

AHA's National Homebrew Competition Information Inside!

Vol. 26 No. 2 March/April 2003 The Journal of the American Homebrewers Association

ZYMOLOGY

FOR THE HOMEBREWER AND BEER LOVER

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Building a Buckapound Brewery

RIMS, DIMS & HERMS:
Brewing Technology Review

The Kingdom of Tuns

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AHA Board Election
Yeast Settling Physics
A Simple Start to All-Grain





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Roy Bailey - Beer Correspondent
CAMRA's 'What's Brewing' magazine (April 2000)

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BBC Radio 4 food & drink programme
(July 2000)

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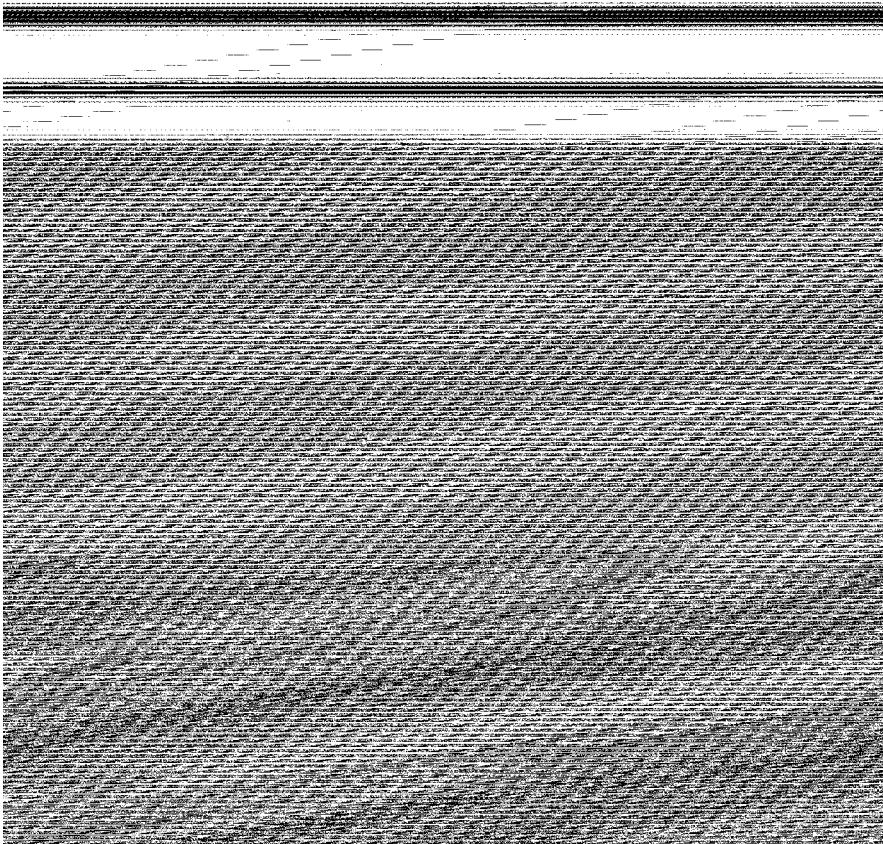
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Journal of the American Homebrewers Association®

Publisher _____ Association of Brewers

Editor-in-Chief _____ Ray Daniels

Associate Editor _____ Jill Redding

Art Director _____ Dave Harford

Graphics/Production Director _____ Stephanie Johnson

Senior/Web Designer _____ Deborah Miller

Graphic Designer _____ Julie Korowotny

Sales & Marketing Director _____ Cindy Jones
cindy@aob.org

Advertising & Sponsorship _____ Matt Dudgeon
Sales East Coast _____ dudgeon@aob.org

Advertising & Sponsorship _____ Linda Starck
Sales West Coast _____ linda@aob.org

Marketing Coordinator _____ Monica Tall
monica@aob.org

Circulation Coordinator _____ Matt Lovrinic

American Homebrewers Association®

Director _____ Paul Gatza

Project Coordinator _____ Gary Glass

Membership Coordinator _____ Erin Fay

Administrator _____ Kate Porter

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To make quality beer and brewing knowledge accessible to all.

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SPECIAL THANKS TO WHAT'S BREWIN'
HOMEBREW SUPPLY AND LIQUOR MART,
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Zymurgy \zī'mər jē\ n: the art and science of fermentation, as in brewing.

THE BUCKAPOUND BREWERY: ONE BEER GEEK'S SEARCH FOR TOTAL BREWHOUSE AUTOMATION FOR A DOLLAR A POUND

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You'll find parts from the B-52 bomber and maybe an oil rig or two in this brewery, where surplus is king. Still, the goal is one that every brewer can lust after—and that means a model for all to learn from.

by Randy Mosher

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From the multitude of homebrew equipment out there you must decide just what to pick for your mashing, lautering and even boiling operations. This guided tour can help you pick what's best for your style of brewing and your budget as well.

by Marc Sedam

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Knowing a RIMS from a DIMS comes in handy when you encounter a stainless steel brewing system and it's essential when you set out to buy or build your own. We trace the history of brewing technology from hewn logs to HERMS to show what's available today and where the ideas and technology came from.

by Steve Alexander

BARLEY WINE: THE BEER THAT WOULD BE KING

40

More malt! More hops! More attitude! If one beer defines the new American mentality toward brewing, it is the royal barley wine. Here a veteran of many batches, both homebrewed and commercial, lays out the landscape of this imperial brew.

by Fal Allen

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FOR GEEKS ONLY

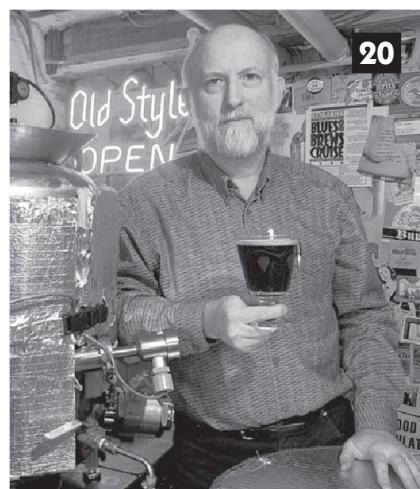
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Dropping Bright: The Physics of Yeast and Haze Removal

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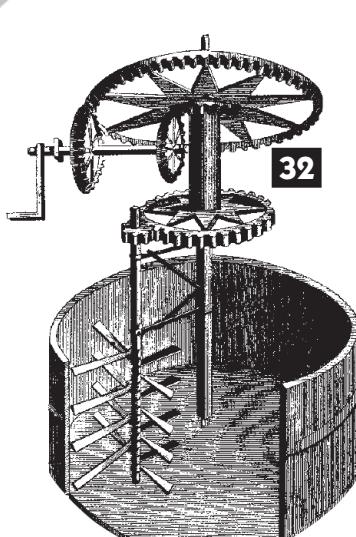
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A Simple Start to All-Grain Brewing



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Gentlemen, Start Your Kettles! It's the Nationals!

Hi everyone. It is now within two months of the first-round entry deadline and judging of the American Homebrewing Association (AHA) National Homebrew Competition. It is time for all brewers and brewsters to brew, ferment and bottle entries to be judged by Beer Judge Certification Program (BJCP) judges at the end of April.

It is simple to enter, package your finest homebrews, figure out what category to enter them in, and send them and your entry form and check to your regional site. There is a site map and entry form on pages 14–16 of this issue of *Zymurgy*. The requirement for each entry is one bottle for the first-round judging. If your beer is advanced to the second round by the judges, you will need three more—one for the second-round judging, one for the final round judging in each category and a bottle for the Best of Show round used to determine the Homebrewer of the Year. Full competition details are available at www.beertown.org.

The National Homebrew Competition relies on hundreds of volunteer unpackers, stewards, judges and site coordination staff to be what it is: the largest beer competition in the world! The AHA would like to thank all volunteers and entrants for making an event that gets lots of publicity for the hobby of homebrewing and the excellence that exists in the hobby. We anticipate more than 3,000 entries for the 2003 National Homebrew Competition.

The National Homebrew Competition is supported by several companies as sponsors or site sponsors. The biggest sponsorship that the AHA receives each year is for the National Homebrew Competition. Our thanks again go to the Boston Beer Co. and the Sam Adams brands for their generous support. The brewers at Sam Adams are on



the cutting edge of brewing technology with their remarkably flavorful light beer, Sam Adams Light, and unbelievable beverage Utopias, which is as complex a beer as I have ever tasted—24 percent alcohol with aromas of fruits, wood, earth and alcohol in a cascade of malt. Here's a toast to commercial brewers like Sam Adams who embrace the innovation, passion and spirit

of homebrewing to push the envelope of commercial beer.

Sweet Homebrew Chicago

If you are looking for the best time with homebrew of the year, nothing compares to the AHA National Homebrewers Conference.



The Conference is June 19 to 21, 2003 in Rosemont, Ill. Events kick off with a pre-conference pub crawl. The host hotel is a couple of

blocks from the Blue Line L train, which means the pub crawl will start by train and not by bus. (Picture being the one person who is not a homebrewer in the same train car as a few dozen thirsty homebrewers. Oh my, what have I gotten myself into?)

The conference will feature blocks of seminars on evaluating beer; Belgian, German, English and American brewing traditions, food and beer; and onsite brewing demonstrations under the banner of "Boot

From Our Readers



Redstone Meadery owner and AHA member David Myers with Andrea Tringo enjoying free poppers at Kona Brewing Company in Hawaii—thanks to the AHA's pub discount program.

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Camp for Brewers" hosted by Charlie Papazian. The nighttime events will again feature the camaraderie of the brewing community at Club Night, the AHA Grand Banquet and Real Beer, Real Food. Real Beer, Real Food will be a sampling and tasting showcase featuring real ales, unfiltered lagers and regional artisanal foods presented in conjunction with Slow Food.

This year's conference is the 25th annual and it should be memorable long into the future.

**Vote for Your AHA
Board of Advisers**

There are three slots open on the AHA Board of Advisers for three-year terms beginning in June 2003. I work with the board on a daily basis for discussing ideas to advance homebrewing and its community. There is a slate of eight candidates for those three positions. Information on the election is on pages 12–13. Votes will be accepted online or by mail. You will need your membership number included with your vote so that we can check the validity of each ballot cast. Your membership card will have your number or you can call or email us at aha@aob.org to get your membership number.



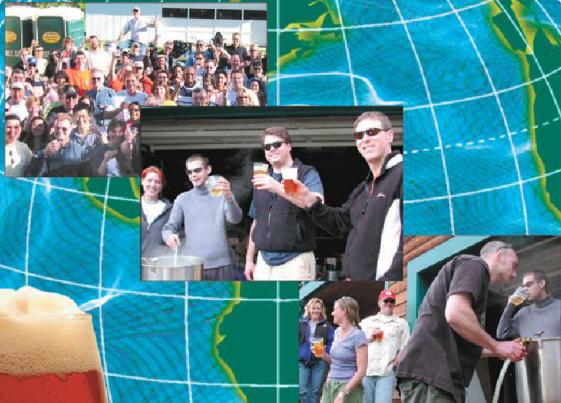
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American Homebrewers Association's 6th Annual

BIG BREW

Saturday, May 3, 2003

Celebrate National Homebrew Day with Big Brew!



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AHA-Lallemand Scholarship Returns

Thanks to the efforts of board of adviser member Rob Moline, Lallemand is again on board to provide the AHA membership benefit of an entry into the AHA-Lallemand Scholarship Contest. All AHA members can log on to the www.beertown.org Web site. Members who vote in the board of advisers election receive an extra entry into the AHA-Lallemand Scholarship Contest. The contest winner receives free admission and some coverage of expenses for the Short Course at the Siebel Institute of Technology in Chicago. The Siebel Institute is part of the World Brewing Academy.

National Homebrew Day/ AHA Big Brew

AHA members will again celebrate National Homebrew Day with the simultaneous brewing event known as the Big Brew on the first Saturday of May (May 3, 2003). All brewers should plan on getting together with other brewers from your area or club to enjoy the camaraderie of homebrewers and to make some great beer. The recipes and registration will be available on www.beertown.org in early April.

The Big Brew has served as a major membership drive for the AHA the past few years, and we encourage all AHA members to recruit new members. Why? Because the more AHA members we have, the more we can do to promote the hobby, which gets new brewers involved who can give us samples of their beer rather than us giving out all of the samples. No, seriously, the more people excited about homebrewing means that the community is stronger, shops are healthier and ingredients turn over faster and are fresher. The more homebrewers that participate in Big Brew means we get more coverage for the hobby in the mainstream press.

Also, if any of you are in the Boulder, Colo. area on the afternoon of Friday, May 2, please join us for a pre-National Homebrew Day celebration on our rooftop deck. The staff of the Association of Brewers will be dividing into brew teams and brewing up several batches and local homebrewers and craft brewers also join us in a fun beverage sharing event.

Paul Gatza is the director of the American Homebrewers Association.

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BY RAY DANIELS

Breakfast Cereal Beer

For a couple of years in the mid-1990s, beer writer Michael Jackson was in the habit of referring to me as “the breakfast cereal brewer.” That’s not a direct quote mind you, just the gist of what he said on a couple of occasions when our paths crossed.

Of course, anyone in the beer world is flattered and delighted when Michael mentions them in even the most remotely favorable way and I was no exception. Still, I couldn’t help but wonder just how widely I might become known for the breakfast cereal beers and whether that might become a substantial part of my brewing identity. A quick flash of panic would pass through me when that thought occurred.

The story of how this came to pass leads us in some interesting directions that center on a program I used to run called the “Invitational Brewoff.” This event was held each spring during the first round of judging for the National Homebrew Competition in Chicago. On Saturday night, we would line up 20 to 25 beers, each made from the same set of ingredients, then conduct a tasting and vote for the best beer. Winner got bragging rights and a handsomely engraved brewer’s paddle to hang on the wall.

The key to the event was that every brewer was given an identical package of ingredients to use: usually a bolus of base malt and maybe some light extract plus a specialty grain or two. Hops were also included. This left just a few variables up to the brewer. Equipment and technique were certainly a part of it; yeast selection was also a major factor.

In general, the beers displayed a good variety. People put in or took out a bit of grain here and there, varied their hop treatments and selected yeast strains suited to the styles they were trying to make. After a couple of years of doing this, we decided that it was successful enough that we wanted to invite the well-known Mr. Jackson to attend the event



as a speaker—and maybe drink our beers! Accordingly, I contacted Jackson’s office in London shortly after our second annual event and invited him to attend the anticipated third Invitational Brewoff in 1995.

By planning a year in advance, we were able to get on Jackson’s calendar and also give him time to arrange other business around that date so that the trip wouldn’t have to be covered by the Chicago Beer Society, the sponsoring homebrew club. Of course the event was far more than just a meeting of our club as the first-round judging draws top brewers and beer judges from across the Midwest—no doubt that is part of what made it attractive to Jackson as well.

Now here’s the subtle part: Jackson was invited to be an after dinner *speaker*. We didn’t consider it a part of his obligation for the event to taste the Brewoff beers. Thus when we began to formulate the Brewoff ingredient package for that year, we didn’t really give much thought to the fact that Jackson might be *tasting* them. And since it was the third year and the idea was in need of some innovation, we struck on the concept of using breakfast cereal in the beers. As with previous years, we gave every brewer a standard set of malts and hops and then

added one little rule: “Every beer must contain one whole box (any size) of breakfast cereal of the brewer’s choosing. During the tasting session, the empty box must be displayed next to the beer.”

Needless to say, that was a wild year for beers. Some of us—myself included—took the conservative route. Being as I was just weeks out of the diploma course at the Siebel Institute, I chose Cream of Wheat® and made a very drinkable product in the style of the historic American lager-ale blends known as “Cream Ale” and dubbed my concoction “Cream (of Wheat) Ale.”

Among the entries, we had beers that included things like Pop-Tarts® Crunch, Grape-Nuts®, Special K®, Honey Nut Cheerios® and Puffed Kashi®. Box sizes varied from the single-portion “variety pak” size to jumbo “family sized” boxes. The styles covered included oatmeal stout (of course), some Belgian-style Abbey beers and a good smattering of British and American styles.

Although not obligated to do so, Jackson showed up for the event in plenty of time to taste the Brewoff beers. To his credit, he studiously tasted every one and even took notes! When it came time for his after dinner talk, he spent most of it discussing the 20 beers everyone in the room had enjoyed. Needless to say, there were a lot of homebrewers floating somewhere close to heaven that night.

The big winner of the Brewoff that year was brewing author Al Korozonas who won not only the popular vote among the judges but also Michael Jackson’s kudos. Steven Klafka from Madison, Wis. took second place.

Ever the diplomat, Jackson had nice things to say about all 20 of the beers—although my memory is that my own Cream (of Wheat) Ale received only passing mention. Perhaps it was simply too civilized and drinkable to compete with the likes of “Pop-Tarts Crunch Ale” and

"Quaker Oatmeal Stout." Whatever the case, I remember it fondly as an enjoyable quaff, so for those who want to get started with breakfast cereal brewing, I've included the recipe with this column. In addition, Steve Klafka dug up his second-place recipe and we're including that as well.

First-round judging for the National Homebrew Competition will be coming up again this April. We'll have a site in Chicago as we have had since the regional structure was established and there will also be judg-

ing sites at a half-dozen other locations around the country. I urge all judges to participate. And if you aren't a judge, you can still help out as a steward or volunteer. See the listings elsewhere in this issue or on beertown.org for further information on getting involved.

Cream (of Wheat) Ale

Recipe for 5 gallons

8.5 lb (3.85 kg) 2-row malt

2.0 oz (57 g) Weyermann
Cara-Munich malt
0.5 lb (0.45 kg) Durst Vienna Malt
0.5 lb (0.45 kg) Schreier 10°L Caramel
28.0 oz (794 g) "Quick" Cream of
Wheat
0.7 oz (20 g) Crystal (4.3% alpha acid)
0.22 oz (6.2 g) Columbus (15.5%
alpha acid)
0.56 oz (16 g) Crystal (4.3% alpha acid)
0.8 oz (23 g) Crystal (4.3% alpha acid)
Wyeast American Ale (4 packs, 2
starters)

- OG: 1.048
- TG: NA

Cook Cream of Wheat for 15 minutes at a full boil in 3 gallons of water. Mash malts in at 122° F (50° C) for 15 minutes and then add enough of the just-boiled Cream of Wheat to raise the mash to a saccharification rest of 153° F (67° C). Add remainder of Cream of Wheat after it cools a bit. Once all ingredients are in mash, rest for 45 to 60 minutes then lauter as normal. Ferment in glass at about 60° F (16° C).

Hickory Nuts Brown Ale

By Steven Klafka

Recipe for 5 gallons

8.0 lb (3.6 kg) 2-row pale
1.0 lb (.045 kg) Cara-Munich
10.0 oz (283 gm) Cara-Vienne
2.0 oz (57 g) Special B
2.0 oz (57 g) Chocolate
2.0 oz (57 g) Black Patent
1.0 lb (0.45 kg) Grape Nuts Cereal
0.5 oz (14 gm) Columbus
(15.8% alpha acid), 60 min.
1.0 oz (28 gm) Crystal
(4.3% alpha acid), 60 min.
1.0 oz (28 gm) Progress
(6.2% alpha acid), 60 min.
1.0 oz (28 gm) Crystal
(4.3% alpha acid), 10 min.

- OG: 1.056
- FG: 1.024
- Mashed at 155-160° F (68-71° C)

Ray Daniels, aka the Breakfast Cereal Brewer, is editor-in-chief of Zymurgy. 

P-lambic P-clarification

Dear *Zymurgy*:

In the January/February 2003 issue of *Zymurgy*, Gus Rappold's letter in the Dear *Zymurgy* section talked about aging a "p-lambic" in wood. The editor's comments suggest that some people, not as familiar with the Universe of Sourness as some of us, may never have seen this term.

The term "p-lambic" is short for "pseudo-lambic" or "pure culture lambic." It is meant to describe a beer made in the style of lambic, but using cultured yeasts and bacteria rather than spontaneous fermentation and originating outside of the Payottenland region of Belgium. The former because we can only estimate a small portion of the microflora involved in creating this style, and the latter because we would like to pay homage to the origin of the style (as if lambic were an appellation such as Champagne or Burgundy).

While one could brew a true lambic beer anywhere in the world by inoculating their wort via exposure to the local microflora, it is unlikely that this would produce anything close to the Belgian classic examples. Thus, pure cultures of *Saccharomyces*, *Brettanomyces* and *Pediococcus* are used to produce an estimation of the style. It is this estimation that is referred to as pseudo lambic, or p-lambic (also written as pLambic).

Joe Preiser
Sour Beer Guy

Hey Sour Guy,

Well, I guess that means we can stop scouring Flemish dictionaries looking for entries under "plambic." We'll also stop expecting a reply from beer writer Michael Jackson on our note asking why this important new style is not included in any of his great books. (Not.) Just goes to show you that



Thanks to Scott Stihler for his home-brew label submissions!



even we can learn something new about beer from Zymurgy!

—Ed.

Much Abrew About Hairdo

Dear *Zymurgy*:

About the November/December 2002 issue of *Zymurgy* (which featured three women holding glasses of beer). Why are the two cool 60s chicks hanging out with a modern chick (behind the bar) on the cover?

Is this a photo trick or some Mensa puzzle that needs solving? It is bothering me.

Gretchen Sky

Dear Sky Babe:

Computers are wonderful, aren't they? Our art director transformed that picture of a futuristic space ship community into a marvelous retro-design with just a few flicks of his mouse. We guess he missed the mid-

dle chick with his retro stick somewhere along the line. In any case, we thought the cover was fun and different—although we did have to clean up one of the dialog bubbles for propriety's sake.

As for the Mensa puzzle, you seem to be the only one who noticed. Actually there are three of them. 1) Name the teams playing in the football game on the TV. 2) Give the name of the organization whose logo appears on the bottle in front of the middle woman. 3) There's something other than hair that's familiar about the middle chick. Guess who we think she looks like.

First right answer to all three questions gets a free beer next time they track us down.
—Ed.

Prohibition in Nebraska

Dear *Zymurgy*:

When we came to Blair, Neb. 53 years ago, a Dr. Morris Nielsen was practicing

medicine here. He was a certified character of the first order. He died in 1955. Then his daughter-in-law wrote a book about him. The book contains a recipe for making beer, which I enclose. I thought this one might be of interest—and a challenge to brew.

"Mother's Beer"

"Boil 8 gallons of water. Put 25 cents worth of hops (3 packages) in sack and put in water and boil it for half of an hour. Have another 8 gallons of water in your tub. Take out the hops and put in the cold water to rinse them good. Then put in a dollar's worth of sugar and a 15-cent can of syrup. When cooled to Blood Heat put in 3 cakes of yeast (5 cents worth) or 5 cakes of Yeast Foam. In morning skim and cork."

(Extracted from The Life and Times of Doc Nielsen by Margaret Ellen Nielsen.)

Sincerely,
Roy Anderson

Dear Roy:

Thanks for the recipe. We did a little research and found that \$1 during prohibition is worth about \$10 today. That would mean that this recipe for 16 gallons of beer was made with \$2.50 worth of hops (~3.5 ounces), \$10 worth of sugar (~20 pounds) and \$1.50 of malt extract (~0.6 pound). By our quick calculations, that gives a beer with an OG of 1.059 and maybe 30 IBUs.

We had a prohibition beer made from a recipe similar to this once. Tasted just like apple cider!

—Ed.

Extract Recipe Expedition

Dear Zymurgy:

I just received my latest copy of **Zymurgy** and read it promptly. The "Expedition Stout" looks and sounds like a winner. Unfortunately, I am not an all-grain brewer. I brew mostly from extracts with a few grain "teas" added. Can you help me by suggesting appropriate modifications to create a reasonable extract clone?

