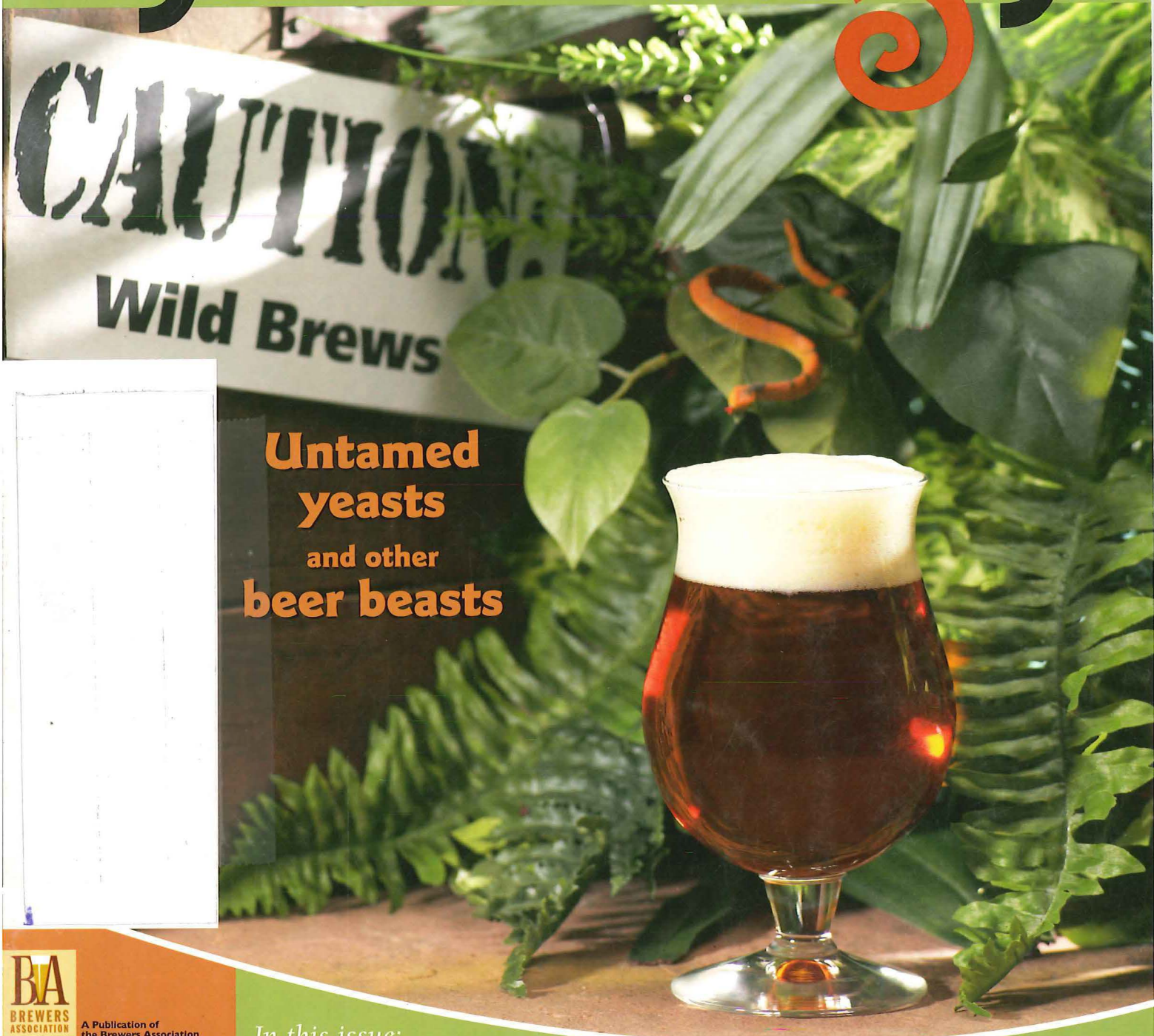


FOR THE **HOMEBREWER & BEER LOVER**

Volume 29 \* No. 2 | March/April 2006

# zymurgy

► The Journal of the American Homebrewers Association ◄



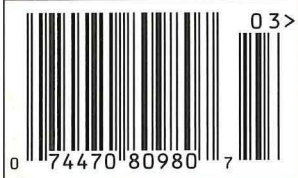
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yeasts  
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beer beasts**



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*In this issue:*



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Kyle Hollingsworth:  
**Bluegrass  
and Beer**

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by Jim Parker

# zymurgy

Journal of the American Homebrewers Association\*

## A Walk on the Wild Side

One of the beauties of brewing is that it provides constant opportunities to break the "rules."

"Darker beers are always stronger." This is probably the first myth burgeoning beer enthusiasts dispel when they taste their first dry stout or Belgian tripel.

"All beer is best consumed closest to its 'born-on' date." Nope. I still have five-plus years before I can crack a jeroboam of Hair of the Dog Adam I received as a wedding present with the inscription "Do not open until your 10th anniversary."

"At all costs, keep beer spoilage bacteria out of your fermenting wort."

All fans of the many Belgian or Belgian-inspired sour beers have their own story about their first taste of lambic, oud bruin or Flanders red ale.

Mine came at Lyon's Brewery of Dublin, a historic beer bar in California when I first began writing about, and making, beer in 1987. The pub's venerable owner, Judy Ashworth, who I still call my "beer-o-logical mother," sat me down for a sample of Rodenbach on one of my many visits to the pub.

At first whiff, I knew this was something different and that first sour sip popped my eyes wide open.

"Do you know what that is?" Judy prodded.

"Yeah, something I was told never to let happen to my beer," I said.

"Not until you know how to control it," Judy said. "Maybe when you have a few hundred years experience like the Belgians."

The art of intentionally inoculating beer with *Lactobacillus*, *Brettanomyces* and a whole host of other microbes—what I like to call "controlled spoilage"—has reached new heights in this country. Everyone from the most adventurous craft brewer to the boldest homebrewer is producing wild beers with amazing degrees of success.

Lew Bryson coaxed some tips out of some of the American craft brewers who are leading the bug beer charge and shares them in his story on page 22.

We also have an excerpt from Jeff Sparrow's *Wild Brews* (Brewers Publications 2005), as well as a handful of recipes from the book, on page 28.

Marty Jones, who knows a thing or two about picking and brewing himself, caught up with Kyle Hollingsworth from the bluegrass band String Cheese Incident to talk about how homebrewing has helped him find another creative release and a way to relax when he's not on the road playing. His story is on page 38.

Speaking of the road, Dan Rabin skipped across The Pond to visit one of the most revered breweries of London—Fuller, Smith & Turner, better known simply as Fuller's. His report, as well as a clone recipe for Fuller's beloved ESB, is on page 32.

One of the benefits of editing both *Zymurgy* and *The New Brewer*—a trade magazine for professional brewers—is that I get access to some great technical articles that are of interest to homebrewers as well. Last issue, we shared Hugh Burns' discussion of dry hopping with T-90 pellets. This issue, we have Steve Holle's take on foiling fermentation flaws.

Jim Parker  
Editor-in-Chief

Publisher \_\_\_\_\_ Brewers Association  
Executive Editor \_\_\_\_\_ Ray Daniels  
Editor-in-Chief \_\_\_\_\_ Jim Parker  
Associate Editor \_\_\_\_\_ Jill Redding  
Art Director \_\_\_\_\_ Kelli Gomez  
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Graphics/Production Director \_\_\_\_\_ Stephanie Johnson  
Senior Designer/Web Designer \_\_\_\_\_ Julie Lawrason  
Sales & Marketing Director \_\_\_\_\_ Cindy Jones  
cindy@brewersassociation.org  
Advertising & Sponsorship \_\_\_\_\_ Chris Pryor  
Sales East Coast pryor@brewersassociation.org  
Advertising & Sponsorship \_\_\_\_\_ Linda Starck  
Sales West Coast linda@brewersassociation.org  
Marketing Coordinator \_\_\_\_\_ Jennifer Reimer  
jennifer@brewersassociation.org  
Circulation Coordinator \_\_\_\_\_ Jason Bell

**American Homebrewers Association\***  
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The purpose of the **Brewers Association** is to promote and protect American craft beer and American craft brewers and the community of brewing enthusiasts. The Brewers Association is a not-for-profit trade Association under Section 501(c)(6) of the Internal Revenue Code.

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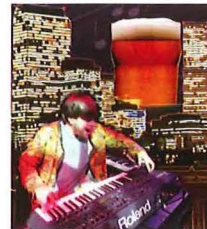
- 22 | There's a bug in my beer...and I like it** By Lew Bryson  
The idea of intentionally introducing wild yeasts, bacteria and other known beer spoilers may seem crazy, but brewers from Belgium to Santa Rosa, Calif. are finding success and fans for their "bug beers." Check out their tips for making your own.
- 28 | Where the wild brews are** By Jeff Sparrow  
In an excerpt from his book *Wild Brews*, Jeff Sparrow shares the secrets of where to taste American-brewed versions of lambics and other sour beers. Here's a hint: Put on your traveling shoes—these special beers are often available only at the brewery.

- 32 | An extra special bitter** By Dan Rabin  
Fuller, Smith & Turner isn't a law firm—it's one of London's most respected brewers. Better known as simply Fuller's, this venerable brewery turns out the benchmark classic for extra special bitters—Fuller's ESB.

- 38 | Bluegrass and beer** By Marty Jones  
Kyle Hollingsworth is the keyboard player for the popular band String Cheese Incident. The band's improvisational style has carried over into Hollingsworth's other passion—brewing beer.

- 52 | Geeks: Foiling fermentation flaws**

## Plus: AHA Governing Committee Ballot



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## >> GET THERE!

### The Ultimate Belgian Tasting

Ale Street News ([www.alestreetnews.com](http://www.alestreetnews.com)) will hold an extensive tasting of Belgian beers in conjunction with the Belgian Consulate March 24 at the Chelsea Museum of Art in New York City.

A wide array of world-class Belgian beers will be presented in a format in which guests will be surrounded by and welcome to tour a Belgian art exhibit throughout the museum. Brewers from Belgium will be in attendance as well for guests to meet and speak with.

For further information e-mail [info@alestreetnews.com](mailto:info@alestreetnews.com). Tickets are extremely limited. Phone: 800-351-2537, Web: [www.alestreetnews.com](http://www.alestreetnews.com)

### February 25

August Schell Annual Bock Fest New Ulm, MN  
Web: [www.schellsbrewery.com](http://www.schellsbrewery.com)

### February 25

Michigan Brewers Guild Winter Beer Festival Lansing, MI  
Phone: 517-327-5004 Web: [www.michiganbrewers-guild.org](http://www.michiganbrewers-guild.org)

### February 26

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Phone: 941-685-2687 Web: [www.sarasotarhythmn-brews.com](http://www.sarasotarhythmn-brews.com)

### March 5-8

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### March 7-10

The 10th China International Exhibition on Beverage, Brewery and Wine Technology Shang Hai, China  
Contact: Adsale Exhibition Services Ltd, E-mail: [publiscity@adsale.com.hk](mailto:publiscity@adsale.com.hk), Web: [www.2456.com/drinktec](http://www.2456.com/drinktec)

For a complete listing of beer festivals and events, see [www.beertown.org/craftbrewing/events.asp](http://www.beertown.org/craftbrewing/events.asp).



### April 5

2006 Australian International Beer Awards Melbourne, Australia Contact: Kerry James, Phone: +61 3 9914 2435, E-mail: [kerry.james@rasv.com.au](mailto:kerry.james@rasv.com.au), Web: [www.beerawards.com.au](http://www.beerawards.com.au)

### April 11-14

Craft Brewers Conference & BrewExpo America® Seattle, WA  
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### April 14-15

Spring Beer & Wine Festival Portland, OR Phone: 541-308-6738 Web: [www.springbeerfest.com](http://www.springbeerfest.com)



## BREW NEWS: Glass Takes Over AHA Reins

Gary Glass, formerly the project coordinator for the Brewers Association, is the new American Homebrewers Association (AHA) director. He succeeds Paul Gatz, who held the dual position of AHA director and Brewers Association director. Gatz will continue as director of the Brewers Association professional division.

"I want to commend and recognize Paul for all of the effort, energy and vision he put toward the AHA," said Bob Pease, vice president of the Brewers Association.

In the last six years Glass built the National Homebrew Competition into the world's largest beer competition, grew participation in the AHA's National Homebrew Day and Teach a Friend to Homebrew Day, and coordinated membership programs that helped to grow the AHA roster to more than 9,000 members.

Filling out Glass' department will be Kate Porter, promoted to AHA membership coordinator. Taking over as AHA project coordinator will be Janis Gross, a homebrewer and lifetime AHA member. Gross has extensive experience with homebrew competitions and has attended several AHA National Homebrewers Conferences.



# GREAT GADGET

WHAT'S NEW FROM UNDERDEVELOPMENT, INC.

## The Beer Belly

OK, we admit it—this could be the most ludicrous idea we've ever seen. But we can't help sharing it. The Beer Belly is billed as "a removable spare tire that also serves as a stealth beverage" by its makers, Underdevelopment, Inc.

And it is just what it sounds like—a polyurethane bladder that fits inside a neoprene sling. When filled, the bladder looks like a ... well, a beer belly. And, with the attached dispensing tube, you can serve the beverage from your Beer Belly.

The makers say it is perfect for sneaking beverages into such places as ballgames and concerts, but we here at the Great Gadget desk would never recommend anything so lawless. We also don't know how you would explain waddling into the game as a portly sober person and staggering out as thin, but tipsy person.

That said, there are some legitimate uses—especially when you add the optional "Pleasure Extender" (read "ice pack"). You can use it to have a hands-free source of beer or other beverages while hiking, biking, kayaking, you name it.

For more information on how to get real "six-pack abs," visit [www.thebeerbelly.com](http://www.thebeerbelly.com).



## THE LIST

Top participating states in the Poor Richard's Ale program.

To honor Ben Franklin on his 300th birthday, the Brewers Association teamed with the Ben Franklin Tercentenary Commission and brewers across the country to brew Poor Richard's Ale, a beer based on a recipe by AHA member Tony Simmons of Pagosa Springs, Colo. Here is a list of the states with the most breweries participating in the program as reported to the Brewers Association Web site [www.beertown.org](http://www.beertown.org).

California	14
Oregon	11
Colorado	9
Michigan	6
Iowa	4
Kansas	4
Minnesota	4
Missouri	4
New York	4
Wisconsin	4
Alaska	3
Indiana	3
Montana	3
Ohio	3
Pennsylvania	3
Virginia	3

## BREW NEWS: Brewing Science Symposium

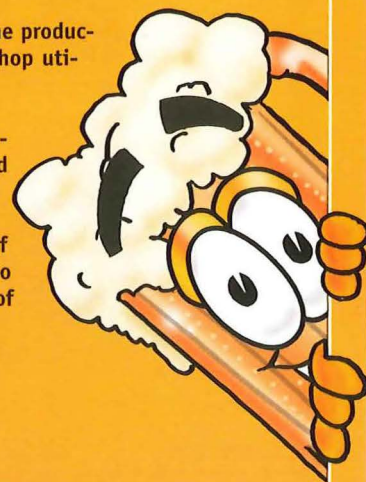
The Brewing Science Symposium will take place on May 19 as two half-day sessions featuring up to 10 oral technical presentations. The symposium is part of the 2006 American Chemical Society (ACS) Central Regional meeting, set for May 16-20 in Frankenmuth, Mich.

Symposium topics are still in the planning stages but will emphasize the chemistry and science involved in the production of beer. Topics under consideration, but not limited to, include malting and mashing, wort production, hop utilization, yeast and fermentation, flavor stability, sanitation and beer analysis.

The intended audience includes the technically oriented homebrewer (or prospective homebrewer), professional brewers seeking a more in-depth understanding of the brewing process, and the academic community engaged in brewing or fermentation research.

Professor Charles Bamforth of the Department of Food Science and Technology at the University of California-Davis will start the Brewing Science Symposium with a plenary lecture. The committee has also secured a commitment from Dr. Chris White, president of White Labs and a world leader in the manufacture of liquid yeast, to speak at the symposium.

For information on attending or presenting at the symposium, visit [www.crm2006.org](http://www.crm2006.org).





## BEER QUOTE

"At the end of two working weeks, you'd have saved \$3.95 per day for 10 days, which works out to, let's see ... carry the six ... OK, it's nearly \$40... You would have saved enough money to invest in a half a keg of beer—enough, if you manage it properly, to maintain a serious buzz for an entire weekend." — Dave Barry on skipping Starbucks in his new book, *Dave Barry's Money Secrets* (Crown, 2005).

## YOUR DOG'S GOTTA DRINK THIS

### Happy Tail Ale



Your dog loves beer, begs for it each time he sees you reach for a bottle, whines at the sound of a cap popping and knocks over your beer when you aren't looking, just so he can lap it up.

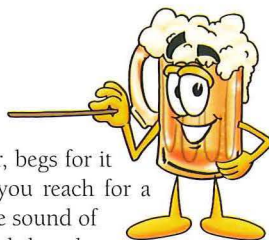
But, deep down, you know the alcohol, carbonation and even the hops are bad for your best friend.

What to do?

That was the question facing Kevin and Jamie Miller and their 120-pound Akita, Kodi. The answer was to found Dog Star Brewing, makers of Happy Tail Ale, a non-alcoholic, non-carbonated, unhopped, beef-flavored beer for dogs.

After two years of making the doggie brew at their Napa Valley, Calif. home, the couple has contracted with a central California brewer to make the pseudo-suds, which are also fortified with glucosamine, vitamin E and lactic acid.

Currently the canine brew is available only in northern California, but it can be ordered from the company's Web site, [www.beerfordogs.com](http://www.beerfordogs.com). The cost is \$9.99 a six-pack, plus \$14.94 shipping.



## BEER JOKE

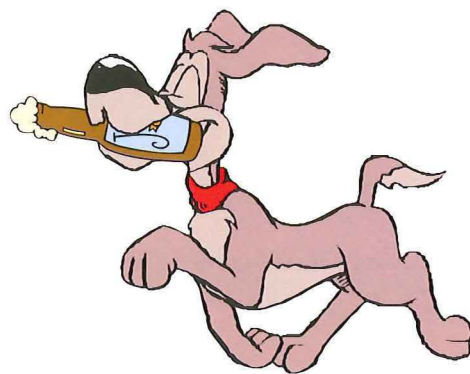
### Last Wishes

A man is sitting in his recliner, watching football, drinking beer and generally ignoring his wife.

During halftime, there is a news bulletin about a patient being kept alive on life support. The man finally notices his wife sitting in the room with him. He turns to her and says, "Honey, if the time ever comes that I am stuck in a vegetative state, dependent on a machine and reliant on liquids from a bottle, promise me you will pull the plug."

"Of course, honey," she says.

So midway through the fourth quarter, the wife unplugs the TV and takes his beer out of his hand.



## BEER QUOTE

"As far as his shoulder is concerned, he is going to be OK. He didn't have any trouble lifting up a can of beer, anyway." —British cricket chairman David Graveney, with an injury update on Freddie Flintoff.



# By The Seat of Whose Pants?

Dear Zymurgy,

Having an interest in both medieval history and brewing, I started reading the "Medieval Brewing Experiment" article by Matt Jarvis (January/February 2006) with interest. However, it didn't take long before I was brought up short. It seems that Matt's ideas of medieval technology relating to brewing seem to be loaded with a lot of unnecessary stereotypes. I feel it's necessary to address them.

The first problem is to determine what constitutes "medieval." The Middle Ages could easily be understood to cover nearly 1,000 years, from the fall of Rome to the Renaissance. The accumulation of knowledge, including brewing knowledge, did not stand still during that time, so saying that something was from the "Middle Ages" doesn't help much. 750AD? 1450 AD? Both could be considered "medieval," but there's a world of difference. Also, if you're talking about medieval Europe, what was known in Germany was considerably different than in Britain or Spain.

There are not a lot of written materials for brewing techniques in the early and middle parts of the medieval period; recipes were passed along by hands-on teaching. However, a surprising amount has survived from the late Middle Ages and early Renaissance. The classic reference that describes beer in detail is "The English Housewife," by Gervase Markham. This work was published in 1615 for women living on small farms, essentially a home economics manual. This book is easily available through your local library's inter-library loan, and a quick read through the chapters relating to brewing would tell you quite a bit about the state of knowledge on brewing in late medieval England. Other works are available, such as *The Closet of Sir Kenelme Digbie Opened*

(though this book has mostly mead recipes).

The main thing to keep in mind is that the medieval person, while perhaps less technically sophisticated than today, was not any less intelligent. Techniques for producing a palatable brew would have been figured out in relatively short order by trial-and-error, then passed from mother to daughter by word of mouth. After all, especially on the medieval farm, beer or ale was the primary drink for all and brewing was carried out pretty much nonstop.

Regarding the assumptions that Matt described, a few of them jumped out at me:

■ "How big a pile of grain..." Medieval brewers measured grain by volume, and the typical amount seen in medieval beer recipes is the "quarter," which is 8 bushels. Markham says that a quarter of good malt should make three hogsheads of beer. So, while technically correct, calling it a "pile" seems



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unnecessarily informal and implies a level of sloppiness that is probably unwarranted.

- "And of course, no clocks!" Sorry, but this is simply wrong. Clocks were around well before the medieval era; in fact the word "clock" itself first appeared before 1400. Markham talks of mashing for "an hour or more." And even if a clock wasn't immediately available, other recipes called for waiting a period of time that it took a man to walk around a field of a certain size. Measuring elapsed time was not just simply a matter of guessing, even during the Middle Ages.
- "Decoction mashing." In all the English language medieval brewing recipes I've seen, boiling water was added to the grist and stirred in, and the mash sat. Decoction mashing was developed in

Germany, but as far as I know it appeared in the late Middle Ages or later.

- No scales (not mentioned directly, but implied by the estimation of the amount of hops): Another mistaken stereotype. Scales were not uncommon. Markham talks about adding a "pound and a half" of hops per quarter of malt.
- Matt's attention to the malt bill was unnecessarily detailed. The concept of different varieties of malt (two row vs. six row, crystal/chocolate/whatever) didn't occur to brewers until well out of the medieval period.
- Hydrometers (mentioned in passing in Matt's article): It's worth noting that Digbie's mead recipes often call for adding honey until the liquor is strong enough to float an egg. This certainly qualifies as a crude hydrometer. Thus,

the concept of a hydrometer was obviously discovered at some point by brewers of the medieval period, though not widely applied until much later.

While Matt's article was an interesting discussion of seat-of-the-pants brewing, as a bit of medieval research it leaves a lot to be desired.

Phil

Dear Phil,

I'm sure Matt meant no disrespect to any medieval brewers. Perhaps we should have avoided any chronological references and stuck with the "seat of the pants" tag. That said, you raise some very interesting points about the technical savvy of early brewers.

—Ed.

## AMERICAN HOMEBREWERS ASSOCIATION 2006 GOVERNING COMMITTEE ELECTION!

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The AHA Governing Committee helps develop the benefits and programs of the AHA.

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Bev Blackwood—Houston, TX

Denny Conn, Noti—OR

Dave Dixon, Bedford—TX

Michael Fairbrother—Londonderry, NH

Bob Kauffman—Lafayette, CO

Alberta Rager—Lenexa, KS

Curt Stock—St. Paul, MN

Gordon Strong—Beavercreek, OH



### VOTE NOW!

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Select up to four (4) of the candidates you feel are best qualified to serve on the AHA Governing Committee.

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|--|--|
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| <input type="checkbox"/> Bev Blackwood       | <input type="checkbox"/> Alberta Rager |
| <input type="checkbox"/> Denny Conn          | <input type="checkbox"/> Curt Stock    |
| <input type="checkbox"/> Dave Dixon          | <input type="checkbox"/> Gordon Strong |
| <input type="checkbox"/> Michael Fairbrother |  |

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APRIL 1, 2006**

☐ Enter Me in the Lallemand Scholarship Drawing

Name \_\_\_\_\_ Membership # \_\_\_\_\_

Signature \_\_\_\_\_ Email \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Mail completed ballot to: AHA Election, c/o Susan Ruud,  
5605 56th Ave N, Harwood, ND, 58042; or fill out the online ballot at [www.beertown.org](http://www.beertown.org).

