

Vol. 24 No. 4 July/August 2001 The Journal of the American Homebrewers Association

ZYMURGY

FOR THE HOMEBREWER AND BEER LOVER

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Berliner Weiss

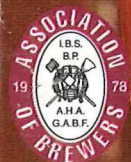
Belgian Brown

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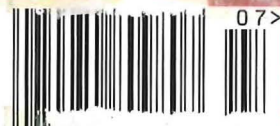
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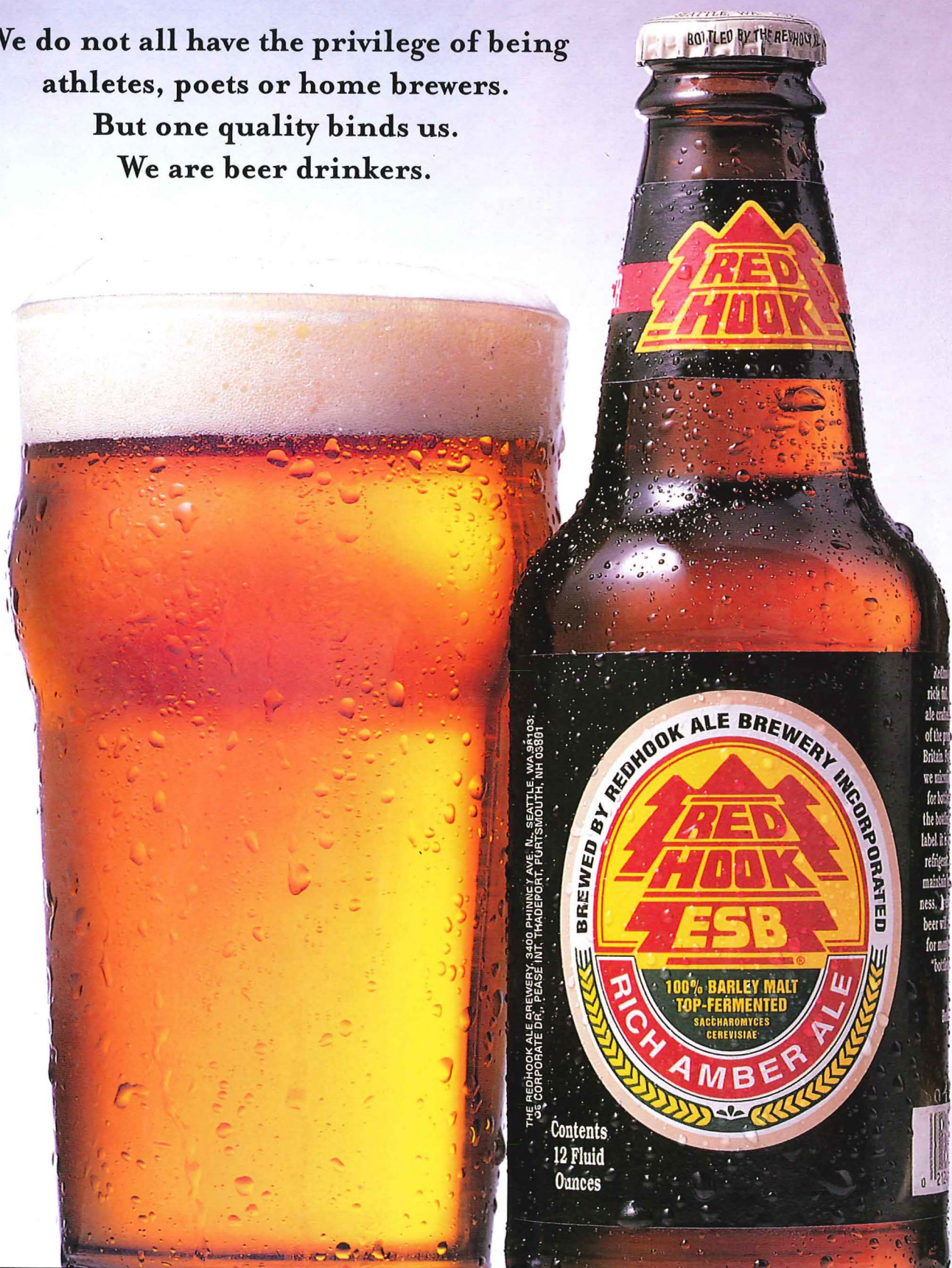
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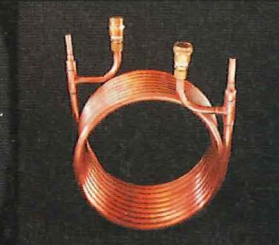
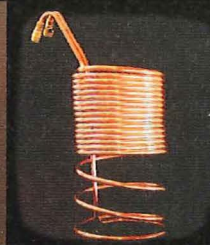
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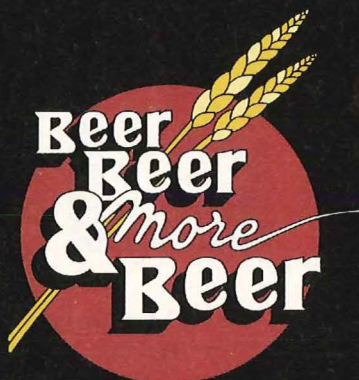
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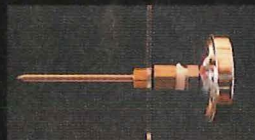
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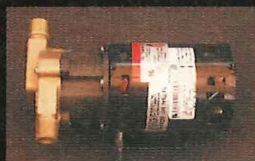
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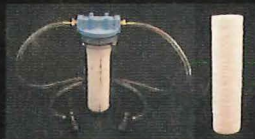
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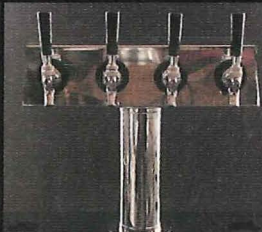
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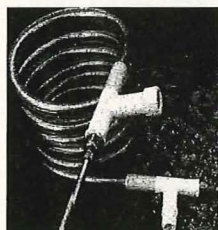
The American Homebrewers Association is a division of The Association of Brewers, a not-for-profit organization located at 736 Pearl Street, Boulder, CO 80302-5006 USA. Membership is open to everyone. *Zymurgy* (ISSN 0196-5921, USPS 018-212) is the bi-monthly journal of the American Homebrewers Association and is published six times per year. Periodicals Postage Paid at Boulder, CO and additional mailing offices. Annual memberships are \$33 U.S., \$38 Canadian and \$51 International and include a \$24 subscription to *Zymurgy*.

