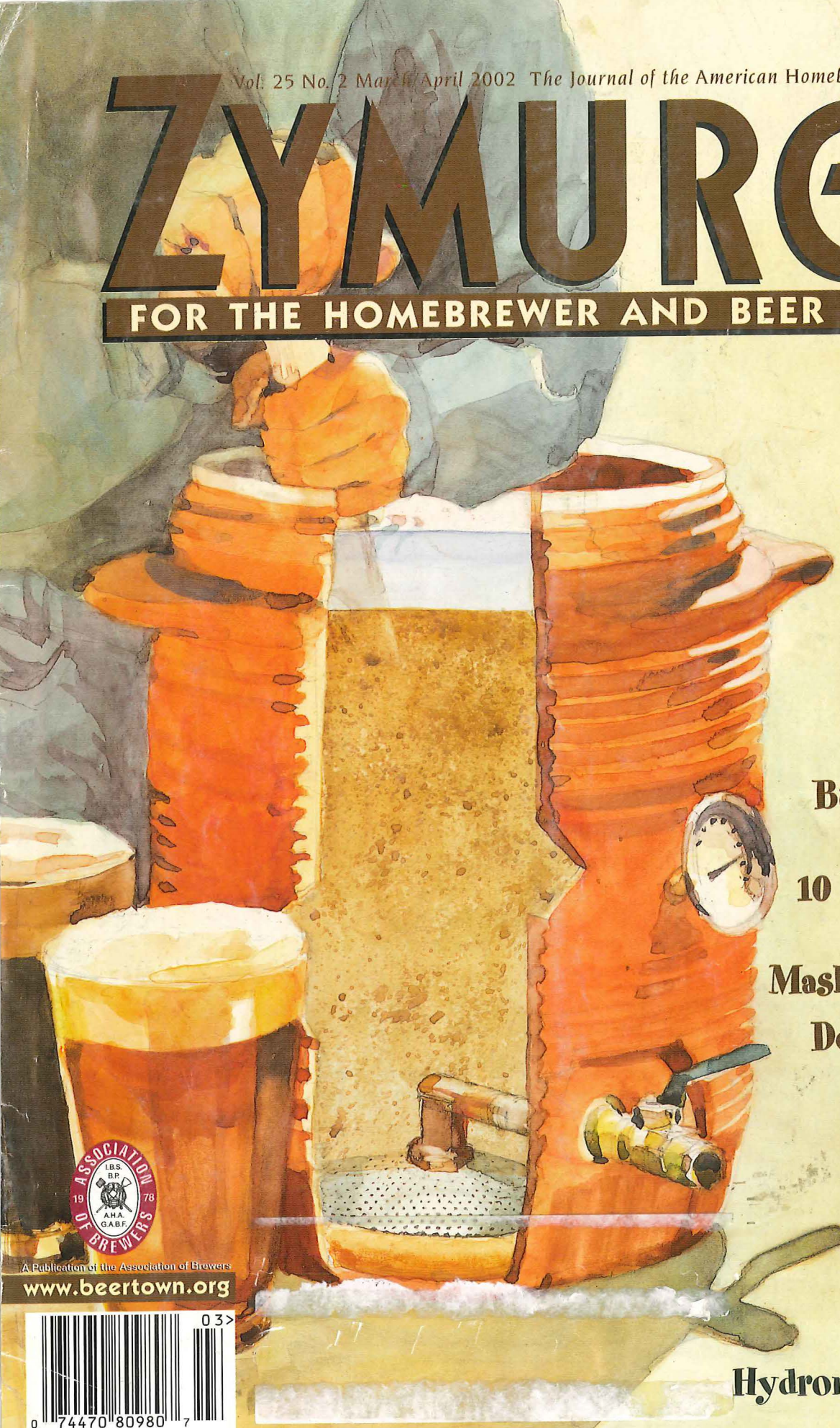
Vol. 25 No. 2 March/April 2002 The Journal of the American Homebrewers Association

ZYMURGY

FOR THE HOMEBREWER AND BEER LOVER



Art of the Mash

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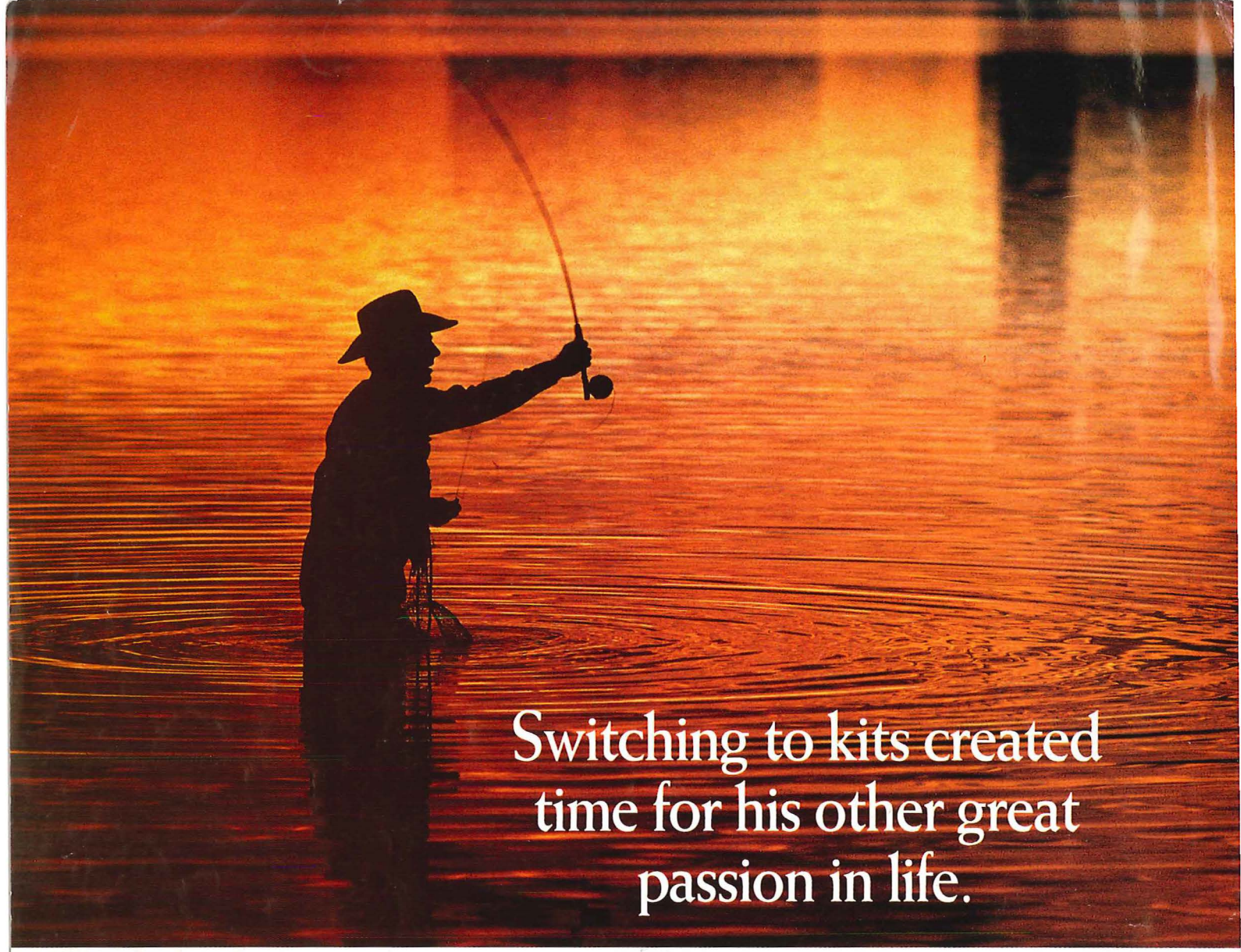

Switching to kits created time for his other great passion in life.

"It tasted just as good - if not better - than many a pint I've drunk in London pubs."

Richard Neill
'Weekend Telegraph' (April 99)

"I wouldn't have believed that a kit beer could be so good"

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

"It resulted in as good a home-made beer as I have ever tasted"

Maximum 5-point rating in kit review
'Bizarre' magazine (September 99)

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The American Homebrewers Association® Mission Statement
To promote public awareness and appreciation of the quality and variety of beer through education, research and the collection and dissemination of information; to serve as a forum for the technological and cross-cultural aspects of the art of brewing; and to encourage responsible use of beer as an alcohol-containing beverage.

Association of Brewers Inc.
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ZYMURGY®

Zymurgy \ zī'mər jē \ *n: the art and science of fermentation, as in brewing.*

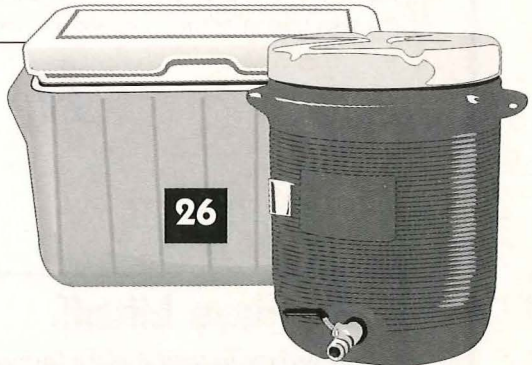
COLUMNS

DEPARTMENTS

COVER ILLUSTRATION BY MOLLY DAVIS

FEATURES

ALSO:



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AHA
Since 1978

BY PAUL GATZA

The Mobile Mash

Hop Barley and the Alers scheduled a club brew day in June several years ago at the house of AHA members and regular AHA National Homebrewers Conference attendees Bob and Caroline Kauffman. (Tall Bob for those of you who have been to any of the conferences since New Orleans.) The idea was to gather in Erie, Colorado on the plains in late morning and get multiple kettles and batches going and enjoy the accompanying homebrew camaraderie. The annual AHA Big Brew has taken on a similar pattern of brewing sites with multiple kettles for many clubs.

I generally start my brewing in the early morning, and decided to start on the early side, allowing me to finish in time for some late afternoon volleyball with some neighbors. I mashed in at the Dome in Summerville, where I was living at the time. I wedged the mash tun in the back seat of the car and headed around to the other side of Bighorn Mountain to pick up my friend Danny Williams in Sunshine. From Sunshine we descended, mash in tow, to the brewing party.

I was quite pleased with myself as I was preparing to sparge when others were an hour behind me. I did not have the last laugh, however. My mash tun doubled as my lauter tun, and the shifting of the false bottom in transport allowed grain to get under the false bottom and clog the outlet. My solution was hardly the most sanitary, as several times I blew back through the tubing and opened spigot to force the grain out of the outlet piping. My sparge was slow and interrupted and the head start I thought I was so clever in taking was largely erased. Fortunately the boil, chilling and post-brew horseshoes all went well.

Thinking myself clever again, I planned on allowing the movement of the car to handle my aeration needs. I pitched the yeast and Danny and I headed back up into the

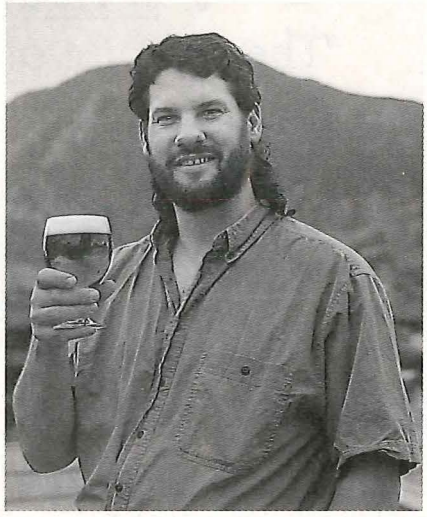


PHOTO BY BOB GOLDMAN
LOGO COURTESY OF BOSTON BEER CO.

mountains for volleyball. By the time we got back to Danny's, the airlock was glurping away, and I had to leave the carboy in Sunshine Canyon, while we went to play volleyball. After fermentation I kegged the beer at Danny's and drove in back to Summerville for carbonating. The beer was served at a party hosted by Brian Lutz, the Redfish Brewhouse brewer, in the nearby mountain town of Sugarloaf.

Out of all of the batches of homebrew I have made, believe it or not, this brew was the only one that I mashed in Summerville, Sunshine and Boulder, brewed in Erie, fermented in Sunshine, carbonated in Summerville and enjoyed in Sugarloaf. If I ever do this recipe again, I probably won't follow the same procedures. The batch was a big hit at the party and probably my best of 1996. I call the beer 100-Mile Mild.

100-Mile Mild

Recipe for 5 gallons

- **6.5 gal. spring water (2.75 gallon mash at 152° F (67° C); 3.75 gallon sparge)**
- **1 tsp. gypsum (5 mL)**
- **3 lb English pale malt (1.36 kg)**
- **2 lb English mild malt (0.9 kg)**
- **1 lb English brown malt (0.45 kg)**
- **0.5 lb English light carastan malt (10-17° L) (0.23 kg)**
- **1.5 oz English East Kent Goldings hops (last 70 min.) (43.5 gm)**
- **0.25 oz Fuggle hops (10 min.) (7 g)**
- **0.25 oz Fuggle hops (1 min.) (7 g)**
- **Wyeast 1028 London Ale yeast**

Now to round out this column, here's a roundup of what is going on with AHA programs and projects:

Boston Beer Company Sponsors AHA National Homebrew Competition

Our regional sites are all set for first round judging of the nationals. The National Homebrew Competition received 2,668 entries in 2001, and we are hoping to grow that number. I would like to thank Michelle Sullivan, Jim Koch and the other staff at the Boston Beer Company, which has signed on again as our Ninkasi Award sponsor. Other sponsors are listed in the AHA National Homebrew Competition section of beertown. This issue of ***Zymurgy*** has an entry form and the site map with shipping addresses. Category information is available on *www.beertown.org*. Enter early and often and we encourage members to participate at a regional site as a judge, steward, sorter or other function.

George Fix and Steve Jones Recipes to be Featured in AHA Big Brew

The AHA Big Brew will again be held the first Saturday of *(continued on page 60)*

BY RAY DANIELS

Beer Transport: There Has to Be a Better Way

Yesterday I left my house at 3 pm with family and a six-pack of beer in tow. Around 8 pm, having parted from the family and joined up with members of the Chicago Beer Society, I finally got to open one of the beers.

The vicissitudes of a Chicago winter and car heating systems had cycled the beer through a variety of temperature phases in the interim, but they seemed suitably cool to the touch after a half-hour in the host's refrigerator, so I figured everything would be OK.

Unfortunately, I was right. They were just "OK."

Gone was the bright beer that I'm able to pour when I pull a bottle from my own cooler and pop the top just a few feet away. So too were the fine bubbles and stable condition of the beer. Instead, I got a yeast-permeated beverage that seeped from the bottle on its own, spewing bubbles big enough to serve as eyes for large amphibious animals.

Of course, the cause of this condition is not mysterious. In the five hours and forty driving miles since leaving my fridge, those beers had been subjected to quite a shake, rattle and roll. Worse yet, I forgot that I would be going through Chicago's one hairpin turn on the trip and left the six-pack unsecured in the trunk (all the better for being out of sight should we need to have a conversation with any law enforcement types along the way). Of course they tumbled over, spilled out of the six-pack carrier and rolled all over for about 15 miles before I could get back there to fix things up.

Well, bad luck I suppose. But it got me to thinking: there must be a better way to haul beer around and get it there in sound condition. That's when it hit me: time to create the ultimate beer hauling system. Something with an air-smooth ride, substantial capacity and built-in draft serving capabilities. And furthermore, this transportation wonder should not be limited to the confines of a homebrewer-operated motor vehicle—I want something that can be used on public transportation too.

PHOTO BY RAY DANIELS

...there must be a better way to haul beer around and get it there in sound condition. That's when it hit me: time to create the ultimate beer hauling system.

That's when I created the Beer Xyppelin®. And even though it is only in the planning stages, I can already imagine what will be written about it when it has been perfected. Here's what they will say.

"The Beer Xyppelin solves the schlepping problem associated with beer in the most ideal way. This high-tech hydrogen balloon with on-board beer storage is equipped with four servo-mounted microprocessor controlled Mighty-Mite propulsion fans linked to a state-of-the-art navigation system with an owner-homing priority beacon system. You just load the thermostatically-controlled cargo compartment with the beer of your choice and then attach the owner-beacon-transmitter to your belt and head out for your destination.

"Whether you are walking, biking or riding in a car—even on public transportation—the Beer Xyppelin follows your transmitter to bring your beer wherever you go. Using sophisticated navigation protocols linked to its own internal maps and continuous contacts with the Global Positioning System (GPS) satellites, the Xyppelin negotiates common obstructions like overhead wires, bridges and tunnels. (Linkages to local FAA radar sites provide mid-air collision avoidance assistance.)

"When you arrive at your destination, the Xyppelin's HoverHome™ logic allows you to park it in a convenient position for beer access by setting the owner-beacon-transmitter on the ground in a convenient location. Then the drop-down tap tower extends to offer you and your friends up to four tap handles that can be used as a portable bar for your next picnic, barbeque or pool party.

"The Xyppelin offers your beer an air-smooth ride so that it arrives at the party without all the bumping or sloshing that can make draft beer foamy and turn bottled beer into spontaneous suds fountains. Best of all, the Xyppelin keeps your beer at your perfect serving temperature. No more freezing your hand off with ice cold beers or accidentally "losing" your glass because of luke-warm brew. Now every pint will be just how you like it.

"Now you might think that a wonderful thing like the Beer Xyppelin would be expensive—maybe even out of the reach of the ordinary consumer. But this is not so. No reasonable person would characterize the Xyppelin as "expensive." No, they would probably tell you that it "costs a fortune," or that it is "outrageously pricey" or perhaps "absurdly costly." Indeed, the Xyppelin is not just out of the reach of the ordinary consumer, it is so costly that even the Nieman-Marcus Christmas catalog wouldn't consider it. Billionaire Bill Gates has reportedly said, "I'll wait a few years for the price to come down."

"We know that soon someone will decide to buy their own Beer Xyppelin and take on the hideous tangled morrass of regulatory and licensing issues it brings with it. As a result, we're sure that every beer lover will someday find himself at the Xyppelin's taps drawing a cool, perfect pint. And just as a precaution, we'd like to remind you to keep open flames and other heat sources well away from this hydrogen-filled wonder. And if you happen to be standing at the taps when you see some joker getting ready to give the balloon a poke with his cigarette, we'd like to suggest that you scream like a banshee and run like you've never run before."

Ok, so maybe development will take more like five years instead of five months, but this is a doable project. All I need is a few appropriately trained homebrewers who are willing to devote some of their time to the project. (I figure 80 hours a week will do.) Then we'll need some folks to be involved in prototype testing.

Of course, when this thing is launched (literally), it will have another benefit beyond beer transportation. Now instead of having to check calendars and e-mails to find out when the next homebrew event is planned, you can just scan the sky for a collection of draft dirigibles hovering on the horizon.

As long as you bring some of your own homebrew to share, I'm sure that any group of blimp brewers will be glad to see you.

Ray Daniels generates hot air (and the occasional homebrew) in his basement in Chicago.

Mild Appreciation

Dear ***Zymurgy***,

For the first time in a long time, I sat still and read the latest ***Zymurgy*** cover-to-cover upon its arrival. Great stuff; best one in a long time, especially Steve Hamburg's piece on mild (You can tell him I said so). You all done good!

Mike Bardallis
Michigan

Mr. Bardallis,

Based on your description, you are clearly a gentleman of refined taste, urbane wit and full fermenters. (If you had an empty fermenter, you'd probably be brewing beer while reading.) In any case, thanks for the kudos. We'll try not to develop a thick creamy head as a result.
—Editor

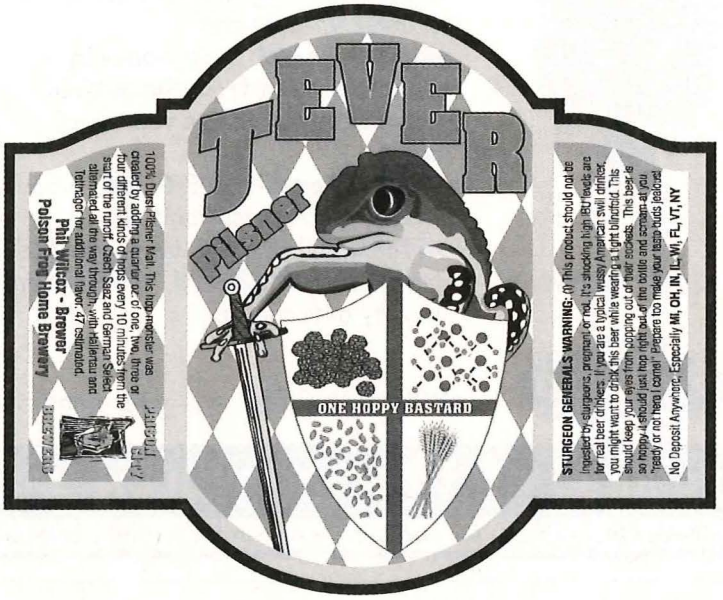
Solera Applause

Dear ***Zymurgy***,

Congratulations to Ray Daniels and his staff for the latest ***Zymurgy***, January 2002. From beginning to end it is the best I have ever read. I can imagine how hard it is to keep the topic fresh. I know there is a lot to write about, but beer only goes so far!

I am impressed with the Solera article by Jeff Renner. This might be a good project for a brew club, as different people could add different beers at different times. I don't have a cellar or a dedicated space that I keep at 55° (12.7° C). We'll talk about it here in Greensboro, NC! I have some Barleywine I was not particularly impressed with that I could add.

Question for Jeff or anyone else: does oxidation play a big part in the process? I assume if you have *acetobacter* working, you have some oxidation somewhere along the way. What keeps this from turning to vinegar?



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Again, a great article and magazine. If you are not a member of the AHA, you should be!

David B. Craft
Battleground Brewers Homebrew Club
Crow Hill Brewery and Meadery
Greensboro, NC

Mr. Craft,

Thank you for your kudos. We too enjoyed Jeff Renner's piece and promptly dubbed that long-neglected fermenter of porter our solera reservoir.

As for the acetobacter *taking over, here are a couple of thoughts. We should start out by saying that we have seen beers with a distinctly vinegary taste, so it can get out of balance. Despite this, certain factors keep you from producing something that would mimic malt vinegar. First, the alcohol level in beer is usually considerably less than the 10-12 percent abv considered ideal for making vinegar. Second, we suspect that the oxygen content and geography of a fermenter are not ideal for robust* acetobacter *activity. More abundant oxygen and support media for the bateria (beechwood chips, interestingly enough) are apparently used in commercial vinegar production. Finally, in a solera-type aging process you have the other organisms in play. They may consume some of the alcohol, oxygen or acetic acid or they might just change the conditions in the fermenter to make them less than optimal for vinegar production.*
—Editor

Fuzzy About Fezziwig

Dear ***Zymurgy***,

Boston Beer Co. has released a seasonal variety case that includes my all time favorite Sam Adams brew, Old Fezziwig. After several years in hiding I'm happy to see its return. Unfortunately, I have not seen "Fezzy" packed up in a case all its own. Any chance of getting a clone recipe of this brew? I'd like to make a few cases of my own. Thanks.

P.S. I've been a member of the AHA since about '91 and I'm sorry to say that I don't think I've ever taken the time to thank all of

you. It is apparent that a lot of hard work and care goes into making this such a great organization. Your dedication has done so much to advance the culture, art and science of homebrewing—I'm proud to be a member. Thank you all!!!!

Prost!
Rick Franckhauser

Dear Rick,

Thanks for the kind words! Our clone king, Mr. Turczyn is embarrassed to say that he's not familiar with Old Fezziwig. He will need to pick up a six pack and do a little homebrew research before coming up with a clone recipe. However, he did do his own recipe recently for a strong Winter Ale that seemed to be popular with the Association of Brewers staff (nothing like a jug of homebrew to lighten up the Friday happy hour in the AHA office!), though it might be a bit darker than the Sam Adams beer. Here it is, in case you're interested in giving it a whirl:

Dark Greeting Winter Mild

(for 5 gallons)

10 lb UK 2-row (4.5 kg)
4 oz 90L crystal (113 g)
4 oz black malt (113 g)
1 oz Centennial pellet hops (28 g) (first wort) (9.9% a.a.)
1.5 oz Willamette pellet hops (42.5 g) (30 min.) (4.4% a.a.)
1 lb honey (knockout, 0.45 g)
White Labs English ale yeast
force carb in keg

- **SRM: 17.5**
- **IBUs: 56**
- **O.G. 17° P (about 1.070)**
- **T.G. 4.0° P (about 1.020)**

Mash for 1 hour at 155° F (68° C); boil 90 minutes, chill and pitch a good quantity of yeast slurry. Ferment at 68° F (10° C) for a week, then condition at 60 ° F (16° C) for another two weeks to let it mellow before kegging. For an extract schedule, you can probably substitute about 6.5 pounds (3.0 kg) of light dry malt extract for the pale malt and crush and steep the specialty grains.