### ELECTION GUIDELINES:

Read the candidate statements on [www.beertown.org](http://www.beertown.org). Vote online at [www.beertown.org](http://www.beertown.org) or photocopy the ballot (that way you don't have to cut your Zymurgy). Vote for up to four (4) candidates by marking the box next to the candidates' names. Fill in your name and membership number in the appropriate place. If you do not know your member number, or would like to become a member, call us toll free at 888-822-6273 or e-mail [info@brewersassociation.org](mailto:info@brewersassociation.org). Sign your ballot.

Mail completed ballots to: AHA Election, c/o Susan Ruud, 5605 56th Ave N, Harwood, ND, 58042; or fill out the online ballot at [www.beertown.org](http://www.beertown.org). Ballots must be postmarked no later than April 1, 2006.

Only one ballot per member will be accepted.

Online voters are eligible for a special AHA membership renewal rate of \$29—available only through [www.beertown.org](http://www.beertown.org).

All AHA members voting in the election are eligible for an additional entry in the Lallemand Scholarship drawing for Siebel Institute's two-week Concise Course. Check the "Enter Me" box on the ballot to submit your entry. The drawing will take place June 24, 2006 at the AHA National Homebrewers Conference in Orlando, Fla.



## Now Where Was That Hopping Story...?

Dear Zymurgy,

I have been a subscriber to *Zymurgy* for many years now, and have dozens of issues of your magazine. Every now and then, I will remember that you wrote an article about something that I need to reference, but I can't remember where it was written (I have a good memory, but it's short!).

Would you ever consider doing a comprehensive index of *Zymurgy* articles? It would be helpful to at least do one annually and put it in the year-end issue covering that year's articles. You could put it online for the brewing world to use! Maybe if people find an article that they want to reference in a back issue, this would inspire them to buy that issue and help deplete your stores! Or, I could just keep quiet, grab a homebrew and search through my gigantic stack of magazines looking for that article.

Dennis G.

Eagle View Brew

Dear Dennis,

A *Zymurgy* index is definitely on our "to do" list—although I have to admit it lands somewhere below getting each issue out. And I heartily agree with the homebrew-in-hand hunting method.

—Ed.

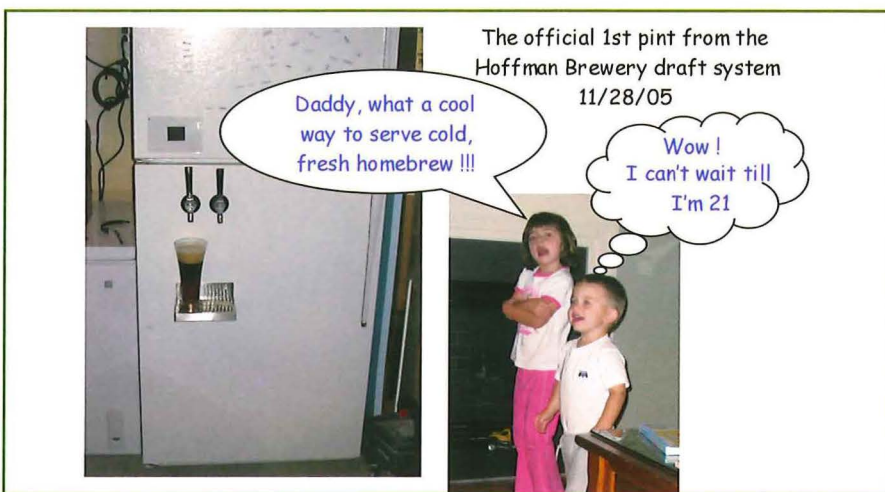
## Recognizing Tradition

Dear Zymurgy,

The January/February 2006 issue was great. I have a comment about one of the letters titled "Get Real."

I don't think the writer's point was that force carbonating would make mediocre beer/ale into medal winners. One of the issues in a contest is that many homebrewers have to mail in their entries. A filtered product will obviously travel better than a bottle-conditioned product.

Many of the styles were originally cask delivered/draft products, and the bottling of them is a fairly recent change. The differences between a draft and bottled version of a beer are often quite noticeable. I agree with "Doc" that it would be appropriate to recognize the bottle-conditioned entries in those cate-



FROM SCOTT HOFFMAN-DOVER, DEL.

It's Monday, November 28 and I'm watching MNF and drinking fresh homebrew from my just-installed draft system. To commemorate this special event I took the above photos, which show the draft system and my 5-year-old and 2-year-old brewers-in-training. Now, if I could only get them to turn the handle on that grain mill.

gories in which that technology is appropriate to style.

Thanks,

Paula


Palm Springs, Calif.

Dear Paula,

In professional brewing circles, there are competitions that differentiate between bottle-conditioned and force-carbonated beers. But in a competition the size and scope of the National Homebrew Competition, I think it might be difficult to award separate medals for "Best Bottle-Conditioned

American IPA," etc. Then would you want to start differentiating based on any other technological advances? "And the silver medal for 'Best Fermented-in-Plastic-with-no-Temperature-Control Mild' goes to..."

—Ed.

Send your letters to Dear Zymurgy, PO Box 1679, Boulder, CO 80306 or e-mail [jill@brewersassociation.org](mailto:jill@brewersassociation.org). Hey homebrewers! If you have a homebrew label that you would like to see in our magazine, send it to Kelli Gomez, Magazine Art Director, at the above address or e-mail it to [kelli@brewersassociation.org](mailto:kelli@brewersassociation.org). 

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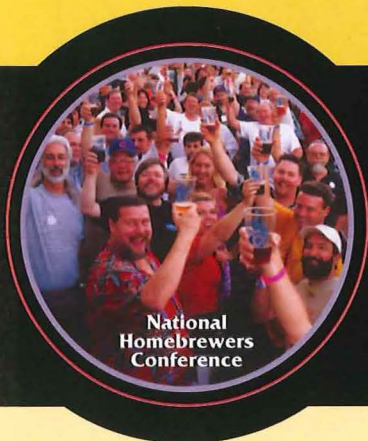
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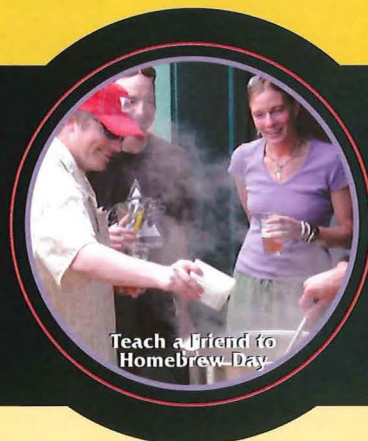
# IS BEER YOUR PASSION?



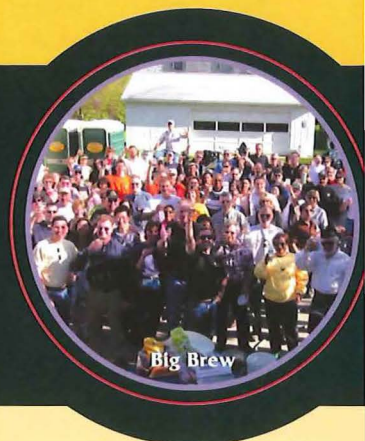
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by Ray Daniels



## Another Homebrew Hero: FDR

**M**ost of you know that homebrewers owe a certain debt to former President Jimmy Carter, who signed the bill legalizing homebrewing in the United States back in 1978. But this time of year, there's another Democrat who deserves some of our attention and maybe even more praise, namely Franklin Delano Roosevelt.

Why Roosevelt? Think Prohibition: the social experiment that failed. The Volstead Act that established Prohibition in the United States had been in effect for 12 years by the time FDR ran for president for the first time in 1932. In contrast to his opponent Herbert Hoover, he ran as an unabashed "wet," favoring repeal of the 18th Amendment to the Constitution that made alcohol illegal throughout the country.

Roosevelt—and Democrats in Congress—won that election by such a huge margin that the movement toward repeal began almost immediately. In a session shortly after the election in 1932, the lame duck Congress passed a resolution proposing a new constitutional amendment repealing the 18th Amendment.

Roosevelt himself had to wait a bit longer to get into the act as his inauguration didn't occur until March 4, 1933. Within a few days, he called for a special session of Congress and among the requests he made to them was for a modification of the Volstead Act, which had established Prohibition. That amendment changed the definition of an intoxicant so that beer with less than 3.2-percent alcohol by weight would become legal again. Congress quickly passed that amendment and the change became effective on April 7, 1933—the day that legal beer was once again served in America.

Of course it took most of 1933 to ratify the constitutional amendment (that would be



**THE BREWERS ASSOCIATION PLANS TO CELEBRATE WHAT SOME CALL "BREW YEAR'S EVE" ON APRIL 7 AND IT IS A GREAT TIME TO HOMEBREW A BEER IN THE SPIRIT OF THE OCCASION.**

the 21st amendment for those of you keeping score at home) and effect repeal nationwide. And you'll never guess which state was the 36th to pass repeal and complete ratification of the amendment. There were 48 states back then and I bet you would guess at least 30 of them before you got the right answer, which is Utah—a state that, despite casting the deciding vote for repeal, still has pretty tight limits on alcohol to this day.

Utah's vote and full ratification happened December 5, 1933, marking the lifting of Prohibition for wine and spirits. But brewers and beer drinkers can celebrate the earlier date of April 7: the day that legal beer once again flowed in our nation.

### Brewing for Repeal

Thus ends our history lesson for today. Now the fun starts. The Brewers Association plans to celebrate what some call "Brew Year's Eve" on April 7 and it is a great time to homebrew a beer in the spirit of the occasion.

As many of you know, a beer with 3.2-percent alcohol by weight would be the same as a beer with 4.0-percent alcohol by volume (abv), the measure U.S. brewers more commonly use these days. In some states, most or all of the beers sold must still meet this alcohol limit.

Some might suspect that such beers would be watery and devoid of flavor,

but these days, that's rarely true. I can certainly think of several notable examples. One is available on tap at a huge number of bars around the country and serves as the flagship of one of the most successful and long-lived breweries in the world: Guinness Stout. Sure, Guinness Foreign Stout is strong, but the draft product (including canned and bottled versions) clocks in at just 4.0-percent abv. This beer and others like Berliner weiss and many English-style bitters proves that a beer doesn't have to have more than 4-percent alcohol in order to be tasty and satisfying.

So that brings us back to homebrewing. It seems only suitable that we homebrewers should brew up a tribute to FDR around the April 7 anniversary of beer repeal. Personally, I think I'll go for a mild ale. Since I have the jump on you (I'm writing this in January!), mine should be ready to drink by then. But if you are just getting the word, you might pick April 7 (or the following Saturday or Sunday, April 8 or 9) as your brew day for your own batch of FDR Ale. If so, be sure to check out the action at your local brewery on the 7th as they may have a 3.2 beer on tap for the occasion that might be a welcome reward for your efforts—or even an inspiration for your own efforts later in the weekend.

I'm going to start with a mini-mash of pale ale malt, a good portion of crystal and



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## PROHIBITION TIMELINE

**1851**—Maine becomes the first state to outlaw the sale of all alcoholic beverages, except for "medicinal, mechanical or manufacturing purposes."

**1855**—Twelve states have joined Maine in Prohibition.

**1874**—Women's Christian Temperance Union forms.

**1880**—Kansas is the first state to outlaw the manufacture and sale of alcohol through a constitutional amendment.

**1890**—Beer consumption surpasses spirits consumption in the United States.

**1893**—Anti-Saloon League forms.

**1900**—Carry Nation comes into prominence when she begins wrecking saloons in Kansas with a hatchet.

**1916**—Nineteen states have passed state laws prohibiting the manufacture and sale of alcohol.

**Jan. 16, 1919**—18th Amendment is ratified outlawing the manufacture and sale of "intoxicating liquors" nationwide.

**Jan. 1, 1920**—National Prohibition goes into effect. Violations are rampant.

**1925**—Six states pass laws prohibiting the investigation of claims of violations of the 18th Amendment.

**1932**—Franklin D. Roosevelt is elected President of the United States, running on a platform that includes the repeal of Prohibition.

**1932**—Congress proposes 21st Amendment, repealing Prohibition.

**April 7, 1933**—President Roosevelt calls special session of Congress and passes alteration to 18th Amendment, making beer of not more than 3.2 percent alcohol by weight legal.

**Dec. 7, 1933**—Utah ratifies 21st Amendment, effectively repealing national Prohibition. Some state prohibitions linger for years to come.

even some black patent. A key will be to include a chunk of Munich or some other "high-dried" malt like Biscuit. I'll use a dose of extract to reach the target gravity of about 1.040.

And since this beer is for my personal enjoyment rather than competition purposes, I might be tempted to ignore the fact that milds are normally malt balanced and toss in a good load of flavor and aroma hops. Mmm. I can hardly wait.

Cheers!

**Ray Daniels is executive editor of Zymurgy and director of craft beer marketing for the Brewers Association.**



by Professor Surfeit



# Spent Hops Can Kill Your Dog!

Dear Professor,

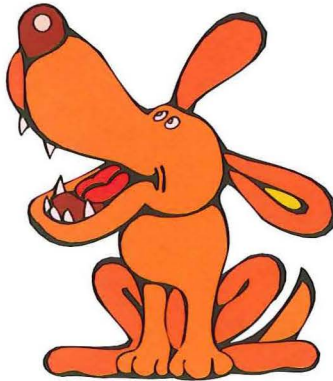
I am a fairly new homebrewer—four batches—and I have discovered a problem that I believe you can help with. I was brewing a batch of Pilsener the other day and I took two bags of hops from the wort and tossed them on the ground to cool while I put the wort into the fermenter. Then I noticed that my dog had swallowed the bags of hops! I called my vet and he said that it should not be a problem for the dog. I called my local brew supplier and they said the same thing. I looked up a big time supplier online and called them and they said the dog would be OK. I was relieved.

I posted a question for the brewers on a cigar bulletin board regarding the hops and the dog. One guy said, "Get your dog to the vet now!" He posted some articles from a veterinary journal that said hops can kill dogs. It referenced eight case studies, and six of the dogs had died. I called animal poison control and they also said to get my dog to the vet.

The vet made him vomit and gave him charcoal and IV fluids. They kept him for most of the day. He survived, thankfully, but the vet said it was only because I saw the dog eat the hops and we got them out before they made him sick.

Apparently the hops can cause "malignant hyperthermia," a sudden and almost irreversible increase in body temperature that basically fries their brains and organs. I was amazed that no one seemed to have heard of this. I have your book, *Joy of Home Brewing*, and I checked it and there is nothing mentioned about this.

I am hoping that you will see that there is a potential danger for pet-owning brewers who might discard their spent hops in the yard or allow the pets to possibly be able



to eat the hops. I was surprised to learn that spent hops are more dangerous to dogs than fresh ones, which doesn't make sense to me.

Anyway, I was hoping that you might consider adding a warning to homebrewers in your works and updates about the danger to pets of eating hops. I am contacting suppliers to ask them to include a warning in their brewing instructions. My local vet is spreading

the word throughout the industry here as well.

I still find this amazing! Hops seem to be such a safe ingredient. How could a flower be so dangerous? Why would a dog eat something so bitter?

I am a firefighter/paramedic (25 years) and many of the guys in my station have read your book and have become brewers. We know that you have a great influence on the brewing community and we ask you to support us in this endeavor. Any help or advice that you can offer will be greatly appreciated.

Thank you,  
Larry Wilson  
Seminole, Fla.

Dear Larry,  
Thanks for the helpful warning. I did a bit of Web research myself and found the following on several Web pages including <http://workingdogs.com/doc0175.htm>.

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Hops Homulus [sic] lupulus, the spent hops from the home brewing of beer, presents a new danger to dogs. Since 1994, the National Animal Poison Control Center has been consulted on five dogs, only one of whom survived. The dogs present with panting, restlessness and signs of increasing pain. The most significant symptom is a rapid increase in temperature called malignant hyperthermia. Treatment includes gastric lavage, charcoal slurry, coldwater baths and IV sodium bicarbonate to reverse metabolic acidosis. Hops contain a variety of biologically active compounds; the most suspect however is an uncharacterized alkaloid.

Seriously,  
The Professor, Hb.D.

#### Wayne's FWH World

Dear Professor,  
In reading over some of the recipes in the September/October 2005 issue of *Zymurgy*, I came across a notation that I am not familiar with. Several of the

recipes had hop additions with time of addition noted as FWH. Subsequent hop additions in these recipes had specific times, e.g. 60 minutes, noted. What does FWH mean?

Mahalo!  
Wayne Borth  
Honolulu, Hawaii

Dear Wayne,  
Very, very good question. I did a double take and asked myself "FWH?" with the same question mark as you. Then I figured it out. "First Wort Hopping," the process of adding hops to the kettle before you add your wort, i.e. at the beginning of the wort collection process and before the temperature is brought to boiling. That's what FWH is all about and is quite controversial among brewers. Some swear that FWH makes a difference and others ballyhoo the idea maintaining there is not scientific evidence that it makes a difference.

Decide for yourself,  
The Professor, Hb.D.

#### RIMS Control

Dear Professor,  
I have a question that seems to have stumped all of the local brewing authorities. I come to you for help!

I am an all-grain brewer and after reading Greg Noonan's book on lager brewing, I have performed decoction mashes on most of my brews. As I advance my skills, I find that the one area (yeah right, just one!) at the top of my list is temperature control. No matter how accurate I am in weighing or using volume to pull decoctions, I find my temperatures are only moderately accurate.

My goal is repeatability, so even though my brews taste good, I feel that I am missing the boat. I have determined that a RIMS or HERMS system should help me out in stabilizing and making minor adjustments in temperature, but here is my question (finally). Noonan mentioned in his book that once the mash is begun, the majority of the enzymes go into solution, which is why bringing the thick mash to a boil has little



effect on the enzymatic activity. My original knowledge focused on the temperature of the grain, but if Noonan is to be believed (and he sounds like he knows what he is doing), then it is actually the liquor that should be the reference temperature. This would make a great deal of difference in a RIMS or HERMS system, since to heat grain

and maintain its temperature, the liquor would be approximately 5° F higher than the actual mash temperature, which would drastically affect the enzyme activity.

Let me put it another way: I am discussing the mash wherein the grain is the crushed grain added to the tun and the liquor is the

liquid portion of the mash, i.e. the water added at sparge-in and whatever components of the grain bed that have gone into solution. The crux of my question surrounds which of these two parts of a mash (if separated, such as in a RIMS system where the liquid portion of the mash is circulated through a heating mechanism) should be the reference for maintaining the temperature. Is it the grain bed or the liquid?

Many hoppy regards,  
James Gritters  
Olympia, Wash.  
Member, South Sound Suds Society

Dear Mr. Gritters,  
The way I see it, it is first the liquid outflow from RIMS that needs to be at temperature, but ultimately you are achieving this temperature so that the entire mash temperature can be maintained at this temperature. With a well-insulated mash container you can achieve this. I have used RIMS in the past with good results, though extra attention to insulating the mash tun was necessary in order for the system to work effectively.

Hoppy regards, malty results,  
The Professor, Hb.D.

### Copper Concerns

Dear Professor,  
I brew using a copper counterflow chiller (Chilzilla) and I discovered it fits inside my pressure cooker. I have been sanitizing, actually sterilizing, it at 10 to 15 psi for 10 to 15 minutes. Can this be harmful to me or my brew?

Jim Skolka  
Salisbury, Md.

Dear Jim,  
The simple answer is: No. Except if you have a genetic disorder that does not metabolize copper, which is extraordinarily rare, but will cause death.

Safe with copper,  
The Professor, Hb.D.

Hey homebrewers! If you have a brewing-related question for Professor Surfeit, send it to "Dear Professor," PO Box 1679, Boulder CO 80306-1679; fax 303-447-2825; or e-mail professor@brewersassociation.org.



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by Zymurgy Staff

# A Taste of Yankee Ingenuity

**F**rom the earliest days of the American craft beer revolution, brewers—both amateur and professional—have put their own stamp on classic beer styles from the Old World.

In many cases, that means pushing the envelope a bit in terms of starting gravity, hops, use of local ingredients or all of the above.

Perhaps one of the best examples of this Yankee ingenuity is the American pale ale style. American pale ale is one of the most popular styles to drink—and brew—and is part of the broader American ale category that is the focus of the March/April American Homebrewers Association Club-Only Competition.

Nearly every American homebrewer and commercial craft brewer has at least one American pale ale in the recipe file. And while the style can trace its roots back to the classic English pale ales, the American versions are characterized by a more assertive, often citrusy hop character and tend to have higher gravities than their British counterparts.

Perhaps the best-known commercial example of the American pale ale is Sierra Nevada Pale Ale, the beer that introduced many brewers and beer lovers to the taste of Cascade hops. Cascade is still one of the most popular signature hops for American pale ales as this issue's recipe shows, but other American hop varieties such as Willamette, Centennial, Ahtanum, Warrior and Horizon are gaining popularity.

The bitterness levels for American pale ales run from 30 to more than 45 International Bittering Units, as compared to English ordinary bitters, which top out

at 35. The American pale ales also tend to have less of a caramel, crystal malt character than British varieties. In addition, the original gravities of American pale ales tend to range higher—1.045 to 1.060—than their British counterparts.

American pale ales are most often dry-hopped, giving a moderate to intense hop aroma.

An offshoot of the American pale ale style is American amber ale. These beers



## American Pale Ale

### Ingredients for 5 U.S. gallons (19 liters)

<b>2 cans</b>	Coopers Light Malt Extract
<b>0.5 lb</b>	(0.23 kg) 60 L crystal malt
<b>0.5 lb</b>	(0.23 kg) Victory malt
<b>1.0 oz</b>	(28 g) Centennial, 10.5% alpha acid (60 min)
<b>1.0 oz</b>	(28 g) Cascade, 5.75% alpha acid (5 min)
<b>1.0 oz</b>	(28 g) Cascade, 5.75% alpha acid (0 min)
<b>1.0 oz</b>	(28 g) Cascade, 5.75% alpha acid (dry hop)
	Wyeast 1056 American Ale Yeast or White Labs WLP001 California Ale Yeast
<b>0.75 C</b>	(180 ml measure) corn sugar for bottling

**Original Specific Gravity:** 1.055

**Final Specific Gravity:** 1.012

**IBUs:** 38

**ABV:** 5.6%

### Directions

Bring 2 gallons of water to a boil, remove from heat and stir in extract. Bring back to a boil and add Centennial hops. Boil 55 minutes then add 1 oz Cascade. Boil five minutes more, turn off burner and stir in 1 oz Cascade. Pour into fermenter with enough cold water to make 5 gallons. When temperature is below 68° F, pitch yeast and aerate well. Ferment at 68° F for one to two weeks or until fermentation is complete. Rack the beer to secondary with dry hops. After one week, prime with corn sugar and bottle.







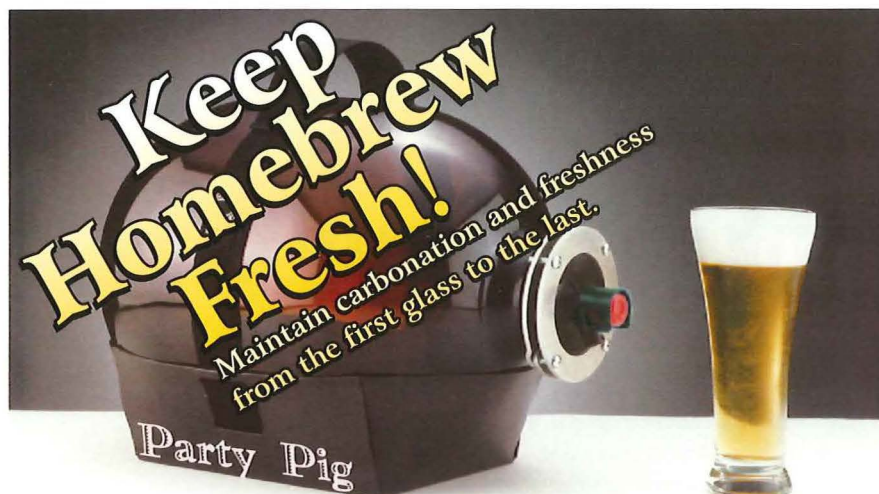
#### ON THE WEB

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share the assertive hop character of American pale ales, but tend to have more crystal malt flavor and color. Some American ambers share similarities to English special and extra special bitters, although, like American pale ales, rely more on American hops and tend to be higher in alcohol and bitterness.

