

I must admit that these beers are true Frankenbräus! The cause of your foaming brews is easy to explain. Beano contains the enzyme amyloglucosidase (AMG) and this enzyme breaks down unfermentable dextrins into fermentable sugars. Since enzymes continue to do their thing as long as substrate is present, any residual dextrins in the beer at the time of bottling will slowly be converted to fermentable sugars in the bottle and yeast will then convert the sugar into alcohol and carbon dioxide.

Although you may think the Beano activity is complete when you bottle, it is probably not. The rate of enzymatic activity depends on the concentration of enzyme and substrate and sometimes is inhibited by the concentration of the product. In practical terms this means that the effects of Beano are really obvious at first then become difficult to monitor because the reaction rate dramatically tails off as dextrin concentration falls. So you think the beer is as dry as it is going to get and end up bottling early.

This is a real concern for brewers who make light beers by adding AMG to the fermenter. If you are a large commercial brewery the obvious solution is to pasteurize the beer and denature the AMG. While homebrew can be pasteurized, you would have to bottle carbonated beer. Obviously you do not want to pasteurize before the beer has carbonated because dead yeast equals flat beer. I am not advocating pasteurizing homebrew and consider this solution as a really bad home method.

Another way to use Beano is to add it to the mash or wort prior to boiling. This will take some experimentation to allow enough time for the AMG to do its thing to the dextrins. Since enzyme activity is accelerated by heat, you will find by trial and error how many tablets are required to affect wort fermentability without extending your brew day. The AMG used in breweries is produced by the mold *Aspergillus niger* and is stable at high temperatures, usually up to around 176 °F (80 °C). This means you can dissolve the Beano in your mash water prior to mashing or in the wort collected prior to boiling. The boiling step will denature the AMG along with the native malt enzymes and your gas problems should go away. I always thought Beano was supposed to prevent gas, not cause it!

Out of this world

I really need your help! I'm a homebrewer and a big fan of your magazine. I've got a special brewing project that may be in jeopardy, but I don't have the expertise to resolve my problem. I work on NASA spacecraft and have a unique opportunity to make beer from spacecraft parts. During certain mechanical tests, we fill the propellant tanks with water to simulate the mass that will be there once the fuel is onboard. The fuel is hazardous to handle, so we make things safer by using water during testing (same specific gravity as the fuel). I convinced the propulsion engineer to keep 15 gallons of the water that came out of the tanks of the STEREO spacecraft (www.stereo.jhuapl.edu) so I could turn it

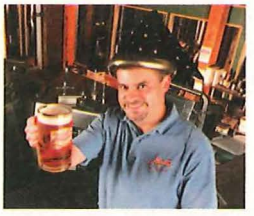
into beer. We'll serve it at the launch party. But here's the problem — they routinely perform chemical analysis of the water that comes out to ensure there was no contamination of the propulsion system. They found sodium silicate (water glass) Na_2SiO_3 in the water (~ 5 ppm). Apparently they add this to the water for some alchemical reason. I can't find enough info to tell if this is hazardous? Benign? Might slow the fermentation? Cause off-flavors? Make the drinkers ill? Do nothing whatsoever? Can you guys help out?

Michael Paul
Laurel, Maryland

This question and answer has absolutely no practical information that any reader other than you can use, but I wanted to print this whacky question because it captures the lighter side of brewing. I like it! It also reminds me of my days as a high school student going to Eleanor Roosevelt High School, down the road from Goddard Space Flight Center where you work, when I started homebrewing with my best friend in Laurel. The short answer is that sodium silicate is a very common corrosion inhibitor added to all sorts of liquids from coolant for your car to drinking water. The following URL (http://www.cdc.gov/oralhealth/waterfluoridation/engineering/wfadditives.htm) goes to a CDC website about fluoride in water and indicates that there is no limit to the concentration of silicate in water by the EPA because there are no known health risks. The National Sanitation Foundation has a maximum sodium silicate level of 16 mg/L in drinking water for turbidity reasons. I guess they figure people don't want to drink murky water. Its cousin, sodium aluminum silicate, is a common additive to granular food ingredients to prevent caking.

The 5 mg/L concentration in water, added to presumably inhibit corrosion in an aluminum fuel tank, can be used safely for homebrewing. Beer contains silicates from malt and sometimes from water and I don't think this will cause any problems with your beer.

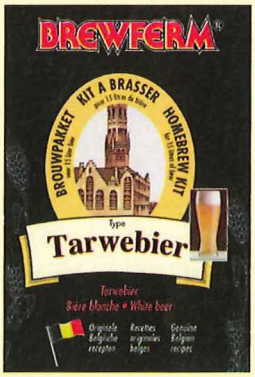
I would suggest making sure that the fuel tank was never used for anything nasty and was somehow cleaned before filling with water. If you can get the folks in the lab to give you a full-blown water report you could match your beer style with the water chemistry and brew something totally out-of-this world. Good luck!



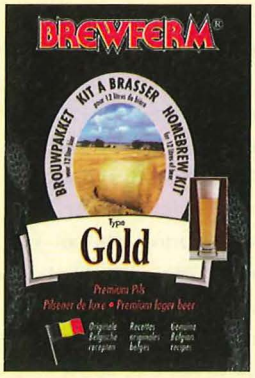
BYO Technical Editor Ashton Lewis has been answering homebrew questions as his alter ego Mr. Wizard for the last 11 years. Do you have a question for him? Send inquiries to *Brew Your Own*, 5053 Main Street, Suite A, Manchester Center, VT 05255 or send your e-mail to wiz@byo.com. If you submit your question by e-mail, please include your full name and hometown. In every issue, the Wizard will select a few questions for publication. Unfortunately, he can't respond personally. Sorry!

Get ready for a hot summer with your own great Belgian Beer !

WHEAT BEER
(For 15 litres)
A thirst-quenching, super light, blond and slightly cloudy beer with a refreshing flavour and a marvellous aroma: a real 'blanchke'.
Made from the best malts and the finest hops!
Original gravity: 1.052
ABV 5 %



BREWFERM®



GOLD
(For 12 litres)
A real deluxe lager: blond, more body, full taste, thirst-quenching with a pleasant bitterness. Made from the best malts and the finest hops!
Original gravity: 1.053
ABV 5,5 %

BREWFERM PRODUCTS
Korspelsesteenweg 86, B-3581 Beverlo – Belgium
www. brewferm.be info@brewferm.be

Dampfbier

A "steamy" brew for a hot summer day

by Horst Dornbusch

Here is a beer style that is now considered an oddity but used to be fairly common . . . at least until the late 19th Century. This brew was mostly popular in southeastern Bavaria near the Czech border. Dampfbier (literally, steam beer) is only made today by a handful of breweries in Germany. Dampfbier is an all-barley ale, brewed mostly in the summer. It is medium-bodied, very gently hopped (only about 14 IBU), low in effervescence and, by German standards, warm-fermented at slightly above 70 °F (21 °C). It is made with a standard Bavarian Weissbier yeast, which gives the beer a slightly phenolic aftertaste.

The "Dampf" in Dampfbier comes from the fact that this ale produces copious amounts of bubbles during its fast and vigorous primary fermentation. As these surface bubbles burst, they give the appearance — at least to the uninitiated — that the ferment is boiling, even giving off "steam."

Dampfbier is not imported into North America, which is a perfect reason for experimenting with it as a homebrewer. The most prominent modern exponent of this unusual ale style is the Erste Dampfbierbrauerei ("The First Steam Beer Brewery") of the small of town of Zwiesel in the Bavarian Forest, and our recipe is based loosely on this Zwiesel brew. The beer's raw material composition and its brewing process are based on a conversation with Mark Pfeffer, the current owner of the Erste Dampfbierbrauerei. Herr Pfeffer is a descendant of Wolfgang Pfeffer, who opened the "First Steam Beer Brewery" in 1889. In the late

photos courtesy of Horst Dornbusch

Dampfbier Zwiesel was featured at this tasting during the 125th anniversary celebration of the Bavarian Brewers Federation in July 2005. "Style Profile" columnist Horst Dornbusch was in attendance.

Dampfbier by the numbers

OG	1.048 (12 °P)
FG	1.010 (2.5 °P)
SRM	3–8
(depending on Lovibond rating of Munich malt)	
IBU	14
ABV	nowadays 6–8%

RECIPE

A Steamy Bavarian Brew

(5 gallons/19 L, all-grain)
OG = 1.048 FG = 1.010
IBU = 14 SRM = 8 ABV = 5%

Ingredients

7.0 lbs. (3.2 kg) Weyermann Pilsner malt (2 °L)
3.0 lbs. (1.4 kg) Weyermann Munich Type I malt (6 °L)
4 AAU Hallertauer Mittelfrüh hops (45 mins) (1.0 oz./28 g of 4% alpha acids)
0.5 oz. (14 g) Hallertauer Mittelfrüh hops (0 mins)
Wyeast 3068 (Weihenstephan Weizen) or White Labs WLP380 (Hefeweizen IV) yeast
½ cup light dry malt extract (optional, for priming)

Step by Step

Use about 4 gallons (about 15 L) of water to create a thin single-infusion mash at about 152 °F (67 °C). Let rest for about an hour. Start sparging and let the grain-bed temperature rise to about 168 °F (76 °C). Sparge for about an hour, until the kettle gravity is about 1.054 (13.5 °P). Boil for 60 minutes. Add bittering hops 15 minutes into the boil. Add the flavor/aroma hops at shut-down. Check the gravity. It should be around 1.048 (12 °P) after evaporation losses. Liquor the wort down if necessary. Using a spatula, gently create a whirlpool in the kettle and wait for a few minutes for the trub to settle.

Siphon about one quart or one liter of hot wort into a sealable container. Let this wort cool off and store in the refrigerator. Heat-exchange to a pitching temperature anywhere between 68 °F (20 °C) and 77 °F (25 °C). Pitch the yeast and aerate. Primary fermentation should be complete within no more than three days. Rack the brew, preferably into a Cornelius keg. Add saved, fresh wort for kräusen. Maintain Cornelius pressure at 7–8 PSI (or roughly 0.5 atmospheres) during a two-week secondary fermentation. If you do not use a Cornelius keg, let secondary fermentation take place without pressure.

If you carbonate the brew in a Cornelius keg, either dispense it

recipe continued on page 20

recipe continued from page 19

photo courtesy of Horst Dornbusch

Dampfbierbrauerei Zwiesel *in Zwiesel, Germany, is located within the Bavarian Forest, the place where beer historians believe the Dampfbier originated. At the brewery they make multiple versions of Dampfbier, one being a Dampfbräu Pils.*

after an additional four weeks of maturation in a cool cellar, or release the keg pressure slowly after secondary fermentation and prime the brew (best done by adding a quarter teaspoon of light DME to each bottle) and fill the bottles from the keg. If secondary fermentation took place in a carboy, rack the brew once more, then prime and bottle it. Use no more than half a cup of DME for priming, though, because the brew is relatively low in effervescence. A good way to prime this beer is to add about a quarter teaspoon of light DME to each bottle before filling it. Lager in a cool cellar for about a month.

A Steamy Bavarian Brew

(5 gallons/19 L, extract with grains)
OG = 1.048 FG = 1.010 IBU = 14
SRM = 5.2 ABV = 5%

Ingredients
5.25 lbs. (2.4 kg) Weyermann Bavarian Pilsner liquid malt extract
2.0 lbs. (0.91 kg) Weyermann Munich Type I malt (6 °L)
4 AAU Hallertauer Mittelfrüh hops (45 mins) (1.0 oz./28 g of 4% alpha acids)
0.5 oz. (14 g) Hallertauer Mittelfrüh hops (0 mins)
Wyeast 3068 (Weihenstephan Weizen) or White Labs WLP380 (Hefeweizen IV) yeast
½ cup light dry malt extract (optional, for priming)

Step by Step
Crack and steep the Munich malt in a muslin bag in about a gallon (4 L) of 170°F (77°C) water for about an hour. Lift bag, rinse with several cups of cold water and discard. Mix LME with about 4 gallons (15 liters) of hot brewing liquor. Add "grain tea" to kettle. Bring to a boil and follow equivalent instructions for all-grain recipe.

A Steamy Bavarian Brew

(5 gallons/19 L, extract only)
OG = 1.048 FG = 1.010
IBU = 14 SRM = 8 ABV = 5%

Ingredients
4.6 lbs. (2.1 kg) Weyermann Bavarian Pilsner liquid malt extract
2.0 lbs. (0.9 kg) Weyermann Munich Oktoberfest liquid malt extract
4 AAU Hallertauer Mittelfrüh hops (45 mins) (1.0 oz./28 g of 4% alpha acids)
0.5 oz. (14 g) Hallertauer Mittelfrüh hops (0 mins)
Wyeast 3068 (Weihenstephan Weizen) or White Labs WLP380 (Hefeweizen IV) yeast
½ cup light dry malt extract (optional, for priming)

Step by Step
Mix liquid malt extract with 5 gallons (19 L) of hot brewing liquor. Bring to a boil and follow equivalent instructions for all-grain recipe.

Nineteenth Century, Dampfbier ale — like its lager cousin, the Bavarian dunkel — was a dark brew. Today, however, Dampfbier comes mostly in a deep golden to light amber color. Its appearance in the glass resembles that of a pale Vienna lager.

Dampfbier, a forgotten brew

The former Speaker of the U.S. House of Representatives, Thomas "Tip" O'Neill, once said "all politics is local," referring, of course to the roots of democratic political power in a system of government "of the people, by the people and for the people." The same holds true for beer, the drink "of the people," because historically, before mankind had developed sophisticated means of transport, all beer, too, was local, composed of local ingredients only and consumed by the locals. Brewers had to take what was readily at hand and then make do — lest the people go thirsty. Considering the variation of agricultural and climatic conditions, beers varied naturally from one locale to the next — as is still the case in such places as Belgium and Franconia. The concept of "style" as a collective beer category stretching over time and geography really did not apply then. Therefore, there were just beers, thousands of them, but no styles in the modern sense. Styles could only emerge as beers became regionalized, nationalized and indeed internationalized, in terms of ingredients, processes and markets. Many beers simply were not able to transform themselves into beer styles and became largely forgotten links in the evolutionary chain of modern beer. The Dampfbier appears to be just such a forgotten brew.

The poor folk's drink

The Bavarian Forest has always been one of the poorer regions of Bavaria and, indeed, Germany. Not surprisingly, wheat (weizen in German) was considered much too precious to be used in beer as the city folk did with their weissbier in Munich, and hops from the nearby Hallertau region (which now produces about one-third of all the world's hops) was just too expensive for the poor Bavarian Forest dwellers. For flavoring, therefore, there was nothing but low-quality local hops.

Lager beer-making, too, which requires careful temperature control to turn out well, was also out of the question for these Bavarians. It was just too complicated a brewing technique. Out of these limitations was thus born the Dampfbier, a poor man's barley ale with only a minimal amount of hop flavor. If Munich could have its hefeweizen, the Forest could have its "hefegerste" (hefe-barley), so to speak. The brew was fermented in wooden vats at ambient temperature and then transferred into wooden lagering casks. The Dampfbier makers kept these casks in cellars dug deep into the region's hills and rocks. These shafts were vented by aeration shafts more than 30 feet (10 meters) long. Many of these lagering cellars are still in use today.

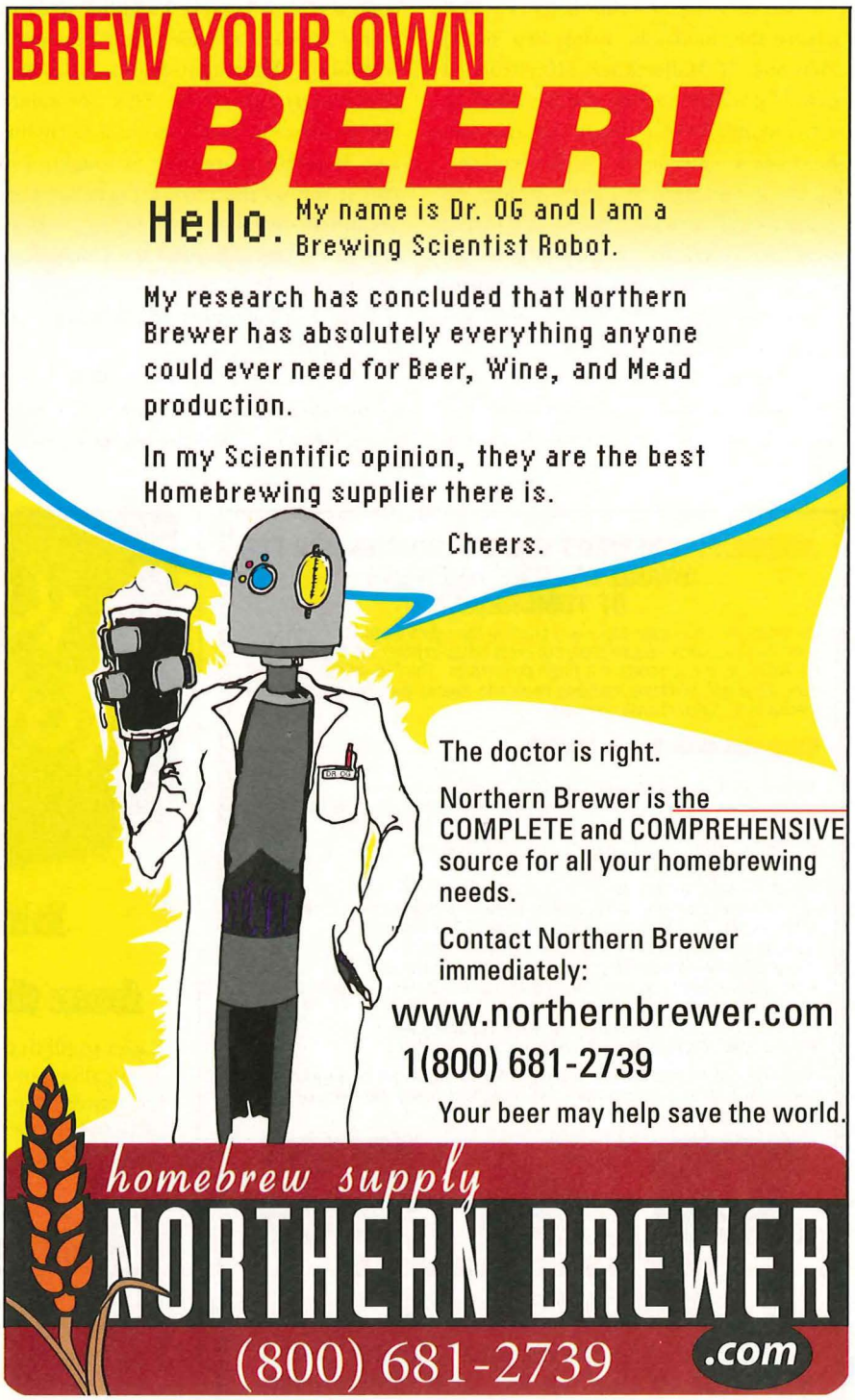
By the early 20th Century, however, with rail transportation and prosperity both on the ascent in Germany, the Dampfbier style slowly vanished until nobody made it any more. It was revived for the first time only in 1989, when the First Dampfbier Brewery made it again to commemorate its founder on the occasion of the brewery's centenary. Since then, the brew has been making a slow comeback.

There are several parallels, incidentally, between this Old World Dampfbier and its New World namesake, the California common (or steam beer, a name for which the Anchor Brewing Company of San Francisco now owns a registered trademark). Both beers evolved almost accidentally in relative remoteness and as a result of the raw materials and brewing processes that were available locally — in the backwaters of Bavaria in the Dampfbier case, and in the rough and tumble outpost of San Francisco during the gold rush days, in the California Common case. Necessity, it seems was the mother of both inventions. Both are brews fermented at what would normally be considered excessively high temperatures. But there is one key difference: the yeast. The California steam brew is a lager, while the Bavarian steam brew is an ale.

The Dampfbier brewing process

The grain bill of a Dampfbier is very simply: a 70/30 mix of Pils and Munich malt. The Pils malt has a Lovibond rating of about 2 °L, while the Munich malt may have one anywhere between 6 °L and 20 °L. For a better flavor balance, considering the Dampfbier's low IBU-value of roughly 14, brew it with the palest Munich malt you can find. The original gravity of a Dampfbier is a standard 1.048 (12 °P), which requires a total grain bill of approximately 8 lbs. (3.7 kg) at an assumed system's extract efficiency of 65%. The split between Pils and Munich malt is thus 5.7 lbs. (2.6 kg) and 2.4 lbs (1.1 kg), respectively. Because the beer finishes relatively dry, a single-step infusion temperature of 152 °F (67 °C) is a good target.

The liquid malt extract (LME) equivalent for the Dampfbier grain bill is about 6.6 lbs. (~ 3 kg), based on a nominal 80% maltose content. Extract brewers can use



a combination of canned Pils and Oktoberfest LME at a ratio by weight of 70/30, that is roughly 4.6 lbs. (2.1 kg) and 2 lbs. (0.9 kg), respectively.

A grain-plus-extract brewer should crack and steep the Munich malt while mixing 6.6 lbs. (~3 kg) Pils LME in the kettle. (An extract late approach may work better if your brewpot is small.)

In the kettle, the modern Dampfbierbrauerei deviates from the traditional practice of using inferior hops. We will imitate this model by using two small) additions of Hallertauer Mittelfrüh at about 4.2% alpha acids, one for bittering at the standard 15 minutes into the boil, the other at shut-down. Let the trub settle for a few minutes, then siphon off about a quart or a liter of hot, still sterile wort into a jar with a tight-fitting lid. Let it cool off and then store it in the refrigerator. Use this wort as kräusen at the end of primary fermentation.

Ferment this all-barley beer with a Bavarian wheat beer (weissbier/hefeweizen) yeast (see recipes). In the old days, Dampfbier was fermented in open vats at a temperature of 64–68 °F (18–20 °C). Today, the First Dampfbier Brewery of Zwiesel uses a very warm 77 °F (25 °C) to ferment its beer and primary fermentation is completely finished after just two or three days, at which point the brew is racked and the quart or liter of kräusen is added for a two-week secondary fermentation in a closed (*gespundet*) fermenter. This secondary fermentation is best done in a Cornelius keg. Maintain a pressure of roughly 7–8 PSI. If you do not have a Cornelius keg, secondary-ferment the brew without pressure. After filtering, the Dampfbierbrauerei packages its brew in kegs and bottles. For homebrewers, filtering is of course optional.

Ferment this all-barley beer with a Bavarian wheat beer (weissbier/hefeweizen) yeast.

If you do not use a Cornelius keg to carbonate your brew as the kräusen is being fermented, but secondary-fermented it in an (unpressurized) carboy, you may wish to rack the brew once more before packaging and priming it. Use no more than half a cup of dry malt extract (DME) for priming, though, because the brew is relatively low in effervescence. A good way to prime this beer is to add about a quarter teaspoon of light DME to each bottle before filling it. Lager in a cool cellar for about a month.

If you mature your brew under pressure in a Cornelius keg, and you choose not to filter it, you can dispense it directly from the keg without additional racking or priming.

There are no fixed rules for the serving temperature of Dampfbier. Subjectively, because this beer is very low in hops, I found it more refreshing on the palate if it is served chilled right out of the refrigerator at about 40 °F (4 °C).

Horst Dornbusch is an award-winning beer writer, brewer and the owner of Cerevisia Communications, a PR agency for the international beverage industry.

AMERICAN BREWERS GUILD STUDENTS ARE THE AWARD-WINNING BREWERS OF TOMORROW!

Our graduates once again took many prizes in this year's World Beer Cup! Held April 11-13 in Seattle, Washington, this event brings together the finest beers in the entire world to compete in a single competition. The Festival's professional panel of judges evaluates attending beers and awards gold, silver and bronze medals in 81 different style categories.

Congratulations to our alumni:

- Leslie Henderson, *Lazy Magnolia Brewing Co.* (Kiln, MS) (2 awards)
- Bob Craig/Jacob Leonard, *Walking Man Brewing* (Stevenson, WA) (2 awards)
- Eric "Hutch" Kugeman, *Great Adirondack Brewing Co.* (Lake Placid, NY)
- Chuck Silva, *Green Flash Brewing Co.* (Vista, CA) (2 awards)
- Jim Leach, *Etna Brewing Co.* (Etna, CA)
- Robert "Beaux" Bowman, *Ram/Big Horn Brewing* (Seattle, WA)
- Jack Johnson, *Glenwood Canyon Brewing Co.* (Glenwood Springs, CO) (2 awards)
- Andy Ingram, *Four Peaks Brewing Co.* (Tempe, AZ) (2 awards)
- Greg Hinge, *Brew Brothers Brewery* (Reno, NV) (2 awards)
- Gordon Grubbs, *Nodding Head* (Philadelphia, PA) (2 awards)
- Darren Welch/Ben Love/Todd Campbell, *Pelican Pub & Brewery* (Pacific City, OR) (2 awards)
- Christian Ettinger, *Laurelwood Brewing Co.* (Portland, OR)
- Charlie Kling, *Diamond Bear Brewing Co.* (Little Rock, AR)

Plus, Guild alumni who are prominent brewing assistants netted six medals for beers they help to brew and two Guild instructors' beers also medaled in this year's judging.

American Brewers Guild

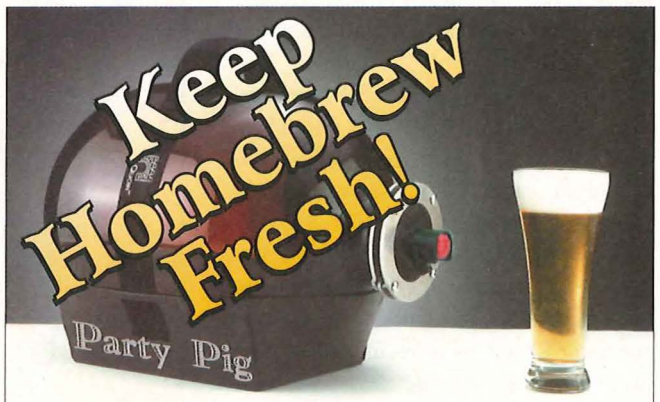
AMERICAN BREWERS GUILD BREWING SCHOOL

Training the brewers of tomorrow today!

2006 sessions are already full – we're currently accepting applications for our February 2007 session.

Call us or email for more information (800) 636-1331

www.abgbrew.com • email: info@abgbrew.com



Maintain carbonation and freshness from the first glass to the last.

Easier to fill than bottles - No pumps or Co_2 systems • Holds 2.25 gallons of beer - Two "Pigs" are perfect for one 5 gallon fermenter • Patented self inflating Pressure Pouch maintains carbonation and freshness • Perfect dispense without disturbing sediment • Simple to use - Easy to carry - Fits in the "fridge" • Ideal for parties, picnics and holidays.

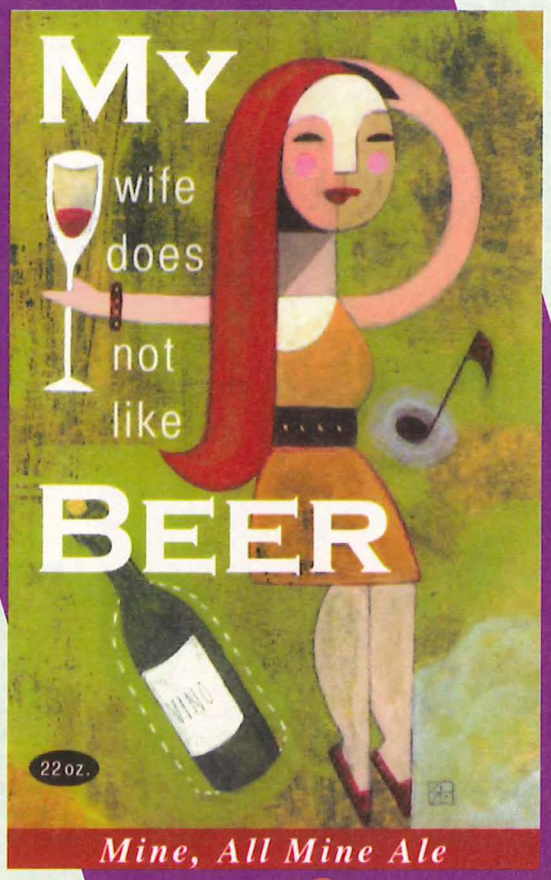
Quoin pronounced "coin"
401 Violet Street
Golden, CO 80401
Phone 303•279•8731
FAX 303•278•0833

partypig.com

It's time to try a **Party Pig**©
(self-pressurizing)
beer dispenser
Just PRESS, POUR & ENJOY!