—Editor

BY GARY GLASS

California Fermentation Society

As most homebrewers know, homebrew supply shops play a key role in the promotion of homebrewing on the local scene. For many homebrew clubs, the local homebrew supply shop is the focal point of club activity. A simple conversation amongst homebrewers patronizing the local shop has been the inspiration for more than one club's start. Homebrew shops may provide space for club meetings or serve as the entry drop off location for the local club's competitions. In addition, many shop owners extend discounts to the members of the local club.

Now no one opens a homebrew shop expecting to become rich. As anyone who has visited their local shop knows, running a homebrew supply shop is a labor of love. Owning a shop can be extremely demanding on the owner's time and is too often financially straining when business is slow. Under the circumstances, it is not surprising when shop owners decide that they want to move on to something new and sell or close their shop. I'm sure almost all of you have witnessed the sad occasion of a local shop closing its doors for business. In many cases, the demise of the local shop can also mean the demise of the local club, which loses its main source of new members.

When the lease on Long Beach, California homebrew shop, Stein Fillers, came up in late 2001, the shop owner of seven years Don Van Valkenburg was not ready to sign on for another three to five years. Don, a 20-year veteran homebrewer and a loyal member of the Long Beach Homebrewers and the Barley Bandits (Orange County homebrew club), feared that if his shop went out of business, the existence of the local homebrew club could be at risk. Southern California has already seen the demise of several local homebrew supply shops over the past 10 years, including South Bay Homebrew, Brew Buddies, and Fun Fermentations. Don and a few of his customers came up with a solution: convert the shop into a non-profit membership organization. The idea was actually spawned by a joke about the shop already being a "non-profit organization"—in the literal rather than the legal meaning of the term.

With the help of shop customers and members of local homebrew clubs, the idea took root. The group came up with a set of bylaws and incorporated the California Fermentation Society as a non-profit organization with the state of California. The organization has a board of directors elected by the members, which determines how the organization will be run, and a set of officers who carry out the wishes of the board and oversee the operation of the shop. California Fermentation Society members pay annual dues and receive benefits for their membership. Associate members who pay $25 per year get a discount of 10 percent off all of their purchases at Stein Fillers, are invited to special events put on by the California Fermentation Society and receive the Society newsletter. Founding members pay $300 per year and pay just 20 percent over cost on all purchases at Stein Fillers. In addition, founding members have voting privileges and can serve as officers and members of the Board of Directors. When I spoke to Don in mid-December, the California Fermentation Society already had 18 founding members drawn mostly from the local homebrew clubs.

In addition to running Stein Fillers, the California Fermentation Society plans to put on tastings and other beer and homebrew related events. The organization's bylaws include a provision for setting aside a certain percentage of annual residual assets for a scholarship fund to send a lucky homebrewer to UC Davis or the Siebel Institute each year.

The members of the California Fermentation Society have a direct stake in the success of Stein Fillers. Hopefully their dedication as members will ensure the long-term survival of Stein Fillers as well as the Long

Homebrew Club of the Year Standings

Points	Club
7	ZZ HOPS
6	Craft
6	Foam on the Range
3	Brew Rats
3	Niagara Association of Homebrewers
3	Prairie Homebrewing Companions
1	Iowa Brewers' Union (IBU)
1	Pint and Pummel

2001–2002 AHA Club-Only Competitions Styles

Month	Style or Name	Cat.#	Host
March	Porter	15	New York City Homebrewers Guild
May	India Pale Ale	7	Gasconade Brewing Society
August	American Lager	1	Beer Unlimited Zany Zymurgists
Sept/Oct	Strong Belgian Ale	18	Minnesota Homebrewers Association
Nov/Dec	Fruits & Veggies	21, 22	Dukes of Ale

Porter AHA Club-Only Competition

The March/April AHA Club-Only Competition is Porter. The competition is hosted by Phil Clarke and the New York City Homebrewers Guild (see the Clubs Column from the last issue of ***Zymurgy*** for more on NYCHG).

The Style for the competition is Porter, Category 15. 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, forms and the schedule are available at *www.beertown.org/AHA/Clubs/clubcomp.htm.* Please send your entry to:

NYCHG AHA COC
C/o Marc LaPointe
425 Park Avenue South #6A
New York, NY 10016

Entries are due by March 23rd, 2002. Judging is slated for March 30th, 2002. Email for questions is *dogglebe@yahoo.com.*

Beach Homebrewers and the Barley Bandits. On January 1, 2002 Don handed over Stein Fillers to the California Fermentation Society. Don plans to assist the organization in running the shop for a few months before he moves on to other adventures. We salute the vision and dedication to homebrewing of Don Van Valkenburg and the members of the California Fermentation Society!

The AHA strongly urges all homebrewers to support their local shops, which in turn helps secure a vibrant local homebrew community. The AHA is committed to helping homebrew supply shops through programs such as the AHA Retailer Program, which allows shops to sell AHA memberships and share the revenue from such sales. The program provides an additional source of income for the shops while increasing the visibility of the AHA, thus strengthening both the local and national homebrewing communities. There are currently around 30 shops participating in the program. Shop owners interested in information on the Retailer Program can contact me at 888-U-CAN-BREW or *gary@aob.org*.

2002 National Homebrew Competition

The 24th Annual AHA National Homebrew Competition is rapidly approaching. If your club wants to walk away with the coveted AHA Homebrewer of the Year trophy at the National Homebrewers Conference in Texas this year, you had better get your entries in! See the ad, site map and entry form in this issue of ***Zymurgy*** for more information on the competition or go to *www.beertown.org*.

Upon the suggestion of many club members and regional competition organizers, the Competitions Committee of the AHA Board of Advisors has made some changes to the rules for this year's NHC. We have heard concerns that internet-based clubs that enter the competition in multiple regions could potentially swamp the competition with entries. So far this has not been a problem, but to ensure the fairness of future competitions the Board has created a 10 point per category limit (the most points any club entering a single region could earn in any category) for clubs competing for Homebrew Club of the Year. The Competitions Committee also intends to increase the points earned in the Club-Only Competitions to encourage greater participation in the competitions and to allow smaller clubs to successfully compete against larger clubs for the Club of the Year trophy. Other changes to the rules include explicitly allowing re-brewing of first round winning recipes for the second round (this has been allowable in past competitions but was not specifically stated as such in the rules), and adding Belgian Specialty Ale (19E) to the categories requiring style and/or special ingredients be listed on the entry form.

Mild Ale Competition

The AHA would like to thank Alison Skeel and the Brewers United for Real Potables (BURP) of the Washington, D.C. area for hosting the Mild Ale Club-Only Competition held December 7, 2001. This was the third of six competitions in the August to May 2001-2002 cycle, with points going toward the Homebrew Club of the Year trophy. Points are awarded on a six-three-one basis for the club-only competitions and the first and second rounds of the AHA National Homebrew Competition. The club whose members have amassed the most points over the year is crowned the Homebrew Club of the Year.

Thanks to all of the club representative brewers who entered. There were 32 entries in the competition.

Congratulations to the following winners:

1st Place

Bob and Janice Krueger of Sterling Heights, MI representing Clinton River Association of Fermenting Trendsetters (CRAFT) with "Alpha Mild."

2nd Place

Ed D'Anna of Niagara Falls, NY representing Niagara Association of Homebrewers with "Ed's No-Sparge Mild Ale."

3rd Place

Eric Armstrong of Ames, Iowa representing Iowa Brewers' Union (IBU) with "Mild Ale."

Gary Glass is the Project Coordinator for the American Homebrewers Association.

Will you be crowned

HOMEBREWER OF THE YEAR?

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

American Homebrewers Association's 24th Annual

NATIONAL HOMEBREW COMPETITION

The World's Largest & Most Prestigious Homebrew Competition

Entries Due: April 3-12, 2002
First Round: Judging at eight regional sites from April 19-28, 2002
Second Round & Awards Ceremony: June 20-22, 2002 at the AHA National Homebrewers Conference, Irving, TX

For complete rules and regulations visit www.beertown.org or
call 1-888-U-CAN-BREW (U.S. and Canada only) or 303-447-0816.
To find your entry site, check the Site Locator Map in the March/April 2002 issue of *Zymurgy*.

JOIN THE FUN!

See entry form on next page

American Homebrewers Association
A Division of the Association of Brewers

American Homebrewers Association's
24th Annual

NATIONAL HOMEBREW COMPETITION
Entry Form

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

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 seperate $33 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) _____

    _____

    _____

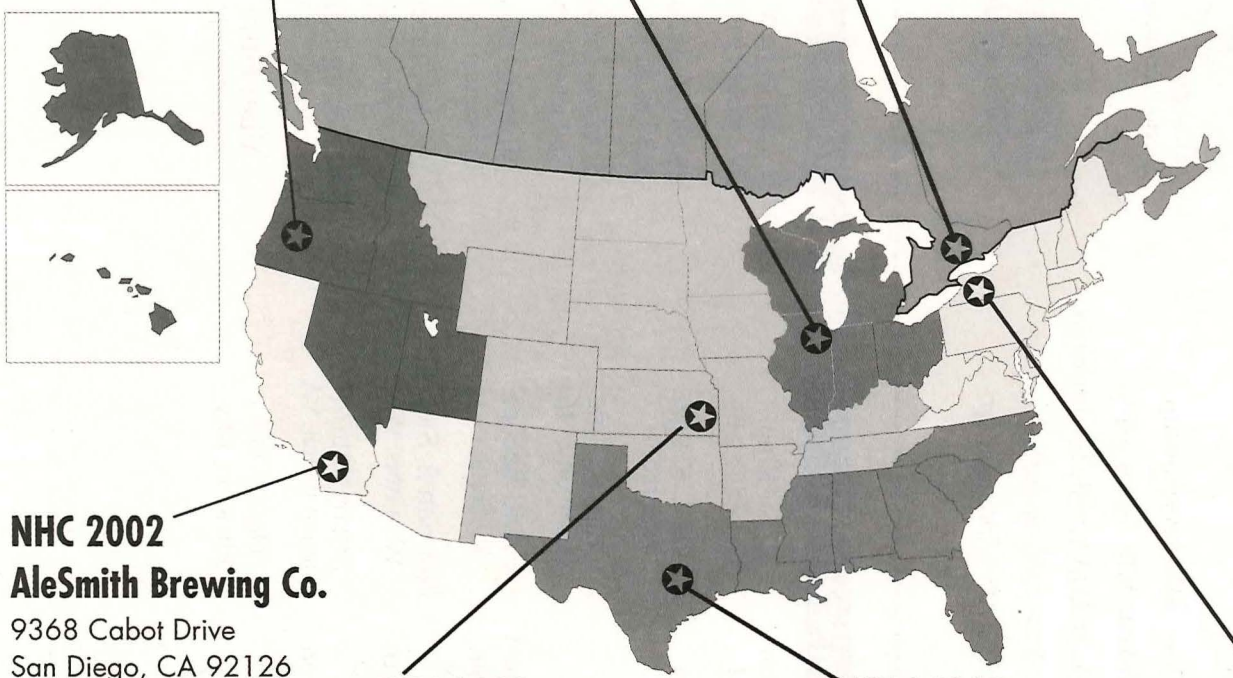
AHA National Homebrew Competition 2002

Entries due April 3 - 12, 2002

NHC 2002
F.H. Steinbart Inc.
234 S. E. 12th
Portland, OR 97214

NHC 2002
Rock Bottom-Chicago
1 West Grand Avenue
Chicago, IL 60610

NHC/GCHC 2002
Magnotta Brewery
271 Chrislea Road
Vaughan, Ontario L4L 8N6



NHC 2002
AleSmith Brewing Co.
9368 Cabot Drive
San Diego, CA 92126

NHC 2002
Bacchus & Barleycorn
6633 Nieman Road
Shawnee, KS 66203

NHC 2002
St. Patrick's of Texas
1828 Fleischer Drive
Austin, TX 78728

NHC 2002
c/o Rohrbach Brewing Co
3859 Buffalo Road
Rochester, NY 14624

CIDER

All cider entries should be sent to Red Hook regardless of where you live:

NHC 2002
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 2002
F.H. Steinbart
234 E. 12th
Portland, OR 97214

American Homebrewers Association • 1.888.U.CAN.BREW • www.beertown.org

American Homebrewers Association
A Division of the Association of Brewers

Become an American Homebrewers Association Sponsor!

I ask you to consider taking the extra step of becoming an AHA sponsor. American Homebrewers Association sponsorship allows the AHA to do more organizing to promote the hobby of homebrewing to the not-yet-brewing public and continue to run outstanding programs for homebrewers. AHA sponsorship is a way for you to show your commitment and give something back to the hobby of homebrewing besides your time, effort and tasty brews. The strength of the AHA is you.

All AHA sponsorships include AHA membership and all of the benefits you currently enjoy, including your subscription to ***Zymurgy***. We will also recognize your contribution on this page of ***Zymurgy*** and send you a certificate of appreciation for your brewhouse wall.

To become an AHA sponsor simply fill out the form and fax it back to 303.447.2825 or call membership services at 303.447.0816 or visit www.beertown.org. Thank you for considering sponsorship of the American Homebrewers Association.

Yours Brewly,

Paul Gatza

Paul Gatza
Director, American Homebrewers Association

- $51 One-Year AHA Sponsorship
- $103 Two-Year AHA Sponsorship
- $60 One-Year AHA Family Sponsorship
- $230 Five-Year AHA Sponsorship
- $460 Lifetime AHA Sponsorship

Please see our ad on page 4 for ordering information!

AHA Sponsors

Henry Atkinson
Columbus, OH

Russ Clayton
Slidell, LA

Steve Conne
Wingo, KY

Tom & Eva Dawn Heydt Benjamin
Mt. Vernon, NY

Robert L. Gallo
Great Mills, MD

Charles B Green
Klamath Falls, OR

Carl Habekost
Waterville, OH

Lou King
Ijamsville, MD

Lyn R. Kruger
Chicago, IL

Orange Films
Jersey City, NJ

David Reeder
Metairie, LA

Norman S. Siegel
West Allis, WI

Stuart Sutton
Virgina Beach, VA

Dan Tveite
Elk River, MN

Lifetime Members

Here is a list of new Lifetime Members and Lifetime members we omitted on previous lists:

Alberto Cardoso
Brussels, Belgium

Robert Cooke
Springfield, VA

Norm Bauer
Bremerton, WA

Roger Bauer
Tukwila, WA

The Flying Barrel
Frederick, MD

Allan Hunt
Nashville, TN

Kraig Krist
Annandale, VA

Tim McManus
Haskell, NJ

Michael Nolan
Arecibo, PR

John Strantzen
Victoria, Australia

David Townsend
Bloomfield Hills, MI

Steve Vilter
Anchorage, AK

BY PROFESSOR SURFEIT

Fridge Freak Out

Dear Professor,

While preparing another batch of homebrew, I inadvertently opened the spare refrigerator in my basement that I am secondary lagering a batch of lager about 2.5 weeks old. The door was open for 3 days, which means not only did the temperature of the lager rise above the target temperature, but also the yeast was exposed to light for three full days. My question is, now that I think I've killed the yeast, is there any manner in which I can salvage the batch? Can I add a second "dose" of yeast to finish-off the fermentation (when I transferred the batch 1.5 weeks ago, it still had a ways to go) and provide carbonation when I bottle condition the beer later, or is this batch doomed? Thanks for your help and encouragement to keep at it (the hobby, that is).

Dan
(otherwise anonymous since I am too embarrassed to provide any more information)
Cincinnati, OH

My man Dan,

No, you didn't kill the yeast by exposing it to light. Because of the warmer temperatures it probably completed fermentation and therefore you observed no more activity. Don't worry. Continue to lager at cold temps if you wish.

Another way to look at your goof was that you accomplished a crude diacetyl rest, which is a good thing of sorts (if you had any diacetyl to begin with). What happened was that with the rise in temperature, the yeast became more active and went into suspension once again and scavenged any diacetyl you may have had. Pro brewers sometimes do this on purpose.

Meanwhile, you should rest calmly, knowing you still have plenty of viable yeast for bottle fermentation. No need to be concerned in the least. Oh yes, the light—unless you had your beer exposed to direct sunlight or fluorescent lighting you shouldn't observe any ill effects. If it is ill, your lager will smell like a lot of imported beer in green or clear glass bottles. Lots of people like that and pay at least $6 to $10 a six-pack for it.

Good night Dan.
The Professor, Hb.D.

Does Not Compute...

Dear Professor,

After reading Ray Daniels' "Hop Fundamentals feature," (Nov/Dec 2001, p. 46) I decided to calculate the IBUs from my recently created IPA. As I started to compute my figures I ran into a slight problem. I couldn't find how to figure for multiple hop additions. I first tried it out by coming up with IBUs for each hop addition (like I had added no other hops), then adding the sums together, and recording my number. Not being sure whether this was the proper way to go about it, I then averaged the alpha acid percentage for each addition, the average for utilization, and the total ounces (kind of like one big hopping). After checking my math repeatedly, I always came up with two different numbers, quite a bit apart. 97 IBUs for the first one and 89 IBUs for the latter. Am I completely missing something here, or am I on the right track? Any guidance you can give me will be greatly appreciated.

Thank you,
Travis Antoine
New Orleans, LA

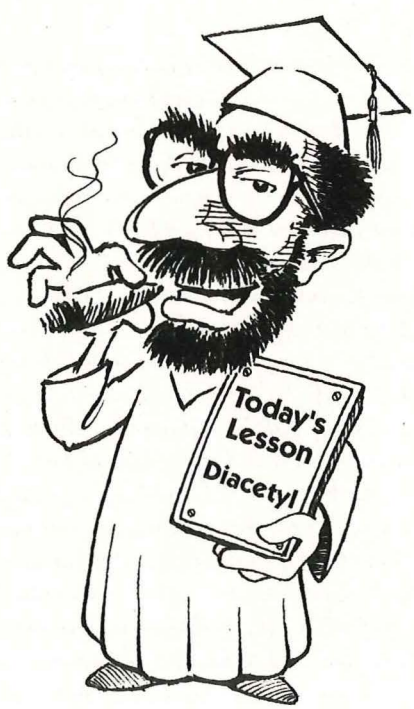


ILLUSTRATION BY JOHN MARTIN

Dear Travis,

I'll try to keep my answer simple, but I may digress a bit...

Your first method is correct.

That being said, know that each addition of hops is (and the bittering units you can expect it to contribute is) influenced by the density of the boiling wort. Denser wort facilitates less utilization and less bitterness. How long the hops are boiled plays a part as well. The longer the boil, the more bitterness is extracted—up to a saturation point (for that given density of the wort).

There are other influences, but remember, I'm trying to keep it simple. So it should make more sense that your first method is the correct one. Averaging will never ever in a million years give you accurate results.

See you in a million,
The Professor, Hb.D.

Forced Carbonation

Dear Professor,

I just finished reading the article on Corny Kegs in the last issue, it was a great issue for me because I am just getting into kegging. According to the chart in the article it takes a lower gas pressure to reach the same amount of [dissolved] volumes [of carbon dioxide] at a lower temperature, than that of a higher temperature. Did that make sense? Anyways, what I want to ask is if you force carbonate at say 34° F, does that mean you have to drink your beer at that cold of temp to keep the gas in solution? Also, are counter-pressure filled bottles competition legal?
Thanks

Dave Perry
Prince George, BC, Canada

Dear valued member Dave,

Yep. It makes sense because that is just the way gas is. Love it or leave it. But, after you force carbonate your beer at 34° F (1° C) as you suggest, no, you don't have to drink it at that temperature. You can serve it at a cool 50 degrees F (10° C) if you wish, but your carbon dioxide will gas out much more rapidly at the higher temperatures. It may be too foamy for you. Solution? Charge your beer with a lower volume of carbon dioxide at 34° in anticipation of serving at 50 degrees. Best method without a computer program or calculator: trial and error. It works like a charm every time.

Counter-pressure filled bottles are perfectly legal in the American Homebrewers Association National competition. Check the rules of any other local or regional competition to be sure you're legal there.

Take it easy,
The Professor, Hb.D.

The following question was forwarded to the Professor by master beer journalist Michael Jackson.

My Goodness Stout

Dear Michael,

I have a question. I would like to know how to brew a beer which resembles Guinness Stout (not the bottled variety, but the tap variety). I recently purchased a homebrew kit and would like to try and duplicate Guinness to the best of my abilities.

Thanks.
Tom Tedino

Dear Tom,

Beer Hunter Michael Jackson passed your homebrew question on to the Professor. I think I can help you. I read you. You want to brew draft style Guinness. To do that to the best of your abilities you'll have to invest in some draft equipment. But before I go into that, you should know that true draft Guinness is about four percent alcohol by volume. It's full of flavor and character but does not have lots of alcohol. So when you get my recipe don't do any double takes. Also, let it be known that you can brew a full flavored version of the draft Guinness Stout and put it in bottles just like regular homebrew and it will be terrific. And actually, by the way, Guinness used to be bottle conditioned with yeast, but they did away with that a decade or so ago. So you can brew and bottle a little tradition that is commercially lost. The major difference you are sure to notice is that you won't get an ultra fine creamy head. Yes, you will get a rich creamy head that will impress immensely, but the fact is, that draft Guinness (out of a can, out of a bottle or out of the tap) is charged with nitrogen. The nitrogen gas mixes with the beer and gives a creamy head. Though visually pleasing, it also leaves your stout tending towards being flat and with a flavor that is the result of a lack of carbon dioxide and the remnants of the nitrogen gas.

Personally speaking, I think it looks beautiful, but it doesn't quite leave the stout tasting full flavored and natural. I'd best describe it as metallic and out of balance.

But perhaps you want to go through the same phase I went through. It is something interesting to do. After you've brewed your stout, siphon it into a stainless steel Cornelius-type homebrew keg system. Cut your priming sugar in half (about 1/3 cup for a five gallon batch). Let the stout naturally condition in the keg for about a week at room temperatures above 65 degrees F. Now here comes the expensive part. You'll need to get a nitrogen gas cylinder, complete with special valves and gauges.

Chill your stout cold. Attach the nitrogen and apply 20 pounds pressure and shake. The nitrogen will grudgingly dissolve into solution. Dispense the stout with nitrogen. Your stout will come out creamy with lots of foam. Serve it colder than it should be using this method. Wait and drink.

All this is rather a basic explanation of what it takes to home dispense a nitrogen Guinness. You be the judge as to whether it's worth it. You know my opinion.

Oh yes. The recipe. In the November-December 2000 issue of **Zymurgy** *magazine you'll find a recipe for "Dusty Mud Stout." It is my favorite Guinness-type stout recipe. It's a simple malt extract recipe with the use of some crystal malt and roasted barley and roasted malt.*

I'm a CO_2 kinda guy,
The Professor, Hb.D.

Editor's Note: Our last issue (January-February 2002) also included an article on the basics of brewing a Guinness-style stout.

Send your homebrewing questions to "Dear Professor," PO Box 1679, Boulder, CO 80306-1679; Fax (303) 447-2825 or professor@aob.org

MARCH

1-2 **America's Finest City Homebrew Competition**, San Diego, CA, **AHA SCP**. QUAFF San Diego sponsors the 9th annual homebrew competition. This is typically one of the largest events on the west coast, with over 300 entries. Deadline: 2/8-2/22. Fee: $6. Contact: Randy Barnes, 858-663-0305 info, 619-388-6530 work, rbarnes@sdccd.net, www.softbrew.com/afchbc.

2 **Mill Creek Classic**, Salem, OR, **AHA SCP**. This homebrew competition is held by Capital Brewer of Salem, Oregon. The judging will take place at the Southside Speakeasy. Please send entries to: Homebrew Heaven, 1292 12th St. SE, Salem, Oregon, 97302-2813. Deadline: 2/16-2/23. Fee: $6 for 1st, $5 for each after. Deadline: 2/16-2/23. Fee: $6 for 1st, $5 for each after. Contact: Sandy LaDue and Harvey Twombley, 503-581-4190 info, roseymum@aol.com.

2 **9th Annual Peach State Brewoff**, Atlanta, GA, **AHA SCP**. Georgia's premier annual competition, and also the first leg of the Mid South Homebrewer/Club of the Year competition. Deadline: 1/28-2/16. Fee: $6. Contact: Fred Francis, 770-434-3440 info, fsf68@bellsouth.net, www.coverthops.com/.

3 **Fifth Annual Eastern Connecticut Homebrew Competition**, Willimantic, CT, **AHA SCP**. All classes of beer, mead, & cider will be at this annual event. Also after the lunch buffet expect a lecture of beer yeast & fermentation by Robert Vieth of University of Connecticut. Deadline: 2/20. Fee: $5. Contact: Paul T Zocco, 860-456-7704 info, zoks.homebrewing@snet.net, http://homemadebrew.net.

8-9 **Iowa Brewers Union Open Homebrew Competition**, Des Moines, IA, **AHA SCP**. Iowa's largest homebrew competition and growing. Hosted by the IBU's. Competition Specific Category: IBU Challenge. For you hopheads, the only requirement for this category is the beer entered must have 1 IBU per 1 OG. Example: 1.045 OG must contain no less than 45 International Bittering Units. Deadline: 3/3. Fee: $5. Contact: Bill VanZante, 515-270-6785 info: 515-253-2240 work, vanzantewm@yahoo.com, www.iowabrewersunion.org.