As a matter of fact, I would recommend that whenever you have an all-grain recipe in an article such as this, you suggest an equivalent extract (obviously not always

possible). I'm sure that a great many of your readers would appreciate this effort.

You have a great publication. I have found a large number of excellent recipes. I'll probably never get to them all, but I'm sure going to try.

Thanks again.
Hoyt Allen

Dear Hoyt:

We know that you are only one of a legion of similar homebrewers out there and we do hope to make all the recipes accessible to you. Unfortunately many recipes don't come with extract recommendations so standard conversions are the best you can do. Here's how we would approach the process.

Look for the "base malt"—usually the one that constitutes the greatest portion of the grain bill by weight. In this case, it is the 12.5 pounds of "two-row" malt. In other cases, it may be called lager malt, pilsener malt, pale ale malt or 6-row malt. In all of these cases, you can substitute a pale or light malt extract by a simple ratio. Replace each pound of base malt, with either one-half (0.5) pound of dry malt extract or two-thirds (0.67) pound of malt extract syrup.

About the only exception to this approach comes when recipes have Vienna or Munich malt as the base. In that case, we would suggest using amber extract for the replacement at the same ratios.

Once you do this, make a tea from the remaining specialty malts and carry on from there.

Hope that helps—not only with this recipe but with anything else you find on the pages of Zymurgy.

—Ed.

Lee's URL Redux

Dear Zymurgy:

I just received the January/February 2003 issue of **Zymurgy** magazine and was pleasantly surprised to see my Web site "Lee's Brewery" mentioned in the "Brewing in the Electronic Age: Software to Help You Brew" article. A relatively minor nit though, the URL provided at the end of the paragraph should actually read www.leebrewery.com/software.htm. There is no "s" in leebrewery.com.

Or perhaps a more useful link for readers is www.leebrewery.com/beermath.htm which will take them directly to the on-line beer calculator and specific gravity correction programs. Cheers!

Lee Chichester
Lee's Brewery
www.leebrewery.com

More Brewing Software Options

Dear Zymurgy,

Thanks for the article on brewing software in your January/February 2003 issue. Unfortunately, several items appear to have been inadvertently left out.

Let me suggest two freeware (Linux) choices. The first is one that I've attempted to improve and update, called BrewNIX. It is available for a free download from <http://brewnix.sourceforge.net>. The second program with which I am familiar is qbrew, available via free download from www.usermodel.org/code.html. Qbrew is also available for various Windows operating systems.

These two programs are just a sample of the many brewing programs available on the Internet. If you or your readers are interested, I would certainly be happy to answer any questions. I'm certain that the author of qbrew would feel similarly.

George Howell

George,

Thanks for the input. There are indeed many other options out there and no single article could hope to review them all. Even within the limits of Windows-based options, more programs exist than we could attempt to cover, as we pointed out. We're sure those readers who work on other operating systems will be glad to be made aware of these options.

—Ed.

Send your homebrewing questions to "Dear Zymurgy," PO Box 1679, Boulder CO 80306-1679; fax (303) 447-2825 or e-mail professor@aob.org. Hey homebrewers! If you have a homebrew label that you would like to see in our magazine, send it to: Dave Harford, Magazine Art Director, The Association of Brewers, 736 Pearl Street, Boulder CO 80303 or e-mail it to harford@aob.org.

BY GARY GLASS

Let Your Voice Be Heard!

This issue's Clubs Report has been shortened to make room for the AHA Board of Advisers election ballot. The people serving on your Board of Advisers have a major impact on your association. We urge you and all of the AHA members in your club to take the time to vote in this year's election.

Also mark your calendars for the upcoming AHA National Homebrew Competition. The competition is a perfect opportunity to show what your club is made of. But you can't win the Homebrew Club of the Year if your club members do not enter the competition. The entry deadline is April 9-18, 2003. Check out the site map in this issue to find where to send your entries. If your club happens to be near one of the sites, please consider volunteering as a judge or steward. This competition is a fun one and attracts the best homebrew in the country.

Fruits & Veggies Club-Only Competition

The AHA thanks David Perez, Mark Tumarkin and the Hogtown Brewers of Gainesville, Fla. for hosting the Fruits & Veggies Club-Only Competition on December 14. This was the third of six competitions in the August to May 2002-2003 cycle, with points going toward the Homebrew Club of the Year trophy. Points are awarded on a 12-8-4 basis for first, second and third place in the club-only competitions. First, second and third places in the first and second rounds of the AHA National Homebrew Competition earn points on a 6-4-2 basis. The club whose members have amassed the most points over the year will be crowned the Homebrew Club of the Year at the AHA National Homebrewers Conference in Chicago June 19-21, 2003.

Of the 46 entries the winners were:

First Place

Curt Hausam of Salem, Ore. (The reigning

PHOTO BY GREG YOUNKIN

From Our Readers



Left to right, Ensley, Klapka and Andrusz of the Madison Homebrewers and Tasters Guild (MHTG) in Madison, Wis. Thanks to Bob Paolino!

Homebrewer of the Year and Ninkasi Award winner)

Representing Strange Brew with his Thrilla Vanilla, a robust porter with vanilla beans.

Second Place

Paul Pilcher of Kansas City, Mo.

Representing the Kansas City Bier Meisters with his English Brown with Chiles, a northern English brown with Anaheim and jalapeño chiles.

Third Place

Ray Lewis of Livonia, N.Y.

Representing the Upstate New York Homebrewers Association with his Cherry Smash, an oud bruin with sour cherries.

Congratulations to all of the winners, and thanks to all of the club representative brewers who entered!

Gary Glass is the project coordinator for the American Homebrewers Association. 

2002-2003 Homebrew Club of the Year Standings

Points	Club
12	Hampton Roads Brewing and Beer Tasting Society
12	James River Homebrewers
12	Kansas City Bier Meisters
12	Strange Brew
8	Fellowship of Oklahoma Ale Makers
8	Great Northern Brewers Club
4	Minnesota Home Brewers Association
4	Upstate New York Homebrewers Association

Brown Ale AHA Club-Only Competition

The April AHA Club-Only Competition is Brown Ales. The competition is hosted by Susan Ruud and the Prairie Homebrewing Companions of Fargo, N.D.

The style for the competition is Brown Ales, BJCP Category 10. One entry of two bottles is accepted per AHA registered homebrew club. Entries require a \$5 check made out to AHA and an entry/recipe form and bottle I.D. forms. More information on the club-only competitions and forms are available at www.beertown.org. Please send your entry to:

AHA COC
C/O Susan Ruud
5605 56th Ave N.
Harwood, ND 58042

Entries are due by April 4, 2003. Judging is slated for April 12, 2003. Email for questions or those interested in judging is susan.ruud@ndsu.nodak.edu.

Upcoming 2003 AHA Club-Only Competition Styles

Month	Style or Name	Cat. #	Host
April	Brown Ale	10	Prairie Homebrewing Companions
May	English & Scottish Strong Ale	11	Rillito Creek brew Club
August	European Pale Lager	2	Foam on the Range
Sept/Oct	Specialty/Experimental/Historical Beers	24	Colonial Ale Smiths & Keggers
Nov/Dec	Koelsch & Altbier	8	Pacific Gravity

AHA BOARD OF ADVISERS ELECTION

Your AHA Board representatives have a very direct impact on the direction of your Association. Please vote today!



Brief Candidate Statements (please see www.beertown.org for full candidate statements)

Chuck Bernard Medina, OH

2003 marks my seventh year as a homebrewer. I am a member of several homebrew clubs: the Society of Akron Area Zymurgists (S.A.A.Z.), the Society of Northeast Ohio Brewers (S.N.O.B.s) and a "lifetime member" of the Music City Brewers in Nashville. I am currently the AHA Liaison for Northeast Ohio. I served on the organizing committee for several editions of Nashville's Music City Brew-Off, as competition director for MCAB-IV in Cleveland, and am currently on the planning committee for the new East regional AHA NHC first round site. I am a BJCP National level judge, exam grader and proctor, and have led exam preparation study groups. I have worked at a local retail home brew shop. I joined the AHA in 1997, and have seen great improvements in the organization since then. Many of those improvements are the direct result of suggestions from the AHA membership. The strength and growth of the AHA is due to its members, and I believe our potential is unlimited. I want to continue the efforts of the Board of Advisers in improving the benefits of AHA membership so homebrewers of all skill and experience levels will want to join the AHA. I am honored to be nominated as a candidate for the Board of Advisers.

Ed Busch Hillsborough, NJ

I'm a veteran of the Board of Advisers, having been on the board for many years. Having taken two years off from the Board, I'd like to return and continue to help the AHA. I have a simple viewpoint that you might want to think about. Homebrewing is a hobby and as a hobby it should always be fun. We should always strive to improve the Association with the "fun" aspect in mind. Whether that fun aspect to you is simple extract brewing or equipment designing doesn't matter, just as long as we each have satisfaction in the hobby and with the AHA.

Brian Cole Black Mountain, NC

I love brewing and teaching people to make and appreciate beer and mead. It is an honor to be nominated for your Board of Advisers. I started brewing in 1995 and helped found the homebrew club in Asheville, NC, Mountain Ale and Lager Tasters. I have served as MALT's President, Minister of Culture and liaison with other clubs. Entering and judging at homebrew competitions is my favorite way to get objective, knowledgeable feedback on my beer and mead and support other brewers and clubs. I am a National judge in the Beer Judge Certification Program. Judging makes me a better brewer and allows me to give something back to the homebrew community. I have won a number of regional and national awards for my beer and mead, the highlight being AHA's Ninkasi Award in 2001. As an AHA member since 1997 and an AHA Liaison, I believe the AHA has significantly improved Zymurgy and communication with and participation by members. I'd like to help the AHA serve you even better. If elected, I will represent your interests and concerns to the AHA, work to improve member benefits and promote our hobby. Please vote.

Dave Dixon Bedford, TX

Brewing has become more than a hobby to me; it is a passion. The AHA has provided guidance in helping me take my brewing to the next level. I would like to provide that assistance to fellow homebrewers. The AHA needs to continue to promote the "grassroots" approach it has adopted by growing the AHA Liaison program. This empowers AHA members to represent the Association at events and helps open the lines of communication with Paul, Gary and the Board of Advisers. This will also provide an avenue to gain membership and community recognition for our Association. Accomplishments:

- Formed NET Hoppers Homebrew Club 1998
- NET Hoppers President 4 years
- Bluebonnet Brew-off Committee 5 years
- 2000 Bluebonnet Brew-off Assistant Director
- 2001 Bluebonnet Brew-off Director
- Assisted with the establishment of the Gulf Coast Competition Committee 2000
- 2002 Committee Chair to bring 2002 AHA National Homebrew Competition to Dallas/Ft. Worth Texas
- 2002 Chairperson AHA National Homebrewers Conference

Being nominated for the AHA Board of Advisers is an honor and a privilege. If elected I will do everything in my power to ensure the AHA will work for the homebrewers that make up our Association.

Steve Ford Overland Park, KS

I'd like to say what an honor it is to be nominated to serve on the Board of Advisers for the American Homebrewers Association. I began brewing about 10 years ago and became a member of the Kansas City Bier Meisters and the AHA shortly after. It didn't take long for me to become immersed in the hobby. I've served the Kansas City Bier Meisters in many capacities and am currently on my second tour as president. I recently earned the ranking of Master Judge in the Beer Judge Certification Program and I've assisted in instructing prospective judges in local review sessions and have proctored on several exams. I believe that education and knowledge is a key part of improving homebrewing. As with any organization like the AHA, the true power of it belongs with the membership and it is only a strong organization with input from the membership. I hope you will take the time to vote.

Al Hazan Stroudsburg, PA

I have been homebrewing for 10 years, a member of the AHA for nine years and am currently a BJCP Certified judge. I am a member of the BJCP Continuing Education Committee and have volunteered to be a member of the newly forming BJCP Style Guideline Update Committee. While being geographically isolated from any homebrew club, I have, for the past four years, judged each competition held for three Philadelphia-area based homebrew clubs (BUZZ, HOPS and Keystone), and maintain

good relationships with many of their members. My goals, if elected, would be to continue the growth the AHA has taken in recent years in providing new, and better (Pub Discount Program and Zymurgy), services to its membership base. I also see the need to recognize and represent those of us who, for the love and passion of our hobby, continue to brew, though live like myself, geographically isolated from other brewers and hence other homebrew clubs. Many thanks for your consideration and support.

Randy Mosher Chicago, IL

Thanks for the opportunity to run again for this office. Here's how I intend to contribute if elected to this important job: (1) Help to continue the shift of the AHA toward a member-driven, grassroots organization. Much progress has been made in this direction (witness these elections, and the club-driven National Homebrewers Conference), but much more remains to be done. (2) Encourage the AHA to facilitate the connections between brewers and brewing-related organizations of all stripes: individuals to clubs, clubs to other clubs, and those to other brewing hobby groups such as the BJCP, Homebrew Digest, etc. This hobby will be much stronger if all of these connections are strengthened. (3) To help secure the place of the AHA and the homebrewing hobby in the larger world of food and drink, by outreach to people with those broader interests (who, by the way, are an excellent source of prospects). Homebrewing is a model for the way dedicated enthusiasts can create something bigger — craft brewing. (4) To continue to help put a face on the AHA that represents the best of what homebrewing is all about — creativity, enthusiasm, knowledge and especially generous good humor.

Gordon Strong Beavercreek, OH

Since becoming a homebrewer seven years ago, I've become somewhat fanatical about beer, brewing and judging. I've brewed more than 80 beers, meads and ciders, and have been fortunate enough to win eight Best-of-Show awards including last year's Mazer Cup. I've been active in my local club (DRAFT), including serving as an officer and hosting Big Brews. I've organized five competitions, including an AHA Club-Only

competition. I'm a lifetime member of the AHA, and am currently an AHA Liaison. I'm also active in the BJCP, and am currently a Grand Master judge, a BJCP Associate Exam Director and exam grader. I wrote the new BJCP database system, and maintain the BJCP Web site for online judge records. I've judged in more than 80 competitions (including 30 BOS sessions), have administered seven exams, have given three judging classes and have graded more than 150 exams. I've attended four National Homebrewers Conferences, and judged BOS at three. I've spoken at MCAB, had recipes published in Zymurgy, and contribute to HBD and JudgeNet. I believe in personal responsibility, lifelong learning, freely sharing knowledge and maintaining balance in life. It's an honor to be asked to serve on the Board of Advisers.

Election Guidelines:

Read the statements, see www.beertown.org for full candidate statements. Vote online at www.beertown.org or photocopy the ballot (that way you don't have to cut your Zymurgy). Vote for three (3) 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 at 888-822-6273 or email info@aob.org. Sign your ballot.

Mail completed ballots to: AHA Election, Attn: Rob Moline, 1332 Arizona Avenue, Ames, IA, 50014; or fill out the online ballot at www.beertown.org. Ballots must be postmarked no later than April 1, 2003. Only one ballot per member will be accepted.

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 or two-week Microbiology Course. Check the "Enter Me" box on the ballot to submit your entry. The drawing will take place June 20, 2003 at the AHA National Homebrewers Conference.

Vote Now!

American Homebrewers Association 2003 Board of Advisers Election OFFICIAL BALLOT

Select the three (3) candidates you feel are best qualified to serve on the AHA Board of Advisers.

- | | |
|--|--|
| <input type="checkbox"/> Chuck Bernard | <input type="checkbox"/> Steve Ford |
| <input type="checkbox"/> Ed Busch | <input type="checkbox"/> Al Hazan |
| <input type="checkbox"/> Brian Cole | <input type="checkbox"/> Randy Mosher |
| <input type="checkbox"/> Dave Dixon | <input type="checkbox"/> Gordon Strong |

Enter Me in the Lallemand Scholarship Drawing

Name _____

Membership Number _____

Signature _____



**BALLOTS MUST BE
POSTMARKED NO
LATER THAN
APRIL 1, 2003**

Ballots will earn an additional entry in the drawing for the Lallemand Scholarship to the Siebel Institute by checking the "Enter me" box on your completed ballot. The drawing will take place on June 20, 2003 at the National Homebrewers Conference in Chicago, IL.



Mail completed ballot to:

AHA Election; Attn: Rob Moline; 1332 Arizona Ave., Ames, IA 50014
or submit your ballot online at www.beertown.org.



American Homebrewers Association's 25th Annual

National Homebrew Competition 2003

Entries due April 9 - 18, 2003

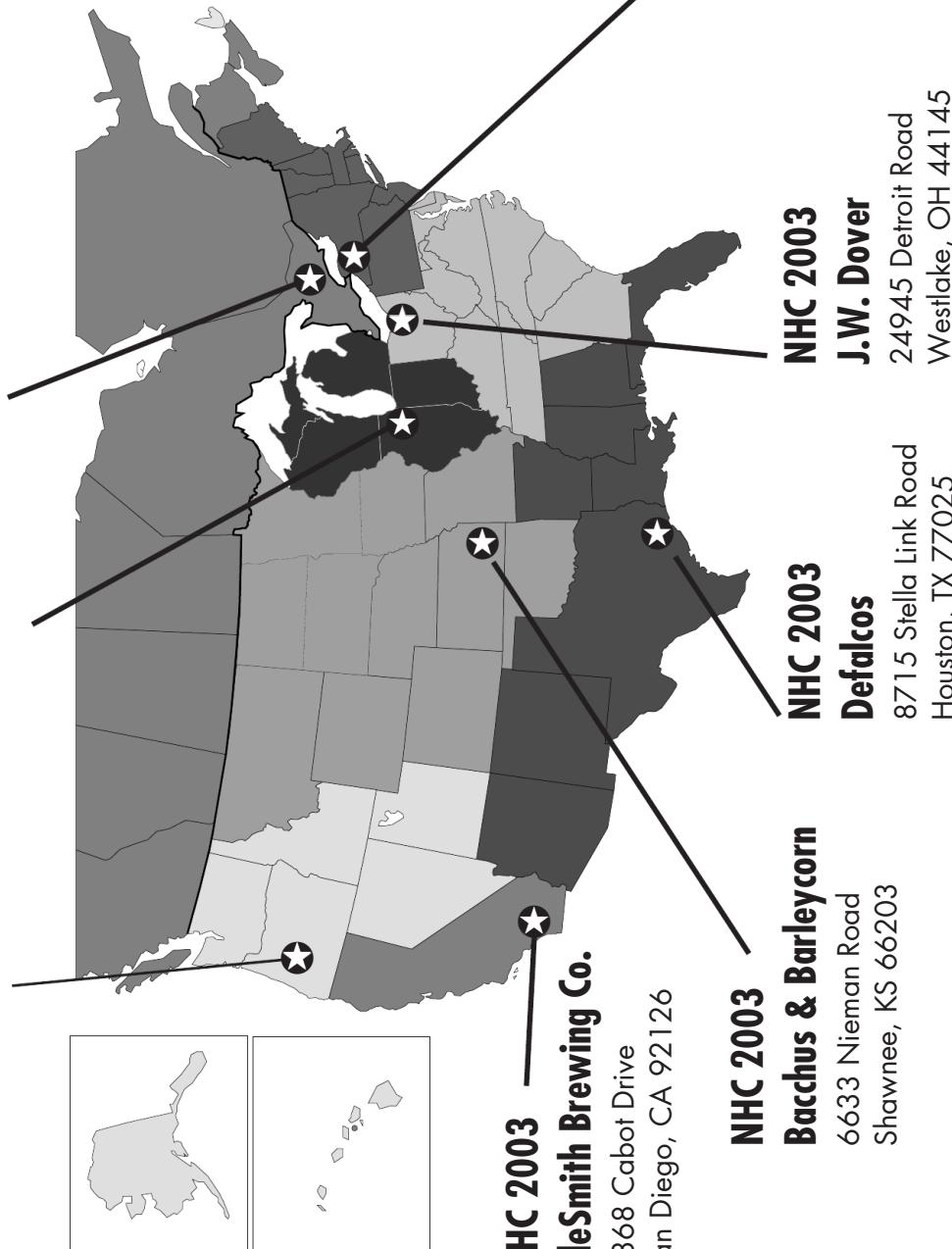
NHC 2003

F.H. Steinbart Inc.

234 S. E. 12th
Portland, OR 97214

NHC/GCHC 2003

For entry information for the Great
Canadian Hombrew Competition
see www.realbeer.com/caba/



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

NHC 2003

Party Creations

345 Rokeby Road
Red Hook, NY 12571

**DO NOT SEND BEER OR MEAD
ENTRIES TO RED HOOK, NEW YORK!**

International Entries

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

NHC 2003

F.H. Steinbart

234 E. 12th
Portland, OR 97214

NHC 2003

Rohrbach Brewing Co

3859 Buffalo Road
Rochester, NY 14624

Contact: Gary Glass • 1.888.822.6273 • +1.303.447.0816 ext. 121 • gary@uob.org • www.beertown.org

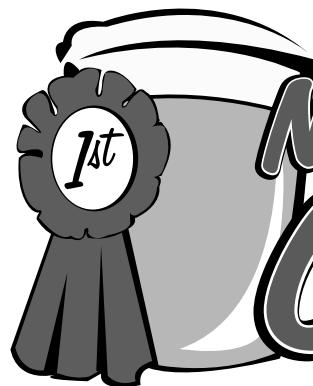


American Homebrewers Association
A Division of the Association of Brewers

It's good to be...
Royalty!

Will you be crowned
**HOMEBREWER
OF THE YEAR?**

Not if you don't enter! Show
us what you've got against
3,000 of the best homebrews
from around the globe.



American Homebrewers Association's 25th Annual

NATIONAL HOMEBREW COMPETITION

Entries Due: April 9-18, 2003

First Round: Judging at regional sites from April 25-May 4, 2003

Second Round & Awards Ceremony: June 19-21, 2003

at the AHA National Homebrewers Conference, Chicago, IL

For complete rules and regulations visit www.beertown.org
or call 1.888.822.6273 (U.S. and Canada only) or +1.303.447.0816.

To find your entry site, check the Site Locator Map
in the March/April 2003 issue of *Zymurgy*.

AHA
members
receive
entry-fee
discounts*



JOIN THE FUN!

See entry form on next page

*See entry form for discounts

American Homebrewers Association
A Division of the Association of Brewers





American Homebrewers Association's 25th Annual NATIONAL HOMEBREW COMPETITION



Entry Form

Send this filled-out form to your regional site. Check the Locator Map in March/April 2003 issue of **Zymurgy**.

Questions? Contact Gary Glass, NHC Director, at gary@aob.org or call (888) 822-6273 (U.S. and Canada only) or (303) 447-0816 x121.

Please read the instructions in PART II of the rules and regulations found on 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.