06 11th annual laBEL contest WINNERS

Every year we make room in our *Brew Your Own* warehouse for the onslaught of packages containing your homebrewed labels. OK, *BYO* doesn't have a warehouse, but the pile of boxes in the editorial office is getting bigger every year. In fact, our intern's desk was buried for over a month as the labels rolled in. And every year the Label Contest gets a little more difficult to judge. We fly in Editor Chris Colby from his satellite office in Bastrop, Texas, call in our panel of dedicated judges and assemble around "The Big Table" in our Manchester, Vermont headquarters. The judging process is more sophisticated than anything the BJCP could fathom . . . but it WORKS! When it was all said and done (26 hours and many broken hearts later) we had a Grand Champion. We had a Gold, Silver and Bronze medalist. We had 19 honorable mention winners and 16 Editor's Choice labelists. Our hats go off to all of you — *Cheers!*

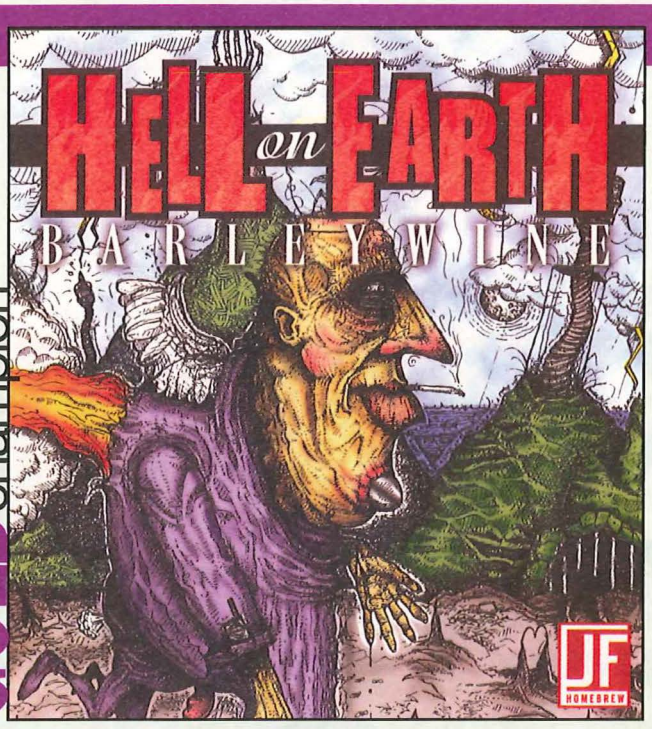


Barry Fitzgerald • Lawrence, KS

This label was inspired by an acrylic painting of Barry's. The painting was one in a series of images depicting women, music and wine. Barry's wife is not a beer drinker and his friends speculate that it is unfortunate that she doesn't appreciate his homebrew efforts. In his mind, the situation leaves more homebrew for him!

Prizes: Gift Certificate from **Grape and Granary**; Infrared thermometer from **Tempgun.com**; Party Pig set-up package from **Quoin Industrial**; Gift Certificate from **Quality Wine and Ale Supply**.

GOLD champion

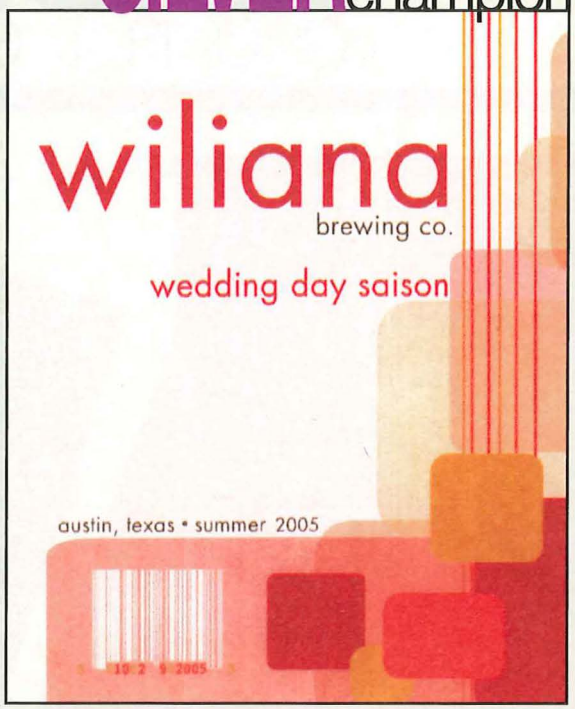


Joe Myers • Sheboygan Falls, WI

This label was inspired by Joe's father-in-law's "very special barleywine." In a letter to us, Joe referred to this concoction as the "Mother of All Hangovers." The label is pen and ink, scanned into Photoshop, colorized and embellished with the logo. Joe comments that "every detail was carefully considered as to fully illustrate the supernatural stupor that resulted from enjoying some of the finest barleywine on the planet Earth!"

Prizes: Counter-pressure bottle filler from **Foxx Equipment Company**; Gift certificate from **High Gravity Homebrewing and Winemaking**; Yeast coupons from **White Labs, Inc.**; Gift certificate from **Quality Wine and Ale Supply**.

SILVER champion

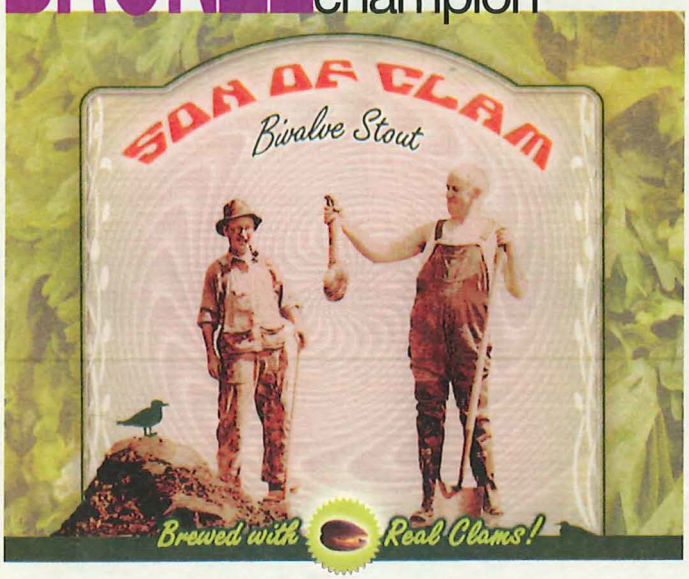


Will McNair • Austin, TX

This label was designed by Will's sister-in-law for he and his wife Iliana's wedding. As a joke, their friends called them "Wiliana," so they named their home brewery after the term. The Saison was just one of seven beers served at the wedding, all with their own label. They saved a few six packs of each for memorabilia.

Prizes: Keg charger and two 6-packs of cartridge refills from **Genuine Innovations**; Six Molson tulip glasses from **BeerCollections.com**; Gift certificate from **Quality Wine and Ale Supply**.

BRONZE champion



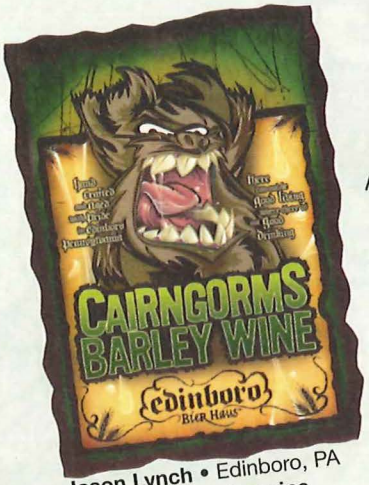
Lenny Eckstein • Golden, CO

This label and beer came to be during Lenny's two-year stint in Boston, Massachusetts. After he realized that New England has "one hell of a beer scene," and some "bomb @#$ fried clams," he felt obligated to produce something to commemorate his short residence in the area. The beer came first, it was brewed using 8 ounces of fresh minced New England clams, added during the last 20 minutes of the boil. The label was a work in progress for the following year, and after catching wind of the Label Contest, he wrapped it up and sent it in. Lenny says the beer was "actually quite good," and we here at *BYO* agree that at least the label was worthy of a prize!

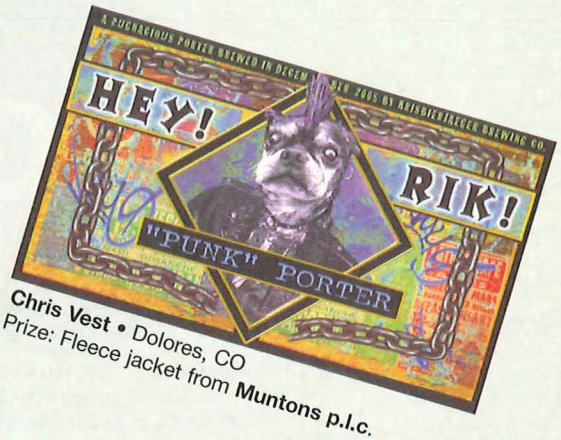
Prizes: Fleece jacket from **Muntons p.l.c.**; Yeast coupons from **White Labs, Inc.**; Gift certificate from **Quality Wine and Ale Supply**.

HONORABLE MENTION

Gabriel Follis • Elgin, IL
Prize: Yeast coupons from **White Labs, Inc.**; Gift certificate from **Quality Wine and Ale Supply.**

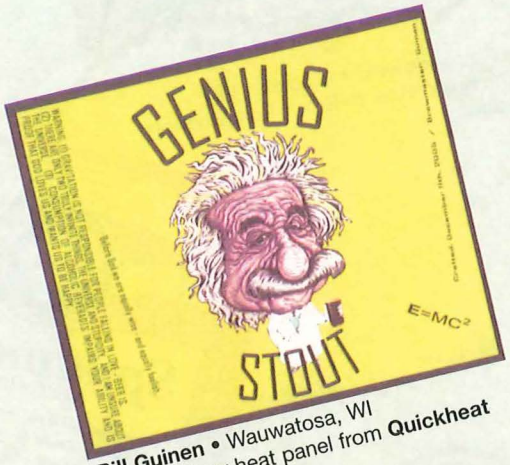


Jason Lynch • Edinboro, PA
Prize: Mug from **Genuine Innovations.**

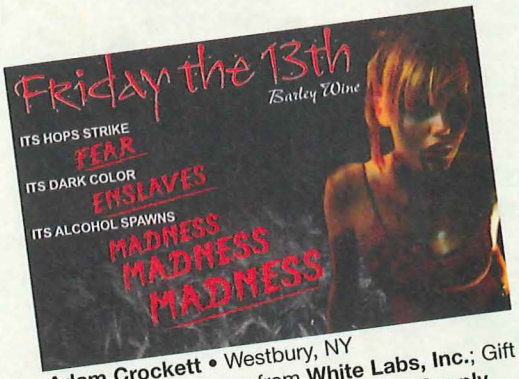


Chris Vest • Dolores, CO
Prize: Fleece jacket from **Muntons p.l.c.**

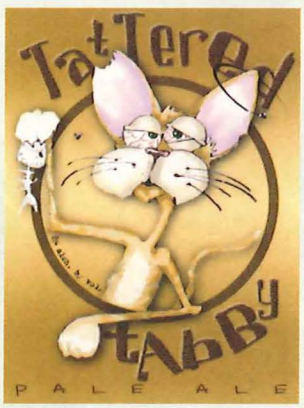
J.C. Romero • Fullerton, CA
Prize: Gift certificate from **Homebrewers Outpost.**



Bill Guinen • Wauwatosa, WI
Prize: Carboy heat panel from **Quickheat Exports Ltd.**

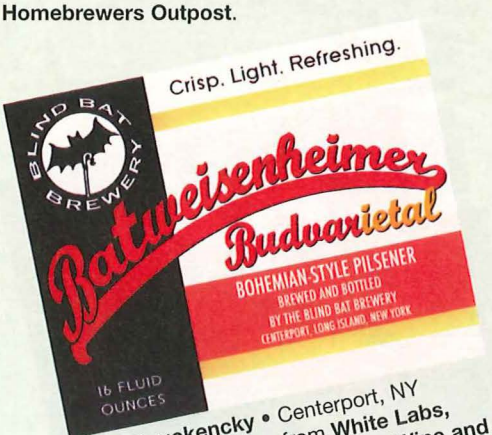


Adam Crockett • Westbury, NY
Prize: Yeast coupons from **White Labs, Inc.**; Gift certificate from **Quality Wine and Ale Supply.**

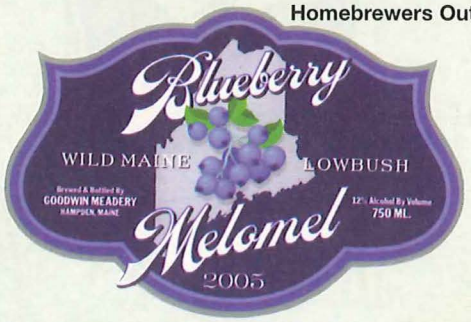


Lydia Martin • Escondido, CA
Prize: Gift certificate from **Homebrewers Outpost.**

William Norris • Carolina, Puerto Rico
Prize: Bottle opener from **Genuine Innovations.**



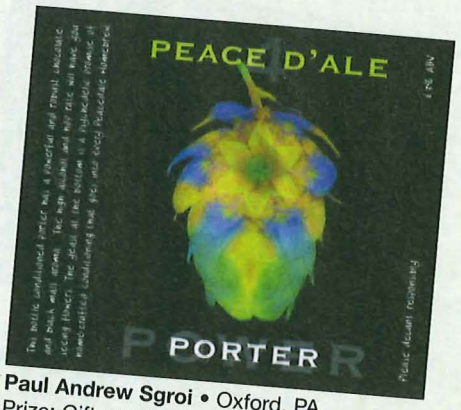
Paul Dlugokencky • Centerport, NY
Prize: Yeast coupons from **White Labs, Inc.**; Gift certificate from **Quality Wine and Ale Supply.**



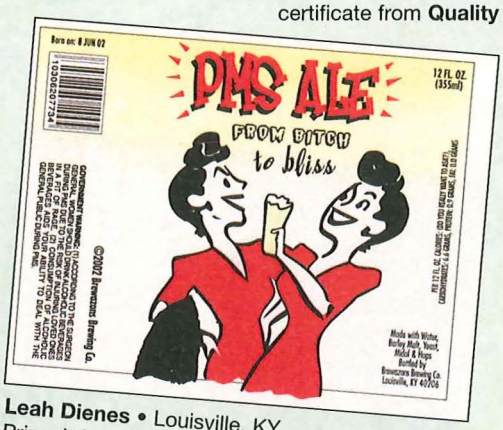
Jen Goodwin • Hampden, ME
Prize: Hooded sweatshirt from **White Labs, Inc.**

HONORABLE MENTION

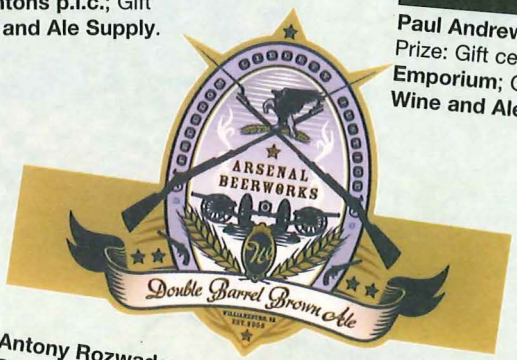
Tim Gerst • Boynton Beach, FL
Prize: Fleece jacket from **Muntons p.l.c.**; Gift certificate from **Quality Wine and Ale Supply**.



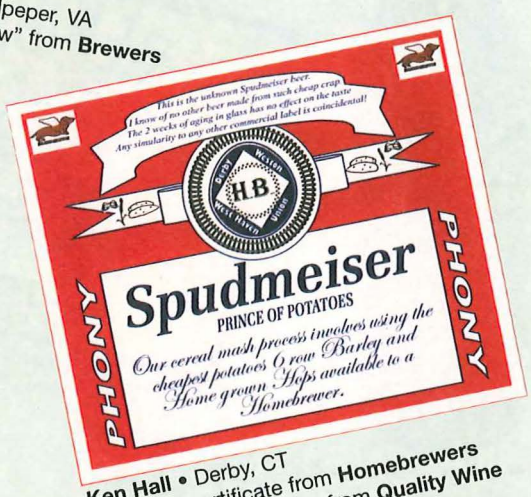
Paul Andrew Sgroi • Oxford, PA
Prize: Gift certificate from **Wine & Beer Emporium**; Gift certificate from **Quality Wine and Ale Supply**.



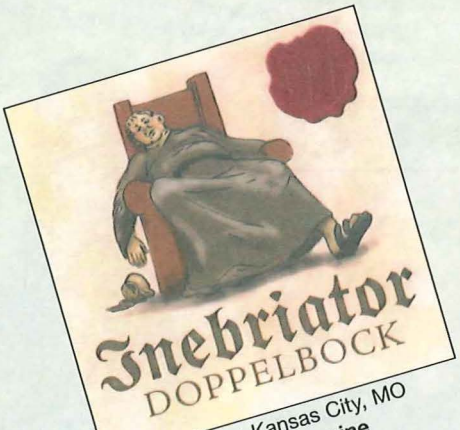
Leah Dienes • Louisville, KY
Prize: Infrared thermometer from **Tempgun.com**.



Antony Rozwadowski • Culpeper, VA
Prize: The book "How to Brew" from **Brewers Publications**.



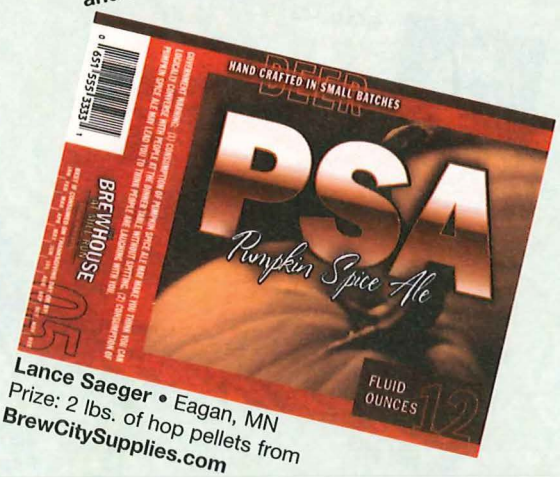
Ken Hall • Derby, CT
Prize: Gift certificate from **Homebrewers Outpost**; Gift certificate from **Quality Wine and Ale Supply**.



Jim Wagner • Kansas City, MO
Prize: T-shirt from **Genuine Innovations**.

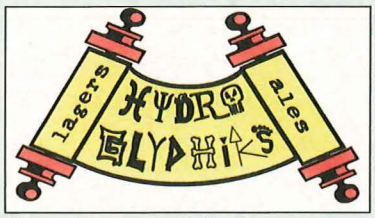
Mike Johnson • Eagle River, AK
Prize: Gift certificate from **Homebrewers Outpost**.

Ken Melnrick • Fort Collins, CO
Prize: Long sleeve denim shirt from **White Labs, Inc.**

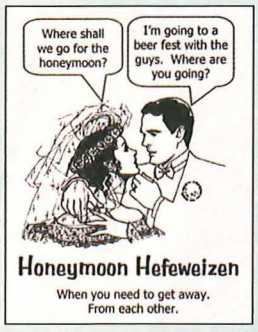


Lance Saeger • Eagan, MN
Prize: 2 lbs. of hop pellets from **BrewCitySupplies.com**

EDITOR'S CHOICE

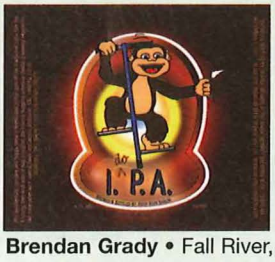


Adam Draeger • Pella, IA



Ben Schwalb • Severna Park, MD

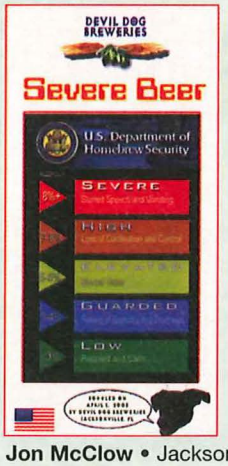
Bo Herter • Corona, CA



Brendan Grady • Fall River, MA

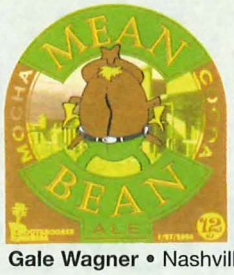
Dale Elster • Auburn, NY

Ian Stallman & Ryan Korkos
Findlay, OH



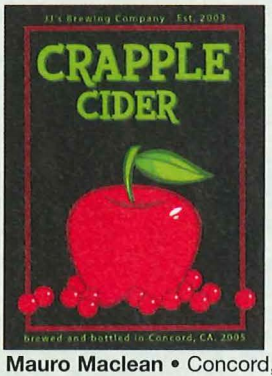
Jon McClow • Jacksonville, FL

Kipp Ots • Oxnard, CA

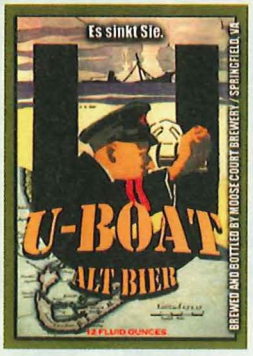


Gale Wagner • Nashville, TN

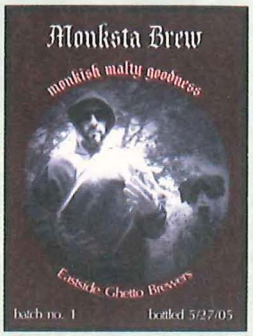
Madeline Faiella • Hollywood, FL



Mauro Maclean • Concord, CA

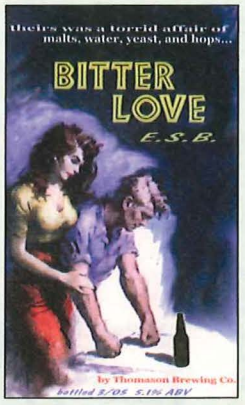


Robert Sherrill • Springfield, VA



Gary Hunt • Tulsa, OK

C.J. Hall • Madison, WI

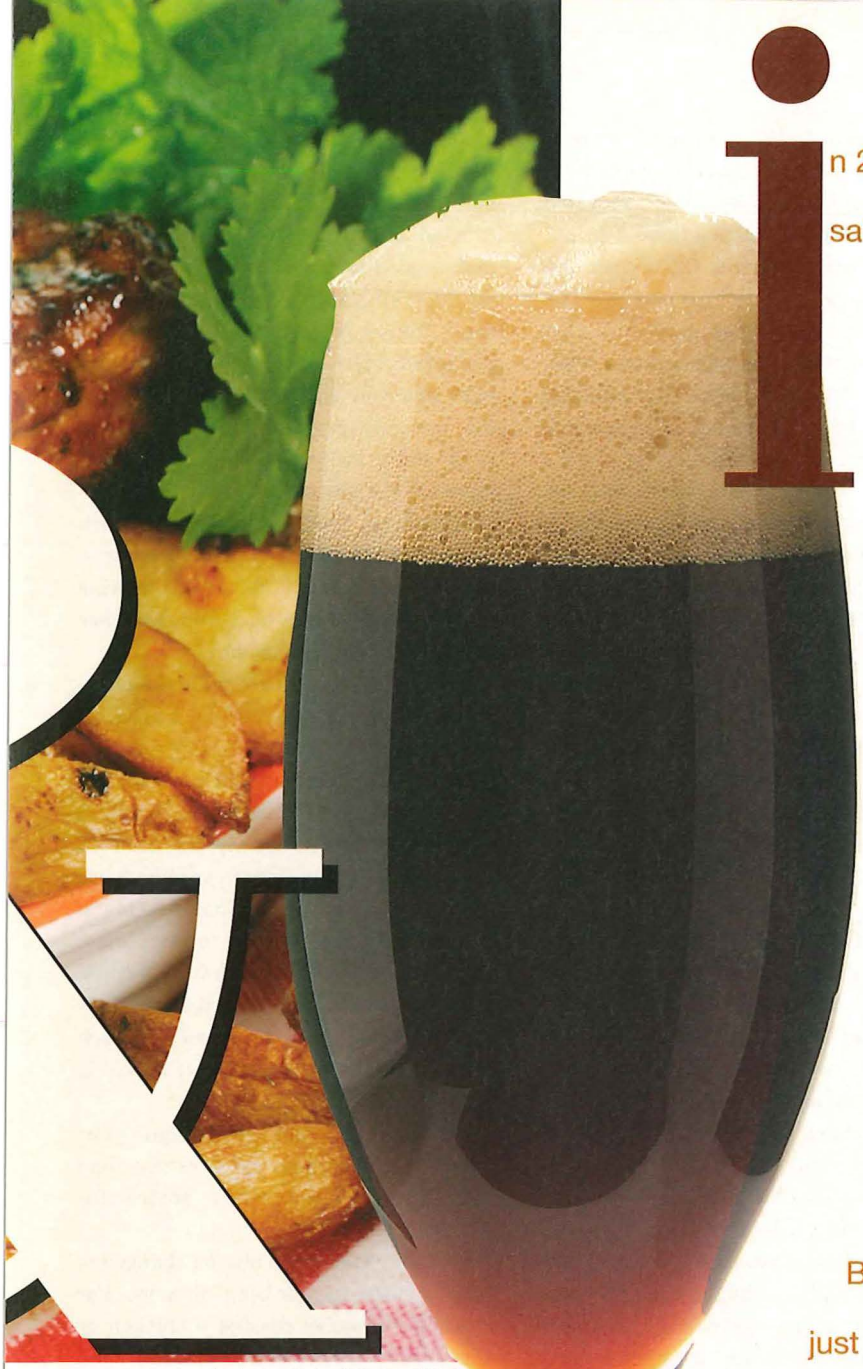


Tray Thomason •
Carlsbad, California

FOOD & BEER PAIRING...

the inside scoop

by **Kristin Grant**



photos by charles a. parker/images plus

In 2003, **GARRETT OLIVER** set out on a colossal endeavor: to convince the general public that the most pleasurable pairings of food and beverage are not accomplished with wine alone. In fact, Oliver argues in his book, "The Brewmaster's Table: Discovering The Pleasures Of Real Beer With Real Food" (2003, Ecco) that the complexities and range of flavors inherent in beer leave diners with little choice but to serve Märzenbier with charred steak or oatmeal stout with cheesecake. Several awards later, including the 2004 International Association of Culinary Professionals (IACP) book award, and a finalist nod for the prestigious James Beard Foundation Book Award, Oliver's plan just might be working.

The first obstacle Oliver had to overcome was redefining many Americans' concepts of beer. As Oliver, brewmaster of the Brooklyn Brewery, notes in his book, "If you've tasted only mass-market beer, I'm afraid that you haven't actually tasted beer at all."

photos courtesy of PDphoto.org

The wide range of flavors and aromas in beer — from a crisp, pale lager to the roastiest stout — make it a perfect companion to almost any food. A beer and food pairing should create a taste experience greater than the sum of its parts.

Discovering Real Beer

The truly flavorful, particularly complex beers of which Oliver speaks spark a moment of discovery when first tasted, much like hearing a certain type of music for the first time.

"Think of it this way: if you are a big jazz fan, there came one day when somebody played you your first Coltrane record or your first Miles Davis record, and it might have been a small moment," Oliver says. "It might have only lasted five minutes, ten minutes or half an hour, but on that day, a little door opened up for you and on the other side of that door was a better life. You will now be a jazz fan, and you will get lots of pleasure over the course of your life from the enjoyment of jazz. So, I look at teaching people about beer as being something very similar to that, which is a small moment that turns into something you can enjoy for the rest of your life."

Oliver vividly recalls his first experience with true beer, 20 years ago and fresh out of college. "When I first had cask-conditioned beer in England, it was genuinely an epiphany for me," he says. "I had never known that beer could be so interesting and complex and enjoyable. Before that, beer was just there."