9 **2002 St. Patrick's Cascadia Cup Homebrew Competition**, Seattle, WA, **AHA SCP**. The 6th annual competition will be held at Hales Ales Brewery in Seattle, sponsored by Cascade Brewers Guild. Deadline: 2/22-3/3. Fee: $6. Contact: Lori Brown, 425-771-7602 info, loribrown@worldnet.att.net, www.cascadebrewersguild.org.

10 **The Milwaukee Beer Festival**, featuring the annual Blessing of the Bock, Milwaukee, WI. Sponsored by the Milwaukee Beer Barrons. Homebrewers and commercial brewers are invited to present their beers to be blessed and tasted. A priest blesses the beers. Then we drink them. Date: Noon - 4:30. Location: Serb Hall. Price: $30 at the door, advance prices available. Awards Ceremony: 3/9. Contact: John Zutz, 414-372-0749, jzutz@wi.rr.com, www.milwaukeebeerfest.com.

16 **Shamrock Open**, Raleigh, NC. 6th Annual Shamrock Open sponsored by CARBOY (Cary-Apex-Raleigh Brewers of Yore). BJCP registered. First qualifying event for NC Homebrewer of the Year. Deadline: 3/10. Fee: $6. Contact: Mike Dixon, 919-554-4229, mpdixon@ipass.net , http://hbd.org/carboy/shamrock.htm.

23 **Drunk Monk Challenge**, Warrenville, IL, **AHA SCP**. Sponsored by the Urban Knaves of Grain, this homebrew competition will be held at Two Brothers Microbrewery in Warrenville, IL. Deadline: 3/7-3/15. Fee: $6 for 1st, $5 for add., all $5 if entered online, $2 for Menace of the Monastery entry. Contact: Luann Fitzpatrick & Laurel Coombs, 630-393-7303 info, 630-226-2729 work, lcoombs@sgu.net, www.sgu.net/ukg/dmc.

23 **Hudson Valley Homebrewers 12th Annual Competition**, Hyde Park, NY, **AHA SCP**. The 12th Annual competition is open to all amateur brewers. Deadline: 3/1 - 3/16. Fee: $5. Contact: David Tuohey, 845-297-5341 or 845-894-9630, davidt7826@aol.com, www.hbd.org/hvhb.

AMERICAN HOMEBREWERS ASSOCIATION
• KUDOS •
SANCTIONED COMPETITION PROGRAM
BEST OF SHOW

• AUGUST 2001 •
Beer & Sweat, 131 entries - **David Faber** of Wadsworth, OH.

• SEPTEMBER 2001 •
Mid South Fair, 93 entries - **Kenny McDonald** of Memphis, TN.

• OCTOBER 2001 •
Hoppy Halloween Challenge, 127 entries - **Mick & Vi Walker** of Fargo, ND.
3rd Annual Palmetto State Brewer Open, 127 entries - **Dr. George Fix** of Clemson, SC.
Oktobersbest Zinzinnati, 168 entries - **Philip Meyer** of Cincinnati, OH.
Brewer's Dozen - TRUB XIII, 95 entries - **Brian Cole**, of Black Mountain, NC.
Sixth Annual Music City Brewoff, 248 entries - **Douglas & Linda McCullough** of Indian Springs, AL.

AHA SCP = American Homebrewers Association Sanctioned Competition 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. 25, No. 3), information must be received by March 5, 2002. 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.

23 **March In Montreal**, Montreal, PQ. Competition, micro brewery beer tasting, conference by Mario D'Ere, tour of Oland's beer school and the Schoune Farm brewery. Information and ticket sales; Denis Barsalo 514-636-8406. Information and competition forms can be obtained on the CABA website. Deadline: 3/2. Awards Ceremony: 3/23. Contact: Deborah Wood, 514-526-5324, garwood@cam.org, http://realbeer.com/caba .

23 **March Mashness Homebrew Competion**, St. Cloud, MN. Sponsored by the Cloudy Town Brewers, the Best of Show will be presented at the Granite City Food & Brewery. Deadline: 3/8. Contact: Erik Nelson, heimbrauer@astound.net, www.cloudytownbrewers.org.

23 **World Cup of Beer**, Berkeley, CO, **AHA SCP**. The Bay Area Mashers proudly presents the 8th annual World Cup of Beer 2002, a qualifying event for the MCAB 5. We ensure careful handling of entries, superb organization, with a reputation for attracting highly experienced judges. Scoresheets, ribbons and prizes mailed back April 10. BJCP style guidelines. Deadline: 3/9. Fee: $7. Awards Ceremony: 3/23. Contact: Scott Rowe, 510-233-9508 info, ged13@earthlink.net, www.bayareamashers.org.

23-24 2002 **Bluebonnet Brewoff**, Irving, TX, **AHA SCP**. The largest, single-site Homebrew Competition is sponsored by the Knights of the Brown Bottle and the Bluebonnet Committee. As the Bluebonnet heads into its 16th year, it also is the 1st in the Gulf Coast Homebrewer of the Year Competition. Deadline: 2/9-3/1. Fee: $7. Contact: Steve Wesstrom, 817-832-8916, sgwesst@aol.com, www.hbd.org/bluebonnet.

24 **Washoe Zepher Zymurgists Homebrew Competition**, Reno, NV. The Washoe Zephyr Zymurgists club, northern NV and eastern CA, invites you to participate in our annual homebrew competition. Sponsors include the Reno Homebrewer, Great Basin Brewing Co, and Silver Peak Brewing. Prizes will be awarded for all placing beers. Additionally, a BOS round will be held with BJCP National and Master judges overseeing this round. Deadline: 2/23-3/16. Fee: 1st $6, add. $4. Contact: John C. Tull, 775-847-0407, jctull@unr.edu .

29-30 **Hurricane Blowoff 2002**, West Palm Beach, FL, **AHA SCP**. The Palm Beach Draughtsmen sponsor the seventh annual homebrewed beer and mead competition. Deadline: 3/11-3/26. Fee: $6, $5 for four or more entries. Contact: Bill Eubank, 561-588-0106 info, 561-793-3400 work, weubank@aol.com, www.fortunecity.com/littleitaly/giotto/175.

30 **13th Annual Reggale & Dredhop Homebrew Competition**, Denver, CO, **AHA SCP**. AHA & BJCP Sanctioned Competition, MCAB Qualifying Event, accepting all categories of beer and mead. Deadline: 3/11 - 3/22. Fee: $5. Contact: Bob Kauffman, 303-828-1237 - 303-913-5722, acmebrew@juno.com, www.hopbarley.org.

APRIL

6 **Knickerbocker Battle of the Brews**, Albany, NY. Contact: James Raimo, 518-844-8689, jraimo@nycap.rr.com .

13 **Chicago Cup Challenge**, Blue Island, IL, , **AHA SCP**. Eleventh annual competition with two BOS awards, i.e. one for beer and one for a non-beer category. Sponsored by the Brewers of South Suburbia (BOSS). Deadline: 4/6. Fee: $6. Awards Ceremony: 5/3. Contact: Dave Persenaire, 708-758-6045 - 708-614-9087, davidpersenaire@aol.com, www.megsinet.net/~bethke/boss/index.html.

19-28 **AHA National Homebrew Competition**, 8 Regional Sites in U.S. & Canada, **AHA SCP**. Do you have what it takes to be crowned AHA Homebrewer of the Year? The 1st round entry deadline is April 3-12, 2002. Judging takes place April 19 - 28. First, Second, and Third place winners in each category advance to the Second Round in June at the National Homebrewers Conference in Irving, TX. Deadline: 4/3-4/12. Contact: Gary Glass, 303-447-0816 x 121, 888-U-CAN-BREW, gary@aob.org,www.beertown.org.

20 **D.E.A. Challenge**, Greenville, NC, , **AHA SCP**. Sponsored by the Down East Alers, this homebrew competition is accepting all styles. Qualifying event for NCBOY (North Carolina Brewer of the Year). 2nd Annual event. Open to the public. Deadline: 4/17. Fee: $6 for 1st, $4 for additional. Contact: Brian Mentzer, 252-931-0960 - 252-321-6911, stinkeeee@yahoo.com.

MAY

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BEER ILLUSTRATION BY DAVE HARFORD

BY RITA LIOTTA

Belgian Beer Kit Yields Many Beer Styles

The Niagara Association of Homebrewers (NAH) was founded in October 1995 in Niagara Falls, New York. Since then membership has grown steadily to an active and involved 33 brewers. Many members are either BJCP-certified or actively studying for the exam. Each spring we brew steinbier, an Oktoberfest-style lager brewed with stones heated white-hot over a beechwood fire. The beer won gold medals at the New York State Fair both years we brewed it. Also in spring, we participate in the annual 300-entry Western New York Homebrew Competition. Nearly all members are involved as organizers, judges, stewards or entrants. The competition ends with a "Homebrewers' Night Out" awards banquet, with many NAH members winning medals. In summer, we have a joint picnic with our good friends and favorite rivals, the Sultans of Swig homebrew club. At Christmas, we gather for our annual holiday party, an excellent home-brewed and home-cooked gourmet dinner. Regardless of the event, we always share the camaraderie and warm fellowship of a group of people who really enjoy one another's company. For more information about NAH or brewing steinbier, please visit our website at *www. niagarabrewers. org*.

The club members who participated in this Extract Experiment included Keith Bailey, Erv Brese, Tim Collins (BJCP), Keith Curtachio, Ed D'Anna (BJCP), Rita Liotta and Larry Pilon. Also joining us for the tasting was Becky Dyster, club member and co-owner of Niagara Tradition Homebrew Supplies.

For this experiment, each brewer was given a 3.3 pound (1.5 kg) can of **Brewferm Dark Abbey Ale**—a hopped kit with yeast. When made according to the can directions, the kit makes about three gallons (11.4 L) of finished beer. The beer produced by the kit is similar to a Belgian dubbel or Belgian dark strong.

PHOTO COURTESY OF RITA LIOTTA

The Niagara Association of Homebrewers (NAH): From bottom left to right: Erv Brese, Keith Bailey, Becky Dyster, Ed D'Anna, Rita Liotta, Larry Pilon.

Tasting methodology: We met and tasted the beers as a group. To start, we sampled an abbey-style commercial beer from Brewery Ommegang in Cooperstown, NY. The tasters described this beer as being: "Complex fruit and malt aroma, dark fruit, raisin and plum notes in flavor, slight dark malt character in finish (dry and roasty), almost a vinous character, firm bitterness in the back, good example of the [abbey] style."

After this warm-up, we then tasted each beer from the experiment, writing down a few impressions. We discussed our impressions and came to a consensus based on the scoring guide on the BJCP score sheet: outstanding, excellent, very good, good, fair, problematic. We did not assign numeric scores. Here are the recipes and tasting notes for each of the experiment beers.

Keith Bailey's Dark Abbey Dubbel

Brewed according to the instructions on the kit label, this beer was the control batch for the experiment. The label directions say to mix the extract, sugar and water in the fermenter, rehydrate the yeast and add. Ferment at 77° F (25° C). No boil is specified. After primary, rack into a bottling vessel, prime and bottle. No secondary is specified. Keith followed the label instructions exactly, using corn sugar in the ferment and for priming.

- **OG: 1.048 (11.9° P)**
- **FG: 1.016 (4.0° P)**

Tasters' Impressions

Aroma: Spice with licorice and fruit overtones. Alcohol and esters noted; malt character present. Flavor: Yeasty, bready and spicy. Spruce-like aspect. Roast malt character in dryish finish. Warming, slightly vegetal, slightly sour, not vinous. Overall: Would benefit from further aging. Good job on a straight-up kit. *CONSENSUS: Good to very good.*

Larry Pilon's Oktoberfest

3.3 lb can Brewferm Dark Abbey (1.5 kg)

2 lb Munich malt (6-12° L) (0.9 kg)
2 lb Vienna malt (3-6° L) (0.9 kg)
Wyeast 2247 European Lager yeast in 0.66 gallon starter (2.5 L)

- **OG: 1.062 (14.7° P)**
- **FG: 1.016 (4.0° P)**

Brewer's Specifics

Steep grains for one hour at 150° F (66° C) in two gallons water (7.6 L). After steeping, rinse grains with two additional gallons of water (7.6 L) at 170° F (77° C). Heat to a boil. Boil for 15 minutes.

Tasters' Impressions

Aroma: Munich malt evident in nose. Low-to-no hop aroma with mild esters. Slight toasted aroma. Flavor: German character evident. Somewhat vegetal with roast malt character in finish. Spicy, too hoppy for style, bready. Shares many flavor characteristics with Keith Bailey's. Overall: Undercarbonated. Color too dark for style. Warming and well balanced. A smooth and clean lager. Oktoberfest character is there. *CONSENSUS: Good-to-very good.*

Tim Collins' Scottish Export 80/-

3.3 lb can Brewferm Dark Abbey (1.5 kg)
1 lb Laaglander Amber Dry Malt Extract (0.45 kg)
0.5 tsp gypsum
0.25 tsp Irish Moss
Wyeast 1728 Scottish Ale in 800 mL (1.7 pints) starter

- **OG: 1.055 (13.3° P)**
- **FG: 1.017 (4.3° P)**

Brewer's Specifics

Boil the Dark Abbey for 20 minutes with the DME and gypsum. Add Irish moss for the last 10 minutes. Cool to 70° F (21° C) and pitch yeast. Ferment at 68° (20° C).

Tasters' Impressions

Aroma: Malty, alcoholic and nutty. Sweet with hint of caramel. Malt came out and vegetal aroma faded as sample warmed. Flavor: Clean and crisp. Slight roast malt aspect in finish. Scottish character is there; malt dominates. Overall: Vegetal and spicy notes from the kit come through again, even with added malt. Tasty, full-bodied, smooth and creamy. *CONSENSUS: Very good.*

Erv Brese's Belgian Dark Strong

3.3 lb Brewferm Dark Abbey (1.5 kg)
2 oz Belgian CaraVienne malt (57 g)
2 oz Belgian CaraMunich malt (57 g)
7 oz Belgian Special B malt (198 g)
5 oz Belgian Aromatic malt (142 g)
2 oz German Vienna malt (57 g)
4 oz US Munich malt (113 g)
8 oz demerara sugar cubes (250 g)
8 oz brown sugar (250 g)
1 lb Laaglander Dry Malt Extract (.45 kg)
0.5 oz Kent Goldings (14 g), 5% AA, 60 minutes
0.5 oz Tettnanger (14 g), 5.6% AA, 60 minutes
0.5 oz Tettnanger (14 g), 5.6% AA, 15 minutes
Wyeast 1214 Belgian Abbey yeast in 750 ml (1.6 pints) starter

- **OG: 1.079 (19.1° P)**
- **FG: 1.019 (4.8° P)**

Brewer's Specifics

Mini-mash grains in two gallons (7.57 L) 155° (68° C) water for 35 minutes. Increase water to four gallons (15 L) total. Add sugar and dry malt extract. Boil 60 minutes. Add hops as directed above. Chill wort to about 180° F (82° C). Add Brewferm can. Chill to 75° F (24° C). Oxygenate and pitch yeast. Ferment at 68° (20° C). Rack after one week and bottle with 4 oz (114 g) corn sugar after another week.

Tasters' Impressions

Aroma: Complex and malty, with plum and raisin notes. Mild hop character. Spicy, grassy and herbal with some esters. Vegetal aspect is absent. Flavor: Distinctly spicy. Distinctly Belgian with big malt character. Smooth, warm and well balanced with a roasty finish. Raisin and orange also noted. Bitterness on target. Pleasant smokiness. Very complex and very much to the Belgian style. Overall: Use of liquid yeast and specialty grains greatly enhanced the kit. Wonderful, rich and warm. Wow! Great winter warmer. *CONSENSUS: Very good to excellent.*

Ed D'Anna's Belgian-Style Barleywine

2 - 3.3 lb cans Brewferm Dark Abbey (1.5 kg each)
2 lb Munton plain light dry malt extract (0.91 kg)
0.5 oz Crystal pellet hops (14 g)
0.33 tsp Wyeast yeast nutrient
Wyeast 3787 Trappist High Gravity in 0.5 L (1.05 pints) starter at high kraeusen

- **OG: 1.110 (25.7° P)**
- **FG: 1.050 (12.4° P)**

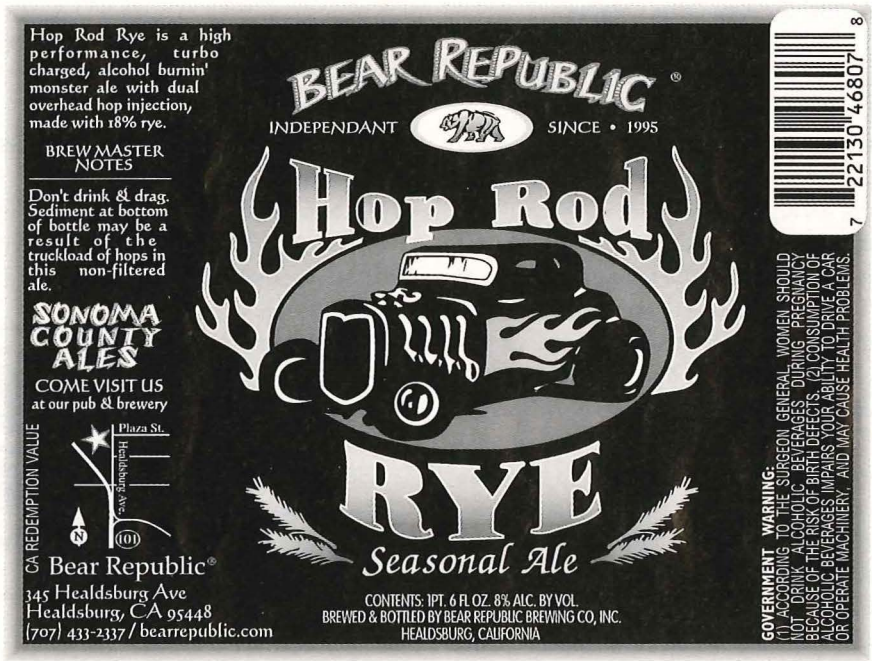
Brewer's Specifics

Boil three gallons (11.4 L) water for 10 minutes. To one gallon (3.78 L) of boiled water, add extract. Rinse cans thoroughly with boiled water. Add boiled water to make three gallons (11.4 *(continued on page 62)*

ILLUSTRATION BY DAVE HARFORD

BY AMAHL TURCZYN

Bear Republic's Hop Rod Rye



Greg Koch of Stone Brewing Company in San Marcos, CA is a man who appreciates hops. He and head brewer/co-owner Steve Wagner opened Stone, famous for the pompously bold and flavorful Arrogant Bastard Ale, in the summer of 1996. Since then the spicy, hoppy character of their beers (including the recently-released and hugely hopped 5th-Anniversary IPA) have become a trademark of the brewery's products. Their marketing approach has also tended to lean toward the extreme: their slogan for Arrogant Bastard, i.e. "You're Not Worthy" has certainly raised its share of eyebrows, as has their disdain for "tasteless fizzy yellow beer." Stone's recent charity fundraiser called on fans to dye their hair bright green for a week, and get people to pledge money to see them do it. So it was that Koch, green hair and all, was asked to name his favorite brew. And unsurprisingly, he chose a bold, over-the-top IPA from another small California brewery: Bear Republic Brewing Company's Hop Rod Rye. Koch had the beer at the brewery during one of his trips north, and loved it. While it isn't yet available in too many places besides the brewpub, I was able to sample the beer at the Great American Beer Festival this last September, and it is indeed an impressive (and quite arrogant) brew!

Bear Republic brewer Richard Norgrove, Jr. began his brewing career as a homebrewer. After he got out of the Army in the late 80s, he got interested in a few hobbies, one of which was brewing, the other, building mountain bikes. His local shop was The Beverage People, a brewshop owned by veteran brewer Byron Burch, and Burch became a great source of inspiration and knowledge for Norgrove. With his bicycle-building skills, he eventually put together a three-tier brewing system (his wife wanted him out of the kitchen, he says), and really got serious. So much, in fact, that he eventually found himself working at Marin Brewing Company with a free year and a half apprenticeship alongside two highly successful craft brewers, Grant Johnson and Paddy Giffen. It was Paddy who convinced him to go pro, but even to this day, Norgrove has not forgotten his roots. He still uses his three-tier homebrew system as a pilot brewery for Bear Republic, and does all his recipe formulation that way. With any new high-alpha hops on the market, Norgrove can't afford to risk a full-scale batch, so he tests recipes on the small system first.

Hop Rod Rye is based on some Rye Pale Ale homebrew recipes which were tweaked and tested prior to the first large-scale production batch. Norgrove played with different proportions of rye and wheat in the grain bill, as well as using flaked rye versus rye malt. Along the way, he suffered through some pretty miserable sparges, but finally got his flaked-to-malted rye ratio where he wanted it. And please take note: these are both high-viscosity grains, and will still gum up your lauter. As with a hefeweizen mash, it is advisable in this recipe to mix in a half pound or so of rice hulls near the end of the mash to help things along.

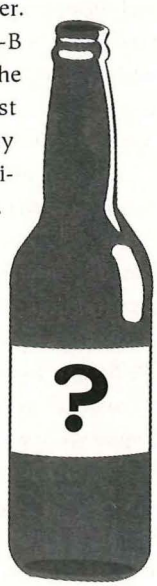
Unlike a wheat beer, however, Hop Rod Rye is hopped to the gills. You'll notice that all the hops in Hop Rod are high-alpha American varieties. No BMW parts on this motorcycle—we're talking Harley-Davidson all the way. Of course, you may have trouble finding Tomahawk or Amarillo varieties in some areas of the country. Ricardo will forgive you if you want to substitute Chinook or more Centennial—but obviously, it will change the character of the beer. IBU ratings for each hop addition are given if you do care to substitute hops. *(continued on page 63)*

LABEL COURTESY OF BEAR REPUBLIC BREWING CO.

BY AMAHL TURCZYN

A Bud By Any Other Name

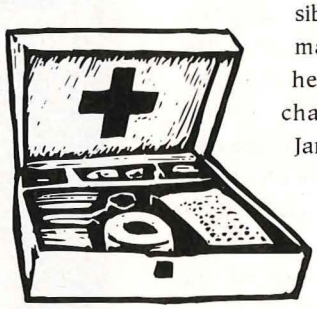
Following the loss of yet another legal battle over Anheuser-Busch's right to use the Budweiser name for its famous brand, the industry giant found itself nameless in Germany. Rival Budweiser Budvar came out on top for that country, and A-B had to tear off thousands of bottle labels to sell its beer legally. The temporary name of "Anheuser-Busch B" was used for a few months, and meanwhile, A-B launched a contest in Berlin to find a new name. "We are pleased with the 'Anheuser-Busch B' name and the brand's performance in Germany, but we thought it would be fun to consider alternative names from the people in Berlin who enjoy our beer," said Richard Taylor, director of international marketing, Anehuser-Busch International, Inc. The company also created an Internet site where consumers could suggest a new name for the beer in Germany and enter a contest for a chance to win a $20,000 weekend shopping trip to the United States. The web site launched September 1 and the contest ended October 31. Now it appears the search is over.



The winning name, "A-B 1879," hearkens back to the year the brand was first brewed by company founder and German immigrant Adolphus Busch. Busch brewed the beer to appeal to the large German population living in St. Louis at the time. Meanwhile, the name war continues, with Budvar facing some 40 lawsuits worldwide. The most recent, in Seoul, Korea, was won by Budvar, which is trying to position itself to open up commercial development of its brand in the promising Asian market.

Beer Health Symposium In Brussels Sings Praises of Real Ale

In November, the European Union Brewers Trade Organization, CBMC, invited beer industry experts from around Europe to present the most recent findings on beer and health, and there were more than a few surprises.



Hop expert Professor Denis de Keukeleire of Belgium's Gent University reported to delegates that beer was very much a part of a healthy lifestyle. Hops, for example, are being scrutinized by researchers for their potential to protect the body against cancer. Since British real ale tends to have a higher hop content than most European beers, "it is possible they could offer even greater benefits," Keukeleire was reported to have said, "but more research needs to be done." Cancer researchers from Germany even isolated one of the hop components that could stop certain kinds of cancer from developing. Research project leader Dr. Norbert Frank said, "Cancer is caused by multiple factors, some genetic as well as external, like diet. Testing beer, we found that Xanthohumol from hops to be the most promising agent with hitherto unknown activities indicative of cancer preventative potential."

Folates were also high on the list of beneficial beer compounds. Dr. Caroline Walker of Britain's Brewing Research International said that folate could provide protection against cardiovascular disease as well as cancer. Folate is often found in cereals, among them barley, so it makes sense that beer is loaded with the stuff. Beer was also discussed as a nutritional benefit to healthy bones and connective tissue, according to Dr. Johnathan Powell, Senior Lecturer in Nutrition and Medicine at King's College, London. Because of the brewing process, silicon is leached from barley grain in a form that is readily accessible to the body. Drinking beer may actually promote bone health. Finally, symposium chairman Professor Oliver James, from the School of Clinical Medical Studies at the University of Newcastle upon Tyne, suggested that beer also may protect against gallstones, kidney stones, and the bacterium *Heliobacter pylori*, which is linked to stomach ulcers and cancer.