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. Category and Subcategory (Print full names) _____
13. Category Number (1-29) _____
14. Subcategory Letter (a-e) _____
15. Name of Brew (optional) _____
16. For Mead and Cider (check one): Dry Medium Sweet
17. For Mead and Cider (check one): Sparkling Still
18. SPECIAL INGREDIENTS:

If you have entered in any of the following categories 19e, 20c, 21, 22, 23b, 24, 25, 26, 27, 28b, 28c, 29 refer to part II of the Rules and Regulations and the NHC Style Guidelines at 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) _____



AMERICAN HOMEBREWERS ASSOCIATION

MARCH

1 **14th Annual Reggale and Dredhop Homebrew Competition.** Denver, CO. AHA/BJCP SCP. Sponsored by: Hop Barley and The Alers. Deadline: 2/10-2/21. Fees: \$5. Awards Ceremony: 3/1. Contact: Bob Kauffman. Phone: 303-828-1237, 303-913-5722. E-mail: dredhop@hopbarley.org Web: <http://hopbarley.org>

3 **Washoe Zephyr Zymurgists Homebrew Competition.** Reno, NV. AHA/BJCP SCP. Sponsoring Club: Washoe Zephyr Zymurgists. Deadline: 2/8-2/22. Fees: \$6 first, \$4 add. Awards Ceremony: 3/2. Contact: John C. Tull. Phone: 775-784-4804, 775-329-2537. E-mail: johnctull@fastmail.fm Web: <http://134.197.55.114/wzz/wzz-comp2003.html>

8 **9th Annual Boston Homebrew Competition.** Waltham, MA. BJCP SCP. BHC9 is an MCAB6 qualifying event, as well as part of the New England Homebrewer of the Year circuit. Best of Show and Brewmaster's Choice (you get to brew your recipe at Watch City!) prizes will be awarded. Sponsoring Club: Boston Wort Processors. Deadline: 2/1-2/21. Fee: \$5. Awards Ceremony: 3/8. Contact: John Doherty. Phone: 508-923-6376. E-mail: dohertybrewing@yahoo.com Web: www.wort.org

8 **Bluebonnet Brew-off.** Irving, TX. AHA/BJCP SCP. Sponsored by Cowtown Cappers, NET Hoppers, Knights of the Brown Bottle, North Texas Homebrewers Association and Red River Brewers. Deadline: 2/14-2/28. Fee: \$7-9. Awards Ceremony: 3/21-3/22. Contact: Mark A. Wedge. Phone: 817-938-8400, 817-381-2915. E-mail: markwedge@yahoo.com Web: www.bluebonnetbrewoff.com

8 **St. Patrick's Cascadia Cup Homebrew Competition.** Redmond, WA. AHA/BJCP SCP. The largest industry sponsored homebrew competition in Washington State! Sponsoring Club: Cascade Brewers Guild. Deadline: 2/15-3/03. Fees: \$6. Awards Ceremony: 3/08. Contact: Alan Hord. Phone: 425-844-8473. E-mail: Alan@HordsOfFun.Com Web: www.CascadeBrewersGuild.org/default.asp?np=2003cbgcontest.asp

8 **12th Annual BOSS Challenge** featuring the Chicago Cup. Flossmoor, IL. BCJP SCP. Sponsored by the Brewers of South Suburbia (BOSS). Deadlines: 2/21-3/1. Fees: \$6 1st entry, \$5 each add. Awards Ceremony following BOSS meeting 4/4. Contact: David Persenaire. Phone: 708-614-9087, E-mail: Davidpersenaire@aol.com Web: www.uswbaccess.net/boss

13-22 **March Mashness.** St. Cloud, MN. AHA/BJCP SCP. A growing Midwest competition with all BJCP styles accepted. Sponsored by The Cloudytown Brewers. Deadline: 2/26-3/12. Fees: \$6. Awards Ceremony: 3/22. Contact: Darin Dorholt. Phone: 320-656-0899, E-mail: itsusfolks@aol.com Web: www.cloudytownbrewers.org

15 **AHA TechTalk Homebrew Competition.** Denver, CO. AHA/BJCP SCP. Foam on the Range hosts the first annual AHA TechTalk. Competition entries accepted in Categories 6A, 6B & 6C American Pale Ales as well as Category 10D American Brown Ale. Must be an AHA member to enter. Deadline: 2/3-3/12. Fees: \$5 1st entry, \$4 additional. Awards Ceremony: 03/15. Contact: Jon Douglas. Phone: 303-766-6747. E-mail: events@foamontherange.org Web: www.foamontherange.org

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Our catalogue and web site has everything you need to brew the best beer possible. Home brew starter kits, pitchable Wyeast and White Labs yeast, fresh malt extract, thirty hop varieties, keg equipment, glassware and so much more. Stop in our store, visit northernbrewer.com or call 1-800-681-2739.



15 CARBOY Shamrock Open Homebrew Competition. Raleigh, NC. AHA/BJCP SCP. Sponsored by CARBOY (Cary Apex Raleigh Brewers of Yore). Deadlines: 3/9-3/15. Fees: \$6 1st entry, \$5 each add. Awards Ceremony: 3/15. Contact: Jim Brewer. Phone: 919-465-2045, E-mail: brewer27513@hotmail.com Web: www.hbd.org/carboy/shamrock.htm

28-29 8th Annual Hurricane Blowoff Homebrew Competition. West Palm Beach, FL. AHA/BJCP SCP. Open to all styles of beer and mead. Sponsored by Palm Beach Draughtsmen. Entry deadline: 3/8-3/22. Fees: \$6. Judging: Evening of 3/28 and morning and afternoon of 3/29. Awards Ceremony: 3/29. Contact: John Peterson. Phone: 561-625-3400, 561-575-3682. E-mail: jep_kgpa@bellsouth.net Web: www.fortunecity.com/littleitaly/giotto/175

29 Slurp and Burp Open. Salem, OR AHA/BJCP SCP. Win a 15 gallon stainless steel brew pot. The 6th Annual Slurp and Burp is an event you don't want to miss. Quality judging of all Beer, Mead and Cider categories without collapsing. Medals to all 1st, 2nd and 3rd place winners with quick feedback to entrants. Sponsored by Strange Brew Club. Deadline: 3/10-3/25. Fees: \$6. Awards Ceremony: 3/29. Contact: Ted Hausotter. Phone: 503-538-9501, 503-625-2566. E-mail: tednjodie@msn.com Web: http://members.aol.com/slurpnburpor

APRIL

5 8th Annual Knickerbocker Battle of Brews. Albany, NY. AHA/BJCP SCP. All BJCP styles, meads and ciders will be judged. Albany Pump House's Master Brewer George De Piro will supply an extra special prize by selecting one of the Best of Shows entries to brew at his Brew Pub. Sponsoring Club: Saratoga Thorough Brews. Deadline 3/17-3/29. Fees: \$5. Awards Ceremony: 4/5. Contact: Reed Antis. Phone: 518-583-0434, 518-793-9654. E-mail: reedmary@capital.net

5 11th Annual Dominion Cup. Richmond, VA. AHA/BJCP SCP. Sponsored by The James River Homebrewers. Don't be afraid, send in your homebrew! Judging will be held at Legend Brewing. Deadline: 3/19-4/3. Fees: \$5. Awards Ceremony: 4/5. Contact: Joel Trojnar. Phone: 804-556-1136. E-mail: joel@trojnar.com Web: http://jrhomebrewers.org/

5 Bay Area Mashers World Cup of Beer. Berkeley, CA. AHA/BJCP SCP. Sponsored by Bay Area Mashers. Deadline: 2/15-3/15. Fees: \$7. Awards Ceremony: 4/5. Contact: Lee Shephard. Phone: 510-336-1546. E-mail: lshephard@earthlink.net Web: www.bayareamashers.org

21-24 Association of Brewers goes "On the Road" - Southeast Region. Southeast, USA The Association of Brewers invites YOU to participate in the "On the Road" events. Charlie Papazian wants to meet enthusiastic homebrewers on his visit to the Southeast region. Visit www.beertown.org for specific times, locations and special homebrew contest information. Contact: Mark Snyder. Phone: 303-447-0816, 888-822-6273. E-mail: mark@aob.org Web: www.beertown.org

April 25 - May 4 AHA National Homebrew Competition 1st Round.

Regional Sites across the states. AHA/BJCP SCP. Entry Fee: \$8 for AHA members/\$12 for non-members. Entry Deadline: April 9-18. Judging: April 25-May 4. Contact: Gary Glass. Phone: 303-447-0816 x 121, 888-U-CAN-BREW x 121. E-mail: gary@aob.org Web: www.beertown.org

MAY

1 2003 Upper Mississippi Mash-Out. Minneapolis /St. Paul, MN. AHA/BJCP SCP. 2nd Annual Upper Mississippi Mash-Out Homebrew Competition, sponsored by the Minnesota Home Brewer's Association and the St. Paul Home Brewer's Club. All 26 BJCP categories including Cider and Mead. Deadline: 4/11-4/20. Fees: \$7 for 1st entry, \$5 for additional entries, 2 bottles per entry. Awards Ceremony: 5/3 at Summit Brewing in St. Paul. Contact: Al Boyce. Phone: 952-927-8968, 651-205-0471. E-mail: al@mnbrewers.com Web: www.mnbrewers.com/mashout

3 AHA's 6th Annual Big Brew. All around the world. Celebrate National Homebrew Day with the American Homebrewers Association's Big Brew. Simultaneous Toast: 12:00 Central Time. Recipes TBA. Visit www.beertown.org to find out how you can celebrate. Contact: Gary Glass. Phone: 303-447-0816 x 121, 888-U-CAN-BREW X 121. E-mail: gary@aob.org Web: www.beertown.org

AMERICAN HOMEBREWERS ASSOCIATION

• KUDOS • SANCTIONED COMPETITION PROGRAM BEST OF SHOW

MARCH 2002

Kona Brewers Fest 2002, 146 entries - Bill Brooks & Jud Robison of Honolulu, HI.

SEPTEMBER 2002

Pacific Brewers Cup, 241 entries - Jeff Williams of Laguna Niguel, CA.

OCTOBER 2002

Hoppy Halloween Challenge, 151 entries - Jim Maurer of Aurora, CO.

NOVEMBER 2002

Humpy's Big Fish Homebrew Competition, 123 entries - Jason Ditsworth of Anchorage, AK.

QUAFF 4th Annual Strong Ale Homebrew Competition, 36 entries - Chuck West of San Diego, CA.

AHA SCP = American Homebrewers Association Sanctioned Competition Program. **BJCP** = Beer Judge Certification Program. The Calendar of Events is updated weekly and is available from the Association of Brewers: info@aob.org or www.beertown.org on the Web. To list events, send information to **Zymurgy** Calendar of Events. To be listed in the May/June Issue (Vol. 26, No. 3), information must be received by March 4, 2003. Competition organizers wishing to apply for AHA Sanctioning must do so at least two months prior to the event. Contact Kate Porter at kate@aob.org; (303) 447-0816 ext.123; FAX (303) 447-2825; PO Box 1679, Boulder, CO 80306-1679.

10 B.E.E.R.'s 7th Annual Brew-off Homebrew Competition. Nesconset, NY. AHA/BJCP SCP. Sponsored by B.E.E.R. (Brewer's East End Revival), this is the island's largest competition. This is now part of the "New York State Homebrewer of the Year" (NYS HOTY) statewide competition. Deadline: 4/1-5/2. Fees: \$6. Awards Ceremony: 5/10. Contact: Kevin Basso. Phone: 631-327-1338, 631-231-7050. E-mail: kevinb@awsperry.com Web: http://hbd.org/beer

15-18 Calaveras County Fair and Jumping Frog Jubilee. Angels Camp, CA. AHA/BJCP SCP. Amateur Beer Fair Competition open to the following counties: Placer, El Dorado, San Joaquin, Sacramento, Amador, Tuolumne, Alpine, Mariposa, Stanislaus and Calaveras. Sponsored by: Calaveras County Fair. Deadline: 4/1. Fees: \$2. Awards Ceremony: 5/15-5/18. Contact: William Tarchala. Phone: 209-736-2561. E-mail: info@frogtown.org

16 21st Annual Oregon Homebrew Festival. Corvallis, OR. AHA/BJCP SCP. The oldest and one of the largest homebrew competitions and festivals in Oregon, this year featuring added entertainment to celebrate our 21st Anniversary! Sponsored by: Heart of the Valley Homebrewers. Deadline: 4/1-4/26. Fees: \$6. Awards Ceremony: 5/17. Contact: Ron Hall. Phone: 541-715-2727, 541-745-7062. E-mail: rhall@hp.com Web: www.hotv.org

17 The BrewMaster's Open. Alpharetta, GA. AHA/BJCP SCP. Awards also given for 1st, 2nd and 3rd Best of Show. Sponsored by The BrewMasters of Alpharetta. Deadline: 5/1-5/10. Fees: \$6. Awards Ceremony: 5/17. Contact: Craig Sikes. Phone: 770-645-1777, 770 888-8665. E-mail: CraigSikes@aol.com Web: www.GeorgiaBrewer.com/BrewMastersOpen

JUNE

6 2003 Aurora Brewing Challenge. Edmonton, Alberta. BJCP SCP. See Web site for more details. Contact: Glen Hannah. Phone: 780-417-3695, E-mail: ghannah@telusplanet Web: www.ehg.ca/

19-21 AHA National Homebrewers Conference. Chicago, IL. Holiday Inn Chicago-O'Hare International. "Sweet Home Brew Chicago." Join us at the American Homebrewers Association's 25th Annual National Homebrew Conference. Meet up with all your homebrewing cronies with the opportunity to learn more about your favorite hobby, homebrewing! Contact: Gary Glass. Phone: 303-447-0816 x 121, 888-U-CAN-BREW X 121. E-mail: gary@aob.org Web: www.chibeer.org/aha03/

JULY

1-31 American Beer Month 2003. Everywhere, USA. "Discover the Flavors of Independence." Plan your events and promotions early! Contact: Monica Tall. Phone: 303-447-0816, 888-822-6273. E-mail: monica@aob.org Web: www.americanbeermonth.com

BY PROFESSOR SURFEIT

The Mystery of "The Dark Side"

Dear Professor,

Three of us just completed a side-by-side tasting of a Belgian dark strong ale. I brewed it about 18 months ago. Some was bottled and the rest was kegged. The draft variety was darker, clearer, fuller-bodied and tasted much better. As they were both from the same batch, the only real variables were the packaging and the use of Primetabs for carbonation in the bottles (five tabs per 12-ounce bottle). The kegged beer was force carbonated. The bottled beer has been kept refrigerated.

Another member of our club has just reported very similar results with a Belgian-style ale he describes as a wheat trippel.

Why should the kegged portion be so much better than the bottled?

Burp!

Mark E. Ryan
Anchorage, Alaska

Dear Mark,

I'm not quite sure what "Primetabs" are but I'm imagining they look like aspirin tablets but are really sugar tablets. Perhaps the tabs are stored in a bag that is contaminated with unwanted microorganisms, thus contaminating your bottled beer and really affecting the outcome. That would certainly explain "clearer, fuller-bodied and tasted much better." I bottle with a measured amount of corn sugar that has been dissolved and boiled in a small amount of water. Then it is added to the racked batch to be bottled, thus minimizing (virtually eliminating) any chance of contamination from this process.

Now the "darker" part of the contrast is still a mystery to me. You sure you were drinking out of the same exact size and style of glass?

Coming over to the Dark Side,
The Professor, Hb.D.

oyster essence being available from New Zealand as a brewing adjunct in the immediate post WWII period. This essence hasn't come up since then and has never been around as a homebrewing product, to our knowledge at any rate.

Now there is something called oyster sauce, used in Asian cooking. This would almost be good for making stout—unfortunately it has quite a bit of salt added. Thai oyster sauce has less salt, sometimes no MSG. Other ingredients are oysters, caramel coloring and cornstarch. It might be worth experimenting with in small batches.

You could always go with shucked, fresh oysters. Puree them and add to the boiling wort. Just make sure you have a powerful yeast starter. You definitely don't want bacteria getting a head start on stout with oysters in it.

Oysters in stout? I wouldn't recommend it. I'd rather shuck, jive and eat my oysters raw with stout.

And the legend of oyster stout? I just wonder a little bit—was it the calcium in the shells they were actually adding or the oyster itself?

I'll pass on this one. Sorry bub,
The Professor, Hb.D.

Beer Stats

Dear Michael Jackson,

Recently I have become fascinated by the way beers are often classified and described by international bitterness unit (IBU), SRM for color, OG and FG. Is there any reference for finding out the numbers for the beers I come into on a day-to-day basis (the usual mix of commercial American beers)?

All the very best,
John Asker
Harvard University (continued on page 56)



Essence of Oyster

Dear Michael Jackson,

What is "essence of oyster"? How do I use it to make Oyster Stout? Where can I find a recipe? Please help me!

Thanks,
Dan Callaghan

Dear My Man Dan,

Michael passed your question on to your professor. It's got both Michael and me scratching our bald spots (on our head, as in atop and between the shoulders). Neither one of us has heard of "essence of oyster." I hope it's not the name of a new perfume—wow, now that would be something else. We only know of brewers who have used oysters with and without shell in the wort boil. And Michael seems to recall a reference to

THE **BUCKAPOUND** **BREWERY**



**One Beer Geek's Search for
Total Brewhouse Automation
For a Dollar a Pound**

By Randy Mosher

For many homebrewers, equipment is simply a means to an end—simple, functional—something that has to be addressed before the real work of brewing can begin.

For me it's a little different. Of course I enjoy making and sharing homebrew, but my real love is hardware. For me, the thrill of a good scrounge combined with the rewarding handwork of cutting, shaping and fusing stainless steel suits me perfectly. Part NASA, part Frankenstein's lab and part Snuffy Smith, I view my Buckapound Brewery as functional kinetic art.

It's called the Buckapound Brewery because for a long time this was the price of scrap stainless. Now the price is \$1.25, but that just doesn't have the same ring.

I've been working on this outrageous brewery-building path since 1986 or so, and have gone through numerous variations, not all of them successful. I now have it to the point that it is functioning smoothly; it's a rare brew day now that I have to get out the tool kit. Parts of it are still pretty rough looking—prototypes really. My current thrust is toward making it all attractive as well as functional.

The lauter tun is the first piece of this better-looking gear; wood cladding will complete the classic look. A copper and stainless brew kettle is in the works. How I ever ended up with a hobby that involves so much plumbing is a cosmic mystery I'll never fathom, except to acknowledge that the universe does have a sense of humor.

I thought it might be amusing, or possibly even informative, to share some of my principles and practicalities with you. Few would want to follow me all the way down this path, but I think there are ideas here that are well worth considering, no matter what sort of homebrewery you're assembling.

One more thing. I am an artist by training, not an engineer. So those of you without technical training should know that this deficiency is no barrier to making the homebrewery of your dreams. Those of you who are engineers (and who may have designed some of the castoffs I'm using) can laugh if you want, but this thing *does* brew beer.

Planning and Goals

You can just start building stuff willy-nilly, but the beginning is a good time to pause and decide what you are trying to accomplish with all this grinding and welding. You will want to formulate some sort of a plan.

Some possible goals are (some of these may conflict):

- Shorter brew day
- Less effort/attention
- More complete control
- Special processes like adjunct mashes, decoctions
- Really cool looking
- Built around a unique found object/vessel/part
- Historical authenticity

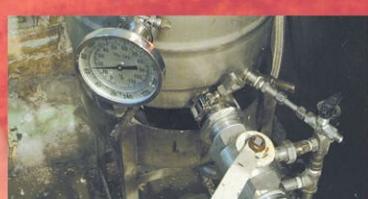
You will also have some limitations to deal with:

- Your personal skills
- Access to tools—your own or otherwise
- What's available for \$1 per pound
- Space available for brewery
- Brewery energy source(s)

You also have to ask the hard question: will the new doojiemaflopper work for you? It's easy to make brewing more difficult as things get more complex. There are issues of coordination and reliability; the more pieces you have, the more time it takes to hook it up and then take it apart. And more to wash, at the very least. You need to coldly decide if the benefit is worth the effort.

I must mention safety at this point. Many of the improvements discussed here involve electricity, which can be a lethal hazard when combined with copious amounts of randomly squirting water. Start with a GFCI outlet and press the test button before every brew. And any equipment you build should be well insulated, well constructed and properly grounded. I recommend low-voltage switching for things like float switches and thermostats.

Also, rotating motors and things like stirring paddles connected to them can be dangerous as well, so try to design them in such a way as to keep fingers out of the way as much as possible.





Cool looks: a basic brew kettle I built for my brother, with a kind of artful, stylized design.

Hot water is another danger. A loose hose clamp can result in a boiling hot geyser of wort, which will burn you most painfully.

Interchangeability, Modularity

This is crucial for an easy-to-use system. Standardize all hose connections with the same type of connector. I like 3/8" Swagelok® compression fittings. Other, quicker disconnects are available, but are



Left, NPT threaded plumbing fittings, not quick; center, Swagelok® tubing fittings, sort of quick; right, quick disconnects, expensive and hard to clean.

usually pretty expensive, even on eBay. Valuable components such as pumps need to do multiple duty, making an even stronger case for a unified system of hookups.

On larger vessels it is helpful if components, especially electrical stuff, can come off for cleaning. I have installed sanitary (Tri-Clover®) fittings to all my larger vessels, so thermometers and large valves can quickly pop on and off for cleaning or reconfiguration. You will see this as we tour the brewery later on.

Reliability

It's a problem sometimes with surplus, but more often it's:

- Poor planning
- Improper usage
- Quickie (duct tape) construction



Hot and cold water can be hooked up with readily available (and inexpensive) garden hose disconnects.

Take the time to install something properly, and resist the urge to put something to use as soon as you can.

Simplicity

Well, this is a beautiful idea, and I highly recommend it to others, but it's really not the path for me!

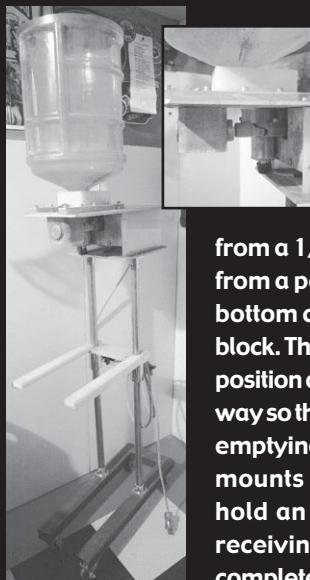
Automation

My goals are, in order of importance:

- Faster brewing
- Easier setup/takedown/cleanup
- Better beer, more flexible process

The length of the brew day is important, but also how much energy and attention is required for each stage. I like to have things running without a lot of intervention so I can do something else.

A TOUR OF THE BUCKAPOUND BREWERY



MALT MILL

Using a geared motor from a copy machine, I motorized a PhilMill. I hung both motor and mill housing

from a 1/4" plate. The hopper is made from a polycarbonate carboy with the bottom cut off, which fits into a plastic block. This block slides on guides from a position above the mill to back out of the way so the mill can be accessed without emptying the hopper. The whole thing mounts on removable legs that also hold an adjustable platform for the receiving vessel. Wheels on the base complete the mobility.



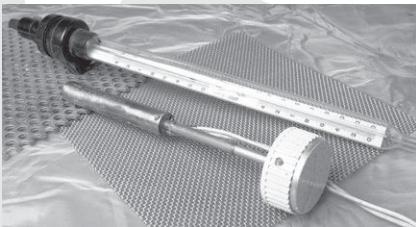
ADJUNCT MILL

This is an old grocery store coffee grinder, a "pin mill," which gives a shearing action useful for cutting up wheat, oats, etc., to a fine grit.

MASH KETTLE

This vessel has a copper bottom and sits directly above a stove burner. A reversing DC gear motor attached to a stainless paddle stirs the mash. The sanitary fitting in the middle holds a (nine wire!) probe for the NIST-certified RTD pasteurization thermometer bought for \$42 on eBay.





Three different salvaged temperature control devices. Top, process controller accepts thermocouple or sometimes other types of probes; top right, a highly accurate mercury in glass incubator thermostat; bottom, Fenwal-cartridge thermostat.

Temperature Control

I have implemented some temperature control measures in these areas: mashing, sparge water and fermentation. Fortunately this a common occurrence in the industry, so the parts and pieces are readily available on the salvage market.



The Buckapound's mashing and boiling vessels both have copper bottoms installed for more even heating.

Mechanical Mixing

This has been a big success at the Buckapound. I always hated stirring, but with flame-heated step mashes, the scorching and sticking required constant stirring and even that wasn't enough. There are geared motors available with speed reduction built in. You want something around 60 rpm or somewhat lower. If you can find a reversible one, even better. The bigger problem with stainless vessels is the scorching. I solved this by cutting out the bottom of the vessel and replacing it with 0.090" copper sheet. This isn't easy to do, but silicon bronze or aluminum bronze rod with a TIG process will stick permanently to both metals.