The second barrier Oliver met was convincing wine-lovers that beer provides a much broader range of flavors than wine. "Beer flavor is much, much wider than wine flavor," he says. "You go all the way from imperial stout to a Belgian-style wheat beer, and even in those two styles, you have a much wider range of flavor than you have from the lightest white wine to the heaviest red wine."

"Really, the big take-home message about beer is that you have wonderful complexity, you have wonderful abilities for food matching, you have a much wider range of flavor to work with."

Oliver is so sure of his conviction that foods — even desserts — pair well with beer, that one time, Oliver invited the top sommeliers of New York City to a luncheon at Gramercy Tavern and challenged them to come up with the name of one wine that paired better with the rich, chocolate desserts, than his beer selection. The wine enthusiasts were shocked at Oliver's audacity, and many admitted afterward that they had "beer epiphanies."

According to Oliver's book, those poor sommeliers were sitting ducks. "My challenge was a bit unfair — wine never stood a chance. I served my own Brooklyn Black Chocolate Stout, an imperial stout with a huge, complex dark chocolate and coffee flavor, and Lindemans Framboise, a sweet Belgian lambic fermented with outrageously fragrant raspberries."

Beer. Food. Food. Beer.

Oliver acknowledges that food and beer have had an ongoing relationship for the past thousand years. However, his book aims to formalize this relationship. According to the New York Times, Oliver's knack for pairing the two is "brilliant." Here is what he told *Brew Your Own* regarding pairing food and beer:

"First, you're going to start off by making sure that one does not overwhelm the other, and that's what I refer to as matching up the 'impact' of the food and the beer." To Oliver, "impact" is generated by the intensity and weight of the food. "We want the beer and food to engage in a lively dance, not a football tackle."

"So, it's pretty simple. You want to make sure that you're not going to serve an imperial stout with delicate fish," he says. "You're not going to serve a really powerfully spicy dish with a beer that's so light that you would be unable to taste the beer. Once you've done that, then really the principles come down to finding what the harmonies are between the beer and the food. Wine tends to work more on a contrast basis, so you have a contrast between the flavor of the wine and the flavor of the food, whereas beer is better at being a harmony."

"Flavors such as caramelized flavors, for example, in food can be linked up with caramelized flavors in beer, and that tends to be a really pleasant combination. And you can take it from there."

Certain herbs and spices used in cooking lend themselves to specific types of beer. "I would say that rosemary, thyme, and tarragon tend to work quite well with beers that have herbal flavors, and that would include Belgian tripels and dubbels, and especially French bières de garde, which are very herbal in their flavors," Oliver says.

If you'd prefer to design your meals to match your beer rather than vice versa, Oliver offers advice for dish selection.

"Your cooking can also be changed to bring it closer to your beer," he says. "For example, if you've roasted a chicken or something, you might decide before you serve it that you're going to pan sear the surface, to slightly blacken the surface of the skin. So you might take a leg off, and then toss it into a hot pan for a couple of minutes. Hopefully the skin is brown anyway, but then you turn it dark brown. That's going to make that particular dish pair up even better with a beer that has caramelized or roasted flavors, because you've developed even more of that kind of character in the dish itself."

Oliver warns that, as an exception to the rule, some seemingly complementary flavors do not pair well. "I think that many people will try to pair barleywines with dessert, because they have some residual sweetness. However, despite the fact they have residual sweetness,

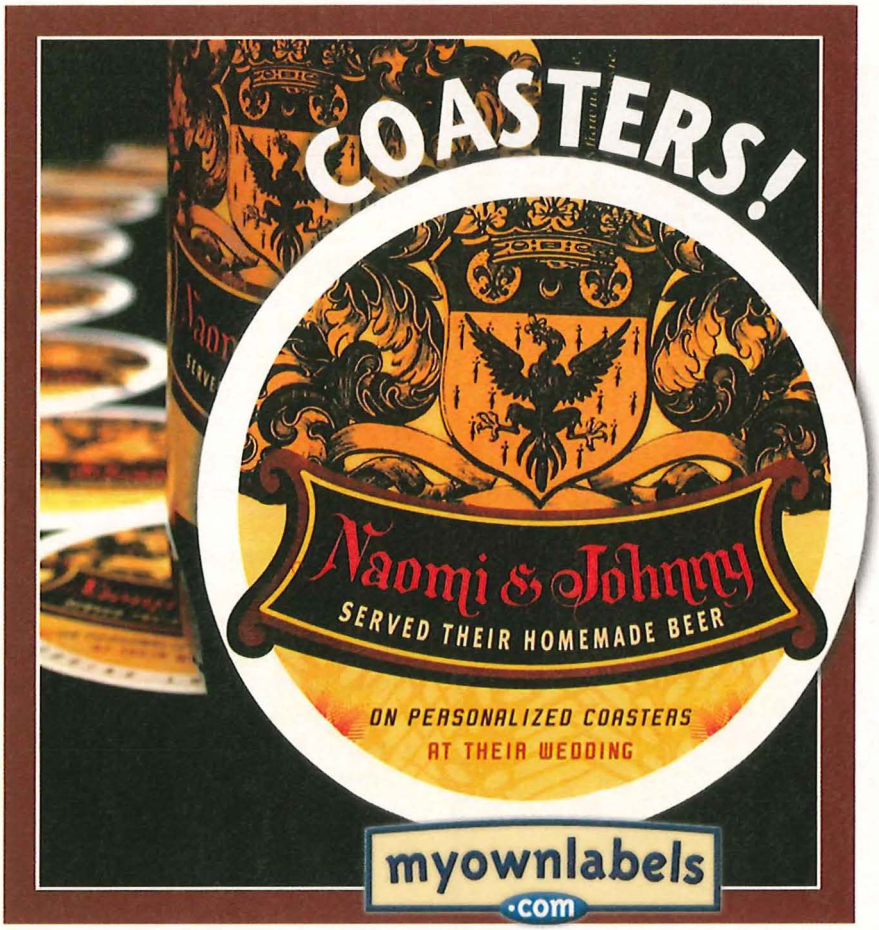
usually they also have a very high level of bitterness," Oliver says. "You have to be fairly careful to see whether or not that's going to work. Aside from that, I've seen all kinds of interesting attempts at pairings: IPAs with chocolate, for example, which I've never really quite got, but some people might like."

Pairing the perfect beverage, whether beer or wine, proves difficult for one common dish. "To this day, I have to say I still have not found something that's entirely convincing with a straight tomato sauce with no cheese, when it comes to beer," he says. "It's also the most difficult thing to pair with wine. My friends who are sommeliers tell me that basically they recommend the rosé and then they go and hide. There's nothing you can do that truly matches with a straight marinara sauce."

Some dinner themes tend to go better with beer than any type of wine. "Last night I was out eating Indian food at one of the places where we did some pictures for the book, Tabla," Oliver says. "They have a very nice wine list, but even the general manager there says that their beer list, which is quite considerable, really works with the food much better than the wine list since the food is all very spicy. The flavor profiles just tend to work better with beers."

Indian cuisine doesn't stand alone as an ethnic cuisine pairing better with beer than with wine. "Thai food, which does tend to be spicy, is much too spicy for most wines," Oliver says. "You could apply that also to Vietnamese and a couple of other Asian cuisines. And then there's Mexican food, which I have generally found to be very complementary to beer and not that friendly to wine. Also, sushi, which I think is great with sake, I've never found it to be at all convincing with wine," Oliver adds, "but beer can work wonderfully with it, especially wheat beers, which is one reason why in Japan now, they have their own microbrewing revolution. You see people brewing lots of Belgian and German style wheat beers because they have chosen a style which works well with the local cuisine."

So, several ethnic foods pair well with beer. What about regular-old-cook-out foods? Not to fear. "The same is true of

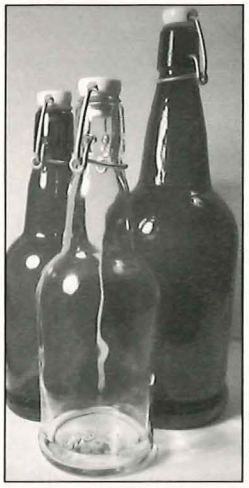


E.Z.Cap

Now our bottles are smooth for easier labelling!

The manufacturer of 16 oz. & 32 oz. flip-top bottles in clear and amber colors

NEW!



The bottles you trust to hold your brew now hold your labels better too!

Smooth Shoulders & Sides-
now the E.Z. Cap logo is on the bottom....
but our bottles are still the tops!

Available to homebrew suppliers through:
L.D. Carlson (330) 678-7733 www.ldcarlson.com
Steinbart Wholesale (503) 281-3941 www.steinbart.com

Manufactured by: E.Z. Cap (403) 282-5972 www.ezcap.net

BEER STYLES and their FOOD "FRIENDS"

Here's a quick guide to some food-friendly beer styles and the foods that often pair well with them.

American amber ale
barbecued chicken
pork ribs

American pale ale
salted almonds
avacado/guacamole
burritos
calamari
chorizo
enchiladas
fajitas
gumbo
jambalaya

Belgian strong golden ale
pasta with pesto
ratatouille
shrimp
tandoori chicken

Brown ale
bison, burgers and steak
nuts

Doppelbock
beans
mushrooms
au gratin potatoes

Fruit beers
chocolate

Octoberfest
roast chicken
macaroni and cheese
pizza
sausage

Saison
most Asian foods
falafel

Sour beers
ceviche
crème brûlée

Stout
oysters
beef stew

Weissbier
most Asian foods
eggs
fish (and sushi)
lobster
melon
salad

barbecue, which is a pretty broad area, I know," Oliver says. "Not that you can't do some types of barbecue with some wines, but beer works better with the smoky flavors and the caramelization."

Homebrew and Food

Pairing specific foods with specific types of beer is described in detail in "The Brewmaster's Table" — but what if the beer you are serving does not clearly fit into a category? What if it's a homebrew that defies categorization? How can you identify your perfect brew/meal combination?

"If you break up the beer's flavor into its components, say caramelization, roast, citrusy flavors, and then think, 'Okay, I'm going to have a dish then, with citrusy flavors,'" Oliver says. "Say I have a citrusy flavor because I used Simcoe as a hop, which has a very orangey, citrus character to it. Then you think about what dishes have lemon juice, lime juice, et cetera. Well, Thai food does. Lots of lime juice in Thai food, generally speaking. Then you look at the impact of the beer and the food — do these seem to match up? Well, yes because you have a big, flavorful beer with big, flavorful food. And if you try those things together, you will see the way those harmonies come together."

Oliver explains this theory using a specific example. "Same thing if you take, say, a steak, and you look at the steak and think what the steak is actually about," he says. "You have the flavor of the meat, but frankly, the steak is mostly about how it's cooked. If I offer you a grilled steak or a boiled steak, even if they're both medium rare, you're not going to want the boiled one, I can promise you. It's really about the grilling, so what's that about? It's about caramelization and char. So, you think about caramelization and char and what beer ingredient flavors are going to lead in that direction — you look at caramelized malts, you look at roasted malts, you look at smoked malts. And all of those things are going to harmonize with that character that you get from grilling a steak."

Homebrewers know that hop choice plays a significant role in the taste of the beer. After all, hops are one of the "big four." According to Oliver, hop choice can directly affect the foods that should be paired with the homebrew.

"Hop variety certainly can provide what I refer to as the flavor hook," he says. "That is, the particular harmony that something might work with. I mean, American hops tend to have a lot of citrus flavors, they tend to have flavors of, say, pine needles, and these flavors are very close to certain herbs, like cilantro. And cilantro tends to pair up very nicely with American hop varieties. Lime juice and lemon juice tend to pair up very well with American hop varieties."

Spreading the Word

As a homebrewer, telling you to pair beer with food is like preaching to the choir. So, how do you convince your friends that wine is passé and beer is here to stay? Not tough to do, according to Oliver.

"I mean, some of the best beers in the world cost less than a cup of coffee at Starbucks, which is pretty amazing when you think about it," Oliver says. "You might have a brewery that's been in a family for 200 years, one of the best producers of some particular type of beer, say Schneider Weisse, and you go out and get a Schneider Weisse for $2 or $2.50, and turn a meal into a wonderful meal, whereas a bottle of a wine of similar complexity will probably cost you $20 and up."

The Brewmaster's Top Picks

Oliver pauses for only a moment before describing his favorite beer-meal combinations. "Belgian farmhouse ales with any number of Thai dishes, I think, are wonderfully explosive and complex, enjoyable combinations," he says. "For a casual meal, with a pork chop and doppelbock, it's pretty hard to go wrong. There's something about the nutty flavor of good pork and the nutty flavor that you have from the German malt in doppelbocks that just make those two things go together."

Lots of people are familiar with the best wines and champagnes. So, what, according to Oliver, is the "Roederer Cristal" of beer?

"These days, I think that title would probably be taken by the Brouwerij Bosteels in Belgium and the beer's called

Deus," he says. "It actually goes through the *methode champanoise* (the traditional method of Champagne production). And it's a wonderfully light, fluffy beer, but it's about 11.5%, so it's quite strong. Wonderful flavors, and it beats out most Champagnes pretty easily, I'd say."

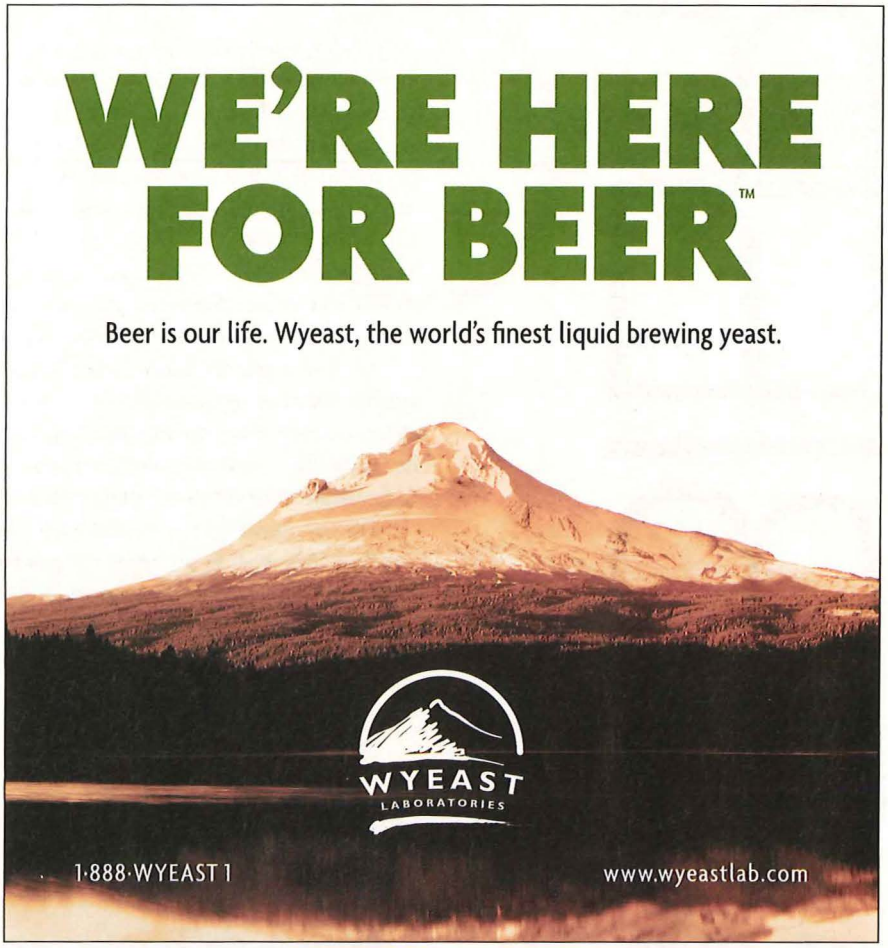
As far as home-entertaining, Oliver feels beer can add to any dining experience. "For the time being, only some restaurants so far have great beer lists, but people can have great beer lists at home all the time. It makes entertaining a lot different, because whether you're just serving some hors d'oeuvres, or you're going to be serving a big, serious meal, you have a wide range of flavors to choose from," he says.

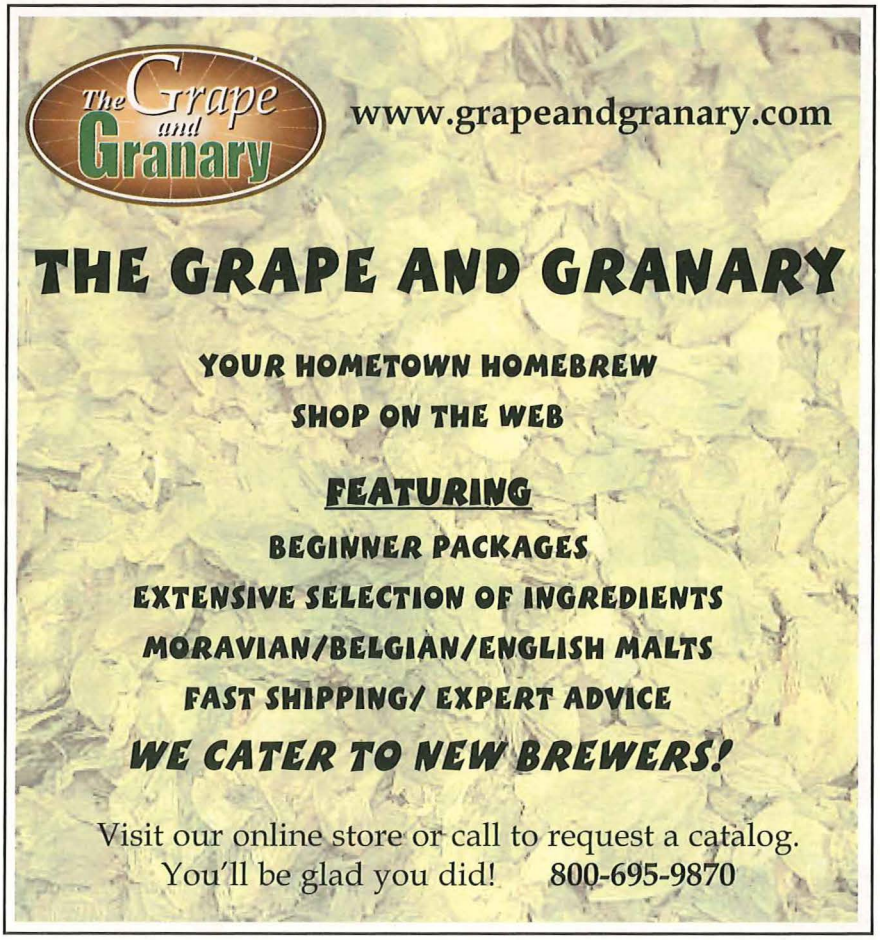
"Also, you really have a much better opportunity to show people something new, exciting, and different when it comes to beer. To a lot of people, white wine tastes like white wine and red wine tastes like red wine. And there's not a huge difference between all the different types, so it's kind of hard for people to make out. Well, it's pretty easy for anybody to tell the difference between an IPA and a stout. These are much bigger differences in flavor, so you have a lot more to work with."

After a long pause, Oliver sums up his passion for matching beer and food with a final thought. "Basically, what you want is to have something come together and become larger than its parts," he says. "You don't want just one thing or just the other. At the end of the day, what you want is the two things to come together and become something better than either of them were by themselves."

"I have hosted about 500 beer dinners and tastings over the years, and so I run into people all the time, who tell me, 'Oh, I took a tasting with you ten years ago and it really opened my eyes, and I'm drinking this and that,' and it's so great to hear that, because otherwise, if that person hadn't gone to that beer tasting, they may never have even discovered great beer. And now they're enjoying themselves so much more than they would have before."

Kristin Grant wrote about growing a beer garden in the March-April issue.





WEISSBIER

On its home turf in Bavaria, a properly brewed wheat ale is usually referred to as a weissbier (German for "white beer) or a weizenbier ("wheat beer"), while in North America this beer is called by its now less common German name of hefeweizen (literally "yeast wheat"). The German Beer Purity Law defines weizenbier as any top-fermented brew that is made with at least 50 percent wheat. A few breweries mash their weissbiers with as much as 75 percent wheat.

WEISSBIER (HEFEWEIZEN) by the numbers

OG	1.056 (14 °P)
FG	1.012 (3 °P)
SRM	10
IBU	13–15
ABV	5.4

Weissbier stands apart from all other beer styles primarily because of one difficult-to-describe signature flavor, which has been variably compared to the taste of clove, banana, nutmeg, vanilla, apple and even bubblegum. As for adjectives, phenolic, spicy, tart, aromatic, fruity, complex and crisp have all been pressed into service to translate the weissbier palate experience into words.

Oh yes, now that you are about to become an expert in weissbier or hefeweizen, you may also wish to pronounce it properly: It's "*vice*-beer" for weissbier, not "wise-beer." For hefeweizen, it's "*hay*-fuh-veyt-sssenn," never "haffie-vi-zon!"

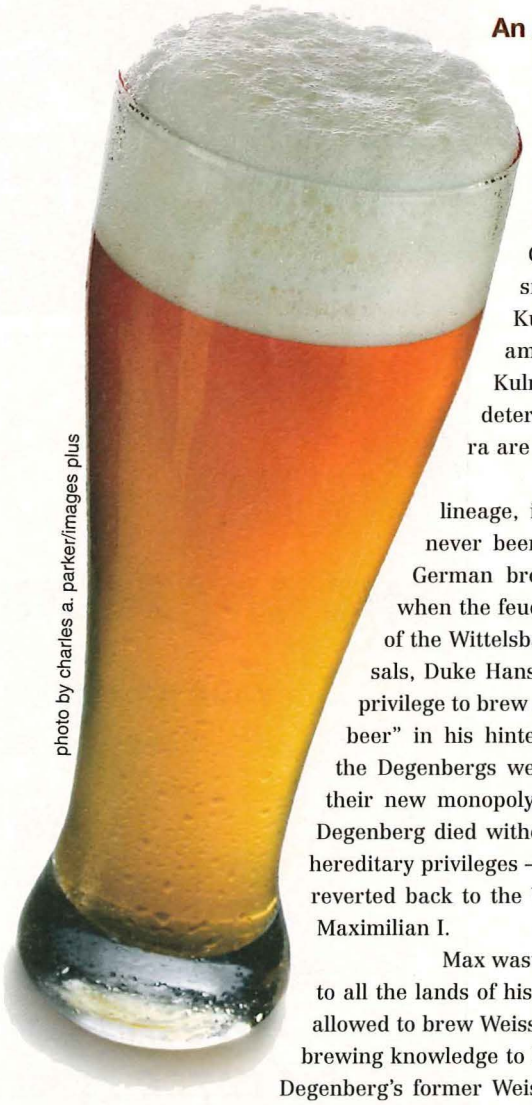


photo by charles a. parker/images plus

An Ancient Beverage

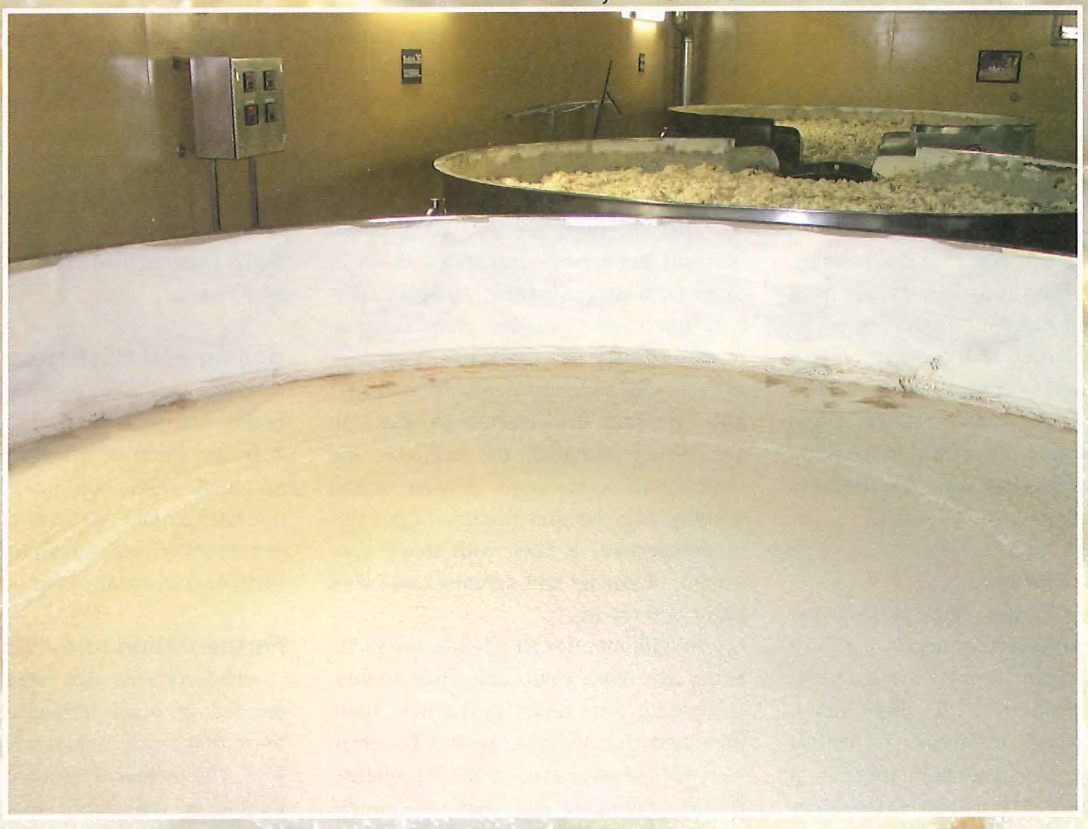
Wheat beer has apparently been brewed in Bavaria (and probably in neighboring Bohemia) since the Bronze Age. Proof of this is a 2,800-year old earthenware fermentation amphora discovered in 1934 in a Celtic tribal burial mound near the small village of Kasendorf, outside Kulmbach, in northern Bavaria. The amphora can now be seen in the Kulmbach Beer Museum. Scientists have determined that the residues in the amphora are from dark wheat beer.

In spite of this impressive lineage, in historical times, wheat beers had never been an important part of the southern German brewing tradition—until 1520, that is, when the feudal ruler of Bavaria, Duke Wilhelm IV of the Wittelsbach dynasty, rewarded one of his vassals, Duke Hans VI of Degenberg, with the exclusive privilege to brew and sell the not very important "white beer" in his hinterland region. Perhaps unexpectedly, the Degenbergs were able to make quite a profit from their new monopoly. Then, in 1602, Duke Sigismund of Degenberg died without leaving an heir and all the clan's hereditary privileges — including their Weissbier monopoly, reverted back to the Wittelsbach ruler of the day — Duke Maximilian I.

Max wasted no time in extending his monopoly to all the lands of his realm. Henceforth, only he would be allowed to brew Weissbier. To ensure the proper transfer of brewing knowledge to his state enterprise, he instructed the Degenberg's former Weissbier-brewmaster Siegmund Bettl to come to Munich and build a "white" brewery, which he did, smack downtown, on the location of the current landmark Hofbräuhaus. Our innkeeper Duke Max opened shop in the new premises in 1605 and never looked back. During the Thirty Years War (1618–1848), only the revenues from the insatiable Weissbier thirst of his Bavarian subjects allowed the House of Wittelsbach to fight off several

"The compound most responsible for a hefeweizen's signature flavor is a phenol, 4-vinyl guaiacol."

by **HORST DORNBUSCH**



THE ORIGINS OF ITS FANTASTIC PHENOLIC FLAVOR

photos courtesy Horst Dornbusch

invasions by the King Gustaf II Adolph of Sweden.

Soon every little town and village in Bavaria had its own Wittelsbach weissbier brewery, and the profits from the monopoly rose to almost one third of Bavaria's entire state revenues. At the end of the 18th Century, however, "white beer" fell out of fashion and the traditional brown lager of Bavaria started to make a comeback. As weissbier revenues declined, weissbier breweries run by the state bureaucracy became largely unprofitable. Thus, with the monopoly losing its value, the crown began to lease its weissbier brewhouses to burgher brewers. In 1798, it abandoned the monopoly altogether and, by 1812, only two weissbier breweries were still in operation. Then in 1856, the crown sold the seemingly worthless brew right to a brewer named George Schneider I, who happily started what turned out to be a brand new weissbier dynasty. In 1927, the Schneider family moved its brewery (a former Wittlesbach brewery) from Munich to Kelheim, a few dozen miles to the east of Munich, where it still is today.