MiniHop Jack Doubles as Grant, Wort Cooler

The hop jack is a device used to filter the spent hops from wort. It also filters out trub and break material. Hobby Beverage Equipment Company now has a homebrew-sized hopjack that performs these tasks and more. Brewers can add a charge of whole aroma hops to the wort as it goes through the jack, or any other final-stage flavorings like coriander and orange peel for a Belgian Wit. The MiniHop Jack uses a seven-inch screen bolted between the two tanks, with a silicone rubber washer sealing the tanks together. The jack easily tolerates hot wort temperatures, and is easy to clean. It can also be used as a grant during the lautering process, or as a cooling device (with the

Hobby Beverage Equipment

ILLUSTRATION BY DAVE HARFORD
ILLUSTRATION © 2002 ART PARTS
LOGO COURTESY OF HOBBY BEVERAGE EQUIPMENT

separate purchase of the Cooling Cone.) The cone fits inside of the larger tank, and cools the wort by use of a cone-shaped series of copper coils that carry coolant water. With this configuration, the hot wort leaves the kettle, is filtered of any hop or trub material, and then flows over the cooling pipes like an old fashioned Baudelot cooler. The MiniHop Jack is $146; with the cooling cone, it is $315. (909) 676-2337 PST or john@minibrew.com.

Monster Grain Mills from Crankandstein

Fred Francis of the Covert Hops Society homebrew club knows grain mills. As an avid homebrewer, he saw the need for a supplier of quality mills for the homebrewing community, so he decided to open a small business himself: Crankandstein. His mills feature aluminum block frames, oil impregnated bronze bushings, and knurled steel rollers. Innovations include the Crank-and-Drive Cog—this is a standard feature on all of Crankandstein's Drill-Drive mills. Essentially, it is a small section (less than 0.5-inch wide) of straight knurl on one end of all the rollers that aids in feeding. The small section of straight knurl acts like gears that force the non-driven rollers to spin and feeds the grain through the crush. The crush is just as effective, but the mill feeds better. With Crank-and-Drive, Francis claims, you get Positive Grain Feed (PGF). If you have ever had problems with your driven roller spinning without feeding and crushing the grist, this is the solution. The adjustable Drill-Drive mills are priced from $80 for the four-inch fixed gap roller mill to $150 for the granddaddy of all mills: a monstrous five-inch three-roller mill, with two adjustable gaps and finer knurls to process up to seven pounds of grain per minute. They also offer a host of other special order options, including stainless steel rollers, custom roller lengths, and shaft drives for motorizing—their motto is, if you can dream it, they can build it. Crankandstein also offers a $50 hand-cranked fixed-gap mill for those on a tight budget, and a base and hopper for each mill is offered for an additional $30. Check out the web site at www.crankandstein.com.

LOGO COURTESY OF CRANKANDSTEIN

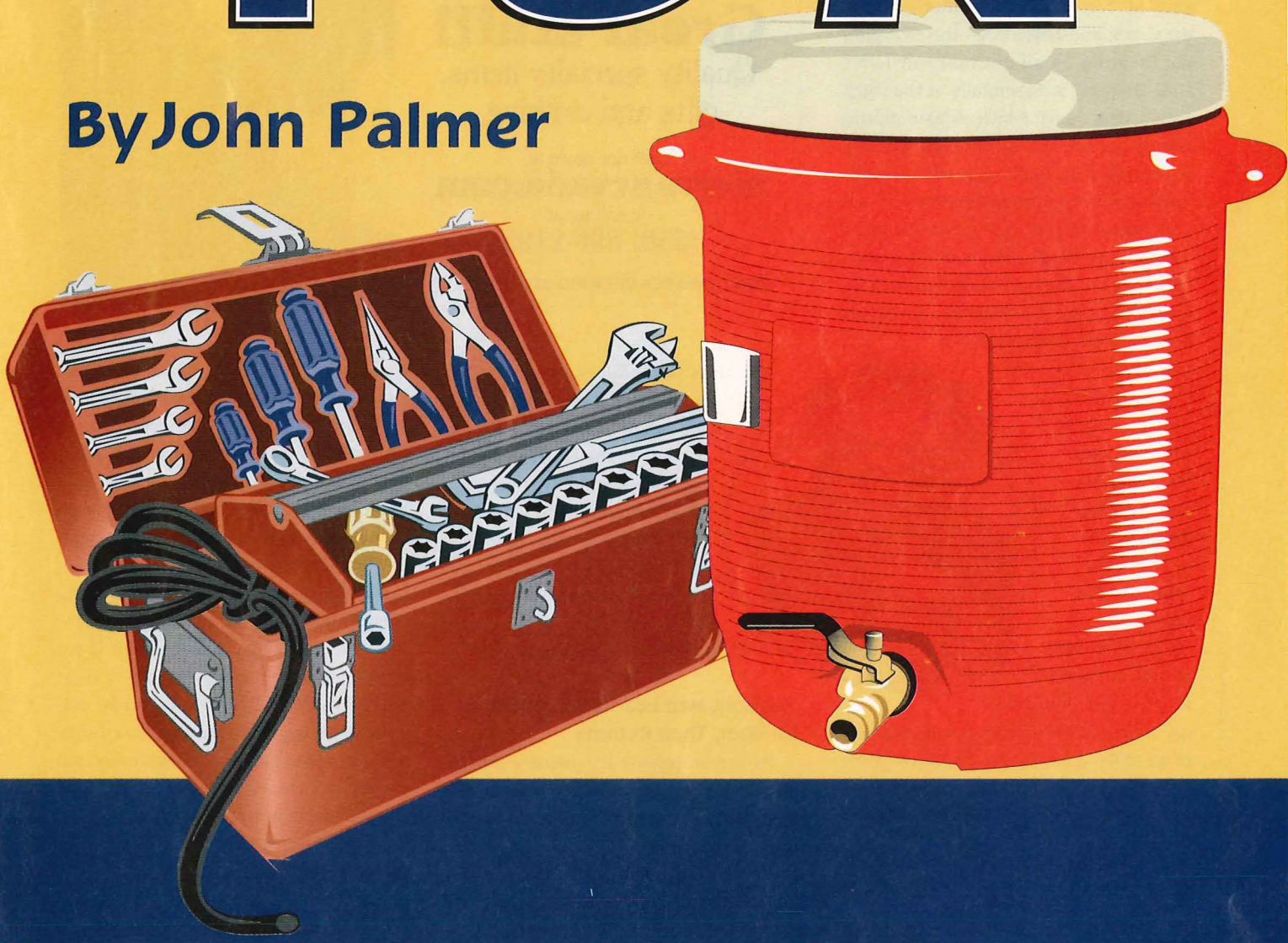
Vermont Man Leaves Prison Camp for Beer, Then Returns

At the St. Johnsbury prison camp in Vermont, a prisoner allegedly escaped to buy a case of beer and a carton of cigarettes, then broke back into the camp. Mark Delude of South Barre crawled under the barrier fence surrounding the work camp, authorities say, then walked a mile and a half to the nearest convenience store for the goods, and then returned. Lieutenant George Hacking, a 21-year veteran of the Vermont State Police, said it was the first case of its kind he'd ever investigated. "I don't remember trying to catch people trying to break back in," Hacking reportedly said. "But nothing surprises me." St. Johnsbury prison camp is for minor, nonviolent offenders serving short sentences. After Delude was caught outside the prison, he was returned to custody and transferred to a prison with a secure perimeter fence system. The beer run could get him two more years behind bars.

Amahl Turczyn is the associate editor of *Zymurgy* magazine.

HOW TO BUILD A MASH/LAUTER T·U·N

By John Palmer



While small amounts of grain can be used in homebrewing with grain bags and such, full-sized mashes really require that you build your own lauter device—most commonly as part of a combination mash/lauter tun. It's really not difficult—I'll give you several options here and tell you how to go about assembling each one.

The function of a mash tun is to hold the mash at a nearly constant temperature so that the enzymes in the malt can convert the malt starches to fermentable sugars. An insulated cooler makes a good mash tun because it will only lose a couple degrees during the hour-long mash. A lauter tun is a vessel dedicated to separation of the wort from the malt so that fluid alone is drained to the boiling kettle. By combining these two functions into a single insulated vessel you will save yourself a lot of time and trouble. Building a mash/lauter tun from a cooler is inexpensive and the easiest way to start all-grain brewing. Everything you need to make one is readily available at your local brewshop or hardware store.

There are lots of different ways to build a lauter tun. You can use rectangular or cylindrical coolers to hold the mash. You can use slotted pipes, tubular screens, or a perforated metal false bottom to separate the wort from the grain. And to get the wort out of the tun and into your brewing kettle, you can siphon it out over the side, or use a bulkhead fitting to come through the wall. To regulate the flow, you should use a ball valve or stopcock of some sort. Each design option has its pros and cons, and the relative merits of any particular system are going to depend on how you plan to brew with it.

Choosing Your Tun

The first decision you have to make is what type of cooler would you like to use:cylindrical or rectangular. I can tell you that in general, that cylindrical beverage coolers allow you to extract the greatest amount of gravity from the grain. (Those interested in the details can refer to the *For Geeks Only* columns in the July/August and September/October 2001 issues of ***Zymurgy***.)

But what if you don't care about extracting every last bit of sugar out of your mash? What if you would rather just add a couple more pounds of grain and batch-sparge or no-sparge to obtain your wort without worrying about lautering efficiency? Then you may want to consider using one of the larger rectangular coolers with lots of volume for a big mash. This method may cost a couple more dollars in grain per batch, but it certainly makes your mash/lauter tun simpler to build.

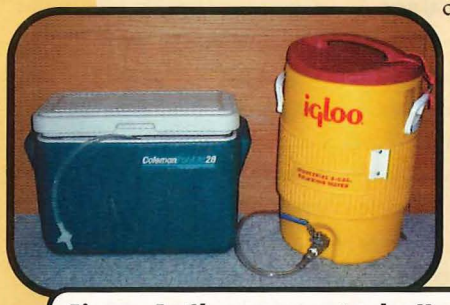


Figure 1: Choose your tools. You can pick either a cylindrical beverage cooler or a rectangular chest cooler. Both work well, but overall performance also depends on the lautering device and your technique.

False Bottom, Slotted Pipes or Screens?

As mentioned above, the essential function of a lauter tun is separation of wort from grain. To accomplish this we need something that holds coarsely ground grain particles back but lets fluid flow through at a reasonable rate.

Generally there are two options: a false bottom or some sort of pipe or tube device. The false bottom is essentially a rigid platform above the actual bottom of your vessel and it may be made of perforated food-grade metal or plastic. In this arrangement, the drain is separate from the separation device. With the pipe or tube option the separation device is usually connected directly to the drain. These items may consist of a pipe manifold with slots cut in it, or a tube made of screen. The pipe manifold will usually have two or more arms in a "fork" pattern. The screen tube is usually a single tube. In most cases, these devices are surrounded by grain in the lauter tun and the liquid that enters them flows directly to the lauter drain.

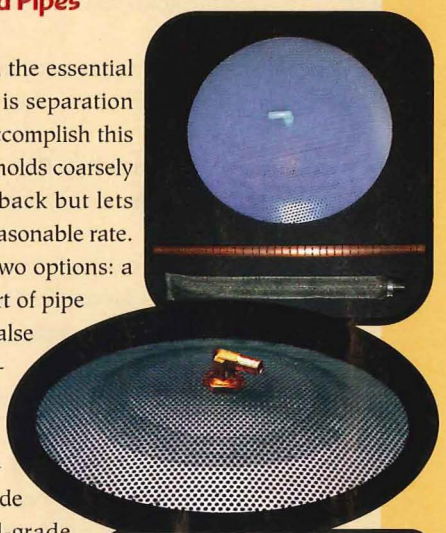


Figure 2: A variety of lautering devices are available: false bottoms, tubular screens, and slotted pipes. The materials can be food grade plastic, copper, brass, aluminum, or stainless steel.

For the best performance you will want to choose a cooler and lautering device that complement each other. The reason is that each type works best with a different type of cooler.

Here is a list of pros and cons for the different lautering devices:

False Bottoms, Pro:

- Full size false bottoms are always more uniform than manifolds, especially when the grain bed is shallow.
- The uniformity of false bottoms hardly varies with grain bed depth.

• False bottoms for round beverage coolers can be made from pizza screens or purchased from suppliers.

False Bottoms, Con:

• False bottoms are tedious to fabricate for rectangular coolers and difficult to fit. They should fit closely around the edges of the tun to prevent gaps that can allow sparge water to bypass the grain bed and reduce the yield.

• False bottoms are more prone to stuck sparges when the lauter flow is too fast.

Slotted Pipes or Screen-tubes, Pro:

• Copper pipe manifolds are easy to build and fit to any size cooler.

A center-to-center pipe spacing of two to three inches is optimum for one-half inch diameter pipe, and results in a highly efficacious manifold.

• Stuck sparges are rare with manifolds.

Slotted Pipes or Screen-tubes, Con:

• The uniformity of manifolds varies with the pipe spacing and the grain bed depth. The wort will not flow up from below the pipe, so the pipe slots should face down and be as close to the bottom of the tun as possible.

Bulkhead Fitting or Siphon

You also have two options for getting the wort out of the tun-you can use a bulkhead fitting, or you can siphon the wort out. A bulkhead fitting allows wort to drain through the side of the cooler; the siphon takes the wort up and out of the vessel without broaching the vessel wall.

Figure 3: To actually get the wort out of the tun, you will need to use either a bulkhead fitting or a siphon. One looks spiffy, while the other is the soul of simplicity.

To accomplish the bulkhead exit, you'll have to make or liberate a suitably sized hole in the vessel. Then you'll need to create a liquid-tight pipeline through that hole. For this you need a short section of pipe with two flat washers, two rubber washers, and two nuts for sealing around the hole that the pipe passes through. (See Figure 4 for details.) A hose barb and vinyl tubing can be used to connect to the lautering device on the inside, and a ball valve and/or a hose barb is connected to the outside.

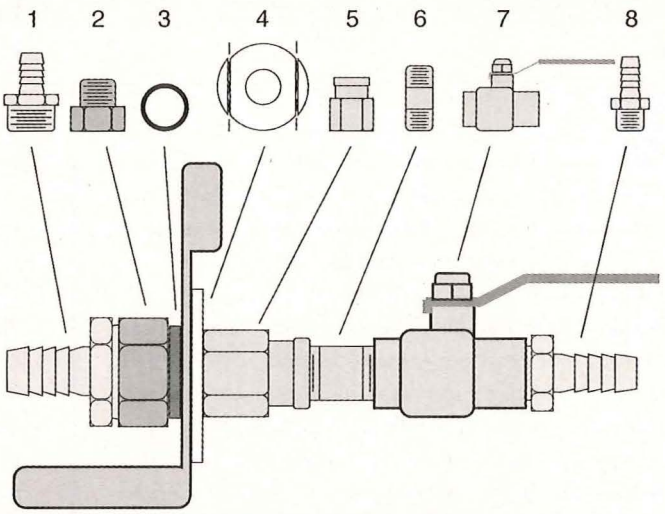


Figure 4: Suggested design for brass bulkhead fitting

Parts:

1. 0.5-inch Nylon Barb to 0.75-inch M Hose fitting
2. 0.75-inch F Hose to 0.5-inch MIP (Male International Pipe) Adapter (brass)
3. Rubber O Ring (No.15, 1/8-inch thick)
4. Washer/Spacer, trimmed to fit
5. 0.5-inch Female International Pipe thread fitting (FIP) to 3/8-inch FIP Reducer
6. 3/8-inch MIP nipple (1.5-inch)
7. 3/8-inch ball valve (brass)
8. 3/8-inch MIP to 3/8-inch barb

To Assemble:

1. Slip the O ring over the male threads on #2, so it rests against the flange.
2. Apply some teflon tape to the male threads of #2, and insert it through the spigot hole from the inside of the cooler.
3. Slip the spacer over the threads and hand tighten #5 to make a good seal.
4. Assemble the rest of the parts in the sequence shown.

With the siphon method, vinyl tubing connects directly to the lautering device and just comes out over the side to the brewpot. During the mash, the tubing can be coiled inside the tun with the lid on to help retain the heat. Both methods work equally well, though the bulkhead fitting looks spiffier. Whichever method you choose, you will also need a valve to regulate the flow rate. The recommended flow rate for lautering on this scale is about one quart/minute. Ball valves are readily available in brass, chrome-plated brass, or stainless steel. Plastic stopcocks are an inexpensive option and work nicely with the siphoning method.

Building Your Lauter Tun: Six Options

Now that we have covered the basic decisions that you have to make in putting together a lauter tun let's look at putting one together. We will review several ways that you can combine the individual elements into a complete system you can brew beer with. But before we begin, a couple of notes about terminology and construction.

Many of the metal joints in these projects will be soldered. The solder for these projects should be plumbing solder, which is combination of tin and silver and sold as a solid wire (various diameters) in hardware

TOOLBOX ILLUSTRATION ©2002 DYNAMIC GRAPHICS, INC.
MASH TUN ILLUSTRATION BY DAVE HARFORD
PHOTOS & FIGURES COURTESY OF JOHN PALMER

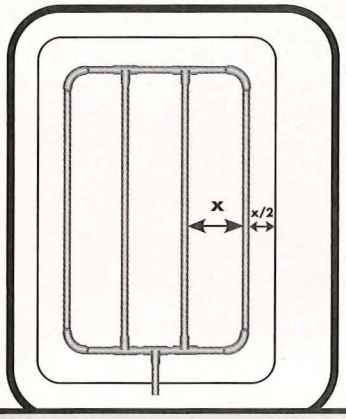


Figure 5: Manifold diagram

Cut a length of 0.5-inch dia. copper water pipe to fit the length of the tun. Saw slots about 0.5-inch apart with a standard hacksaw blade. Only cut one side of the pipe, and cut no farther than halfway. (See Figure 2.) You can use copper sweat fittings to join different pipes together to make a manifold. The fittings may be soldered with silver plumbing solder or simply crimped a bit with a pair of pliers to hold the manifold together. (It does not matter if these fittings "leak" a little—after all, you just cut slots in them—but you don't want the assembly to come apart during use.) For the best performance, the center-to-center spacing between the pipes should be 2-3 inches and the distance from the outer pipes to the wall should be half of the pipe spacing. To connect the manifold to the outlet hose, hose barbs may be connected via 3/ 8-inch or 0.5-inch FIP and MIP-to-Sweat adapter fittings.

FIGURE COURTESY OF JOHN PALMER

stores. Do not use the solder sold in electronic stores as it contains lead. The easiest way to do this soldering is to use a propane torch. To obtain a good joint use only a thin smearing of flux to completely cover the surfaces to be soldered. It greatly helps if you "tin" one of the surfaces with solder before making the joint.

Option 1: Rectangular Cooler with Single Pipe or Screen-tube

This is the easiest system to build and the simplest to operate. Range of sizes allows for larger batches or using batch/no-sparge lautering techniques. On the downside, the grain bed tends to be shallow, which leads to lower yield in gravity points per pound of grain per gallon (ppg). In general, I would recommend this type of system for higher gravity batches and for use with batch sparging. Expect to achieve an extraction efficiency of 25-29 ppg, depending on grain bed depth.

Parts:

- Copper water pipe, 0.5-inch diameter or or stainless tubular screen
- Copper elbow sweat fitting
- Copper end cap
- Copper sweat to 3/8-inch MIP thread fitting
- Brass or nylon 3/8-inch MIP to 3/8-inch hose barb
- Plastic stopcock

How to Build: Create a slotted pipe to fit the length of the cooler, allowing for the elbow and end cap. *(continued on page 58)*

Recommended Equipment Suppliers or Raw Materials

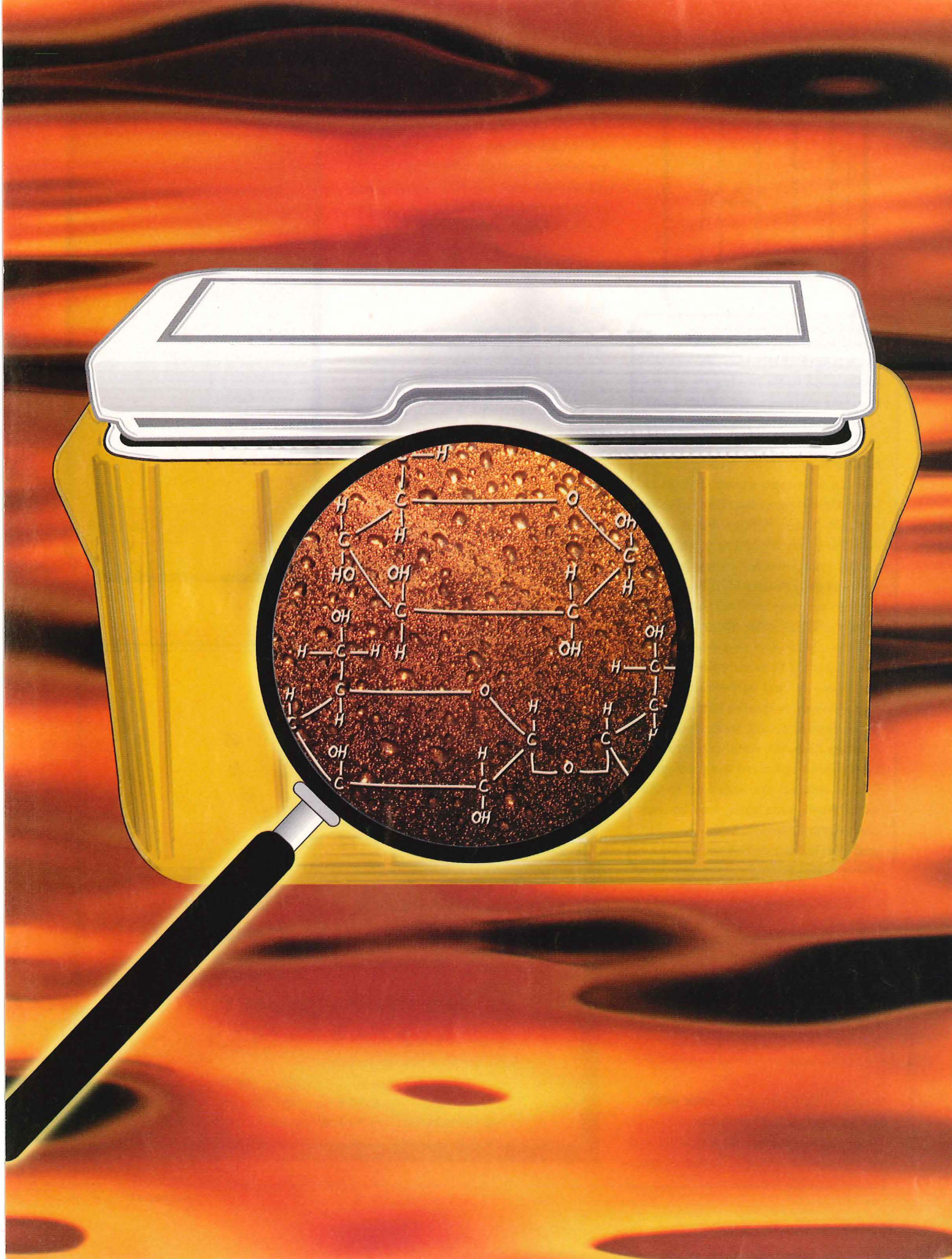
Coolers:
Rectangular: Coleman, Igloo, etc.
Cylindrical: Gott, Igloo, Rubbermaid, etc.

False Bottoms:
Listermann Mfg. (listermann.com)
Fermentap (fermentap.com)

Stainless Steel Screens:
Zymico (zymico.com)
Easymasher (Jack Schmidling Productions)

Bulkhead Assemblies:
Fermentap (fermentap.com)
Zymico (zymico.com)

** See Mashing Equipment catalog elsewhere in this issue for additional suppliers.*



MASHING BASICS

What's Going On Inside the Tun

By Marc Sedam

The whole purpose of the mash is simple—convert the starches that exist in the kernels of brewing grains (barley, wheat, corn, oats, rye, etc) into fermentable sugars. This conversion happens because naturally-occurring enzymes in the malted grains break down the grain components via specific methods of action to produce fermentable sugars.

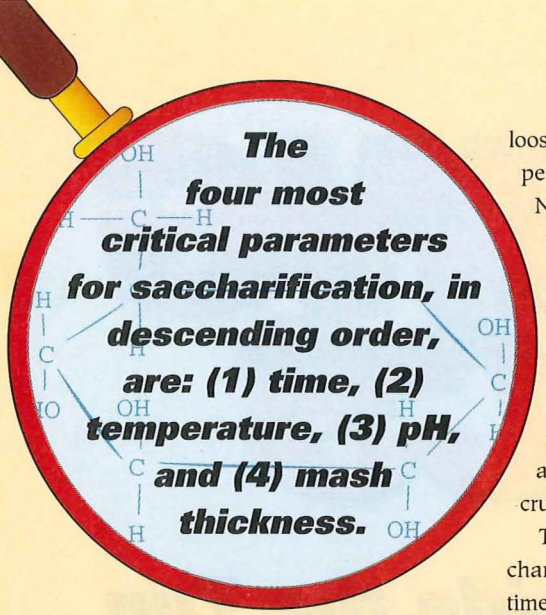
Brewing enzymes are protein-based catalysts that facilitate a particular reaction. Understanding the mash means understanding what enzymes do and what you can do to help them act in the most favorable way to produce the desired wort.