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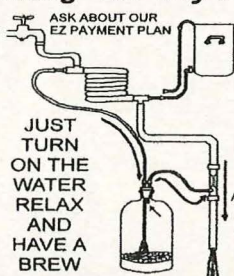
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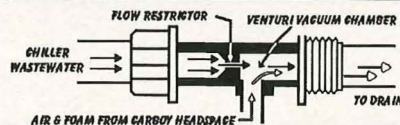
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JULY/AUGUST 2001, VOL. 24, NO. 4

ZYMURGY®

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*Lauter Dynamics: Design Priorities Based on Fluid Flow Studies
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**We regret that Extract Experiments does not appear in this issue of Zymurgy, but it will appear in the September/October edition.*

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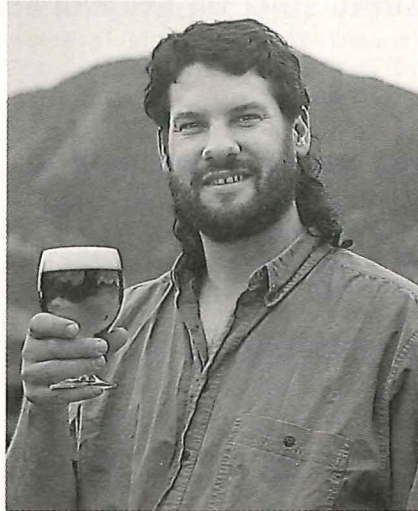
BY PAUL GATZA