I have installed a solenoid valve on my filtered tap water line. This may seem like a



A mash-stirring paddle based on Donald Put's design (*Brewing Techniques* November/December 1994).

pointless luxury, but when controlled by a float switch at the top of my kettle or liquor back, it saves me hours of mopping up water which used to spill out when I forgot to stand there and monitor the fill level.

I have a couple of other uses for float switches: one in the lauter tun, which monitors the sparge water level and kicks on a pump to keep the bed from drying out. The



GLORPING TUBE

A 2" ball valve and a flexible stainless steel hose attached with sanitary fittings allow the converted mash to be "glorp" directly into the lauter tun.

GRANT

Made from an industrial pressure vessel—sort of a beefed up corny keg—this is

the vessel into which the sparged wort flows. A float switch turns a pump on when two-thirds full, which then transfers the wort to the brewkettle.



LAUTER TUN

This vessel was made from scratch, designed to have a wider profile than the mash or boiling vessels in order to end up with a shallow lauter bed. Unusual features include a vacuum gauge that can tell when a too-fast runoff is compacting the grain bed; and a manifold of tubing that routes incoming sparge water around the bottom of the wall to help maintain the heat of the tun. As mentioned earlier, an adjustable float switch attaches, which can automatically turn on the flow of sparge water when the level gets low. An oak jacket will clad the outer walls.

SURPLUS SCROUNGING STRATEGIES

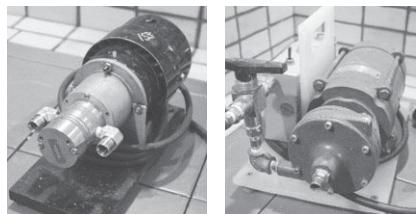
"If you don't buy it when you see it, you'll need it next week."

"Buy half of something. You'll find the other half eventually."

"If it looks cool, put a bid on it."



This ceremonial brew kettle assembled for the Bloatarian Brewing League was based on a 100 year-old steam-jacketed vessel found on eBay. Decorative jester figures were cut on a computer-controlled plasma cutter.



A pair of pumps: left, a magnetically-coupled self-priming gear pump used for wort transfer; right, a direct-drive centrifugal pump that will move several gallons a minute.

second is attached to the grant, and, when a certain level is reached, turns on a pump that moves the wort to the brew kettle. With these two devices, I can let the sparge go almost completely unattended, freeing me to get the next stage of brewing setup.

These float switches work on a low-voltage signal, which, when connected to a relay, switch the 110 volts the pumps require. This is a necessity, as the float switches have a very tiny switch and are not suitable for more than just a trickle of electricity, but it's also a great safety feature as it keeps the line voltage high and dry on the wall or ceiling. I have one freestanding relay box, and have another one built into the control box of a pump.



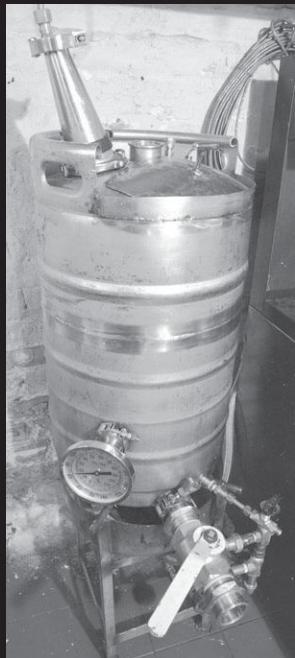
Left: Solenoid valve accepts low-voltage switch input from float switch.



Right: This low-voltage switching relay box accepts inputs from thermostats or float switches, and has outlets that either turn on or off with a positive signal.

A Note on Surplus

As Los Angeles-based homebrewer Steve Casselman noted, if it's somebody else's, it's junk. If it's yours, it's stuff. It is a sign of the great abundance of our civilization that massive quantities of perfectly useful industrial parts and pieces are scrapped out and end up for sale for just



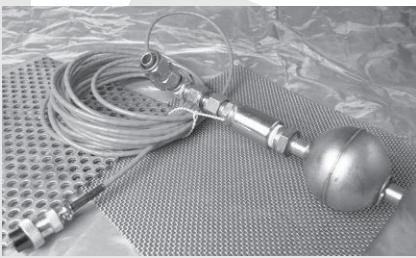
BREW KETTLE
Made from a half-barrel with a quarter-barrel welded on top, this keg-and-a-half has enough room to boil a full 15-gallon batch. Interesting features include a copper bottom and a 1.5" ball valve that allows hop cones to flow easily into the hop back. Note the world's largest dial thermometer.



A dedicated light was fashioned from a tapered sanitary fitting. A tall vessel like this with a mostly closed top can sure get dark inside, and the light really helps when it comes time to clean up. A fitting and dip tube allows the wort being pumped in to flow all the way to the bottom with minimal splashing. The kettle has a close-fitting lid and a fitting to accept a spray ball for cleaning in place.



The kettle is fired by a custom stove built around a wok burner. Twelve of the 20 burner jets (like little torches) were removed and reconfigured so that three pairs of burners are controlled by one valve, and a single pair on another.



Float switch connects to the grant, turns on pump when level rises.



This aerospace-grade solid titanium filter probably came off of a B-52. It hasn't yet found a place in my brewery but it's just too cool to get rid of.

pennies on the dollar. Most cities of any size have an industrial surplus outlet and these are well worth searching out. Many of these operations now have a presence on the Web, and of course eBay has become a tremendous source for just about anything you need to put a really crazy, wonderful brewery together.

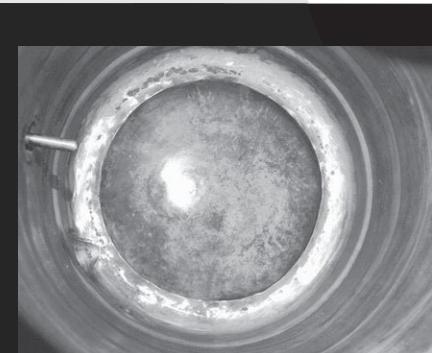
Randy Mosher is a veteran homebrewer and equipment builder. He is the author of *The Brewers Companion* and creator of "Dr. Bob Technical's Amazing Wheels"—circular calculators for brewing recipe formulation. The Buckapound Brewery resides in his basement in the Roger's Park neighborhood of Chicago.



CLEANING UNIT

A very dedicated cleaning unit was

fabricated from a half-barrel and a powerful gear pump. Three-way valves allow fresh water in, recirculation and waste water pumped to drain. Water sprays up through the center. A timer allows vessels to be cleaned for up to 15 minutes with automatic shutoff. Cone in center holds carboys and other narrow-necked vessels, but removes easily to allow cornies to fit comfortably. A hose can be connected to the sprayer to clean-in-place vessels too large to invert. A filter just ahead of the pump keeps chunks out of the works.



COPPER BREW KETTLE

Work has begun on a traditional style copper domed brew kettle.



HOP BACK

Made from a soda carbonator tank, and completely lined with a fine perforated screen, the hop back can be charged with hops or simply used to filter hops and trub from the brew. A ball-lock fitting allows a vent line to be attached, which prevents gurgling.



AERATOR/ OXYGENATOR

An inline wort aerator/oxygenator was built from sanitary fittings plus a sintered stainless airstone.



CONE-BOTTOM FERMENTER

Cone-bottom fermenter was made from a stainless milk can, with additional sheet metal added to increase the height. A corny hatch on top provides access for cleaning. Sanitary fittings are used for the drain as well as the pressure gauge.



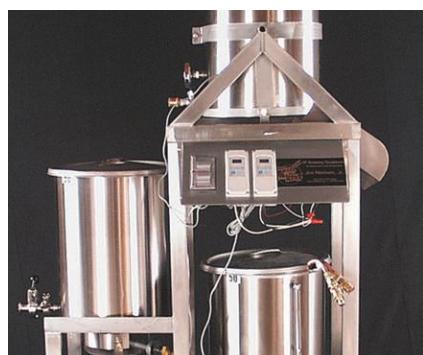
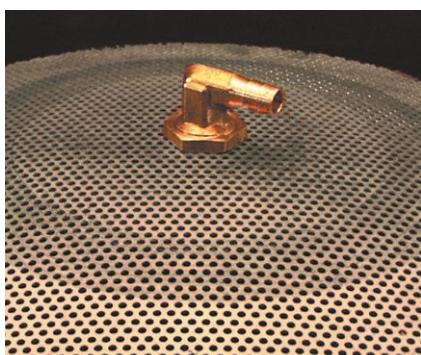
SAMPLE CHILLER

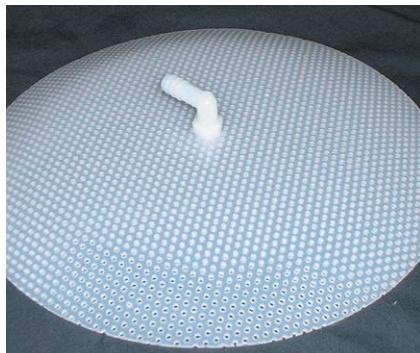
This industrial sample chiller contains 50 feet of stainless tubing and is very efficient!

From Here to Kingdom Come

A Primer on Homebrew Equipment

By Marc Sedam





People give all kinds of reasons for getting into homebrewing.

"It sounds like fun."

"My friends are doing it."

"I like good beer."

"You save money."

Save money? Probably not. Any serious homebrewer knows that there are more gadgets and gear related to the pursuit of brewing than any single brewer could reasonably own. Furthermore, often what seems like a

down the stages of the brewing process by equipment component and then discussing some of the options and their merits. First up is the central component of any brewing system, the boiling vessel.

Boiling Kettles or Coppers

When people find out I homebrew, the single most prevalent question is, "What do you make it in?" Boiling the wort is one process that is near universal in brewing.

ume of wort are many. Hop utilization goes up, protein break is improved, you are certain that all of the cooled wort is sterile, and lighter styles of beer can be made.

The two primary questions to consider when choosing a boiling kettle are volume and the heat source. In both instances it comes down to a balance of cost versus need. If you most often make the standard 5-gallon batch of beer, you should buy a boiling kettle with a volume of at least 5 gal-

“Anyone with reasonable tinkering or engineering skills and some time can build a fantastic brewery for a small monetary cost.”

good purchase gets used only a few times before going into the drawer for good.

While there is nothing wrong with experimenting or moving on when something no longer gives the function or results you want, it's nice to have some knowledge about the pros and cons of the various options before selecting equipment. Let's start by breaking

First you need to find an appropriate vessel to boil the wort in, and then you need to determine the right heat source to fire up that kettle. Many extract brewers boil only a portion of the wort and dilute it in the fermenting container. This works well and good beer can certainly be produced using this method. But the advantages of boiling your full vol-

lons. This allows you to get close to boiling your full volume of wort. That being said, I've never heard a brewer say that their boiling kettle was too big, and many experienced 5-gallon brewers choose to buy a kettle that holds 6.5 to 8 gallons.

Deciding between aluminum or stainless steel kettles is a less controversial choice

than it's often made out to be. Despite previous theories, no conclusive evidence links aluminum in cooking to Alzheimer's disease and conventional wisdom now is that aluminum is safe. Stainless steel is a more durable material while aluminum is often several times cheaper.

Five-gallon stockpots are easy to find in kitchen stores for \$25 to \$30. Larger sizes can be difficult to find outside of homebrew supply shops. I brewed for years with a 7.5-gallon stainless steel stockpot found at clearance for \$60. In general, the marginal cost for a larger kettle is often small until you reach 10 gallons.

Sizes larger than 10 gallons have prices that significantly increase since the manufacturer has to use a much larger sheet of metal from which to fashion the pot. Most homebrew supply stores sell stainless steel pots of varying sizes from between \$100 to \$200 for an unadulterated kettle. Additional models with threaded openings for a thermometer or drain are also available. While the stainless steel pots are beautiful, sturdy and will last a lifetime, they are no better than a thin gauge stockpot that can be had for half the price (or less on eBay).

The ultra-cheap brewer has another option—used half-barrel kegs. These containers are made of good quality stainless steel, and are virtually indestructible. While it is not legal to snag a keg acquired for a party in exchange for the forfeit of your deposit, they can be legally purchased from dealers and occasionally found in scrap yards or the county dumps. I've acquired two of these. The first cost \$15 at a scrap yard and the second was free, sitting next to the metal scraps at our local landfill. Vent all of the pressure from the keg (do this several times to ensure there is absolutely no pressure built up), and then use a rotary tool or Sawzall to cut the top of the keg off. A little scrubbing and the keg is ready to use.

I find it helpful to have a lid for my kettle, especially to cover it while chilling the wort. Installation of a brass or stainless steel ball valve in the bottom of the kettle also makes removing the wort easier, especially for large kettles. Brass is much cheaper and works just fine. Several retailers sell weld-free kits to install the ball valve; kits range from \$35 to \$65.

Where There's Wort, There's Fire

Coincident with choosing the kettle is choosing a heat source. Many brewers use the utilitarian approach of the kitchen stove. But if your only choice is the stove then you're somewhat limited in the size of the kettle. My 7.5-gallon kettle would barely boil when used on an electric stove. I certainly couldn't get a good rolling boil and I also wound up doing some damage to the stove surface. If you only have the stove, I would suggest a maximum kettle volume of 6 to 7 gallons.

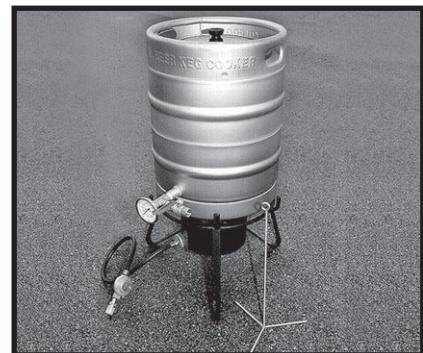
If you are brewing larger batches, the "Cajun cooker" is a brewer's best friend. These propane-fired cookers are available in nearly all home-improvement shops, barbecue equipment retailers and other sources for as cheap as \$35. For a few dollars more you can get a perfectly good boiling kettle included. These kettles are almost always aluminum and work just fine.

Of course the Cajun cookers (also called turkey fryers) require propane. I find that a 20-pound propane tank will last for three or four 5-gallon batches and can be filled or swapped out at gas stations, hardware or grocery stores. The fittings are standard so that the same propane tank that powers a gas grill will work for your cooker. It is also possible to modify these cookers to run on natural gas by changing the fittings. I plan to do this with my two cookers and have a permanent gas line hooked up to my brewing system. Cajun cookers are a must-have if you ever plan to brew 10-gallon batches or greater. Furthermore they are a great addition when you want to boil all your wort for 5-gallon batches.

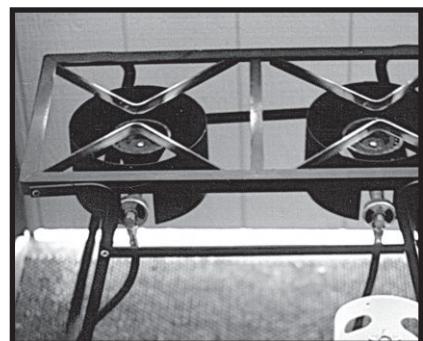
The Mash Monster

To mash or not to mash? Once people get interested in homebrewing it is often only a matter of time before they want to see what all the fuss is about in all-grain brewing. The most common misconception regarding all-grain brewing is that it's much more expensive when compared to extract brewing. Of course this isn't wholly untrue: you do need extra equipment such as the mash/lauter tun to brew all-grain. Fortunately, that equipment can cost under \$20.

Most mash tuns require a coupling to run a pipe from the inside to the outside of



The standard "lasts-a-lifetime" setup for brewing: a converted keg heated with a Cajun cooker.



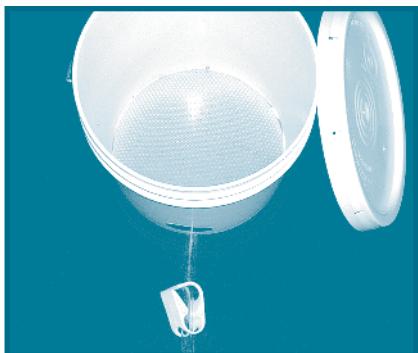
A Cajun cooker with two burners allows you to heat sparge water while maintaining the temperature of the mash.



A standard 20-pound propane tank lasts for three to four 5-gallon batches.



This plastic mash/lauter tun offers nearly all the advantages of stainless steel at a fraction of the cost.



Plain-old plastic gets the job done and provides many homebrewers with their introduction to all-grain.

the vessel for wort collection. Homebrew supply shops offer both weld-free couplings (\$30 for brass, \$60 for stainless steel) and couplings which need to be welded. These same couplings can be used to install a thermometer in the tun for accurate readings of the mash temperature.

Beyond this basic plumbing necessity, I classify mash tuns into three categories: ultra-cheap, good and lifetime. Within each of these areas, we'll discuss the vessel itself as well as options for creating a false bottom or other filtering device.

Ultra-cheap: I brewed for five years using nothing more than an Easymasher and a 5-gallon bucket wrapped in an old wool blanket. The Easymasher was \$15, the bucket was \$3 and the hose clamp for the wort exiting the tun was 50 cents. Using this system I was able to consistently get 75-percent efficiency. If you are extremely frugal you can try to manufacture the Zapap mash tun by drilling hundreds of 3/16" holes into the bottom of one bucket and placing it inside another bucket. While you can create this system for less than \$10, my experience is that it takes recirculating large volumes of wort until the runoff is clear and I could never get efficiencies greater than 65 percent.

False bottoms: As mentioned, I used an Easymasher for five years. In contrast, using the Easymasher I almost never had to recirculate more than two quarts of wort before it ran clear. Zymico and other manufacturers make "mash screens" using the same rolled screen and hose clamp concept and, while there are claims that some work better than others, all systems will work per-



Coolers of various types and shapes can be adopted for mashing and sparging at a very reasonable cost.

fectly well for the average homebrewery. Many retailers sell the Phil's Phalse Bottom (\$12.95) made specifically for use with buckets. As with most equipment, stainless steel false bottoms (\$35) for use in buckets are available as well.

Good: The next step up from the plastic bucket is the insulated Gott or Rubbermaid cooler. These come in 5- and 10-gallon sizes at prices ranging from \$30 to \$60. Again, the choice early on is what type of brewing you want to do. The 5-gallon insulated cooler is perfect for making 5 gallons of normal gravity beers—those with starting gravities under 1.060. But the 10-gallon cooler is useful for making those meaty barleywines and imperial stouts, while also allowing you to brew larger batches of beer. Since these coolers are



Welded ports for a thermometer and wort outlet offer a vast improvement over a plain old pot.

insulated, the mash temperatures rarely drop more than 2° F (1° C) over the course of the mash. While these coolers are incredibly durable, lasting more than five years, they do eventually warp and crack.

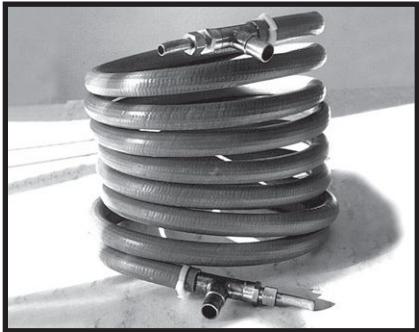
False bottoms: Most of the false bottoms that work with plastic buckets work well with the 5-gallon coolers, but the larger coolers require different equipment. There is a larger diameter Phil's Phalse Bottom (\$15.95) as well as Zymico's larger Bazooka screen (\$29.95). Larger diameter stainless steel false bottoms are also available. All false bottoms must be connected through the wall of the vessel using a weld-free coupling.

Lifetime: In brewing, equipment that will last a lifetime is almost always manufactured of stainless steel. And as with most of the options discussed, there are less

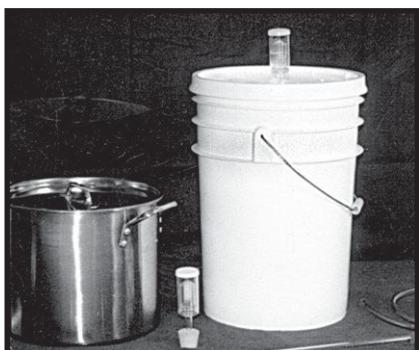




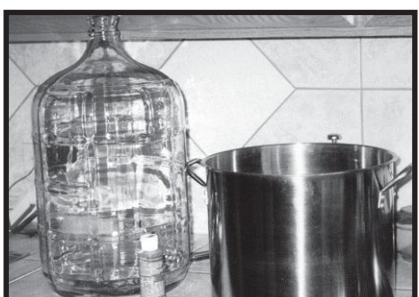
Immersion wort chillers can be purchased at most homebrew stores or made from a few simple items of hardware.



Counterflow chillers offer another alternative for chilling your wort.



Basic and inexpensive items like a plastic fermenter and a common stock pot provide a good base for homebrewing.



Glass fermenters resist scratches and provide a cost-effective solution for fermentation.

expensive and more expensive options. By far, the cheapest option is to create a stainless steel mash tun from a used beer keg. Kegs have a capacity of 15.5 gallons and are flexible enough to make beer in volumes from 5 to 20 gallons or more. (See earlier comments about acquiring and modifying kegs.) Connect the false bottom as you would with the other mash tuns.

If you aren't interested in creating your own equipment, the Polar Ware mash tun is a thing of beauty that can be found at many homebrew shops. For a mere \$300 you can have a 10-gallon mash tun complete with stainless steel false bottom specifically manufactured for the kettle as well as a coupling for a thermometer. Polar Ware also manufactures a 15-gallon model and other suppliers offer vessels and systems with even more bells and whistles.

False bottoms: If you step up to the converted keg route there are only two pre-fabricated options for the false bottom: a large mash screen or a stainless steel false bottom specifically manufactured for kegs. The mash screen provides a built-in way to drain the sweet wort out of the tun, while the false bottom requires a drain tube to remove the wort.

Counterflow Chillers

You have managed to afford the creation of the wort and boiled it for the amount of time called for in the recipe. Now it's time to chill...the wort, that is. Rapid wort chilling is one of the best things you can do for your soon-to-be beer. It promotes good cold break, prevents high levels of DMS (cooked corn flavor) from being formed and reduces the attractiveness of the wort for the growth of any stray bacteria.

By far the cheapest method is to sit your kettle into a bathtub filled with cool water and wait for it to hit room temperature. Stirring the wort every few minutes can accelerate cooling. The disadvantages of this process are that heat transfer is very slow and that constant exposure of the wort to air risks infection. Few people follow this route for more than a batch or two, moving on to some sort of purpose-built wort chiller.

You can buy prefabricated immersion chillers from homebrew supply shops (\$40) but it is almost always cheaper to build one

yourself. Home improvement stores sell 3/16" copper tubing in 25- and 50-foot lengths for under \$20. Add a few feet of vinyl tubing to each end and a female plumbing coupling, which allows you to hook one end up to a handy faucet, and you're in business. Immersion chillers work great especially if you have cold groundwater, but they have trouble dropping the wort the last few degrees difference between the cooling water and the wort temperature. They are also less efficient if your groundwater is warmer than your desired fermentation temperature.

A more expensive, but more efficient, option is the counterflow chiller (CFC). A CFC has the wort running in one direction through tubing encased in a larger tube. Cold water runs in between the two tubes in the opposite direction of the wort flow. CFCs are usually made of copper and are much more expensive (\$60 to \$100) than immersion chillers, but are much more efficient. I can drop the temperature of wort from boiling to pitching temperatures in 10 minutes using only 15 gallons of cooling water.