The maltster takes care in preparing brewing grains so that the proper enzymes are active in the grain for us to use. Although it's possible to malt most any grain, most all-grain brewing utilizes malted barley and perhaps malted wheat to provide these enzymes for the rest of the mash. The two main categories of enzymes in malted grains are proteases and amylases. Proteases are most active between 113° F (45° C) and 128° F (54° C) and they break down proteins and protein by-products, while amylases, which are most active between 140° F (60° C) and 162° F (71° C), degrade starch into sugars and dextrins. Although it's not wholly accurate, for the remainder of this article the fermentable byproducts of saccharification will be called "sugars" and the unfermentable byproducts will be called "dextrins."

Most modern malts are considered well modified, meaning they do not require any appreciable time in the temperatures associated with protease activity, so we will not worry about them here. For the most part, we will assume the use of a single-temperature mash rest in what is known as the "saccharification zone"—the temperature range where the starch-busting amylases are most active.

When looking at the saccharification process, the focus is on two enzymes: alpha-amylase and beta-amylase. Both degrade starch, but act in different but specific ways. To understand this, it is useful to have an idea of what starch looks like to begin with. Starch is basically a huge collection of sugars all linked together. The nature of the linkages produces a molecule that looks something like a bush with long chains that branch frequently. Alpha-amylase acts non-specifically, breaking big chains into smaller chains. While the activity of alpha amylase produces some fermentable sugars, it also generates many dextrins.

By contrast, beta-amylase acts only at the ends of the sugar chains. It snips off two sugars at a time generating



highly fermentable sugars called disaccharides, most commonly, maltose.

Wort generally contains a mixture of fermentable sugars (mono-, di-, and some trisaccharides) as well as unfermentable dextrins. Fermenting sugars generate alcohol while dextrins contribute to mouthfeel and body in the beer. By controlling the relative balance between sugars and dextrins in your wort, you can control the alcohol level and body of the final product. Let's take a look at strategies for doing this.

First, since every mash must have sufficient levels of enzymes to convert all the available starch into sugars and dextrins, you have to be certain that there are enough malted grains in the batch to do the job. A loose rule of thumb is to include at least 70 percent of malted grains in every batch. Note that the enzymatic content of malted grains decreases as color increases (pale ale/pilsner malts have the most, Munich and Vienna malts about half as much, while the crystal malts on up have none). Finally, I'll assume that everyone attempting all-grain brewing will either buy pre-ground malt or have access to a malt mill that can properly crush the grain to facilitate conversion.

The four most critical parameters for saccharification, in descending order, are: (1) time, (2) temperature, (3) pH, and (4) mash thickness. Each of these properties affects the activity of the enzymes in the mash in predictable ways. Knowing how to manipulate these properties means having total control of the wort you produce. Let's look at each one in turn.

Time: Given enough time, even the smallest concentration of an enzyme can convert all of its substrate (the material the enzyme breaks down). But few people are interested in an eight-hour mash, so to speed things up, the temperature is adjusted to ensure that conversion occurs in a reasonable amount of time. The amount of time spent in the different enzyme temperature ranges dramatically effects the final composition and fermentability of the wort. For example, short time periods in the protease temperature range can help improve eventual clarity of the beer, while longer times negatively affect head retention. Long time periods spent in the beta-amylase rest (more below) will result in a more fermentable and highly attenuated wort, while shorter time periods followed by a long alpha-amylase rest results in a less fermentable, highly dextrinous wort.

Temperature: Enzymes are very sensitive to their ambient conditions. Every enzyme has an optimal temperature range. Part of the enzymes sensitivity to conditions includes the fact that excessive temperatures will denature (or permanently inactivate) the enzymes rendering them useless for further action.

For the amylases, beta-amylase is most active between 140-149° F (60-65° C) while alpha-amylase is most active at 158° F (70° C)—a temperature that rapidly inactivates the beta-amylase. The temperature or temperatures you select for mashing are the main way that you determine the balance of sugars and dextrins.

This is arguably the primary advantage to being an all-grain brewer—you control how completely your beer ferments out in the end rather than trust the wort processor to do it for you.

pH: Proper mash pH for rapid conversion is in the range of 5.2-5.6. Serendipitously, most mashes will settle into this range without any significant adjustments by the brewer. pH becomes a problem for brewers using water with high carbonate content since bicarbonate increases mash pH. If your water has this characteristic, you can counteract it by mashing with highly kilned or roasted specialty grains, acid malt (made specifically for this purpose), gypsum or maybe even food-grade acids to help decrease mash pH. In general, dark beers (brown ale or darker) won't need an adjustment. For paler beers, a bit of gypsum (one to two tablespoons in a five gallon batch) is nearly always a good addition. It is also possible to do an acid rest to help lower pH. This is the favored method of German brewers who use this method to comply with Rheinheitsgebot. Most basic homebrewing books have instructions on how to do the acid rest.

If you happen to have a pH meter or pH papers and find that your mash pHs are higher than 5.6, then you might want to consider other measures such as the use of food-grade acid to get the pH in the proper range. Without knowing the starting mineral composition of your brewing water, it's best to adjust pH with a food grade acid. Most homebrew stores carry lactic and citric acids, but because both can add "off" flavors if used in very high concentrations—I prefer phosphoric acid. The pH of the mash infrequently falls below 5.2 naturally.

Truthfully, most people don't want to bother much with pH and for good reason. Buy some pH papers and do an all pale malt mash. Check the pH and write down any adjustments necessary to get pH in the proper range. Remember these adjustments and repeat it in subsequent sessions. Eventually it just becomes a part of the brew day.

Mash thickness: This parameter is often ignored in all-grain brewing but it does have an effect. A thicker mash (between 0.8-1.25 quarts of water per pound of grain) will help keep enzymes active for longer times at long time and temperature combinations. A thinner mash (>1.50 qt/lb) facilitates overall activity at the expense of total time active. Again, serendipity plays a role. Infusion mashers take advantage of this regularly. Infusion mashes start off with a relatively thick mash during the beta-amylase rest keeping it active longer. Boiling water is infused which increases the temperature, dilutes the mash, and facilitates a final, rapid conversion of any remaining starches by alpha amylase.

The overall process of mashing grains requires a balance between all four of these properties. Often you can compensate for a problem with one property by adjustments in the other three. For example, the pH of your mash may be at 5.7 and you don't have a way to adjust it to assist in a rapid conversion. Longer times and thicker mashes could help. Once the general concepts of what's happening in the mash are understood, it becomes easier to change and adjust on the fly.

When you first start out, your main concern will be with the temperature of the mash. For starters, follow the guidelines given by your recipe. For most medium-bodied beers the mash program calls for a single rest in the 151-153° F (66-67° C) range. If the body of the beer is thinner than you like, increase the mash temperature next time by about two degrees (2° F or 1° C) for a slightly more full-bodied product. For a thick, chewy beer crank the mash temperature up to 158° F (70° C) right off the bat. If you want something thin and highly fermentable, hold it down at 147° F (64° C) or so.

All-grain brewing isn't as hard as it has been made out to be, and understanding the mash is where your creativity can shine through. Finding the perfect balance of the mash properties gives you, the brewer, ultimate control of what your beer can be.

Marc Sedam, a.k.a. 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, been writing on the subject since 1998, and is a member of the North American Guild of Beer Writers. He lives in Chapel Hill, NC and is currently trying to perfect the ultimate German helles.

Survey of Mash/Lauter

Some brewers like to build their own mashing equipment from scratch. Rather than purchasing a pre-made false bottom, they'll scrounge scrap stainless steel screen and fabricate their own. Rather than buying a ready-made vessel with a plumbed drain spout and impervious interior they'll cobble together the hardware bits to bring a second-hand cooler up to snuff.

For those who don't want to develop building equipment into a necessary ancillary hobby for homebrewing, there are plenty of ready-made options when it comes to mashing. As a part of this issue, we thought we would give you a look at some of the options available out there. To do so, we asked all of the homebrew equipment suppliers we could find to send us pictures and descriptions of their gear. In general, we've tried to arrange things starting with the simplest and least expensive and working up to the more sophisticated and more costly systems. Here's a look at what we received.

HELP IN BUILDING YOUR OWN

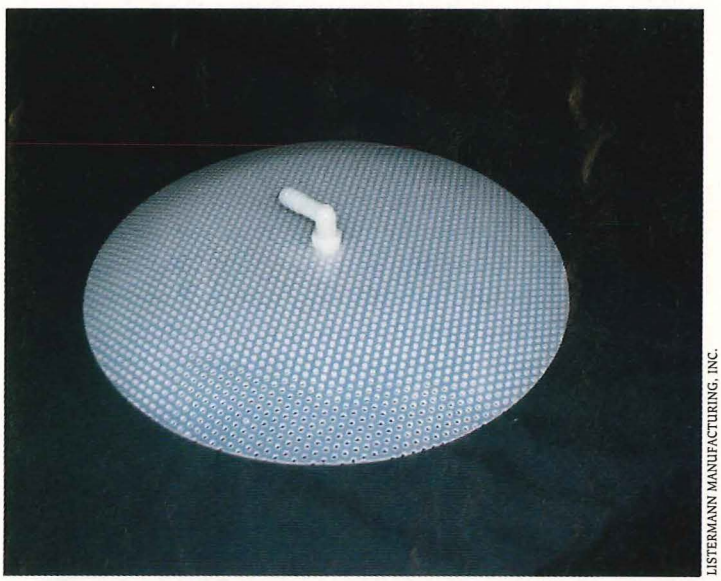
One way to go is to buy pre-made plumbing. These first few items are designed to be installed in a cooler or other mashing vessel and provide specific functions as part of the overall lautering process.

Equipment

Phil's Phalse Bottom

The first item simply performs the lautering function. Phil's Phalse Bottom turns any bucket or round picnic cooler into an efficient lauter tun. This food grade polypropylene perforated dome sits on the bottom of the vessel to separate wort from the grains. Wort removal is accomplished through a fitting at the center of the dome. Wort flows up and out of the dome through this fitting and into an attached drain hose. It is up to the user to arrange the plumbing of an exit from the lauter vessel.

Its maker says that the shape of the Phalse Bottom promotes efficient sparging and requires very little foundation water. Three sizes are available: nine-inch (22.9 cm) for five gallon (19 L) coolers, 10 inch (25.4 cm) for standard buckets and 12 inch (30.5 cm) for 10 gallon (38 L) coolers. Prices range from $12.25 to $20.25 depending on size and can be purchased at many homebrew retailers as well as directly from at *www.listermann.com*.



LISTERMANN MANUFACTURING, INC.

Listermann's Phalse Bottom can quickly convert many vessels into a mash tun.

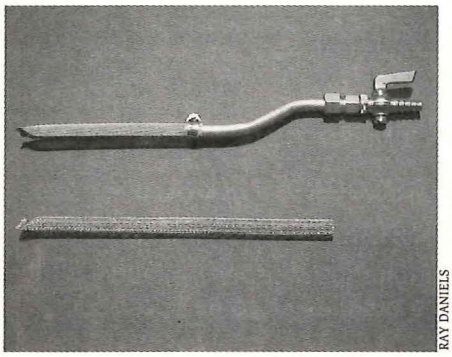
By Ray Daniels

The Easymasher™

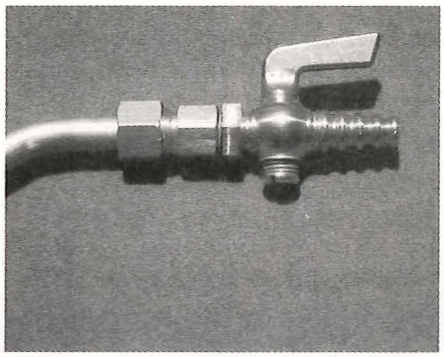
The Easymasher is a stainless steel strainer assembly with a spigot and fittings that can be easily installed in a suitable vessel to provide grain/wort separation as well as an outlet for the wort from the vessel. According to manufacturer Jack Schmidling Productions, Inc., installation requires only a 3/8 inch (0.95 cm) drill and a crescent wrench.

Several variations of the Easymasher are available for use with different types of vessels, including stainless steel kettles of all sizes, Gott coolers and converted kegs. In the cooler version the spigot is replaced by a stopper and strainer assembly which can be attached to a plastic hose equipped with a hose clamp on the exterior of the cooler. Also, the tubular screen component can be purchased separately for those who wish to fashion their own drain plumbing.

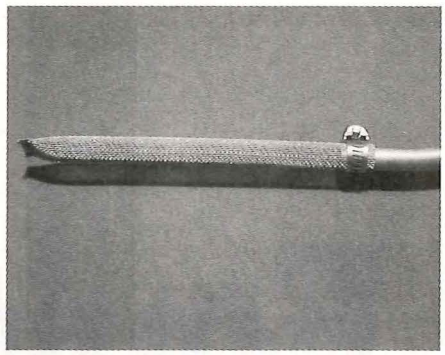
Retail prices range from $20 to $32 depending on model and they can be purchased from most homebrew retailers or directly from Jack Schmidling Productions, Inc. See the web page at *http://user.mc.net/arf* or contact the manufacturer at *arf@mc.net*.



RAY DANIELS



RAY DANIELS



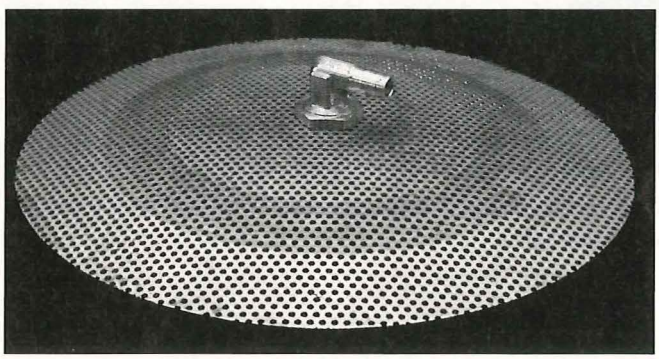
RAY DANIELS

Schmidling's Easymasher provides both grain-wort separation and removal of the wort from the vessel.

Stainless Steel False Bottoms

Beer, Beer and More Beer offers perforated, domed, stainless steel false bottoms for use in various types of vessels. These are constructed from 304 stainless steel with a dome height of 0.5 inch (1.27 cm) for the nine inch (22.9 cm) diameter screen and 0.75 inch (1.9 cm) for the 10 inch (25.4 cm) and 12 inch (30.5 cm) screen. There is a 0.5 inch hose fitting in the center to draw the wort from beneath the dome. Hose can exit bucket or cooler in a number of different methods. Prices range from $17.95 to $19.95 at www.morebeer.com/.

Beer, Beer and More Beer also offers flat false bottoms with 0.75 inch legs which can be used for mashing. These screens are constructed from type 304 stainless steel with 3/32 perforated holes on 5/32 centers and include a handle for easy removal. Three sizes are available to fit kettles ranging from nine to 28 gallons (34-106 L) in capacity. Prices range from $60 to $75 at *www.morebeer.com/*.

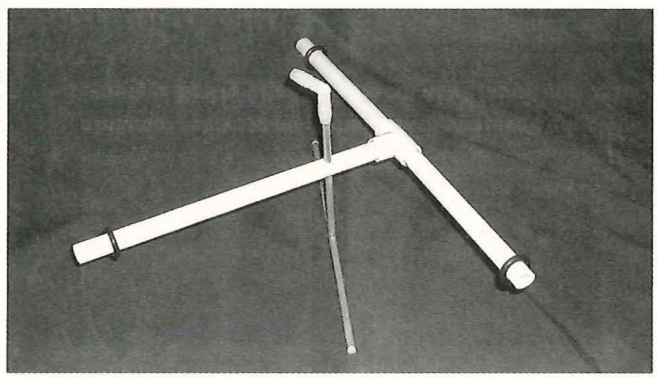


BEER, BEER AND MORE BEER

Beer, Beer and More Beer's stainless steel false bottom comes in three sizes.

Phil's Sparger

Another element in the lautering operation is the spraying of sparge water on the top of the grain bed. Phil's Sparger accomplishes this task through a rotating sparge arm which provides an evenly distributed spray. It is a great way to provide some "hands off" time during the sparge. Phil's Sparger includes a holding bracket to affix the device to the top of your lauter vessel. This item comes in four sizes: seven-inch (17.7 cm) diameter for five gallon coolers, 8.5 inch (21.6 cm) diameter for standard buckets, 10 inch for 10 gallon (25.4 cm) coolers and a 12 inch (30.5 cm) size for half-barrel (58.7 L) sized lauter tuns. Prices range from $12.25 to $13.95 and can be purchased at many homebrew retailers as well as directly from Listermann Manufacturing, Inc. at *www.listermann.com*.

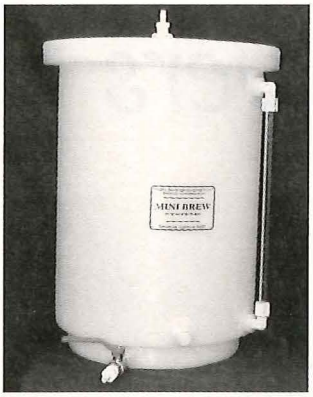


LISTERMANN MANUFACTURING, INC.

Listermann's Sparger supplies a shower of sparge water to the top of the grain bed.

COMPLETE LAUTER TUNS

No good at plumbing? Don't want to drill a beautiful stainless steel pot or disassemble that pretty new water cooler? No problem. Homebrew suppliers thoughtfully offer a complete range of mash/lauter vessels from simple but functional food-grade plastic systems that are easy on the wallet to full-on stainless steel beauties that will make your homebrew comrades drool. Let's take a look.



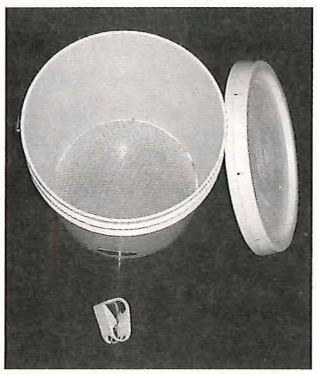
HOBBY BEVERAGE

HOBBY BEVERAGE

The Hobby Beverage mash-lauter tun provides complete lauter functionality in an economically-priced system.

Hobby Beverage Mini-Mash/Lauter

This combination mash/lauter vessel was designed to meet the ideal dimensions for lautering with a diameter of seventeen inches (43.2 cm) and a height of twenty-two inches (55.8 cm). The false bottom is 1.5 inches (3.8 cm) above the true bottom. The remaining vessel depth allows lautering of five to 30 pounds (2.26-13.6 kg) of grain. The thick polyethylene walls of this vessel provide insulation to help maintain steady mash and lauter temperatures better than stainless steel or copper. The drain is mounted flush with the bottom of the vessel for maximum wort removal. In addition, it has an internally mounted sparge arm and an external liquid level indicator. These features allow you to sparge with the lid on as a further aid in maintaining temperatures. An externally mounted probe thermometer is useful in establishing mash temperatures and monitoring lautering conditions. Price is $145.



LISTERMANN MANUFACTURING, INC.

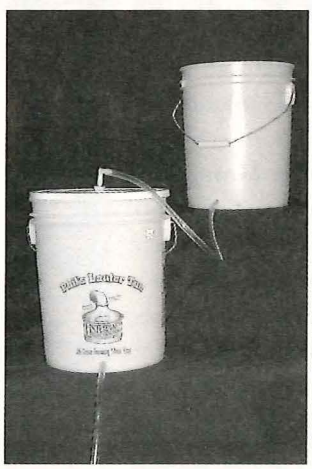
Listermann's mini-lauter tun provides enough capacity to lauter up to five pounds of grain.

Phil's Mini Lauter Tun and Phil's Lauter Tun

Listermann Manufacturing offers two ready-to-use systems for lautering various quantities of grain. Phil's Mini Lauter Tun was designed for intermediate brewers who want to utilize grains efficiently in their extract brews. It features a two-gallon bucket with a lid and a false bottom that can lauter up to five pounds of grist. It can also be used as a hop back after the boil.

The full-sized Phil's Lauter Tun can lautering enough grist for a five gallon batch of beer—even for a fairly high-gravity beer. This model consists of two five gallon buckets: one for the hot sparge water and another for the lauter tun itself. The lauter tun is equipped with Phil's Sparger, Phil's Phalse Bottom (see above) and all the hoses and clamps needed for all-grain brewing.

The mini-lauter tun goes for $17.50 while the full-sized version retails at $44.95. Check local homebrew retailers or go direct to the source at *www.listermann.com*.



LISTERMANN MANUFACTURING, INC.

Listermann's full-sized lauter tun provides ample capacity for high-gravity five-gallon all-grain brews.

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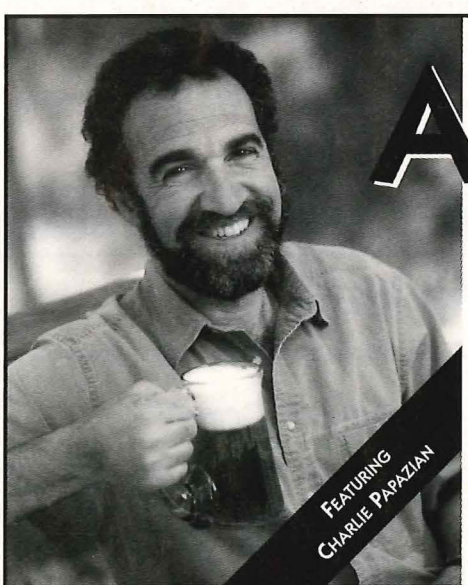

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Texas Brewers Guild Fest - *Friday*	$30	$36	_____
Grand Banquet Only - Saturday	$55	$65	_____
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American Homebrewers Association
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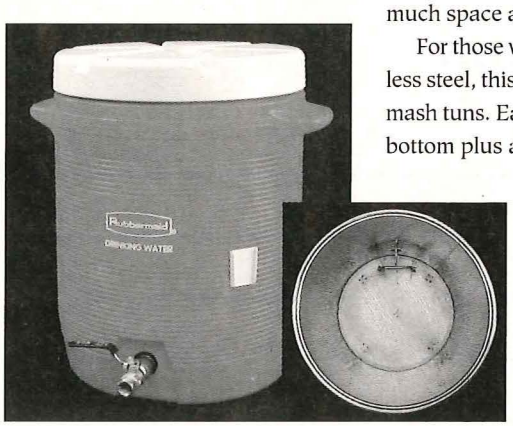
Beer, Beer and More Beer Mash Tuns

These guys offer an affordable option for doing all-grain brewing based on two Rubbermaid five gallon insulated beverage coolers. They drill out the factory spigots and install 0.5 inch ball valves and then include a stainless steel false bottom and Phil's sparger to complete a very efficient all-grain system. This model (known as the B3-150) doesn't take up very much space and it is comfortably priced at $165.00.

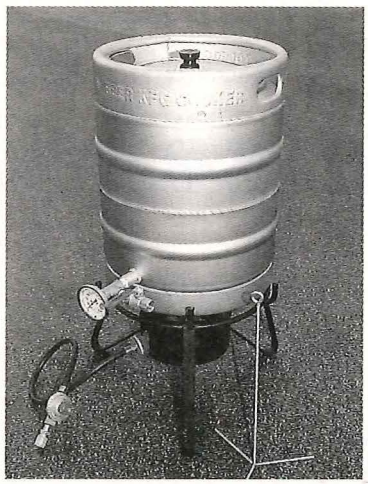


BEER, BEER AND MORE BEER

For those who want something in the way of stainless steel, this same organization also offers all-metal mash tuns. Each has a stainless steel perforated false bottom plus a three-inch (7.6 cm) dial thermometer with glass face and an angled siphon tube which runs from the backside of the spigot to underneath the false bottom. These vessels are available in nine, 14 and 28 gallon (34, 53 and 106 L) capacities at prices ranging from $240.00 to $340.00. See *www.morebeer.com*.

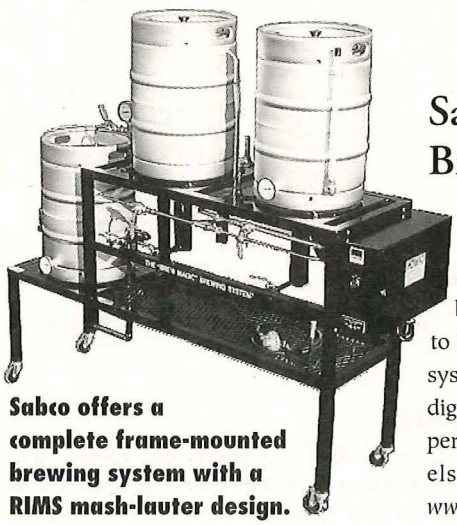
Sabco Industries Universal Kettle

Converted half-barrel kegs have long been a favorite raw material for the fabrication of homebrewing equipment. This company specializes in handling all that fabrication so that the homebrewer gets a finished system. When equipped with a false bottom, this Universal Kettle functions as a mash/lauter vessel. Top notch sanitary welding, fully reconditioned, acid cleaned and tested. Sabco offers an all-stainless false bottom, a great cleanable, removable siphon package, temp gauges, ball valves etc. The base kettle is $119.95 with false bottom and other options added on from there. See *www.kegs.com* or call Sabco at 419-531-KEGS.