July is American Beer Month

July means many things to many people. Some think of fireworks, baseball, apple pie, hot dogs (or tofu dogs for VegAmericans), vacations, beaches, mountains, recreational vehicles... Wait, I'm forgetting something. Perhaps I should open a homebrew to help me remember. Kshh. Ah, there, that's better. Of course! Beer! (I'm just kidding, I could never forget about beer.)

Yes, July is American Beer Month. The kernel of the idea for American Beer Month arose during a discussion of state brewing guild members and members of the Institute for Brewing Studies board of advisors and staff during a meeting at the Great American Beer Festival in 1999. An American Beer Month committee was formed to make plans for getting attention to July as a month devoted to American beer. The first American Beer Month in July 2000 included a small rally in Philadelphia on the Art Museum steps made famous by beer lover Rocky Balboa. From that small gathering, some of the larger craft brewers, The Boston Beer Company and Rogue Ales to be specific, seeded \$25,000 to the committee to promote the event in 2001. The total fund is now over \$42,000 thanks to contributions from Great Lakes Brewing Company, both the Gordon Biersch restaurant group and packaging group, Kalamazoo Brewing Company, the Rock Bottom Brewery and Restaurant group, Stone Brewing Company, Wynkoop Brewing Company, BJ's Chicago Pizza and Brewery Restaurants, the Illinois Craft Brewers Guild, KClinger's Tavern, the Michigan Brewers Guild, Left Hand & Tabernash Brewing Company, Jacob Leinenkugel Brewing Company, the Brewers Association of Maryland, Unita Brewing Company, Willoughby Brewing Company and a personal donation from Ed Canty.

The seed money and additional contributions have been used to fund the Ameri-



can Beer Month website, www.american-beermonth.com. Don't let the dotcom fool you; American Beer Month is only a for-profit venture in the sense that American brewers and homebrew supply shops should make some money from product sales. And of course, it is for the emotional profit of all those who explore the vastness of American beer products. The American Beer Month website is meant to be a little "edgy." The producers acknowledge that it may not necessarily be politically correct and may have some distasteful elements

American Beer Month Pledge

On my honor,
I do hereby pledge,
That for the month of July
I will celebrate the breadth and diversity
Of the beers and ales of the United States of America.
That I will recognize the heritage, tradition and future
of brewing in our republic,
And that I will savor the flavor of American-made beer
Responsibly, moderately and exclusively.
Hail to beer, America's beverage!



that are not normally promoted alongside quality beer. The objective of the site is to draw attention to American Beer Month through humor and fun. The previews of the site are so funny I plan to forward the URL to friends that I don't normally forward jokes to. One neat feature of the site is that you can become a card-carrying member of American Beer Month for free and print out your membership card on the spot. The big message for me is that we can never finish the job of saying that beer is fun.

The goal is to celebrate the excellence of American beers, not to criticize imports. I personally love a good Belgian strong ale, but I will again forego the temptation and have my own homebrewed Belgian-style ale made in America in the cooler to help get me through. For those of you in Canada or overseas, check out a few American imports in July or celebrate the beers of your homeland. Let's raise our glass to beer.

For this year's American Beer Month, two rallies are planned to bookend activities across the country. The kickoff rally and pub crawl will be in Philadelphia on June 29th. The closing rally will be at the Oregon Brewers Guild pavilion at the Oregon Brewers Festival in Portland on July 28th. I expect the Michigan Brewers Guild festival in Livonia, Michigan will (continued on page 62)

PHOTO BY BOB GOLDMAN

BY RAY DANIELS

A Letter From Homebrew Summer Camp

Dear Kids:

My brewmaster said that I have to write you a letter to tell you about camp. He said that if I don't you'll think that I have fallen in a fermenter and drowned. Personally, I think the real reason that he wants me to write is so you will think the camp is good for me and agree to let me come here again next year.