And, like American pale ales, American ambers are often dry-hopped to increase the hop aroma.

Some of the more popular commercial examples of American ambers are New Belgium Fat Tire, Mendocino Red Tail Ale, North Coast Red Seal and Anderson Valley Boont Amber.

The third style included within the American Ales category is American brown ale. This style originated with American homebrewers and has found its way into the professional craft beer world.

American brown ales, like the American pales and ambers, are hoppier than their English brethren, with IBUs topping 40 in some examples, compared to 30 tops in English brown ales.

To balance the hop bitterness, American browns have a healthy dose of crystal and some chocolate malt. They also tend to be stronger than the various English brown ales, with gravities reaching 1.060.

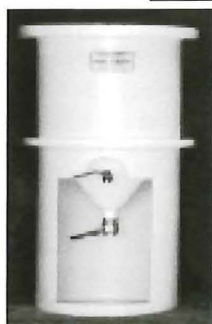
In amateur brewing circles, it is more common for brewers to dry-hop their American brown ales than in the commercial examples.

Commercial examples of American brown ales include Pelican Pub's Doryman's Dark Ale, Brooklyn Brown Ale, Avery Ellie's Brown Ale, Lost Coast Downtown Brown and Great Lakes Cleveland Brown Ale.

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American Homebrewers Association's 28th Annual

# National HOMEBREW Competition

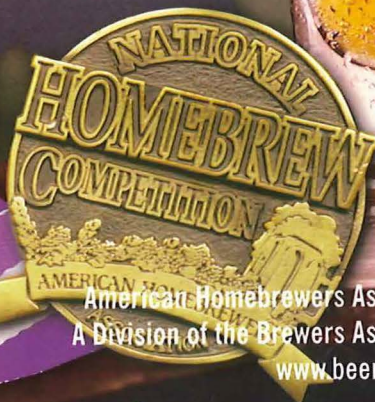
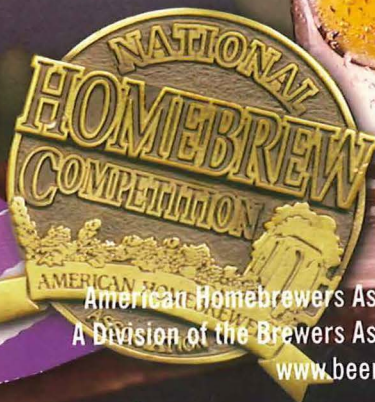
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To find your entry site, check the Site Locator Map on page 20.



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# American Homebrewers Association's 28th Annual National Homebrew Competition 2006

Entries due April 3-14, 2006 - Entries may be shipped or dropped off.

Entries must be submitted to the proper regional site for your state.  
Competition site organizers and judge coordinators are required to send their entries to a site other than their own.

## NHC 2006\* Beer, Beer, & More Beer

975 Detroit Ave, Ste. D  
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## NHC 2006 F.H. Steinbart Inc.

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## ALES Competition

Entries due March 31, 2006  
The Bushwacker  
2206 Dewdney Avenue  
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See [www.alesclub.com](http://www.alesclub.com) for  
entry details.

## NHC 2006 Emmet's Tavern

128 W Main Street  
West Dundee, IL 60118

## CIDER

All cider entries should include 3 bottles and  
should be sent to Poughkeepsie regardless  
of where you live:

## NHC 2006 Halftime Beverages

2290 South Road  
Poughkeepsie, NY 12601

**DO NOT SEND BEER OR MEAD  
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## International Entries

Please send all international beer and  
mead (but not cider) entries other than  
Canadian entries, to:

## NHC 2006 AleSmith Brewing Co.

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San Diego, CA 92126

## NHC 2006\* AleSmith Brewing Co.

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\*California entrants see  
[www.beertown.org](http://www.beertown.org) for list  
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## NHC 2006 Edwards Graphics

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## NHC 2006 Defalco's

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Businesses receiving NHC entries cannot answer questions regarding the competition. All competition questions should be directed to Janis Gross.

American Homebrewers Association  
A Division of the Brewers Association







# 2006 National HOMEBREW Competition

## ENTRY FORM

**Save Time! Fill out entry forms online. See [www.beertown.org](http://www.beertown.org).**

Send completed entry form with your entry to your regional site. Entries submitted to the wrong site will be disqualified. Check the Locator Map in March/April 2006 issue of **Zymurgy** or online at [www.beertown.org](http://www.beertown.org). Questions? Contact Janis Gross, NHC Director, at [janis@brewersassociation.org](mailto:janis@brewersassociation.org) or call (888) 822-6273 or (303) 447-0816 ext 134. Please read the instructions in PART II of the rules and regulations found on [www.beertown.org](http://www.beertown.org).

### Section A: Brewer Information

1. Name \_\_\_\_\_
2. Additional Brewer(s) \_\_\_\_\_
3. Address \_\_\_\_\_
4. City \_\_\_\_\_ State/Province \_\_\_\_\_ Zip/Postal Code \_\_\_\_\_
5. Country \_\_\_\_\_ Phone (H) (\_\_\_\_\_) \_\_\_\_\_ (W) (\_\_\_\_\_) \_\_\_\_\_
6. E-mail \_\_\_\_\_
7. Homebrew Club (Please spell out full name of the club. Do not abbreviate.) \_\_\_\_\_
8. AHA Membership Number (if you are already a member) \_\_\_\_\_
9. Join the AHA and save on entry fees! Or renew your membership (enclose a separate \$38 check) ☐ New Membership ☐ Renewal
10. Entry Fees Enclosed. Make checks payable to AHA.
 

☐ AHA Member      AHA members pay \$8 per entry : \_\_\_\_\_ no. of entries x \$8 = \$ \_\_\_\_\_ total  
☐ Non-member      Non-members pay \$12 per entry: \_\_\_\_\_ no. of entries x \$12 = \$ \_\_\_\_\_ total
11. If you are a BJCP judge, please include your BJCP Number here \_\_\_\_\_



### Section B: Entry Information

12. Name of Brew (optional) \_\_\_\_\_
13. Category and Subcategory (Print full names) \_\_\_\_\_
14. Category Number (1-29) \_\_\_\_\_
15. Subcategory Letter (a-e) \_\_\_\_\_
16. For Mead and Cider (check one): ☐ Dry ☐ Semi-Sweet ☐ Sweet
17. For Mead and Cider (check one): ☐ Sparkling ☐ Petillant (Lightly Sparkling) ☐ Still
18. For Mead (check one): ☐ Hydromel (Light Mead) ☐ Standard Mead ☐ Sack (Strong Mead)
19. SPECIAL INGREDIENTS:

**If you have entered in any of the following categories 6d, 16e, 17f, 20, 21, 22b, 22c, 23, 25c, 26a, 26c, 27e, 28b, 28c, 28d, 29** refer to part II of the Rules and Regulations and the NHC Style Guidelines at [www.beertown.org](http://www.beertown.org) for instructions on filling out the spaces below. The judges will use this important information for evaluating entries in these categories. **Leave these spaces blank if you have not entered the above categories.** Entrants of Historical Beers are asked to provide the historical beer style and information on the style profile and history as an aid to judges.

Classic Style \_\_\_\_\_

Special Ingredient(s) \_\_\_\_\_

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There's a

Bug



My

Beer

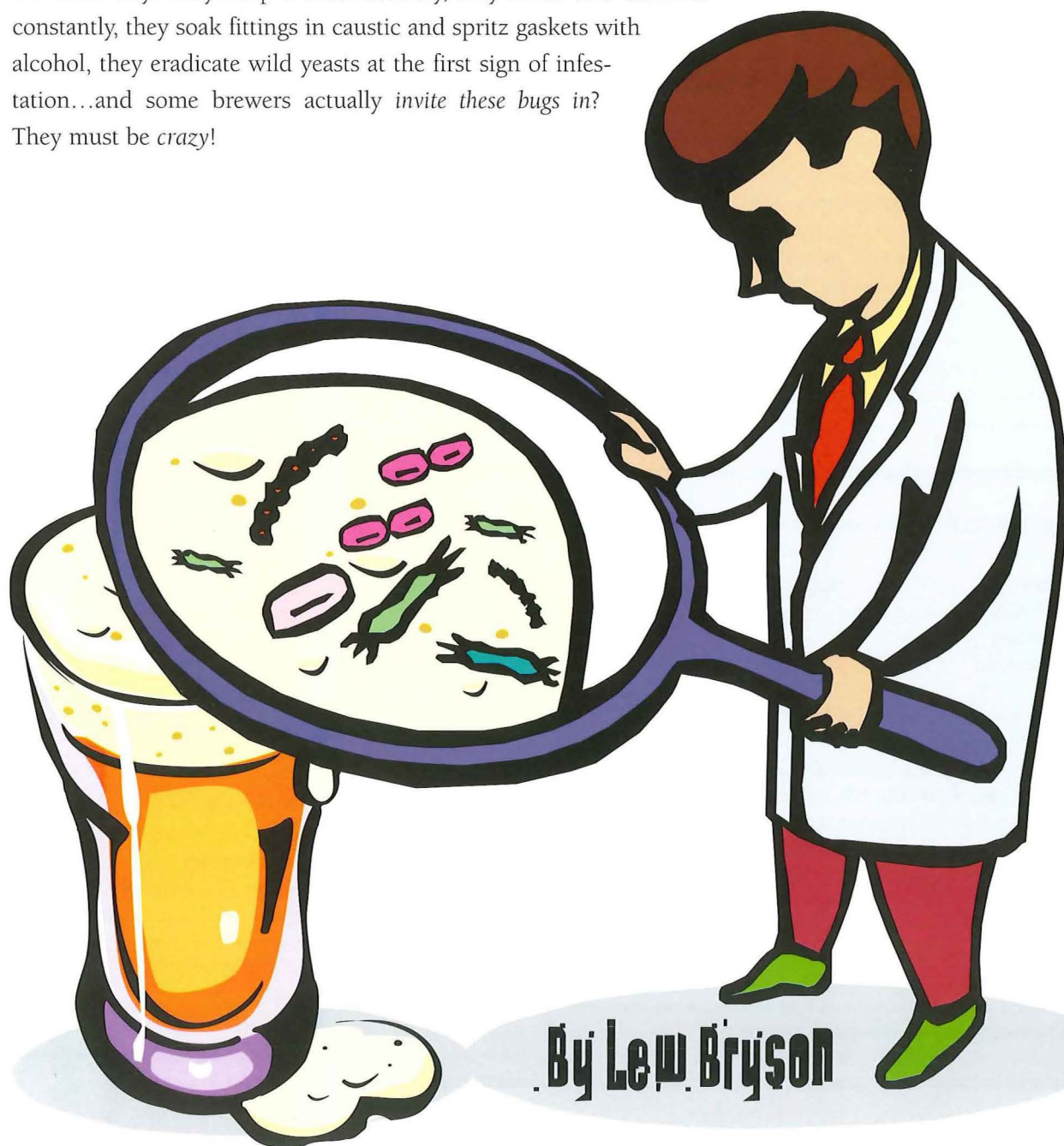
and i like it



**M**y parents visited me once when I was living in Pittsburgh. We did some touristy stuff, including a drive down to Frank Lloyd Wright's rural masterpiece, Fallingwater. I'd been to see it and thought that my father would enjoy the gadgets and innovations of this house perched over a lively mountain stream. But he was clearly ill at ease during the tour.

I pulled him aside near the end and asked him if he liked the house. He looked around quickly and hissed, "They must have been *crazy!* Hell, boy, they've got water in the basement *all the time!*" I'd forgotten about the floods that had drowned our basement. Twice. Sorry, Dad.

There must be some brewers who think of lambic, Berliner weisse, Flemish red and other "bug beers" in the same way. They keep a clean brewery, they scrub and disinfect constantly, they soak fittings in caustic and spritz gaskets with alcohol, they eradicate wild yeasts at the first sign of infestation...and some brewers actually *invite these bugs in?* They must be *crazy!*





"Letting them in the brewery can be a problem," admitted Charlie Schnable, brewer/owner at Otto's in State College, Pa. Schnable said one of the hardest parts about brewing his Flanders Red is "worrying about those organisms loose in my brewery."

Yet Schnabel and other brewers have cautiously embraced "those organisms" as the source of some of brewing's most interesting products: bug beers. These are beers that are close to brewing's origins, venturing beyond the friendly assistance of *Saccharomyces cerevisiae*. These may include the *Brettanomyces* yeasts, differentiated into strains of *Bruxellensis* or *Lambicus*, two names that betray their Belgian heritage. There may also be true "bugs" in the beer: beer-hungry bacteria of the genera *Pediococcus* or *Lactobacillus*.

### Why Bug Beer?

It's more than just beer archeology. For bug brewers, *Saccharomyces* is just one path. "As far as flavor, fermentations with *Saccharomyces cerevisiae* are only the tip of the iceberg," said Cody Reif, microbiologist at New Belgium Brewing in Fort Collins, Colo. "Using other organisms opens the door to many flavors and aromas you can't get with a production yeast strain. These organisms are tools to make great, creative beers."

It's not a very long list of organisms, though, for which brewers can be thankful; not many microorganisms can live in the low pH, high alcohol environment of beer. These elite few have evolved—sometimes with human guidance—into alcohol-proof sugar-chompers that give their own stamp to their environment, so much so that these organisms are known to "normal" brewers as "beer spoiling organisms."

Brewer Chris LaPierre of Iron Hill's West Chester, Pa., brewpub, said he began making sour beers as a homebrewer, "but unfortunately those were unintentional," he said. He was introduced to Rodenbach Grand Cru in 1995 and has been making "bug beers" on a regular basis ever since.

LaPierre turned pro at the old Dock Street brewpub shortly afterward, and has since wanted to replicate that pleasant sourness of Rodenbach. "The other reason for doing bug beer is that it's one of the last frontiers in American brewing," added LaPierre. "Americans have perfected replications of time-honored European styles and have gone a long way to create uniquely American styles like the ultra hoppy San Diego styles. What's left? Until five or 10 years ago, bug beers were really the only styles in the world that Americans didn't brew."

Some of that reluctance stems from the fear of contamination of the brewery. New Belgium is the biggest brewery doing bug beers in the United States, and has a lot to lose if the bugs get loose. Reif was unequivocal about the risks involved—not that the bugs will take over your brewery, but that they must be taken seriously. "It is absolutely crucial to keep alternative organism beers away from your equipment and other products," he said. "These organisms are critical beer spoilers and can ruin beer. Once they take hold they are very difficult to remove from equipment."

Phil Markowski, who's brought a few bug-beer medals home to Southampton Publick House in New York, keeps a calm eye on the risks of using bugs in the brewery. "There's a bit of myth to the notion that they take over the brewery," he said. "Be extra careful in cleaning, and you won't have a problem. Someone who's going to do sour beers regularly might want to set aside a dedicated carboy or Corny keg. Go a bit further on your cleaning, but it tends not to be an issue when you use the culture once and throw it out. That removes most of the chance of the organism spreading."

Vinnie Cilurzo, who's doing a very interesting series of barrel-aged bug beers at his Russian River brewery in Santa Rosa, Calif., echoed the double equipment advice. "We do something a homebrewer should want to do," he said. "We have two of everything: hose gaskets, pumps, gloves. We keep it in what we call our Brett bucket, just for the wild beers. There's an inherent risk in having wild yeasts and bacteria in your brewery. But if you clean diligently and regularly, you won't have any problem."

That's not to say problems don't exist, and Cilurzo did an experiment to find out just how risky things were. "When I was testing out some *Brettanomyces* beers, I took a homebrew bucket with the spigot on the bottom, and bottled some Temptation with it. Then I racked out 5 gallons of Redemption into it, after rinsing it well with hot water. Six months later that Redemption had Brett in it. That's why we have two of everything."

## Singularité Recipe taken from *Wild Brews* (Brewers Publications, 2005 by Jeff Sparrow)

Malt Type	Color (ASBC)	Grist % by Weight
Pilsener	1.6	88.0%
Wheat	2.5	8.0%
Acidulated	2.5	4.0%

**Mash Schedule:** 90 minutes at 148° F (64° C)

**Boiling Time:** 1.5 hours

**Bittering Hop Addition:** 25 IBUs. Suggested variety: Crystal

**Finishing Hop Addition:** 0.5 oz/5 gal (4 g/liter) or 3.0 oz/bbl (72 g/hl) during the final two minutes of the boil. Suggested variety: Crystal.

**Original Gravity:** 15.3° P (1.062 SG)

**Fermentation:** Wyeast 3110 or White Labs WLP645 at 65° F (18° C) for two weeks or 78° F (26° C) for less than one week.

**Secondary Storage:** Two to four weeks at 55° F (13° C) or less.

**Comments:** A pale beer fermented with a "single" strain of *Brettanomyces*. Primary fermentation with *Brettanomyces anomalus* produces the bulk of the flavor and aroma. Bitterness is moderate and malt character low to accentuate the yeast character. No *Saccharomyces* will be harmed during the fermentation of this beer!



## Getting Suggy

Once you're behind a commitment to clean like you've never cleaned before, where do you go to get those bugs? It can be as easy as getting a smack-pack of 1056. "Wyeast came out with a new mixed culture called Roeselare [Wyeast 3763]," said Schnable. "It's a balanced mixture of *Brettanomyces*, *Lactobacillus* and Belgian ale yeast. It worked out pretty well, although I thought it turned out more like a bruin than a red. I want to make it again."

Cilurzo uses a variety of strains. "Most of mine are from Wyeast," he said, "but I do have some from White Labs—they just started doing the wild stuff. And you should remember that these cultures are not the same. There are different strains. The *Brettanomyces bruxellensis* is different between Wyeast and White Labs. The *Lambicus* is also different—which is a great thing for homebrewers."

With a resource like Belgian brewer and wood expert Peter Bouckaert, it's not surprising that New Belgium sources things a bit differently. "The organisms themselves and their origins are a bit of a trade secret," Reif said. "All our wood-aged beers contain some combination of *Lactobacilli*, *Pediococcus* and *Brettanomyces*, along with other organisms as well. In Belgium, many of the breweries don't have a standard yeast strain. They use the native flora via spontaneous fermentation. Whether or not that was an effective means to procuring organisms is up for debate."

## Different Strokes

LaPierre is right in that debate. After a mild success making a Flemish red with bugs added in the fermenter, he stood that on its head. It's a process that homebrewers might find interesting. "I had a lot more success in getting sourness into the beer by employing bugs in the front end of the process rather than toward the end," he said. "My second Flemish red got all of its sourness from a sour mash. All of the bugs you need to get a really beautiful lactic sourness are right there in the malt you use every day, and best of all, they're free! That's why when Iron Hill builds a brewery, we keep our grain storage and mill in a completely different room than our fermentation vessels. When you mash

off, you kill most of them, and what you don't kill then, you'll certainly kill during your boil. But if you give them time to work, they'll start doing their thing right there in the mash.

"I mashed in like normal and did a standard mash off to denature the enzymes," he continued. "Then I cooled the mash down to bug-friendly temperatures and milled in another bag of regular old Maris Otter pale malt to replace the bugs that I'd killed by mashing off. I let the mash sit for 72 hours

and the pH dropped to 3.5 (our mash usually ends between 5 and 5.2). Then I pitched White Lab's Belgian Ale Yeast. I was much happier with that beer. It had a nice lactic sourness. I did blend in about 15 percent of the previous year's Oud Bruin, though. The Flemish red was a bit thin and the Oud Bruin had a slightly toasted, sweet character that rounded it out."

Let's not forget that the Belgians are not the only ones with a tradition of bug beers. When Brandon Greenwood was still brew-

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## Sans Le Chat

Recipe taken from *Wild Brews* (Brewers Publications, 2005 by Jeff Sparrow)

Malt Type	Color (ASBC)	Grist % by Weight
Pilsener	1.6	90.0%
Wheat	2.5	5.0%
Acidulated	2.5	5.0%

**Mash Schedule:** 90 minutes at 148° F (64° C)

**Boiling Time:** 1.5 hours

**Bittering Hop Addition:** 20 IBUs. Suggested variety: Willamette.

**Finishing Hop Addition:** 0.25 oz/5 gal (7 g/19 l) or 1.5 oz/bbl (36g/hl) during the final two minutes of the boil. Suggested variety: Willamette.

**Original Gravity:** 15.3° P (1.062 SG)

**Fermentation:** Wyeast 3112 and/or 3536 or White Labs WLP650 and/or WLP653 at 65° F (18° C) for two weeks.

**Secondary Storage:** Two to four weeks at 55° F (13° C) or less.

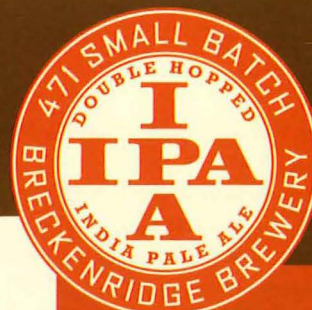
**Comments:** A pale beer fermented with two (or more) strains of *Brettanomyces*. Primary fermentation with *Brettanomyces lambicus* and/or *Brettanomyces bruxellensis* produces the characteristic wild, fruity aromas and flavors. The malt and hop character is kept very low. A slower, cooler fermentation increases the development of "traditional" flavors and aromas.

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## Lacto In De Heuvels

Recipe taken from *Wild Brews* (Brewers Publications, 2005 by Jeff Sparrow)

Malt Type	Color (ASBC)	Grist % by Weight
Pilsener	1.6	85.0%
Wheat	2.5	5.0%
Vienna	7	5.0%
Munich	14	5.0%

**Mash Schedule:** 90 minutes at 150° F (66° C)

**Boiling Time:** 1.5 hours

**Bittering Hop Addition:** 20 IBUs. Suggested variety: Sterling.

**Finishing Hop Addition:** 0.5 oz/5 gal (14 g/ 19 l) or 3 oz/bbl (73 g/hl) during the final two minutes of the boil. Suggested variety: Crystal.

**Original Gravity:** 18° P (1.074 SG)

**Fermentation:** Wyeast 3942 or White Labs WLP410 at 70° F (21° C) for one week.

**Secondary Storage:** Wyeast 3112 and/or 3536 or White Labs WLP650 and/or WLP653 for three months at cellar temperature.

**Option:** Age with a variety of wine grapes for an additional three to six months.

**Comments:** Inspired by some of the classic wild beers brewed near the Ardennes, which isn't terribly far from the growing region of Champagne grapes. *Lactobacillus* and/or *Pediococcus* will feed on the "scraps" of sugar left unfermented by *Saccharomyces*. Grapes not only provide flavor and aroma but also may encourage acid development (malolactic fermentation). The use of both lactic acid-producing bacteria and wine grapes may produce a tart beer, so some experimentation is required.

ing in Philadelphia at Nodding Head (he's now the technical brewer at High Falls in Rochester, N.Y.), he introduced a tart, traditional Berliner weisse that eventually became almost *too* popular.

"The first few years we brewed with a blend of two bacteria and two yeasts," Greenwood said. "We had time to let it sour naturally, in the traditional fashion. But this stuff just works very slowly. By the third year we were making so much, seven or eight brews in the summer...I hate to admit it, but we really did just add the lactic acid. The yeast metabolizes the sugars and amino acids so fast that the bugs can't grow until it's done. They're opportunistic, so they'll wait till their moment. Depending on the mix, it could take two to six months."

### Take Your Time

All the brewers agreed: if you're going to stick to the traditional method of introducing the bugs in the fermenter, be prepared to wait a bit. "Generally speaking, the most common mistakes people make involve waiting," Markowski said. "Homebrewer or pro, people expect that these cultures will react the same way *Saccharomyces* yeasts will. But you don't see the activity. They work so slowly and steadily that there's no perceptible change. Any visual changes—pellicle, ropy sediment—appear over long times. You kind of have to forget about it, have the discipline to just leave it alone."