SABCO INDUSTRIES

Sabco's Universal Kettle can be outfitted with a false bottom and other accessories to make an all-stainless mash/ lauter vessel.



SABCO INDUSTRIES

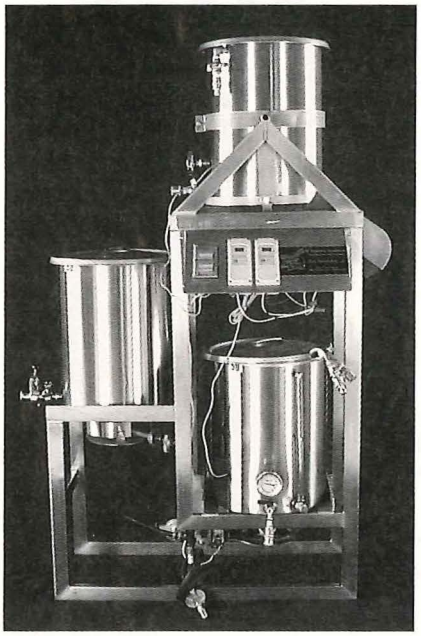
Sabco offers a complete frame-mounted brewing system with a RIMS mash-lauter design.

Sabco Brew-Magic Brewing System

Sabco sells a RIMS (recirculating infusion mash system) which they tell us was designed by brewmasters, scientists, and brewery engineers. They originally created it to be used by craft brewers as a pilot brewing system. A pump and in-line heater driven by a digital thermal controller provide for mash temperature control. They offer three different models from $2,995. Sabco Industries, Inc. *www.kegs.com* or call Sabco at 419-531-KEGS.

COMPLETE BREWING SYSTEMS

OK, so maybe you've come into some money or would just rather spend your time brewing than building. You want the whole enchilada and you want it delivered and ready to brew. For you, there are complete brewing systems that include mashing and lauter vessels. These systems are quite advanced and often include pumps, burners and even digital controllers so that your brew day starts to resemble that of a professional brewer. We couldn't possibly cover all the systems out there in this section, but here is what we received for this article.



BEER, BEER AND MORE BEER

Brewing Sculptures

The folks at Beer, Beer and More Beer offer a wide range of complete brewing systems (which they call "brewing sculptures") starting at five gallon batches and moving up from there. Prices start at $895.00 and go up depending on the size and options selected. See *www.morebeer.com*.

Ray Daniels is Editor-in-Chief of *Zymurgy* magazine. After looking at this collection of gear, he will most likely be upgrading his tired old mashing equipment in the near future.

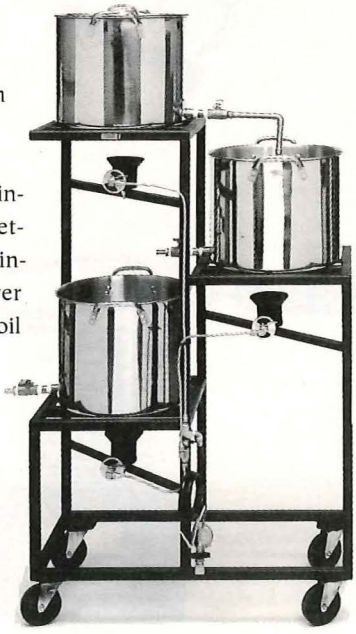
RAY DANIELS

The Beverage People Brewing Systems

THE BEVERAGE PEOPLE

The Beverage People manufacture personal breweries in both five and 10 gallon sizes. These systems come with a sturdy iron stand on wheels and three 70,000 BTU propane burners which are independently adjustable but all fed from a single propane tank. Included are three stainless steel kettles: the mash/lauter kettle fitted with a strainer, the hot liquor kettle comes with a shower tree for gentle sparging of the grain and the boil kettle. All kettles come with brass 0.5-inch shut-off valves. Prices are $695 for the five gallon system, $995 for the 10 gallon system.

The Beverage People offer both mash-lauter vessels and complete brewing systems in five- and 10-gallon batch size configurations.



THE BEVERAGE PEOPLE

Boiling Your Mash

By
Steve
Alexander

Into A Decoction

Double, double toil and trouble;
Fire burn, and cauldron bubble.

—*Macbeth*, Act 4, Scene 1, William Shakespeare

The three witches in Macbeth weren't chanting about brewing beer, but the twice doubled toil and trouble over a bubbling cauldron should remind brewers of the extra complexity, time and effort involved in the decoction mashing. There are a number of common questions about decoction mashing which have clear and direct answers in the modern brewing literature. Unfortunately, a large number of questions are about as murky as the witches' brew.

There are several methods of mashing in use. Infusion mashing is the simplest as a certain amount of water at a predetermined temperature is added to the grist for a single rest at the strike temperature. In step mashing, or programmed mashing, heat is added to the mash by some means in order to boost the mash through its timed temperature rests. RIMS, HERMS, direct and steam heated systems are used for step mashes. Decoction mashing is certainly the most labor intensive technique since a measured fraction of the mash is removed, heated to the boiling point and reintroduced to the mash to produce the temperature increases for each step. There seems to be some special property of decoction mashing that makes all the extra effort worthwhile in the minds of traditionalist brewers, but getting a handle on the difference is difficult.

The origins of decoction brewing are hard to trace, but it may have developed as a way to manipulate mash temperatures before thermometers were available to brewers. Use of a decoction allows mashing procedures to be based on an easily determinable temperature: the boiling point! By manipulating the proportions of the rest and decoction mashes, desired temperatures could be attained.

In the twentieth century, decoction mashing saw wide use in continental Europe and especially Germany where it became something of a hallmark of lager brewing. The key practical reason behind decoction mashing was the use of undermodified malts that demanded a rigorous mashing regime to yield optimal extract. Along the way, a distinctive flavor profile was ascribed to the method and its legend continues to impress us today. Despite this, the method has been in decline in recent decades due to the high energy and process costs and ready availability of well-modified malts.

The term "decoction" refers to the method generally and to the specific step in the process when a thick portion of the mash is removed from the main body of the mash and brought to a boil before being added back. In the classic decoction mash

regimes, this step could be repeated three times but modern modifications might cut this down to twice or even once. Let's talk about some of these variations.

A typical modern three-decoction mash uses about 1.25 quarts/pound (2.6 L/kg) of mash water. The grist is doughed-in with about two-thirds of the mash water at ambient temperatures. The remaining third of the mash water is added hot to achieve a first rest around 95° F (35° C). After 30 minutes a first thick decoction is drawn. This first decoction is first heated to 158° F (70° C) for a saccharification rest of 30 minutes to permit starch conversion. This first decoction is then brought to a boil for about 30 minutes and mixed back into the mash for a protein rest around 125° F (52° C) for 30 minutes. The second decoction is subjected to a saccharification rest and then brought to a boil for 30 minutes and returned to attain a 149° F (65° C) saccharification rest for the entire mash.

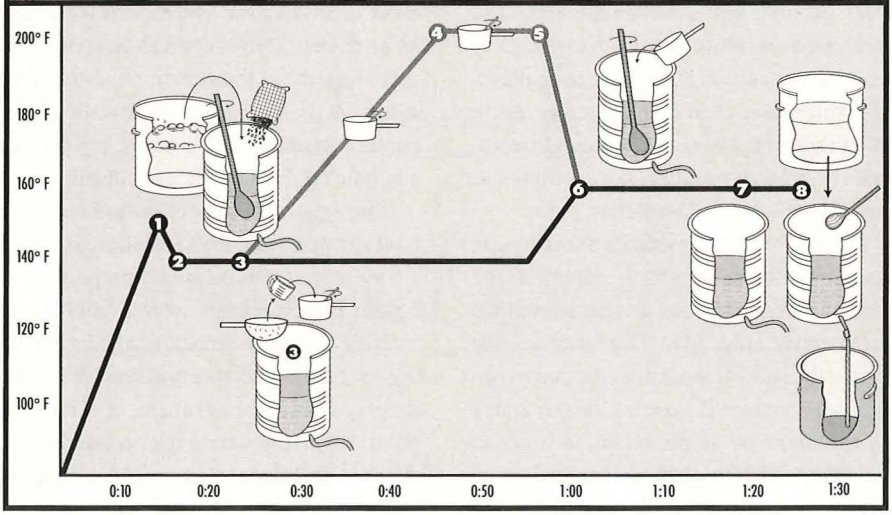
The last decoction is used to boost the temperature to about 168° F (75° C) for mash-out. Figure 1 shows the temperature steps for a classic three-step decoction in detail. Obviously this is a long process that requires several hours and will be heavily dependent on how quickly you can heat the decoctions using your equipment. For additional practical details on modern decoction brewing, Greg Noonan's, *New Brewing Lager Beer* is an excellent resource.

Traditional decoction brewing however differs a bit from the modern methods particularly because of the malts used. Traditional decoction brewing used malts that were less modified than modern malts. The degree of malt modification is a thorny issue since there are many ways to measure this parameter. The acrospire length is a practical measure but tells us little about the malt characteristics. The soluble nitrogen ratio (SNR) or Kolbach index measures the degree of protein degradation is a more useful characteristic. Another measure is wort viscosity, which is an indirect measure of degradation of beta-glucans in the malt.

To understand why malt modification impacts mashing so greatly, it's necessary to look at the changes that take place throughout the malting process. Raw barley contains an endosperm with millions of tiny starch granules embedded in a matrix of proteins and beta-glucans. In the malting process the germinating barley very quickly develops the enzymes needed for the mashing process. Later as malting proceeds the barley seed must mobilize proteins and other materials in order to grow the acrospire and the roots and also degrade the endosperm matrix so the starch can be used as an energy source to fuel this growth. At some point the maltster will dry and kiln the germinating barley stopping the process and making it into finished malt.

Single Decoction: Step-by-Step

1. In your eight-gallon brewing pot heat 2.75 gallons (10.4 L) of water to 155° F (68° C) and transfer it to your lauter tun.
2. Slowly add crushed grain, stirring gently as you go so it all goes into solution and there are no lumps. The temperature should come to rest at about 140° F (60° C). If the temperature is too high, you can add cold water to adjust; if too low, add boiling water. Let the mash sit for 15 minutes.
3. Using a strainer, scoop out 1.5 gallons (5.68 L) of mash (the decoction). Use a measuring cup to get the volume right. The idea here is to get a thick, but not dry, portion of the mash. You should see some liquid near the top in each measure, but each scoop should be mostly malt solids. Transfer the mash to the two-gallon pot.
4. Turn on the stove and raise the temperature of the decoction slowly to a boil. The temperature change should be no more than 2° F (1° C) per minute, so it should take about one-half hour or even a bit longer to get to a boil. Stir occasionally but don't leave it alone. The brewing gods have decreed that the brewer who ignores a decoction shall spend much elbow grease cleaning the pot.
5. When it reaches a boil, continue to stir occasionally. Add up to one quart (0.95 L) of water, a little at a time, during the boil to keep it from drying out and burning. Boil for 20 minutes.
6. Add one gallon (3.79 L) of the decoction mash back to the main mash which has been maintained at 140° F (60° C) in the lauter tun. Stir gently to distribute the mash evenly and take a temperature reading. Continue adding the boiled mash back until the resting mash reaches 160° F (71° C). If there's any boiled mash left over, let it cool to 160° F before adding it.
7. Let the mash rest for another 20 minutes or until an iodine test shows no blue-black color in the mash liquid. (Never allow any of the iodine to get back into your mash.)
8. Time to lauter!



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GRAPH ILLUSTRATION BY VICKI HOPEWELL

If the maltster kilns the barley early he produces undermodified malt similar to traditional lager malts. The enzyme levels are almost fully developed, but the starch matrix is partly intact making it difficult to get good extraction. The proteins are not so greatly degraded so the levels of amino acids needed for fermentation are low and the levels of haze-producing proteins is high. The beta-glucans polymers are larger and more likely to produce viscous wort. When using such malts the brewer must complete some of the work the maltster left unfinished. Protein and beta-glucanase rests are appropriate for such malt. When the maltster allows the barley to proceed farther before kilning then he makes a well-modified or over modified malt similar to English pale ale malts. Such malts have a degraded matrix making extraction of starch easy. The amino acid levels are good for fermentation and the level of undegraded beta-glucans is low. If proteinase or peptidase rests are used with this malt it can result in loss of head and mouthfeel and poor flavors from excess amino acids.

Any mashing method chosen must account for the characteristics of the malt. In the case of traditional decoction mashing with undermodified malts the grist is crushed more finely, greater amounts of water, up to 2.4 quarts per pound (5 L/kg) are used for the mash and the triple decoction process is employed to achieve all the needed temperature rests.

The German brewing textbook, *Technology, Brewing and Malting*, by Wolfgang Kunze describes a double decoction mash for use with modern well-modified malts. The "abridged two mash process" shown in Figure 2 includes a mash-in at 143° F (62° C). The first decoction portion has a rest at 158° F (70° C) followed by a five minute boil and is returned to the main mash for a 158°F (70° C) rest and a final decoction to mash-out temperatures.

Assuming we navigate the difficulties of the mash regime for our malts, what do we get in return? Clearly decoction can allow greater extraction from a less-than-fully-modified malt than would infusion or step mashing. Boiling the grist portion of the mash fully gelatinizes the starch and makes it available for saccharification. My own experience shows a as much as a seven percent increase in extraction from the same malts when using decoction. The wort is somewhat darker as well. This is partly due to the increased wort oxidation from the many decoction transfers, but the more significant factor is melanoidin formation created by the process. Melanoidins are formed by a complex set of reactions (known as Maillard reactions) that begin with the combination of an amino acid and a simple sugar. The resulting products contribute both flavor and color to beer.

The subject of flavor differences in decoction mashing is an extremely controversial one. The less arguable points are that the DMS level of the wort is reduced and that melanoidin compounds responsible for various malty flavors and aromas are created. Common homebrew lore dictates that overheating the grist will cause the release of nasty phenolic compounds, but in practice this seems not to be a problem with two-row barley malts used in decoction.

When it comes to the resulting flavor of the finished beer there have been several informal studies. Louis Bonham and Andy Thomas (See reference 5) compared a decoction versus a RIMS mashed beer with no clear differences. Dr. Michael J. Lewis, professor emeritus of brewing science at the University of California, Davis, has written that in annually held comparisons of decoction versus infusion mashed beers that tasters could not reliably determine which was which. I've made several beers while changing just the mashing technique and I sometimes find the decocted beer slightly preferable, but not reliably better. Kunze writes that decoction will produce more aromatic beers, but that the deficiencies of decoction mashes, "can to a large extent be compensated for by the use of special malts and more colored malts [Munich malt]".

Personally, I am uncertain that decoction with modern well-modified malts offers any real advantage over step mashing these same malt. I feel the difference is usually small enough to be ignored and rarely worth the hours required for decoction.

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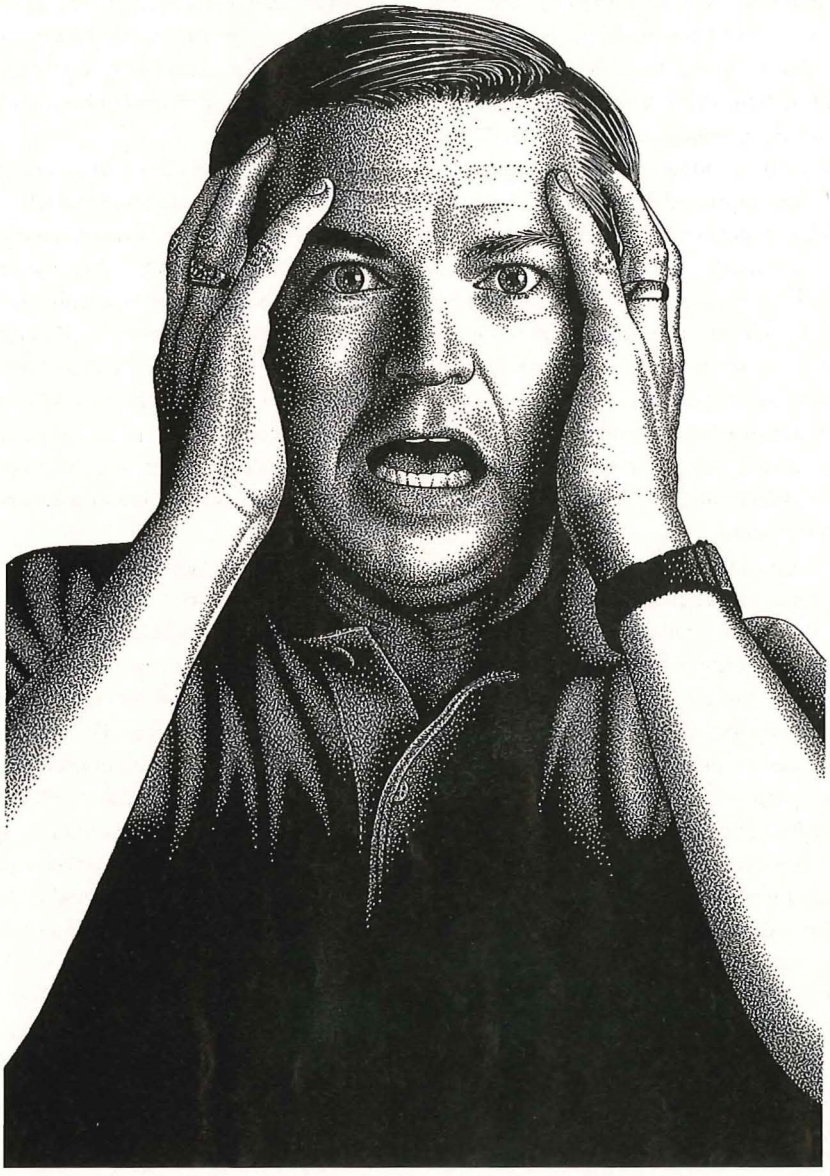
2. *Malting and Brewing Science*, Volume 1, 2nd edition 1981, Briggs, Hough, Stevens and Young, Chapman &Hall.
3. *Technology, Malting and Brewing*, 7th edition 1996, W.Kunze, English Translation, VLB Berlin.
4. "Decoction: A Review of a Traditional Technique and Some Time-Saving Alternatives", *Brewing Techniques*, Vol 6, No.1, 1998,, Spencer W. Thomas
5. "RIMS versus Decoction: The Great Texas Mash-Off", *Brewing Techniques*, Vol 6, No.1, 1998, Louis Bonham and Andy Thomas

Though Steve Alexander began homebrewing in 1984, he has been obsessed with technical aspects of the hobby since 1995. Contact Steve at steve-alexander@att.net.

10 WAYS

To Avoid



By Randy Mosher

A Stuck Sparge

I just about quit homebrewing in disgust more than once. Each and every time occurred about four hours into a miserable sparging experience, and was accompanied by considerable verbal fireworks. There's nothing worse that being ready to move on and being subjected to the Chinese water torture of a sluggish drip, drip, drip. It drove me nuts. Now admittedly, as a brewer of exotic beers I was opening myself for punishment by frequently using unmalted and huskless grains, but I knew such beers *could* be produced without a brewer having to pull all of his or her hair out.

So, I began a quest involving both technique and equipment. It took a while, but I finally got it licked, and now sparging is one of the most enjoyably satisfying parts of the process. Here's some of what I learned along the way. You don't necessarily need to do all of these to have a pleasant sparge, but if you're having problems, start looking at these items, implementing what you can until things become bearable. (Now, if I could only make cleanup this easy!)

1. Be sure your grain is correctly ground. The idea is to crush the malty center of the kernels evenly into pinhead-sized particles, while keeping the husks as intact as possible for good filtering action. This always involves a tradeoff, but a reasonable balance can be achieved. I find roller mills are best. I have a motorized PhilMill, but others will do the job as well. There are magicians who can coax well-milled malt from a Corona-style mill, but they are rare. Anything with a slicing or shearing action should be avoided.

The roller settings are critical, and should be fine-tuned with every change of grain. Generally, roller mills don't do as great a job with huskless grains like wheat, which should be ground very finely. I use an old grocery-store coffee mill, which works brilliantly for this.

2. Don't make the bed too deep. Four inches will give you all the filtering action you need. More than eight or so and you're asking for trouble. When I redid my lauter tun, I made it half again as wide as my brewkettle so as to have the proper surface area; this size difference occurs in commercial breweries as well. I know you have to load it up to make that juicy barley wine or abbey-style quadrupel, but why don't you do as the Belgians do and use a tasty sugar for the last 10-20 percent of the gravity? A good unrefined sugar can add a caramelly twist while enhancing drinkability.

3. Use a mash-out rest after conversion. Most commercial techniques raise the goods to 170° F (77° C) or thereabouts to stop enzyme activity, and importantly here, to keep any remaining starch or glucans liquified. See Number 4 below.

4. Keep the temperature up. If you let the goods drop below 145° F (63° C) or so, they'll

begin to gel, with unpleasant consequences. Insulation is of obvious benefit. Keeping your sparge water at 170-180° F (77- 82° C) is critical.

5. Start your runoff slowly. At the beginning, get just a trickle going, then slowly increase. Having the wort flowing at a high rate before the filter bed is set creates a considerable vacuum which can compact the bed into a bricklike substance.

6. Don't let the bed drain dry. A free-flowing filter bed is dependent on the grains being suspended—floating—in the sparge water. Remove this liquid support and the bed collapses from its own weight. If this happens mid-sparge, flood the goods to get them floating, stir to unclump, then reset the sparge as if you were just starting.

7. Add a vent to the bottom of your lauter screen. This involves running a tube just barely through to the underside of the lauter screen to a level well above the top of the goods, and fitting the top end with a clip, plug or valve. Then, if you experience the kind of excessive vacuum described above in **5**, you can open the tube and release the vacuum.

8. Make a vacuum break into the grant or kettle. This simply means that you shouldn't have the runoff tube submerged in the receiving vessel. If you do, the water pressure above the bottom of the tube will prevent liquid from draining freely. Another solution to this is to use a T fitting. I position the "T" in the hose leading from the lauter to the receiving vessel. It is placed above the highest possible liquid level in the receiving vessel, with the top leg going up to the lauter tun, the bottom leg down to the receiver. The side leg of the "T" is left open to act as the vacuum break.

9. Add a vacuum gauge (manometer) to the underside of the lauter screen. This is a geeky one, I admit, but it helped the lesson of number **5** really sink in for me. They're used in commercial-scale breweries for the same purpose. You can watch the thing as you start the runoff, and if you start to pull a vacuum, the needle starts to swing. At this point you can slow the flow and release the pressure to bring things back to normal. I used a pressure gauge from a CPR training dummy. It was set to register low positive pressure, but I took it apart and bent some things so it reads very slight vacuums now. I'm not sure what sort of pressure scale you're looking for, probably "inches of water." Having a calibrated scale is unimportant; you just want to make sure the needle moves visibly with the kind of suction required to drink soda—not a milkshake—through a straw.

You can install a gauge like this while also accomplishing the vacuum-break mentioned above in item **7**. What you want to do is run a small tube to just below the bottom of the lauter screen. At the top of the lauter tun, connect the tube to a "T" fitting. Connect the gauge to one leg, and a simple valve on the other leg. With the valve closed, you can watch the pressure changes—when it is open, you release pressure.

I know such a manometer device can be rigged up from a transparent U-shaped tube partially filled with water in lieu of a gauge, but I haven't had the need to sort this one out myself. One end of the "U" would be attached to the top of the tube that is set below your false bottom while the other end is open to the atmosphere. You would mark the level of the fluid on one side of the "U" before your start to lauter and then monitor any movement of the liquid level toward the tube end of the device. With experience you could determine how much movement would be appropriate for successful lautering and when a vacuum release is needed.

10. When all else fails, try rice hulls. Actually, they are a cheap and easy fix for whatever ails your sparge, although they're a particular godsend to the brewing of beers with wheat, rye, oats or other gooey adjuncts. One-half to two pounds per five-gallon batch, depending on quantity and stickiness of the adjuncts, does the job. This emulates traditional practice with wheat beers, for example, in which husks were reserved after threshing to be added to the mash for the purpose described here. Most homebrew stores sell rice hulls and you should just rinse them with hot water before mixing them into the mash at the end of your last rest. Give the mash a few minutes to settle and begin your lautering process.

Randy Mosher is a veteran homebrewer and incurable homebrew equipment builder based in Chicago. In addition to being a regular contributor to *Zymurgy* and *All About Beer* magazines he is the author of *The Brewers Companion*.

For Geeks Only

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

Testing Hydrometer Accuracy

By Frank Tutzauer

Testing the accuracy of your hydrometer . . . easy, right? Put the hydrometer in water and it should read 1.000. Nothing to it. When I began brewing and got my first hydrometer, that's exactly what I did. Plopped it in water, saw it read 1.000, and never thought about it again. Until recently.