In any case, I'm having a good time at Camp Hallertau-Mittelfruh. Last week I got my Helles badge and this week I'm working on Dunkel and Schwarzbier. With any luck at all, I'll make it to Bock before I leave.

This whole lager brewing thing is a big change from what I did last summer at Camp Kilderkin where all they brewed were traditional British ales. For starters, I'm learning how to float this year. It's required for something called "cold flotation" that nearly all brewers in Germany do.

After the wort is boiled, it goes through a whirlpool to separate out the hot break and hop particulates. Next the wort is chilled and sent to the floatation tank. Along the way, the yeast is injected in addition to a good dose of oxygen. Once in the floatation tank, the oxygen bubbles cause the cold trub to rise to the top. After 10 hours, you can drain the tank from the bottom and send clear wort to the fermenter. According to the brewmasters, 90 percent of breweries in Germany use this technique.

In addition to flotation, I've been working on my paddling. I work out every day and my strength is developing so that by the end of the summer I should be able to stir a whole seven-barrel mash all by myself.

This week, I'm on hopper duty. You can't brew without cleaning up the mess, so every morning before breakfast each cabin sends one "hopper" to shovel out the mash tuns from the previous day. It is



hard enough to get up and get moving in a cold cabin after a night of quality control tasting in the pub. Add to that the fun of pulling on rubber boots and climbing around in a steamy, shifting bed of spent grain for an hour before breakfast and you'll have an idea of what my mornings have been like.

In target practice yesterday, I nailed two 1.048s and a 1.054. Brewmaster Gerhardt says next week I can start working on high gravity brews. Right now I'm in the running for the coveted "Total Gravity" award. This German malt is pretty consistent, so I think I'll be OK as long as we don't change malt lots. When that happened last summer, I missed my last target OG by 0.005!

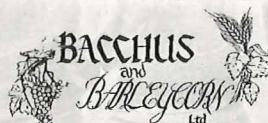
I am sick of spent grain cookies, malt waffles and roast barley coffee. I don't think there has been a meal yet where we didn't have at least one dish prepared with beer ingredients. One day they even tried to give us yeast sludge shakes. Only Rupert, the guy from Franconia, could actually drink the things. The rest of us snuck them in the floor drains when the plant manager wasn't looking.

I've got a cold from all the time spent in the fermentation cellars. I know you made me bring a sweater, but I lost it on a pub crawl one night the first week. Primary fermentation

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I submitted a label for “Moonlight Helles” the first week and it was rejected because—and I quote—“Moonlight was not used in the brewing of this beer.”

really isn't too bad—that's 50° F (10° C), but the lagering cellars are another matter. They are freezing. Last week brewmaster Klaus found two specs (!!!) of spent grain on my boots during inspection. I got giggled for “unsanitary conditions” and had to scrub the inside of a lager tank with a toothbrush. That's why I have a cold.

I've mostly been spending my time with the lagers. I tried weizens one day in part because the ferments are warmer and I had lost my sweater. That night, some of the kids started calling me “Ubergarig Guy,” “Wheat Wuss” and “Filter Hater.” At that point I figured I'd better just stick with the lagers.

My biggest disappointment has been in handling the livestock. I thought I was pret-

ty good at the care and feeding of *Saccharomyces cerevisiae* after my experiences last summer, but what I'm discovering is that those hoppy ales covered a lot of flaws. Brewmaster Hansen in the microlab is a strict disciplinarian: just one wild yeast or one *Lactobacillus* in your culture and you have to start all over again.