In the 1960s, weissbier experienced a sudden and dramatic revival in popularity, a comeback which continues to this day. Today, weissbier holds more than 35 percent market share in its land of origin and has become Bavaria's best-selling beer style, even surpassing the formerly dominant helles.

Schneider Weisse

Schneider Weisse Original, from the Private Weissbierbrauerei Georg Schneider & Sohn GmbHA, is a classic among weissbiers. On the label, Schneider chooses to identify its Weisse Original the old-fashioned way as a hefeweizenbier rather than a weissbier because the recipe of this hefeweizenbier is at least 130 years old, which makes it the oldest continuously brewed weissbier in the world. Our homebrew recipe — named Kelheim Weissbier, in honor of the Schneider family — is based in part on information generously supplied by Herr Hans-Peter Drexler, Schneider's Brewmaster and Technical Manager.

Schneider uses a grist bill of pale wheat and barley malts at a ratio of 60 to 40 for its Weisse Original, which is the ratio we use in our recipe as well. Depending on the preferred color of your Weissbier, you can use a single pale malt for the barley portion of the mash or a mixture of several barley malts of different colors. Common barley malt additions for weissbier include Pils, Vienna, Carafoam®, Carahell® and Caramunich®. Our model, the Schneider Weisse Original, is slightly more amber than many other weissbier brands.

Phantastic Phenolics

The compound most responsible for a hefeweizen's signature flavor is a phenol. Phenols are one of the natural byproducts of any yeast's metabolism, but certain yeast strains simply have a much greater capacity to produce phenols than do others — and hefeweizen yeast strains are particularly good at it. This is precisely why not all beers have the pronounced phenolic taste of a hefeweizen. As a general rule, top fermenting (ale) yeasts produce more phenols than do bottom-fermenting (lager) yeasts.

Phenols, however, can be a mixed blessing. In miniscule quantities, they can make for a very satisfying beer with plenty of depth and a rounded, complex taste. In excess, they can make the same beer taste broad and harsh, almost undrinkable. Quoting Brewmaster Drexler, "In our Weisse Original, for instance, the total phenol level ranges between 2 and 4 milligrams per liter (mg/L). To put this in perspective, a beer with more than 4 mg/L of phenol will actually taste very bitter and too dry."

In addition, not all phenols are alike. Some are more noticeable than others, depending on their particular taste thresholds for humans. Typical Bavarian weissbier yeasts have a genetic propensity for producing one type of phenol known by the chemical name of 4-vinyl guaiacol, or 4VG for short. This phenol is fairly noticeable in hefeweizens, because they usually contain as much as 0.3 to 0.6 milligrams of 4VG per liter. This level is well above the human taste threshold, around 0.3 mg/L.

Mashing and Ferulic Acid

Four-VG is formed from ferulic acid, a precursor compound in malt, and wheat malts contain more ferulic acid than barley malt. Comments Herr Drexler: "We have found that a mash-in temperature of 37 °C (99 °F) is particularly favorable to ferulic acid production. In addition to the mash temperature, we noticed that barley quality, too, can have a significant impact on the amount of ferulic acid in the wort."

Traditionally, Weissbier is double-decoction mashed, but the modern Schneider Weisse Original relies on a straightforward infusion that starts at 99 °F (37 °C) and ends at an unusually low temperature of only 145 °F (63 °C)! This method favors the production of plenty of fermentable sugars by beta amylase for a very dry, refreshing beer, while suppressing the production of unfermentable sugars by alpha amylase.

Because wheat, compared to barley, has very little husk material, brewers who push the wheat portion of their grain bill above 70% often have difficulties keeping their lautering times and extract efficiency values within tolerable limits. To prevent stuck mashes, you can "fluff up" your mash with flavorless rice husks (up to 1 unit of husks for 10 units of grain, by weight).

Boiling and Bitterness

Although many hefeweizens are pale beers, boil times may be as long as 2-½ hours. Because a hefeweizen is malt-accented, while hop notes should be in the background. Hallertau Mittelfrüh or Hersbrucker are suitable hop choices. Bitterness is usually kept under 20 IBUs.

Fermentation and 4VG

Hefeweizens are traditionally fermented in open fermenters, and it is there that ferulic acid is transformed into 4VG. The technical term for this transformation is "enzymatic decarboxilation." Explains Schneider Brewmaster Herr Drexler: "Our own extensive research has confirmed that the phenols in our beers are generated exclusively during fermentation."

As mentioned earlier, hefeweizen yeast strains are particularly good at producing phenols. Commenting on Schneider's yeast selection, Herr Drexler elaborates, "Ours is a single-strain house yeast based on the common Weihenstephan 68 variety. I should stress that

the standard Weihenstephan 68 produces not only phenols but also plenty of esters, while our own variation of that yeast emphasizes phenol over ester production, which is one reason why most other Bavarian wheat beers taste slightly fruitier-esterier and less clovey-phenolic than our Schneider beers."

Hefeweizen specialist yeast strains that would work best for our beer include White Labs WLP380 (Hefeweizen IV Ale) and Wyeast 3068 (Weihenstephan Weizen) yeast. White Labs describes its WLP380 as producing clove and phenolic as well as citrus and apricot notes, with minimal banana, but some sulfur. The optimum fermentation temperature is listed as 66–70 °F (20–21 °C). The Wyeast 3068 is descendant of the traditional Hefeweizen workhorses used by many German Weissbier breweries. It is based on the same Weihenstephan strain as the Schneider house yeast. Wyeast describes this yeast as producing a tart brew with banana, phenol and clove notes. The optimum fermentation temperature is listed as 64–75 °F (18–24 °C).

Packaging and Speise

Hefeweizens are bottle-conditioned beers, primed with fermenting wort (called Speise). At Schneider, where many batches are constantly at different stages of fermentation, the Speise is drawn from a batch that has just started its primary fermentation and has plenty of active yeast in suspension. This young beer is added to the finished beer right before bottling.

Several modern breweries, including a few very large ones, use a "multi-strain" concept for their hefeweizens nowadays. They use hefeweizen yeast for primary fermentation only and then pitch their Speise with a Pils or helles-style lager yeast for a "cleaner" taste. The German Beer Purity Law has accommodated this practice by allowing for up to 15% of a weissbier's volume to be pitched with lager yeast — a practice that, regardless of its technical legality, upsets, to my palate, the proper balance between banana and clove/phenol and slants the beer flavor too much in the direction of smooth banana. The effect is an easy-drinking brew, perhaps more accessible for drinkers from the world of pale lagers,

Kelheim Weissbier

(5 gallons/19 L, all grain)
OG = 1.056 FG = 1.012
IBU = 14 SRM = ~10 ABV = 5.6%

Ingredients

7.4 lbs. (3.4 kg) Weyermann pale wheat malt (2 °L)
1.85 lbs. (0.84 kg) Weyermann Pilsner malt (1.8 °L)
1.85 lbs. (0.84 kg) Weyermann Vienna malt (3.3 °L)
0.53 lbs (0.24 kg) Caramunich® Type III malt (56 °L)
3.1 AAU Hallertauer Mittelfrüh hops (30 mins)
(0.74 oz./21 g of 4.2% alpha acids)
1 oz. Hallertauer Mittelfrüh hops (10 mins)
1 tsp. Irish moss
2 packages of White Labs WLP380 (Hefeweizen IV Ale) or Wyeast 3068 (Weihenstephan Weizen) yeast (one for primary fermentation, one for inoculating Speise)
2 qts. (~2 L) sterile wort (for bottle conditioning)

Step by Step

Dough in at 99 °F (37 °C) with about 2 gallons (~7.5 L) of water. This amounts to a 2:1 liquor to grist ratio. Allow for a 30-minute rest to thoroughly hydrate the grist, then bring the grain bed gradually to the mash-out temperature of 145 °F (63 °C) using a hot-water infusion and direct heat. While ramping up, employ a 20-minute protein and beta-glucan rest at 122 °F (50°C). Give the grain bed a 60-minute rest at 145 °F (63 °C) to allow for thorough starch conversion, then recirculate the first runnings until they are clear and sparge while maintaining a stable grain bed temperature.

The boil lasts 60 minutes with two additions of hops, one for bittering after 30 minutes and one for aroma after 50 minutes. Add the teaspoon of Irish moss immediately after the addition of the aroma hops. After shut down, with a spatula, carefully stir the hot wort in one direction to make it spin. Repeat the spinning several times as the wort motion slows down. About 30 minutes into the whirlpool, draw about 2 quarts (2 L) of hot, sterile wort from the top of the kettle (where there is less trub than below) into a sealable container. Let that wort cool; then store it in the refrigerator during the brew's primary fermentation. You will need this wort later as a priming agent, called Speise, during bottle conditioning. Continue whirlpooling for another 30 minutes, by which time, plenty of protein-rich trub should have accumulated in the center-bottom of the brew kettle.

Now siphon the clarified wort carefully off the debris and heat exchange it into a clean carboy (or bucket for open fermentation) with the pitched yeast. Aerate the wort and ferment it at a temperature of 68 °F (20 °C) for about four days. The brew should now be at the terminal gravity of FG 1.012 (3°P) and ready for bottle conditioning. On bottling or kegging day, take the Speise out of the refrigerator and let it warm up to room temperature. Because at home you are dealing with just a single batch, you must inoculate your saved "unpitched" wort before using it as a Speise. Thus, pitch the second package of yeast into your Speise, close the container and shake it vigorously to aerate it. Then pour the Speise into a clean carboy or a Cornelius keg and rack the fully fermented brew into it for a thorough mix. Transfer the inoculated beer into bottles or keep it in the closed Cornelius keg.

Once mixed with Speise, let the beer condition for about one week at a cozy room temperature of 70 °F (21 °C). This will produce the hefeweizen's spritzy carbonation. Also at this temperature, the flavor of the hefeweizen becomes soft and mellow with mild banana tones starting to emerge next to clove and phenol notes. Then cool-condition the brew for another two weeks at about 45 °F (7 °C), which is also a good serving temperature.

Kelheim Weissbier

(5 gallons/19 L, all extract)
OG = 1.056 FG = 1.012
IBU = 14 SRM = ~10 ABV = 5.4%

Ingredients

8.2 lbs. (3.7 kg) Weyermann Bavarian Hefeweizen liquid malt extract
3.1 AAU Hallertauer Mittelfrüh hops (30 mins)
(0.74 oz./21 g of 4.2% alpha acids)
1 oz. Hallertauer Mittelfrüh hops (10 mins)
1 tsp. Irish moss
2 packages of White Labs WLP380 (Hefeweizen IV Ale) or Wyeast 3068 (Weihenstephan Weizen) yeast (one for primary fermentation, one for inoculating Speise)
2 qts. (~2 L) sterile wort or 1.2 cups corn sugar (for bottle conditioning)

Step by Step

Bring your brewing liquor (brewing water) to a boil and turn off the heat. Stir half the malt extract into it. Bring this wort to a boil and add the bittering hops. After 15 minutes, shut of the heat and stir in the remaining malt extract. Five minutes later, add the aroma hops and the Irish moss and boil for another 10 minutes. Shut down. Whirlpool for 30 minutes. Next, siphon 2 qts. (~2 L)) of hot wort (for Speise) into a container. Let the wort cool, then seal the container and refrigerate until needed. Chill wort and rack to a clean, sanitized fermenter. Aerate, pitch yeast and ferment at 68 °F (20 °C). Prime with Speise and bottle. Condition at 70 °F (21 °C) for one week, then at 45 °F (7 °C) for two more weeks.

THE ORIGINAL AMERICAN HEFEWEIZEN

Thomas Jefferson's "DUNKELHEFECORNWEIZEN"

Independence Day and beer go together like hand and glove — officially! — not just because a BBQ and a cold beer on the 4th of July are an ideal way to celebrate the country's birthday, but also because many of the key leaders who forged the new nation of the United States were brewers. For example, Thomas Jefferson, main author of the Declaration of Independence of 1776 and the third U.S. president, was a brewer.

The Jeffersonian Brew

Always the revolutionary, the gifted Jefferson came up with a non-conformist brew that might strike the modern homebrewer as odd. A plaque at Monticello explains that the mash he concocted was made not from barley — as were most beers in 18th Century America — but from a mixture of "wheat or corn," a truly American combination. According to the staff at Monticello, it is not certain if Jefferson made pure corn and pure wheat beers or if he used the two grains in the same mash.

Jefferson learned the craft of brewing from the sea captain Joseph Miller. In a letter to his friend Joseph Coppinger, dated April 25, 1818, Jefferson says, "I am lately become a brewer for family use, having had the benefit of instruction to one of my people by an English brewer of the first order." "One of my people" is Jefferson's reference to Peter Hemings, Jefferson's key slave, principal cook and private tailor. Explains a plaque at Monticello: "The most fruitful period of brewing began with the chance appearance of . . . Captain Miller [who] improved upon the quality and quantity of beer produced here. He came to Monticello in 1813 to brew ale, a stronger beer better suited to storage. Miller also trained the enslaved Peter Hemings in the arts of malting and brewing. From this time, Hemings carried on the brewing operations, making one hundred gallons of ale every spring and fall."

Of the quality of Hemings' brew, Jefferson had this to say (from a letter to his friend Joseph Miller dated March 11, 1817): " . . . Peter's brewing of the last season I am in hopes will prove excellent. At least the only cask of it we have tried proves so."

Reconstructing the Beer

Though obsessed with precision in his legal and scientific studies, surprisingly, Jefferson was no stickler for exactitude in brewing ingredients and processes. In fact, Jefferson did not even believe in stipulating recipes because he did not believe that "the operations of malting and brewing could be successfully performed from a receipt."

I have composed a Jeffersonian brew with both of his favorite mash malts, corn and wheat. We know from Jefferson's own notations that his wheat and corn were malted by first steeping them in water and then draining them for germination. Jefferson's beer was probably also a darkish brew, because his grain was "dried" (today we call this process kilning) and even roasted. A plaque at Monticello reads: "The heat and duration of the roasting ultimately determined the darkness of the beer."

Jefferson boiled his wort with hops. As we learn from the Monticello inscriptions, he used about three-quarters of a pound (340 g) of hops per bushel of grain (40 lbs./18.2 kg). For a grain bill of 7.5 lbs. (3.4 kg), therefore, we would need 2.25 oz. (64 grams) of Jefferson's hops. He grew hops in his own garden at Monticello, though we do not know which variety, nor do we know its alpha-acid content. I chose Cluster, which was one of the most common hop varieties in early America.

Fermentation, according to a plaque, took "several weeks." The brew was then racked into cork-stoppered "stone ware" or glass bottles. The tools and workbench used for corking beer and securing the stoppers with string to the bottles are shown in the Monticello basement. Fragments of "stone ware" bottles as well as a metal spigot for filling bottles from the wooden casks have been unearthed as well. As a safeguard against bottles bursting from overpressure and thus turning chards into dangerous shrapnel, the bottles were kept in wooden crates or casks filled with straw or sand.

Thomas Jefferson's Dunkelhefecornweizen

(5 gallons/19 L, all grain)
OG = 1.047 FG = 1.010
IBU = 30 SRM = 17 ABV = 4.8%

Ingredients

4.2 lbs. (1.9 kg) Weyermann dark wheat malt (approx. 7°L)
3.9 lbs. (1.8 kg) Briess pregelatinized flaked corn (0.8 °L)
1.6 lbs. (0.74 kg) Weyermann Carawheat® (approx. 45°L)
2.0 lbs. (0.91 kg) rice hulls
1/4 tsp (1.5 g) Convertase MG-300 gluco-amylase enzyme formula
8.2 AAU Cluster hops (bittering) (1.2 oz./34 g of 6.8% alpha acid)
Wyeast 1056 (American Ale) or White Labs WLP001 (California Ale) yeast
1 cup DME (for priming)

Step by Step

Mill the malted wheat (but not the corn or rice hulls). Add the enzyme preparation to the base water and mash at about 152 °F (67 °C). For better amylase action and improved lautering, make the mash as thin as possible. Use at least 3–4 gallons (11–15 L) of mash water, if your tun can hold that much. Allow for a 60-minute saccharification rest. Then raise the temperature to 170 °F (77 °C) for the mash-out. Lauter and sparge. Boil the wort for 90 minutes. Add all the hops about 30 minutes into the boil. At the end of the boil, check the gravity and adjust for evaporation losses. Let the wort rest for about 30 minutes to allow the trub to settle. Siphon the wort off the trub and heat exchange to a temperature of about 68 °F (20 °C). Aerate the wort thoroughly, pitch the yeast, and primary-ferment for about a week. Rack and secondary-ferment for another two weeks. Rack again, add the priming agent, and condition in bottles or a keg for another week.

but much less distinct than a weissbier pitched exclusively with a true hefeweizen yeast. As the yeast in a bottle of Schneider Weisse is their primary yeast strain, you can attempt to culture the yeast from a bottle.

Extract Brewing Tips

For extract brewers, the malt extract I chose for our grain bill is Weyermann Bavarian Hefeweizen Extract. This liquid malt extract (LME) is produced entirely from a decoction mash of Weyermann Pale Wheat Malt, Weyermann Pilsner Malt, and Weyermann Carahell®. This grist composition is very similar to the one used in our all-grain recipe. According to information from the Weyermann Malting Company, the extract contains 75% fermentables, so 8.21 lbs. (3.724 kg) of LME is required to reach our OG of 1.056 (14°P). This amount of LME yields a brew with a color rating of roughly 10 °L. Because all Weyermann LMEs come in 4-kg (8.82-lbs.) plastic jerry cans, feel free to cheat just a little bit and use the entire can for your brew.

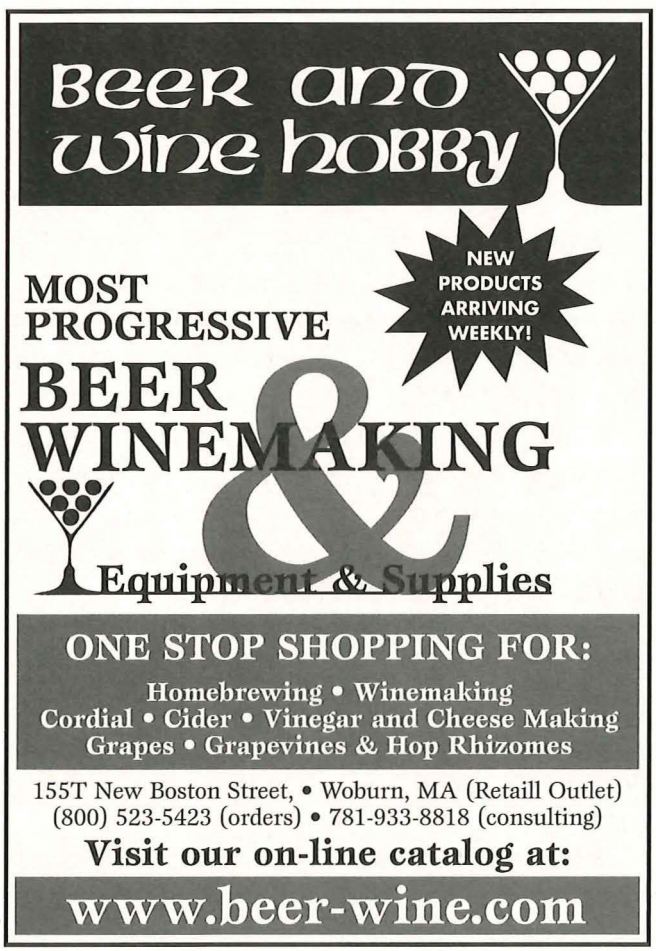
Weissbier Serving Tips

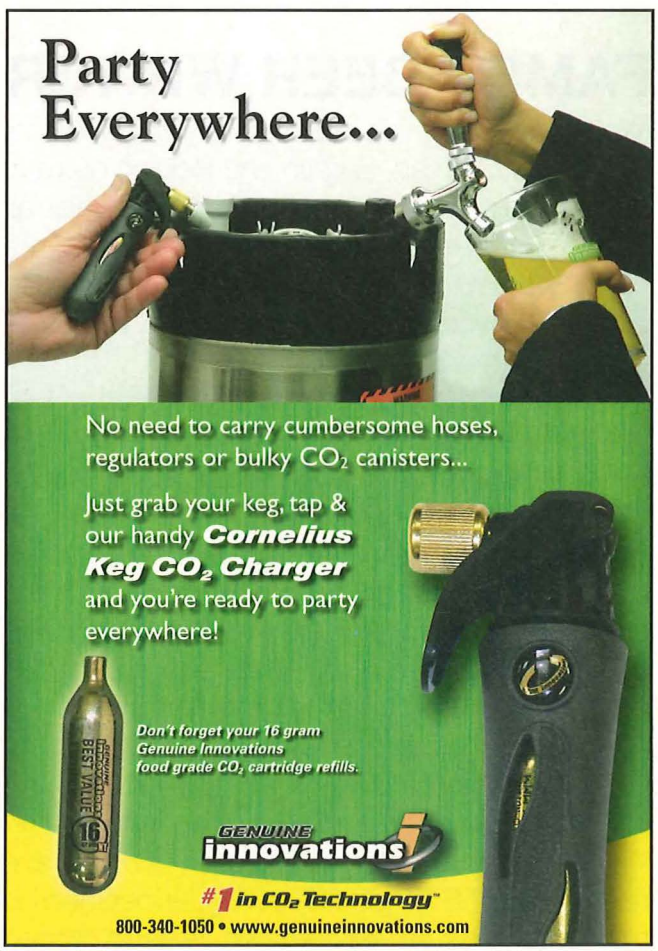
Always store bottled hefeweizen standing up. This allows the yeast to settle at the bottom of the bottle. For a less yeast-turbid glass of beer, you can pour the entire bottle in one go, while leaving most of the sediment behind. If you prefer a more turbid glass of beer, you can empty the bottle only four-fifths of the way and then roll it flat on a horizontal surface to loosen the sediment. Then pour the intensely cloudy remaining one-fifth in one fell swoop into your glass.

To accentuate the bouquet of weissbier, serve it in a tall, slender glass with plenty of room for the tall head. Best are specially curved weissbier glasses. A glass of weissbier always sports an appetizing, tall, white, creamy head. To prevent excessive foaming as you pour, rinse the glass in cold water but do not dry it. Then tilt the glass as you fill it. Also avoid glasses with grease or detergent residues, because they destroy a beer's head. Though Weissbier is served with a lemon slice in many parts of the world, this is decidedly *verboten* in Bavaria. Bavarians believe that the lemon flavor obscures the true flavor of weissbier. They also believe that weissbier does not need assistance from a lemon to taste satisfying and refreshing. On a more objective level, they also point out that the oils in the lemon juice destroy the white creamy head that is so indispensable for a total weissbier experience.

A great hefeweizen has an impressive presence at the table. Because of its racy, palate-cleansing assertiveness, it goes well with such flavorful foods as trout and salmon or a Jaipur or Madras curry. It also goes well with a crisp, tart salad of arugula, romaine or Belgian endive. Of course, it's also great when quaffed just by itself, especially as a cool, spritzy summer-brew.

Horst Dornbusch is Brew Your Own *magazine's Style Profile columnist.*





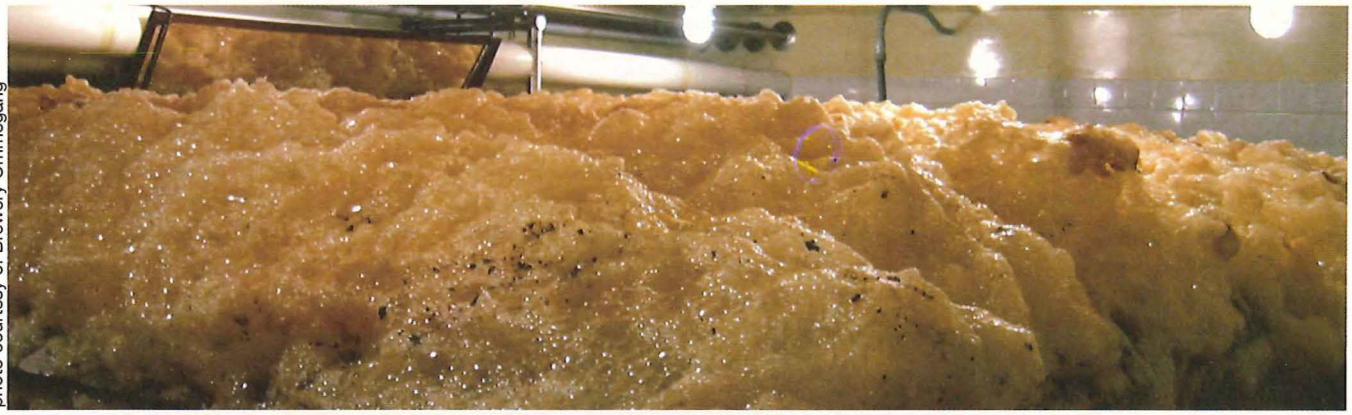


photo courtesy of Brewery Ommegang

BY STAN HIERONYMUS

FERMENTING BELGIAN-STYLE BEERS

FAMED BEER WRITER

Michael Jackson tells a particularly colorful story about how German, English and Belgian brewers differ, painting an image of a Belgian brewer as circus performer. "You imagine a lion tamer in a cage," he said one time, stepping back and lifting an imaginary whip. "They love the danger of working with wild yeast."

He was talking not only about the sort of wild yeasts we associate with sour beers, but also Belgian *Saccharomyces cerevisiae* in general.

Consider these facts:

The Trappist breweries Westmalle, Westvleteren and Achel all ferment with yeast top cropped at Westmalle. Westvleteren and Achel use it just as fresh as Westmalle, picking up recently harvested yeast the day they brew.

At Achel, yeast is pitched at 63–64 °F (17–18 °C) and climbs to 72–73 °F (22–23 °C) during fermentation in cylindro-conical tanks. At Westmalle, yeast is pitched at 64 °F (18 °C) and rises only to 68 °F (20 °C) during fermentation in closed squares. At Westvleteren, yeast is pitched at 68 °F (20 °C) and reaches 82–84 °F (28–29 °C) in open fermenters. Same yeast, three very different schedules.

At Brasserie Caracole, brewers of Saxo, Troublette and Nostradamus, yeast is pitched at 77 °F (25 °C). The brewers allow it to ferment as it will, depending on the season. In the summer it may reach 86 °F (30 °C) and in the winter it will fall to 68 °F (20 °C).

At American microbreweries, the usual pitching rate is 1 million cells of yeast per milliliter of wort per degrees Plato (cells/mL/°P). (One degree Plato is roughly equivalent to 4 gravity "points" on the specific gravity scale.)

Common advice for homebrewers calls for boosting the pitching rate by 50% for higher gravity beers. In contrast, Westmalle pitches 5–6 million cells per milliliter for its 19.6 °P (1.081) Westmalle Tripel — just over 0.25 million cells/mL/°P.

When working with these and other Belgian yeast strains, good fermentation practices can't be ignored. However, these strains are

different from British and American ale yeasts — and from one another.

Ron Jeffries — founder and brewer at Jolly Pumpkin Ales in Michigan — speaks like a brewer who has entered into a partnership with his yeast, rather than expecting it to obey his orders.

"I usually let (fermentation) start in the upper 60s (Fahrenheit, around 20 °C)," he says, "and finish in the mid-80s (~29 °C). I try not to mess with it. For me, all the best beers I've made with Belgian yeast have been the ones I've done the least with. The yeast is almost always one step ahead of me. I've learned, don't slow them once they start. If you try (to dial down the temperature), what you think is under control isn't. Once the temperature jumps up, step back."

Belgian Yeast Strains

Belgian yeast strains are different. They tolerate higher alcohol levels than many other beer strains, attenuate well and generate a range of phenolics and esters. Chris White of White Labs sees cells that have a smaller surface area than other ale yeast when he looks at them under a microscope. Dave Logsdon of Wyeast Laboratories finds, "Belgian yeasts have a lot in common with wine yeasts. They produce phenolic compounds that are similar to wine yeasts."

We understand that Belgian yeasts, aided by a proper mashing schedule, will attenuate well and produce high levels of alcohol. On the down side, we know that many show a low degree of flocculation. As such, filtration or an extended amount of conditioning time may be required to get them to clear.