A couple of years ago I began joint brewing with fellow Sultan, [of the Sultans of Swig homebrew club] Pavlo Baker. Several times, we would test the same wort sample with each of our hydrometers, and son of a gun if mine didn't always read two or three points lower than Pavlo's. So I went back home and repeated the water test, but again the hydrometer read 1.000, or close enough anyway. So I said, "Screw it. It's Pavlo's hydrometer that's off."

But last May, my wife, Carol, bought me a hand held refractometer for an anniversary gift. (What a wife, right?) By noticing how light refracts through a drop of solution, a refractometer determines the sugar content of that solution and expresses it as degrees Brix, which is the percentage of sucrose by weight (essentially the same as degrees Plato). There are formulas for converting Plato to specific gravity, and it didn't take me long to realize that it wasn't Pavlo's hydrometer that was off, it was mine. Not only was my hydrometer reading low compared to his, it was also reading low compared to the refractometer.

The problem with the "1.000 in water" test is that it only accounts for one type of error: misalignment of the scale. If the paper scale in the stem of an otherwise accurate hydrometer is knocked loose and drops down a few millimeters, then the hydrometer will read low. If it reads, say, 0.996 in water, then 0.004 will have to be added to all readings. Suppose now, however, the 1.000 tick mark is lined up at the appropriate spot in the stem, but the intervals along the scale are only 90 percent as large as they should be. Then this hypothetical hydrometer would read 1.000 in water, 1.018 in a 1.020 solution, 1.036 in a 1.040 solution, and 1.054 in a 1.060 solution. In other words, the correction factor would not be a constant, but would be proportional to the actual gravity. There might also be errors from other sources that necessitate non-constant corrections.

So with all of this, I decided to empirically check the accuracy of the hydrometers in my household. The basic strategy is to put a known weight of sugar into a known weight of water, which will yield solutions of known Plato values. Convert Plato to specific gravity, take a hydrometer reading, and compare.

To get Plato, simply divide the weight of the total amount of sugar added by the weight of the solution (i.e., the weight of the water plus the weight of the sugar). To turn Plato into specific gravity, I recommend using the cubic polynomial given in Noonan's *New Brewing Lager Beer*. If you don't want to do the computations yourself, just follow the procedure I outline below (I've done the computations for you). As far as the weights go, if you don't have access to lab equipment, it's important to use largish quantities. It's a lot easier to measure an ounce of sugar than a gram when using normal brewer's scales.

Procedure

Measure out a fair bit more than a quart of water and let it come to room temperature. Meanwhile, as accurately as you can, measure out an ounce of table sugar and put it in a paper cup. Repeat this process until you have ten paper cups, each holding an ounce of sugar. Once your water is at room temperature, weigh out two pounds of water (32 ounces by weight). If necessary, measure several smaller amounts and combine until you have two pounds of water. Place the two pounds of water into a container large enough to hold it all, with some headroom.

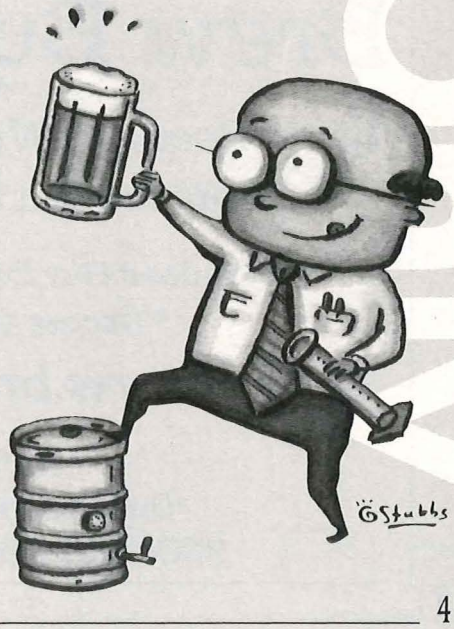


ILLUSTRATION BY CHARLES STUBBS

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.

Carefully pour water from your water container into your hydrometer test jar. Take a hydrometer reading, correct it for temperature, and record. Carefully pour the sample back into the water. (Throughout, try not to "lose" any solution through drips, splashes, etc. If the amount of water from one trial to the next changes appreciably, it will throw off the calculations.)

Add the first ounce of sugar to the water container. Stir until completely dissolved. Carefully collect a sample, take a hydrometer reading, correct for temperature, and record. Return the sugar solution to the water container. Add the second ounce of sugar. Stir to dissolve, take a sample, measure and record, and return it to the water container. Continue this process one ounce of sugar at a time, until you've used all ten ounces of sugar. You will end up with eleven data points at eleven different gravities, as shown in the table. You can compare the gravities in the table with what you actually measured with your hydrometer, as I have done below for two hydrometers.

Table 1: Hydrometer Measurements of Various Sugar Solutions with Two Hydrometers

S	P	SG	H1	E1	H2	E2
0	0.0	1.000	1.001	.001	1.005	.005
1	3.0	1.012	1.012	.000	1.016	.004
2	5.9	1.023	1.021	-.002	1.028	.005
3	8.6	1.034	1.032	-.002	1.040	.006
4	11.1	1.045	1.041	-.004	1.050	.005
5	13.5	1.055	1.050	-.005	1.060	.005
6	15.8	1.065	1.059	-.006	1.069	.004
7	17.9	1.074	1.066	-.008	1.078	.004
8	20.0	1.083	1.076	-.007	1.086	.003
9	22.0	1.092	1.083	-.009	1.096	.004
10	23.8	1.101	1.090	-.011	1.103	.002

S = oz. of sugar in two pounds of water
P = true percent sugar (Plato)
SG = true specific gravity
H1 = measured specific gravity, hydrometer #1
E1 = error of hydrometer #1; negative sign means hydrometer reads low
H2 = measured specific gravity, hydrometer #2
E2 = error of hydrometer #2; negative sign means hydrometer reads low

Results

Table 1 gives the results that I obtained when I conducted this test on the two hydrometers I had available. Looking at the table, some interesting results emerge. Column H1 contains my hydrometer readings, and as can be seen there is a very small misalignment error, but also a non-constant error that grows as the gravity gets larger, so that if I were doing a middle gravity pale ale, the hydrometer reads four or five points low, but if I were doing a huge barley wine or mead, the hydrometer might read ten or eleven points low! I calculate each interval on the hydrometer's scale as being only 88.7 percent as large as it should be.

H2 is Carol's hydrometer (how many of you have wives with their own hydrometers?). The error in her hydrometer is of the more classic type. It reads an average of about four and a half points high. (The fluctuations around this point are probably due to small measurement errors in making the sugar solutions and in reading the hydrometer itself.) If I were using her hydrometer, I would simply subtract five from any reading below 1.060 and subtract four for higher readings.

In my view, the results of this experiment are quite surprising. I know we're not dealing with lab equipment, but no way did I expect the hydrometers to be off by as much as they were, and to be so different from each other. (Incidentally, the refractometer readings of the test solutions were much better than either of the hydrometers.) I now keep the table in my brew kit so I can make adjustments on the fly.

Frank Tutzauer is an Associate Professor of Communication at the University at Buffalo. He has been homebrewing since 1991, and belongs to the Buffalo based Sultans of Swig where he is Grand-Poobah-in-training. He is a hop head.

BY CHARLIE PAPAZIAN

Embracing Sunset Lager

The more I brew, the more I find myself inclined towards a desire for full-flavored thirst quenching ales and lagers that offer more drinkability. Now what I mean by drinkability is not what many others would settle down to. Perhaps in the world of beer, the most drinkable substance known to man is water. Drinkability to many means a carbonated beverage as close to water, devoid of flavor. Personally, I find that making beer taste close to water makes it less drinkable in my world of sensibility. Flavorless beer, void of hops and malt balance and for that matter void of any hop or malt flavor renders a beverage that leaves my palate with an acidic aftertaste. No surprise. Even beer that doesn't have much character has undergone fermentation. Fermentation causes a drop in pH (meaning a rise in acidity and sourness). When I want to quench my palate I need hops and I need a balance of malt, otherwise beer doesn't work for me. I'd rather simply drink water, which I have been known to do on occasion.

So springtime is here in the northern hemisphere. It won't be long until those hot afternoons linger into sunsets. I want two or three beers, but I also want the remainder of the afternoon and evening coherent and fresh to enjoy all those other activities the lengthening days bring.

I love Oktoberfest style lagers, with their rich malt overtones and pleasant smooth balance of hop flavors. But I got to thinking, an Oktoberfest lager for quenching a thirst doesn't quite cut it when you're lusting for two or three cold brews. So with German-style Oktoberfest lagers as a theme, I formulated an amber lager that is worthy of embracing any warm sunset. A magnificent luster of malt and a smooth mellow trumpeting of hop flavors. No, this is not malty sweet. No, this is not full of hop flavor. It is a relatively low alcohol lager whose aim is

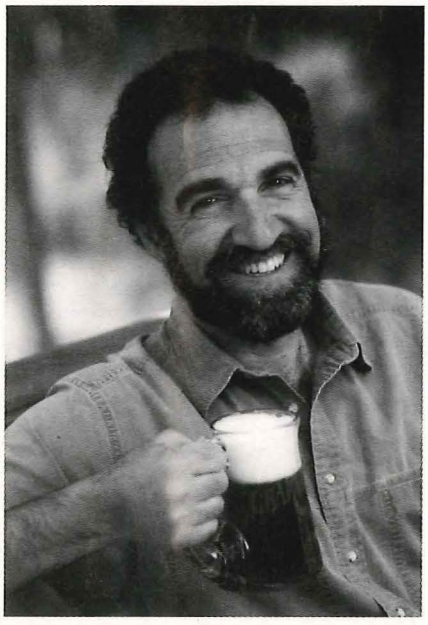


PHOTO BY MICHAEL LICHTER

to weld lightly toasted malt flavors with gentle yet flavorful hop character. This is going to be a summer standard, brewed many times as supplies run out.

Careful choice of aroma/flavor hops with low alpha acid ratings should be used whenever substituting hop ingredients in this recipe. Avoid high alpha hops, otherwise your results become hop assertive and aggressive, defeating the theme of this recipe.

Style? What style? This beer has no matching classic style, so I'm afraid you won't be entering this into many competitions. You are simply doomed to enjoy every last drop.

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

Embracing Sunset Amber Lager

Ingredients and recipe for 5.5 U.S. gallons (21 L) for a yield of 5 gallons (19 L) Malt

7.0 lb (3.0 kg) Munich malt (color: 7° L)
8 oz (225 gm) Belgian aromatic malt
1.25 oz (35 gm) Santiam, Tettnanger or Mt. Hood (6.6 HBU/185 MBU) pellet hops—60 minute boiling
0.6 oz (16 g) Crystal, Tettnanger or Mt. Hood hops (same as above) (3 HBU/88 MBU) whole hops or pellets—5 minute boiling
0.25 tsp powdered Irish moss (1.25 ml)
0.75 cup (180 mL measure) corn sugar (priming bottles) or 0.33 cups (80 mL) corn sugar for kegging
Oktoberfest style Lager Yeast or other Munich/Bavarian style lager yeasts.

- **Target Original gravity 1.040 (10° P)**
- **Approximate Final gravity 1.011 (2.7° P)**
- **IBUs—about 28**
- **Approximate color: 11 SRM (22 EBC)**
- **Alcohol: 3.8% by volume**
- **Apparent Yeast Attenuation: about 72%**

A step infusion mash is employed to mash the grains. Add 7.5 quarts (7.1 L) 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 4 quarts (3.8 L) of boiling water and add heat to bring temperature up to 157° F (69.5° C) and hold for about 30 minutes. Then raise temperature to 167° F (75° C), lauter and sparge with 4.5 gallons (17 L) of 170° F (77° C) water. Collect about 6 gallons (23 L) of runoff and add "60 minute" hops and bring to a full and vigorous boil.

The total boil time will be 60 minutes or long enough to end up with 5.5 gallons (21 L) of wort. When 10 minutes remain, add Irish moss. When 10 minutes remain add 0.6 ounces of hops. After a total wort boil of

at least 60 minutes (5.5 gallons should remain) turn off the heat and cool all of the wort. Use an immersion cold-water bath or heat exchanging coils. Then strain and sparge into a sanitized fermenter.

Pitch a good dose of healthy active lager yeast when temperature of wort is about 70° F (21° C), then primary ferment at temperatures at about 55° F (12.5° C); make sure that nearly all of the fermentation is complete before lagering. Rack from the primary to the secondary. Your net yield will be five gallons (19 L) to the secondary. Lager between 35-40° F (2-4.5° C) for four to six weeks.

Prime with sugar and bottle or keg when lagering is complete.

Embracing Sunset Amber Lager

Ingredients and Malt Extract recipe for 5.8 U.S. gallons (22 L) for a yield of 5+ gallons (19+ L)

- **2 3.3 lb cans (6.6 lb or 3 kg) pale/amber malt extract syrup**
- **1.6 oz (45 g) Santiam, Tettnanger or Mt. Hood) (8.8 HBU/247 MBU) pellet hops—60 minute boiling**
- **0.6 oz (16 g) Crystal, Tettnanger or Mt. Hood hops (same as above) (3 HBU/88 MBU) whole hops or pellets—5 minute boiling**
- **0.25 tsp powdered Irish moss (1.25 ml)**
- **0.75 cup (180 mL measure) corn sugar (priming bottles) or 0.33 cups (80 mL) corn sugar for kegging**

Oktoberfest style Lager Yeast or other Munich/Bavarian style lager yeasts.

- **Target Original gravity 1.040 (10° P)**
- **Approximate Final gravity 1.012 (3° P)**
- **IBUs—about 28**
- **Approximate color: 11-15 SRM (22-30 EBC)**
- **Alcohol: 3.8 % by volume**
- **Apparent Yeast Attenuation: about 72%**

Add malt extract to 2.5 gallons (9.5 L) hot water. Bring to a boil and add "60 minute hops". Boil for 50 minutes. Then add remaining Irish moss. When five minutes remain add the "5 minute hops." After a total wort boil of 60 minutes turn off the heat. Then strain out and sparge hops and direct the hot wort into a sanitized fermenter to which two gallons (7.5 L) of cold water have been added. If necessary add additional cold water to achieve a 5.8—gallon (22 L) batch size. Add a starter culture of yeast when temperature of wort is about 70° F (21° C). When evidence of fermentation is seen ferment at about 55° F (12.5° C) range for about seven days or until fermentation is complete and appears to clear and darken. At this point rack (transfer) the beer into a secondary fermenter and lager between 35-40° F (2–4.5° C) for four to six weeks. Bottle or keg with corn sugar. Age and carbonate/condition at temperatures between 70° F (21° C).

Charlie Papazian is the President of the Association of Brewers.

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 x 9) + (3 x 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:

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

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:

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

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

When I want to quench my palate I need hops and I need a balance of malt, otherwise beer doesn't work for me. I'd rather simply drink water, which I have been known to do on occasion.

BY AMAHL TURCZYN

Summer is right around the corner—that means the official brewing season is coming to a close once again. Fortunately, we've got some excellent spring beer recipes in this edition of Winners Circle. A crisp, spicy American-style IPA made with good old Pacific Northwest hop varieties like Chinook, Centennial and Cascade is always a favorite with hopheads, and with Ken Zuzack's 10 gallon recipe, there will be plenty to go around. Or try your hand at a Classic American Pilsner, with the sweet kiss of corn and the subtley sweet aroma of Santiam hops—Richard Scott's CAP is a brilliantly balanced example of a truly American brew.

But in this edition we also pay homage to that great brewing nation of Germany. Much of our American brewing heritage grew out of German immigrants seeking to copy the brewing traditions of their homeland, and they'd be proud to see a classic Marzen recipe like Shane Mock's "Edel Marzen." Michael McNally nails one popular German style of ale, Kolsch. Not an easy thing for American homebrewers, since most of us haven't ever been to Koln to try the real thing! And finally, not wanting to leave out the strong beer lovers, we've included Cas Koralewski's Weizenbock. At a starting gravity of 1.080, this one looks like just the thing to lay down in the cellar for the occasional summertime libation.

India Pale Ale

BRONZE MEDAL
AHA 2001 NATIONAL HOMEBREW COMPETITION
Ken Zuzack, Rising Sun, MD
"Zubru IPA"
India Pale Ale

Ingredients for 10 U.S. gal (38 L)

- **24 lb American two-row malt (10.8 kg)**
- **4 lb 20° L crystal malt (1.8 kg)**
- **2 lb 60° L crystal malt (0.91 kg)**
- **2 oz Chinook pellet hops, 13.2% alpha acid (56 g) (45 min.)**
- **1.5 oz Cascade pellet hops, 7.3% alpha acid (42 g) (15 min.)**
- **1.5 oz Cascade pellet hops, 7.3% alpha acid (42 g) (0 min.)**
- **2 oz Cascade pellet hops, 7.3% alpha acid (56 g) (dry)**
- **2 oz Centennial pellet hops, 9.4% alpha acid (56 g) (dry)**
- **Wyeast No. 1056 American ale yeast**
- **Forced CO_2 to carbonate**

- **Original specific gravity: 1.070**
- **Final specific gravity: 1.010**
- **Boiling time: 75 min.**
- **Primary fermentation: 10 days at 68° F (20° C) in glass**
- **Secondary fermentation: 18 days at 68° F (20° C) in glass**

Brewer's Specifics

Mash grains at 152° F (66.6° C) for 90 minutes.

Judges' Comments

"A very drinkable beer. The malt has too much presence with hops at this level. Bitterness is appropriate for this beer. It may need more bitterness if you add hop flavor and aroma."

"Excellent beer, not an IPA. Malt, especially caramel dominate. Great amber ale. With a touch less hops this is a good wee heavy. Really enjoyed it."

American Lager

SILVER MEDAL
AHA 2001 NATIONAL HOMEBREW COMPETITION
Richard Scott, Dearborn, MI
"American Lager"
Classic American Pilsner

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

- **7 lb two-row malt (3.17 kg)**
- **1 lb dextrin malt (0.45 kg)**
- **1 lb corn (0.45 kg)**
- **0.5 oz Willamette whole hops, 6% alpha acid (14 g) (45 min.)**
- **0.5 oz Willamette whole hops, 6% alpha acid (14 g) (20 min.)**
- **2 oz Santiam pellet hops, 5.3% alpha acid (56 g) (10 min.)**
- **Wyeast No. 2206 Bavarian lager yeast**
- **0.67 cup corn sugar (to prime) (156 mL)**

- **Original specific gravity: 1.046**
- **Final specific gravity: 1.014**
- **Boiling time: 90 min.**
- **Primary fermentation: 10 days at 50-55° F (11-13° C) in glass**
  Secondary fermentation: 15 days at 40-45° F (4-7° C) in glass

Brewer's Specifics

Mash grains at 138° F (59° C) for 30 minutes. Raise temperature to 150° F (65.5° C) and hold for one hour.

Judges' Comments

"Good recipe; earthy, slightly phenolic. Hot finish; a touch of sourness."

"Great tasting beer, just bump up hop flavor slightly."

German Amber Lager

BRONZE MEDAL
AHA 2001 NATIONAL HOMEBREW COMPETITION
Shane Mock, Ft. Wayne, IN
"Edel Marzen"
Oktoberfest/Marzen

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

5	lb Durst Vienna malt (2.26 kg)
4.25	lb Durst light Munich malt (1.93 kg)
0.25	lb Durst 16° L crystal malt (113 g)
0.5	oz Czech Sladek pellet hops, 4.9% alpha acid (14 g) (80 min.)
0.5	oz Mittelfruh pellet hops, 3.4% alpha acid (14 g) (80 min.)
0.67	oz Mittelfruh pellet hops, 3.4% alpha acid (19 g) (20 min.)
	White Labs No. WLP820 Oktoberfest/Marzen lager yeast
1.25	cup light dry malt extract (296 mL) (to prime)

- Original specific gravity: 1.060
- Final specific gravity: 1.012
- Boiling time: 1 hr. 45 min.
- Primary fermentation: 10 days at 52° F (11° C) in steel
- Diacetyl Rest: 6 days at 64° F (18° C) in steel
- Secondary Fermentation: 28 days at 34° F (1° C) in stainless steel

Brewer's Specifics

Grains mashed via single decoction. Rests at 98° F (36.6° C), 127° F (52.7° C), 148∞ F (64.4° C), 160° F (71° C) and 168° F (75.5° C)

Judges' Comments

"Very good job. A very good example of an Oktoberfest/Marzen."

"Good beer—a bit higher OG might have helped with alcohol, however, overall, excellent."

German Ale

SILVER MEDAL
AHA 2001 NATIONAL HOMEBREW COMPETITION
Michael McNally, Chippewa Falls, WI
"Iowa Golden Ale"
Kolsch

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

7	lb Pilsner malt (3.18 kg)
1	lb white wheat malt (0.45 kg)
1	lb Munich malt (0.45 kg)
3.75	oz Hallertauer pellet hops, 5.2% alpha acid (106 g) (60 min.)
0.75	oz Hallertauer pellet hops, 5.2% alpha acid (21 g) (30 min.)
0.5	oz Mt. Hood pellet hops, 4.6% alpha acid (14 g) (15 min.)
	White Labs Koelsch yeast
	Forced CO_2 to carbonate

- Original specific gravity: 1.045
- Final specific gravity: 1.008
- Boiling time: 60 min.
- Primary fermentation: 1 week at 55° F (13° C) in glass
- Secondary fermentation: 21 days at 49° F (9° C) in glass
- Tertiary fermentation: 60 days at 35° F (2° C) in steel

Brewer's Specifics

Mash grains at 149° F (65° C) for 90 minutes.

Judge's Comment

"Crisp, light and refreshing. No significant technical flaws. Complex, yet subtle—this is as good as home-brewed Kolsch gets."

German Wheat Beer

BRONZE MEDAL
AHA 2001 NATIONAL HOMEBREW COMPETITION
Cas Koralewski, Toledo, OH
"Weizenbock #1 2001"
Wiezenbock

Ingredients for 5.5 U.S. gal (20.8 L)

9	lb Bavarian wheat malt (4.08 kg)
1	lb Durst light German crystal malt (0.45 kg)
1	lb six-row pale malt (0.45 kg)
1	lb dextrin malt (0.45 kg)
0.19	lb chocolate malt (86 g)
1	oz Hallertau Hersbrucker pellet hops, 2.9% alpha acid (28 g) (70 min.)
1	oz Hallertau Hersbrucker pellet hops, 2.9% alpha acid (28 g) (50 min.)
	White Labs WLP300 Hefeweizen ale yeast

- Original specific gravity: 1.080
- Final specific gravity: 1.018
- Boiling time: 70 min
- Primary fermentation: 4 days at 72° F (22° C) in glass

Judges' Comments

"This beer starts subtle and grows on you as it goes down. Wow—full of flavors without being overwhelming. Nice fruit, malt fermentation character in good proportions, then dries appropriately."

"Would be better entered as a Dunkel weizen—of which it would be a very good one."

Amahl Turczyn is the Associate Editor of *Zymurgy*.

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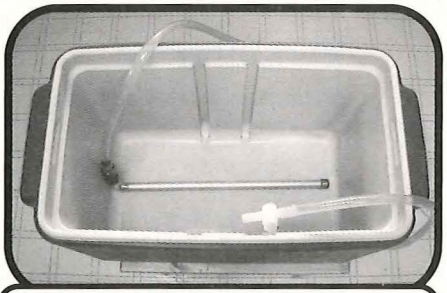

Figure 6: Rectangular cooler with a single lautering screen. Better suited to larger batches.

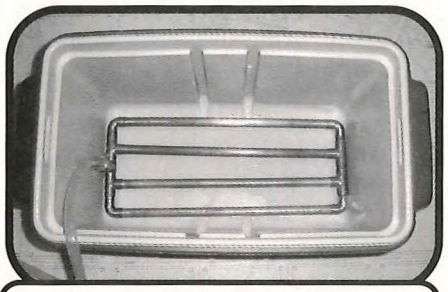

Figure 7: This arrangement is the most uniform setup for a rectangular cooler, short of a false bottom.

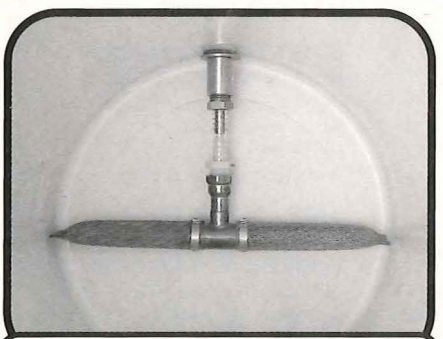

Figure 8: The deeper grain bed of a cylindrical cooler improves the performance of single screens or pipes, and this system is easy to build.