By early this week, I had my classic Tuborg lager strain in its fourth doubling when disaster struck. A bully named Auggie figured out how to get in the lab at night and laced the diluent supply with *Pediococcus*. Needless to say, we had some pretty nasty worts on our hands after that. For punishment, Auggie will be washing kegs for the rest of the summer. Meantime the rest of us will be learning how to acid wash the

yeast coming off of the production batches so that it can be re-pitched.

The only thing I haven't mentioned is label design. The drawing part of it isn't bad, but we also have to learn a lot of government regulations which is a pain. I submitted a label for “Moonlight Helles” the first week and it was rejected because—and I quote—“Moonlight was not used in the brewing of this beer.” I changed the name to “Camp Hallertau-Mittelfruh Helles” and it sailed right through.

Too bad they don't have a brewster's camp nearby—I miss last year's panty raids to Camp Alewife. Oh well, at least your mom will be happy when I don't come home with a pair of “Duvel” panties in my suitcase.

Hope all is well at home.

Love,
Dad

Over the last few years, Ray Daniels has camped out for a few weeks in Bamberg, Germany to study smoked beers and Bavarian brewing techniques.



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Mulling Munich Malts

Dear *Zymurgy*,

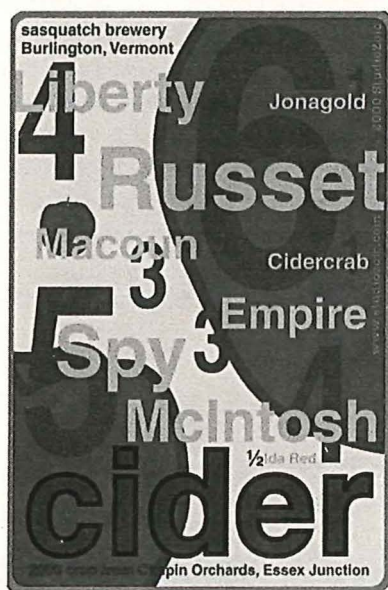
I enjoyed Amahl Turczyn's May/June *Zymurgy* "Brewer's Favorites" piece on one of my favorites, Oktoberfest. In my 1976 visit to the Oktoberfest, I was told in no uncertain terms by the locals I consulted that Augustiner was the local favorite, so I was disappointed not to see it among those listed. I'd like to amplify a couple of things Amahl noted, but with a cautionary note. I have had good success with a combination of Pilsner and Munich malts and have not really seen a need to add more than a pound of Carapils for body. I heartily agree that one cannot really succeed with Oktoberfest without a decoction mash (though I've not had any experience with melanoidin malts yet). However, there is a not-so-fine line, as I've discovered, between adequate and excessive conversion and I'd resist the temptation to do a double decoction to further enhance production of melanoidins because it causes both color and flavor to shift significantly from the malty Oktoberfest/maerzen character to something more akin to a caramelly Vienna. Otherwise, kudos to Amahl for his articles and advice. I've made good use of his *A Year of Beer*. Keep up the good work.

Eric Ginsburg
Chapel Hill, NC

Dear Eric,

Thanks for your kudos of Mr. T's work. He is a valuable asset to the production of the magazine.

We believe in simplicity when it comes to these things and have been known to make this style with 100 percent Munich malt and a single decoction. From a historical perspective, specialty malts like cara-



pils and melanoidin certainly would have been unknown when the style originated—although admittedly their use in Germany today is quite common.

Of course the most fun comes from brewing O-fests in about six different ways and then carefully comparing them during those pleasant autumn weekends.

—Ed.

Still Grinding Away

In our last two issues we have neglected proper mention of The Valley Mill produced by Valley Brewing Equipment of Ottawa, Ontario. In the March-April issue the copy for their ad became jumbled in production; in May-June we failed to include them in the box covering motorization details for grain mills. Please note that The Valley Mill is suitable for motorizing and can be cranked at 300 rpm. For further information on The Valley Mill, see their ad in this issue.