Greenwood got tired of waiting one time, and really kicked things up a notch. "The fastest action we had was a Flanders red," he said. "I had a starter going for four months in the brewery, and I just kept feeding it. It was packed bugs, essentially a microbial bomb, and I detonated it in a red formulation I brewed up. It got sour in a week."

There's not a lot else you can do. "People might make the mistake of aerating," Markowski cautioned. "People might take the starter and shake it, like yeast, but that's not what to do. Provide warm temperatures, between 65 and 75° F, and that will keep activity up without going too warm and getting odd flavors. Keep it in that range and add the *Lactobacillus* and

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## Donkere Geneeskunde

Recipe taken from *Wild Brews* (Brewers Publications, 2005 by Jeff Sparrow)

Malt Type	Color (ASBC)	Grist % by Weight
Pilsener	1.6	66.0%
Wheat	2.5	6.0%
Munich	14	6.0%
Aromatic	20	6.0%
CaraMunich®	60	6.0%
Special "B"	115	2.0%
Chocolate	300	2.0%
Sugar	n/a	6.0%

**Mash Schedule:** 90 minutes at 152° F (67° C).

**Boiling Time:** 2 hours

**Bittering Hop Addition:** 25 IBUs. Suggested variety: Challenger.

**Finishing Hop Addition:** 0.5 oz/5 gal (14 g/ 19 l) or 3.0 oz/bbl (73 g/hl) during the final two minutes of the boil. Suggested variety: Styrian Goldings.

**Original Gravity:** 21° P (1.087 SG)

**Fermentation:** Wyeast 1214 or 3763 or White Labs WLP530 at 68° F (20° C) for one week.

**Secondary Storage:** Wyeast 3278 or White Labs WLP655 for six months or longer at cellar temperature.

**Options:** 1. Age with fresh dark cherries; 2. Age in a used bourbon or wine barrel.

**Comments:** Literally "dark medicine," this recipe may (or may not) have been inspired by Tomme Arthur's *Cuvée de Tomme*. Dark malt plays a large role in the flavor and aroma profile. Wild character gradually increases with age, as microorganisms commonly found in lambic produce their respective by-products. Use of fruit or a barrel with residual character further increases complexity.



*Pediococcus* as anaerobically as possible, without aeration or splashing.”


### Roll Out the Barrels

The preferred method for introducing microflora, of course, is reusing barrels that have been “infected.” Reif had some suggestions for creating those barrels. “In the lab, we use either an MRS broth or sterile wort incubated anaerobically to propagate the bacterial cultures. For the yeast, we’ll propagate them aerobically, also in sterile wort. Once the cultures are established, we put them in oak casks where they essentially fend for themselves. After the initial fermentation, we move the beer to the casks that house the bugs. The beer will remain there for anywhere from six months to three years. At this point the best way to check in on the beer is to taste. The casks take on a life of their own, each with a unique character. Important things to look for are specific acids, like lactic and acetic, and also the aroma contributed by the wood.”

If you don’t have that kind of lab facility, maybe you can get some help from Cilurzo, who’s never strayed far from his homebrewing roots. “One of the limits for a homebrewer is that they don’t have the used wood,” he said. “If they buy a barrel, it’s going to be new oak, and if they leave their beer in there, they’ll just have an oak bomb. But the one thing you don’t get in aging barrel-type beers or wild beers in plastic or glass carboys is the air diffusion that happens through porous wood. That’s part of the profile as well. You can only do so much with oak chips, because they’re new oak, too.

“So I’m aging some of our beers in right-gallon wooden barrels,” he said, “and we’ll release them as clean beers, just oak-aged. Then I’ll inoculate the barrels with our cultures, and sell them to homebrewers. It will take us about two years of aging to strip the heavy flavor out of the oak, so it’s a long-term project.”

That’s the kind of professional help a homebrewer is happy to get. Because when you’re working with bug beers, you need all the help you can get.

**Lew Bryson is a frequent contributor to *Zymurgy* and the author of several regional brewing books.** 

## Flemish Nouveau Recipe taken from *Wild Brews* (Brewers Publications, 2005 by Jeff Sparrow)

Malt Type	Color (ASBC)	Grist % by Weight
Pilsener	1.6	85.0%
Wheat	2.5	7.5%
Vienna	14	7.5%

**Mash Schedule:** 90 minutes at 150° F (66° C)

**Boiling Time:** 1.5 hours

**Bittering Hop Addition:** 25 IBUs. Suggested variety: Sterling.

**Finishing Hop Addition:** 0.75 oz/5 gal (21 g/ 19 l) or 4.5 oz/bbl (110g/hl) during the final two minutes of the boil. Suggested variety: Crystal.

**Original Gravity:** 18° P (1.074 SG)

**Options:** Steep fresh heather flowers in wort for one hour after cooling.

**Fermentation:** Wyeast 3942 or White Labs WLP410 at 70° F (21° C) for one week.

**Secondary Storage:** Wyeast 3112 and/or 3536 or White Labs WLP650 and/or WLP653 for three months at cellar temperature.

**Comments:** My “new Flemish ale” was inspired by the beers produced with *Brettanomyces* at De Proef with some help from those ancient brewers, the Picts. *Brettanomyces* provides flavor and aroma development in the “classic” method—after the completion of primary fermentation. Fresh heather flowers, a historic brewing ingredient, may introduce *Brettanomyces* without using any actual additional cultures. You may wish to decrease the amount of finishing hops if you choose to use heather.



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*Wild Brews:* Beer Beyond the Influence of Brewer's Yeast by Jeff Sparrow





*"If you do not enjoy my beer, then I say it is  
a pity for you!"*

*—Armand DeBelder of the Brouwerij Drie Fonteinen*

**T**he traditional beers of Flanders and the Payottenland are unlike any on the planet. Each beer is more a product of the terroir of the brewery than simply the actual ingredients. Curiously enough, while most producers would share the details of their process, few would contribute specifics regarding the ingredients. While the nature of fermentation with wild yeast and bacteria, particularly spontaneous fermentation, remains much a "magical" process, the brewer directly controls (and guards) malt, hops, the gravity of the beer, and other related factors. In this chapter, I explore a number of interpretations of traditional and not-so-traditional styles.

You don't set out to reproduce a Cantillon Gueuze or a Rodenbach Grand Cru as you would attempt to clone a popular India pale ale. You can attempt to slant the variables toward the profile of a particular beer and possibly produce something reminiscent, but in the end your beer will taste unique. Vive la difference!

When New Belgium Brewing of Fort Collins, Colorado, began its program of barrel aging, it respected the Flanders tradition, but the goal was always to make a good, acidic beer pleasant to the brewer's palate. The result is something unique. The traditional beers of Flanders and the Senne Valley set standards to which other brewers can aspire, especially in the beginning. Producing a quality product out of style is difficult until you can produce one in style. American producers have followed this path, and several now produce unique wild beers.

Belgium is filled with both small country pubs and trendy city center cafés that offer dozens of different beers. Small, local breweries once owned their own cafés or sold beer to those in the area. Today, many independent cafés have an exclusive arrangement with one of a few larger brewery groups. Those cafés carry that group's overall line, including a Pilsener, an abbey beer, etc. This tie makes local beers difficult to find even a moderate distance from the brewery. Surprisingly enough, a number of wild Belgian beers are more readily available in parts of the United States than in their native land. One thing the Belgian and American examples have in common is that usually the best way to find them is to visit the respective brewery.

### **Drinking in the States**

While Belgium is a small country, the United States is not. Breweries making types of wild beers stretch from sea to shining sea. Lest you get the impression of a secret underground society of wild beer producers hundreds of members strong, let me qualify that last statement by saying that the United States has fewer producers than Belgium has within its considerably tighter borders.

Many unique beers are produced in Belgium by some very obscure breweries. At first glance, some breweries in the United States may appear unlikely producers of wild ales, but many secrets often lie within both fashionable metropolitan brewpubs and colorful rural microbreweries. You won't find any of these products available far from the brewery of origin. They are almost always available in bottles and often only at the brewery.

On the East Coast, and receiving many accolades, is Dogfish Head Brewing of Milton, Delaware. This brewery began life as a brewpub in the Atlantic oceanside town of Rehoboth Beach in June 1995, before opening as a microbrewery in nearby Lewes and moving to the current location in 2002. Founder Sam Calagione has always ventured more than a branch off the mainstream and has attributed Dogfish Head's propensity for unusual beers to the desire to drink something interesting during the rigorous brewing schedule on the original 12-gallon system.

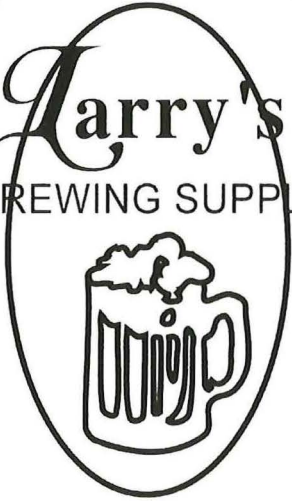
Dogfish Head's Festina Lente (7 percent abv) can be loosely described as "a peach neo-lambic." A pale beer fermented an additional three months on oak chips with *Brettanomyces* and whole, stoned, unsterilized Delaware peaches containing an indeterminate amount of wild yeast, Festina Lente has a spritzy acidity, distinct peach flavor, and late tartness.

Nestled in the vacationland of New York City dwellers, the Southampton Publick House lies near the tip of Long Island. Brewer and author Phil Markowski has consistently experimented with producing unique beers since the brewpub's inception in 1996. Markowski has produced characteristically tart and acidic Flanders red ales, oud bruins, and lambics using both stainless steel and wooden barrels and finds, quite naturally, the best results



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come when using wood. Phil feels the typical characteristics of *Brettanomyces* better develop with the use of wood.

The Iron Hill Restaurant and Brewery was founded in Newark, Delaware, in 1996 and quickly expanded into two additional locations in Pennsylvania. Brewing director Mark Edelson, having a homebrewer's background, has always enjoyed producing unique beers. Mark periodically creates lambics both with and without fruit. The lambics begin life in a stainless steel tank with a blend of yeast and bacteria,

just to make certain they are active, before finishing in wooden barrels.

New Glarus Brewing Company is located in a small, picturesque Swiss village near Madison, Wisconsin. From the inception of the brewery in 1993, Dan Carey stated he would brew some type of sourish Belgian-style beer. He did not disappoint with the production of Wisconsin Belgian Red (5.1 percent abv), produced with Door County cherries and a portion of beer aged in oaken barrels. This ruby red beer offers an intense cherry character but only modest acidity. Raspberry Tart (4 percent abv) matures for one year in oak vats with fresh Oregon raspberries, where wild yeast on the skins is allowed to ferment the sugars from the fruit. A more recent brew is New Glarus Brown Ale, aged in wood, including used port barrels.

At the foothills of the Rocky Mountains, about an hour north of Denver, is Fort Collins, Colorado, home to New Belgium Brewing Company. The brewery was opened by husband and wife Jeff Lebesch and Kim Jordan in their basement in June 1991. Two brewhouses later, their monument to the mix of American and Belgian culture, including hand-painted, ceramic cartoon tiles surrounding each brew kettle, and a brewery powered largely by wind, is a mecca for beer lovers both here and abroad. Lebesch and Jordan were already quite successful when they hired former Rodenbach brewer Peter Bouckaert to oversee the brewing operations.

Among Bouckaert's numerous contributions was the inception of Flanders-style aging for beer in large, wooden barrels. La

Folie (6 percent abv), which means "a folly" or more loosely "a business endeavor on which you will lose money," is a blend of several barrels. La Folie features a balanced acidity and lactic dryness missing from many of the sweetened, pasteurized examples currently produced in Belgium. La Folie may be pale or dark, depending on Bouckaert's current projects (or moods). One of them is *Biere de Mars* (6.2 percent abv), an ever-changing light, fruity ale that gradually includes more and more *Brettanomyces*. Another is *Transatlantique Kriek* (6.2 percent abv), blended from New Belgium Golden Ale and kriek lambic from Frank Boon. *Transatlantique Kriek* has a tart character filled with cherry flavor followed by a sweet finish.

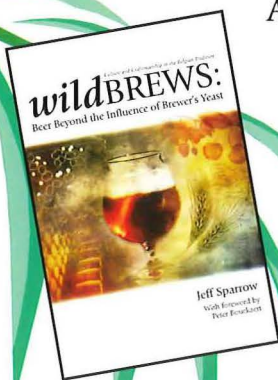
The Bristol Brewing Company in Colorado Springs opened in June 1994 in the shadow of Pikes Peak. Brewer Jason Yester and microbiologist Ken Andrews have taken the concept of lambic one step closer to its roots. They have isolated three strains of wild yeast and three strains of lactic acid bacteria from local sources including North Cheyenne Canyon, found on the skin of raspberries. Andrews produced a "local cocktail" of yeast and bacteria to inoculate used wine and whiskey barrels.

Bristol produces six to eight different beers best described as a "skull and bones series of local lambic styles," including an oud bruin, Flanders red, aged pale, strong ale, grand cru, sour wheat, aged IPA, and special cuvée. Wort fermented with *Saccharomyces* is added to oak barrels, which originally took two to three years to produce excellent beers. One long-term wish is to open a new brewhouse and dedicate the current one to the production of aged, wild beers.

A bistro in Austin, Texas, known as the Bitter End, has been an unexpected bastion of wild ales for many years. The Bitter End has produced the dry and acidic Lip Burner Lamb-Beak as well as the equally acidic and fruity Sour Prick, both roughly in the lambic-style and both Great American Beer Festival winners.

Russian River Brewing Company was originally a part of the Korbel Champagne

**At first glance, some breweries in the United States may appear unlikely producers of wild ales, but many secrets often lie within both fashionable metropolitan brewpubs and colorful rural microbreweries.**





Cellars in the historic Russian River valley in Guerneville, California. Korbelt lost interest in producing beer and in 2002 sold the name to head brewer Vinnie Cilurzo. He moved the brewery to the current location in Santa Rosa, which opened in the spring of 2004. Cilurzo's close ties to the wine industry drove him to the use of wine barrels for aging beer and fermentation with the wild yeast *Brettanomyces*. The aging cellar is proudly visible from the bar, much to the chagrin of local winemakers, who seem to live in fear of spreading *Brettanomyces* in their wineries. To reduce this risk, Vinnie has offered to allow visiting vintners to burn their clothes upon leaving the brewpub.

The line of Belgian-inspired beers available from Russian River Brewing includes Temptation, Supplication, Depuration, and Sanctification, at least for starters. Temptation (8.5 percent abv)—a Belgian golden ale aged in French oak white wine barrels—was inoculated with *Brettanomyces* after primary fermentation and added to barrels that had previously been used to ferment Chardonnay. Supplication (6 percent abv) is amber beer aged in Pinot Noir barrels with cherries and a number of wort-souring microorganisms, while Depuration is a similar beer aged with Muscat grapes. Sanctification (6.5 percent abv) Belgian blonde ale was fermented entirely with three different strains of *Brettanomyces* in stainless steel. As you would expect, all four beers exhibit unique characteristics dependent both upon the relevant microorganisms and upon the barrels in which they were aged.

The Pacific oceanside town of Solana Beach, California, just north of San Diego, might remind you more of the north shore of Oahu than of Belgium. Pizza Port was established here in 1987 as a simple pizza parlor, but a 7-barrel brewhouse was installed in 1992 and head brewer Tomme Arthur hired a few years later. Rather than be constrained by style—or anything, for that matter—Arthur chooses to develop entirely new tastes in beer.

Perhaps Arthur's greatest triumph is Cuvée de Tomme. The base wort is the dark and chewy Mother of All Beers (11 percent abv), a Belgian "quadrupel" aged in used bourbon

barrels with cherries and wild yeast and bacteria. Vintages vary in tartness, acidity, cherry flavor, oak, and bourbon character. Arthur's newest creation, produced in collaboration with Peter Bouckaert of New Belgium Brewing, is Mo Betta Brett (6.5 percent abv)—a beer of 100 percent Pilsener malt fermented entirely with one species of *Brettanomyces*. Mo Betta Brett exhibits few of the traditional esters or acidity commonly expected from *Brettanomyces*. Instead, this pale, modestly hopped beer projects an extremely fruity, pineapple character.


Along with Brian Hunt of Moonlight Brewing Company in Windsor, California, Arthur's latest project delves into the world of spontaneous fermentation. Literally a "farmhouse brewery," north of San Francisco, Arthur and Hunt hope to discover firsthand the results of spontaneous fermentation in the United States.

**Jeff Sparrow is the author of *Wild Brews*, published by Brewers Publications, and a longtime homebrewer and beer writer.**

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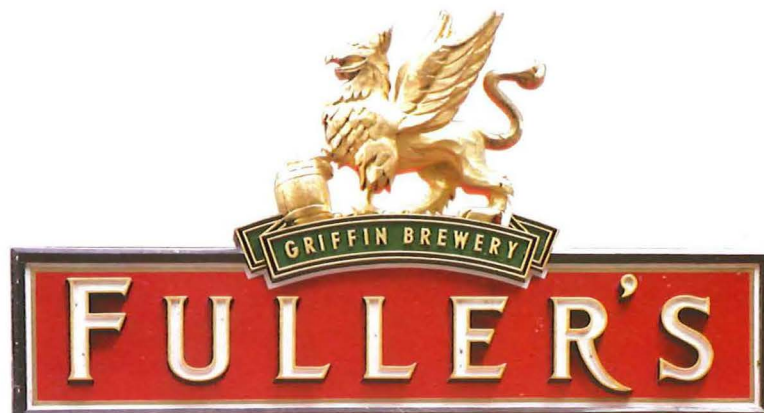
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# *The Pride of* **LONDON**



## *A Visit to* *Chiswick* **Finds Fuller's in Fine Form**

*By Dan Rabin*

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THEY'RE THE UNITED KINGDOM'S MOST DECORATED BREWERY. THEY DEvised THE ESB BEER STYLE THAT HAS BECOME A PERENNIAL FAVORITE OF NORTH AMERICAN CRAFT BREWERS. THEIR NAME IS SYNONYMOUS WITH TRADITIONAL BRITISH ALES. THEY'RE ONE OF THE FEW INDEPENDENT LONDON BREWERIES THAT HAVE MANAGED TO SURVIVE AND THRIVE WHILE OTHERS HAVE FADED AWAY.

THEY'RE FULLER, SMITH & TURNER, THOUGH THEIR PRODUCTS ARE SIMPLY CALLED FULLER'S. WHO ARE THE PEOPLE BEHIND THE TITLE, WHAT'S THE STORY OF THEIR PARTNERSHIP AND WHAT'S THE SECRET OF THEIR SUCCESS? THESE ARE QUESTIONS I HAD HOPED TO GET ANSWERED ON A RECENT TRIP TO THE HISTORIC LONDON BREWERY AND SEVERAL BREWERY-OWNED PUBS AROUND THE CITY.

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## THE HISTORY

Like many London institutions, the Griffin Brewery, as it's known, has a history that can be traced back several centuries. Fuller's sits near the River Thames in the west London village of Chiswick (*CHIZ-ick*). Records indicate that brewing has occurred on the site since the 1600s and was a thriving business for many years. But in the 1800s, brothers Douglas and Henry Thompson, schemers of dubious character, inherited the brewery and plunged the company into financial turmoil.

With assets mortgaged, and in dire need of cash, the Thompsons took on two partners in 1829. One was Philip Wood,

brother of the former Lord Mayor of London. The other was a country gentleman named John Fuller.

It was a troubled partnership from the start. Henry Thompson sold his shares in the business, squandered the proceeds and was declared bankrupt in 1831. In 1832, Wood passed away. Douglas Thompson was deeply in debt in addition to being responsible for more than a dozen dependents by three marriages.

When John Fuller died of influenza in 1839, his majority stake in the brewery—and its problems—went to his son, John Bird Fuller. In 1841, the younger Fuller successfully dissolved the partnership with Thompson and took over sole control of the troubled business.

Needing investors to keep the company afloat, Fuller enticed John Smith to leave the Romford brewery and join him in Chiswick. Smith arrived with his son, Henry, and his son-in-law, a brewer named John Turner.

The partnership of Fuller, Smith & Turner, which commenced in 1845, endured these early hardships to evolve into one of Britain's most respected brewing enterprises. While the Smiths are now retired, direct descendants of the original Fuller and Turner partnership are still active in the company's day-to-day operations.

It's interesting to note that Douglas Thompson left a permanent signature on the brewery whose reputation he had tarnished for decades. In 1816, he pilfered the name "Griffin Brewery" from a failed London brewing operation and the title has remained with the Chiswick brewery ever since.



## Fuller's ESB Clone

**Ingredients for 5 U.S. gallons  
(19 liters)**

**All-Grain Recipe**

### Ingredients

<b>9.0 lb</b>	(4.1 kg) English pale malt
<b>1.0 lb</b>	(454 g) Crystal 70° L
<b>8.0 oz</b>	(225 g) Crystal 26° L
<b>1.0 oz</b>	(28 g) Target pellet hops, 6.7% alpha acid (60 min.)
<b>0.5 oz</b>	(14 g) Challenger pellet hops, 8.2% alpha acid (15 minutes)
<b>0.5 oz</b>	(14 g) Northdown pellet hops, 7.6% alpha acid (8 min.)
<b>0.5 oz</b>	(14 g) Goldings whole hops (dry) White Labs WLP002 English ale yeast

**Boiling Time:** 90 minutes

**Original Target Gravity:** 1.054

**Final Target Gravity:** 1.010

**Approximate SRM:** 12.7

**Approximate IBUs:** 32

### Directions

Mash grains at 155° F (68° C) for 60 minutes. Ferment at 65° F (18° C). Condition for 30 days.

**Note:** Thanks to Bob Kauffman of Boulder, Colo.'s Hop Barley & the Alers homebrew club for helping formulate and test this recipe.

### Malt Extract Recipe

Substitute 8.0 lb (3.6 kg) of pale malt extract syrup for the English pale malt.

## THE VISIT

Pieces of the past are much in evidence at the historic riverside property, and not all are beer-related. Among the brewery's treasures is a prized wisteria—a climbing vine notable for prolific growth and longevity. Planted in 1815, the hardy plant has grown to impressive proportions in its 190-year existence. The oldest of the species in all of Britain, it forms an immense blanket of greenery on the brick façade of the centuries-old brewhouse.

A few clusters of purple flowers, remnants of a profuse springtime bloom, hung from the massive vine the day I visited the brewery with a small delegation of journalists and representatives from Distinguished Brands Inc., Fuller's American importer.

Though the old brewhouse has been modernized, pieces of antiquated equipment were left in place for display. The old copper (brew kettle), we were told, was installed in 1823 and was still in use as late as 1984. The brewery's closed fermenters, installed in the 1970s, reside

Photos © 2006 Jupiterimages Corporation and courtesy of Fullers and Dan Rabin.



near a vintage square open fermentation tank that is now obsolete.

## THE BEER TASTING

The highlight of the visit was a beer tasting conducted by John Keeling, Fuller's personable brewing director. We convened in the ancient Hock Room, a cavernous space that houses a collection of brewery memorabilia and a tasting bar where visitors are entertained following their brewery tours.

As we sipped our way through samples of London Pride, ESB, 1845, London Porter and Vintage Ale, our host enthusiastically shared insights about each offering. On occasion, he'd stray off-topic to exchange verbal jabs with brewery colleagues who dared to admit allegiance to soccer teams other than his beloved Manchester United.

If you've ever wondered how Fuller's has been able to win more CAMRA (Campaign for Real Ale) awards than any other British brewery, the secret, according to Keeling, is in the yeast. "Fuller's yeast is a big, bold flavor producer," he explained as we scrutinized our first offering, a cask-conditioned London Pride.



**LONDON PRIDE:** A one-time CAMRA Beer of the Year winner, Pride is Fuller's flagship beer, representing nearly three-quarters of the brewery's output. While cask versions weigh in at a session-strength 4.1-percent alcohol by volume, the bottled product is a slightly more fortified 4.7 per-

cent. Pride, states Keeling, "is meant to drink by the pint, pint after pint, so it's got to have great drinkability."