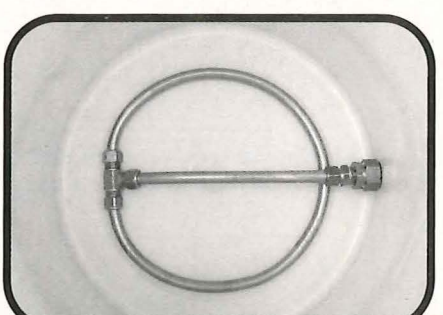

Figure 9: A ring manifold helps to cover more of the grain bed and adds to the uniformity of the lauter. The cross pipe can be slotted also.

On any given day there is at least one guy standing in front of the brass fittings at the hardware store trying to figure out what he needs to build his mash tun.

Building Mash Tun *(from page 29)*
Solder or crimp the elbow to the tube, insert the MIP fitting, and solder or crimp in place. Screw on the hose barb and attach the vinyl tubing and stopcock.

Option 2: Rectangular Cooler with Multi-pipe Manifold or Multiple Screens

This setup is also easy to build and still simple to operate. It will give more uniform sparging than the single pipe system given in Option 1. As with Option 1, grain beds tend to be shallow, which lowers yield to some extent. This setup is recommended for general brewing, and normal batch sparging. Expect to achieve an extraction efficiency of 28-30 ppg, depending on grain bed depth.

Parts:

- Copper water pipe, 0.5-inch (1.27 cm) diameter or stainless steel tubular screens
- Copper elbow sweat fittings
- Copper T sweat fittings
- Copper sweat to 3/8-inch MIP fitting
- Brass or nylon 3/8-inch MIP to 3/8-inch hose barb
- Plastic stopcock

How to Build: Create three or four slotted pipes to fit the length of the cooler, allowing for the elbow and T fittings. Solder or crimp the elbows and Ts to the tubes, using short pieces of slotted pipe to join the tubes into a rectangular array. Select a location for the outlet T, insert the MIP fitting, and solder or crimp in place. Screw on the hose barb and attach the vinyl tubing and stopcock. The location of the outlet doesn't have to be centered or symmetrical, but it doesn't hurt.

Option 3: Cylindrical Cooler with Single Pipe or Screen

This is another easy-to-build and simple to operate system. Here, the grain bed is usually deeper and therefore uniformity of sparging is better than a single pipe in a rectangular cooler for the same size batch, although not as uniform as multi-pipe designs. Five and ten gallon (19 and 38 L) coolers are available for this approach. This system is well suited for most brewing. Expect to achieve an extraction efficiency of 27-30 ppg, depending on grain bed depth.

Parts:

- Copper water pipe, 0.5-inch diameter or stainless steel tubular screens
- Ball valve
- Copper sweat to MIP fitting
- Brass adapter fittings (as needed)
- Brass or nylon hose barb(s)
- Bulkhead assembly (see sidebar) or cooler conversion kit (purchased)

How to Build: Unscrew and remove the spigot fitting from the cooler. Assemble the bulkhead and tighten it in place. Attach the tube or screen with either threaded fittings or with the hose barbs and a short length of vinyl tubing. Attach the ball valve and hose barb to the outside of the bulkhead and it is done.

Option 4: Cylindrical Cooler with Ring

This system is not hard to build and simple to operate. Five and ten gallon coolers are available. The biggest challenge is forming a smooth ring and attaching it to the bulkhead assembly—a process that requires elbow grease. This system is well suited for

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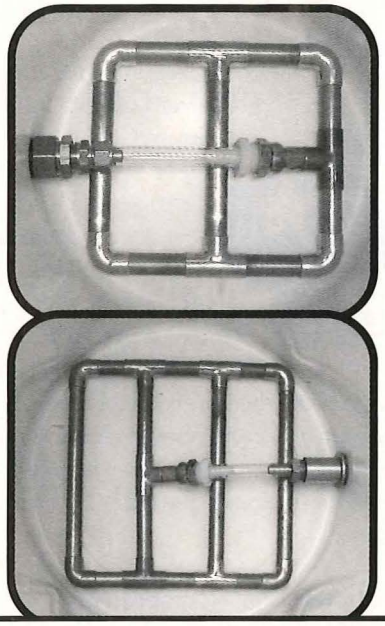

Figure 10: You can use copper water pipe and sweat fittings to make square manifolds inside the cylindrical tuns. These designs are the second most uniform lautering device after a false bottom. Manifolds are shown for five and ten gallon coolers.

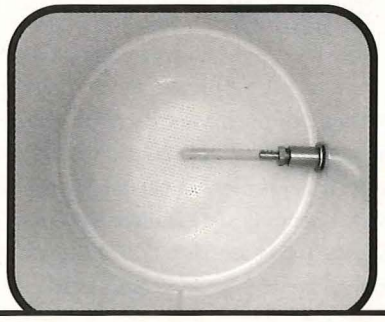

Figure 11: A false bottom is the most uniform lautering device, and the use of one in a ten gallon cylindrical cooler will perform very well for whatever size of batch and lautering method you wish to use.

most brewing applications. Expect to achieve an extraction efficiency of 29-31 ppg, depending on grain bed depth.

Parts:

- Soft copper tubing, 3/8-inch or 0.5-inch OD (a.k.a. refrigerator tubing, or Type L) Brass compression T fitting (3/8-inch or 0.5-inch)
- Brass adapter fittings (as needed)
- Ball valve
- Brass or nylon hose barb(s)
- Bulkhead assembly (see sidebar) or cooler conversion kit (purchased)

How to Build: Unscrew and remove the spigot fitting from the cooler. Assemble the bulkhead and tighten it in place. Using a tubing bender (spring-sleeve device), form a smooth circle to a diameter of 6.75 inches for a five gallon cooler or 8.875-inch for the 10 gallon. Center the ring in the tun and use a length of tubing to attach the ring to the bulkhead assembly. This cross member can also be slotted. Attach the ball valve and hose barb to the outside of the bulkhead and it's done.

Option 5: Cylindrical Cooler with Multi-pipe Manifold

This option is not hard to build and is simple to operate. Five and ten gallon coolers are available. The biggest downside is that it is usually too small to produce all the wort you need for brewing a ten gallon batch—although that may not be a limitation for many brewers. It is generally well suited for all types of brewing. Expect to achieve an extraction efficiency of 29-31 ppg, depending on grain bed depth.

Parts:

- Copper water pipe, 0.5-inch diameter or stainless steel tubular screens
- Copper elbow sweat fittings
- Copper T sweat fittings
- Copper sweat to 3/8-inch MIP fitting
- Brass or nylon 3/8-inch MIP to 3/8-inch hose barb
- Bulkhead assembly (see sidebar) or cooler conversion kit (purchased)

How to Build: Unscrew and remove the spigot fitting from the cooler. Assemble the bulkhead and tighten it in place. Create three or four slotted pipes to fit the inside the cooler, including the elbow and T fittings. For best results, the center-to-center pipe spacing should be two to three inches. The length of the sides of the inscribed square(s) is the same as the diameter of the ring(s) for each of the coolers above. Solder or crimp the elbows and Ts to the tubes, using short pieces of slotted pipe to join the tubes into a square array. Select a location for the outlet T, insert the MIP fitting, and solder or crimp in place. Screw on the hose barb and attach the vinyl tubing and stopcock. The location of the outlet doesn't have to be centered or symmetrical, but it doesn't hurt.

Option 6: Cylindrical Cooler with False Bottom

This system is easy to assemble once you purchase a false bottom—a bit more tedious if you make your own. False bottoms sized for five and ten gallon coolers are available from suppliers. This is very well suited for all types of brewing. Expect to achieve an extraction efficiency of 30-31 ppg, independent of grain bed depth.

Parts:

- False bottom (perforated plastic, stainless steel, or screen)
- Hose barbs
- Vinyl tubing
- Bulkhead assembly (see sidebar) or cooler conversion kit (purchased)

How to Build: Unscrew and remove the spigot fitting from the cooler. Assemble the bulkhead and tighten it in place. Connect the hose barb on the false bottom outlet to the bulkhead assembly with a short length of vinyl tubing. Attach the ball valve and hose barb to the outside of the bulkhead and it is done.

Conclusion

Well, that about covers the primary options available for building your own mash/lauter tun. Of course, there are many other ways to do it—spiral-shaped manifolds, different fittings, and different combinations of all the above. On any given day there is at least one guy standing in front of the brass fittings at the hardware store trying to figure out what he needs to build his mash tun. And for every guy doing it himself, there are several more who opt to buy their components and get right to the brewing. Suit yourself and have fun!

John J. Palmer is a metallurgical and welding engineer currently employed by 3M Corporation. He has been brewing for nine years and is the author of *How To Brew* as seen at www.howtobrew.com. John lives in Monrovia, CA.

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Beer Talk *(from page 5)*

May (May 4, 2002). We honor the Homebrewer of the Year award-winning old ale recipe of Steve Jones. See the 2001 September/October issue of ***Zymurgy*** for the authentic all-grain version. For lager brewers George Fix is working up a traditional maibock recipe. Visit beertown.org for the recipes converted for each brewing level and for site registration. The 2001 AHA Big Brew had 2099 participants registered at 182 brewing sites.

AHA National Homebrewers Conference

The 24th annual AHA National Homebrewers Conference will be held June 20-22 in Irving, Texas. The coalition that has run the Bluebonnet Brew-Off each year is heavy into the planning. The latest speakers and events list is available at the conference website accessed through *www.beertown.org*. The nighttime events include a pub crawl, club night, a Texas brewers Guild night and the Grand Banquet. The conference is a great time with great people, lots of different styles of homebrewed beer and great speakers.

Membership Activities Update

As of this writing in early January, AHA has registered 42 liaisons. The AHA staff identified a group of members who have taken leadership roles in advancing AHA activities through the Big Brew, conference, competition or other volunteer roles. AHA "Beer Evange-Ale-Ists" will build AHA membership and public awareness through presentations at homebrew club meetings and tabling at public events.

Paul Gatza is the Director of the American Homebrewers Association.

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More Classifieds on page 62

Extract Experiments *(from page 22)*

L). Bring to a boil for five minutes. Add hops, remove from the heat and chill. Pitch yeast and oxygenate. Ferment at 77° (25° C) for four days. Rack to secondary and hold for 19 days.

Tasters' Impressions

Aroma: Fruity with raisin, banana and tutti-frutti notes. Estery and malty, with sweetness apparent. Flavor: Cloying sweetness in finish with dark fruit flavors that counter the high alcohol. Underattenuated, but rich and malty. Some roastiness. Some spiciness. Some hop bitterness in the roasty, dry finish. Overall: Too sweet, could have fermented longer. Good flavor and complexity that will improve with age. Nice dessert beer. Dry finish counters the sweetness somewhat. *CONSENSUS: Good; needs time.*

Rita Liotta's Spiced Dark Abbey Dubbel

3.3 lb can Brewferm Dark Abbey kit (1.5 kg)
0.5 lb clover honey (227g)
0.25 lb dark corn syrup (113 g)
0.25 lb brown sugar (113 g)
Zest of three medium oranges (orange part only, no white)
2 oz fresh ginger, peeled and grated
Yeast from kit in 800 mL (1.7 pints) starter

- **OG: 1.067 (16.4° P)**
- **FG: 1.017 (4.3° P)**

Brewer's Specifics

Simmer ginger and zest in four cups (0.94 liter) water, covered, for 20 minutes. Strain and add the liquid to fermenter. No boil. Add all other ingredients. Stir well and top up with water to three gallons (11.4 l). Ferment at 77° (25 C). No secondary. Bottle with 3 oz corn sugar (85 g).

Tasters' Impressions

Aroma: Spruce or pine-like aspect. Ginger and orange apparent. Some hop and malt noted. Spicy, slightly phenolic. Fruity. Flavor: Some dryness and roasted grain character in finish. Tangy, cidery, astringent aspect from yeast and sugar. Needs more malt. Good holiday beer. Slight orange flavor. Slightly sour. Overall: Would benefit from added malt extract, needs higher ending gravity, thin. *CONSENSUS: Good; replace sugar with malt extract.*

Keith Curtachio's Spiced Dark Abbey Dubbel

3.3 lb can Brewferm Dark Abbey (1.5 kg)
1 lb clear Belgian candi sugar (0.45 kg)
0.35 oz dried sweet orange peel (10 g)
1/8 tsp paradise seed (0.6 ml)
1/8 tsp sweet gale (0.6 mL)
0.25 lb brown sugar (113 g)
Wyeast 1762 Belgian Abbey II

- **OG: 1.072 (17.5° P)**
- **FG: 1.016 (4.0° P)**

Brewer's Specifics

Use spring water for the entire recipe. Boil about 40 minutes, adjust volume to nine liters (2.37 gallons). Cool to 78° F (26° C). Pitch yeast. Fermented at 77° F (25° C).

Tasters' Impressions

Aroma: Alcohol, spice, banana and malt noted. Fruity and floral with a suggestion of cherry. Aroma is bready, raisiny and very Belgian. Flavor: Rich and complex, with slight banana and spice. Nice malt character with dark fruit, and caramel overtones. Warming. Orange and spice not very evident. Some roast grain astringency in finish. Overall: Will improve with age. Nice spiced beer with good, complex flavors. Tasty, creamy and full. Good example of a Belgian ale. *CONSENSUS: Good to very good.*

Group Experiment: "The Blend"

Two of the beers were rated "good" but had some flaws: the Belgian-style barleywine and ginger-spiced abbey dubbel. As an experiment, we blended these two beers together, using 50 percent of each. This produced a beer that was much better than either of the components. The over-sweetness of the barleywine countered the tangy slight-sourness of the abbey. The ginger and orange of the abbey complimented the dark fruit of the barleywine perfectly. The dry, roasty finish of the abbey balanced the thick, sweet, spicy flavor of the barleywine. We plan to serve this blended beer at an upcoming club party. *CONSENSUS: Very good. Better than either beer alone. Some tasters thought the blend was as good as the Ommegang commercial example.*

Conclusion

Certain aspects of the kit appeared to some extent in all the beers. Most notable is the roasty dryness in the finish. Other flavor and aroma characteristics like yeasty/bready, spicy and vegetal are also apparent in several beers. The spruce- or pine-like character appears in both beers that used the yeast from the kit. The kit lent itself well to adaptation, producing a very good Scottish ale and an equally good Oktoberfest. The Belgian character was more evident in beers that did used separately obtained Belgian yeast strains. The best beer, the Belgian dark strong, also had the most complex recipe and brewing procedure. The Brewferm Dark Abbey is a quality kit. It produces a good to very good beer when prepared according to label directions, but benefits from the substitution of malt extract for sugar in the recipe. Brewers who wish to make further improvements can substitute liquid yeast and/or steep specialty grains.

Rita Liotta has been brewing since 1992. A mostly all-grain brewer, she specializes in the German ales, Kölsch and Altbier. Rita lives in a suburb of Buffalo, NY with her husband and three spoiled cats.

Brewers Favorites *(from page 23)*

For all you extract and partial mash brewers out there, sorry ladies and gentlemen, but rye malt extract just isn't widely available so we had to stick with grain on this one. (Besides, this is the Art of the Mash issue, right?) Now, grab your lauter tuns—it's time to fire up those Hop Rods.

Hop Rod Rye

Recipe for 5 US gallons (19 L)
All-grain recipe

- **7 lb 2-row malt (3.18 kg)**
- **3 lb rye malt (1.36 kg)**
- **1.5 lb flaked rye (0.68 kg)**
- **22 oz Munich malt (0.62 kg)**
- **0.75 lb dextrin malt (0.34 kg)**
- **0.75 lb white wheat malt (0.34 kg)**
- **2 oz Carafa malt or de-bitterized black (57 g)**
- **0.75 oz Tomahawk pellet hops (12% a.a., 40 IBUs) (21 g) (60 min)**
- **0.5 oz Centennial pellet hops (10.6% a.a., 12 IBUs) (14 g) (30 min)**
- **1.75 oz Tomahawk pellet hops (12% a.a., 15.5 IBUs) (50 g) (5 min)**
- **0.75 oz Centennial pellet hops (10.5% a.a.) (21 g) (dry)**
- **0.75 oz Amarillo pellet hops (10% a.a.) (21 g) (dry)**
- **White Labs WLP001 California ale yeast**

- **Original gravity: 1.072**
- **Final gravity: 1.018**
- **Boiling time: 90 minutes**
- **Primary fermentation: 68° F (20° C) for one week**
- **Secondary fermentation: 45° F (7.2° C) for one week**

Mash grains at 152 to 155° F (67-68° C) for one hour. Raise temperature to 165° F (74° C) and hold for a 15-minute mash-out. Sparge at 170° F (77° C).

Amahl Turczyn is the Associate Editor of *Zymurgy* magazine.

Last Drop *(from page 64)*

ery was born on the idea of jump starting brands that had long since been purchased by Bass and either been forgotten about or left to die. So with the slogan of "The flavor of our heritage" the Bass museum brewery brews such famous brands as Worthington White Shield, Worthington "E," Joules, and Offilers Best Bitter. All of which are either bottle-or cask-conditioned real ales.

Working under resident Master Brewer Steve Wellington and Brewster Jo White was a wonderful educational experience. My stay at the Bass Museum lasted just ten weeks but it was a period that I know I will remember for a long time to come. Day in and day out I was confronted with all the practical problems of running a successful brewery. Simple issues like how to fine beer to be sent out or more complex issues such as how to de-scale the hot liquor tank without destroying the 1920s era copper work and "blowing out" the boiler. I was involved in all parts of the process at one time or another. Under the ever watchful and experienced eye of Mr. Wellington I learned how to calculate a brew, operate the malt hoist (a ferocious and rather temperamental beast) and how to use and efficiently operate a diatomaceous earth horizontal leaf filter bank.

Not all of my time was spent in the brewery, however. I also had the experience of representing the Bass Museum (along with my colleagues) at several Campaign For Real Ale beer festivals. Aside from being in attendance at the Derby and Peterborough beer festivals, I was also a judge at the Tamworth event.

I thoroughly enjoyed working alongside such truly talented and knowledgeable people. I would like to thank the entire crew of the Bass Museum for taking an American brewing student under their wing. And a big thanks to Dr. Charlie Bamforth for making the idea of this trip a reality.

Chris Dennis-Strathmeyer got into homebrewing by turning his closet into a fermenter room and ruining his mother's electric stove with his first boilover. Undaunted, he enrolled in the Fermentation Science degree program at UC Davis and is now looking for a job in the brewing business.

BY CHRIS DENNIS-STRATHMEYER

A Bass-ically Historic Brewing Experience

"Say, for what were hop yards meant,
Or why was Burton built on Trent?
Or many a peer of England brews,
Livelier liquor than the Muse,
And malt does more than Milton can,
To justify Gods ways to man."
—A.E. Housman

Chris Dennis-Strathmeyer and Bass master brewer Steve Wellington

In the months preceding this past summer I spent a fair amount of time answering questions about what I was going to do with my vacation. Being a Fermentation Science major at the University of California Davis, I knew that I wanted to spend the time in a worthwhile way, gaining some invaluable work experience in a brewery. And when the opportunity came along to work in England's oldest micro brewery in the nation's most fabled brewing town, Burton-Upon-Trent, I knew that I could not resist.

Visitors come from all over the world to savor the Bass Museum of Brewing. They not only learn about the history of brewing beer in Burton, but also about the history of Bass and of Interbrew, who recently became the parent company. One could spend hours walking through the galleries that cover everything from the harvesting of hops and barley to modern fully automated brewing systems. The museum also has its own fully operational microbrewery sandwiched between the stables for the Bass shire horses and the Robey engine shed.

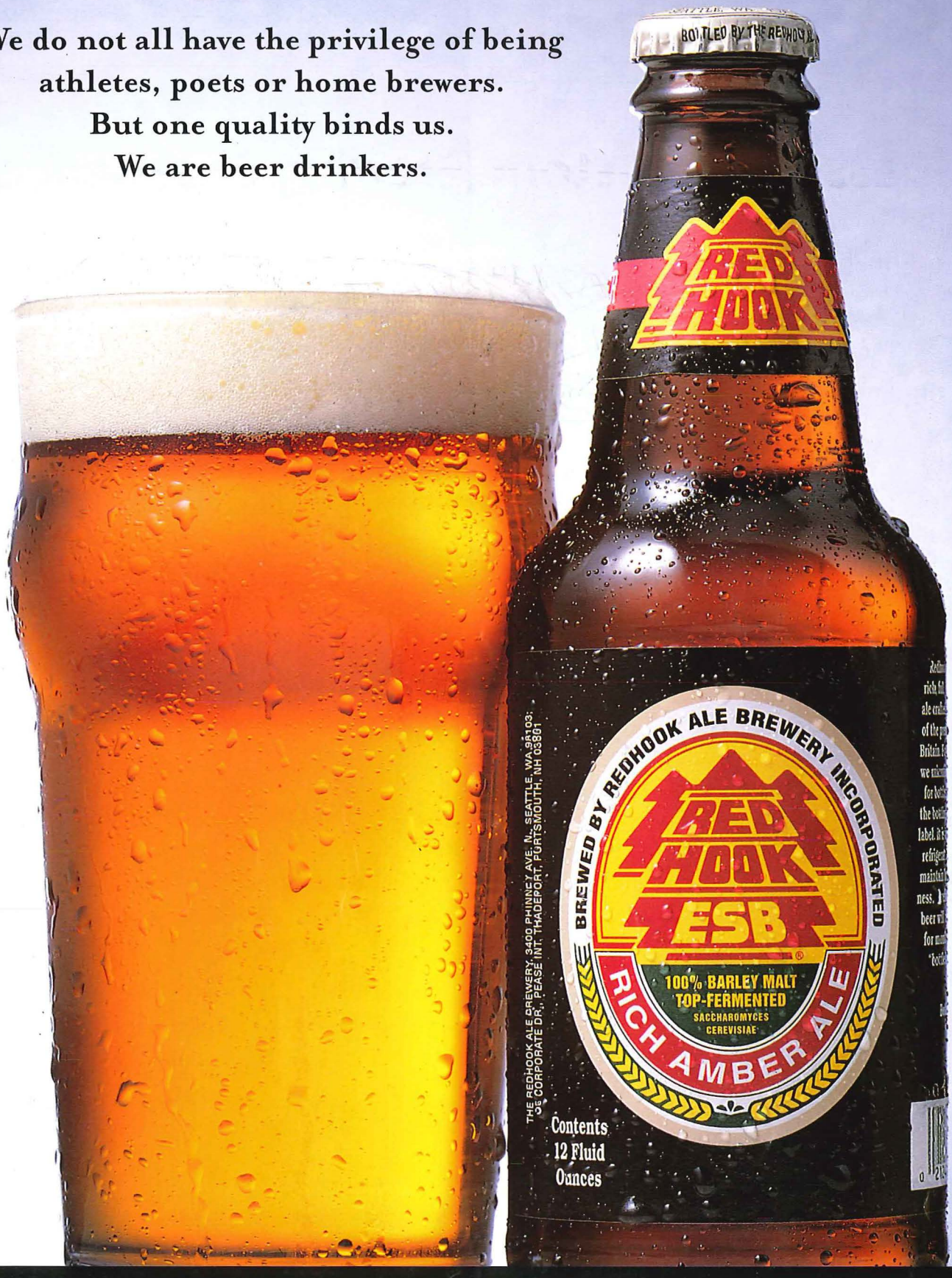
The brewery itself is fully operational but rather antique. In the brewhouse you will not find a single programmed logic controller or gas operated valve. The brewery is truly "belts and braces." The brewing equipment was originally the pilot brewery for the famed Mitchell & Butlers located at Cape Hill in Birmingham (now a part of Bass). It was built in the early 1920s and is in the traditional "tower brewery" format. All of the raw ingredients are hoisted to the top of the brewery and the process works its way down.

The malt is ground in a single pass roller mill through to the grist case, with mashing via a Steels premasher and infusion set-up. Runoff is through a single tap via an underback to the "copper" on ground level. Boiling is with 100 percent traditional varietal whole cone hops for roughly 90 minutes and aroma hops are added in the hopback. The wort then flows through the only pump in the brewhouse and back up to the top of the brewery into the hot wort collection vessel where it stays briefly before heading down across the cooling surface of the old fashioned washboard cooler. (The washboard cooler was actually a display piece in the museum's gallery prior to being commandeered.) The pitching wort flows to the fermentation cellar via a pipe running though the brewmaster's office!

Unlike the United States, England does not have a three tier distribution system for alcoholic beverages. This means that in England a brewery can own its own pubs. Over the last hundred years there has been a great deal of brewery consolidation in the UK. Often times this means that a brewery will purchase another brewery just for its pubs and not for its breweries or its brands. So the Bass Museum brew- *(continued on page 63)*

PHOTO COURTESY OF DENNIS STRATHMEYER

We do not all have the privilege of being
athletes, poets or home brewers.
But one quality binds us.
We are beer drinkers.



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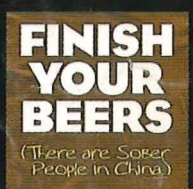

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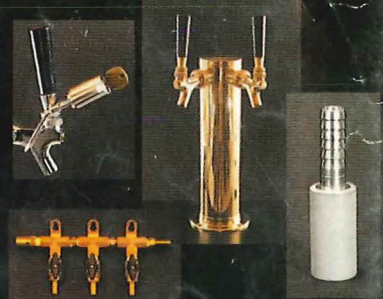

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