The complex aromas — with scents reminiscent of fruit and spices — are what set Belgain ales apart. These characteristics stem from the esters, higher alcohols and phenols generated during fermentation. Take a good whiff of a Belgian ale and you may smell pears, apples, tangerines, oranges or strawberries. In beers that contain darker malts or sugars, you may also detect raisins, plums, figs or prunes. Peppery, perfumy and roselike characteristics may also be found in many Belgian beers.

Belgian yeasts exhibit some similarities to other wheat yeasts, although the phenolic character exhibited in Belgian beers is not the same as that found in Bavarian wheat beers. In 2003, Wyeast and Microanalytics Corporation tested a variety of wheat and Belgian yeast strains using a gas chromatograph, a piece of analytical equipment that separates mixed gases into their component parts and gives their relative concentrations. Dave Logsdon and Larry Nielsen (Microanalytics) presented their findings at the 2003 Craft Brewers Conference.

Levels of 4-vinyl guaiacol (4VG), the molecule responsible for the signature flavor of a Bavarian wheat beer, were higher in Wyeast 1214 (Belgian Ale), 3787 (Trappist High Gravity) and 3522 (Belgian Ardennes) than they were in Bavarian wheats. The panel identified them as spicy and singled out the clove in 1214 and 3522. On the other hand, Wyeast 1762 (Belgian Abbey II) showed only trace amounts and the panel cited no clove or spice characteristics.

Styrene — which has a resiny flavor, perceived as phenolic by some — was found in Wyeast 1214, 3787 and 3522 at roughly the same levels as in a wheat

photo courtesy of Russian River Brewing Company

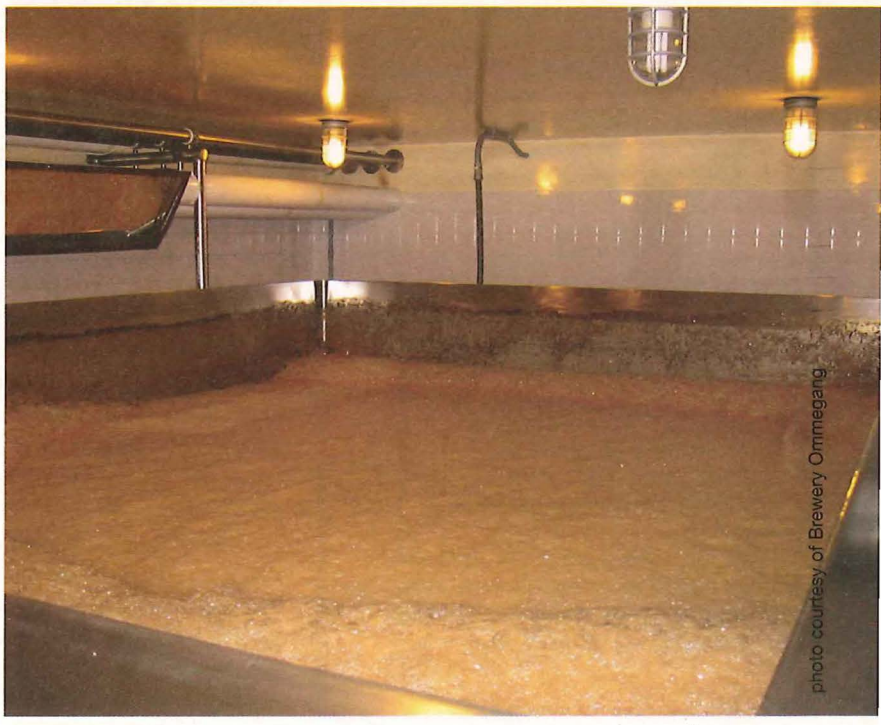


photo courtesy of Brewery Ommegang

Closed, upright fermenters at Russian River and an open, shallow fermenter at Ommegang. Most homebrewers use closed fermenters (buckets or carboys), but many are experimenting with open fermentation. Open, shallow fermentation allows for more air contact with the yeast, faster heat dispersal and easier top cropping.

Chris White of White Labs and **Dave Logsdon** of Wyeast don't officially list the source of their Belgian yeast for good reason.

Wyeast acquired its 1214 more than 20 years ago from Chimay, and has monitored the yeast to make sure it hasn't changed since. Chimay, on the other hand, "cleaned up" its yeast in the 1990s, so it's not the same as it once was.

Then there's the "abbey" yeast that New Belgium Brewing uses for its Abbey Ale. Founder Jeff Lebesch cultured that from bottles of Chimay in the 1980s. "What I learned later is that Chimay could get kind of wild," Lebesch said, "so who knows how reflective what I got out of that bottle was of Chimay. I was doing all my culturing from bottles then, keeping them on plates in the house. Somewhere in the early 1990s, I did a major cleanup of our yeast. It really changed the character of the beer."

The bottom line is that a source is just that, a source. But because brewers always ask, Logsdon and White have provided those sources.

Wyeast: 1214 (Chimay), 1762 (Rochefort), 3522 (Achouffe), 3787 (Westmalle), 3864 (Unibroue), 1388 (Duvel), 3538 (Corsendonk-Bocq).

White Labs: WLP500 (Chimay), WLP510 (Orval), WLP530 (Westmalle), WLP540 (Rochefort), WLP550 (Achouffe), WLP570 (Duvel).

beer. As with the 4VG, Wyeast 1762 showed only trace amounts. However, 1762 registered levels of phenyl ethyl alcohol and phenyl ethyl acetate, which result in rose and honey notes, closer to the other Belgian strains. Phenyl ethyl alcohol is necessary for the recognized flavor of beer, and may stand out more in beers fermented with 1762 because of lower levels of clove and spices.

It's important to note that the percent of wheat in the grist (40%), and how it was mashed, surely affected how the beers were perceived.

Esters and Higher Alcohols

Esters are the most important aroma compounds in beer. In general, they impart a fruity character to beer. Most esters are desirable, but ethyl acetate — which is perceived as solventy, like nail polish remover — is not. Likewise isoamyl acetate, which smells like bananas, may or may not be desirable.

Higher alcohols, sometimes called fusel alcohols, are produced during primary fermentation alongside ethanol, although at much lower concentrations. Some can be converted to softer esters during conditioning. Those that don't can contribute harsh, solvent-like flavors over a certain threshold. However — in the right beer and at the right level — higher alcohols may also increase the complexity of a beer, and those that soften in secondary add spicy, perfumy and roselike aromas.

Most of the beer produced worldwide is lager beer. Consequently, most of the studies on esters in beer have been in lagers. However, some of that research may be applicable to ales.

Gregory Casey, director of brewing services at Coors Brewing Company says, "My belief is that, directionally, many of the findings (regarding esters) with lager beer would be applicable to ale. In the case of esters and higher alcohols, the pathways leading to their formation are 'core' pathways for *Saccharomyces* yeasts in general."

Casey gave a talk on fermentation at the 2005 Rocky Mountain Microbrewing Symposium. There, he related that yeast growth and higher alcohol production are directly correlated — i.e. more growth equals more fusels.

As with higher alcohol production, most sources claim that ester production is increased by yeast growth. However, Casey presented evidence that — at least in some circumstances — ester production may be inversely related to yeast growth. He did show, however, that this association could be altered by the fermenter design or amount of trub carried over into the wort. Casey also cited a study that found that temperature had a much greater effect on ester production than pitching rate did; increased pitching rates lowered ethyl acetate levels and increased temperature increased ethyl acetate levels.

Fermentation Temperatures

On their posters and at their websites, yeast producers offer suggested fermentation temperatures for all of their strains. The temperatures listed for many Belgian strains might be considered "fool proof," but are lower than the temperatures reached at some Belgian breweries. Yeast suppliers don't want to see homebrewers, enchanted by reports of high temperatures at which some Belgians ferment, losing control of their fermentation. Logsdon explains, "For homebrewers, the problem is lack of control. If they start at 75 °F (24 °C) and let it go, then they are going to get lots of higher alcohol and solventy character."

Once the fermentation temperature has risen beyond a certain point, it may not be possible to correct the problem and still yield good beer. Brother Joris of Westvleteren will still try to slow the rise in fermentation temperature if he suspects it exceeds 84 °F (29 °C), even if it means rising in the middle of the night. He knows that if he tries to reduce the temperature beyond that point, his yeast may crash. Others report White Labs WLP530 (Abbey Ale) and Wyeast 3787 Trappist High Gravity), both Westmalle offspring, acting the same way for them.

"When you cool them, they stop," White said. "They go into survival mode. You can try rousing them, raising the temperature, but they won't start again. You just have to add a new yeast. You don't want to let it spike, and that can be hard to control in a homebrew situation."

Obtaining the flavor profiles listed in the literature of yeast producers requires

considering many variables associated with fermentation. It helps to recognize at what stage of fermentation different flavors are produced. "You get more phenolics at lower temperatures," White said. "The absence of esters makes them stand out more. If you continue to suppress the esters, then you will continue to perceive the phenolics. You are looking for a balance."

American craft breweries such as Russian River Brewing and Allagash Brewing found similar balance through trial and error. Both breweries now let their temperature rise during the fermentation process. This allows them to retain the esters and attenuation they wanted without getting solventy notes.

In Belgium, Duvel Moortgat pitches yeast at 61–64 °F (16–18 °C) and will let it rise to as high as 84 °F (29 °C) during five days. "One of the things that starting cooler does, is it leaves some of the fatty acids for ester production otherwise utilized early by yeast growth," Logsdon said.

So what's the take-home message for a homebrewer interested in Belgian-style beers? Although Belgian brewers ferment their beers at higher temperatures, you still have to be able to control the fermentation. As a starting point, you need to know the temperature of your fermenting wort. At Westvleteren, the monks don't measure the ambient temperature of their fermentation room — they measure wort temperature directly from the middle of their open tanks. If more homebrewers had probes inside their fermentation vessels, they might be surprised. "At a minimum, you'd expect a temperature rise in moderate fermentation to be 7 °F (~4 °C), and it might get a lot hotter," Logsdon said. A strip thermometer on the side of a glass carboy will be more accurate than measuring the ambient temperature, but glass is a good insulator.

To increase the amount of air the wort is exposed to, try using multiple fermenters. This will reduce the height-to-width ratio of your wort and possibly put a damper on surges in fermentation temperature. "I'd go shallow, and I wouldn't even put an airlock on," White said. As an added benefit, it is easier to top crop yeast from a plastic bucket than a glass carboy. Top-cropped yeast can be used for another fermentation or as bottling yeast.

MIDWEST
HOMEBREWING AND WINEMAKING SUPPLIES

Call for our FREE — 76 page New Catalog 1-888-449-2739

Carboy Dryer/Stacker
Promotion!

Stack and organize your Carboys while they dry. Stack 2-3 high to create more Homebrewing space.

Reg. price $9.95
Sale price $5.95
"No limit"

Offer good through August 31th, 2006

Midwest 3440 Beltline Blvd. Mpls., MN 55416
Monthly Specials — www.midwestsupplies.com

Beercollections.com
The Best Source for Beer Related Gifts and Collectibles from U.S. Breweries

Glassware * Coasters * Crowns
Labels * Specialty Character Items
Hats * Stickers * Posters * Golf Items
Tap Handles * Steins * Beer Foods
Bottle Openers *Fishing Lures
Tacker and Neon Signs * and More!

THE SHAPE OF YOUR FERMENTER

Studies — mostly done with lager beers — show that the levels of ester production decrease when CO_2 levels increase around the yeast in a fermenter.

Coors Brewing Company Director of Brewing Services Gregory Casey says, "A classic example of a design impact became apparent with the introduction of cylindro-conicals in replacement of traditional box fermenters. Due to the greater height-to-width ratio of the former, many of the early lagers coming out of cylindro-conicals were much less estery than the box-fermented counterpart (all other things being equal). This 'washed-out' ester character was linked to CO_2 inhibition, a finding which has since been applied in designing cylindro-conicals to more reasonable ratios (lower height to width)."

Abbaye d'Orval converted to cylindro-conical tanks in 2004 and found that it could produce a beer it considered basically unchanged in flavor, but there were some measurable differences in the levels of esters that occurred above threshold levels.

Of course, the depth of a homebrew bucket or carboy is less than even the smallest of shallow commercial fermenters. And, the pressures that inhibit ester production are not even approached. As such, experimenting with fermenter shape may not yield the same results as at a commercial scale with regards to esters.

Higher temperatures are part of the reason that many Belgian beers are so well attenuated, usually more than yeast company profiles promise. For instance, Duvel is 93% attenuated, Westmalle Dubbel 87% and Chimay Blue 89%.

When Wyeast and White Labs provide guidelines for apparent attenuation they base them on all-malt beers, usually not fermented at the top of the suggested temperature range. Beers with sugar providing more than 10% of their fermentables will attenuate further, and further still at higher temperatures. "It's really important that brewers let them reach terminal gravity," Logsdon said. "I have heard too many brewers who say 'I'm going to stop it here,' because they've calculated what the attenuation should be. The worst thing you can do is get incomplete fermentation."

Pitching Rates

As mentioned at the beginning of the article, American microbreweries usually pitch around 1 million cells of yeast per milliliter of wort per degree Plato. For example, Brewery Ommegang pitches 18.5 million cells per milliliter for its 1.076 (18.5 °P) Ommegang Ale — right at the "standard" rate.

In contrast, Duvel Moortgat in Belgium, which owns Ommegang, pitches just 7.5 million cells per milliliter in fermenting Duvel, a beer with an original gravity of 16.9 °P (1.069) — or 0.44 million cells/mL/°P. Ommegang Brewmaster Randy Thiel and Moortgat Brewing Technical Director Hedwig Neven have discussed lowering the rate at Ommegang, but experiments yielded a beer that didn't attenuate completely.

For the past year, Moortgat has brewed Ommegang Ale while Ommegang expanded capacity. Both versions were brewed to the same specifications using the same recipe and basically the same ingredients. The only difference is that Moortgat pitched 8 million cells per milliliter. In blind triangle tastings, only half of consumers could pick out the odd beer, just what you'd expect by chance.

Of course, these beers contain a good percentage of sugar. Simple sugars are easier for yeast to process, and the breweries are confident about the viability of their yeast. Many are using freshly top-cropped yeast — not impossible for homebrewers, but not common either.

White understands. "On the professional level, the norm is pitching 2 L (of yeast) per barrel (34 gallons/129 L)," he said. "Belgians are below that. I've talked some (American) brewers into cutting back on their pitching level, and they are surprised their fermentations are stronger. By pitching a little less, if your yeast is healthy, flavor is going to be spit out during growth." He added a warning: "Of course, if you don't pitch enough, you get solventy. The Belgians know where that balance is."

Finding the Balance

Unfortunately, there is no guarantee that if you pitch a certain amount of yeast into a wort with a given original gravity and ferment it at a specified temperature that you will produce a perfect beer.

As Peter Bouckaert of New Belgium Brewing says, "Brewing is a compromise. You have to take into account so many factors. You can't look at the temperature as a sole factor. It's an interaction. You need to see any beer you create as a holistic thing."

Key Variables (Revisited)

When planning your own Belgian-style beer fermentation at home, here are some of the key variables to consider:

Belgian yeasts typically produce more esters than British ale yeasts, and also some molecules associated with wheat yeasts. Logsdon adds, "Fusel alcohol raises perception of isoamyl acetate (banana). It isn't detected as strongly when fusels are lower." Higher original gravities, higher attenuation and inadequate aeration leads to more esters. (See the sidebar on page 45 for more.)

Increased fermentation temperature increases ethyl acetate levels, floral and fruity esters, and may be necessary for some of these yeasts to finish attenuating. Lower temperatures promote perception of phenols.

Higher pitching rates lower ethyl acetate levels. Very high or very low pitching rates increase ester levels.

Taming the beast begins with finding a balance. Defining balance can be another matter.

Consider Logsdon back on the subject of pitching rates. "Boosting the (pitching) rate reduces esters and creates more acetaldehyde (which have a green apple character). Reducing aeration increases esters," he said.

He paused, then laughed. "Everybody has a different opinion of optimal profile."

Stan Hieronymus is the author of "Brew Like a Monk" (2005, Brewers Publications). He provides book updates at www.brewlikeamonk.com.

those ELUSIVE ESTERS

Yeast growth stimulates the production of esters. Yeast growth inhibits the production of esters. If you read various brewing texts and listen to different experts — or read this issue of *BYO* — you can find both opinions expressed. How can this be?

Almost everyone agrees on a few facts about ester production during beer fermentation. Esters are formed by a reaction between an alcohol and a molecule called acyl CoA. (Ethanol and acyl CoA form the common ester ethyl acetate.) Different yeast strains produce different levels of esters. In addition, higher temperatures, higher original gravities, higher levels of attenuation and an inadequate amount of wort lipids (from trub) all lead to increased ester production. Likewise, on a commercial scale it's well-established that deeper fermenters — much deeper than a bucket or carboy — decrease ester production.

Inadequate aeration is known to increase ester production and adequate aeration lowers it. Sources differ on the effect of increasing levels of aeration to very high levels. Likewise, smaller pitching rates (requiring correspondingly more yeast growth) have long been cited as a factor that stimulates ester production.

Recently, however, some beer scientists have claimed that yeast growth inhibits ester production (because it depletes the pool of acyl CoA).

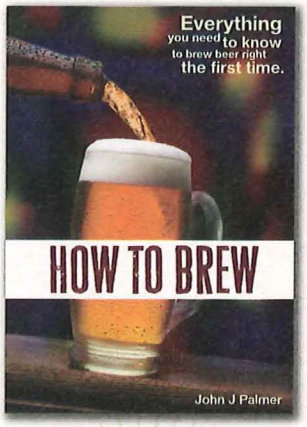
So what's a homebrewer concerned about esters to do? Biological systems are complex and figuring out the role of yeast growth and ester production may depend on other, as yet unrecognized, variables. Likewise, there may not be a linear relationship between the variables in question — it's at least theoretically possible that adequate yeast growth limits ester production, while too much or too little stimulates it.

From a practical viewpoint, if you are interested in controlling the ester level in your beer, you should be able to do so by selecting a suitable yeast strain and running a good fermentation at an appropriate temperature. Anecdotal evidence strongly suggests that underpitching, poor aeration or high fermentation temperatures are the main culprits when excessive esters are present in homebrew.

— Chris Colby

HOW TO BREW

Ingredients, methods, recipes and equipment for brewing beer at home.



Everything that's needed to brew beer right the first time. Presented in a light-hearted style without frivolous interruptions, this authoritative text introduces brewing in a easy step-by-step review that covers the essentials of making good beer.

Beyond the first batch, it provides an accessible reference to intermediate techniques like all-grain brewing variations and recipe formulation. A must for any novice or intermediate brewer—perfect for anyone who has discovered the joy of homebrewing!

400 pages including photos, illustrations and 22 recipes.
Retail price: $19.95.
Available in June 2006.

Veteran homebrewer John J. Palmer is a respected author and speaker in homebrewing circles. His years of hands-on experience help homebrewers consistently make great beers while expanding their knowledge and experience with the hobby.

Order online www.beertown.org
Or Call 1.888.822.6273 or +1.303.447.0816

Brewers Publications
A Division of the Brewers Association
www.beertown.org

Brewv YOUR OWN

Shirts, Sweats, Hats & Lots More!

GREAT Gifts For You Or Your Brewing Buddies

Go to
www.cafepress.com/brewyourown
and order your Brew Gear today!

www.cafepress.com/brewyourown
SHOW THE WORLD YOU'RE A HOMEBREWER!

BYO BACK ISSUE SALE!

Buy 5 Issues...Get 5 More Issues FREE!

We are offering readers a very special deal on our limited quantities of back issues. Buy any 5 issues for $25 (plus $10 shipping) and receive 5 more issues for FREE! Buy 5 and get 5 FREE! Choose from these collectible classics still in stock from 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004 and 2005.

HURRY! SUPPLIES ARE LIMITED!

DEC. 95
- Controlling Beer Color
- Winter Brew Recipes

APR. 96
- Apartment Brewing
- Lager & Kegs

MAY 96
- Lautering Tips
- Troubleshooting Guide

JUNE 96
- Partial Mash Tips
- 15 Great Extract Recipes

JULY 96
- Big Batch Brewing
- Scotch Ale

SEPT. 96
- Brewing with Wheat
- Grain Milling Tips

NOV. 96
- Medieval Beer Recipes
- Build a Mash Stirrer

FEB. 97
- Lager Tips
- Microwave Mashing

MAR. 97
- Build Tap Handles
- Growing Backyard Hops

APR. 97
- Low-Alcohol Recipes
- American Pale Ale Recipes

AUG.97
- Make Your Own Malt
- Dry Hopping Tips

SEPT. 97
- Build a Keg Cleaner
- Tips from Sierra Nevada Brewing

OCT. 97
- Extract Kit Guide
- Decoction Mashing

NOV. 97
- Refining Your Mash
- Brewing with Adjuncts

DEC. 97
- Clone Recipes
- Keg Tips

FEB. 98
- Belgian Lambic Tour
- Belgian Abbey Ale Recipes

MAR. 98
- Super Hoppy Recipes
- Lautering Guide

APR. 98
- Scotch Ale Recipes
- Choosing the Right Yeast

JUNE 98
- Hop Profiles and Tips
- Malt Cooler Recipes

JULY 98
- 15 Clone Recipes
- 3 Beers, 1 Mash

AUG. 98
- Easy Beer Calculations
- Yeast Pitching

OCT. 98
- Great Bock Recipes
- Choose the Right Kit

NOV. 98
- Kegging Techniques
- Using Liquid Yeast

DEC. 98
- Cask Conditioning Tips
- Convert Freezer to Beer Chest

JAN. 99
- Aging in Wood
- Figuring Hop Bitterness

FEB. 99
- Malta Yeast Starter
- Organic Homebrewing

MAR. 99
- Imported Clone Recipes
- Build an Electric Brew Stove

APR. 99
- Kegging Guide
- Understanding Brewing Water

MAY 99
- Perfecting Pale Ales
- Nitrogen Homebrews

JUNE 99
- Nut Brown Ale, Pilsner Recipes
- Experimenting w/ Grains

JULY 99
- Summer Homebrew Recipes
- Hempen Ale Recipe

AUG. 99
- Wit, Kölsch Recipes
- American Lager Clones

SEPT. 99
- Build a $50 Mash Tun
- Lager Techniques

OCT. 99
- Homebrewing Soda Pop
- Doppelbock Recipes

NOV. 99
- Hop Flavor Chart
- Easy Partial Mashing

DEC. 99
- Cutting Edge Equipment
- Increasing Batch Size

JAN. 00
- 7 Czech Beer Recipes
- Your First Brew

FEB. 00
- High-Gravity Brewing
- Foreign Clone Recipes

MAR. 00
- Master Beer Conditioning
- Beer Tasting Lessons

APR. 00
- Making Smoked Beers
- Your First Keg

MAY 00
- Your First Mash
- Understanding Your Water

SUMMER 00
- 4 British Clone Recipes
- Put a Spigot in Your Brew Kettle

OCT. 00
- 20 Autumn Extract Recipes
- Build a Counterflow Wort Chiller

NOV. 00
- 6 Belgian Clone Recipes
- Expert Belgian Brewing Tips

DEC. 00
- Brewing Lagers
- Homebrew Lab Gizmos

JAN. 01
- Brew Indigenous Beers From 4 Continents
- Making Root Beer

FEB. 01
- 5 German Clone Recipes
- Decoction Step-by-Step

MAR. 01
- Growing Yeast Strains at Home
- Brew Low-Carb Beer with Beano®

APR. 01
- Grow Your Own Hops
- Strong Ales

MAY 01
- 20 Extract Recipes for Spring
- Build a Counter PressureBottle Filler

SUMMER 01
- 5 Clone Recipes for Summer
- Build a Big-Batch Mash Tun

SEPT. 01
- Learn to Brew with No-Boil Kits, Extract with Grains, Partial Mash, Single-Infusion Mash and Step Mash

OCT. 01
- 15 Classic Extract Recipes for Different Beer Styles
- Build a Hopback

NOV. 01
- Using and Building With Stainless Steel
- Build a Draft Jockey Box

DEC. 01
- Brewing Scotland's Classic Beers
- Build an Easy RIMS

JAN./FEB. 02
- 8 Ski Town Clone Recipes
- Thomas Jefferson's Homebrew

MAR./APR. 02
- Understanding Malt
- Computer Brewing Software

MAY/JUNE 02
- Faster Brewing Tips
- Big Batch Brews

BUY 5 ISSUES...GET 5 MORE ISSUES FREE!

JULY/AUG. 02
- 21 Regional U.S. Recipes
- Brewing with Fruit

SEPT. 02
- Homebrew Trouble shooting Guide
- Build a Draft Beer Fridge

OCT. 02
- Better Extract Techniques
- One Batch, Two Beers

NOV. 02
- 4 Dream Homebrew Set-ups
- Indoor Brewing Systems

DEC. 02
- Monster Holiday Beer Recipes
- Oatmeal Stout, Coffee Beer

JAN./FEB. 03
- Brewing Porter
- Cleaning & Sanitation Made Easy

MAR./APR. 03
- Selecting Hops to Style
- Introduction to Kegging

MAY/JUNE 03
- How to Control the Color of Your Beer
- Adding Oak to Beer

JULY/AUG. 03
- Light Beer Recipes
- Tips for Entering Homebrew Competitions

SEPT. 03
- Pale Ale Recipes
- Yeast Pointers

OCT. 03
- 17 Foolproof Extract Recipes
- Trappist Ale Tips & Recipes

NOV. 03
- Choosing and Using Homebrew Pumps
- Steeping vs. Partial Mashing

DEC. 03
- High-Gravity Beers
- Brewing with Spices

JAN./FEB. 04
- Brewing Milk Stout
- 3 Mardi Gras Clone Recipes

MAR./APR. 04
- Brewing Sugars & How to use Them
- Yeast: Choose the Right Strain for your Beer

MAY/JUNE 04
- Making Low-Carb Homebrew
- Beer Barbecue Recipes

JULY/AUG. 04
- Brewing Bocks -American & German
- Water Tips for Extract Beer

SEPT. 04
- 13 Commercial Hoppy Beers Cloned
- Brewing Old Ales

OCT. 04
- Extract Experiments
- Lambic Brewing

NOV. 04
- 4 Homebrew Projects
- Hard Cider Made Easy

JAN./FEB. 05
- Kegging: Nitros, Beer Engines, Refurbishing
- Stout Clones

MAR./APR. 05
- New Hop Varieties
- Grow Your Own Hops

MAY/JUNE 05
- 10 Classic Clones: Anchor Steam, Fuller's ESB, Guinness, Sierra Nevada Pale Ale, Orval, Duvel, Paulaner Hefe-Weizen, Pilsner Urquell, Celebrator, Warsteiner

JULY/AUG. 05
- Brewing Heineken and International Lagers
- Belgian Saison

SEPT. 05
- 10th Anniversary Issue: 10 Best Wizard Questions
- 10 Dark Beer Clones

OCT. 05
- 10 Keys to Better Extract Beers
- Brewing Beers with Brettanomyces

NOV. 05
- Build a 3-Tier System
- Converting a Keg to Kettle

DEC. 05
- Pacific Northwest Clones
- 10 Hardest Beer Styles

DON'T FORGET TO ORDER MAGAZINE BINDERS!

BrewYour Own

BUY 5 GET 5 FREE

Mark your 10 choices below.

Qty.	Issue	Qty.	Issue
	December 95 (limited quantities)		November 00
	April 96		December 00
	May 96		January 01
	June 96		February 01
	July 96		March 01
	September 96		April 01
	November 96		May 01
	February 97		Summer 01
	March 97		September 01
	April 97		October 01
	August 97		November 01
	September 97		December 01
	October 97		Jan./Feb. 02
	November 97		Mar./April 02
	December 97		May/June 02
	February 98		July/Aug. 02
	March 98		September 02
	April 98		October 02
	June 98		November 02
	July 98		December 02
	August 98		Jan./Feb. 03
	October 98		Mar./April 03
	November 98		May/June 03
	December 98		July/Aug 03
	January 99		September 03
	February 99		October 03
	March 99		November 03
	April 99		December 03
	May 99		Jan./Feb. 04
	June 99		Mar./April 04
	July 99		May/June 04
	August 99		July/Aug. 04
	September 99		September 04
	October 99		October 04
	November 99		November 04
	December 99		Jan./Feb. 05
	January 00		Mar. /April 05
	February 00		May/June 05
	March 00		July/Aug. 05
	April 00		September 05
	May 00		October 05
	Summer 00		November 05
	October 00		December 05

* issues not listed are sold out

5 copies . . . . . .$25 $_____

5 BONUS copies . . . . . .FREE $ FREE

Shipping/Handling . . . . . .$10 $_____

Orders outside the U.S. please call or e-mail for shipping quote.