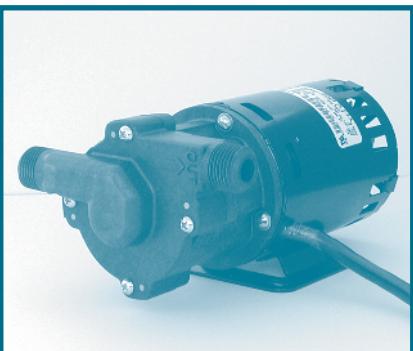
A CFC is one situation where stainless steel is not necessarily better. Stainless steel has poor heat conducting properties so it would take much longer to chill the wort when compared to a copper version. The stainless version (\$125) would certainly last forever but the longevity may be less desirable than rapid cooling. Some brewers dislike CFCs because you cannot see the surface when you're trying to clean the chiller. My experience has been that flushing the CFC with boiling water right after use keeps it very clean.

Fermentation: The Final Equipment Frontier

As with the mash tun, there is a choice of three different materials in which to ferment the wort: plastic, glass and stainless steel. Again, plastic buckets provide the cheapest option. Besides the ubiquitous 5-gallon bucket, 7-gallon buckets can be found in homebrew shops for about \$10. Buckets are cheap, light, easily moved with the built-in handle and virtually indestructible. Unfortunately, they are also easily scratched. If cleaned regularly, plastic



Soda kegs are a welcome addition to many homebrewers' equipment lists, allowing them to minimize packaging chores.



Just one good pump like this food-grade centrifugal model can make brewing much easier when you need to move many gallons of fluid.

buckets can last several years. Furthermore, they are easy and cheap to replace when the time comes.

Glass carboys are much more durable than buckets and come in several sizes. Most carboys cost less than \$20 and glass demi-johns (15-gallon capacity) are around \$50. Glass is easily cleaned but also breaks rather easily. Hot liquids cannot be added to carboys and even a carelessly handled cleaning brush can lead to their ruin. For safe handling, a carboy handle for each carboy you own is a must at \$6.

There are quite a few more options for the homebrewer who wants to ferment in stainless steel. The previously mentioned beer keg is a great way to have an inexpensive 15-gallon fermenter, but you can't really see inside the keg to be certain it's clean. Other brewers simply ferment in a stainless steel soda keg (\$20 to \$40 used), but they're best suited for secondary fermentation. But the ultimate for the homebrewer is the relatively

new, small volume cylindroconical unitank. These are available in 7.1-gallon (\$450), 12.2-gallon (\$495) and 27-gallon (\$700) capacities and are sold by many of the large homebrew retailers. Engineering of the tanks makes them easy to disassemble and reassemble, easy to clean and a very convenient way to harvest yeast and dump trub. I have not personally used one of these fermenters, but am more than happy to test one if a manufacturer or retailer is interested.

The Jack of All Trades

Over the last 10 years, the single most useful and time saving piece of equipment I've purchased has been a pump. I certainly have a bias but I use a high temperature, 1/2-horsepower pump (\$150 with all necessary fittings) for transferring sparge water and hot wort, recirculating the mash and pumping wort rapidly through the chiller. Since I started primarily brewing 10- and 15-gallon batches, it would be close to impossible to move those volumes of liquid rapidly without a pump. Other magnetic drive pumps are not designed for use with boiling or near-boiling liquids so be sure you know in advance how you intend to use the pump. If you're only going to use it to transfer the wort off the mash or transfer cold wort to fermenters, then a lower temperature-rated pump (\$100) will be just fine. Use of a pump also negates the need to lift large, heavy volumes of wort or beer.

Do It Yourself

I have specifically limited this discussion to equipment readily available to purchase at most well-stocked homebrew supply shops. This is certainly not the end of the discussion. Anyone with reasonable tinkering or engineering skills and some time can build a fantastic brewery for a small monetary cost. (See related article in this issue by Randy Mosher.) Industrious brewers mash in fish tanks, create false bottoms out of slotted PVC pipe, ferment in new plastic garbage cans, and even boil using plastic buckets equipped with electric heating elements. But with a little forethought, even the new brewer can plot out an inexpensive all-grain system. Just \$50 can buy you a 5-gallon bucket (\$3) with a Bazooka screen (\$15) for mashing, a 5-gallon stock pot (\$20) for boiling, and a 7-gallon bucket for fermenting (\$10)—a complete all-grain setup. The choices are up to the individual but the flexibility exists for any budget.

Marc Sedam, aka The Alechemist, has a degree in biochemistry from the University of New Hampshire and is completing an MBA from UNC-Chapel Hill. He has been homebrewing since 1992, writing on the subject since 1998 and is a member of the North American Guild of Beer Writers. He lives in Chapel Hill, N.C. and is currently trying to perfect the ultimate German helles.



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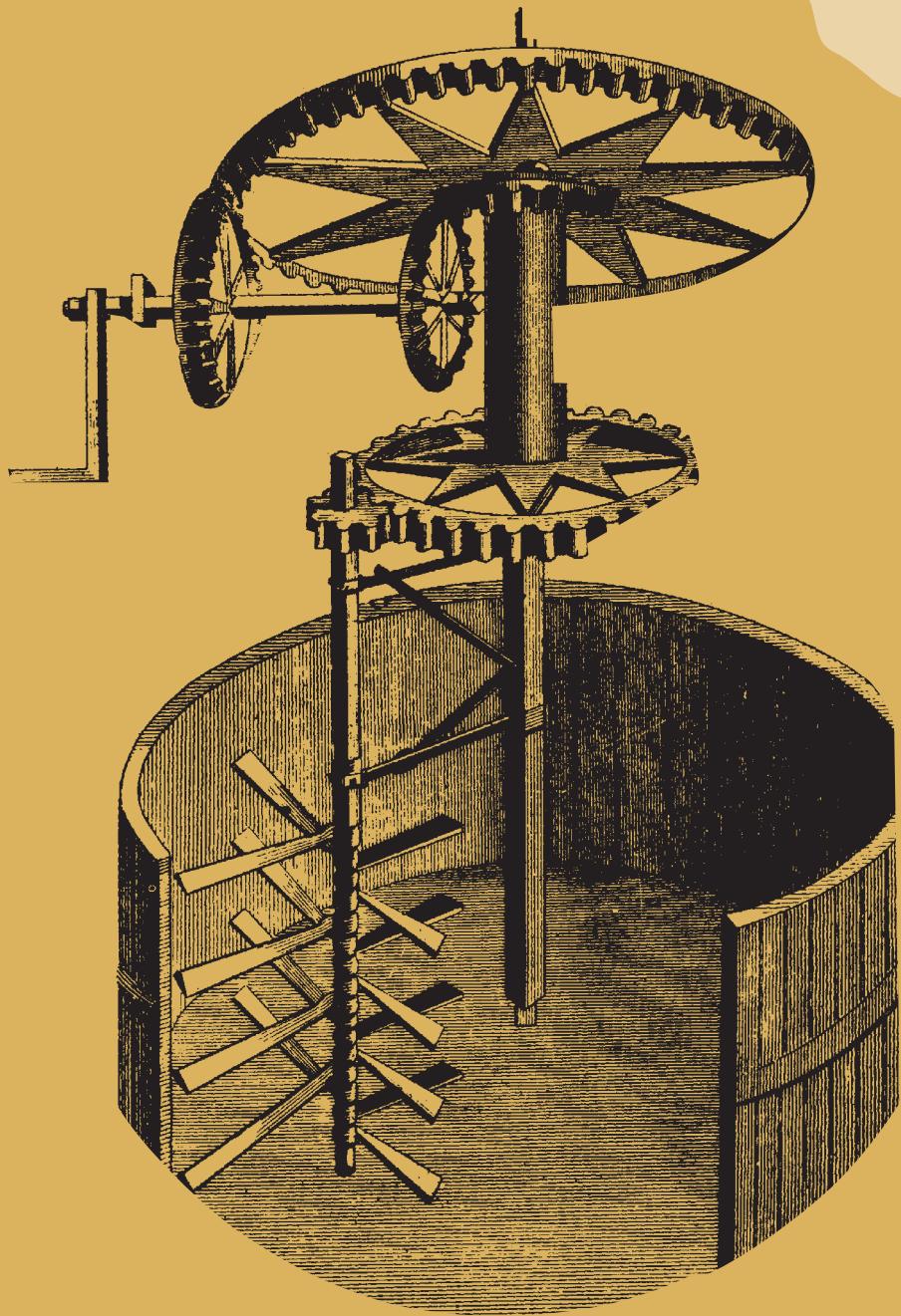
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EVOLUTION Of MASHING SYSTEMS

FROM HEWN LOGS TO HERMS, BREWERS THROUGHOUT HISTORY HAVE USED A WIDE RANGE OF DIFFERENT VESSELS AND SYSTEMS FOR MASHING AND LAUTERING.

BY STEVE ALEXANDER

Mashing is little more than steeping crushed grain in water at a few temperatures, allowing the grist to release its goods into a solution while enzymes work their magic. The mash is then lautered, separating the solubles from the insolubles, and the resulting wort is boiled. It sounds so simple yet keeping the temperatures constant and controlled for the mash rests, and separating clear wort from a mash with good efficiency while preventing scorching aren't trivial tasks at all.

The difficult steps surrounding the process of mashing have led to a surprising number of inventions and the assembly of diverse systems throughout the history of brewing. Some homebrewing systems have been adapted from commercial designs—both modern and historical—while others are unique homebrewing inventions. To begin our review of mash and lauter systems, let's take a brief look at the history of commercial brewing technology before moving on to examine the current array of homebrewing systems.

Historic Mash Making Methods

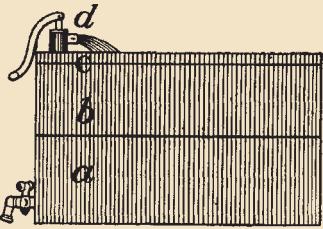
Historically, mashing before the age of thermometers progressed in two different directions. Decoction boiling measured volumes of mash to attain fixed temperature steps. Infusion mashing used careful observation of the water to "judge" the strike temperature. Decoction's many steps and extensive boils were needed when ancient decoction malts were made with only six or seven days from wetting the barley to kiln². Today the differences in malts have faded but the methods persist. Step mashes, which are infusion mashes with rests at several temperatures, became practical after thermometers allowed the controlled addition of heat to the mash.

The earliest references to lautering mention the use of slotted

spoons, sieves and filter cloths. Ancient lautering systems were undoubtedly simple since the importance of clear runoff on the quality of beer wasn't fully appreciated until about 1880¹. Turbid runoff causes high levels of lipids that create stale flavors and foam damage. The "modern" method of lautering involves placing the mash on a screen or perforated plate and was certainly in use by the 1850s and probably appeared somewhat earlier. Lauters that use perforated pipe manifolds in the bottom of the tun appeared by the same decade. The barley husks and grist form a natural filter and thus, the grist solids are the real filter while the screen, false bottom or pipe is just a porous support.

Combined mash-lauter tuns developed for infusion mashing are designed so a false bottom stands a few inches above the actual vessel bottom. Hot water is underlet to the level of the false bottom, then grist and strike water are delivered to the tun. Performing a temperature step in a combined mash-lauter tun is not simple. The thick infusion mash at around 2.6 liters of water per 1 kilogram of grist (1.3 qt/lb) cannot be heated with steam pipes since the thick mash bakes onto the hot pipes. Additional hot water can be underlet below the false bottom, or steam can be directly injected into the mash to create a step mash. These mash-lauter vessels permit sparging directly in the mash tun, which avoids the transfer to a separate lauter tun. It's remarkable that aside from modern instrumentation, computerized control and cleaning systems, all of the basic features of modern mash-lauter tun design appeared in the mid-19th century.

Decoction systems typically include a separate decoction vessel, mash tun and lauter tun as well as a hot liquor tank (for heating and storing hot water) and a boiler⁴. Older style German mash vessels

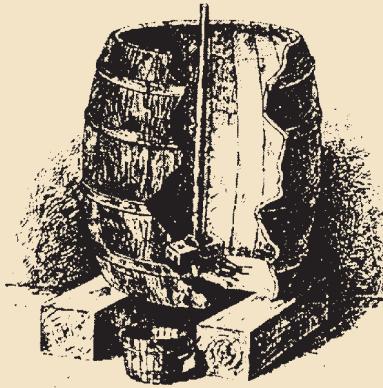


BOARDLEY'S FAMILY BREWING VESSEL.

The "Boardley's Family Brewing Vessel" was used in the early 19th century for mashing purposes. The horizontal lines are where the false bottoms would be placed. *a* is where the water or wort would be held, *b* is for the malt, and the hot water would be pumped into the area marked *c*.

often include a steam heating system at the bottom of the tun and a stirrer. More recent implementations use an internal steam heater. Decoction systems with heated mash tuns can be used for step mashes without decoction. The decoction boiler is similarly built with steam coils or a complete steam jacket. The decoction lauter tun is not very different from the combined mash-lauter designs used for infusion mashes and again much of the apparatus appears in 19th-century designs.

One other development in lautering was the use of cloth sheets set between frames



PRIMITIVE MASH TUB

This type of wooden mash tub used a long, rounded shaft called a tap tree to plug the hole built into the bottom of it. The liquor would be poured over the grist and afterwards the mash would be drawn from the bottom by lifting the shaft from the hole and collecting it in a bucket underneath.



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Basic Homebrew Mash Systems: RIMS, HERMS, DIMS

On the homebrew front, the mechanics of brewing advanced slowly and homebrew books published as recently as the early 1990s discuss the use of cloth sacks as lautering filters and other crude brewing techniques. Charlie Papazian's 1984 classic, *The Complete Joy of Home Brewing*,³ reflected the surging interest in homebrewing and brought some brewing innovations to a wider audience. The picnic cooler as an insulated infusion mash tun and the Zapap lauter, a cheap, effective false bottom lauter, both appeared in Papazian's book and were widely adopted by early homebrewers.

All-grain homebrewing increased in popularity in the late 1980s and early 1990s. As a result there was a brief renaissance in homebrew equipment design as a wave of new brewers moved beyond the stovetop pot and the Zapap lauter seeking a more advanced means of brewing. The Zapap gave way to the slotted pipe manifolds, steel



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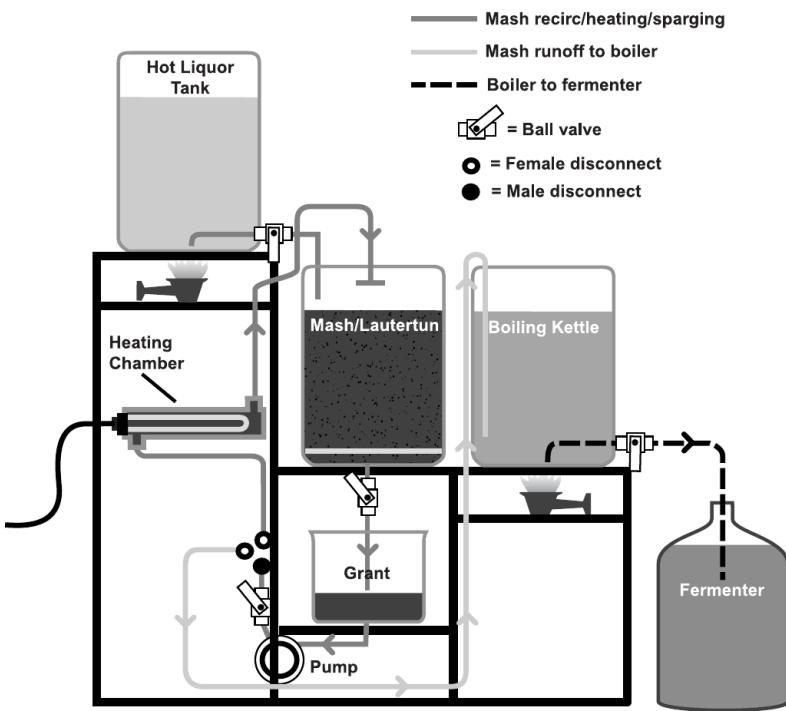
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Figure 1

Typical RIMS Design



The RIMS system was the first integrated multi-vessel brewing system created by latter-day homebrewers.

and plastic removable false bottoms and tubular screen lauters. Coolers still appear regularly in homebrewery designs, but large pots, often made from half-barrel kegs and directly heated by massive propane burners, became common topics on the newly created Usenet and Internet brewing groups. More recent trends favor aluminum and steel restaurant pots over makeshift kegs. One design factor that emerged is that many homebrewers prefer to brew 10- or 15-gallon quantities.

Somewhere in this fog of component invention and originality someone realized that the pieces needed for a miniature three-tier infusion mash brewery were available to the homebrewer. The highest tier has a heated hot liquor tank used to supply mash-in and sparge water. The mid-tier holds a combined mash-lauter tun. The lowest tier holds the boiler.

The tiered system calls upon classic commercial brewery design in that it allows

gravity to power the flow for most brewing materials. Once the cold water charge is added to the hot liquor tank (a hose does the job easily) gravity takes everything else where it needs to go, with the possible exception of small amounts of wort used for recirculation or vorlauf. Many of these three-tiered systems use a mash-lauter tun with a false bottom and a direct flame burner to achieve mash temperature steps. This sort of mash-lauter tun heating arrangement must be handled with care since the underlet fluid doesn't mix freely with the mash above, and any small grist particles that fall under the false bottom can scorch.

RIMS, an acronym for Recirculating Infusion Mash System, launched a new age for homebrew systems (see Figure 1). RIMS, invented by Rodney Morris, was mentioned in a 1988 *Zymurgy* article⁵ and described fully in the 1992 special issue on "Gadgets."⁶ The most surprising thing about RIMS is the number of features that were

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new in this system. The layout of a RIMS system looks like a conventional three-tun system with a hot liquor tun, a boiler and a completely conventional mash-lauter combination tun. During mashing, wort is continuously taken from the tun and routed to a pump, then over a resistive electrical heating element. The heater maintains the mash temperature and also heats the mash through mash steps as heated wort is gently reintroduced to the top of the mash.

Since the heat source is electrical it is easy to add automatic controls and the original design included mash temperature sensors and control circuitry. Because RIMS recirculates wort through the grist bed in a continuous vorlauf, the output of the pump can simply be diverted to the boiler to collect first wort. A series of batch sparges follows. The use of a pump removes the need for gravity

feed from the mash tun to the boiler and for manual vorlauf so only two tiers are needed for RIMS and other pumped-wort systems.

Worries that RIMS could denature enzymes or extract husk tannins appear unfounded in practice. The worst that can be said is that it is not easy to scale RIMS to handle large batches as it requires a tremendous amount of electrical power. Care is needed to prevent mash grist compaction from stopping the flow of wort. Mash compaction can be avoided by restricting flow or with the use of a grant between the mash/lauter tun and the pump. Scorching at the heating element can be a problem too. In its favor RIMS is nearly automatic, can perform complex step mash schedules almost unattended and, because of the extensive recirculation, produces the clearest wort possible.

HERMS, or Heat Exchange Recirculating Mash System, first appeared as a simplification of RIMS about a decade later (see Figure 2). It is similar to RIMS except that the electrical heater is replaced with a heat exchanger and bypass valve to control heating. The most common implementation uses a coil, much like an immersion wort chiller, inside the hot liquor tank as the heat exchanger. This system can be electronically controlled when an electrically activated valve is used to shunt wort past the heat exchanger. Scorching isn't an issue with the HERMS design and HERMS can be designed to handle large batches. The common HERMS design may require the use of a hot liquor tank stirrer to achieve good heat transfer in the heat exchanger.

Another variation, called DIMS for Drop In Manifold System, is a recently developed simple system that does away with the false bottom typically found in combination mash-lauter tuns. Instead, it employs a slotted pipe manifold that can be inserted (or "dropped") into the mash tun for the lautering phase (see Figure 3). DIMS takes advantage of the fact that a manifold, unlike a false bottom, can be inserted into a mash tun after the mash steps, instantly converting it to a lauter tun. Unlike other systems that use a combina-



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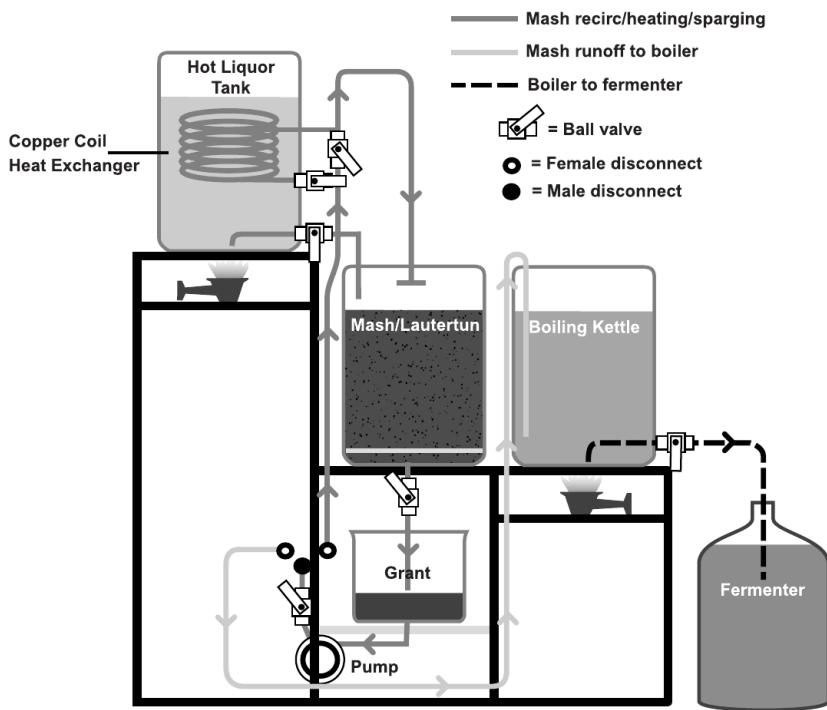
-Jim Wagner, Brewmaster
DuClaw Brewing Co.,
Bel Air, Maryland



A "tower" design like this one allows gravity to do much of the work involved in moving brewing liquids from the hot liquor tank to the mash/lauter tun and on to the kettle.

Figure 2

Typical HERMS Design



The HERMS design offers brewers a heater bypass to allow greater control over heating.

tion mash-lauter tun, the DIMS mash tun can be directly heated as long as a stirrer is available to prevent scorching. After mashout the stirrer is removed and the manifold—attached to a wort pump—is inserted to the bottom of the mash. Lautering proceeds just as for RIMS.

DIMS offers less opportunity for automatic control, but reduces the risk of scorching that occurs when heating a combined mash-lauter tun with a false bottom. DIMS also provides the same excellent wort clarity as RIMS and HERMS. DIMS systems can be easily scaled for use with large batches. A unique feature of DIMS is that it allows the brewer to pump off some wort to a holding tank, withdraw the manifold and perform a decoction boil of the thick grist fraction in the mash tun. If high temperature components are used, the DIMS hardware can also be used to filter whole hops and break material from the boiled wort.

Variations on the Themes

Homebrewers have created many systems that are variations of these three: RIMS that use alternate heat sources, HERMS with different heat exchanger designs and systems that control the wort pump rather than the heating element. Rather than attempt to list all of the possible systems, let us examine the features than can make or break a mashing system design.

The most critical issue in most systems is the need to avoid scorching the grist when heating the mash. Scorching occurs when sugars or starches are heated to temperatures around 480° F (250° C). At this temperature carbohydrates change structure, scorch, char and damage beer with an unmaskable burnt flavor. Given the high temperatures required and the fact that mash liquid never exceeds the boiling point it might seem impossible to scorch a tun, but it happens. Scorching occurs when stagnant solids or (continued on page 55)



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Barley Wine

The Beer That Would Be King

By Fal Allen



With original gravities starting at 1.085, alcohol by volume at 8 to 14 percent and the International Bittering Units running into the 100+ range, barley wine truly is the king of beers.