The Naked Truth

Dear *Zymurgy*,

Where did the staff at *Zymurgy* get the idea to inform *Zymurgy* readers and subscribers about alternative lifestyles, "practicing nudists, and the nude party scene"? Is *Zymurgy* and the AHA now opening the forum to discuss alternative lifestyles while brewing or drinking beer? Reading about alternative lifestyles is not why I joined the AHA and not the reason I like to read *Zymurgy*. Without a doubt homebrewers come from all walks of life and that is their business—for me, I just want to learn to brew better beer. In my opinion, the article "Bare Naked Brewers," by Hank Stewart, in the May/June 2001 issue of *Zymurgy* is better suited for a different magazine. It certainly does not warrant space in *Zymurgy*.

Mike Dagget
Pultneyville, NY

Dear Mike,

We are sorry if you were offended by Mr. Stewart's article. We run many items on the "homebrew lifestyle" from stories about cult commercial beers to Big Brew photos and homemade labels to vacation travelogues. Some folks don't care for this type of content, others find it to be the most compelling reason to pickup the magazine. Our goal is to serve the overall interests of our thousands of readers and that means that nearly everything we run will have both fans and detractors. We hope that you found plenty in the other 63 pages of the May-June *Zymurgy* to further your brewing education.

—Ed.

Clarification of Plastic

Dear *Zymurgy*:

The March/April *Zymurgy* article by Marc Sedam, "What Have You Surrounded Your Beer With?" and the accompanying chart compiled by Ray Daniels were interesting and timely. You scooped the trade with this one.

The picture of the Hobby Beverage MiniBrew System Fermenter was excellent. However, the price point of \$180 dollars for the Hobby Beverage Equipment was confusing. Our 5-gallon recipe size (marketed as 6.5-gallon and actually holds 8 gallons) sells for \$168 including all attributes. Also, in addition to the sizes mentioned in the comparison, we also offer 10 gallon, half barrel and full barrel recipe size fermenters.

I am not sure where the 160-degree temperature maximum figure came from. I regularly pour boiling water down the sides of my plastic fermenter so the heat can sink into the plastic and kill the bad guys. I would recommend the same treatment for stainless. The plastic melts at 250° F (121°

C) so I am a little confused over this issue unless it is a manufacturer protecting themselves such as McDonald's does with their cool coffee. The idea of using hot water for sterilization was a recommendation by George Fix.

I have talked to Exxon (makers of polyethylene) about the issue of oxygen migration or OTR (oxygen transmission rate). My understanding from this discussion with Exxon is that because of the thickness of my MiniBrew System Fermenter, oxidation is not an issue (doesn't happen) and therefore oxidation through long-term storage is not an issue.

The next time you brew, use a new stiff toothbrush in those threads or buy my used tri-clover valves. My prediction: plastic will replace stainless in time.

It takes a lot of time to write a good story Marc, thanks.

Regards,

John S. Thomas
Hobby Beverage Equipment

John:

Thanks for the compliments on the content—as well as our stunning home-photography. As best we can tell the price we listed for your fermenter included the thermometer—a worthwhile addition in our eyes. We failed to mention the one barrel size mostly because we have never met a homebrewer with a kettle big enough to fill it.

On the issue of temperature tolerance: the documentation sent with the fermenter we purchased contains the following statements:

"Sterilize with 140 degree water."

"Heat distortion temperature is 150°."

"Even though the plastic is rated at 180° it is a good idea to cool the wort before transfer."

Based on this, we decided to err on the side of safety as we don't have the budget to be replacing our readers' equipment if it is adversely affected by the conditions we list.

As for pipe threads, the toothbrush approach to cleaning is a good one. But our concern relates as much to inspection as cleaning. The HBE system we tested has three threaded female fittings embedded in the walls of the fermenter. All will be in contact with wort



The image shows a vintage computer setup. A CRT monitor displays the Northern Brewer website, which features a red logo with a stylized 'NB' and the text 'northern BREWER'. Below the logo, it says 'June 22, 2000' and 'browse our online CATALOG'. To the right of the logo, there's a button that says 'Automatic For The People' and another that says 'Ready to get your own...'. A white keyboard is in front of the monitor. To the right of the keyboard is a tall, slender glass filled with beer, with a label that says 'Avenger' and 'First Canadian Double IPA'. The background is dark and out of focus.