Beginner's Guide _____ x $6 each = $_____

BYO Binders _____ x $15 each = $_____
(Binders hold 12 issues each)

Total $_____

Name _____

Address _____

City _____ State _____ Zip _____

E-mail _____

❑ Check Enclosed ❑ MasterCard ❑Visa

Card# _____

Exp. Date _____

Signature _____

MAIL ORDER FORM TO:
BYO Back Issues
5053 Main St., Suite A
Manchester Center, VT 05255

FAX FORM TO:
802-362-2377
or CALL:
802-362-3981

backissue@byo.com

Mashing Matters

And a note on extract efficiency

by Chris Colby

In the previous installment of Techniques, I discussed aspects of the mash that you could tweak once you have learned the basic skills of mashing.

In this installment, I continue the discussion and look at lautering speed, mash thickness and mashing times. I'll also discuss a finer point regarding extract efficiency.

Lautering speed

In a fly sparged (or continuously sparged) homebrew set-up, the speed of wort collection is inversely related to extract efficiency — the faster you go, the more inefficient you are. Excessively fast wort collection can also compact the grain bed, slowing or even stopping wort collection. This is the dreaded "stuck mash."

In order for your calculation of extract efficiency to mean anything, you need to measure your wort volume somewhat accurately.

In a commercial brewery, brewers want to rinse their grain bed (sparge) and extract as much from their grain as is practical. There is a point at which a slower runoff could yield more extract, but it would cost too much in terms of time spent. For homebrewers, a total wort collection time of around 60–90 minutes has two main benefits. First, you get a thorough rinsing of the grain bed. Second, at this speed, the chances of encountering a stuck mash are very slim, even when working with wheat or rye.

In no-sparge or batch sparge mashing, there is no connection between runoff speed and efficiency. When using these techniques, the wort you run off is all of the same specific gravity and you should drain your mash tun as fast as you can manage. Likewise, if you performed a thin mash, you may choose to run off a bit of first wort before you begin sparging. This first wort can be run off quickly without any loss of efficiency.

Mash thickness

In the previous article, I discussed how mash thickness affected temperature differences across the grain bed. In thicker mashes, grain solids can insulate "pockets" of hot or cold mash better.

Mash thickness also affects fermentability. Worts produced from thinner mashes are more fermentable than worts from thicker mashes if all other variables are equal. Of course, the temperature of your saccharification rest primarily determines fermentability and most homebrewers choose a standard mash thickness, often based on how much liquid their mash tun can hold. In contrast, some commercial brewers vary their mash thickness according to beer style. For instance, in Germany, Munich-style lagers are typically made with a thick mash while Pilsners are made from a thinner mash.

When performing a step mash and using hot water to increase the temperature between rests, your mash gets thinner and thinner. While it is unusual for the mash to get too thin for conversion to take place, homebrewers frequently encounter problems with their mash volume. Many have ended up with a full mash vessel, yet are still several degrees below their target temperature. Two solutions to this problem are to mash in your kettle and use direct heat to change the mash temperature or to employ a decoction mash. In any step mash where hot water infusions are used, it pays to mash in thickly, so the mash doesn't get too diluted by the time you are ready to mash out.

The overall range of usable mash thickness ranges from roughly 2:1 (kg water: kg grain) to 5:1. In the units homebrewers use most this is roughly 1 quart of water per pound of grain (qts./lb.) to 2.5 qts./lb.

Mashing times

The amount of time spent mashing has received little attention in the homebrew literature. Most recipes for single infusion mashed beers specify to mash for an hour. Step or ramped mashes may be longer.

As long as your mash temperature stays in the beta-amylase (or maltose-producing) range, increasing your mash time increases fermentability. For brewers of extremely fermentable beers, rests in or ramps through the 131–145 °F (55–63 °C) range may last for hours. Bud Light, for example, achieves its high fermentability not through the addition of enzymes, but through a 3.5-hour mash around 140 °F (60 °C). Once you move the temperature into the high alpha-amylase range, most enzyme activity will stop shortly and extending the mashing time at these temperatures has little effect.

The amount of time spent at a beta-amylase rest may need to be shortened, however, if enzyme right (or "hot") malts are used. Some 6-row barley malts have so much enzymatic power that brewers of American Pilsners and light beers must shorten their mash times or face overly fermentable worts.

An underappreciated aspect of mashing times is that longer mashing times allow for more contact time with the husks, from which malty flavors — but also tannic and other off flavors —are derived. I spoke with one brewer, who requested anonymity, who got rid of a hard-to-peg off-flavor in his Pilsner by

getting rid of some low temperature rests and shortening his mash schedule. (His wort fermentability, incidentally, remained unchanged.)

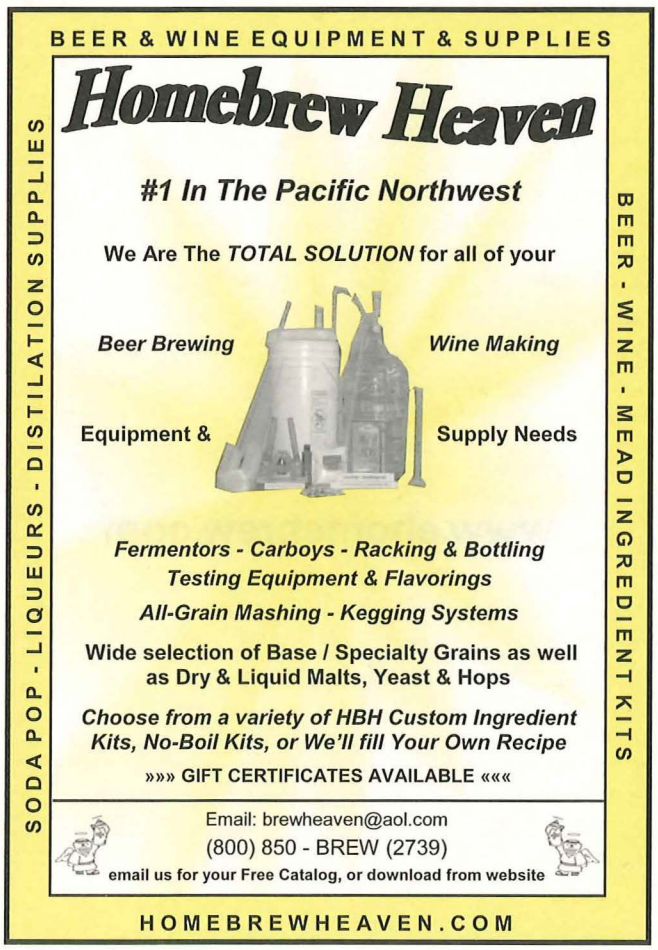
You can experiment with increasing your mashing time at "low" temperatures to increase fermentability, but some commercial brewers have gone the other way and tried very short hot mashes. One brewery has even gone to a short single infusion mash at 165 °F (74 °C)! For the adventurous homebrewer, experimenting with odd mashing schedules could yield interesting results.

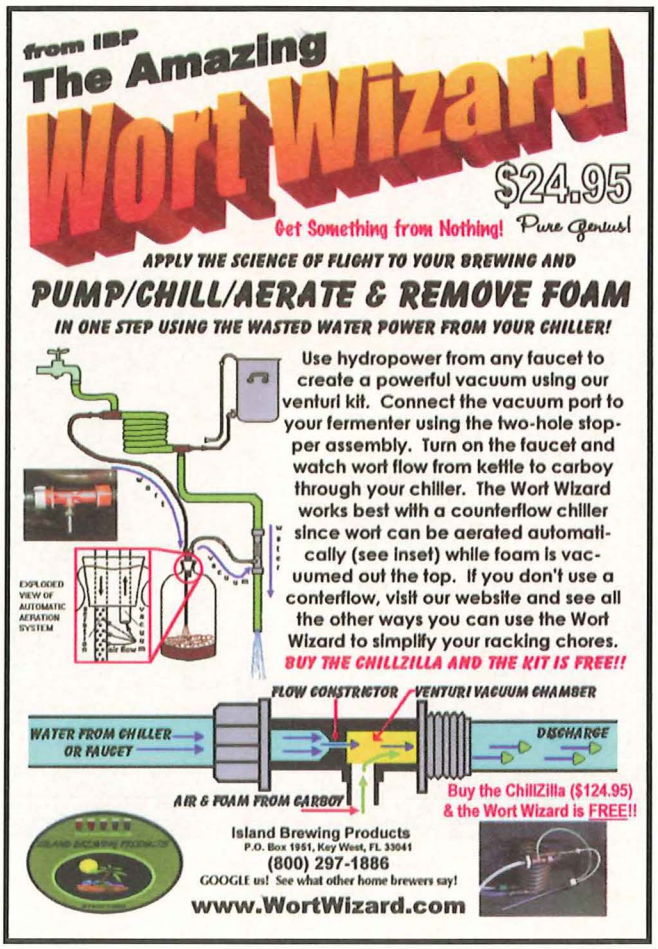
A note on extract efficiency

At some point, most advanced all-grain brewers attempt to calculate their extract efficiencies — the percentage of extract they get from their grains, compared to the theoretical maximum. The numbers you need to plug into this calculation are your original gravity, weight of your ingredients, potential extract of your ingredients and wort volume. If you plug these numbers into your brewing software or spreadsheet, your computer will spit back a number, expressed to however many decimal points your display typically shows. For an example, let's say the your calculated efficiency is 75.86439. What do these digits mean? An underappreciated fact is that, unless you made careful measurements of all the variables, all of the digits expressed in this extract efficiency — with the exception of the "7" and possibly the "5" — are meaningless. Let me explain.

When you perform a calculation using measured variables, the answer you get cannot be more precise than your measurements themselves. For example, let's say you live in a town that is serviced by two highways — one runs exactly north/south and the other runs exactly east/west. Both highways meet in the center of town. Let's further say that there are two homebrew shops outside of town. One is 5.2 kilometers (km) north of where the highways cross, as measured by your car's odometer; the other is 3.7 km west. How far apart are these shops as the crow flies? If you remember the good old Pythagorean Theorem, you can quickly calculate that they are 6.382005 km apart. However, most of the digits expressed in this answer are useless. Your car's odometer only measured the distance to the nearest tenth of a kilometer, yet the answer is expressed to a precision of a millimeter. In reality, the best answer is that the two shops are 6.4 km apart. And, given that the "4" is the last significant digit in this number, the best way to interpret this number is look at it as a range of numbers from 6.35 to 6.44 — all the numbers that would round to 6.4.

Before we take this highway all the way to Dorksylvania, let me explain what this has to do with extract efficiency. When calculating extract efficiency, you can only usefully express your answer to the precision that your measurements were taken. For example, if you want to





express your extract efficiency to two digits — say 75% — all of your measurements have to be taken to two significant digits. To be specific, you'd need to take your OG to two "gravity points." This is not a big problem; most homebrewers give their specific gravity as 1.0XX, where XX are two digits that they actually measure with their hydrometer.

Next, you'd need to have measured your weight to two significant digits. For a 5-gallon (19-L), batch this would most likely mean your grains measured to the nearest XX lbs. (or Y.Y kg) — in other words, to the nearest pound or tenth of a kilogram. Again, no sweat. Your potential extract value should likewise be expressed to two significant digits.

However, you'd also need to measure your volume to two significant digits. At a 5-gallon (19-L) scale, this would mean volume measured as X.X gallons (or YY L) — in other words, the volume measured to the nearest tenth of a gallon (about 13 fluid oz.) or to the nearest liter. (Note that the precision required varies with scale. For a 15-gallon (57 L) batch, you'd only need to measure to the nearest gallon to get two significant digits.) This is where the calculation may break down for many homebrewers. Unless you've actually calibrated your fermenter, you are just assuming you have 5 gallons (19 L) in it. Without actually measuring (and assuming you really are within a half gallon (1.9 L) of the 5-gallon (19-L) mark), you can only meaningfully express your extract efficiency to one significant digit. In our case a calculated 75.86439 would round to 80%. (This may sound like your efficiency went up, but it didn't. In this example, the zero in "80" isn't significant, so this single number really represents a range from 75–84, the range of numbers that would round to "80.")

If you wanted to express your extract efficiency to 3 significant figures, notice that your job becomes a lot more difficult. You need to measure your gravity to 1.0XXX. In other words, you might have to estimate where, for example, you are between SG 1.048 and 1.049 on your hydrometer. Likewise, you'd need your weight measured as XX.X lbs. (or Y.YY kg), roughly to the nearest 2 oz. (or 10 g). This would be your easiest task in this case. For potential extract, you'd really need to get a malt specification sheet, as specs vary enough that the third significant digit would need to be measured. You couldn't rely, for example, on the fact that the default in your brewing software was 38 p/p/g for wheat malt. You'd need the number measured as XX.X p/p/g (or whatever other units you use). For volume, you'd need to measure X.XX gallons (or Y.YY L) — i.e. roughly to the nearest fluid ounce or 10 mL).

The point here is not that you need to start measuring everything more precisely. That's up to you. The point is to realize what the numbers your brewing software spits out really mean. For example, if your calculated efficiency jumps from 67.53 to 68.38%, should you be happy?

Chris Colby is 98.73% sure that he the editor of BYO.

www.ehomebrew.com

Open Square Fermenter

Leave your fermenting brew open to the elements

Story and photos by Thom Cannell

Originally, all brewing was done in open fermenters, wood, and copper predominated. But for some British brewers, the choice was tanks made of honest slate. Brewers and homebrewers today react in horror at the idea of unprotected fermenters with their entire surface open to contamination. We homebrewers have copied the big boys with closed and ultra-sanitized fermentations in tall metal or glass containers. Yet there is research that says tall is not good for yeast, that pressure is detrimental to yeast health — that long, wide and low fermentation vessels are better.

As we at *BYO* are always experimental, we've decided to adopt the open brewing system for our project, and we'll base some of our ideas on what a couple of professional brewers do. Arcadia Brewing in Battle Creek, Michigan uses English-style yeast in their open fermenter. Jolly Pumpkin in Dexter, Michigan brews traditional Belgian style and sour ales. Both use stainless steel tanks rather than slate.

(left): Sean Brennan, Assistant Brewer at Jolly Pumpkin Artisan ales sanitizes a stainless steel open fermenter that they use for their Belgian style and sour beers.
(right): An open fermentation in action at Arcadia Brewing Company.

Advice from the pros

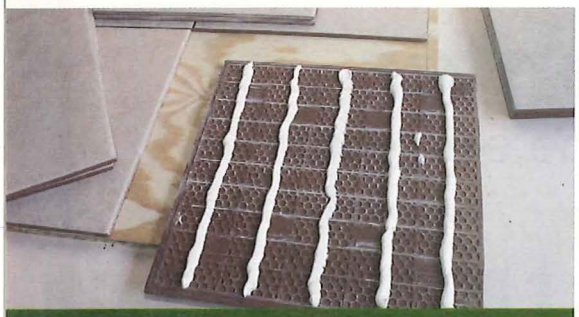
Ron Jeffries is the proprietor of Jolly Pumpkin, brewing ales in the Belgian style. His open fermentation system offered the opportunity for expert advice. "The shape of a fermenter has a huge impact on flavor profile," Ron told *BYO*. Many breweries worldwide use open fermenters, some you might not expect. "One of my interns was from Germany, his job at Bitburger was to scrub the open fermentation lager tanks."

We found this interesting as homebrewers normally associate open fermentation with ales, which ferment at warmer temperatures. Of course yeast is a huge contributor to flavor, but using a

PARTS:

½" plywood or ½–1" MDF 4'x8' sheet	$20.00
Ceramic tiles, approximately 16, plus 2 for breakage @	$0.85 each
Ceramic cutoff wheel for angle grinder	$2.25
Wet area construction adhesive; 3 tubes @	$3.25
Aquarium sealant; 2 tubes @	$3.75
Deck screws; 1.5" x #6; 1 box	$6.25
Optional: bulkhead fitting of 2 washers, 1 nipple, 1 ball valve, 1 nut or coupling, 2 O-rings	

(top): The tool list is short: a hand saw, power saw, measuring tools, caulking gun, marking pencils, hammer and glue.
(middle): If your tiles don't fit exactly into your box, you can cut them on a wet tile saw, use an angle grinder to remove excess tile.
(bottom): Lay out the tiles on the sides, allowing proper edges so the end can butt against the sides.



(top): With food grade adhesive, attach the tiles to the plywood.

(left): After the tiles are in place, evenly weight the tiles and allow to dry. We used a scrap of plywood, a box of tiles destined for the sides and bottom and a CO_2 cylinder on top for good measure.

top-cropping strain is not as critical as one might think.

"Most yeasts don't top crop; all sorts of yeasts are applicable to open fermentation," Ron said. He contends that any yeast that worked well in your carboy will work well in open fermentation. He also suggests pitching as you always have, and if starters are your normal procedure stick with it.

"You should use a clean area, one free of pet danders and debris falling from the ceiling. Once the fermentation has started, CO_2 should create a fairly protected environment for fermentation," Ron continued. "If you use a true top-cropping yeast it will form a nice thick crust as CO_2 production slows, and the crust will protect your brew from oxygen. There is no magic in learning to run a fermentation in open systems; pitch your yeast and get a vigorous fermentation started as soon as possible."

Ron says open fermenters require more labor intensive cleaning, "but it makes darn good beer. One could argue open fermentation makes better beer, beer with more flavor." Only you will know the answer to that, and your personal taste is unique to your palate.

Step By Step

Our idea is to create an open fermenter that is similar to traditional British, German, and Belgian brewing. That is, shallow fermenters of an appropriate capacity.

Begin by determining your willingness to experiment. Are you willing to sacrifice, one gallon or ten? Our fermenter is based on standard homebrew volumes of 5–10 gallons (19–38 L). Recipes require no modification, and a larger fermenter would be incredibly heavy — ours weighs almost 60 pounds (27 kg) empty!

We've chosen tiles that are a bit under 12" x 12" (30 cm x 30 cm), a dimension big enough to contain even the most vigorous fermentation, even the type that can blow out the top of your carboy. It's oversized to account for yeast

Quality Wine and Ale Supply

Wine and Beer Making Supplies for Home Brewers and Vintners

Awarded "Retailer of the Year" by the 2005 WineMaker International Amateur Wine Competition

Wine kits - Beer kits - Corks - Bottles - Barrels
Kegging - Equipment - Supplies - Books - Gifts

Our newsletter is a great source for recipes, wine making and home brewing tips, information and specials for our newsletter members only. Sign up today at www.HomeBrewIt.com!

Store: 108 S. Elkhart Ave., Elkhart, IN 46516
Mail: 530 E. Lexington Ave. Suite 115, Elkhart IN 46516
Phone - Fax - Voice: (574) 295-9975
info@HomeBrewIt.com - www.HomeBrewIt.com

Elkhart County's *First* and *Finest*
Winemaking & Homebrew Specialty Store

www.HomeBrewIt.com

SABCO

Amazing Tools for amazing Brewers !

(Since 1961)
AN ISO9001:2000 QUALITY CO.

Commercial Brew-Kettle design !

The 'Chill-Wizard' System
A 'chilling' combination of components that's totally 'CIP' !

BREW-MAGIC
Brewing System by Sabco

The most desired 'small-batch' brewery in America ! . . . Find out why !

Commercial Quality Repeatability !

WWW.KEGS.COM
SABCO INDUSTRIES, INC. TOLEDO, OH
419-531-5347, FAX 419-531-7765, SABCO@KEGS.COM

bloom, the frothy kräusen and a firm top-cropping cap of yeast.

Once volumes and vertical height is selected (ours is 12 cubic feet or 30 cubic cm), select tiles with a length and width to create the least cutting of tiles. If you can use whole tiles it would be ideal. Fortunately, tile saws are rentable, or some tile vendors might cut a few for you for a nominal fee.

Once dimensions are known, lay out your tiles and allow ⅛" (3 mm) for a sealing line of food grade (aquarium) caulking. Measure length, width and height, as the next step is to construct a support structure — essentially a box — out of plywood. You'll have to use at least ⅜" thick plywood to have dimensional rigidity and prevent bowing which would crack the brittle tiles.

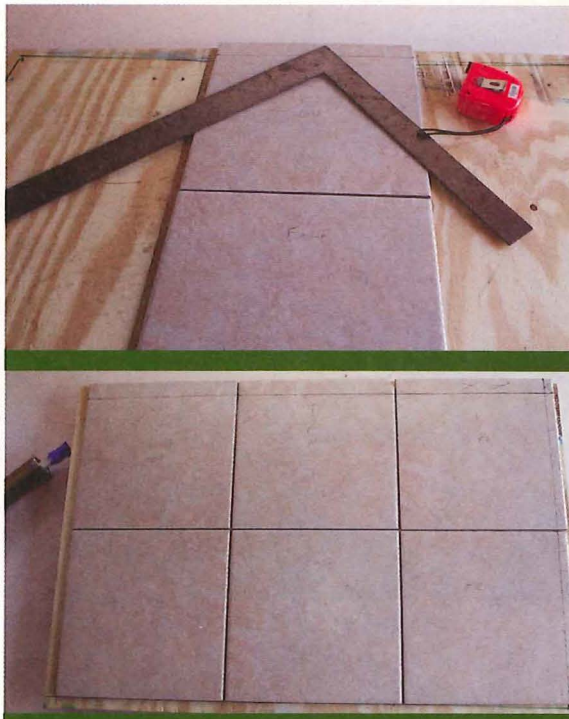
Step One: Build the box.
Our box has the following dimensions: a bottom of 37" x 23 ⅞"(~94 cm x 60 cm), ends of 24 ⅜" x 23 ⅞" (~62 cm x 60 cm) and sides of 36" x 23 ⅞"(91 cm x 60 cm). Cut these five pieces, or have them cut at your home store.

Step Two: Use food grade adhesive to attach tiles to the side. Lay them out and allow a vertical edge (equaling one tile plus plywood/MDF) of bare wood on the left and right side of the tiles (flush on the top and bottom.) This will become your glue/screw joint where the end piece meets the joining edge of the side piece(s.)

Step Three: Attach tiles to each side piece with construction adhesive. Your tiles should completely cover the plywood/MDF support. You will attach the side pieces to end pieces in a later step.

Step Four: Dry assemble the sides and ensure that they fit snugly atop the base. I'd suggest cutting the base slightly larger, then marking and cutting to size.

Step Five: Once the ends and sides are firmly attached (it takes hours) seal the



(top): When building the base, leave a wooden lip around the tiles. You'll attach screws or nails here. (bottom): Fill in the cracks with aquarium or food grade silicone sealant.

ANNAPOLIS HOME BREW
Great Beer Recipes!
We specialize in tested & proven beer recipes. Using the finest ingredients, each recipe kit is measured and packaged by our brewmasters.
Visit our website to see what makes our beer recipe kits so good. Over 50 beers available in malt extract, partial mash, or all-grain!
Premium Malt Extract
Crushed & Sealed Grains
Grain Steeping Bag
UV & Oxygen Sealed Hops
Live Yeast Culture
Bottling Sugar & Caps
Step-by-Step Instructions
Some include fruit, honey, etc.

We're open 7 days a week!
Everyone on our staff is an experienced home brewer!
800-279-7556
Secure Online Ordering
www.annapolishomebrew.com

LISTERMANN'S
Manufacturers of the PHIL'S line of homebrewing equipment
Wide selection of wine & wine cooler kits available
or try our tasty beer kits made from the personal recipes of our adequately-sober staff.
49 different styles from which to choose.
LISTERMANN MANUFACTURING CO. INC.
- FREE SHIPPING -
on e-tail orders over $35
from east of the Mississippi River
Check out our retail website at
LISTERMANN.COM
or call (513) 731-1130

Attach one end to a side, then screw the remaining end to the first side. Add the second side, turn the unit over and attach sides to the base. When construction is complete, seal all the edges and test for water tightness.

joints with food grade silicone, or aquarium-grade silicone (any 100% silicone should be food safe, but use one that has been FDA tested.) When sealing, use a very small tip opening and push the silicone deep into the gap before smoothing the grout. (Tip: keep your finger wet in rubbing alcohol to make a smooth grout line.)

Step Seven: Attach ends to the sides. Predrill a pilot hole large enough to prevent end splitting, and use outdoors rated screws. I used 1 ½" #6 deck screws for their length and thinness. You could also use ring nails. Be anal, use glue or construction adhesive as well.

Step eight: Attach tiles to the bottom, but dry fit them first and cut to fit if necessary. (I used a small grinder with a masonry wheel to cut the glazed clay tiles.) Silicone the grout lines, and where the sides meet the bottom.

Allow the silicone to dry, and then protect your investment by sealing and painting any exposed wood.

While our project does not include a drain, one could easily be built in, assuming you wish to build a bulkhead fitting similar to those found in our kettle or mash tun projects (see Summer 2001's issue of *Brew Your Own* for instruction). An ordinary hole saw would cut the necessary opening for a stainless steel pipe nipple.

Once the hole is cut, two food-grade O-rings, two stainless steel washers, a stainless steel nut or coupling on the inside and a ball valve on the outside would make this a complete all-purpose fermenter. The rest of us, me included, will just have to siphon.

You're almost done, you only have to brew a rugged pale ale and select yeast you know, or one that is a true top cropping English yeast to produce your first, richly flavored, open fermented beer.

Thom Cannell writes the "Projects" department in each issue of Brew Your Own *magazine.*

www.kegkits.com
Your homebrew kegging and draft beer keg source

Hardware | Refurbished Cornelius Kegs | CO2 Tanks
Bulk HOPS | All Metal Beer Towers | Keg Coolers
Pony Pumps | New Cornelius Kegs | Kegerator Kits
CO2 Regulators | Briess Malt Extract | Draft Beer Taps
Temp Controllers | Kegging Supplies | White Labs Yeast

www.kegkits.com

Perfect Results are Within Your Reach.

www.homebrewery.com
THE HOME BREWERY

From aspiring brew masters to seasoned veterans, The Home Brewery will help you achieve the perfect results. We're available to answer any questions you may have along the way. Expert equipment. Expert advice. Give us a call.

Call Today to Receive a FREE Catalog!
Featuring our Top 10 Tips for Creating the Ultimate Homebrew.

www.homebrewery.com
1-800-321-BREW(2739)
Ozark, Missouri

Going Belgian

Launch a transatlantic journey from your home brewery

by Bill Pierce

No nation has a more interesting and diverse brewing tradition than that of Belgium. This small European country is divided between two major language groups that speak a dialect of Dutch as well as French, but united in their love of a wide range of beer styles. More than 100 breweries vary in size from small artisanal operations recreating historical beers that otherwise would be extinct to the headquarters of the world's largest (by volume) brewing conglomerate, InBev.

Over the past decade there has been a swell of interest in Belgian-style beers in North America. Several small breweries — and at least one medium-sized brewery — now devote all or much of their efforts to recreating or reinterpreting these beers on this side of the Atlantic.

Many homebrewers come late to Belgian brewing. Some of them require a more complex brewing process, longer aging, and blending of more than one beer, as opposed to more straightforward styles. Specific gravities can be somewhat higher, requiring more ingredients and larger equipment capacity. Some of these ingredients — for example, spices, exotic brewing sugars and bacterial culture — may have to be obtained outside the normal homebrewing channels, or even improvised. However, not all Belgian styles require a monk's patience, a nobleman's budget or a professional brewer's equipment. So these obstacles should not stand in the way of any homebrewer with the interest, desire and a moderate level of experience.

As for the rewards, some of these styles are only sporadically imported and distributed commercially, and therefore have limited availability in North America.