Who really is the king of beers? Television might lead you to one conclusion, but most thoughtful brewers know otherwise. To ponder this, I offer the following questions: Which beer costs the most money to make? Which beer does the brewer hide away in the dark corners of the brewery or basement only to be brought out for other brewers or chance encounters with beer dignitaries? Which beer can be aged for so long it needs a vintage date? Which beer is the biggest, the strongest, the most massive?

This train of thought can lead to only one conclusion: barley wine! With original gravities starting at 1.085, alcohol by volume (ABV) at 8 to 14 percent and the International Bittering Units (IBUs) running into the 100+ range, barley wine truly is the king of beers.

Over the years I've made barley wines as both a homebrewer and in commercial breweries and I've found that few beers are more satisfying to have in the cellar for special occasions. But making one isn't just a matter of cranking up the gravity a bit. Let's look at the various factors to consider when making your own "King of Beers."

Malt Bill

Barley wines feature malt character. To get a beer to that strength (gravity) you have to use three to four times the normal amount of malt per gallon, and with that much grain going into a beer you are going to get plenty of malt flavor. I have found that for beers this big, less complex is often better. Keep your malt bill simple. Too many (or too much) specialty malts will cloud the flavors and make them muddled and indistinct. Too much specialty malt can also leave too many complex unfermentable sugars in the finished product, making your beer cloying and overly sweet. Use 80- to 100-percent pale malt. When choosing specialty malts, carefully select only one or two. Take it easy on the dark malts, because with so much malt and an extended boil, a little bit goes a long way.

To be the biggest and baddest you have to be strong. How does one attain a sufficiently high gravity to be the king of beers? Your first inclination will be to fill your mash tun to the very rim with as much grain as you can possibly fit. Try to avoid this impulse. The deeper your mash bed, the slower your runoff and the greater your chance of compacting or setting your mash (this would be a true bummer). Setting your mash will reduce your runoff to a trickle and extend it into multiple hours. I recommend that you do not exceed twice to two-and-a-half times your normal mash bed depth. Shoot for a relatively thick mash and a medium-low mash temperature, somewhere between 147 and 150° F (64–66° C). This will give you fewer of the complex sugars (unfermentables) and more of the simple or fermentable sugars. With the amount of malt you are using, you will get plenty of unfermentables for sweetness, mouth feel and body.

Reduced levels of complex sugars may help with runoff. I have found that an infusion mash works best with these big beers. It should be well mixed but not overly stirred. Excessive stirring or the multiple mixings of a temperature-controlled mash regime will tend to "beat" the air out of the mash. The air in the mash helps buoy it up and keep it from collapsing or "setting" your mash bed. You want to keep the mash bed from being too compact, which can translate into poor runoff, poor extract and thus a lower gravity.

Runoff and Sparging

It is always best to start your runoff slowly. If your runoff is too fast you could set the mash or not extract all of the sugar in the mash bed. Slow and steady—that's what you want. Don't be concerned about an extended runoff—an extra 30 to 60 minutes won't have a negative impact on flavor. If you do set your mash bed, try to avoid repeated or excessive "underletting" (infusing hot water into the mash tun under the false bottom), which can greatly reduce the gravity of your wort. In order to make

Batch 100: Barley Wine

Brewer: Ray Daniels

Ingredients for 5 U.S. gal (19 L)

10.0 lb (4.5 kg) Marris Otter pale malt
4.5 lb (2 kg) light malt extract
3.0 lb (1.36 kg) dark wheat malt
3.0 lb (1.36 kg) Belgian biscuit malt
1.0 lb 80° L (0.45 kg) crystal malt
1.0 lb (0.45 kg) Carapils malt
1.0 lb (0.45 kg) Cara-Munich malt
1.5 oz (42 g) Chinook (60 min)
1.0 oz (28 g) Perle (60 min)
1.5 oz (42 g) Cascade (15 min)
1.0 oz (28 g) Northern Brewer (5 min)
1.0 oz (28 g) Cascade (5 min)

- Original specific gravity: 1.102
- Final specific gravity: 1.032
- ABV: 8.95%
- Primary fermentation: 15 days at 64-68°F (18-20°C)
- Secondary fermentation: 15-30 days

Brewer's Specifics

Mash in at 150° F (66° C) for 90 minutes.

Add extract at boil. Boil for two hours.

the strongest beer possible you will need to keep from over-sparging your mash. I have found it very useful to measure the gravity of the running as it enters the kettle. By doing this throughout the runoff it will give you a good idea of the overall gravity in the kettle. It will be a good indicator of when (and how much) to sparge and when to stop the runoff.

In my experience, typical barley wine runnings start at 1.070 to 1.080 and may slowly move into the upper 1.090s. They then fall off to 1.060 or so, at which point it is time to briefly sparge. It is best to stop the runoff when the runnings measure between 1.040 and 1.050, depending on the kettle volume. Taking the running much farther below 1.040 carries the risk of a low gravity barley wine (and at that point ... well, you're just making strong ale). At the end of the barley wine running, brewers with holding tanks or additional kettles will often continue to sparge and collect the lower gravity runnings. They will use these last runnings to make a small beer. This is a traditional practice that not only makes economical sense, but is also a fun challenge of one's brewing skills to create an interesting beer with what would otherwise be waste.

The Boil

Of course most brewers understand that the longer you boil, the more water you evaporate out and the more concentrated your

wort will become. This will result in a higher gravity. I have found it best to boil a barley wine for two to two-and-a-half hours. If you have a good rolling boil (with a good evaporation rate—say 10 percent per hour), you can increase your gravity 10 to 20 points (e.g. 1.070 up to 1.085 or 1.090). Also bear in mind that the longer you boil the more sugars will caramelize and thus the more color you will get. This is another reason that you may want to take it easy on the darker malts.

If your boil is not as vigorous as you would like you can increase the evaporation rate by stirring or mixing the wort during the boil. Agitated (or swept) kettles were once common in systems that had low heat exchange surface to liquid volume ratios.

Some brewers will add sugar or malt extract to the kettle during the boil to achieve a higher gravity. I would recommend keeping this practice to a minimum. If you plan on using malt extract, try to keep it to 40 percent or less of your total fermentables. If you use non-malt sugars, I would suggest keeping it to 15 percent or less of your total. If you stay with these percentages there should be no significant impact on the flavor of your beer.

Hops

Someone once told me that you cannot add too many hops to a barley wine. After my first home-brewed barley wine, I no longer think that's an accurate statement. However, you *can* add an enormous amount and still make a well-balanced beer. Barley wine IBUs usually run in the 50 to 90 range and some are even reported to break 100. Keep in mind that these higher hopped beers usually have a high terminal gravity as well, so the higher residual sugars help to balance all that bitterness. Also be aware that high gravity worts will have lower hop utilization than a normal gravity beer. (The increased sugar content reduces the solubility of alpha acids in wort.) As a result, I suggest using high alpha acid hops for bittering in barley wines. This will reduce the volume of hop material and thereby reduce wort losses due to wort absorption in the hop mass. This will also avoid the vegetable flavor you can pick up from boiling too large a hop mass. For finishing hops you can go either way, but before using up a lot of expensive hops, remember that hop aroma is the first thing to go in an aged beer.



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Yeast

To ferment a behemoth beer you will need a good healthy ale yeast culture. I can't overemphasize the need to pitch enough yeast; without it, you will not get the proper attenuation and the resulting beer will be too sweet and cloying.

When you go to pitch, always try to use an active culture, preferably from a recent fermentation. If you are using a new culture, make sure you grow up a good, strong starter so you will have enough yeast for the correct pitching rate. The proper pitching rate for any beer is one million cells per milliliter of wort per degree Plato. For a barley wine that is 1.092, or 22° Plato, you will need 22 million healthy yeast cells per milliliter in your pitched wort. Since most homebrewers don't have access to a microscope and a hemocytometer, I personally advise pitching two-and-a-half times the regular pitching volume or weight that you would use for a beer with an O.G. of 1.050. Any way you cut it, that's a lot of yeast.

As for yeast strain, choose one with flavors that you like and are familiar with. It should be alcohol tolerant and at least a medium attenuator. Your local brewery or yeast supplier should be able to advise you on your options.

Of course proper oxygenation of the cooled wort is very important. You simply cannot put too much oxygen into a barley wine wort; otherwise, the yeast suffers and the fermentation will peter out, leaving you with an under-attenuated beer. Beer with unfermented simple sugars will have off-flavors, be overly sweet and will be more susceptible to bacterial infection during prolonged storage.

Fermentation

During fermentation, be sure to watch the temperature carefully. Do not ferment your big beers too warm. High gravity fermentations naturally produce more esters than a lower gravity beer. Higher temperature fermentations will produce more of both esters and higher alcohols. The two combined (high gravity wort and a high fermentation temperature) can create some pretty strange tasting beers. I like to keep the temperature between 66 and 70° F (19 to 21° C). If the temperature is too (continued on page 61)

Malzwein Alt Barley Wine ("German Experiment") Brewer: Charlie Papazian

Ingredients for 5 U.S. gal (19 L)

- 12.0 lb (5.4 kg) light dry malt extract
- 2.5 lb (1.13 kg) pale malt
- 2.0 lb (0.9 kg) Munich malt
- 1.0 lb (0.45 kg) crystal malt
- 0.5 lb (226 g) Dextrin malt
- 0.5 lb (226 g) Special roast or Aromatic malt
- 6.0 oz (170 g) German Northern Brewer (60 min)
- 1.5 oz (42 g) German Hallertau (10 min)
- 1.5 oz (42 g) Saaz (end of boil)

- Original specific gravity: 1.098-1.108
- Final specific gravity: 1.028-1.032

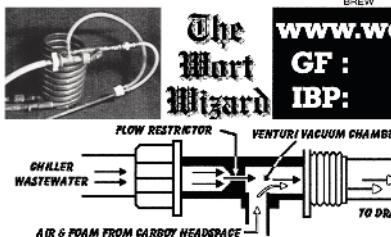
- ABV: 8.9-10.5%
- Primary fermentation: 3 to 7 days at 66-70° F (19-21° C)

Brewer's Specifics

Mix 6.5 quarts 130° F (54° C) water with crushed malt and hold at 122° F (50°C) for 30 minutes. Add 3.5 quarts of boiling water and hold at 152-155° F (67-68° C) for 60 minutes. Mash out to 165° F (74° C). Sparge with 3 gallons. Add extract and boil. At the end of the boil let the wort cool to 110° F (43° C) and then add to 3 gallons of chilled 50° F (10° C) water. Let wort stand until it is 70° F (21° C). Pitch yeast.

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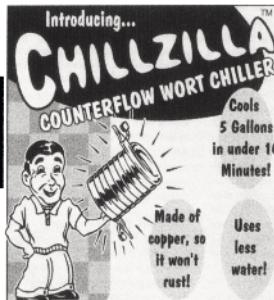
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Dropping Bright: The Physics of Yeast and Haze Removal

By Chris Bible

Nothing is more pleasing to a beer enthusiast than pouring a beer with a beautiful, foamy head and lofting it skyward to observe the transparent, bright clarity of a well made beer! (Okay, I guess you could talk me into believing that drinking the beer is more pleasing than looking at the beer, but humor me for a minute here.)

Amazingly enough, much of beer clarity is ruled by a surprising force—gravity. Most of the haze-causing elements in beer such as yeast, protein and tannin will yield to gravity and settle out eventually. Unfortunately, the brewer (and his or her adoring fans) is not always patient enough to let nature take its course. Thus we sometimes help the process along.

In this article, we'll review the role of gravity and particle settling in the production of attractively clear beer. Let's start with a little background.

Settling Effects in Beer

A well-clarified beer is a thing of beauty. Clarification of beer and the prevention of "chill haze" are an important part of the brewing process. Beer haze is the result of the formation of an insoluble colloid-complex from soluble proteins and tannins (polyphenols) during the brewing process. One component of beer haze called "chill haze" is relatively soluble (and invisible) at room temperature, but is much less soluble

(and therefore hazy) at the cooler temperatures at which beer is typically served.

To prevent the formation of this colloidal haze, the brewer merely needs to remove enough of either the protein-tannin complexes of permanent haze or—in the case of chill haze—the haze-forming proteins or tannins. For more than 100 years, brewers have tried and used a range of different fining agents and clarification substances. A representative table of these substances with the mechanism of removal is given in Table 1.

Many clarification agents adsorb either protein or tannin to prevent chill haze and improve the clarity of beer. This adsorption is the result of surface charges on the molecules that comprise the clarification aid attracting opposite surface charges on the protein or tannin molecules. Opposite charges attract and the protein or tannin becomes physio-chemically bound to the surface of the clarification agent. As this occurs, clumps are formed that connect many different molecules of protein or tannin and the clarification agent. These heavy clumps will settle out of solution.

Yeast are also characterized by their tendency to settle out of suspension. The speed and efficiency with which yeast settle from beer is determined by the flocculation of the yeast strain. Simply stated, flocculation is the tendency for yeast to form clumps or flocs. Because flocs have a

greater density than individual yeast cells, they settle faster. Thus, a highly flocculent yeast strain will tend to settle out of suspension more quickly than a less flocculent yeast.

Harnessing Gravity

The force of gravity drives the settling-out of colloidal matter (proteins and tannins suspended in beer), the clumps they form with clarification agents or flocs of yeast. The process is sedimentation and physics provides us with a mathematical model for understanding the process.

A discrete particle settling in water (or wort) accelerates until the drag force reaches equilibrium with the driving force.¹ Once this happens, the settling velocity becomes constant; this equilibrium velocity is referred to as the "terminal velocity." At terminal velocity the settling velocity of a discrete particle is given by



Are You A Geek Too? Zymurgy is looking for contributions for the "For Geeks Only" section. If you have studied a particular area of brewing science using in-depth library research or experimental data and would like to see the results published here, let us know by contacting Ray Daniels at ray@aob.org or via the mail address listed in the masthead on page 2.

the equation:

$$v = \left[\frac{2g(\rho_s - \rho)V}{C_D A \rho} \right]^{0.5}$$

Where:

v = settling velocity (m/s)

g = acceleration due to gravity (9.8m/s²)

ρ_s = density of the particle (kg/m³)

ρ = density of the wort (kg/m³)

r = density of the wort (kg/m³)

V = volume of the particle (m³)

A = projected area in the direction of motion (m²)

C_D = drag coefficient

If we take the liberty and assume that the solid particle that is settling out of the wort is spherical, then the above equation simplifies to:

$$v = \left[\frac{4g(\rho_s - \rho)d}{3C_D \rho} \right]^{0.5}$$

Where:

d = settling particle diameter

If we take one additional liberty and assume that the settling velocity is such that the fluid flow around the particle is laminar (not turbulent), then we can use:

$$C_D = 24/Re$$

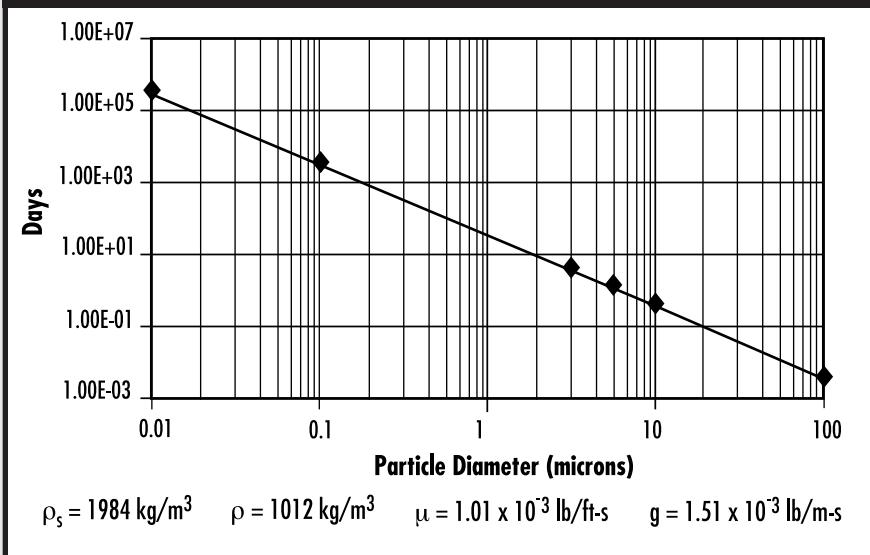
Where Re = Reynolds number of the settling situation in question.



Table 1: Beer Clarification Aids and Mechanism of Action

Substance	Mechanism of Action	Typical Dose Rate
Papian (enzyme)	Modifies protein molecules to inhibit reaction with tannins	3 mg/l
Tannic Acid (tannin)	Addition of tannin forces chill haze reaction to completion. Colloid can then be filtered out.	Depends on batch
PVPP (polyvinylpolypyrrolidone)	Adsorbs tannins	1/2 tsp/5-gal batch or 7.5–25 mg/l
Nylon 66	Adsorbs tannins	More than PVPP
Bentonite	Adsorbs proteins	—
Silica Gel	Adsorbs proteins	45–360 mg/l
Polyclar	Adsorbs tannins	1/2–1 teaspoon/5-gal
Gelatin	Adsorbs proteins and acts as a yeast flocculation aid	1/2–1 teaspoon/5-gal
Isinglass	Adsorbs proteins and acts as a yeast flocculation aid	1/2–1 teaspoon/5-gal
Irish Moss (seaweed)	Adsorbs proteins	1/2–1 teaspoon/5-gal

Figure 1: Time Required for Spherical Particulate Matter to Settle 1 meter



By substituting this into the above equation, we get an actual, useful equation:

$$v = \frac{g(\rho_s - \rho)d^2}{18\mu}$$

Where:

μ = dynamic viscosity of the fermented beer (kg/m·s)

With this equation we can finally predict the settling time required to remove the particulate from our fermentation vessel. All we

need to know is the density of the settling particle, the density of the wort, the diameter of the settling particle and the viscosity of the wort.

As an example:

Assume the density of the settling particle = 1984 kg/m³, the density of the fermented beer = 1012 kg/m³, the diameter of the settling particle = 3 microns (3×10^{-6} m) and the viscosity of the fermented beer is 1.5 centipoise (1.51×10^{-3} kg/m·sec). Then we get:

(continued on page 62)

BY CHARLIE PAPAZIAN

Come Helles or High Water

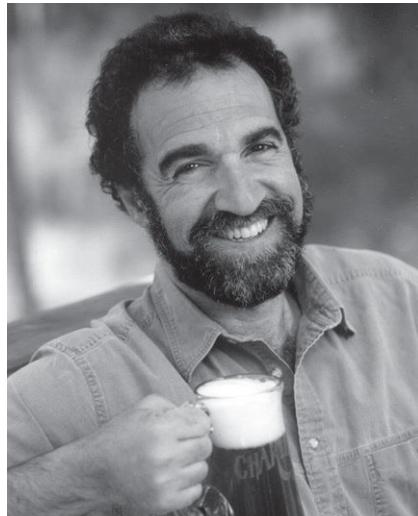
In the July-August 2002 issue of *Zymurgy* I revisited "Toad Spit Stout," one of the most popular recipes in my book, *The New Complete Joy of Home Brewing*. I closed my discussion lamenting, "I know; it is the year 2002 and the book is due for an upgrading, but these are tough times for publishers and no interest has been expressed—so far."

As the magazine was being printed and delivered to your doors I was contacted by my publisher, now Harper-Collins, and discussions were reopened concerning an update. I'm happy to say that after busily applying myself last summer and fall, a revision has been completed and a third edition of *The Complete Joy of Home Brewing* will be released around September.

Here is an adaptation of the introduction to the third edition, providing you a glimpse of the new release:

I'm close to completing this third edition of *The Joy of Home Brewing*. I've had plenty of time to reflect on my 32 years of continued homebrewing and all that has changed and so much that has been maintained. There are two constants that I've learned to recognize. 1) Traditions of beer brewing are always evolving and 2) the best thing you can do for yourself and your homebrewing is to relax, not worry and have a homebrew.

Why do I know these truths? I brewed my first beer in 1970. Those early homebrews inspired such wonderful times that my friends begged me to teach them how to make beer. I've been teaching ever since. In the earlier days I discovered how intimidating homebrewing could be to the uninitiated; how nervous and anxious people were about entering into the mystic world of beer making. After all, how many things can one actually create that result in such satisfaction and enjoyment? Beer making seemed out of the boundaries of possibilities to most people. Fact is these same feelings exist today among



people who have never brewed, just as they had in the early 1970s. "Relax. Don't worry. Have a homebrew," became the mantra in my early teachings. Homebrewers and friends welcomed and embraced that attitude. The word spread that homebrewing quality beer was easy.

I know homebrewing your first batches of beer, like doing anything totally new and "risky," creates anxiety. Supporting each other with a simple offering of homebrew and "Relax. Don't worry. Have a homebrew," is just the right formula to go on and succeed by doing. Knowing there are hundreds of thousands creating their first batch of beer each year with the same shared values comforts each batch of beer. It is also a window toward how we look at life.

Thousands of people come up to me and express their appreciation that I have kept a tone of humor throughout the book, while conveying reassurance and technically accurate and informative information. I realize a book like this can easily overwhelm the beginner. It is with great and deliberate purpose I emphasize a good dose of humor and lightness throughout the

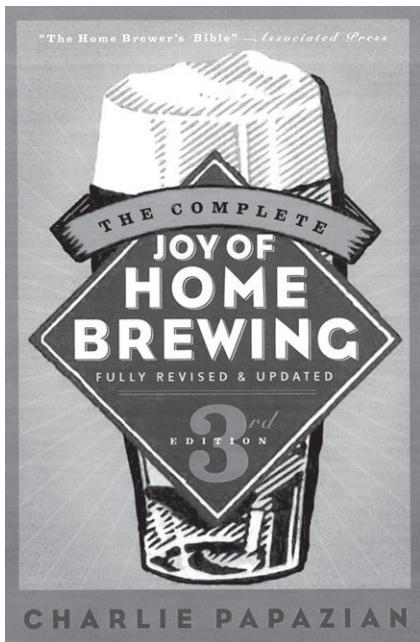
book, in order to keep you engaged while minimizing your anxiety.

Some of the humor may seem personal and mysterious. It is. Mystery and personality is what each of our lives is about. Beer making is about life and living it well. By reading this book and engaging in the process of creating beer you will be creating things very personal and mysterious. With this book and its "attitude" you will find your own humor between the lines. You will learn how to approach the mysterious with accomplished confidence.

During my early days of homebrew crusading, popularity slowly grew and I founded the American Homebrewers Association in Boulder, Colo. with my good friend Charlie Matzen in 1978. The attitude and principles of homebrewing we pursued with the association are the same as what inspired the pages of this book. I am still involved on a daily basis as president of the Association of Brewers.

With the 1980s and 1990s came a revival of appreciation for beer in America. Homebrewers put the "pride" back into American beer culture. The American Homebrewers Association and tens of thousands of homebrewers just like you brewed one pot of brew at a time and inspired the microbrewing/craft beer movement throughout the world. Furthermore the American Homebrewers Association developed the network that provided the founding of so many other association events and services, perhaps one of the most famous being the Great American Beer Festival. All of this, I believe, is a testament to what quality homebrew and a great attitude can achieve.

Traditional beer styles go in and out of favor with consumers. When they are rediscovered homebrewers tend to be their champions. While there is still a commercial trend toward lighter and less flavor in beer, homebrewers are the beer world's saviors,



The third edition of *The Complete Joy of Home Brewing* is scheduled to be released in September 2003.

maintaining the enthusiasm for the classic traditions of beer and nurturing the emergence of new flavors and traditions. I don't know whether creative people are drawn to homebrewing or homebrewing helps develop creative people. It really doesn't matter which it is. It is probably both and that is why creativity with a reverence toward tradition has been the personality of almost every single homebrewer I've met.