Pride maintains interest over the long haul with malt flavors that are complex but not overly assertive. Target, Northdown and Challenger hops produce a superb balance and dry finish that calls for encore after encore.



## IF YOU GO

### Fuller's Brewery Tours

Tours of Fuller's Griffin Brewery must be booked in advance and space is limited. Tours are conducted on Monday, Wednesday, Thursday and Friday at 11 a.m., 12 p.m., 1 p.m. and 2 p.m. Each tour lasts one-and-a-half hours. To book a tour, call +44 (0)20 8996 2063 and leave contact information or send a fax to +44 (0)20 8996 2079. The nearest underground station is Turnham Green.

### The Dove

A visit to this historic pub is well worthwhile following a tour of the Griffin Brewery. The Dove is located in Hammersmith, a short, pleasant walk along the Thames River from the brewery. Nearby underground stations are Ravenscourt Park and Hammersmith. For more information and a map, see [www.pubs.com/dovew6.htm](http://www.pubs.com/dovew6.htm).

### The Old Bank of England

This grand pub resides in a former bank on Fleet Street, near many London attractions. Nearby underground stations include Temple, Chancery Lane, Holborn and Blackfriars. The pub is closed on weekends. For more information and a map, see [www.pubs.com/banke4.htm](http://www.pubs.com/banke4.htm).

### One Final Note

If you are arriving or departing London from Heathrow Airport, there's an express train that runs between the airport and Paddington Station. Inside Paddington, at the top of the escalator, is a Fuller's pub named the Mad Bishop and Bear. Despite its unusual location, it's a comfortable place to have a farewell pint while waiting for a train or to toast your arrival in the city.



**ESB:** As we turned our attention to a pour of ESB, Keeling explained that Pride, ESB and easy-drinking Chiswick Bitter (3.5 percent), another former CAMRA Beer of the Year, are created using a parti-gyle brewing system. In this traditional, if out-of-fashion, process, high-gravity and low-gravity worts are collected from

first and second runnings of a single mash. The worts are then mixed in varying proportions to yield beers of the desired strength.

Though the three ales share a common origin, ESB is not merely a more robust version of its smaller siblings. ESB undergoes prolonged conditioning and is dry-hopped with Goldings, as is Chiswick Bitter. Pride is not dry-hopped. Though the house yeast is used for all the Fuller's beers, "the same yeast will perform differently at different gravities," our host reminded us.

A perennial favorite of North American ale drinkers and British beer judges, ESB has won more CAMRA awards than any other beer. It was chosen as Britain's Best Strong Ale seven times, and was three times selected as the Champion Beer of Britain.

The amber ale reveals a rich malt character and is noticeably more aggressive on the palate than London Pride. Many drinkers can pick out an orange-citrus essence, which is characteristic of the house yeast. It finishes with a hop bitterness that lingers without harshness.

At 5.5-percent abv from the cask (the bottled version is 5.9 percent), most

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Londoners would likely consider it too hefty for an extended pub session, though it's of similar strength to many North American ales.



**1845:** In 1995, Fuller's introduced a new beer to commemorate the 150-year anniversary of the partnership of Fuller, Smith & Turner. Named 1845, the ale was "based on the sort of things Fuller's would have been producing in 1845," according to Keeling.

From regal beginnings—hops for the first batch were added to the brew kettle by the Prince of Wales—1845 has distinguished itself as the U.K.'s leading bottle-conditioned beer and was twice awarded CAMRA's Champion Bottle Conditioned Beer of Britain.

Brewed with pale and amber malts to 6.3-percent abv, it pours with an attractive reddish-brown hue and a creamy, off-white head enhanced by bottle conditioning.

Hugely aromatic with fruit, malt and spicy hops, 1845 starts with an assault of

intense flavors that succumb to a satisfyingly dry finish.



**LONDON PORTER:** For reasons I find difficult to fathom, Fuller's luscious London Porter is far more popular in America than in the United Kingdom. Though the style originated in London centuries ago, draught porters are seldom served in the city's pubs today.

At 5.4-percent abv, London Porter is considered a big beer by British standards.

Like Pride and ESB, Porter is brewed with pale and crystal malts. However, the addition of brown malt and a small quantity of chocolate malt creates a dark ale with a roasty, dry character and notes of coffee and licorice. A light hopping of Fuggles rounds out the flavors while keeping an understated presence.

**VINTAGE ALE:** First released in 1997, Vintage Ale is produced in limited quantities every year. Unique packaging piques interest in the distinctive contents, with each bottle individually numbered and boxed.



While the beer is slightly tweaked from year to year, the basic recipe remains the same. At 8.5-percent ABV, this intense, bottle-conditioned brew benefits from aging and darkens slightly over time.

As we analyzed samples from 2003, Keeling noted that, in vertical tastings that he conducts from time to time, the 1997 batch consistently rates the highest. If 1997 is excluded from the mix, there is little consensus as to which release is most preferred.

Vintage is big-bodied, fruity and alcoholic. Beyond that, our tasters used a broad range of descriptors to pinpoint the nuances of this heady brew.

**FROM REGAL  
BEGINNINGS—HOPS  
FOR THE FIRST BATCH  
WERE ADDED TO THE  
BREW KETTLE BY THE  
PRINCE OF WALES—  
1845 HAS DISTIN-  
GUISHED ITSELF AS  
THE U.K.'S LEADING  
BOTTLE-CONDI-  
TIONED BEER**

My impression was of sherry and currants, while others in our entourage picked out a vinous quality along with orange, cherry and raisin flavors. Without doubt, this is a beer to be sipped and savored, discussed and debated.

### THE PUBS

Fuller's operates nearly 250 pubs throughout the United Kingdom, including many in London. Of the half-dozen I've managed to visit, two stand out as especially inviting for visitors in search of atmosphere and fresh ale.

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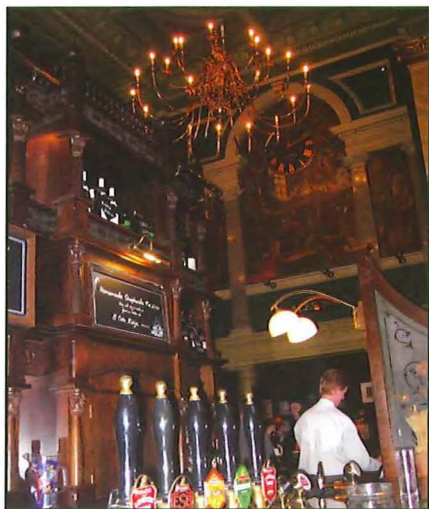


**THE DOVE:** A pleasant 10-minute walk from Fuller's, the Dove is a perfect aperitif for a tour of the Griffin Brewery. The entrance to this 17th century riverside charmer is in a narrow alleyway under a sign sporting the quirky message,

*Children may not come inside  
Although an awful lot have tried  
Come inside yourself we plead  
But keep your dog upon a lead.*

Even without youngsters and free-roaming canines, this time-weathered watering hole exudes a comfortable ambiance that only centuries of spirited ale drinking can create. Like most London pubs its age, the Dove claims a list of famous patrons with Ernest Hemingway being the most recognizable to visitors from our shores.

Near the front of the pub, a miniscule drinking space offers the chance to get up



close and personal with your mates. A framed letter on the wall confirms that the 4-foot-by-8-foot enclosure holds the Guinness record for Britain's smallest public bar room.

When the weather is favorable, tables on the outdoor riverside terrace are in short supply. Basking on the deck with a cask-conditioned ale in hand, conversations flow as effortlessly as the nearby Thames.

**THE OLD BANK OF ENGLAND:** On bustling Fleet Street, the Old Bank of England is decidedly un-Dove-like. Neither timeworn nor nostalgic, the central London pub has a history dating back barely a decade. But if the Old Bank lacks a storied past, it overflows with elegance and class.

Prior to its 1995 retrofitting, the building operated as a branch of the Bank of England. Built in 1888 in the Italianate style, the finely detailed white stone exterior presents a stately façade to passersby.

The stunning two-story interior elevates ale drinking to new heights of sophistication. Murals adorn the walls and arched windows are framed with heavy curtains. An immense central bar rises toward an ornate ceiling from which brass chandeliers are suspended.

If you feel like escaping from the crowds in this popular pub, a perch on the upstairs

balcony offers an opportunity to survey the masses mingling below and contemplate the irony that an old pub on the site had to be relocated for the bank to be built. What goes around comes around, I suppose.

**Travel writer and homebrewer Dan Rabin is a longtime member of Hop Barley and the Alers homebrew club in Boulder, Colo.**

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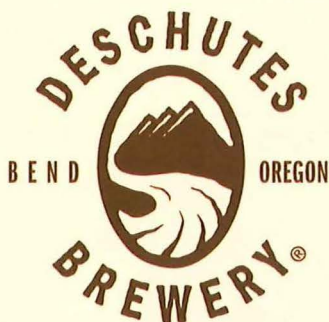
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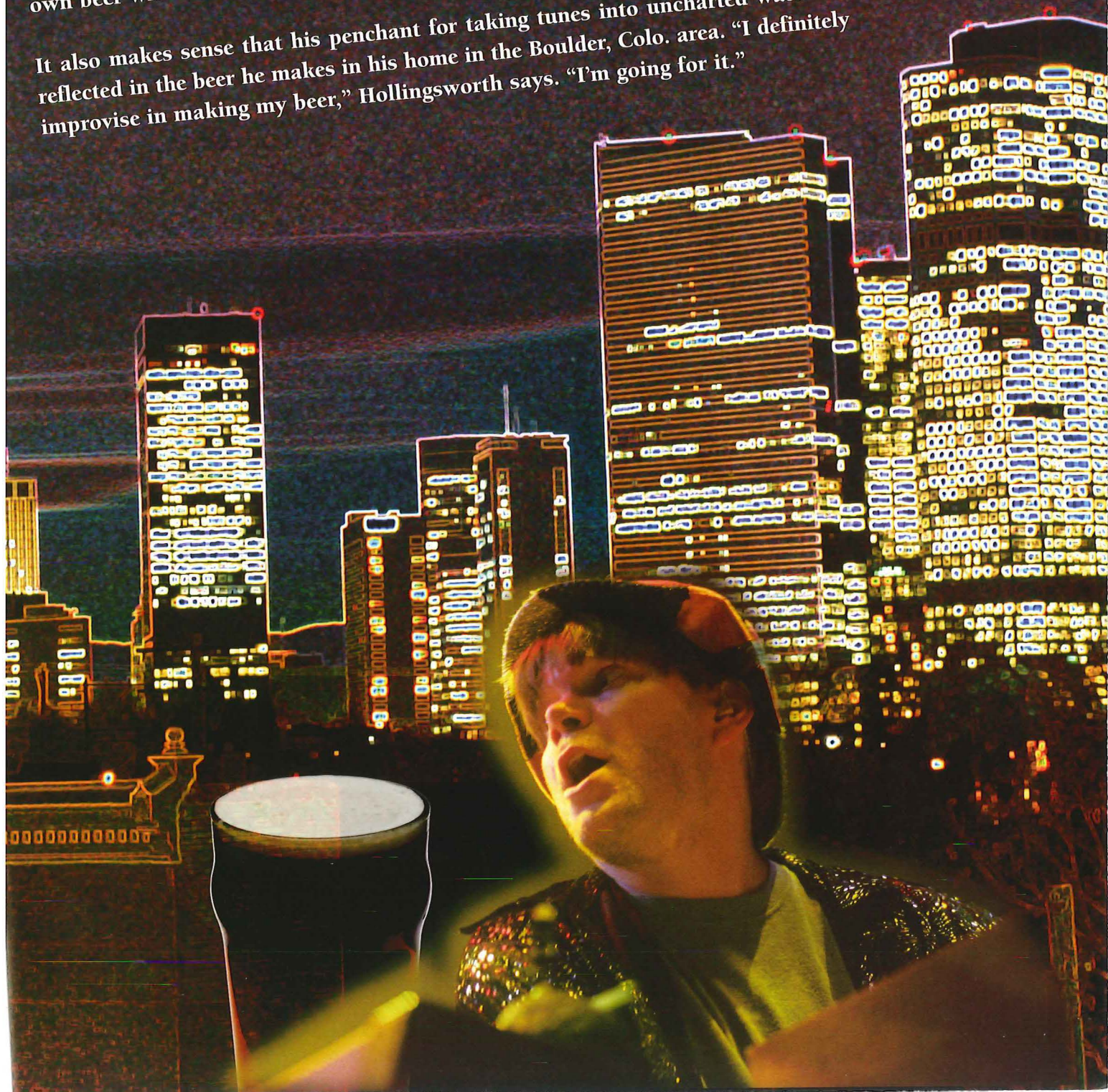
String Cheese Incident's Kyle Hollingsworth  
Makes Music and Homebrew  
by Marty Jones





**K**yle Hollingsworth's band, String Cheese Incident, has blazed its successful trail with a love of jamming and a staunch do-it-yourself ethic. Hollingsworth is also a big fan of great beer, so it makes sense that he'd brew his own beer when he's not on the road.

It also makes sense that his penchant for taking tunes into uncharted waters is reflected in the beer he makes in his home in the Boulder, Colo. area. "I definitely improvise in making my beer," Hollingsworth says. "I'm going for it."





Hollingsworth and his band mates in String Cheese Incident (guitarist Bill Nershi, bassist Keith Moseley and violinist/mandolinist Michael Kang) have been going for it as well. Founded in 1993, the band started out playing small venues in the Boulder area. It soon hit the road and began what has become one of the most successful indie-band track records in the United States.

Today String Cheese has sold more than 590,000 CDs of its hybrid blend of bluegrass, jazz, rock and jam, songs that become multi-minute excursions in concert. In 2004, the band played before more than a half-million people in the nation's best venues and in several countries. Along the way, SCI has exemplified an unmatched do-it-yourself philosophy. The band records for its own label, and has launched a variety of in-house businesses that handle the group's booking, ticket sales and travel arrangements for the band and its fans.

Indeed, SCI has proven to be the jam band that takes care of business. But the jamming Hollingsworth does behind his keyboards is a bit different than the stretching out he does over his brew pot.

"When I improvise in my music, I come at it from a very learned space," he says. "With music, I've got all my scales behind me, I've got my background. But when it comes to making beer, I don't have that

background as much. So when I improvise it's not always as good, and it may not work. It's a good thing to know all of your ABCs. If you're a master brewer, it's easier to experiment."

For the past few years, Hollingsworth has spent his down time working to improve his brewing chops. He grew up in Baltimore, Md., where his older brother made homebrew. Hollingsworth, intrigued with the beer and the process, later brewed with his brother. The pair started out brewing pale ales and porters, and one of their early batches was a beer infused with sassafras roots from trees in their neighborhood.

The pair pulled small sassafras saplings (they're a ubiquitous tree in the Mid Atlantic and South), peeled the bark from the roots and made a tea with them. They then added the tea to a pale ale recipe. "I'd like to try it again, but there's no sassafras out here," Hollingsworth says.

**"With music, I've got all my scales behind me, I've got my background. But when it comes to making beer, I don't have that background as much. So when I improvise it's not always as good, and it may not work. It's a good thing to know all of your ABCs."**



**CURRENT MEMBERS OF STRING CHEESE INCIDENT.**

Left to Right back:  
Keith Moseley, Michael Travis,  
Kyle Hollingsworth  
L to R front:  
Billy Nershi, Michael Kang,  
Jason Hann

While Colorado may hold no sassafras, it does hold a wealth of great beer culture and beer makers. Through his band and its hefty popularity in the jam-music-loving Boulder area, Hollingsworth has made some choice connections with those brewers.

Bruce Payne was a soundman in Durt, a Boulder-based band of Hollingsworth's that preceded String Cheese Incident. The pair discovered their mutual affection for homemade brew when they worked together. Payne was heavy into brewing at the time, and active in Hop Barley & the Alers, a local homebrewing club. "I was brewing a lot of beer then," Payne recalls. "Kyle was a kit brewer back then."

"Bruce pointed out that I can't wash out the bottles with my finger anymore," Hollingsworth says. The pair's first brew together was a batch of Kyle's Brown Birthday Brew. It was the first batch Hollingsworth had made using steeped specialty grains, a move suggested by Payne. That beer, and others made with help from Payne, renewed Hollingsworth's interest in homebrewing.

Like many homebrewers, his taste in small-batch beer had progressed faster than his ability to make it. "For so many years," Hollingsworth recalls, "I made very OK beer. The beers were better than Coors and Budweiser, but they hadn't really done anything for me."

But new brewing methods and ideas from his pals helped ramp up the quality and his desire to make more of it. Today Payne gets out to see Hollingsworth play three to four times a year, they hit brewpubs together a half-dozen times each year, and the pair get together and brew a couple times a year.

Last November for Teach a Friend to Homebrew Day, Hollingsworth brought a few friends to Payne's house, where they all brewed their own batches of beer. Hollingsworth recently made a batch of Solstice Spice, a spiced beer based on a popular recipe of Payne's.

"I love drinking his homebrew now," Payne says, noting he couldn't say that



when the two first started brewing together. "The key to keeping people interested in homebrewing is to make their beer taste better, whether it's through better ingredients or better processes."

Hollingsworth recently embraced both of those factors when he made a batch of beer cloned after the recipe for Boulder Beer's hoppy Hazed & Infused. Staff at What's Brewin', a Boulder homebrewing store, helped him with the recipe formulation. "There was an incredible amount of hop drops in the beer," Hollingsworth says, "and I had never done that before. But it turned out great and tasted awesome."

"Now I'm working at getting better and finding out what works, to make better beer," Hollingsworth says. "I'm stepping it up." His recent beers included a vanilla porter inspired by one he tried at a local Rock Bottom brewpub. Like any good home zymurgist, Hollingsworth called the beer's maker, picked his brain and went after making a version of it.

One brewer he has become friends with is Mike Altman, the former award-winning brewer of Boulder's Mountain Sun Pub and Brewery. Altman met Hollingsworth through the brewery when the band played shows there in its early days. The band and the pub have remained pals to this day.

Before he left Mountain Sun and started his own brewpub (Iron Springs Pub & Brewery in Fairfax, Calif.), Altman helped Hollingsworth with a larger-scale brewing project: a custom beer for Hollingsworth's wedding to his wife, Tanya. Altman hipped the musician to his recipe for Matrimony Ale, a beer that Altman brewed at Mountain Sun.

A refreshing, accessible beer made with a dose of rye, Altman knew it was perfect for summer nuptials. "For a wedding, you need a crowd-pleaser," Altman says. The pair brewed it together (all 150 gallons' worth) on Mountain Sun's system. "Dragging the grains out of my 5-gallon system is a lot different than dragging the grain out of theirs, with a rake," Hollingsworth recalls. "It was serious work."

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## Solstice Spice

Partial Mash recipe by Bruce Payne

Recipe for 5 U.S. gallons (19 liters)

### Ingredients

<b>8.0 lb</b>	(3.62 kg) pale extract
<b>1.0 lb</b>	(.045 kg) amber Belgian candi sugar (substitutions in order of preference: pale candi sugar; corn sugar)
<b>1.0 lb</b>	(0.45 kg) Belgian Special B malt
<b>1.0 lb</b>	(0.45 kg) Vienna malt
<b>1.0 lb</b>	(0.45 kg) Munich malt
<b>1.0 lb</b>	(0.45 kg) 75 L crystal malt
<b>0.5 lb</b>	(25 g) flaked barley (for head retention)
<b>Hops</b>	
<b>1.0 oz</b>	(28 g) Chinook hop pellets (12.2 alpha)
<b>1.0 oz</b>	(28 g) Saaz hop pellets
<b>1.0 T</b>	gypsum (added to mash water)
<b>0.5 tsp</b>	Irish moss (improves clarity)
<b>0.25 tsp</b>	dried ginger (I have tried with fresh ginger, but this is far too risky as ginger potency varies)
<b>1.0 tsp</b>	nutmeg
<b>1.0 tsp</b>	cinnamon
	zest from 1/2 orange
	London ale yeast (Wyeast 1028)

**Original Target Gravity:** 1.084

**Final Target Gravity:** 1.027

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**Note:** This is a 10-gallon recipe scaled down to 5 gallons. This is a partial mash version of the steeped grain recipe that Kyle uses. For modifications for the steeped grain version, add 2 pounds pale extract, remove Vienna and Munich malts. For all-grain version, replace pale extract with 10 pounds pale malt.

### Directions

Mash grains in 2 gallons of water at 156° F (69° C) for 30 minutes. Sparge with 2 gallons of 180° F (82° C) water.

For steeping grains: put grains in bag in the amount of cold water you normally use for brewing. Heat the water to 150-160° F (66-71° C), let sit 5 minutes, remove grains.

For all-grain: mash in 4 gallons water at 156° F (69° C) for 45 minutes, sparge with 3 gallons 180° F (82° C) water.

Add extract and candi sugar and bring to a boil. Add Chinook hops and boil for 45 minutes. Add spices and Irish moss and boil 15 minutes more. Add Saaz hops at end of boil. Chill and pitch yeast; ferment at 65° F for two weeks. Age at least two more weeks before drinking.

Altman has brewed many versions of Matrimony for his friends and coworkers over the years, and he says the beer has helped send many a friend off into the land of the happily married. It may also have some special powers: "I tell people, 'We take no responsibility for any children that come about after drinking the beer.'"

Part of its special ingredients is a mixture of herbs added to the beer. "It's all about the tincture," says Altman, who was a chef before becoming a brewer. The tincture includes ginseng, damiana, sarsaparilla, rose hips, valerian root and wormwood, used in small amounts "to add a special essence" to the beer.

Altman helped Hollingsworth tweak the recipe a bit for his tastes, and turned Hollingsworth on to one more addition to the beer: a meaningful keepsake of Tanya's, placed into the kettle. "It adds a little voodoo to the beer," Altman says.

The novel practice is a result of Altman's early years brewing for McMenamin's in the Northwest. In preparation for the brewing of the pub's Anniversary Ale, Altman says founder Mike McMenamin would bring bottles of obscure beers and spirits to the pub. The staff would taste and enjoy them, and then pour a mixture of the beverages into a bucket and add them to the kettle of the company's annu-



al celebration beer. Altman has taken the idea to another level with the addition of personal items and herbs.

"It was a special thing," Hollingsworth says, noting that the medallion of his wife's that he dropped into the Matrimony Ale survived the brewing process just fine.

Altman feels that homebrewing fills a need for Hollingsworth. "It gives him another creative outlet when he's not on the road," Altman said. "I think that's one of the things he grooves on."

**"There's nothing like a delicious beer after a great night of music. It's our favorite way of winding down."**

"I think there's a tie between the grassroots aspects of beer and its history, and the grassroots aspects of music and its history," says Altman, who books jam and other acts into his brewpub. "A lot of people who are in the jam band scene are really into the brewpub scene as well. There's nothing like a delicious beer after a great night of music. It's our favorite way of winding down."

Hollingsworth gets to wind down with his brew kettle and recipes about four times a year. "I'm kegging, being more aware of temperatures, and when to add hops at different times," he says.

On the road, he says he's enjoying the kind of fellowship and growth among musicians that he has enjoyed among beer makers. String Cheese has toured with Spearhead, Umphrey's McGee and other bands, and the band members often sit in with each other's bands on tour. "It brings new flavors to the music," Hollingsworth says.

Beer, like the music of his band and his peers, is more flavorful when made in small batches. "Mainstream beer is like pop-music beer. It's Britney Spears beer," Hollingsworth says. The fact that his band doesn't reach the audience that Spears and her musically diluted peers have doesn't trouble him. "It means you have maybe a smaller crowd," he says, "but it's a crowd of intense listeners. I'd rather have that steady fan base."

And he'd rather have a carefully crafted beer, too. He looks for local beers when the band travels, and the band's contract calls for a six-pack of local micro beer for him. "If we're in Wisconsin, it's Bell's. If we're in the Northwest, it's Deschutes Brewery.