Breaking the rules

To some extent, Belgian brewing is a matter of bending — or even outright breaking — the rules associated with more conventional beers. Clarity is often not a priority, as some Belgian beers are decidedly cloudy. Witbier and lambic recipes sometimes specify what is called a "turbid mash," in which the mash liquid is boiled and added back to the grain solids as a means of raising the temperature between steps. Some Belgian beers include a variety of adjunct grains, both malted and unmalted, such as wheat, oats and corn. Likewise, sugars account for 20 percent or more of the total fermentables in some of these brews.

Belgian styles tend to be high in original gravity, low in the final gravity and correspondingly high in alcohol. This requires highly fermentable wort. All-grain brewers can employ a saccharification rest at a lower temperature (148–150 °F/64–65 °C); this encourages the production of simple sugars that are more easily metabolized by the yeast. A rest in (or ramp through) lower temperatures may also help (See this issue's installment of Techniques, on p. 48, for more.) Extract brewers should use the most fermentable (typically also the lightest in color) extract they can find, and also increase the percentage of ordinary sugar in the recipe to make up for the fact that malt extract tends to be lower in fermentability.

Many of the yeast strains used in Belgian brewing are available only in liquid form, although recently a couple of dried varieties have become available. In general, you will want to make a large yeast starter — 1–2 qts. (~1–2 L) for 5-gallon (19-L) batches — and aerate the chilled wort extremely well. Some commercial Belgian ales are brewed with pitching rates lower than the usual ale rate. With lower pitching rates, however, you risk the chance of a stuck or overly sluggish fermentation.

Carbonation levels also tend to be higher in many of these beers. For these reasons, Belgian breweries often pitch additional yeast at bottling. A neutral ale strain (dried yeast is convenient for this)

Make your own caramel syrup

A more flavorful — and authentic — alternative to amber or dark "candi" sugar

Over medium heat in a clean, very smooth skillet, add about a cup of white table sugar with a teaspoon of cream of tartar or lemon juice or a pinch of citric acid. (This will help "invert" the glucose-fructose bond in the sucrose). The sugar will melt, become pale yellow, turn tan, various shades of brown and finally nearly black. A medium shade is about right for amber syrup. Stir constantly so that the solution doesn't actually burn. Use a high temperature silicon rubber spatula or metal spoon that will not char or melt.

Remove the skillet from the heat before the sugar smokes, smells burnt or catches fire (yes, it eventually can flame if you are not careful). Pour the melted, caramelized sugar onto a piece of aluminum foil on a surface that heat will not damage, such as a thick cookie sheet or cutting board covered with a towel. Scrape the skillet clean with the spatula or spoon. The hardened sugar will look like peanut brittle and range in color from medium gold to very dark, depending on how long it was heated.

Allow the caramelized sugar to cool and then melt it in a pan over low heat, stirring in enough water to achieve the consistency of thick syrup or honey as well as the desired color. Briefly bring the syrup to a boil. It will have a very rich caramel flavor that definitely contributes to the beer, and also darkens it. However, the fermentability is limited, so you will want to add the equivalent amount of white sugar to achieve the same weight of "candi" sugar called for in the recipe. Add the syrup and any other sugars at the end of the boil.

(Thanks to longtime homebrewer and frequent Internet Homebrew Digest contributor Jeff Renner for the basic instructions.)

will produce carbonation with little additional effect on flavor.

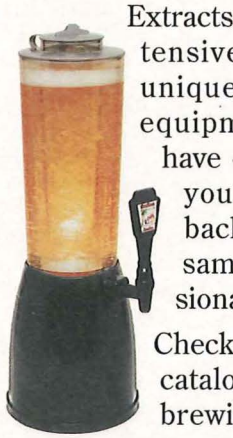
The major yeast suppliers produce a variety of Belgian yeast strains, but sometimes you may wish to use one that is not easily available. In some cases it's possible to culture the yeast sediment from a bottle of a commercial Belgian-style beer. This may not be successful in every case — as the yeast may not be very healthy due to the high alcohol content, long aging or poor handling — but it may be worth a try if you are adventuresome and enjoy "yeast ranching."

Many Belgian beers feature distinctive estery and phenolic flavor profiles. This is a consequence of the yeast, but also greatly influenced by the fermentation temperature. Each strain has its own character and suggested temperature range; sometimes deliberately manipulating the temperature profile can produce rather different beers from the same yeast. It's worth experimenting to determine what seems to work best. As mentioned, Belgian styles tend to be well attenuated. One method of encouraging more complete fermentation is to raise the temperature as fermentation activity begins to subside. This can make Belgian brewing a good summertime activity when the temperature in your fermenting space may be relatively warm. Some Belgian styles (saison, for example) are fermented at temperatures as high as the low 80s Fahrenheit (around 28 °C). In many cases, however, the beer is pitched at lower temperatures — 65–70 °F (18–21 °C) — and allowed to heat up during fermentation. And, even with warmer than average fermentation temperatures, many Belgian beers require more time to attenuate than an English-style ale of the same starting gravity.

How sweet it is

Belgian brewers often use various sugars in their brewing. This boosts the alcohol content and increases fermentability without leaving a sweet finish. Because the yeast more easily metabolizes these simple sugars, it results in a drier rather than sweeter beer. Many Belgian beers "hide" their alcohol surprisingly well and are relatively refreshing despite a high original specific gravity. The use of sugar in the range to 10 to 20 percent (by weight) of the total fermentables is not at all uncommon. Typically, the sugars are added at the end of the boil.

There is some controversy about the kind of sugar used. Texts on Belgian brewing and homebrew recipes often refer to "candi" sugar, which usually has been interpreted in North America to mean the large crystalline sugar used in rock candy. This is available in light, amber and dark colors. The darker varieties have noticeable caramel and even slight licorice flavors, but lack the intensity of the sugars used by Belgian brewers. Recently it has been revealed that most Belgian breweries actually use sugar syrups that have been caramelized to varying degrees. Only since late 2005 has this caramel syrup been available from a few select homebrew suppliers.



BREWERS!

Since 1979, William's Brewing has been a pioneer in innovative, quality home brewing equipment and supplies.

From our renowned William's Brewing Kits and William's Malt Extracts to our extensive line of unique brewing equipment, we have everything you need. All backed by our huge inventory, same-day shipping, and professional customer service.

Check our website and request our catalog, for our full line of home brewing, winemaking, and coffee roasting supplies.

Free Catalog Requests: 800-759-6025

2594 Nicholson St. • San Leandro • CA • 94577

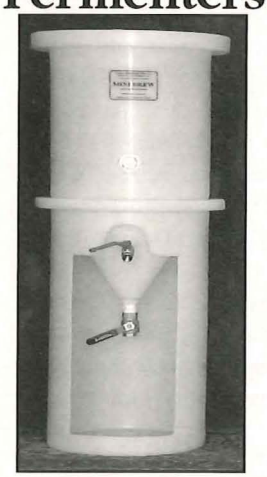
www.williamsbrewing.com

Hobby Beverage Equipment

FERMENTERS - MASH TUNS
HOT LIQUOR TANKS - THERMOMETERS

A major medical company and now a major brewery have purchased our plastic fermenters

Fermenters



What kind of recommendation do you need?

Box 1387 Temecula CA 92593 - 951-676-2337 – minibrew.com

You may need to search to find it, or it is possible to make your own (see sidebar on page 55).

For styles and recipes calling for light or clear candi sugar, you can substitute white table sugar in the same amount. The differences between clear sugar syrup and common cane or beet sugar are minimal; as a practical matter, they are just about equally fermentable. The brewer of a silver medal-winning tripel at the Great American Beer Festival stated that he used the same cane sugar as his brewpub's restaurant kitchen.

Age before beauty

Higher alcohol beers tend to benefit from long aging, and Belgians are no exception to this rule. The beer should be transferred to a secondary fermenter when fermentation is complete. This removes the beer from the yeast that can have a negative effect on flavor if left for a long time. During conditioning, the higher alcohols produced in a warm fermentation break down, and other undesirable byproducts are reduced, making the beer less "hot" and encouraging the flavors to blend and mellow.

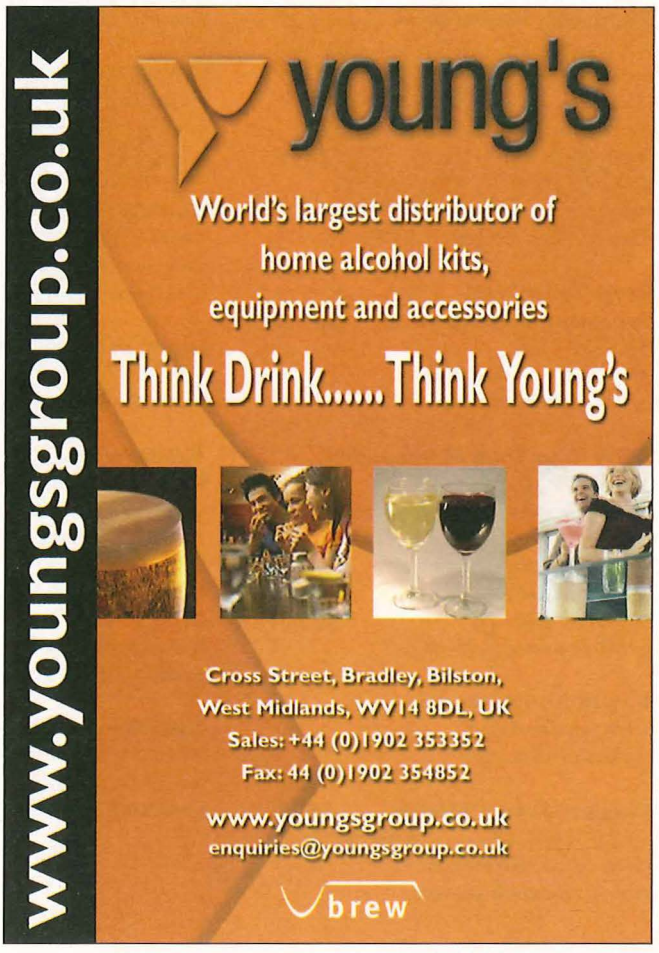
Any fruits used in Belgian brewing are typically added when the beer is racked to the secondary fermenter. Especially for sour styles, secondary yeast strains or bacterial cultures may be added at this time. These are available as blends from the major yeast producers, or as individual cultures. Some of them take months, or even as long as a couple of years, to complete their job. You are likely to want to sample the beer periodically in order to determine the progress and the overall effect on the flavor. Some sour-beer brewers maintain separate equipment for their "wild" brews so that their other, "normal," beers are not contaminated due to contact with them.

Some Belgian beers are matured in wooden casks, occasionally for years. The effect of the wood can be imitated by the use of oak chips or pellets. Because of the unpredictability, blending of these Belgian styles is a common practice. Often a portion of aged beer produced with the help of additional microorganisms is blended to taste with a younger, conventionally fermented beer. This allows the brewer to control the sourness and "wild" character, achieving a level of flavor and character unique to each batch.

Embrace your inner Belgian

Belgian-style brewing has its challenges and may not be for everyone, but if you have any interest whatsoever in these wonderful and diverse beers from this small nation across the ocean, you owe it to yourself to indulge your curiosity and creativity. It just might be the beginning of a magnificent obsession that results in something of which you could once only dream. Moreover, there is the exciting possibility of creating unique beers unduplicated anywhere else and by anyone other than you.

Bill Pierce wrote about turning professional in the May-June issue of Brew Your Own.



READER SERVICE

For direct links to all of our advertisers' Websites, go to www.byo.com

pg.

Advintage Distribution 50
1-800-WINE KIT
www.advintage.ca
info@advintage.ca

American Brewers Guild Brewing School 22
1-800-636-1331
www.abgbrew.com
info@abgbrew.com

Annapolis Home Brew 53
1-800-279-7556
www.annapolishomebrew.com
email@annapolishomebrew.com

Beer and Wine Hobby 39
1-800-523-5423
www.beer-wine.com
shop@beer-wine.com

Beer, Beer and More Beer .Cov. III
1-800-600-0033
www.morebeer.com
sales@morebeer.com

Beginner's Guide 57
802-362-3981
www.byo.com
beginnersgd@byo.com

Blichmann Engineering, LLC 7
www.blichmannengineering.com
john@blichmannengineering.com

Brew Your Own Back Issues 46-47
802-362-3981
www.byo.com/backissues/index.html
backissues@byo.com

Brew Your Own European BeerTrips 1
406-531-9109
www.beertrips.com/byo
beerguy@beertrips.com

Brew Your Own Merchandise .45
1-877-809-1659
www.cafepress.com/brewyourown

Brewers Publications 45
1-888-822-6273
www.beertown.org
info@brewersassociation.org

Brewferm Products 18
www.brewferm.com
info@brewferm.com

Coopers Brew Products . . .Cov. IV
1-888-588-9262 & Recipe Cards
www.cascadiabrew.com
mark@cascadiabrew.com

pg.

Crosby & Baker Ltd. 14
508-636-5154
www.crosby-baker.com
info@crosby-baker.com

E.Z. Cap 31
403-282-5972
www.ezcap.net
ezcap@ezcap.net

Foxx Equipment Company 59
1-800-821-8254
www.foxxequipment.com
ford@foxx.cnc.net

Genuine Innovations 39
1-800-340-1050
www.innovationsaz.com
amyt@innovationsaz.com

Grape and Granary 33
1-800-695-9870
www.grapeandgranary.com
info@grapeandgranary.com

Here's to Beer, Inc. 3
www.herestobeer.com

Hobby Beverage Equipment . . .56
951-676-2337
www.minibrew.com
john@minibrew.com

Home Brewery (MO) 54
1-800-321-2739 (BREW)
www.homebrewery.com
brewery@homebrewery.com

Homebrew Heaven 49
1-800-850-2739
www.homebrewheaven.com
brewheaven@aol.com

Island Brewing Products 49
1-800-297-1886
www.WortWizard.com

JCD Enterprises dba BeerCollections.com 43
www.BeerCollections.com
staff@beercollections.com

KegKits.com 54
256-656-1924
www.KegKits.com
sales@KegKits.com

Listermann Mfg. Co. 53
513-731-1130
www.listermann.com
dan@listermann.com

pg.

Midwest Homebrewing & Winemaking Supplies 43
1-888-449-2739
www.midwestsupplies.com
info@midwestsupplies.com

Muntons p.l.c. . . . . . .Cov. II
011-441-449618333
www.muntons.com
james.smith@muntons.com

My Own Labels 31
www.myownlabels.com
info@myownlabels.com

Northern Brewer, Ltd. 21
1-800-681-2739
www.northernbrewer.com
info@northernbrewer.com

Original Home Brew Outlet . . .50
www.ehomebrew.com

Party Pig / Quoin Industrial . . .22
303-279-8731
www.partypig.com
info@partypig.com

Quality Wine and Ale Supply .52
574-295-9975
www.HomeBrewIt.com
info@HomeBrewIt.com

SABCO Industries, Inc. 52
419-531-5347
www.kegs.co
sabco@kegs.com

White Labs Pure Yeast & Fermentation 59
1-888-5-YEAST-5 & Recipe Cards
www.whitelabs.com
info@whitelabs.com

William's Brewing 56
1-800-759-6025
www.williamsbrewing.com
service@williamsbrewing.com

Wyeast Laboratories, Inc. – Fresh Fermentation Cultures . . .33
www.wyeastlab.com
brewerschoice@wyeastlab.com

Young's Group 57
+44 (0)1902 353352
www.youngsgroup.co.uk
enquiries@youngsgroup.co.uk

CLASSIFIEDS

APPAREL

GET YOUR BYO GEAR!
Logo shirts, sweats, hats,
& lots more.
www.cafepress.com/brewyourown

BOOKS & VIDEOS

HOMEBREW DVD's
MUST SEE ON YOUR TV!
Complete information packed guide to Extract and All-grain brewing.
2 DVD's $34.90 + $3.90 shipping & handling. Features beers that are: Organic, German, Alcohol-free, Hempy, Spacy and more!
www.easyhomebrew.com

BREWING EQUIPMENT

The Barley Crusher MaltMill
"Homebrewer's best friend."
Mills for the homebrewer, brew shop and microbrewer.
www.barleycrusher.com

CrankandStein
Hand-crafted grist mills for the homebrewer. 6 models to choose from including our massive 3-roller.
www.crankandstein.com

LATEST & BEST Homebrew Heaters now available in the U.S.!
See them at www.quickheat.net
E-mail us for a list of the Homebrew Shops who stock them - Dealer enquiries welcome.

SOFTWARE

BEERSMITH BREWING SOFTWARE
Take the guesswork out of brewing!
Free 21 day trial!
www.beersmith.com

SUPPLIES

DRAFTSMAN BREWING COMPANY
Don't dodge the draft!
Call today for our FREE homebrew supply catalog.
1-888-440-BEER
www.draftsman.com

MICRO DISTILLING
Stills, Flavours, All Equipment.
Ex Factory
www.spiritsunlimited.co.nz

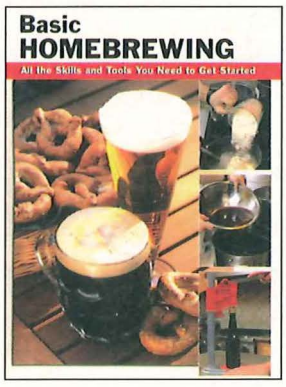
WINEMAKING

WINEMAKER BACK ISSUES
Tips, techniques and recipes from magazine issues dating back to 2001.
Call 802-362-3981 or visit
www.winemakermag.com/backissues/index.html

BREWER'S LOG

Tempgun releases infrared thermometers

Tempgun.com has released a line of infrared thermometers that allows homebrewers, winemakers and chefs the ability to aim, press a button and read the surface temperature of a target within one second. The two most popular units are the PE-1 and the PE-2. The PE-1 has capabilities of reading temperatures from -27 °F (-33 °C) to 428 °F (220 °C) and retails for $25. The PE-2 increases the temperature range to nearly 500 °F (260 °C), adds a red sighting laser and retails for $45. For more information visit www.tempgun.com.



Stackpole Books releases "Basic Homebrewing"

"Basic Homebrewing" is a full-color illustrated brewing guide structured around a number of recipes and techniques. Jim Parker, former director of the American Homebrewers Association, was the consultant for this book, which was edited by Stacy Tibbetts. The book retails for $19.95 and is available at www.stackpolebooks.com.

BREWER'S MARKETPLACE

YOUR FERMENTATION SOURCE
Since 1995
WHITE LABS
PURE YEAST AND FERMENTATION
www.whitelabs.com

Attention Homebrew Shops
Interested in selling
Brew Your Own?
It's easy!

- Free point-of-purchase display rack
- Big 45% discount off cover price
- Minimum order of just 5 copies
- Help drive more customer business and demand
- Flat shipping fee
- NEW! Free Online listing & Hotlink on byo.com!

To set up an account or find out more call John at (802) 362-3981 ext. 106

FOXX EQUIPMENT company
Quality Kegging Parts especially for the Home Brewer.
Visit foxxequipment.com to find a Home Brew Shop near you!

ALABAMA

Werner's Trading Company
1115 Fourth St. S.W.
Cullman
1-800-965-8796
www.wernerstradingco.com
The Unusual Store.

The Wine Smith
6800 A Moffett Rd. (US Hwy. 98)
Mobile 36618
(251) 645-5554
fax (251) 645-6446
e-mail: winesmith@bellsouth.net
Serving Central Gulf Coast Homebrewers

ARIZONA

Brew Your Own Brew
2564 N. Campbell Ave., Suite 106
Tucson (520) 322-5049 or
1-888-322-5049
www.brewyourownbrew.com
Where the art of homebrewing starts.

Homebrewers Outpost & Mail Order Co.
801 S. Milton Rd., Suite 2
Flagstaff
1-800-450-9535
www.homebrewers.com
Free Shipping in Arizona on orders over $50.

What Ale's Ya
6363 West Bell Road
Glendale
(623) 486-8016
www.whatalesya.com
Great selection of beer & wine making supplies.

ARKANSAS

Fermentables
3915 Crutcher St.
North Little Rock 72118
(501) 758-6261
www.fermentables.com
Complete homebrew & winemakers supply

The Home Brewery
455 E. Township St.
Fayetteville
1-800-618-9474
homebrewery@arkansasusa.com
www.thehomebrewery.com
Top-quality Home Brewery products.

CALIFORNIA

Beer, Beer & More Beer Riverside
1506 Columbia Ave. #12
Riverside 92507
1-800-622-7393
www.morebeer.com
Top-quality Supplies for the Home Brewer or Vintner.

Beverage Company Beer, Wine & Cheesemaking Supply
2990 East St.
Anderson 1-800-317-9963
E-mail:
maltbyault@winemakingbrewingco.com
www.winemakingbrewingco.com
53 Years Brewing Experience!

The Beverage People
840 Piner Road, #14
Santa Rosa
1-800-544-1867
www.thebeveragepeople.com
Fast Shipping, Great Service!

Brewers Discount
8565 Twin Trails Dr.
Antelope 95843
1-800-901-8859
sales@brewersdiscount.com
www.brewersdiscount.com
Lowest prices on the Web!

Doc's Cellar
855 Capitolio Way, Ste. #2
San Luis Obispo
805-781-9974
www.docscellar.com
Largest beer & wine supplier on the central coast.

The Good Brewer
2960 Pacific Ave.
Livermore 94550
(925) 373-0333
fax (925) 373-6232
www.goodbrewer.com
Home brew and wine making supplies

Home Brew Shop
1570 Nord Ave.
Chico 95926
(530) 342-3768
E-mail: homebrushop@yahoo.com
Years of experience, advice always free!

HopTech Home Brewing Supplies
6398 Dougherty Rd. #7
Dublin 94568
1-800-DRY-HOPS
www.hoptech.com
Beer, Wine, Root Beer-Kits & Brew Supplies!

HydroBrew
1319 South Coast Hwy.
Oceanside 92054
(760) 966-1885
www.hydrobrew.com
Homebrewing & Hydroponics supplies serving the San Diego area.

Morning Glory Fermentation Supply
6601-C Merchandise Way
Diamond Springs 95619
1-866-622-9660
www.morningloryfermentation.com
Great selection. Best quality. Awesome service!

Napa Fermentation Supplies
575 3rd St., Bldg. A (Inside Town & Country Fairgrounds)
P.O. Box 5839
Napa 94581
(707) 255-6372
www.napafermentation.com
Serving your brewing needs since 1983!

Original Home Brew Outlet
5528 Auburn Blvd., #1
Sacramento (916) 348-6322
Check us out on the Web at www.ehomebrew.com

O'Shea Brewing Company
28142 Camino Capistrano
Laguna Niguel
(949) 364-4440
www.osheabrewing.com
Providing southern California with great beer!

San Francisco Brewcraft
1555 Clement Street
San Francisco 94118
(800) 513-5196
or 415-751-9338
www.sfbrewcraft.com
Low Prices, Large Selection

Seven Bridges Organic Homebrewing Supplies
325 A River St.
Santa Cruz 95060
1-800-768-4409
fax 831-466-9844
www.breworganic.com
Certified Organic Brewing Ingredients

Stein Fillers
4160 Norse Way
Long Beach (562) 425-0588
www.steinfillers.com
brew@steinfillers.com
A nonprofit public benefit company.

COLORADO

Beer and Wine at Home
1325 W. 121st. Ave.
Westminster (720) 872-9463
www.beerathome.com
Now Open!

Beer at Home
4393 South Broadway
Englewood (303) 789-3676
1-800-789-3677
www.beerathome.com

The Brew Hut
15108 East Hampden Ave.
Aurora 1-800-730-9336
www.thebrewhut.com
Beer, Wine, Mead & Soda — WE HAVE IT ALL!

Lil' Ole' Winemaker
516 Main Street
Grand Junction 81501
(970) 242-3754
Serving Colorado & Utah brewers since 1978

My Home Brew Shop & Brew on Premise
5923 N. Academy Blvd.
Colorado Springs 80918
(719) 528-1651
www.myhomebrew.com
Taking Homebrewers to the next level

Stomp Them Grapes!
2563 15th Street, 101
Denver 80211
(303) 433-6552
www.stompthemgrapes.com
Because making it is almost as fun as drinking it!

CONNECTICUT

Beer & Wine Makers Warehouse
290 Murphy Road
Hartford 06114
(860) 247-BWMW (2969)
e-mail: bwmwct@cs.com
www.bwmwct.com
Area's largest selection of beer & winemaking supplies. Visit our 3000 sq ft facility with class & demo areas. New grain crushing room.

Maltose Express
887 Main St. (Route 25)
Monroe 06468
In Ct.: (203) 452-7332
Out of State: 1-800-MALTOSE
www.maltose.com
Connecticut's largest homebrew & winemaking supply store. Buy supplies from the authors of "CLONEBREWS" and "BEER CAPTURED"!

FLORIDA

The Shady Lady
2475 B East Nine Mile Rd.
Pensacola 32514
(850) 436-4436
www.theshadylady.net
From bottles to books, from kits to chemicals - We have everything to brew your own!

GEORGIA

Beer Necessities
9850 Nesbit Ferry Rd.
Alpharetta 30022
(770) 645-1777
www.brewvan.com
Located North of Atlanta off of HWY 400

Just Brew It
103 Rainbow Way
Fayetteville 30214
(770) 719-0222
Fax (770) 719-0274
www.aardvarkbrewing.com
9 miles south of Perimeter on GA Hwy. 85

Wine Craft of Atlanta
5920 Roswell Rd., C-205
Atlanta 30328 (404) 252-5606
winecraftatl@bellsouth.net
Helping customers make beer and wine since 1969!

IDAHO

Your Place or Mine?
9424 N. Government Way
Hayden Lake 83864
1-800-606-6046
or (208) 762-2550
www.vintit.com
"Check us out again for the very first time"

ILLINOIS

Bev Art Brewer & Winemaker Supply
10033 S. Western Ave.
Chicago (773) 233-7579
www.bev-art.com
Mead supplies, grains, liquid yeast and beer making classes on Premise.

The Brewer's Coop
30 W. 114 Butterfield Road
Warrenville 60555
(630) 393-BEER (2337)
www.TheBrewersCoop.com
DuPage County's LARGEST homebrew shop!

Chicagoland Winemakers Inc.
689 West North Ave.
Elmhurst 60126
Phone: 1-800-226-BREW
E-mail: cwinemaker@aol.com
www.cwinemaker.com
Personal Instruction!

Crystal Lake Health Food Store
25 E. Crystal Lake Ave.
Crystal Lake (815) 459-7942
Upstairs brew shop - Complete selection incl. Honey, Maple Syrup & unusual grains.

Home Brew Shop LTD
225 West Main Street
St. Charles 60174 (630) 377-1338
www.homebrewshopltd.com
Full line of Kegging equipment, Varietal Honey

Somethings Brewn'
401 E. Main Street
Galesburg 61401 (309) 341-4118
www.somethingsbrewn.com
Midwestern Illinois' most complete beer and winemaking shop.

INDIANA

The Brewers Art Supply
1520 N. Wells Street
Fort Wayne 46808 (260) 426-7399
e-mail: francie.brew@verizon.net
www.brewersartsupply.com
Friendly, Reliable service in house and on-line

Butler Winery, Inc.
1022 N. College Ave.
Bloomington 47404
(812) 339-7233
e-mail: vineyard@butlerwinery.com
Southern Indiana's largest selection of homebrewing and winemaking supplies. Secure shopping online at www.butlerwinery.com

Co-op Corner General Store
5015 N. St. Joe Ave.
Evansville 47720
1-800-398-9214 or
(812) 423-6481
Beer & Wine. Brew supplier for Southern Indiana.

Great Fermentations of Indiana
853 E. 65th St.
Indianapolis
(317) 257-WINE (9463)
or toll-free 1-888-463-2739
www.greatfermentations.com
E-mail us at anita@greatfermentations.com

Hammer's Wine
408 Arnold Ct.
Kokomo 46902
(765) 453-9165
fax (765) 453-9209
www.hammerswine.com
For all your beer making pleasures.

Kennywood Brewing Supply
Crown Point
(219) 765-BREW
www.kennywoodbrew.com
Visit us online. Fresh homebrewing ingredients and more!

Quality Wine and Ale Supply
530 E. Lexington Ave., Suite 115
Elkhart 46516
Phone or fax (574) 295-9975
e-mail: info@homebrewit.com
www.homebrewit.com
Quality wine & beer making supplies. 24/7 secure online ordering w/fast, safe & reliable worldwide shipping. Visit our FULLY STOCKED retail store in Elkhart for everday supplies and over 200 wine and beer kits always in stock.