My travels have taken me all over the world visiting professional and amateur brewers and after more than three decades of involvement with this fantastic hobby, I am still learning and inspired by the brewers I meet. People like you offering me your beers or your experience is what drives the enjoyment of this hobby. Hundreds of homebrew clubs meet monthly; probably in your area, too, offering the camaraderie, great beer and information continuing to improve our beers and hobby.

The principles and techniques behind making great homebrew have not changed dramatically in the past few decades, but quality and innovation have. New homebrewers have always been the driving force behind the excitement of the hobby. While there are hundreds of thousands of veteran homebrewers making excellent beer, the element of discovery provides the energy that drives all of us to brew better beer with each new batch. There are few things more satisfying in the world than to be involved with instilling the sense of discovery, happiness and satisfaction to others. This is what homebrewing does.

Providing a means to help new homebrewers develop a love of beer and homebrewing is what the third edition of *The Complete Joy of Home Brewing* is about. Every single recipe has been reviewed and improved based on the availability of ingredients and new, evolved information. There are several

new recipes, most of which are favorites, which I continue to brew today. Every procedure, chart and guideline has been reviewed for accuracy, updated and revised.

I was always tempted to add new charts, data and techniques—there's so much more great information I'd like to share with you. But I had to remember that this is a first book for most homebrewers. Thus, I have not added too much to the technical side of the brewing process. If you get hooked and are ready to take your hobby to the next level there is a wealth of additional information. My second book, *The Home Brewers Companion* is in actuality *The Complete Joy of Home Brewing, Volume 2*. It is packed with additional information, recipes, data, valuable charts and techniques that will take you beyond this first book on homebrewing.

And beyond that there is the list of additional resources at the end of the book taking you on your own personal journey while making the best beers you have ever had in your life.

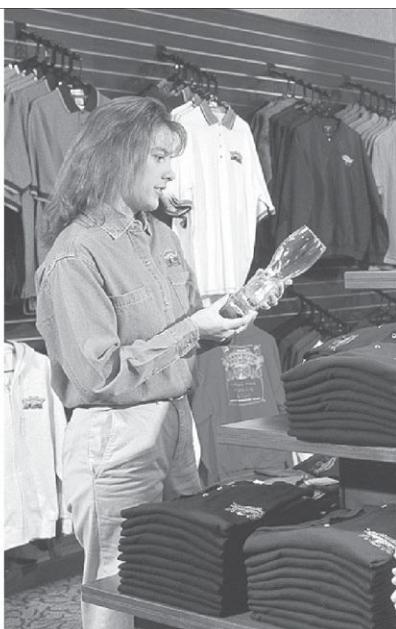
I think I'll have a homebrew; my own. And of course relax and not worry.

Thank you for what you've given back to me. A smile, a laugh, a cheer and good brew.

So let's cut the shuck and jive and get on with the recipe.

Here comes "Helles or High Water," a Munich style Helles lager of the type you would typically find yourself drinking liters of in a summer Bavarian beer garden. There are three essential components of the character of this style of beer. The hop bitterness must be subdued and not at all aggressive. A full malt aroma and flavor should emerge with each indulgence. Relatively low in alcohol, the beer is refreshing yet full flavored. And for those of us who have been lucky enough to roam the Bavarian and Franconian countryside sampling the variations among the small brewers of Germany, we recall enjoying the complexity that is contributed by sulfur related compounds produced as a byproduct of fermentation. These sulfur compounds are not overwhelming, yet they add complexity to the character and a stamp of authenticity.

In these recipes a good dose of aromatic malt helps the biscuit-like malty character in aroma and flavor. Using low alpha acid hops of Noble-type origins adds finesse and authenticity to the hop character emerg-



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ing from this Helles. Better to underhop than overhop with this style. If in doubt about alpha acid content of your hops, less is better than more. Take care to note whether you use pellets or whole hops (these varieties may only be available in one or the other form at your local shop); use 15 percent less hops when substituting pellets for whole hops.

Consult with your local homebrew supply shop regarding yeast types that produce small amounts of sulfur compounds adding complexity to your Helles.

Helles or High Water German style Munich Helles Lager Extract Version

Ingredients and Mash Extract recipe for 5 U.S. gal (19 L)

There's a little mashing to do in this recipe only because I really want you to use aromatic malt in your recipe and that requires a bit of mashing. Don't worry, you will only be mashing a total of 1.75 lbs. (0.8 kg) of grain malt and using the simplest of methods to separate the grain from your sweetly produced extract. Because aromatic malt does not have a tremendous amount of diastatic power, the mash extract recipe includes a small amount of Pilsener malt to supply "insurance" enzymes for the conversion.

- 6.5 lb.(3 kg) very light malt extract syrup or 5.25 lbs. (2.4 kg) very light DRIED malt extract
- 1.0 lb. (454 gm) Belgian (or other) aromatic malt
- 0.5 lb. (225 gm) Pilsener malt
- 0.25 lb. (112 gm) malt (75° L caramel malt)
- 0.65 oz. (18 gm) of a 4.5% alpha Mt Hood whole hops (3 HBU/84 MBU) 60 min
- 0.5 oz. (14 gm) of a 6.5% alpha German Tradition whole hops (3.4 HBU/95 MBU) 60 min
- 0.6 oz. (16 g) 5.5% alpha Crystal hop pellets 1 min steep
- 0.3 oz. (8 g) Crystal hop pellets—Dry hop
- 0.25 tsp powdered Irish moss

0.75 C (180 ml measure) corn sugar (priming bottles) or 0.33 cups (80 ml) corn sugar for kegging Saflager dried lager yeast

- Target original gravity: 1.050 (12.5 B)
- Approximate final gravity: 1.014 – 1.016 (3.5-4 B)
- IBU's: about 21
- Approximate color: 10 SRM (20 EBC)
- ABV: 4.6%

Heat 1.75 quarts (1.7 L) water to 172° F (77.5° C) and then add crushed pilsener, aromatic and Cara Munich malt to the water. Stir well to distribute heat. Temperature should stabilize at about 155° F (68° C). Wrap a towel around the pot and set aside for about 45 minutes. Have a homebrew.

After 45 minutes add heat to the mini-mash and raise the temperature to 167° F (75° C). Then pass the liquid and grains through a strainer and rinse with water at about 170° F (77° C). Discard the grains.

Add more water to the sweet aromatic extract you have just produced, bringing the volume up to about 2.5 gallons (9.5 L). Add malt extract and both "60 minute" hops and boil for 50 minutes. Then add Irish moss and boil for 10 more minutes. Then add "1-minute" Crystal hop pellets for a final minute of boiling. Turn off heat.

HOMEBREW BITTERING UNITS (HBUs) are a measure of the total amount of bitterness in a given volume of beer. Homebrew Bittering Units can easily be calculated by multiplying the percent of alpha acid in the hops by the number of ounces. For example, if 2 ounces of Northern Brewer hops (9 percent alpha acid) and 3 ounces of Cascade hops (5 percent alpha acid) were used in a 10-gallon batch, the total amount of bittering units would be 33: $(2 \times 9) + (3 \times 5) = 18 + 15$. Bittering units per gallon would be 3.3 in a 10-gallon batch or 6.6 in a five-gallon batch, so it is important to note volumes whenever expressing bittering units.

INTERNATIONAL BITTERNESS UNITS (IBUs) are a measure of the bitterness of a beer in parts per million (ppm), or milligrams per liter (mg/L) of alpha acids. You can estimate the IBUs in your beer by using the following formula:

$$\text{IBU} = \frac{\text{ounces of hops} \times \% \text{ alpha acid of hop} \times \% \text{ utilization}}{\text{gallons of wort} \times 1.34}$$

Percent utilization varies because of wort gravity, boiling time, wort volume and other factors. Homebrewers get about 25 percent utilization for a full one-hour boil, about 15 percent for a 30-minute boil and about 5 percent for a 15-minute boil. As an example, 1 ounce of 6 percent alpha acid hops in five gallons of wort boiled for one hour would produce a beer with 22 IBUs:

$$\text{IBU} = \frac{1 \times 6 \times 25}{5 \times 1.34} = 22 \text{ IBUs.}$$

METRIC BITTERNESS UNITS (MBUs) are equal to the number of grams of hops multiplied by the percent alpha acid.

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

If using the recommended Saflager dried yeast, rehydrate the yeast in one cup (250 ml) 90° F (32.5° C) clean water for 15 minutes. Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident primary ferment at temperatures of about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the hop pellets for dry hopping. If you have the capability "lager" the beer at temperatures between 35 and 45° F (1.5 to 7° C) for three to six weeks.

Prime with sugar and bottle or keg when complete.

Helles or High Water German style Munich Helles Lager All-Grain Recipe

Ingredients and all-grain recipe for 5 U.S. gal (19 L)

Note: Because the full amount of wort is boiled better hop utilization is achieved, thus less bittering hops are needed to achieve the same bitterness as the previous mash-extract recipe.

- 7.5 lb. (3.4 kg) Pilsener malt
- 1.0 lb. (454 gm) Belgian (or other) aromatic malt
- 0.25 lb. (112 gm) malt (75° L caramel malt)
- 0.4 oz. (12 gm) of a 4.5% alpha Mt Hood whole hops (2 HBU/56 MBU) 60 min
- 0.4 oz. (12 gm) of a 6.5% alpha German Tradition whole hops (2.6 HBU/73 MBU) 60 min
- 0.6 oz. (16 g) 5.5% alpha Crystal hop pellets. 1 min
- 0.3 oz. (8 g) Crystal hop pellets—Dry hop
- 0.25 tsp powdered Irish moss
- 0.75 C (180 ml measure) corn sugar (priming bottles) or 0.33 cups (80 ml) corn sugar for kegging
- Saflager dried lager yeast

- Target original gravity: 1.050 (12.5 B)
- Approximate final gravity: 1.014 – 1.016 (3.5-4 B)
- IBU's: about 21
- Approximate color: 10 SRM (20 EBC)
- ABV: 4.6%

A step infusion mash is employed to mash the grains. Add 4.5 quarts (4.3 liters) of 145° F (63° C) water to the crushed grain, stir, stabilize and hold the temperature at 132° F (53° C) for 30 minutes. Add 2 quarts (2 L) of boiling water and add heat to bring temperature up to 155° F (68° C) and hold for about 30 minutes. Then raise temperature to 167° F (75° C), lauter and sparge with 4 gallons (15 L) of 170° F (77° C) water. Collect about 5 gallons (19 L) of runoff. Add water to bring total volume to about 5.25 gallons (20 L) for the boil. Add "60 minute" hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes. When 10 minutes remain add the Irish moss. When one minute remains add the "1-minute" crystal hop pellets. 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 15 minutes. Continue to chill in the immersion or use other methods to chill your wort. Then strain and sparge the wort into a sanitized fermenter. Bring the total volume to 5 gallons (19 L) with additional cold water if necessary.

If using the recommended Saflager dried yeast, rehydrate the yeast in one cup (250 ml) 90° F (32.5° C) clean water for 15 minutes. Pitch the yeast when temperature of wort is about 70° F (21° C). Once visible signs of fermentation are evident primary ferment at temperatures at about 55° F (12.5° C) for about one week or when fermentation shows signs of calm and stopping. Rack from your primary to a secondary and add the hop pellets for dry hopping. If you have the capability "lager" the beer at temperatures between 35 and 45° F (1.5 to 7° C) for three to six weeks.

Prime with sugar and bottle or keg when complete.

Charlie Papazian is president of the Association of Brewers.

BY RAY DANIELS

Beer for the Afterlife

The December 16 edition of BEERWeek reported that 72-year-old Yugoslavian Slobodan Ristivojevic has spent the last 30 years drinking nothing but beer, and doesn't want to go to the grave without his bottle. Ristivojevic began his beer-drinking marathon in 1972 and has since knocked back about 100,000 bottles.

"There is no drink that refreshes like beer. I used to drink up to 20 bottles a day but nowadays it's only about six a day. I'm not an alcoholic, but I simply can't drink anything else but beer. If I were to drink a glass of water right now I think I'd just collapse on the floor," he told Serbian daily *Glas Javnosti*.

Speaking of the headstone he added, "One beer is for me and another one for my loving wife Slavka. She drinks water too but likes beer, and when we die I want to be sure we'll have beer there at the cemetery as well."

**Germans Work on Cancer-Fighting Beer**

German scientists say they have developed a beer that could help fight cancer. It contains high levels of a potent antioxidant called xanthohumol, which is found in hops and has been shown in previous laboratory studies to stem the growth of tumor cells.

Achim Zuercher, a scientist involved in the study, said an as-yet-unnamed brewery in Bavaria would sell the beer early in 2003. He also expects it to be sold outside Germany. Tests on the effects of xanthohumol have been carried out only in the laboratory, he said, but were promising. He stressed it would not be possible to say conclusively that the beer will fight cancer in humans until tests are completed several years down the line. More is available on-line at www.real-beer.com/news/articles/-news-001802.html.

Beer Drinker of the Year

Just three finalists remained for The Beerdrinker of the Year competition as this issue headed to press, held at Wynkoop Brewing Co. in Denver.

The impressive finalists were: John Ahrens of Mount Laurel, N.J.; John Marioni of Bothell, Wash.; and Ray McCoy of Clemmons, N.C.

Ahrens, a 59-year-old sales director for a law book publisher, was listed in the *Guinness Book of World Records* for having the World's Largest Collection of Beer Cans. He also has compiled a tape library of almost 2,000 beer songs.

Marioni, a 39-year-old high tech operative, raises Cascade hops in his backyard and once worked in a brewery in Germany. He also appeared on the cover of *Brew Your Own* magazine.

McCoy, a 42-year-old computer consultant, made several pilgrimages in 2002 to beer festivals in places such as Belgium and Sweden. He provides homebrew for opening night cast parties for a local community theatre. His favorite quote: "Life's a journey. Pack a cooler."

The nine judge panel (including Paul Gatz, Nancy Johnson and Charlie Papazian) selected Ray McCoy as "Beer Drinker of the Year."

Double Bale Quail

Deschutes Brewery in Bend, Ore. debuted its Double Bale Quail Imperial IPA in late November. Just 900 cases of this "hop lover's dream" were available.

Made in the style of a barley wine and inspired by Quail Springs IPA, Double Bale Quail Imperial IPA is a 100-barrel limited



release featuring 400 pounds of hops, the equivalent of two full hop bales. Oak cask conditioning and dry hopping provide the finishing touches for the flavorful ale. Promises the company's press release, "With a 10-percent alcohol content, Double Bale Imperial IPA will keep the fire burning inside."

Don't Eat Yellow Snow—Drink It!

Rogue Ales' Yellow Snow Ale is celebrating its third season as a "tribute to snow-related sports—even ice fishing." The award-winning IPA is brewed using whole juniper berries. Pale saffron in color, Yellow Snow has a smooth malt balance, floral aroma and spicy hop finish. It's available nationwide in 22-ounce and 64-ounce serigraphed bottles.

Not satisfied with just drinking Yellow Snow Ale? There's also a Yellow Snow merchandise line including T-shirts, baseball caps, beanies, condoms, tattoos and pint glasses. The Yellow Snow label and logo depicts goggle-clad Uncle Sam on the slopes with his best friend, Brewer, Rogue's own "brewdawg and chief financial officer." Visit www.rogue.com for more information.

Wine is Fine, but Beer is Better

Noted beer enthusiast Fred Eckhardt brought down the house—Rogue Ales Public

House in Portland, that is—last October with a series of events pairing craft beers with gourmet cheeses, following that up with an event pairing 10 Oregon-made craft beers with 10 gourmet food selections.

The event was organized by the Portland chapter of the international Slow Food movement. Several members of the Oregon brewing community united for the event, including representatives from Portland Brewing Co., Hair of the Dog, BJ's Pizza and Brewery, Bridgeport, Widmer Gasthaus, Deschutes and Rogue.

The two hours of grand tastings at the second event included such pairings as Zenner's bratwurst with Widmer's Oktoberfest; a vegetarian bean burrito from the Rogue kitchen with Rogue's Mocha Porter; Ben and Jerry's vanilla ice cream with Rogue's Shakespeare Stout; and Hershey's Symphony caramel chocolate bar with Hair of the Dog's Fred.

"When you think of fine dining, you tend to default your taste buds to wine," said Peter DeGarmo, president of Slow Food Portland. "But Fred showed us—as no one else could—that there are beers that can work as well with some foods."



Sulley's Light Lager

Rockies Brewing Co. in Boulder, Colo., announced the newest addition of its year-round lineup in November. Sulley's Light Lager, the first lager offered by Rockies, is brewed with U.S. 2-row malted barley, pilsen and domestic Vienna malt along with Hallertau and Salz hops.

Coinciding with the release of Sulley's, Rockies redesigned and repackaged its two flagship brands, making all three brands (Singletrack Copper Ale, Buffalo Gold Premium Ale and Sulley's) available in longneck 12-ounce bottles in an updated yet classic red, black and yellow color combination.

Milk Stout Six-Packs

Left Hand Brewing Co. of Longmont, Colo. announced that its Milk Stout is available in six-packs for the first time. Left Hand was previously a winter seasonal available only in 22-ounce bombers and draft. With the addition of six-packs, Left Hand planned to extend the availability of Milk Stout into the spring.

Milk Stout is a sweet stout brewed with lactose, or powdered milk sugar, with a smooth, creamy chocolate flavor. The label and six-pack carrier are adorned with a dairy cow whose spots are in the shape of left hands.

The six-packs are available in the Front Range and mountains of Colorado.

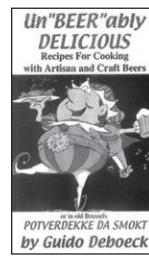
Deschutes Unveils New Seasonal



The popular Cinder Cone Red, which first appeared in limited draft availability in 2001, is the newest seasonal offering from Deschutes Brewery in Bend, Ore. Cinder Cone Red is a medium-bodied amber ale with a rich malt flavor and red color derived from four kinds of caramel malt with a hint of dark roasted barley. East Kent Goldings and Tettnang hops balance the toffee sweetness, creating a full hop flavor.

Cinder Cone Red became available in pubs and stores in mid-January.

Cooking With Beer



Dokus Publishing in Arlington, Va., released "Un-Beer-ably Delicious: Recipes for Cooking with Artisan and Craft Beers," by Guido Deboeck in December. The book, which contains a wealth of information on artisan and craft beers as well as how beer can be paired with food or used in cooking, is prefaced by Michael Jackson.

All proceeds of the book will be applied to support children at risk of HIV and AIDS in Africa.

To order the book, or to view an abbreviated e-book version, go to www.dokus.com.

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BY AMALIAH TURCZYN

Some classic styles represented in this edition of Winners Circle come with surprising variations on both grain bills and brewing techniques. Larry Baker brought home a silver with his spin on an Oktoberfest. Baker avoids the traditional decoction mash schedule, instead going with a simple step mash. He also shows off the flexibility of this versatile German lager strain, opting to lager his "Festbier" at 50° F (10° C).

Roxanne Hastings shows off her skills as a brewer with a good, clean Southern brown ale. Not an easy category to medal in, brown ale is all about balance and Hastings nailed it, going for a base malt of imported British Golden Promise coupled with two classic English hop varieties.

Rick Georgette, no stranger to winning medals in the NHC, takes yet another with his Rauchbier. With a grain bill of mainly German imported malts and the unusual blend of two German lager yeast strains, this is one recipe Georgette has perfected.

Another familiar face in Winners Circle, Peter Zien, tackles the highly complex Saison style. This particular yeast strain bears many similarities to the one used by Brasserie Dupont to produce its famous saison, and it can be a little quirky. Even with proper aeration, fermentation often appears to stall out halfway through, so it is not surprising Zien's primary took 27 days. But once it finally reached its rather dry finish, the brewer was awarded with an amazing variety of flavors and aromas.

Rounding out this issue's Circle, Todd Howes and Chip Morgan show their mastery of another classic British ale style, Robust Porter. And at an original gravity of 1.073, their "Kent Porter" is a whopper, with a combination of black patent and chocolate malts and an unusual blend of American, German and British hop varieties.

ILLUSTRATIONS BY JOHN MARTIN

Oktoberfest Märzen



SILVER MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Larry Baker, Corning, N.Y.

"Festbier"

Oktoberfest Märzen

Ingredients for 5 U.S. gal (18.93 L)

8.0	lb (3.6 kg) German Munich malt
2.0	lb (0.9 kg) U.S. 2-row malt
1.0	lb (0.45 kg) German dark crystal malt
0.5	lb (0.225 kg) dextrin malt
0.5	oz (14 g) U.S. Tettnang plug hops, 7.5% alpha acid (45 min)
1.0	oz (28 g) Hallertauer Hersbrucker plug hops, 2.9% alpha acid (30 min)
1.0	tube Wyeast 2206 Bavarian Lager yeast
0.75	tsp (3.7 ml) Irish moss flakes (30 min)

- Original specific gravity: 1.055
- Final specific gravity: 1.016
- Primary fermentation: 3 days at 50° F (10° C) in plastic
- Secondary fermentation: 39 days at 50° F (10° C) in glass

Brewer's Specifics

Mash all grains at 120° F (49° C) for 30 minutes, 153° F (67° C) for 45 minutes. Boil one hour.

Judges' Comments

"More malt aroma and less sweetness (more hops) would help strengthen this decent effort."

"I'd adjust my grain bill (perhaps a bit more Vienna) and mash schedule to add more interest. Carb level really leads to a full mouthfeel."

Southern English Brown Ale



SILVER MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Roxanne Hastings, Edmonton, Alberta

"King Chob's Brown"

Southern English Brown Ale

Ingredients for 5 U.S. gal (20.845 L)

8.6	lb (3.87 kg) Golden Promise malt
1.0	lb (0.45 kg) 75° Hugh Baird crystal malt
8.0	oz (224 g) Cara Aroma Weyermann
6.0	oz (168 g) chocolate malt
0.75	oz (21 g) Kent Goldings whole hops 5.0% alpha acid (45 min)
0.55	oz (15.4 g) Bramling Cross pellet hops 5.0% alpha acid (45 min)
26.66	oz (800 ml) starter of Wyeast 1028 London Ale yeast

- Original specific gravity: 1.053
- Final specific gravity: 1.018
- Primary fermentation: 3 days at 60° F (16° C) in glass
- Secondary fermentation: 34 days at 60° F (16° C) in glass

Brewer's Specifics

Half the brew water filtered with a reverse osmosis filter. Mash all grains at 120° F (49° C) and 156° F (69° C). Boil one hour.

Judges' Comments

"Brown malt character evident, but not sharp. Good. Hops balance malt appropriately. Not as malty sweet as I would expect."

"Malt flavor dominates. Brown malt is predominant flavor. No hop flavor noticed. Slight sweetness. A nice southern brown ale."

"Nice beer. The dark malt is emphasized. Should be a little sweeter. Low in carbonation."

Classic Rauchbier



BRONZE MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Rick Georgette, West Bloomfield, Mich.

Classic Rauchbier

Ingredients for 5 U.S. gal (18.93 L)

- 6.0 lb (2.7 kg) Weyermann smoked malt
- 1.75 lb (0.79 kg) Durst Vienna malt
- 0.5 lb (0.23 kg) Cara Vienne
- 10.66 oz (299 g) Cara Munich
- 4.0 oz (112 g) dextrin malt
- 2.5 lb (1.125 kg) aromatic malt
- 1.25 lb (0.56 kg) Durst Munich malt
- 0.5 lb (0.225 kg) 30° L Czech crystal malt
- 4.0 oz (112 g) 10° L German crystal malt
- 0.75 oz (21 g) Saaz whole hops 4% alpha acid (90 min)
- 0.5 oz (14 g) Santiam pellet hops 6.8% alpha acid (30 min)
- 0.5 oz (14 g) Spalt whole hops 5% alpha acid (15 min)
- 1 tube White Labs WPL 820 Oktoberfest/Märzen lager yeast
- 1 tube White Labs WPL 830 German lager yeast
- Original specific gravity: 1.059
- Final specific gravity: 1.013
- Primary fermentation: 14 days at 48° F (9° C) in plastic
- Secondary fermentation: 14 days at 42° F (6° C) in steel
- Other: 30 days at 32° F (0° C)

Brewer's Specifics

Mash all grains at 131° F (55° C) for 20 minutes, 148° F (64° C) for 50 minutes, 151° F (66° C) for 30 minutes. Boil 1.5 hours.