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during fermentation to some extent, so sanitation here is very important. Our concern is that barring the use of some high-tech device, these fixed, internal threads cannot be carefully inspected for damage or debris.

There are many, many issues involved in evaluation of fermenters like yours—the chart in the March/April issue was just a first look at some of those issues. With luck we'll have space to do an in-depth review in another year or so.

—Ed.

Blue Algae and Goat Cheese Beer

Dear Zymurgy,

I urgently need clarification on a specific point of Ray Daniels' "Homebrew and Beyond" column regarding the Chicago Real Ale Festival in the May/June issue. Mr. Daniels states that as long as one's home brewed ale does not contain cinnamon-crust-ed sun-dried raisins or beef jerky, then it may be classified as "real ale." The meat, as it were, of my confusion is that I need to know if the two additional ingredients Mr. Daniels explicitly mentions are the only two extraneous items that would disqualify an ale as "real." The reason I ask is that I am planning on entering one of my own unique ale recipes for consideration in next year's festival. However, I am concerned that Mr. Daniels' definition of "real ale," if viewed from a slightly broader perspective, might also exclude the special goat cheese, haggis and blue-green algae ale I'm currently aging in wormwood casks for the 2002 event. Anxiously and with great moral trepidation awaiting your wise council on this matter, I sincerely remain your humble and worshipful reader,

Greg Robinson
Minneapolis, MN

Dear Greg,

Touche Greg - you had us going there for a minute. The dictum on ingredients comes from those arbiters of all things real with regard to ale, the Campaign for Real Ale (CAMRA) in Britain. They specify that real ale be made from "traditional ingredients." Of course the term "traditional" is subject to interpretation, both culturally and historically. German brewers would allow nothing but malt, hops, yeast and water. The

British on the other hand use adjuncts such as corn and various sorts of sugar and have for many decades. (Let's not even start on the Belgians . . .) Then of course there was the "tradition" of using hallucinogenic drugs such as cocculus indicus in London porters circa 1800. Overall we're of the opinion that dili-

gent research could probably uncover a "tradition" of brewing with nearly any edible substance. Of course we have met many who would question the edibility of haggis and even goat cheese - not to mention the algae!

—Ed.





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BY GARY GLASS

Bluebonnet Brew-Off

Earlier this year, Dave Dixon, Director of the 2001 Bluebonnet Brew-Off, invited me to come speak at the competition in March. Honored by the invite and thirsty for some tasty homebrew, I accepted the opportunity to travel to the Dallas-Ft. Worth area for the largest single-site homebrew competition in the country. This year the Bluebonnet drew 873 entries submitted from 43 Clubs spanning 18 states!

With 15 years of experience, the Bluebonnet committee sure knows how to put on a top-notch competition. The competition committee draws talent from the four Dallas-Ft. Worth area clubs: the Cowtown Cappers, Knights of the Brown Bottle, the Net Hoppers, and the North Texas Homebrewers Association. With a competition of this scale it definitely pays off to have a large base of support. Amazingly, for such a large competition, the organizers managed to pull it off without a hitch.

Things got started on Thursday with the Bluebonnet kick-off party at the new Big Buck Brewery in Grapevine. After a tour of the brewery we sat down to a steak dinner, while the head brewer hovered near by to keep our glasses full. It was good to see such a close relationship between homebrewers and pros in the Dallas-Ft. Worth area.