IOWA

BlueStem Winery
305 Third St.
Parkersburg
(319) 346-1046
www.bluestemwine.com
e-mail: bluestemwine@mchsi.com
Brewing & Winemaking Supplies

KANSAS

Bacchus & Barleycorn Ltd.
6633 Nieman Road
Shawnee 66203
(913) 962-2501
www.bacchus-barleycorn.com
Your one stop home fermentation shop!

Homebrew Pro Shoppe, Inc.
2059 E. Santa Fe
Olathe (913) 768-1090 or
Toll Free: 1-866-BYO-BREW
Secure online ordering: www.brewcat.com

Kramer's Ale-N-Vino
925 N. Kansas Ave.
Topeka 66608 (785) 232-1990
e-mail: ale-n-vino@kscoxmail.com
www.ale-n-vino.com
Not the largest, just the best. Personal service.

MARYLAND

Annapolis Home Brew
836 Ritchie Hwy., Suite 19
Severna Park 21146
(800) 279-7556
Fax (410) 975-0931
www.annapolishomebrew.com
Friendly and informative personal service; Online ordering.

The Cracked Cork LLC
19202 Poffenberger Rd.
Hagerstown 21740 (301)791-2882
e-mail: egbowles1@earthlink.net
www.crackedcork.com
Brew on Premise and brewing supplies.

The Flying Barrel
103 South Carrol St.
Frederick (301) 663-4491 or
Fax (301) 663-6195
www.flyingbarrel.com
Maryland's 1st Brew-On-Premise; winemaking and homebrewing supplies!

Maryland Homebrew
6770 Oak Hall Lane, #115
Columbia 1-888-BREWNOW
www.mdhb.com
We ship UPS daily.

MASSACHUSETTS

Beer & Wine Hobby
155 New Boston St., Unit T
Woburn 1-800-523-5423
E-mail: shop@beer-wine.com
Web site: www.beer-wine.com
One stop shopping for the most discriminating beginner & advanced beer & wine hobbyist.

Beer & Winemaking Supplies, Inc.
154 King St.
Northampton (413) 586-0150
or Fax (413) 584-5674
www.beer-winemaking.com
29th year! Fresh White Labs.

Modern Homebrew Emporium
2304 Massachusetts Ave.
Cambridge 02140 (617) 498-0400
fax (617) 498-0444
www.modernbrewer.com
The Freshest Supplies, In Business for 13 Years!

NFG Homebrew Supplies
72 Summer St.
Leominster 01453
(978) 840-1955
or Toll Free: 1-866-559-1955
www.nfghomebrew.com
Email: nfgbrew@aol.com
Great prices! Personalized service! Celebrating 10 years in business.

Strange Brew Beer & Winemaking Supply
331 Boston Post Rd. E. (Rt. 20)
Marlboro
1-888-BREWING
E-mail: dash@Home-Brew.com
Website: www.Home-Brew.com
We put the dash back in Home-Brew!

West Boylston Homebrew Emporium
Causeway Mall, Rt. 12
West Boylston
(508) 835-3374
www.wbhomebrew.com
Service, variety, quality. Open 7 days.

The Witches Brew, Inc.
12 Maple Ave.
Foxborough
(508) 543-0433
thewitchesbrew@att.net
www.thewitchesbrew.com
You've Got the Notion, We've Got the Potion

MICHIGAN

Adventures in Homebrewing
23439 Ford Road
Dearborn
(313) 277-BREW
Visit us at www.homebrewing.org

Brewingworld
5919 Chicago Rd.
Warren 48092
(586) 264-2351
Brew on Premise, Microbrewery, Homebrewing Supplies
www.brewingworld.com
www.kbrewery.com

Cap'n' Cork Homebrew Supplies
16812 - 21 Mile Road
Macomb Twp.
(586) 286-5202
Fax (586) 286-5133
www.capncorkhomebrew.com
e-mail: cap_n_cork@netzero.net
Wyeast, White Labs, Hops & Bulk Grains!

Oppermann's Cork 'N' Ale
2940 Midland Rd.
Saginaw 48603
(989) 797-8466
fax (989) 790-8885
www.cork-n-ale.com
Mid-Michigan's Largest Home Beer & Wine Making Supply. Your Store for Knowledge!

Park Winery and Home Brew Supply
15320 Charlevoix
Grosse Pointe Park 48230
(313) 821-9463
Fax: (313) 821-5298
www.parkwinery.com
Beer & Wine making supplies, Wine on Premise

The Red Salamander
205 North Bridge St.
Grand Ledge (517) 627-2012
Fax: (517) 627-3167
Phone or fax your order.

Siciliano's Market
2840 Lake Michigan Dr. N.W.
Grand Rapids 49504
(616) 453-9674
fax (616) 453-9687
www.sicilianosmkt.com
The largest selection of beer and wine making supplies in west Michigan.

things BEER
Webberville 1-800-765-9435
www.thingsbeer.com
Your Full-Service Homebrew Shop With A Home Town Feel!

MINNESOTA

Homebrewersupply.com
Minneapolis 55413
(612) 788-6160
info@homebrewersupply.com
www.homebrewersupply.com
Large Selection, low prices. Free shipping on orders over $60. Most orders shipped within 24 hours.*

Midwest Homebrewing and Winemaking Supplies
3440 Beltline Blvd.
St. Louis Park 55416
1-888-449-2739
www.midwestsupplies.com
FREE instructional video with any purchase

Northern Brewer, Ltd.
1150 Grand Ave.
St. Paul 55105
1-800-681-2739
www.northernbrewer.com
Call or write for a FREE CATALOG!

WindRiver Brewing Co., Inc
7212 Washington Ave. S.
Eden Prairie 55344
1-800-266-4677
www.windriverbrew.com
FREE catalog. Fast nationwide shipping.

MISSOURI

The Home Brewery
205 West Bain (P.O. Box 730)
Ozark 1-800-321-BREW (2739)
brewery@homebrewery.com
www.homebrewery.com
The original Home Brewery products.

Homebrew Pro Shoppe, Inc.
531 SE Melody Lane
Lee's Summit 64063
(816) 524-0808 or
Toll-free 1-866-BYO-BREW
support@brewcat.com
www.brewcat.com
Secure On-line shopping - Complete line of beer & wine making supplies & equipment.

St. Louis Wine & Beermaking
251 Lamp & Lantern Village
St. Louis 63017
1-888-622-WINE (9463)
www.wineandbeermaking.com
The complete source for Beer, Wine & Mead makers!
Fax us at (636) 527-5413

NEBRASKA

Fermenter's Supply & Equipment
8410 'K' Plaza, Suite #10
Omaha 68127 (402) 593-9171
Fax: (402) 593-9942
www.fermenterssupply.com
Beer & winemaking supplies since 1971. Same day shipping on most orders.

NEVADA

Nevada Brew and Wine Supply
4800 S. Maryland Pkwy., Suite J
Las Vegas 89119
(702) 456-2739 (BREW)
Fax: (702) 891-0563
www.nevadabrew.com
Serving Southern Nevada, Northern Arizona and Southwest Utah.

NEW HAMPSHIRE

Hops and Dreams
P.O. Box 914
Atkinson 03811
1-888-BREW-BY-U
www.brewbyu.com
Great prices & FREE catalog!

Kettle to Keg
161 Main Street
Pembroke 03275
(603) 485-2054
www.kettletokeg.com
Homebrewing supplies, tea and gifts

NEW JERSEY

BEERCRAFTERS
110A Greentree Road
Turnersville 08012
(856) 2-BREW-IT
E-mail: drbarley@aol.com
www.beercrafters.com
NJ's Leader in Home Wine & Beer Supplies

Brewer's Apprentice
179 South Street
Freehold 07728 (732) 863-9411
www.brewapp.com
Online Homebrew Shopping.

Rubino's Homemade Wine & Beer Supply
2919 Route 206, Store# 405
(located at the Columbus Farmer's Market) Columbus 08022
(609) 261-8420
homebrewsupply@optonline.net
www.hamiltonhomebrew.com
Beer making equipment & ingredient kits including: Brew House, True Brew & Brewer's Best.

NEW YORK

Bottom of the Barrel
1736 Mt. Hope Ave.
Oneida 13421
(315) 366-0655
fax (315) 363-0670
Best Little Homebrew Store Around

E.J. Wren Homebrewer, Inc.
Ponderosa Plaza,
Old Liverpool Rd.
Liverpool 13088
1-800-724-6875
E-mail: ejwren@twcny.rr.com
www.ejwren.com
Largest homebrew shop in Central New York

Hennessy Homebrew Emporium
470 N. Greenbush Rd.
Rensselaer 12144
(800) 462-7397
www.beerbrew.com
Huge Selection, Open 7 days a week, Est. 1984

Niagara Tradition Homebrewing Supplies
1296 Sheridan Drive
Buffalo 14217
(800) 283-4418
Fax (716) 877-6274
On-line ordering. Next-day service. Huge Inventory.
www.nthomebrew.com

Party Creations
345 Rokeby Rd.
Red Hook 12571
(845) 758-0661
www.partycreations.net
Everything for making beer and wine

NORTH CAROLINA

Alternative Beverage
114 Freeland Lane
Charlotte
Advice Line: (704) 527-2337
Order Line: 1-800-365-2739
www.ebrew.com
29 years serving all home brewers' & winemakers' needs! One of the largest suppliers in the country

Asheville Brewers Supply
2 Wall Street #101
Asheville 28801 (828) 285-0515
www.ashevillebrewers.com
The South's Finest Since 1994!

Assembly Required
1507D Haywood Rd.
Hendersonville 1-800-486-2592
www.assemblyrequired.com
Your Full-Service Home Brew Shop!

Homebrew.com
526 Griffith Rd.
Charlotte 28217 1-888-785-7766
www.homebrew.com
The Southeast's best-stocked store with excellent low prices!

OHIO

The Grape and Granary
915 Home Ave.
Akron 44310 (800) 695-9870
www.grapeandgranary.com
Complete Brewing & Winemaking Store.

Leeners
9293 Olde Eight Rd.
Northfield 44067
1-800-543-3697
www.leeners.com
Complete supplies for making beer to bubblegum, wine to cheese

Listermann Mfg. Co.
1621 Dana Ave.
Cincinnati 45207 (513) 731-1130
fax (513) 731-3938
www.listermann.com
Beer, wine and cheesemaking equipment and supplies.

The Pumphouse
336 Elm Street
Struthers 44471
1(800) 947-8677 or
(330) 755-3642
www.thepumphouse.cjb.net
Beer & winemaking supplies & more.

The Winemakers Shop
3517 North High Street
Columbus 43214
(614) 263-1744
www.winemakersshop.com
Serving Beer and Winemakers since 1974

OKLAHOMA

High Gravity Homebrewing and Winemaking Supplies
7164 S. Memorial Drive
Tulsa 74133 (918) 461-2605
e-mail:store@highgravitybrew.com
www.highgravitybrew.com
Online ordering. Fast friendly service.

OREGON

Above the Rest Homebrewing Supplies
11945 SW Pacific Hwy, #235
Tigard 97223
(503) 968-2736
Serving Beer & Wine Makers since 1993

PENNSYLVANIA

Country Wines
3333 Babcock Blvd.
Pittsburgh 15237-2421
(412) 366-0151 or
FAX (412) 366-9809
Orders toll-free 866-880-7404
Online catalog at:
www.countrywines.com

Keystone Homebrew Supply
599 Main St.
Bethlehem 18018
(610) 997-0911
sales@keystonehomebrew.com
www.keystonehomebrew.com
Quality Ingredients and Expert Advice!

Keystone Homebrew Supply
779 Bethlehem Pike (Rt. 309)
Montgomeryville
(215) 855-0100
sales@keystonehomebrew.com
www.keystonehomebrew.com
Quality Ingredients and Expert Advice!

Triangle Homebrewing Supply
2100 Smallman St.
Pittsburgh (412) 261-4707
www.ralph.pair.com/triangle.html
Bringing you the BEST for less!

Wine, Barley & Hops Homebrew Supply
248 Bustleton Pike
Feasterville 19053
(215) 322-4780
winebarleyandhops@worldlynx.net
www.winebarleyandhops.com
Your source for premium beer & winemaking supplies

Wine & Beer Emporium
100 Ridge Rd. #27
Chadds Ford 19317
(610) 558-BEER (2337)
winebeeremporium@aol.com
www.winebeeremporium.com
We carry a complete line of beer & winemaking supplies, honeys, cigars and more!

RHODE ISLAND

Blackstone Valley Brewing Supplies
407 Park Ave.
Woonsocket
(401) 765-3830
Quality Products and Personalized Service!

SOUTH CAROLINA

Bet-Mar Liquid Hobby Shop
736-F Saint Andrews Rd.
Columbia 29210
(803) 798-2033 or
1-800-882-7713
www.liquidhobby.com
Unmatched Value, Service & Quality Since 1968

TENNESSEE

All Seasons Gardening & Brewing Supply
3900 Hillsboro Pike, Ste. 16
Nashville 1-800-790-2188
www.allseasonsnashville.com
Shop online. Nashville's Largest Homebrew Supplier!

Brewers Corner
800 Park Ave., Suite E
Murfreesboro 37129
(615) 849-7797
www.brewerscorner.com
Middle Tennessee's source for homebrew supplies.

TEXAS

Austin Homebrew Supply
7951 Burnet Rd.
Austin 1-800-890-BREW
(512) 467-8427
www.austinhomebrew.com
Free Shipping on orders over $60.00!

The Brew Stop
16460 Kuykendahl #140
Houston 77068 (281) 397-9411
Fax: (281) 397-8482
www.brewstop.com
Your complete brewing & wine-making source!

DeFalco's Home Wine and Beer Supplies
8715 Stella Link
Houston 77025 (713) 668-9440
fax (713) 668-8856
www.defalcos.com
Check us out on-line!

Foreman's / The Home Brewery
3801 Colleyville Blvd.
(P.O. Box 308)
Colleyville 1-800-817-7369
www.homebrewerysupply.com
Top-quality Home Brewery products. Check out our site.

Homebrew Headquarters
300 N. Coit Rd., Suite 134
Richardson 75080
(972) 234-4411
fax (972) 234-5005
www.homebrewhq.com
Dallas' only home beer and wine making supply store!

The Winemaker Shop
3006 S.E. Loop 820
Fort Worth 1-800-482-7397 or
(817) 568-4700
brew@winemakershop.com
http://winemakershop.com
FREE catalog

UTAH

The Beer Nut
1200 S. State
Salt Lake City 84111
(888) 825-4697
fax (801) 531-8605
www.beernut.com
"Make Beer not Bombs"™

VIRGINIA

HomeBrewUSA
5802 E. Virginia Beach Blvd., #115
Norfolk 23502 1-888-459-BREW
or (757) 459-2739
www.homebrewusa.com
Largest Selection of Beer & Wine Making Supplies & Equipment in Southeastern Virginia!

Vintage Cellar
1340 South Main St.
Blacksburg
1-800-672-9463
www.vintagecellar.com
Ingredient kits with White Labs Yeast, Belgian Ales & Glassware! Complete line of brewing supplies.

Weekend Brewer - Home Beer & Wine Supply
4205 West Hundred Road
Chester/Richmond area 23831
1-800-320-1456 or
(804) 796-9760
beerinfo@weekendbrewer.com
www.weekendbrewer.com
LARGEST variety of malts & hops in the area!

WASHINGTON

Bader Beer & Wine Supply, Inc.
711 Grand Blvd.
Vancouver, WA 98661
1-800-596-3610
Sign up for our free e-newsletter at www.baderbrewing.com

The Beer Essentials
2624 South 112th St., #E-1
Lakewood 98499
(253) 581-4288 or
1-877-557-BREW (2739)
www.thebeeressentials.com
Mail order and secure on-line ordering available

The Cellar Homebrew
Make your own beer & wine
14320 Greenwood Ave. N.
Seattle 98133
1-800-342-1871
FREE Catalog/Guidebook, FAST Reliable Service, 33 Years! Secure ordering online www.cellar-homebrew.com

Homebrew Heaven
9109 Evergreen Way
Everett 98204
1-800-850-BREW (2739)
fax 425-290-8336
brewheaven@aol.com
www.homebrewheaven.com
Voted Best Online Web Site for Ordering

Larry's Brewing Supply
7405 S. 212th St., #103
Kent 1-800-441-2739
www.larrysbrewsupply.com
Products for Home and Craft Brewers!

Mountain Homebrew & Wine Supply
8520 122nd Ave. NE, B-6
Kirkland 98033 (425) 803-3996
www.mountainhomebrew.com
The Northwest's premier home brewing & winemaking store!

Northwest Brewers Supply
1006 6th Street
Anacortes 98221 (800) 460-7095
www.nwbrewers.com
All Your Brewing Needs Since 1987

WISCONSIN

BrewCitySupplies.com
The Market Basket
14835 W. Lisbon Road
Brookfield 53005-1510
1-800-824-5562
Fax (262) 783-5203
www.BrewCitySupplies.com
Secure On-Line Catalog, Superb Service, Superior Selection & Unbeatable Prices

Homebrew Market
1326 North Meade St.
Appleton 54911 1-800-261-BEER
www.homebrewmarket.com
Beer & Wine Supply Retail Store and Mail Order

House of Homebrew
415 Dousman St.
Green Bay 54303
(920) 435-1007
Fax (920) 435-1008
staff@houseofhomebrew.com
www.houseofhomebrew.com
Beer, Wine, Cider, Mead, Soda, Coffee, Tea, Cheese Making.

Point Brew Supply
3041 A. Michigan Ave.
Stevens Point 54481
(715) 342-9535
marc@pointbrewsupply.com
www.pointbrewsupply.com
"The Feel Good Store"

Wine & Hop Shop
1931 Monroe Street
Madison 53711
1-800-657-5199
www.wineandhop.com
Southern Wisconsin's largest selection of beer & winemaking supplies.

CANADA

SASKATCHEWAN

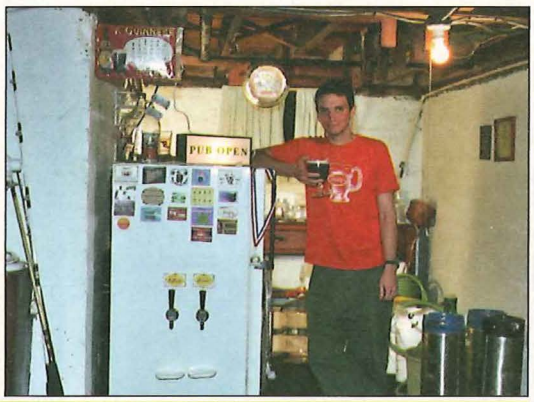
Paddock Wood Brewing Supplies
#B1-116 103rd Street
Saskatoon S7N 1Y7
1-888-539-3622
experts@paddockwood.com
www.paddockwood.com
Canada's largest mail order store - We've got what you need.

From Schmo to Pro:

A homebrewing revolution takes it to the next level

by Jay Lampart • Baltimore, Maryland

Before you read on, ask yourself the following question: Are you an ordinary guy that enjoys the challenge of brewing extraordinary beer? If so, the following story is for you. It's for you, because it can potentially be about you. I know this, because it is a true story about me, and I'm probably much like you. I arrived home one evening from the local brew shop eager to venture into the world of brewing. I held in my hand several buckets full of gadgets, grain and dreams. Sure, it was a start up kit. Sure, any yokel with half a brain could follow the simple directions and wind up with something drinkable at the least. But it was a start, and 31 days later, it was beer.



Jay Lampart put together his homebrewery for under $200 USD.

A little over a year later my wife and I purchased our first home, with an unfinished basement that stayed cool all year long. I immediately saw a basement brewery in my future. Money was tight, and knowing that home breweries can be brutal on the bank account, patience and innovation would have to be implemented.

I built my enterprise from the ground up. I saved everything. If it was metal, plastic, had a motor in it, or just looked neat, I tossed it in the pile. Even if it couldn't be identified, I salvaged it anyway in the event that somehow, it could be used. I remember the first piece of equipment I obtained was an old garden hose that I found in my parents attic. It was the perfect length for a heat exchanger (counterflow chiller).

Next, I noticed a refrigerator sitting outside my pastry kitchen at work. The compressor needed some work, but that wouldn't present a problem. A few trips to the local junkyard later, followed by a public auction at a chemical plant (where I landed three carboys, an Erlenmeyer flask, a hot plate and several hydrometers for 15 bucks!) and I was in business. Over the course of a year I built my brewery for less than 200 dollars! I could now brew up to 10 gallons (38 L) from all grain, store my equipment neatly and counter-pressure bottle or dispense.

It seemed fitting to be in the midst of a thunderstorm the night I tapped my first brew. I was immersed in my work like a mad scientist, checking and double-checking every part of the system. I even searched the house for the perfect ceremonial glass. It flowed like clockwork. The perfect pour, the hesitant sip, the flash of lightning, the crack of thunder, and the curdling laugh. "It's alive!" Family and friends lined up to try the heavenly concoction that flowed through the sub-level of our home. Life was good. Another year had passed, and the same question seemed to surface. "Have you ever thought about doing this for a living?" I would smile, maybe blush, and humbly reply no — but I would be lying if I told you I didn't fancy the thought. Even when I had a few gold medals under my belt, I still asked myself, "what do I really know about brewing beer?" Besides, who was going to hire a schmo like me?

After getting his feet wet, Lampart found his way into a craft brewery.

With a mortgage to pay, and a baby on the way, money was quickly becoming an issue, especially on a simple baker's wage. With gas prices rocketing through the roof, I needed to find a part-time gig fast. How about working in a brewery part-time? There may be too many scheduling conflicts, but it might be worth investigating.

A malfunctioning Corney keg and an upcoming homebrew competition brought me to a brew shop that I don't normally frequent. I brought up the notion of working as a brewer's assistant with the shopkeep. She handed me the e-mail address of a craft brewer who was interested in finding some part time help. I wasn't convinced it could be this easy. Although it seemed like a long shot, I still felt it worth a try. Even if nothing came of it, I stood the possibility of getting a free tour of the brewery, and putting myself on the "craft brewing radar."

Long story short, I was presented with the opportunity to take the reigns of a small craft brewery. Imagine me, a craft brewer. I still had much to consider. Average production was 28 barrels per month. This could be accomplished quite easily on a part time basis by any skilled professional brewer — but professional brewer I was not. After talking it over with the wife, as always, we sought prayerful consideration. Despite the fact that it was 40 minutes from my house, I made the call and accepted the position. Training day was in 1 week. No time to celebrate now, I had some big rubber shoes to fill, and certainly had some brushing-up to do. Fortunately, with the extraordinary number of home brewers going pro these days, the rift is beginning to narrow between the pro and the novice. Home brewers make great problem solvers in the brew house.

HUGE Website
www.MoreBeer.com

Beer Beer & More Beer

Free Shipping On UPS Orders Over $59!

LIFE IS FULL OF TOUGH CHOICES... THESE ARE THE FUN ONES!

Base Price
$895

Base Price
$1250

Base Price
$1450

Base Price
$1750

Base Price
$2550

Base Price
$2350

MoreBeer! BrewSculptures™ — With 10 base frames and up to 20 options to choose from, any brewing dream can be realized!

Make the right choice!
— Ask A MoreBeer!™ BrewSculpture™ Expert

James Cossart
- *Beer Fanatic*
- *Gas System Expert*
- *BrewSculpture™ Builder*
- *Owns a BrewSculpture™*

Chris Graham
- *MoreBeer!™ Partner*
- *Small System Expert*
- *Owns a BrewSculpture™ (of course!)*
- *Siebel Brewing Institute Advanced Homebrewing Instructor*

Call us toll-free at 1–800–600–0033
Online at www.MoreBeer.com

*Worldwide Supplier of **Absolutely Everything!**℠ needed for Beer Making, Wine Making, & Coffee Roasting*
Regional Stores • Huge, Very Helpful Website • Over 5000 Products • Free Full-Color 88 page Catalog

Get News You Can Use!
Sign Up For Your FREE Coopers Club Quarterly Newsletter!

HOME Coopers BREW

PHOTO COURTESY OF DENVER METRO CONVENTION & VISITORS BUREAU

...And You'll Be Entered for a chance to WIN A TRIP FOR TWO TO THE GREAT AMERICAN BEER FESTIVAL in Denver!

Sign up, & be entered to WIN!

PRODUCT CORNER

ORIGINAL SERIES REAL ALE

Someone pops open a couple of bottles of their home brewed beer and pours it into tall gorgeous stand glasses. The beer has a bright golden color, with a strong head. The nose is a pleasant blend of fruit and malt. One sip to acclimatize the taste buds. A long draw and, ahhh yes, the generous mouthfeel and moderately bitter finish that speaks to us unequivocally. And what does it say? "I'm a Real Ale!" It is no wonder that Coopers Real Ale is the best selling beer kit in the United States. Long a part of our Original Series of beer kits, we designed the Real Ale beer kit to be a good example of a Coopers Traditional Ale. Oh, better drink up, he's bringing us another bottle!

COOPERS Q & A

Your questions answered by Coopers homebrewing experts:

Jeff P. from California sends us this question via email:

Hey Guys, I've been using Coopers beer kits for years. Haven't had a miss yet! But something has always nagged me in the back of my brain. The cans say "makes approximately 23 liters". Now by my calculator, that is about 6 gallons. My carboy is 5 gallons and I've always been instructed to make 5 gallons. So, am I missing beer on the table?

G'Day Jeff. We sure hope not! Here at Coopers we try to keep our beer in our glass. You do raise an interesting question, though. There are multiple standards used in different parts of the world. Here in Oz we use metric. In Canada and the UK, besides metric, they also use "imperial" measurements. And of course in California you use standard US measurements. This can lead to some confusion. We design our brew kits with a final outcome in mind and as such we need to prescribe a recommended volume. Coopers beer kits are designed to produce 23 liters, which equals 6.07 US gallons or 5 Imperial gallons as this is the most common size fermentor used worldwide. If you have the capability of producing 6 US gallons at a time, that is our recommendation. So, what to do if your carboy only holds 5 US gallons? Make 5 US gallons of beer, of course. What you must keep in mind is that the original gravity of the Coopers beer kit that you make to 5 US gallons will be higher by almost 20%, making your beer a bit stronger and more robust. The hop bitterness will be a bit more pronounced as well. As long as you know this going in, we say "brew your beer in the glass, and enjoy!"

Got a question? Send it to us at mark@cascadiabrew.com

HB RETAILER

JON MENDRICK OF MOUNTAIN HOMEBREW & WINE SUPPLY • KIRKLAND, WA

I opened Mountain Homebrew & Wine Supply in 2000. Prior to that I managed two successful retail shops. The quality and selection of homebrew products has improved so much from where it was when I began brewing twelve years ago. I can't wait to see where the hobby takes us in the future.

The biggest piece of advice I would impart to a new homebrewer would be to make the process as simple as possible. There's no reason to make your introduction into homebrewing a complicated, rocket science procedure. We include Coopers Beer Kits with every beginner kit that goes out the door. I feel this keeps the customer from feeling overwhelmed and keeps them coming back for their next batch sooner than later. It's in our best interest to keep the customer interested and satisfied. Initial simplicity and high quality through Coopers Beer Kits achieves that goal.

We use Coopers products in most all of our in house recipes and recommend Coopers products for those bringing in their own recipes as well. I firmly believe Coopers products are the highest quality malt products available to the homebrewer today. My customers know they can trust the Coopers brand to produce the best beer possible and a satisfied customer is one who returns to our store again and again!

2006 GREAT AMERICAN BEER FESTIVAL®

SEPTEMBER 28-30, 2006

DOPPELBOCK · ALE · STOUT · LAGER · PILSENER · PORTER · DUNKELWEIZEN · BOCK · WEISS

THE GREAT AMERICAN BEER FESTIVAL

DENVER, COLORADO, U.S.A.

It's Fast & Easy! Ask your retail specialist for an entry form, or visit us at www.cascadiabrew.com

For more information about the Brewers Association Great American Beer Festival visit www. GreatAmericanBeerFestival.com

For more information about the Coopers Club Newsletter Sweepstakes you can also contact us at 1-888-588-9262