Judges' Comments

"I'd like a little more smoke effect here. However, it is clean and well balanced. Good CO₂, warmth, clean palate. Nicely mellow in character."

"Creamy, but not too sweet. Nice balance of smoke and elegantly creamy base beer. Highly drinkable!"

Belgian and French Ale/Saison



BRONZE MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Peter Zien, San Diego, Calif.

"Saison"

Belgian and French Ale/Saison

Ingredients for 5 U.S. gal (19 L)

- 8.0 lb (3.63 kg) 2-row Pils malt
- 1.0 lb (0.45 kg) Vienna malt
- 1.5 lb (0.68 kg) malted wheat
- 0.625 lb (0.28 kg) dextrin malt
- 0.625 lb (0.28 kg) aromatic malt
- 0.75 lb (0.34 kg) candi sugar
- 1.0 oz (28 g) Spalt whole hops 5% alpha acid (60 min)
- 0.25 oz (7 g) Czech Sladek pellet hops 4.9% alpha acid (30 min)
- 0.25 oz (7 g) Czech Sladek pellet hops 4.9% alpha acid (15 min)
- 0.25 oz (7 g) Czech Spalt whole hops 5% alpha acid (0 min)
- 0.5 tsp Irish moss
- 28.5 oz (735 ml) White Labs Saison yeast
- 5.0 oz (142 g) light dry malt extract (to prime)

- Original specific gravity: 1.068
- Final specific gravity: 1.006
- Primary fermentation: 27 days at 72° F (22° C) in glass
- Secondary fermentation: 15 days at 74° F (23° C) in glass

Brewer's Specifics

Mash grains at 150° F (65.5° C) for 80 minutes. Boil 90 minutes.

Judges' Comments

"Lots of citrus fruitiness and phenolic spiciness; higher alcohols, especially in finish. Very nice example, good complexity, at the same time very light and refreshing."

"Well-made beer. Nice citrusy flavors predominating. Needs a little more bitterness to balance."

Porter/ Robust Porter



SILVER MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Todd Howes and Chip Morgan, Orange, Calif.

"Kent Porter"

Porter/ Robust Porter

Ingredients for 11 U.S. gal (41.6 L)

- 20.5 lb (9.3 kg) 2-row malt
- 3.25 lb (1.47 kg) carastan malt
- 1.5 lb (0.68 kg) 120° L crystal malt
- 1.25 lb (0.56 kg) chocolate malt
- 1.75 lb (0.8 kg) black patent malt
- 1.75 lb (0.8 kg) honey malt
- 1.25 oz (35 g) Horizon pellet hops 11% alpha acid (60 min)
- 1.65 oz (47 g) Willamette whole hops 5% alpha acid (30 min)
- 0.5 oz (14 g) Tettanger pellet hops 5.6% alpha acid (30 min)
- 1.65 oz (47 g) Kent Golding whole hops 4.48% alpha acid (10 min)
- 1.10 oz (31 g) Kent Golding pellet hops 5.9% alpha acid (0 min)
- 1 tube White Labs British ale yeast
- 3 Primetabs (to prime)

- Original specific gravity: 1.073
- Final specific gravity: 1.012
- Primary fermentation: 14 days at 68° F (20° C) in glass

Brewer's Specifics

Mash grains at 153° F (67° C) for 60 minutes. Raise temperature to 158° F (70° C) and hold for 15 minutes. Raise temperature to 168° F (75.5° C) and mash out for 10 minutes.

Judges' Comments

"Dark malt flavor with distinct roasted coffee notes. Good balance. No hop flavor."

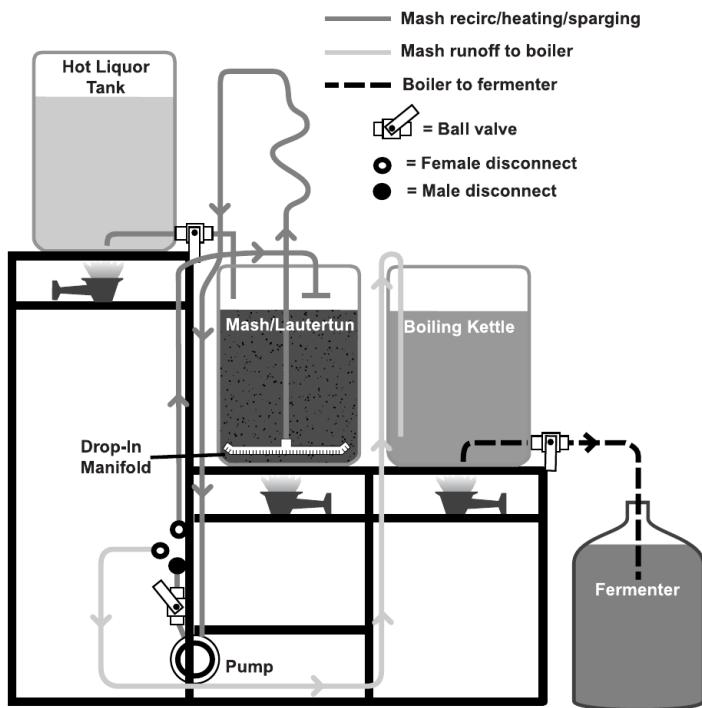
"Excellent example of a robust porter style. Very enjoyable beer."

"Everything is here. Very smooth. Blends well. May be on the lower end of everything so if anything I would bump everything up just slightly. Nice job!"

Former Zymurgy Associate Editor Amahl Turczyn still finds time to brew on weekends, and is currently in search of the perfect 100+ IBU rye beer recipe.

Figure 3

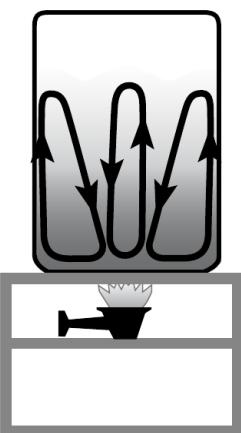
Typical DIMS Design



The DIMS, or "Drop-In Manifold System" offers a variation on the popular HERMS design and reduces the risk of scorching when heating the mash.

Figure 4

Convection



Convection currents occur as liquid is heated and cooled causing circular movement within the pot.

Mashing Systems (from page 39)

thickened sugar syrups reach very high temperatures near heat sources. If the stirring, pump flow or natural convection is low and the heat source is hot and applies heat over a small area, then scorching is likely.

For an electric RIMS the heated surface area is very small so the wort flow rate must be high to avoid scorching. Direct fired tuns scorch when the metal pot material is thin or has a low heat conductivity since this allows the hot spots of the flame to transmit heat to localized hot spots on the pot interior. Stainless steel is an inferior heat conductor and so a thin stainless pot is the most likely to scorch. Thicker pots made of good thermal conductors like aluminum or copper heat far more evenly. The natural liquid convection that occurs in a heated hot liquor tank or boiler (see Figure 4) helps reduce hot spot problems by constantly mixing the fluid. Anything added to the fluid,

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including grist and a false-bottom or manifold device, reduces convection and helps create hot spot scorching conditions. Steam injection and steam- or hot water-based heat exchangers make scorching impossible since these operate at temperatures below the scorch point.

The heating rate of a step mash determines the schedule and thus the wort properties. A mash can be heated as slowly as 1° C (1.8° F) per minute, but when mashing well modified malts the brewer should step over the proteolysis range rapidly at about 2° C (3.6° F) per minute to prevent excessive foam and body loss. This raises the question of how much heating power is required. A high gravity recipe with a temperature rate of 2° C per minute requires 4,600 watts of electrical power or a flame with 32,000 BTU/hour for 5 gallons. If the rate of 1° C per minute is acceptable then the power requirements are halved. It's clear that natural gas and propane burners, which are available above 100k BTU/hour, are capable of powering very large homebrew systems despite their inefficiencies. Electri-

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Zymurgy reader Dion Hollenbeck's RIMS system. The temperature controller cabinet is homebuilt with parts mostly from Omega (PID controller and SSRs). The pump is from March, the stand is completely homebuilt. The two 6,500 watt heater elements are from Grainger. All parts of the system are connected with Hansen straight through quick disconnects for easy disassembly and cleaning.

cal heating is practical for 5-gallon RIMS systems but larger systems require extraordinary amounts of electricity to achieve satisfactory heating rates for a full range of recipes. Heat exchanger systems and steam injection systems do not transfer 100 percent of their source power to the tun, but these systems can be scaled to large batch size when adequately powered.

Lauter devices for homebrew systems include perforated plates, flat screens, screens formed into pipes and slotted pipe manifolds. All can be efficient and effective at the task of separating wort from grist. Recent *Zymurgy* articles by John Palmer⁷ reviewed the properties and use of these lauter devices while his excellent book⁸ contains the most advanced analysis of homebrew lauter devices available. False-bottom plates seem the best choice for lautering efficiency, with properly constructed manifolds giving respectable results.

Finally: Moving it Around

The use of pumps for extensive vorlauf significantly improves the lauter clarity and provides freedom from tall and awkward gravity feed systems. The ideal mash pump is certified for food use, can handle some grist without clogging, has a working temperature well above mash temperatures, does not introduce cavitation or excess turbulence and is self-priming. Such pumps are expensive and difficult to find and usually there is some compromise of the parameters. Most homebrewing pumps lack the self-priming feature and so gravity or some other means should be devised to start the inflow of liquid.

The systems described here differ widely and there are some clear tradeoffs between automation, batch size, cost and other features. There are many variations of these basic designs. Before deciding to build or buy a system, consider the advantages and disadvantages and how they match up with your own needs and wants.

Acknowledgment: Special thanks to Jack Kephart for assistance in the development of this article.

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Dear Professor (from page 19)

Hi John,

Michael Jackson passed on your question to me. While the Association of Brewers has published this kind of information (see beer style guidelines on the Association of Brewers's www.beertown.org Web site) for more than 70 styles of beer, it has not compiled a comprehensive list of stats on each beer brewed in or imported into the USA. Why not? Well, with more than 1,400 American breweries brewing more than 10,000 brands of beer it would be a rather daunting undertaking. Furthermore, brewers are always tweaking and changing their formulations so that if you do find stats on your favorite beer take into consideration when the data was published. It may have changed.

*Hope this helps a little twit,
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 it to professor@aob.org.

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 - [8] John Palmer. *How to Brew*. Defensive Press: 2001
- Steve Alexander lives in Ohio and is a longtime homebrewer and regular contributor to *Homebrew Digest* (www.hbd.org). He is currently revising his homebrewing system. You can contact him at stevealexander@att.net.**

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Barley Wine (from page 43)

low it may cause your ale yeast to quit on you. As the fermentation progresses, you may need to "rouse" the yeast from the bottom of your fermenter. This will help keep the yeast in suspension. Rousing will aid in fully attenuating your monster brew.

Aging

After active fermentation is finished (in three to 10 days), leave the beer "warm" (at fermentation temperature) for another one to three weeks to allow the yeast time to reduce diacetyl and other fermentation by-products. Then, chill the beer down to 34 to 38° F (1 to 3° C) for aging.

Most brewers agree that high gravity beers like barley wine require some additional aging. In order to develop some roundness and integration of flavors it's advisable to give barley wine a minimum of 90 days cold storage prior to packaging. Beyond that, I have found that most barley wines improve with one to two years of post-packaging aging. Some can age for 10 years or more before you begin to see negative flavor effects. As a rule

of thumb, the higher the starting gravity, the better a barley wine will age.

One other aging factor I have found is that the hop component tends to break down first, usually within one to three years so that the hoppier barley wines seem to peak sooner, at about two to two-and-a-half years. The fewer hops that are in a barley wine, the longer it will improve as it ages.

Waiting for Wood

A relatively new development worth mentioning in the world of beer aging is maturing beers in wood. Some brewers in America have started to age their bigger beers in used whiskey, port and other types of wood barrels. The ones that I have tasted have been very interesting indeed. The wood subtly changes the beers and it can pick up some wonderful flavors. Wood barrels will often impart some flavors of whatever was previously in the barrel (port, bourbon, wine, etc.) and the wood itself can lend roundness and a vanilla or buttery characteristic. One can even pick up notes of toasted wood or caramelized sugars.

Often times, other yeast or bacteria in the wood can change or enhance the barley wine's flavors. The grape winemakers have refined the use of wood as a flavor component to a high art form and there is no reason the brewer cannot do the same. Wood-aged beers may not be economically viable for production breweries, but it seems like a natural for the small brewer who is looking to create a premium beer experience.

Since barley wine does improve with age, make sure to vintage-date those bottles. The corollary to this is to be sure to set a few bottles or even cases aside for long-term storage. Over the years you'll be able to go to the reserve stock, pull out the special vintage dated bottles and share a taste with fellow brewers or select friends. You'll be amazed at how these beers will change as they mature and grow into a rare nobility.

Fal Allen is the co-author of the Classic Style Series book *Barley Wine*. Early in his career, he was the head brewer at the Pike Brewery in Seattle and now serves as the brewery general manager for Anderson Valley Brewing Co. in Boonville, Calif.



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Table 2: Typical Diameters of Substances

Substance	Diameter (microns)
Colloidal Matter	0.1
Bacteria	1
Yeast	2-8
Silt	10
Fine Sand	100

Geeks (from page 46)

$$v = [(9.8 \text{ m/s}^2)(1984 \text{ kg/m}^3 - 1012 \text{ kg/m}^3) \\ (3 \times 10^{-6} \text{ m})^2]/[18(1.51 \times 10^{-3} \text{ kg/m} \cdot \text{sec})] \\ = 3.15 \times 10^{-6} \text{ m/s}$$

This means that for a 3-micron diameter, spherical particle to settle one meter it takes approximately 317,000 seconds, which is 88 hours or 3.67 days. The beauty of yeast flocs or protein-tannin clumps formed by clarification agents is that bigger particles settle faster. Thus settling—and therefore clarification—times can be dramatically reduced. Table 2 above illustrates the typical diameters of substances of interest to homebrewers.

stances of interest to homebrewers.

As you can see from Table 2 and Figure 1, the small particle-size colloidal matter will take an incredibly long time to settle out on its own. This is why it remains suspended and causes haze unless we give it some help in settling out. The benefits of using clarification aids to increase sedimentation rate are obvious; settling velocity increases with the square of the diameter of the settling particle. Use them and your beer will be a thing of beauty!

Reference

1. Viessman, W. and Hammer, M., *Water Supply and Pollution Control*, 4th ed: 1985.

Chris Bible is a chemical engineer currently working as the Engineering Quality Manager for J.M. Huber Corp.'s Etowah, Tenn., facility. He lives in Knoxville with his wife of seven years and 3-year-old son. He has been a homebrewer for more than five years and especially enjoys making and drinking stouts and porters.

Last Drop (from page 64)

plus—the lower gravity wort seems to foam less when boiling, so the boil-over vigil is history.

For cooling, you may be able to use your sink, as I do. With the two pots, I use both sides of the double sink; my sister uses her bathtub, which I've had good success with, especially when I don't want to baby-sit the process. In the sink, it's two to three water changes, then adding ice to the new water once the wort is down below 90° and presto—chilled wort in 30 to 45 minutes. Each pot is only about 30 pounds—light enough to lift, carry and pour into the carboy. Clean-up is easy since these pots fit into the kitchen sink.

Lest you think I'm a Luddite, my latest addition is an air stone aerator, air filter and aquarium pump to oxygenate the wort before fermentation. This small addition has made my beer even better!

That's it. Great beer, less stuff!

Don Simpson is an avid homebrewer who resides in Pasadena, California.

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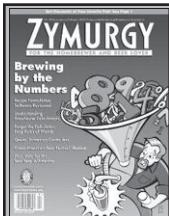
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My homebrewing life started like many, when my sister gave me a copy of Charlie Papazian's *The New Complete Joy of Home Brewing* for Christmas. I read the first few chapters and thought, "This looks pretty easy." I already had two 6.5-gallon glass carboys that had once been home to 100 pounds of acid and a couple of cases of empty champagne bottles from my wedding the prior spring. My wife even had a 3-gallon enamel-on-steel pot for the boil. (This was replaced with a nice 5-gallon stainless steel pot after a nasty boil-over.)

I enjoyed extract brewing for quite a while. Family and friends loved the beer and I was able to capture the taste of authentic English bitter as I recalled it from my trip to London. My sister borrowed the book and she became an excellent brewer also. The beer was good; life was good.

The only problem was that my sister's friend and brew partner who grew up in Bavaria was not satisfied with our wheat beers. With the liquid yeast, the taste was right, but the color was way wrong. The wheat extracts gave us a beer that was too dark. The only solution: all-grain.

So, the next Christmas my sister got me a sparging kit. Not much of an addition to the gear collection, but it left me facing the questions of a) how to mash and b) how to boil and cool about 7 gallons of liquid.

The "normal" way to deal with this is to use a 5-gallon insulated picnic cooler for the mash, then boil in a big pot—at least 8 gallons. The boil can be done minimal-



ly with an enamel-on-steel canning pot, which covers two burners on your stove. If you can lift then carry that boiling-hot pot to your bathtub, you can cool it without any more equipment. The more elegant alternative is a 9- or 10-gallon stainless steel pot, propane burner and immersion chiller. Of course, with a propane burner, the boiling must move outside for safety's sake.

I was quickly coming to the conclusion that there would be several hundred dollars to be spent and nowhere to store all this gear. Clearly, I faced a challenge. Luckily, my engineering degree kicked in and I devised an answer: two pots!

Before I go any further, you might be wondering if it works. The beer my sister (she uses the same system) and I make is dramatically better than anything we made with extracts. The cost goes down, also, and you can be much more creative with your recipes. Yes, my first Bavarian Weizen was blessed by my sister's brewing partner and by a first prize at the Los Angeles County Fair. And, at a statewide competition, the judges mysteriously "lost" one of my California-style ale samples and needed a replacement. (The guy

who picked up the bottle told my wife it was the best beer he'd ever tasted!)

So here's what I put together to get into all-grain brewing the easy way:

- A second stainless steel 5-gallon pot—I'm assuming you've already gotten your first. Mine had aluminum rivets that I drilled out and replaced with stainless steel screws.

- Sparging gear. Mine's a couple of 6-gallon food-grade buckets, perforated false bottom, spray arm, a couple of clamps and some 7/16" OD tubing.

- You might get a second opinion (besides Charlie's) and get a good book primarily on all-grain brewing, such as *Dave Miller's Homebrewing Guide* or *New Brewing Lager Beer* by Gregory J. Noonan. Both have a bias toward lager beer, and this method makes excellent lager beer as well as fabulous ales, since you can fully control the mash temperature unlike when using insulated boxes.

Here's what you do:

One of the 5-gallon pots is for the mash. By mashing in a pot, you can fully control the temperature of the mash, from protein rest to mash out—all at exactly the right temperature. (Yes, you will need an instant-read thermometer.) One of my pots has a domed lid, so I can mash about 14 pounds of grain, and I use my regular spatula to stir. Use the second pot to heat the sparge water.

Split the wort as you are sparging. To help keep the boil gravity of the two pots closer, sparge the first pot half-full, fill the second pot (to about 3 inches from the top), then finish the first—**do not mix them**. If you start with about 8 gallons in the two pots, you will end up with 6 gallons to ferment. If you are doing 5-gallon batches, adjust accordingly.

Split the hops and Irish Moss during the boil. Here's another (*continued on page 62*)

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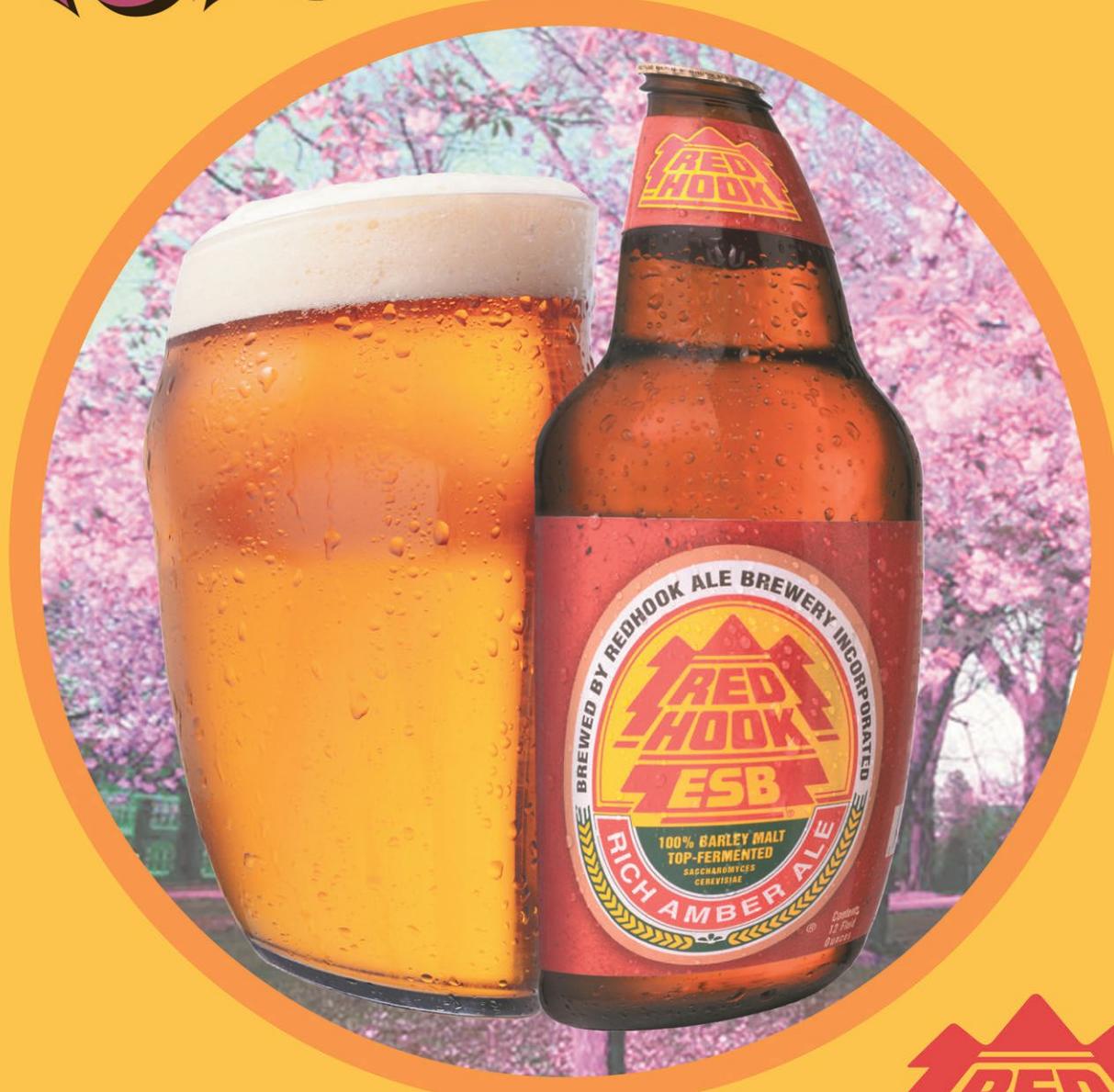
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