"Life really is too short to drink bad beer," he says. "Why waste the calories if the beer sucks? I don't want to just drink any beer, I want it to be good. Otherwise it's a waste of my brain cells, and a waste of my waistline."

**Marty Jones splits his time between being a "man about foam," writing for and about the craft beer industry, and playing beer-minded music in and around Denver.**



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“What do you have that’s kind of amberish, not too hoppy and easy drinking?” Whether bartending or serving beers to friends at home, that is a common request. Sometimes a hop monster IPA is too much, but a crisp lager or wheat beer isn’t enough. That’s when it’s time to reach into the grab bag of amber ales for something that’s just right.

That is where we have sent our panel of expert Beer Judge Certification Program judges this issue—into the land of amber. We start with one of the classic Old World amber ales, extra special bitter, more commonly known here in the United States as ESB.

ESBs are the strongest of the English pale ales, with more malt, hops and alcohol than either ordinary or best bitters. The hop-malt balance may tip ever so slightly to the hop side, although a firm malty background is a must. Colors can range from golden in some cases to a deep copper with the darker versions having more crystal malt character.

You can read more on the classic English ESB, Fuller’s, in Dan Rabin’s story on page 32. In England, only Fuller’s uses ESB as a brand name. Here in the States, there are a number of brewers using the ESB moniker. For our panel, we have chosen BridgePort ESB, a brew that stays true to its English roots with the use of imported Goldings hops—a pound per barrel, according to the company Web site.

BridgePort, in Portland, Ore., is better known for its India Pale Ale, which has won the Brewing Industry International Award for top beer in its category in England. But brewmaster Karl Ockert takes just as much pride in his ESB.

Like ESBs that were an outgrowth of the English pale ales and bitters, American amber ales followed the development of American pale ales. Brewers found they could add richer malt character with the addition of more crystal malt, yet still keep the crisp hop bitterness and flavor they sought. In the early days of the craft beer movement, a brewpub’s amber or red ale often became the flagship beer, occupying the space between a light pale ale or lager and more robust porter or stout.

Such was the case with North Coast Brewing’s Red Seal Ale. North Coast, in Fort Bragg, Calif., started in 1988 as a small brewpub with Scrimshaw Pilsener, Red Seal and Old No. 38 Stout. The brewery has gone on to add many beers, including the famed Old Rasputin Russian Imperial Stout, but Red Seal continues to be the flagship.

Our expert panel includes David Houseman, a Grand Master II judge and competition director for the BJCP from Chester Springs, Pa.; Beth Zangari, a Master level judge from Placerville, Calif. and founding member of Hangtown Association of Zymurgy Enthusiasts (H.A.Z.E.); Scott Bickham, a Grand Master II judge from Corning, N.Y., who has been exam director or associate exam director for the BJCP since 1995; and Gordon Strong, a Grand Master II judge and principal author of the new BJCP Style Guidelines who lives in Beavercreek, Ohio.



## ON THE WEB

### BJCP Style Guidelines

[www.bjcp.org](http://www.bjcp.org)

### BridgePort Brewing

[www.bridgeportbrew.com](http://www.bridgeportbrew.com)

### North Coast Brewing

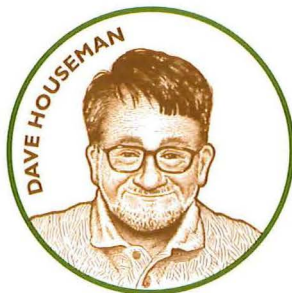
[www.northcoastbrewing.com](http://www.northcoastbrewing.com)





Red Seal Ale, North Coast Brewing Co., Fort Bragg, Calif.  
BJCP Category: 10B American Amber

## THE JUDGES' SCORES FOR RED SEAL



**Aroma:** Moderately high spicy and floral hop aroma. Quite a bit of alcohol evident in the aroma of my tulip glass. Pineapple esters abound; perhaps fermentation temperature was a bit high. No diacetyl. My sample had slight vegetal/cabbage aroma, DMS that faded as the beer warmed in the glass. Good balancing maltiness with hints of caramel malt. There's an overall light, bright crispness to the aroma that's quite pleasing. (10/12)

**Appearance:** Amber color is appropriate but at light end of the American Amber Ale category. Considerable chill haze that cleared as the beer warmed to room temperature. Thick, long-lasting head was quite inviting. (2/3)

**Flavor:** Assertively high hop bitterness. Spicy, peppery hop flavor. Very well balanced with grainy, chewy malt backbone. Caramel malt character and a touch of roasted malt. Bitterness lingers heavily in aftertaste; a bit more than style calls for. No DMS. No diacetyl. Some indistinct yeast esters help to solidify Red Seal as an ale. Alcohol in the aroma doesn't come through in the flavor. (15/20)

**Mouthfeel:** Medium bodied. Mouthfeel is on thin side of medium where the style really should be a bit more malt accented. Medium carbonation is fine. Astringency from hop tannins is over the top for the American Amber Ale style; otherwise smooth. Not particularly warming from alcohol. (2/5)

**Overall Impression:** While a very drinkable beer, the accent on hops rather than malt and the lighter body seem to better position this beer as an American Pale Ale rather than an American Amber Ale. Still this is very enjoyable, particularly for the hop-head. (8/10)

**Total Score: (37/50)**



**Aroma:** Firry (as in Christmas tree fir) with citrus Cascade-y hops dominating malt aromas. No diacetyl or esters but a very slight sulfur note in the background, like the smell of raw egg. What malt comes through is richly caramel, but detected at low levels. (7/12)

**Appearance:** Deep golden amber with off-white head. A few uneven bubbles. The head still leaves ring of lace on the glass as the level goes down. Very clear, almost brilliant. (3/3)

**Flavor:** My first impression is of crystal caramel malt with a citrus, firry hop flavor and maybe a little pine. Hop bitterness is actually lower than I expected from the aroma. Mid palate a "brothy" flavor similar to eggy aroma creeps in—maybe a little DMS? Balanced, but the egg notes are bothersome. (15/20)

**Mouthfeel:** Medium full body with somewhat soft carbonation. Hop bitterness lingers, and with some alcoholic warmth leaves a tingling sensation on the lips. Not astringent. Quite pleasurable. (5/5)

**Overall Impression:** Crystal caramel maltiness provides support to the firry hop flavor. The hop character is assertively bitter without being aggressive and lingers just enough. The eggy character is not one I normally find in this beer—Red Seal being a regular in our home—and I find it a little troubling. Regardless, this beer goes well with vegetarian chili, any vindaloo or a plate of garlic fries. (6/10)

**Total Score: (36/50)**



**Aroma:** Grainy, bready aroma at first followed by earthy hops with nutmeg, citrus and pine needles. Esters are light but contribute to the background. Good malt complexity—toasted notes with honey and toffee. Overall nature is subtle, but balanced. (9/12)

**Appearance:** Copper/bronze color, excellent clarity. Solid carbonation forms a long-lasting head with uniform beading. (3/3)

**Flavor:** Balance is toward hop bitterness, which lingers nicely in the finish. The malt flavors at the forefront are consistent with the aroma, but it finishes a little dry and thin. Hop character is mainly earthy and spicy; citrus notes are subdued. Graininess accents the bitterness in the finish. (15/20)

**Mouthfeel:** Good carbonation and creaminess. Body is a little thin, perhaps from being a little overattenuated. Slight astringency is linked to the husky phenols that give the grainy aroma and flavor. (3/5)

**Overall Impression:** Good example of the style, and pleasant to drink. The assertive bitterness is geared toward West Coast palates, but a little more malt richness with less graininess would improve the balance. A little more fresh hop character—particularly citrus—would add to the complexity of the aroma and flavor. (7/10)

**Total Score: (37/50)**



**Aroma:** Wow—I smelled the hops from a foot away! High hop aroma—citrusy, piney, pungent, grassy, fresh, dry hop-like. Clean American yeast character; no esters. Background malt, very subtle, slightly grainy, with some sweetness as it warms. Could use more malt complexity and depth. Alcohol mixes in with hops. (9/12)

**Appearance:** Medium amber color—seems rather pale. Big creamy, long-lasting, slightly off-white head. Quite clear but not brilliant. (2/3)

**Flavor:** Strong bitterness straight through palate into finish. Clean, subtle malt in background—grainy, very light caramel. Dry finish. Clean yeast character with very few esters. Moderate hop flavor; not overpowering, citrusy, piney, and increasing as it warms. American character apparent. Alcohol noticeable and adds to dryness. (14/20)

**Mouthfeel:** Medium body, seems lighter because finish is so dry. Moderate alcohol warmth. Medium to medium-high carbonation. Alcohol is a bit much. (4/5)

**Overall Impression:** More like a West Coast-style American Pale Ale, I think. Hop-focused and lacking malt complexity. Alcohol heat could be better controlled through additional cellaring. Great hop character but malt is somewhat disappointing, and alcohol runs a bit wild. Very clean, but age it to let it mellow out. Probably goes with a lot of food, but I was thinking of brewpub-type deep fried or spicy appetizers. The hops can stand up to a lot of strong flavors. (7/10)

**Total Score: (36/50)**





## THE JUDGES' SCORES FOR BRIDGEPORT ESB



**Aroma:** Very fruity but mainly of bananas, almost weizen-like. This was very distracting. Lots of alcohol wafting from my tulip tasting glass. No diacetyl. No hop aroma; this was very unexpected, both of the style and this beer. There's a dull, oxidized malt character. Perhaps this is an old sample? (6/12)

**Appearance:** Chill haze that never cleared. Thick, chewy head that was quite long lasting. Very carbonated (high for an ESB but OK). Amber color was right on target. (2/3)

**Flavor:** Soft maltiness with balancing and assertive hop bitterness, particularly evident in the finish. Little hop flavor however. This was out of style and character for BridgePort. Fruity esters present in flavor as well as aroma, especially the banana character that is really out of place. Alcohols evident. Low diacetyl level, OK. Some dull, caramel malt character that was indicative of oxidation. Was this an older sample that was beyond its shelf life? (11/20)

**Mouthfeel:** Medium body, good. Slight astringency in mouthfeel from high hopping rates, OK. Smooth otherwise. Some alcohol warming. (4/5)

**Overall Impression:** An older sample that lacked brightness, crispness and freshness that one expects in an ESB. The lack of hop flavor and aroma and the muted caramel notes would support this possibility. The banana character may have been from an errant bug or warm storage damaging the beer. Not a particularly exciting sample in this condition. There was no date code but this bottle may have been older than the product's shelf life. (5/10)

**Total Score: (28/50)**



**Aroma:** Crystal caramel malt sweetness with mild fruity esters of ripe Bartlett pear skin. Moderate hop aroma of noble type, spicy floral, like some rose varieties. No off aromas. (8/12)

**Appearance:** Deep golden color with slight haze. Creamy persistent head, off-white with tiny even bubbles, creates lovely lace on sides of the glass. (3/3)

**Flavor:** Toasty-caramel malt flavors support hop flavors of cinnamon-peppery rose. Lingering bitterness more West Coast American than British. Caramel malt lingers as well, adding richness and sweetness, providing backbone for hop character that evolves to ruby grapefruit. (16/20)

**Mouthfeel:** Medium full body; not heavy or cloying. Carbonation is firm, not soft, not gassy or prickly. Finishes with slight alcoholic warmth and lingering hop bitterness. (4/5)

**Overall Impression:** Clean beer with a caramel sweet malt backbone to support the spicy grapefruit hop character. Seems skewed toward the West Coast American style in hop character, but stands up to some British examples. A great first beer of the day, this would go well with "pub" foods like fish and chips or Scotch eggs. (7/10)

**Total Score: (38/50)**



**Aroma:** Fruit and hoppy, with malt playing a secondary role. Esters are predominantly pear and strawberry, and caramel malt and spicy hops combine to give notes similar to some pipe tobaccos. It doesn't have the mineral edge of a classic British ESB like Fuller's but is still quite pleasant. Some alcohol is evident as it breathes. (9/12)

**Appearance:** Beautiful in all respects. Creamy, linen-white head with uniform beading. Deep copper/ruby color with pristine clarity. Head retention is impressive. (3/3)

**Flavor:** Good interpretation of an ESB—crystal malt is evident but is not excessively roasty. Esters are also apparent, and hops lend an earthiness with a hint of citrus. Flavors seem a little muted, perhaps from oxidation. Finally, long hop bitterness is a bit more pronounced than Fuller's but pleasant and within style boundaries. (15/20)

**Mouthfeel:** Slightly metallic, but is not the same character as that imparted by Burtonization. Slight alcoholic warmth is appropriate, but body could be creamier with more dextrins. (3/5)

**Overall Impression:** Good interpretation of the ESB style, which does allow quite a bit of latitude. This version leans toward hop bitterness and fermentation character, while others emphasize the malt more. The flavors seem a little muted, but the beer could be brightened up by using water salts to mimic the mineral character of Burton. This beer would do well if served from a beer engine. (8/10)

**Total Score: (38/50)**



**Aroma:** Sweet caramelly malt up front with an earthy, floral hop nose. The malt has a bready, biscuity character. Both hops and malt are fairly strong and in balance. Soft fruity esters in background. Hops linger and develop a piney quality. A little bit of alcohol is noticeable as it warms but is mixed in with the malt. Nothing off but not quite as clean and rich as expected. (9/12)

**Appearance:** Well-formed off-white head—creamy, frothy, persistent. Medium amber color—fairly light. Slight haze—could be clearer. (2/3)

**Flavor:** Strong grainy, malty flavor initially with a bready, toasty, lightly toffee quality. A strong hop bitterness develops mid-palate and lingers into the long, dusty, dry finish. Herbal, floral hop flavor is prominent and blends with malt flavors. Restrained caramel. Dry. Alcohol flavors present. A sulfury mineral profile adds to the dryness. Very light esters. Bitterness tends to overshadow the malt. (14/20)

**Mouthfeel:** Medium-full body (nicely done). Moderately warming alcohol present. Medium to medium-low carbonation. Dryness hits most of palate. Alcohol seems a bit over the top—it enhances the dryness. (3/5)

**Overall Impression:** Could use a bit more sweetness in the finish and a caramel richness in the flavor (or just more malt complexity; it's too grainy). Quite dry and mineral. Perhaps a bit too much sulfate—less would let the malt step up more. Some additional age might smooth out the alcohol; it's a little too hot now. Maybe mash higher and/or use more/darker crystal malts. Tasty nonetheless. (6/10)

**Total Score: (34/50)**





# Another Round, Please

*Note: I've received a number of inquiries recently about lower alcohol beers and why they aren't featured so much in discussions about homebrewing. I thought I'd share with American Homebrewers Association members/readers the thoughts I expressed to the professional craft beer community a year ago. Still relevant, even to homebrewers.*

I love hop-infused India pale ales. I savor the complexity of wood-aged imperial stout. I get happy as I enjoy a wonderfully complex Belgian-style tripel. If you offer me a super double altbier or German-style Maibock, you'll see a big grin crawl across my face. There is obviously no end to the adventure and enjoyment of American craft beer for me.

When I recall my best beer experiences in England, I reminisce about Britain's recent loss of Henley on Thames' Brakspears Ordinary Bitter and the wonderful pint-filled sessions with just Ordinary. It was a less than 4-percent ale that exploded with real beer flavor. In Ireland, I savored and downed many a draft stout, also less than 4-percent alcohol by volume. In Germany the most comforting and memorable experiences have always been over craft and locally made German-style helles and kellerbier, often barely 5-percent alcohol. In Scotland it was pint after pint of "low-shilling" ale. All these beers were spectacularly fresh and relatively low in alcohol. Furthermore I drank several pints or liters and actually remembered the ambiance, camaraderie, food and conversation. There was always a choice of these great, flavorful craft made beers. There was also a lot of upfront pride in being able to offer them.

In my travels through America I have delightfully indulged in hopped up imperials and huge, fruity and complex strong specialties. I'm often on the move, visiting

## Coriandered Mild Brown Ale

### All-Grain Recipe

### Ingredients for 5 U.S. gallons (19 liters)

<b>5.0 lb</b>	(2.3 kg) Pilsener malt
<b>12.0 oz</b>	(340 g) wheat malt
<b>12.0 oz</b>	(340 g) Crystal malt (40 L)
<b>4.0 oz</b>	(113 g) chocolate malt
<b>0.75 oz</b>	(21 g) Vanguard whole hops 5% alpha (3.75 HBU/105 MBU), 60 minute boiling
<b>0.5 oz</b>	(14 g) Glacier hops 6% alpha (3 HBU/84 MBU), 30 minute boiling
<b>1.0 oz</b>	(28 g) Mt. Hood hops 4% alpha (4 HBU/112 MBU), 10 minute boiling
<b>1.25 oz</b>	(35 g) freshly crushed corian- der
<b>0.25 tsp</b>	(1 g) powdered Irish moss
	Your favorite ale yeast
<b>0.75 cup</b>	(175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for kegging

**Target Original Gravity:** 1.040 (10 B)  
**Approximate Final Gravity:** 1.010 (2.5 B)  
**IBUs:** about 25  
**Approximate color:** 15 SRM (30 EBC)  
**Alcohol:** 4% by volume

### Directions

A step infusion mash is employed to mash the grains. Add 7 quarts (6.7 liters) of 140° F (60° C) water to the crushed grain, stir, stabilize and hold the temperature at 132° F (53° C) for 30 minutes. Add 3.5 quarts (3.3 liters) of boiling water and bring temperature up to 155° F (68° C) and hold for about 30 minutes. Raise temperature to 167° F (75° C), laut and sparge with 3.5 gallons (13.5 liters) of 170° F (77° C) water. Collect about 5.5 gallons (21 liters) of runoff. Add 60-minute hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes. When 30 minutes remain add the 30-minute hops. When 10 minutes remain add the 10-minute hops and Irish moss. When 1 minute remains add the 0.75 oz (21 g) of crushed coriander seed. After a total wort boil of 60 minutes turn off the heat and place the pot (with cover on) in a running cold-water bath for 30 minutes. Continue to chill in the immersion or use other methods to chill your wort. Strain and sparge the wort into a sanitized fermenter. Bring the total volume to 5 gallons (19 liters) with additional cold water if necessary. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Ferment at about 70° F (21° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the remaining 0.5 oz (14 g) crushed coriander seed. If you have the capability, "cellar" the beer at about 55° F (12.5° C) for about one week.

Prime with sugar and bottle or keg when complete.





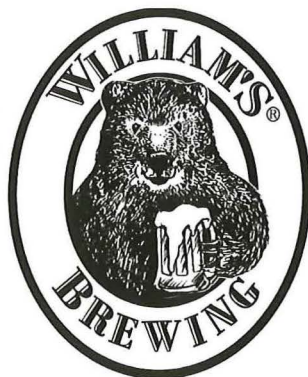
several breweries on a tour, tasting, sipping, experiencing. Yet when I really want to settle in, I seem to find myself with very few choices.

For me, settling in would be having two or three beers with a meal, conversation, laughter and celebration. Maybe even four beers. Five? Well, I used to have five but not so much any longer. My choice turns to full-flavored, lower alcohol ales and lagers. No, my preference has not migrated toward the tasteless cousins of beer called "American light lager." I'm seeking flavorful session beers like those I have experienced so often in Europe. Ordinary bitter, helles, mild and draft stout types that have a well-proportioned balance of hops, malt, flavor, character, complexity and, yes, alcohol.

Yes, I'm getting older. Yes, I continue to enjoy the taste of beer. Yes, I desire to quench my thirst. Yes, I usually would like to have more than one. When I'm offered a homebrew, or I step up to a bar that is serving fresh craft beer, more often than not there are no session ales to choose from. Come to think of it, even if there is a choice of perhaps a low alcohol English-style bitter, usually it's not a beer that the brewer takes great pride in. The pride is reserved for all those big and hugely wonderful ales, lagers and specialties.

What about my thirst? What about the pride of brewing a wonderfully complex 4-percent ale full of hop and malt personality—without being over the top? These are the kind of beers I remember. Why? Because I buy several of them. Because I spend time enjoying them. Because I'm able to enjoy food and beverage during the distance of the evening. Serve me a hugely hopped barley wine and you may find me nursing it for an hour, thirsting for the session beer that will never arrive.

Am I missing something here? I'm not in the business of selling beer. Perhaps existing customers love the big, bold, wonderful beers and there's a need for brewing them. How many do they have? I love them too, on occasion. I wonder if I speak for the customer that isn't there? I wonder



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## Attention AHA MEMBERS

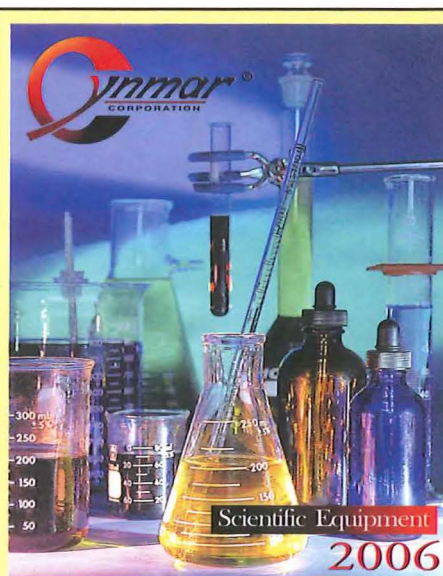
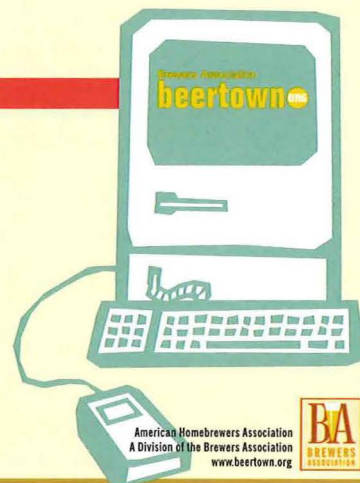
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if I speak for the customer that would love to have two or three beers and not feel that one is enough?

Beer for lunch? I'll be more likely to have one if it weren't at 6.5-percent alcohol. I might even have two—if it had character and represented the pride of the brewer.

There's nothing to be ashamed of in offering these beers. Many beer cultures have been founded on characterful "session beers."

Maybe I'm getting too old and you can tell me to shut up. Maybe big beers are the "in" thing and I'm not in touch. If that's the case, I won't be offended, though I'll continue to seek the quintessential ordinary bitter or the American Ordinary I had at Eugene, Ore.'s West Brothers Brewery, full of earthy Fuggles, Goldings, Cascades and complexly satisfying malt character. Or a countryside, small brewery-style German helles or kellerbier. I've had many a Utah-brewed 3.5-percent all-malt stout having more character than internationally famous high-octane versions.

Are homebrewers and craft brewers drifting away from the premise of flavor and diversity in favor of big, bold and strong? Are we abandoning the very roots that provide us with beer culture?

## Coriandered Mild Brown Ale

### Malt Extract Recipe

#### Ingredients

for 5 U.S. gallons (19 liters)

<b>3.5 lb</b>	(1.6 kg) very light malt extract syrup or 2.8 lb (1.3 kg) very light DRIED malt extract
<b>1.5 lb</b>	(680 g) wheat malt extract syrup
<b>12.0 oz</b>	(340 g) crystal malt (40 L)
<b>4.0 oz</b>	(113 g) chocolate malt
<b>0.75 oz</b>	(21 g) Vanguard whole hops 5% alpha (3.75 HBU/105 MBU), 60 minute boiling
<b>0.75 oz</b>	(21 g) Glacier hops 6% alpha (4.5 HBU/126 MBU), 30 minute boiling
<b>1.0 oz</b>	(28 g) Mt. Hood hops 4% alpha (4 HBU/112 MBU), 10 minute boiling
<b>1.25 oz</b>	(35 g) freshly crushed coriander
<b>0.25 tsp</b>	(1 g) powdered Irish moss
<b>0.75 cup</b>	Your favorite ale yeast (175 ml measure) corn sugar (priming bottles) or 0.33 cup (80 ml) corn sugar for kegging

#### Directions

Place crushed grains in 2 gallons (7.6 liters) of 150° F (68° C) water and let steep for 30 minutes. Strain out and rinse with 3 quarts (3 liters) hot water and discard the crushed grains, reserving the approximately 2.5 gallons (9.5 liters) of liquid to which you will now add malt extract and 60 minute hops. Bring to a boil.

The total boil time will be 60 minutes. When 30 minutes remain add the 30-minute hops. When 10 minutes remain add the 10-minute hops and Irish moss. When 1 minute remains add 0.75 oz (21 g) of crushed coriander seed. After a total wort boil of 60 minutes, turn off the heat.

Immerse the covered pot of wort in a cold water bath and let sit for 15 to 30 minutes or the time it takes to have a couple of homebrews.

Strain out and sparge hops and direct the hot wort into a sanitized fermenter to which 2.5 gallons (9.5 liters) of cold water has been added. If necessary add cold water to achieve a 5 gallon (19 liter) batch size. Aerate the wort very well.

Pitch the yeast when temperature of wort is about 70° F (21° C). Ferment at about 70° F (21° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the remaining 0.5 oz (14 g) crushed coriander seed. If you have the capability "cellar" the beer at about 55° F (12.5° C) for about one week.

Prime with sugar and bottle or keg when complete.

So there I've said it. I've wanted to write this essay for the last six or seven years. Now I can relax and continue to seek those beers I want to spend some extra time with and money on. Whew! Now that I have this off my chest, I think I'll go savor a barleywine.

Let's cut the shuck and jive and get on with the recipe. Here's a refreshing, moderately floral-spicy brown ale that'll go down easy, pint after pint.

**Charlie Papazian is president of the Brewers Association.**





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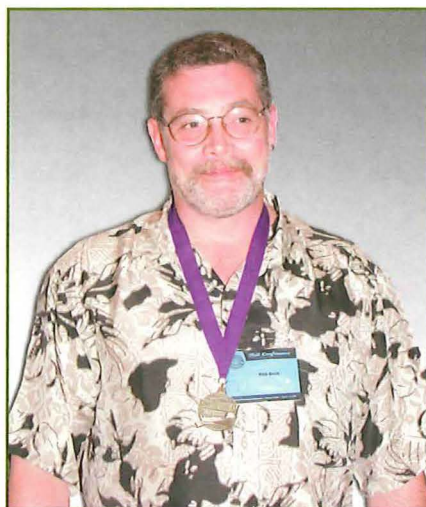
# Beck Masters MCAB VII

**R**ob Beck won Best of Show at the MCAB VII (Masters Championships of Amateur Brewing) in September with his River Forest Pale Ale. In addition to generously sharing his prize recipe, Beck also talked about the system he uses, his favorite beers, his brewing club and advice for entering beer competitions.

Beck brews on a two-tier, three-vessel setup in his basement, using natural gas. The hot liquor tank and the mash tun are 10 gallons (37.8 liters) and the boil kettle is 15 gallons (56.7 liters), all Vollrath stainless. The hot liquor tank is on the upper level, and uses gravity to drain into the mash tun, whereas the mash tun and boil kettle are on the same level.

Beck uses a March magnetic drive pump mounted under the mash tun for recirculating the mash and for moving the wort from the mash tun to the kettle. A perforated stainless false bottom is used in the mash tun; this sits about 2 inches (5 cm) above the bottom, and the space below it holds 1.5 gallons (5.7 liters). Beck does mostly step mashes, so direct heat is used on the dead space beneath the false bottom, and that wort is pumped back over the grain bed to raise the mash temperature between rests. Recirc flow is controlled with a ball valve on the output side of the pump.

After mashing is complete, recirculation commences once more for clarity, then the hoses are switched to begin the sparge. Clear wort is pumped to the kettle while sparge water is pumped to the mash tun. Beck uses stainless quick disconnects and ball valves on all three vessels and the pump, which are all connected with vinyl tubing. A slotted copper ring lines the outer edge of the kettle bottom that is connected to a valve on the kettle.



Rob Beck at the 2003 American Homebrewers Conference.

**IF YOU LIKE YOUR  
BEER, DON'T CHANGE  
IT JUST TO PLEASE  
SOMEONE ELSE. THAT'S  
ONE OF THE BIG DIFFERENCES BETWEEN  
AMATEUR BREWING  
AND PROFESSIONAL  
BREWING.**

Since he uses mostly whole hops, Beck takes advantage of hopback wort filtration when draining the kettle. Chilling is done using a homemade 50-foot (15.2-meter) copper immersion coil with a 15-foot (4.57-meter) pre-chiller that sits in a cooler filled with ice water. After about 10 to 15 minutes of chilling, the water feed line to the chiller is disconnected from the tap and hooked up to a submersible pump that sits in the cooler of ice water. (Beck says he'd love to take credit for this strategy, but that it actually came

from an article in *Zymurgy* by Dean Fikar on hot weather brewing tips.)

But for all this streamlined technique, Beck claims he's not really very innovative or creative when it comes to the brewing process itself. "I tend to follow the accepted traditional methods, for the most part," he says. "In talking to fellow brewers and following the online forums like Tech Talk and HBD, I occasionally will try something new and different."

For the last 11 years that he's been brewing, Beck tries to brew about every other weekend and usually ends up making between 18 and 20 5-gallon (19-liter) batches a year. He shares the spoils with brew club members, friends and family, and the beers he's particularly proud of are entered in various competitions.

His favorite styles to brew include American pale ale, Kölsch, alt, Dortmunder export and blonde ale. When he fancies a commercial brew, the ones at the top of the list include Boulevard Pale Ale, Boulevard Zon (a witbier), just about anything from New Glarus Brewing and Rogue Ales, and the APA from Firestone Walker.

Beck's club is the perennially gifted Kansas City Bier Meisters. "In addition to the wonderful friendships my wife and I have developed in the club," he says, "I feel that my brewing has benefited from both the feedback from the BJCP ranked judges about my beers and from the different ideas and experiments of my fellow Bier Meisters. I'm especially appreciative of the knowledge and support that I have received from Jackie Rager, one of the pioneers in the American homebrewing adventure and from Steve Ford, a BJCP Master judge and a really terrific person and friend who passed away in March



2003. He taught me, among other things, that 'it's just beer.' I feel very fortunate to have been able to know and associate with these wise men of brewing as a member of the Kansas City Bier Meisters."

Asked what advice he would give beginning brewers about entering competitions, Beck says, "My main tip would be 'just do it.' Competitions, for the most part, are an excellent source of feedback on your beers. If possible, try and get some guidance from fellow brewers about which style categories to enter and, if in doubt, you can always enter the same beer in more than one category for more feedback. Competition judging is a very subjective art and sometimes it's hard to differentiate between adherence to style guidelines and personal preferences. If you like your beer, don't change it just to please someone else. That's one of the big differences between amateur brewing and professional brewing. Of course, if you keep getting the same comments about a particular flaw or defect in your beers, it's a good indication that there is a specific problem and you need to do research and talk to other brewers about solving the problem."

Our thanks go to Beck for providing his Best of Show recipe.

**Amahl Turczyn Scheppach is former associate editor of Zymurgy.** 



## KUDOS

AHA/BJCP Sanctioned Competition Program  
BEST OF SHOW

### August 2005

Oregon State Fair, 157 entries—Frank Spirek, Corvallis, OR.

### October 2005

Queen of Beer Women's Homebrew Competition, 54 entries—Linda Rader, Amherst, NY.  
Oktoberfest Zinzinnati, 142 entries—Frank Barickman, Delaware, OH.  
Coconut Cup, 160 entries—Art Watson, Melrose, FL.

### November 2005

10th Knickerbocker Battle of the Brews, 175 entries—Scott C. Ofslager, Albion, NY.  
MALT's First Annual Turkey Shoot, 66 entries—Ty Ming, College Park, MD.  
Michigan Cherry Beer Festival, 5 entries—Paul Sbraccia, St. Clair Shores, MI.

## River Forest Pale Ale

Recipe for 6 U.S. gallons (22.7 liters)

### Ingredients

<b>5.0 lb</b>	(2.27 kg) Great Western Klages two-row malt, 2L
<b>4.25 lb</b>	(1.93 kg) Mid America Harrington two-row malt, 2L
<b>1.0 lb</b>	(0.45 kg) Weissheimer Vienna malt, 5L
<b>0.75 lb</b>	(0.34 kg) Briess Victory malt, 25L
<b>0.5 lb</b>	(227 g) Mid America white wheat malt, 2L
<b>0.5 lb</b>	(227 g) Weyermann Carafoam® malt, 2L
<b>0.5 lb</b>	(227 g) flaked barley, 2L
<b>0.8 oz</b>	(22.6 g) Simcoe whole hops 14.3% AA for 55 min.
<b>0.5 oz</b>	(14 g) Cascade whole hops 6.2% AA for 8 min.
<b>0.4 oz</b>	(11.3 g) Simcoe whole hops 14.3% AA for 8 min.
<b>0.3 oz</b>	(8.5 g) Amarillo pellets 8.3% AA for 8 min.
<b>0.3 oz</b>	(8.5 g) Simcoe whole hops 14.3% AA 7 min. after the end of the boil
<b>0.2 oz</b>	(5.6 g) Cascade whole hops 6.2% AA 7 min. after the end of the boil
<b>0.3 oz</b>	(8.5 g) Amarillo pellets 8.3% AA 7 min. after the end of the boil
<b>0.5 oz</b>	(14 g) Cascade whole hops, dry hop for 17 days
<b>0.5 oz</b>	(14 g) Centennial whole hops, dry hop for 17 days
<b>0.5 oz</b>	(14 g) Amarillo pellets, dry hop for 17 days
	Wyeast 1056 Activator pack, stepped up twice with starters: 4.5 cups (1.06 L) at 1.027 and 10 cups (2.4 L) at 1.036.

**Original Target Gravity:** 1.058

**Final Target Gravity:** 1.009

**Primary Fermentation:** in glass for 14 days at 67° F (19.4° C)

**Secondary Fermentation:** in glass for 4 days at 65° F (18.3° C) and 13 days at 30° F (-1.1° C).

**pH:** 4.8

**Color:** 5 SRM

**Water Treatment:** Mix RO filtered water with filtered tap water at a ratio of 2:1. Add 1 tsp. (4.9 mL) of CaCl<sub>2</sub> to the 4.5 gallons (17 L) of mash water and 1.5 tsp CaCl<sub>2</sub> (7.4 mL) to the 7.0 gallons (26.5 L) of sparge water. Based on the monthly water report, the dilution with RO water and the addition of the CaCl<sub>2</sub>, the approximate water profile should be as follows:

	Ca	Mg	Na	SO <sub>4</sub>	Cl
mash water	53	1.5	21	36	83
sparge water	65	1.5	21	36	80

(these numbers represent ppm)

Adjust mash water pH with phosphoric acid to 6.3 and sparge water to 5.1.

(Beck's water is slightly low in Ca, slightly high in Na and very high in SO<sub>4</sub> and it comes out of the tap at about 10 pH, due to the use of slaked lime in the treatment process.)

### Directions

Dough in at 132° F (55.5° C) and hold for 15 minutes. Raise the mash temperature to 152° F (66.6° C) and hold 55 minutes. Raise the mash temperature to 156° F (68.8° C) and hold 74 minutes. Raise the mash temperature to 168° F (75.5° C) and recirculate for 24 minutes.

Mash pH should be 5.3 and pre-boil wort pH should be 5.4.

Collect 8.0 gallons (30.2 liters) of 1.045 gravity wort in the kettle. Boil for 70 minutes to a volume of 6.2 gallons (23.5 liters). Chill wort to 61° F (16° C), aerate and pitch. Fine with Polyclar and isinglass at the end of the secondary period. Keg and force carbonate to approximately 2.6 volumes of CO<sub>2</sub>.



## AHA/BJCP SANCTIONED COMPETITION PROGRAM CALENDAR



The American Homebrewers Association (AHA) and the Beer Judge Certification Program (BJCP) are pleased to announce that the AHA and the BJCP have merged competition programs. As of January 2006, there is a single system for registering homebrew competitions.

In merging the competition programs, we have combined the best of both. The competition materials have been updated to incorporate aspects of both programs to provide competition organizers with the best information and forms available to run successful competitions.

Interested in becoming a beer judge? See [www.beertown.org/homebrewing/scp/judge.html](http://www.beertown.org/homebrewing/scp/judge.html) for information.

Below is a list of AHA/BJCP Sanctioned Competitions coming up in the next two months.



### MARCH 2006

#### March 4

**2006 Bluebonnet Brewoff** Irving, TX. Contact: Dennis Evans, Phone: 817-832-8916, E-mail: [clearforkbrewing@mesh.net](mailto:clearforkbrewing@mesh.net) Web: [www.bluebonnetbrewoff.com](http://www.bluebonnetbrewoff.com)

#### March 4

**17th Annual Reggale and Dredhop Homebrew Competition** Denver, CO. Entry Fee: \$6. Entry Deadline: 2/24. Contact: Bob Kauffman, Phone: 303-828-1237, E-mail: [acmebrew@juno.com](mailto:acmebrew@juno.com) Web: [www.hopbarley.org/dredhop](http://www.hopbarley.org/dredhop)

#### March 4

**Iowa Brewers Union Open** Urbandale, IA. Contact: Andy Cleghorn, Phone: 515-279-2991 E-mail: [ascleghorn@hotmail.com](mailto:ascleghorn@hotmail.com) Web: [www.iowabrewersunion.org](http://www.iowabrewersunion.org)

#### March 4-5

**St. Patrick's Cascadia Cup** Kirkland, WA. Contact: Alan Hord, 425-881-6585, [CCOrganizer@CascadeBrewersGuild.org](mailto:CCOrganizer@CascadeBrewersGuild.org) [www.CascadiaCup.Com](http://www.CascadiaCup.Com)

#### March 9

**11th Annual Kona Brewers Festival Homebrew Competition** Kailua-Kona, HI. Contact: Rod Romanak, Phone: 808-325-7449 E-mail: [rocketsuds@hawaii.rr.com](mailto:rocketsuds@hawaii.rr.com) Web: [www.geocities.com/konabrewfest](http://www.geocities.com/konabrewfest)

#### March 11

**10th Annual Eastern Connecticut Homebrew Competition** Willimantic, CT. Contact: Paul Zocco, Phone: 860-456-7704 E-mail: [zoks.homebrewing@snet.net](mailto:zoks.homebrewing@snet.net) Web: [www.homemadebrew.net](http://www.homemadebrew.net)

#### March 11

**World Cup of Beers 2006** Berkeley, CA. Contact: Paul His, Phone: 510-339-1816 E-mail: [ashcraftmd@comcast.net](mailto:ashcraftmd@comcast.net) Web: [www.bayarea-mashers.org](http://www.bayarea-mashers.org)

#### March 11

**GCBA Annual Celebretion** Citrus Heights, CA. Contact: Brody Day, Phone: 916-524-3241 E-mail: [jedimaster1600@yahoo.com](mailto:jedimaster1600@yahoo.com)

#### March 11

**Drunk Monk Challenge** Aurora, IL. Contact: Don Alton, Phone: 630-858-1385 E-mail: [donlyn55@aol.com](mailto:donlyn55@aol.com) Web: [www.knaves.org/dmc](http://www.knaves.org/dmc)

#### March 17

**March Mashness** St. Cloud, MN. Contact: Bruce LeBlanc, Phone: 320-251-0229 E-mail: [brewski@astound.net](mailto:brewski@astound.net) Web: [www.cloudytown-brewers.org/competition](http://www.cloudytown-brewers.org/competition)

#### March 18

**Shamrock Open** Raleigh, NC. Contact: Jim Brewer, Phone: 919-465-2045 E-mail: [brewer27513@hotmail.com](mailto:brewer27513@hotmail.com) Web: [www.hbd.org/carboy](http://www.hbd.org/carboy)

#### March 18

**7th Annual Werthogs Homebrew Competition** Lethbridge, AB. Contact: Veryl Todd, Phone: 403-381-8314, E-mail: [toddvii@telusplanet.net](mailto:toddvii@telusplanet.net) Web: [www.netcon.ca/werthogs](http://www.netcon.ca/werthogs)

#### March 18

**Las Vegas Winterfest 2006** Las Vegas, NV. Contact: Scott Alfter, Phone: 702-894-9618, E-mail: [scott@beerandloafing.org](mailto:scott@beerandloafing.org) Web: [snafu.alfter.us/competitions/winterfest06/](http://snafu.alfter.us/competitions/winterfest06/)

#### March 23

**Best the Brewer** Philadelphia, PA. Contact: Theimann Ackerson, Phone: 215-753-7211, E-mail: [theimann@verizon.net](mailto:theimann@verizon.net) Web: [www.manayunkbrewery.com](http://www.manayunkbrewery.com)

#### March 25

**16th Annual Hudson Valley Homebrew Competition** Hyde Park, NY. Contact: Al Alexsa, Phone: 845-255-8685 E-mail: [aalexxa@aol.com](mailto:aalexxa@aol.com) Web: [www.hbd.org/hvvhb](http://www.hbd.org/hvvhb)

#### March 31

**Samuel Adams Holiday Homebrew Competition** Boston, MA. Contact: Robert Driscoll, Phone: 617-368-5000 E-mail: [rob.driscoll@bostonbeer.com](mailto:rob.driscoll@bostonbeer.com) Web: [www.samueladams.com](http://www.samueladams.com)

### APRIL 2006

#### April 1

**SODZ 3rd Annual British Beer Competition** Columbus, OH. Contact: Frank Barickman, Phone: 614-354-8750 E-mail: [fbarickm@columbus.rr.com](mailto:fbarickm@columbus.rr.com) Web: [www.sodz.org](http://www.sodz.org)

#### April 1

**2006 South Shore Brewoff** Mansfield, MA. Contact: Kevin Farrell, Phone: 781-812-1066 E-mail: [kevin.farrell@nuance.com](mailto:kevin.farrell@nuance.com) Web: [www.southshorebrewclub.org](http://www.southshorebrewclub.org)

#### April 23

**10th Annual Silver Dollar Fair Homebrew Competition** Chico, CA. Contact: Larry Rauen, Phone: 530-894-2624 E-mail: [chicobrewer@hotmail.com](mailto:chicobrewer@hotmail.com) Web: [www.chicohomebrewclub.com](http://www.chicohomebrewclub.com)

#### April 28

**12th Annual Titledown Open** Green Bay, WI. Contact: Michael Conard, Phone: 920-388-2728 E-mail: [mconard@itotl.com](mailto:mconard@itotl.com) Web: [www.rackers.org](http://www.rackers.org)

## AHA SPECIAL EVENTS

### February 25

**AHA Membership Rally—New Belgium Brewery** Fort Collins, CO. Free for AHA members, \$33 for new and renewing members. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org) Web: [www.beertown.org/homebrewing/rally.html](http://www.beertown.org/homebrewing/rally.html)

### March 5

**AHA Membership Rally—Saint Arnold Brewing Co** Houston, TX. Free for AHA members, \$33 for new and renewing members. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org) Web: [www.beertown.org/homebrewing/rally.html](http://www.beertown.org/homebrewing/rally.html)

### March 25

**AHA Membership Rally—Deschutes Brewery** Bend, OR. Free for AHA members, \$33 for new and renewing members. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org) Web: [www.beertown.org/homebrewing/rally.html](http://www.beertown.org/homebrewing/rally.html)

### April 9

**AHA Membership Rally—Rogue Ales Issaquah Brewhouse** Issaquah, WA. Free for AHA members, \$33 for new and renewing members. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org) Web: [www.beertown.org/homebrewing/rally.html](http://www.beertown.org/homebrewing/rally.html)

### April 21–30

**AHA National Homebrew Competition** 10 Regional Sites (see page 20 for your location). Fee: \$8. Entry Deadline: 4/3-14. Awards Ceremony: 6/24. Contact: Janis Gross, Phone: 303-447-0816 x 134, E-mail: [janis@brewersassociation.org](mailto:janis@brewersassociation.org) Web: [www.beertown.org/events/nhc/index.html](http://www.beertown.org/events/nhc/index.html)

### April 22

**AHA Membership Rally—Brooklyn Brewery** Brooklyn, NY. Free for AHA members, \$33 for new and renewing members. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org) Web: [www.beertown.org/homebrewing/rally.html](http://www.beertown.org/homebrewing/rally.html)

### May 6

**Big Brew** (A Celebration of National Homebrew Day) Your Brewery. Contact: Kathryn Porter, Phone: 888-822-6273 x 123, E-mail: [kathryn@brewersassociation.org](mailto:kathryn@brewersassociation.org) Web: [www.beertown.org](http://www.beertown.org)

### June 21-24

**AHA National Homebrewers Conference** Orlando, FL. Contact: AHA, Phone: 888-822-6273, E-mail: [aha@brewersassociation.org](mailto:aha@brewersassociation.org) Web: [www.beertown.org/events/hbc/index.html](http://www.beertown.org/events/hbc/index.html)



**Reader Advisory: Warning!**

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

## Foiling Fermentation Flaws

*By Steve Holle*

**M**any beer flaws are the result of unwanted fermentation flavors, yet controlling these flavors can be difficult because so many factors influence the amount and type of fermentation by-products that accompany ethanol production. After all, a miscalculation in the proper types or proportions of malt and hops may result in a failure to produce the desired beer style, but the beer may still be delicious to drink. However, even the most expertly executed recipe may yield an utterly undrinkable brew if fermentation goes awry.

The following discussion describes several common fermentation-derived flavor compounds known as fusel alcohols, esters, aldehydes, diacetyl and various sulfur-containing compounds (sulfur dioxide, hydrogen sulfide and dimethyl sulfide) and how certain fermentation parameters (principally temperature, aeration, wort composition, pressure and pitching rate) influence their creation or suppression.

### Flavors from Fermentation

#### Fusel Alcohols

The primary alcohol produced by brewers yeast is relatively tasteless ethanol. However, yeast must metabolize other wort constituents besides sugar to support cellular activities that ensure yeast growth and health. Included among these wort constituents are amino acids, which are involved in the production of fusel alcohols (e.g. fusel oils, higher alcohols). Fusel alcohols are more aromatic than ethanol and are associated with descriptors such as alcoholic, vinous, spicy, hot and even solvent-like. In general, conditions that promote rapid yeast growth foster fusel alcohol production.

Although very high amino acid levels may lead to higher fusel alcohol content<sup>7</sup>, it is generally accepted that fusel alcohols are produced when the aforementioned growth stimulators create demands for amino acids (used as building blocks for protein synthesis) beyond the quantity of amino acids available in the wort.<sup>3,7</sup> Protein synthesis includes the creation of intermediary products that become protein when combined with the specific amino acid for a particular protein. If the required amino acid is missing, the intermediary product is converted to a fusel alcohol. This process may also explain why fusel alcohol production increases as the percentage of nitrogen-free glucose adjuncts increases and the maltose fraction decreases.<sup>7,10</sup>

High starting wort gravity (especially over 13° Plato) increases fusel alcohol production; however, many modern commercial breweries have moved toward high gravity brewing (≈16° Plato) because it increases plant capacity. They also employ other parameters to shorten fermentation time such as increased fermentation temperatures in tall cylindrical fermenters. Warmer temperatures increase yeast metabolic activity, and stirring created by convection currents in tall fermenters creates better contact between yeast cells and nutrients. Because high gravity, warm temperatures and stirring can increase fusel alcohol production, brewers using any of these parameters may increase fermentation tank pressure because pressure is inhibitory to fusel alcohol production. (As will be discussed later, increased gravity and temperature can also increase ester production, and over-pressure is also a means to inhibit ester formation.)

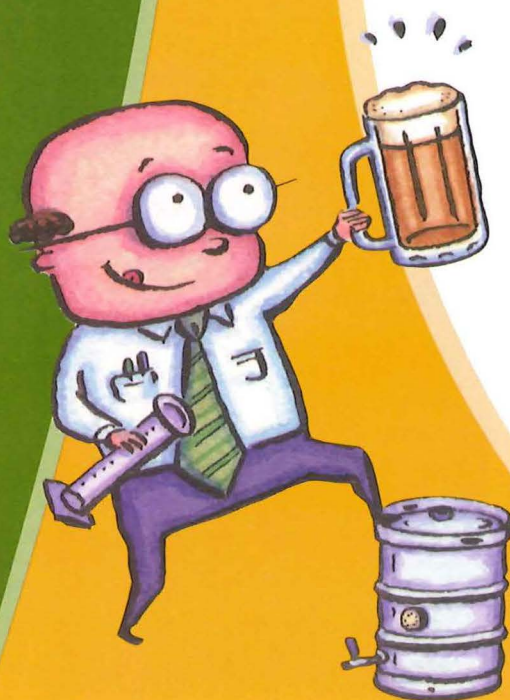


Illustration by Charles Stubbs



Yeast strains also have varying propensities to produce fusel alcohols. Infections by wild yeast or bacteria may also increase fusel alcohol. Top-fermenting ale yeasts are well known for producing more fusel alcohols than bottom-fermenting lager yeast, much of which has to do with lager yeasts' ability to ferment at cooler temperatures. For this and the other aforementioned reasons, warm fermented ales with high starting gravities like barleywines are likely to exhibit high levels of fusel alcohols, especially those fortified with glucose to boost their alcohol content. Conversely, cool-fermented, all-malt lagers of normal starting gravity are likely to produce fewer fusel alcohols. Lager yeast generally produce 60 to 90 milligrams of fusel alcohol, and ale yeast often more than 100 mg/L. Because levels of 100 mg/L cause noticeable flavor consequences, ales are well known for their spicy character relative to lagers.<sup>6</sup>

### Esters

Esters are responsible for fruity aromas in beer and are important flavor contributors, particularly in top-fermenting ales. However, high levels of fruity esters are usually unwanted when producing lager beers. At excess levels, esters become unpleasant and can even take on a solvent-like character. Three factors influencing ester levels are yeast strain, wort composition and fermentation conditions.

Esters are the result of an enzyme-catalyzed combination of an alcohol (ethanol or fusel) and a fatty acid. In general, most factors that promote yeast growth inhibit ester formation. Acetyl CoA, involved in the synthesis of enzymes for ester production, also participates in the synthesis of fatty acids and amino acids for yeast growth. When factors favoring growth (O<sub>2</sub>, lipids, stirring) are present, Acetyl CoA is directed toward yeast growth and away from the creation of enzymes for esterification.<sup>4</sup> Other conditions (high fermentation temperature and *drauflassen*, meaning "adding to," as in adding new wort to an actively fermenting tank) stimulate the activity of ester-creating enzymes. Finally, conditions that increase the level of fusel oils (high temperature, zinc) contribute to esterification.<sup>4</sup> Many important esters are formed from fusel alcohols as well as ethanol, and the increased level of certain fusel alcohols

increases the material for the production of these esters.

Ester formation is quite complicated and dependent on many interrelated variables. Furthermore, certain conditions affect the formation of various esters differently, which may increase one ester while decreasing another. While lager yeast generally produces lower ester levels than top-fermenting yeast, the lower ester levels may be attributable to cooler lager fermentation temperatures, since all lager yeast strains may not produce lower ester levels than ale yeast when fermented at warmer top-fermenting temperatures. There is contradictory evidence as to the effect of

pitching rate on esterification, and the optimal pitching rate to maximize esters may differ by strain.<sup>4</sup>

Carbon dioxide pressure during fermentation is a common way of influencing ester production. High levels of CO<sub>2</sub> inhibit Acetyl CoA activity that causes ester production. Tall cylindrical tanks not only increase hydrostatic pressure (i.e. the weight of the beer increases the pressure on the liquid at the bottom of the tank that increases the solubility of CO<sub>2</sub>), but they also produce natural stirring by convection currents that limit esterification. Conversely, Bavarian weizen brewers who try to maximize ester production prefer

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shallow open fermenters that reduce pressure and convection currents.

### Aldehydes

Fermentation by brewers yeast can be very simply described as the conversion of sugar to ethanol and carbon dioxide, accompanied by the production of lesser quantities of other by-products (e.g. esters and fusel alcohols described above) and intermediary compounds such as aldehydes. When yeast converts sugar to alcohol, the sugar undergoes intermediary changes including conversion to acetaldehyde before becoming alcohol. For this reason, the quantity of acetaldehyde first increases and then declines, which makes high levels of acetaldehyde a common green beer flavor and a good indicator of beer maturity. Acetaldehyde and other carbonyl compounds are responsible for the typical grassy, rough and cidery flavors found in beer before maturation.<sup>9</sup>

Since the creation of acetaldehyde is an intermediate step in ethanol production, successful control includes proper secondary/maturation practices that allow the yeast to reduce acetaldehyde to alcohol. Essential to this reduction is the carryover of enough living and healthy yeast cells through primary fermentation and maturation. Elevated acetaldehyde levels may result from diminished yeast activity brought on by early cooling, non-vital cells or removing yeast from green beer by filtration prior to complete maturation. Ensuring that yeast remain healthy and in sufficient quantities to complete fermentation starts with the rapid onset of active fermentation provided by a sufficiently large and vigorous yeast population supported by adequate pitching rates and strong wort aeration. Because aldehydes are easily volatilized even at low temperatures, they are readily carried off by evolving CO<sub>2</sub>. Pressurized fermentation that traps CO<sub>2</sub> retains higher acetaldehyde levels, which must be reduced in the conditioning process.<sup>7</sup>

It is also noteworthy that the intrusion of oxygen into packaged beer can cause alcohol to convert back to aldehydes, a contributor to stale beer flavors. Other catalysts, including light, can create other oxidative pathways that result in the creation of aldehydes and stale flavors.<sup>7</sup> For these reasons, it is important to avoid the uptake of oxygen after the start of fermentation, especially in packaging, and to protect packaged beer from light and heat.

**TABLE 1: SUMMARY OF INTERNATIONAL BEER FLAVOR TERMINOLOGY<sup>2,5,8</sup>**

Flavor Compound	Meilgaard Flavor Tier	O - odor, T - taste, W - warming	Descriptors
Fusel alcohol	0110	OTW	Alcoholic, spicy, vinous
Esters, Aldehydes	0120	OT	Solvent-like, plasticizers, lacquer-like
Esters	0130	OT	Fruity, banana, apple, solvent-like
Acetaldehyde	0150	OT	Green apple, bruised apple
Diacetyl	0620	OT	Butterscotch, buttermilk
Sulfur Dioxide	0710	OT	Striking match
Hydrogen Sulfide	0721	OT	Rotten egg
Dimethyl Sulfide	0732	OT	Creamed corn, cooked vegetable

However, the slow oxidation of alcohol is sometimes a desirable process that provides the unique character to sherry, a fortified wine that is allowed to oxidize. Controlled oxidation of tannins can soften the astringency of red wine. Esterification of harsh fusel alcohols during aging also leads to improved flavor and aroma. Barleywines and imperial stouts are also examples of “big” beers that may also be purposely “laid down” to increase the complexity through the aging process.

### Diacetyl

Another important flavor compound produced by yeast during fermentation is diacetyl, which has a butterscotch aroma and slick mouthfeel. Diacetyl is derived from  $\alpha$ -acetolactate, an intermediary compound in yeast biosynthesis of the amino acid valine needed for cell growth. However, once  $\alpha$ -acetolactate is in beer, it not only can be converted to valine, but also to diacetyl. Therefore, if sufficient valine already exists, the production of  $\alpha$ -acetolactate for valine

### FACTORS THAT INCREASE FUSEL ALCOHOLS<sup>6</sup>

- Increased dissolved oxygen (↑ growth through yeast cell membrane synthesis)
- Stirring/convection currents (↑ growth through good contact between yeast and nutrients)
- High fermentation temperature (↑ growth through increased yeast metabolic activity)
- High gravity wort (greater than 13 °P)
- Low pitching rate (creates increased demand for amino acids in yeast reproduction)
- Low-pressure fermentation (↑ growth through lower buildup of inhibitory CO<sub>2</sub>)
- Yeast type (certain strains, especially ale-types, produce more fusel alcohols)



synthesis is repressed, which then leads to lower levels of diacetyl.<sup>3</sup>

Warm fermentation temperatures and high levels of aeration that foster cell growth requiring amino acids (e.g. valine) create increased levels of diacetyl. However, in the later stages of fermentation/conditioning, yeast also converts diacetyl to much less offensive and intense flavor compounds. Therefore, it is important to retain enough healthy yeast at the end of primary fermentation for conditioning to clean up the diacetyl. Adequate pitching rates and aeration are important for diacetyl control, as well as avoiding low amino nitrogen adjuncts. Removing yeast from young beer by filtration or chilling the beer before diacetyl reduction has been completed can also lead to increased diacetyl levels. Although high initial temperatures stimulate diacetyl production, high temperatures during conditioning also stimulate yeast activity that aids in the removal of diacetyl when oxygen is excluded. This is why some lager breweries allow the temperature of young beer to rise by as much as 10° C or more for one to two days before beginning cold conditioning (diacetyl rest). A variety of bacteria, wild yeast and mutated brewers yeast also produce diacetyl, so good sanitation and yeast-handling techniques are also important to diacetyl control.

### Sulfur Compounds

Yeast requires sulfur for the synthesis of cell protein. Wort contains sources of sulfur including inorganic sulfate in water and sulfur-containing amino acids, peptides and protein from malt. Sulfur compounds important to beer flavor develop in part from the synthesis of amino acids and the reduction of inorganic sulfur.<sup>7</sup> In general, the concentration of these yeast-produced compounds increases with increasingly unfavorable fermentation conditions. Among these compounds are sulfur dioxide, resembling a struck match smell, and the particularly offensive hydrogen sulfide resembling the aroma of rotten eggs.

Sulfur dioxide (SO<sub>2</sub>) is a common signature of many European lagers. It also has natural antioxidant and antimicrobial properties and acts as a reserve against the production of aldehydes during beer storage.<sup>1</sup> In fact, exogenous sulfites are widely used in wine



### FACTORS THAT INCREASE ESTER PRODUCTION<sup>4</sup>

#### Yeast

- Strain (various strains have different ester production characteristics)
- Flocculent yeast
- Pitching rate (either high or low, depending on yeast strain)
- Genetic and physiological instability of yeast (yeast performance can change with re-pitching)

#### Wort Composition

- Decreased dissolved oxygen (restricts yeast growth)
- Decreased free unsaturated fatty acids, i.e. lipids (increased availability of Acetyl CoA for ester production relative to yeast growth; increased AATase (ester enzyme) activity)
- Increased gravity (reduces oxygen solubility, increases level of alcohol cosubstrate)
- Increased zinc levels (stimulates breakdown of  $\alpha$  keto acids to fusel alcohols)


#### Fermentation Conditions


- Increased temperature (higher levels of fusel alcohols; stimulates activity of AATase)
- Decreased pressure (lowers CO<sub>2</sub> saturation; high CO<sub>2</sub> inhibits Acetyl CoA)
- Decreased stirring (reduces yeast growth)
- Drauflassen ("adding to"; stimulates ester enzyme activity)


production because of their antimicrobial and antioxidant properties. Yet in excessive quantities SO<sub>2</sub> may be unwanted. The loss of SO<sub>2</sub> increases with increasing storage temperature.<sup>1</sup> Lagering reduces the amount of SO<sub>2</sub> through various chemical reactions; however, bunging conditioning tanks causes a more limited reduction in SO<sub>2</sub> since lesser amounts of volatized SO<sub>2</sub> can be carried off by escaping fermentation gas.<sup>7</sup> The most important means to reduce the formation of SO<sub>2</sub> during fermentation is by 1) sufficient levels of yeast nutrients in wort, 2) an increased amount of

lipids, 3) intensive aeration, 4) vital yeast and 5) the removal of hot and cold trub.<sup>7</sup>

Hydrogen sulfide (H<sub>2</sub>S) occurs during alcoholic fermentation. Unhealthy yeast or a deficiency in nutrients for yeast growth lead to higher H<sub>2</sub>S levels. For this reason, beers made from adjuncts may be more susceptible to elevated H<sub>2</sub>S levels.<sup>7</sup> Fortunately, H<sub>2</sub>S is easily volatized and normally only a small fraction remains in beer, usually below the flavor threshold. Increased lagering temperatures and fermenter height contribute to the







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evolution of the H<sub>2</sub>S from the green beer. High levels of H<sub>2</sub>S also may be indicative of infection of the wort by outside microbes.

Although not principally derived from fermentation, dimethyl sulfide (DMS) is another common sulfur compound having an aroma of creamed corn or cooked vegetables. DMS is also produced by fermentation, but like other sulfur compounds, proper fermentation conditions do not allow problematic levels to remain in the beer. In most cases, DMS originates from the precursor S-methyl methionine (SMM) produced by malt during germination.<sup>7</sup> When heated in excess of 65 to 70° C, SMM is converted to DMS, with increased heating

driving off the DMS. This is why highly kilned malts produce worts with less DMS than light colored ones. Boiling temperatures allow the SMM in wort to convert to DMS and then carry off the volatilized DMS with escaping steam vapor. However, when DMS has not been fully volatilized during boiling (e.g. because of a non-vigorous boil, an insufficient boiling time or a covered kettle), SMM can still be converted to DMS in the whirlpool, but the DMS will not be volatilized because the temperature is below boiling. For this reason, extended whirlpool stands should be avoided and the wort chilled as rapidly as possible after hot break separation. The use of a wort stripper post-boil is a recent and highly effective method

of removing DMS. DMS, like diacetyl, can also be a by-product of bacterial infection.

## Conclusion

Although the flavor compounds discussed may be desirable at low levels depending on the beer style, at excess levels they become offensive. In general, there are some common means to control the flavors described in this discussion, although it must be recognized that the pathways leading to these compounds are complex and interdependent, and the guidelines are not always hard and fast rules. But implementing good and repeatable brewing and fermentation practices will lead to higher beer quality and better consistency. These practices can provide the proper environment for yeast to grow and ferment, while avoiding the stress factors that give rise to off-flavors. In a phrase, happy yeast make better beer!

## Good practices include:

- Produce worts with the proper level of amino acids and balance of wort sugars that generally favor maltose over glucose by adjusting to variations in malt quality and the judicious use of adjuncts.
- Provide an adequate quantity of healthy yeast cells for fermentation and maturation through proper yeast propagation, cropping and storage in addition to using sufficient pitching rates and aeration levels. Conversely, after fermentation starts, further intrusions of oxygen should be avoided.
- Maintain the correct fermentation temperature, especially avoiding excessively high temperature levels. Although fermentation temperatures vary by strain, caution should be exercised when fermenting lager yeasts in excess of 50° F and especially in excess of 55° F. For ales, caution should be exercised over 70° F, and especially in excess of 75° F. Furthermore, the solubility of oxygen decreases with increasing wort temperature. At high temperatures, it is difficult or impossible to dissolve sufficient oxygen for the yeast.

Furthermore, other common sense practices beyond fermentation management will further add to successful brewing:

- Avoiding stale malts and hops.
- Using clean de-chlorinated water with the proper balance of minerals, especially calcium.



## METHODS TO INFLUENCE ACETALDEHYDE LEVELS IN BEER<sup>6,7,9</sup>

### Causes of Higher Acetaldehyde Levels from Primary Fermentation

- Intense fermentation
- Increased temperature during fermentation
- Increased pitching rate
- Increased pressure during fermentation
- Minimal aeration
- Stirred fermentation

### Causes of Reduced Acetaldehyde Levels after Primary Fermentation

- Intense secondary fermentation and conditioning
- Warm conditioning
- Increased yeast concentration during conditioning
- Minimal aeration

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- Proper temperatures and pH applied throughout a brewing process that avoids the uptake of oxygen.
- Sanitary conditions that exclude unwanted microbes and keep the wort free of taints from cleaners and sanitizers.

**Steve Holle is a member of the Brewers Association, Master Brewers Association of the Americas and Beer Judge Certification Program, and is an associate member of the Institute and Guild of Brewing, London. He is a contributor to various beer periodicals and author of *A Handbook of Basic Brewing Calculations*. Holle has a BA and MBA from Northwest Missouri State University and an MS from the University of Wisconsin-Madison. This article was peer-reviewed by Florian Kuplent, Anheuser-Busch, St. Louis, Mo., and Steve Pauwels, Boulevard Brewing Company, Kansas City, Mo.**

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## Last Drop (continued from 64)

"I had been judging for 15 years, and had no idea if I'd ever helped anybody make better beer," Tobey explained. "I had no idea if I was a better judge than when I started, or if I had just been reinforcing ineffective patterns. Once you look at it, it only makes sense to close the loop (between brewer and evaluator). I think that is the appeal and it explains the success of the event, which by the way is far beyond what I ever imagined it would be. Originally, it was just a way for me to stop bitching about competition and do something positive about it. What happens to the idea now is out of my hands and I can go back to making beer."

A true zymologist to the bitter end (like most of us homebrew fanatics), Tobey makes some good points. To those of us who were involved in the first Homebrew Fair, the focus seems to be spreading the word and hoping that this type of event will proliferate elsewhere in the world of homebrewing. This type of spirited exchange between brewer and judge should be nourished and allowed to grow, if for no other reason than the fact that it is one hell of a lot of fun!

**Kevin Fawcett is a non-BJCP beer judge and a fanatic, award-winning homebrewer, wine maker and mead maker in Seattle, Wash.**

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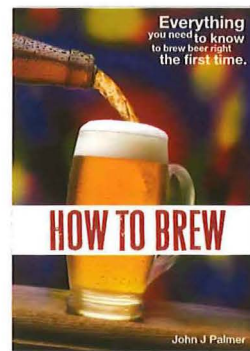
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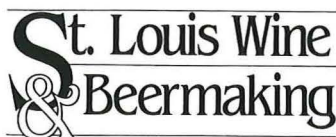
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\*Cover 2 is the inside front cover. Cover 3 is the inside back cover. Cover 4 is the outside back cover.

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March/April 2006

ZYMURGY

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# Homebrew Fair II

Since the beginnings of the American Homebrewers Association and the Association of Brewers, the focus has always been on educating—the public, homebrewers, beer judges and craft brewers—and on the free exchange of information among all, for the mutual benefit of all. Most zymologists (who are obsessed with the process of fermentation) are constantly on the lookout for any new fermented beverages to try or events that are in the interest of the process. I was fortunate enough to have participated in an event last year that was a variation on the traditional theme of homebrew competitions.

Last April 9 in Seattle, the first annual Homebrew Fair, an event like no other in AHA history (to my knowledge, at least), brought together multiple AHA homebrew clubs, local homebrew supply shops, beer writers, curmudgeons and beer judges. The event was such a rousing success that round two is set for March 25 in the Phinney neighborhood of North Seattle.

In one half of the building at the first annual event, local homebrew supply shops and beer clubs set up booths to promote their wares and spark interest in homebrewing. In an adjacent room, several prominent figures lectured on various subjects related to the fermentation process. As if this was not interesting enough to the average brewer, there was also a homebrewing competition that turned out to be larger than expected for a first-time event.

The most striking difference between this event and past homebrew competitions was the interaction between beer judges and brewers.

Entries were evaluated in accordance with BJCP specifications, though not in strict adherence with the rules of most



**THE MOST STRIKING DIFFERENCE BETWEEN THIS EVENT AND PAST HOMEBREW COMPETITIONS WAS THE INTERACTION BETWEEN BEER JUDGES AND BREWERS.**

AHA competitions. Homebrewed beers were evaluated by both BJCP and non-BJCP judges with extensive brewing experience, and by professional brewers and beer writers, and then placed in categories where the evaluators felt they belonged. The beers were evaluated according to the specifications outlined by those categories, rather than throwing an entry out of the event based on improper category entry.

Entries were scored, though only on one scoresheet per two judges, and emphasis was placed not on scoring but on how to improve the entry. After judging, the brewers were asked to discuss the results one-on-one with the evaluators (for the mutual educational benefit of both parties).

More than 35 BJCP and non-BJCP beer judges volunteered their time to participate (knowing that no points would be awarded) and the overwhelming consensus was that this type of event should continue.

How many times has a judge said, “I wish I could talk to this brewer and determine what processes went into formulating this beer?”



## ON THE WEB

### Homebrew Fair II

Information on Homebrew Fair II can be found at [www.homebrewfair.com](http://www.homebrewfair.com).

How many times has a brewer said, “I wish I could talk to this judge and communicate my concerns about this entry?”

In my limited experience as a beer judge, I have never been around a table so animated with the exchange of ideas. And I have never had the pleasure of seeing the smile on a brewer's face when an evaluator tells him (or her) how much he enjoyed partaking in a beverage or offers a simple solution for brewing a better one. There was joviality and camaraderie all around.

This year's event will likely be just as successful as the original, if the interest shown by local brewers and beer judges is any indication. At the Novemberfest Homebrewing competition held at Larry's Brewing Supply in Kent, Wash. on November 5, the upcoming event dominated conversations, with many of those who attended last year encouraging others to join in the spirit of the fair.

One well-known BJCP judge commented, “I was a bit intimidated at first by the thought of actually having to speak one-on-one with the brewers, but it turned out to be one of the most rewarding experiences I have ever had in the course of many years as a beer judge”.

I asked Jon Tobey, the man who gave so much of his time to originate and coordinate this event, about the changes made to accommodate entries and discuss results with the brewers. (continued on page 57)



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<b>Grand Banquet/Awards Ceremony Only - Saturday Evening</b> (AHA National Homebrew Competition Awards Ceremony)	<b>\$70</b> After May 15 - \$80	<b>\$80</b> After May 15 - \$90

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registration discounts.  
Join or Renew Today.

**TOTAL** \_\_\_\_\_

## METHOD OF PAYMENT

Cash ☐ Mastercard ☐ Visa ☐ American Express ☐ Check ☐ Check # \_\_\_\_\_

Credit Card Number \_\_\_\_\_ Exp. Date \_\_\_\_\_

Name on the card \_\_\_\_\_ Signature \_\_\_\_\_

Reproduce this form for additional registrants. Each member may register one guest at the member rate. Call 888.822.6273 or 303.447.0816 x145 with questions regarding registration. For hotel reservations at the Wyndham, call 877.999.3223 or 702.734.5110 and reference American Homebrewers Association for special room rate of \$109 if booked before May 28, 2006.

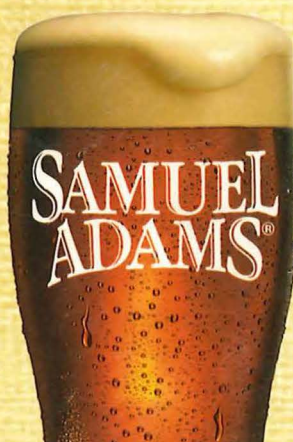
For more information, visit [www.ahaconference.org](http://www.ahaconference.org)

American Homebrewers Association  
A Division of the Brewers Association  
[www.beertown.org](http://www.beertown.org)



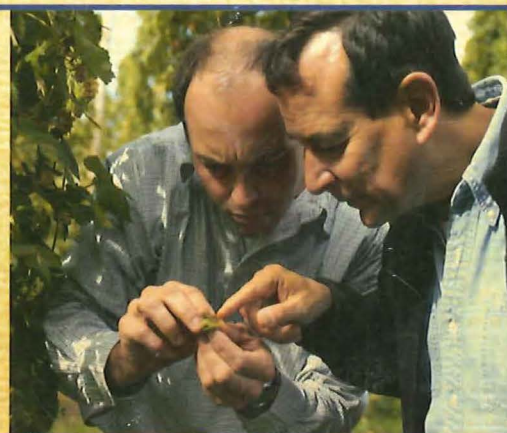


YOU KNOW  
THE HEAD OF A SAMUEL ADAMS.<sup>®</sup>  
Now let's discuss its soul.



HOPS ARE TO BEER WHAT GRAPES ARE TO WINE.<sup>™</sup>

*Every year, Jim Koch, Founder and Brewer of Samuel Adams<sup>®</sup> beers, travels to Bavaria and along with Stefan Stanglmair, a 9th generation hops farmer, hand selects the best Noble hops in the world. Jim does this because he knows that small growing variations such as soil composition or a farmer's growing practices or even which direction a hop field faces can change hop aroma and flavor even within the same hop variety. At Samuel Adams<sup>®</sup>, we're committed to quality and we believe that quality starts with the ingredients.*



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