Friday night was the banquet, Texas barbeque style. The venerable George Fix served as keynote speaker. Following Fix's talk was a "Commercial Beer Guided Tasting" that included more than 50 different beers brewed by 35 breweries from all over the world. The evening finished up with what I thought was the highlight of the Bluebonnet, the Room Crawl. The Room Crawl is much like the Beer Without Borders club night at the National Homebrewers Conference except instead of all the clubs occupying one big room, each club had its own

room. From 9:30 pm until 4 am, homebrewers ruled the 5th floor of the Wilson World Hotel, stumbling between the ten club rooms, sampling the fine food and brew provided by each club. I particularly enjoyed the marinated pork tenderloin the North Texas Homebrewers Association was serving up and the Ale-ian Society was pouring a nice ESB—with the black light you couldn't even tell that it was dark green!

Pulling myself out of bed at 5:30am the next morning to prepare for my talk was no fun at all. I was pleasantly surprised to see that around 50 people had managed to drag themselves to the conference room in time to see my 8:30 am spiel on the AHA's shift towards a more grassroots-oriented organization. I was followed by Don O'Connor's discussion of brewing in the Czech Republic. Don did an outstanding job considering he had driven up from Austin that morning to fill in for his wife, AHA Board member and owner of St. Patrick's of Texas Brewers Supply Lynne O'Connor, who had suddenly fallen ill. George Fix finished up the speaking part of the event with a fascinating presentation on fermentation systems.

The second round judging of the Bluebonnet took place immediately after the talks. With a large room full of judges and stewards coming from as far away as Florida, we managed to judge all 26 BJCP categories in one session! I had the privilege

of judging the first place English Pale Ale submitted by Josie Pociask, Dave Dixon's fiancée (Dave had a hard lesson in humility that weekend as Josie walked away with two gold medals and a silver, while Dave settled for one silver medal.) After the judges' lunch, we all headed out in one of three packed buses for a pub crawl.

Upon our return, everything was set up for the awards ceremony. When it comes to awards, the folks who run the Bluebonnet don't mess around. In addition to the custom medals they had for first, second, and third place in each category, they gave out massive, beautifully painted steins (those things must have been at least a foot and a half tall) to all gold medal winners. Throughout the ceremony, beer paraphernalia (including a mountain bike supplied by Shiner Bock), several tons of grain, brewing equipment, and a three-tier brewing system were raffled off.

Whew, what an event! With three straight days of beer-related activities and over 300 attendees, not only did the Bluebonnet committee manage put on another great competition, but they did it seamlessly. Anyone who has organized a competition will know that this is no small feat. In addition, the homebrewers out there in North Texas were among the friendliest and most hospitable I have ever encountered. They are also some of the strongest supporters of the AHA I have come across. If you ever

2001 AHA Club-Only Competitions Styles

Month	Style or Name	Cat.#	Host
August	Witbier	19B	Gold Country Brewers Assn.
October	California Common	6C	Maltose Falcons
December	Mild Ale	10A	Brewers United for Real Potables

find yourself in the Dallas-Ft. Worth area in late March don't miss the opportunity to check out the Bluebonnet. I guarantee you will not regret it!

A final note on the Bluebonnet: I hope Tom Henderson of the North Texas Homebrewers Association is enjoying my prized '99 GABF hat. Tom insisted that all of the AHA staff members who had ever attended the Bluebonnet had given him their hats. Not wanting to be the guy to break the tradition, I surrendered my favorite cap.

I thank Dave Dixon for inviting me to the Bluebonnet and showing me a great time in Texas. I hope I can make it out again next year!

"The Best of the Irish" Stout Competition

The AHA would like to thank Keith Curtachio and the Niagara Association of Homebrewers for hosting the Stout Club-Only Competition held March 17, 2001. This was the fifth of six competitions in the August to May 2000-2001 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 the club representative brewers. There were 42 entries in the AHA "The Best of the Irish" Stout Club-Only Competition. Congratulations to the following winners:

First Place:

Matt Stinchfield representing the Rillito Creek Brew Club of Tucson, Arizona with his "Diagalev's Garden, Imperial Stout."

Second Place:

Sale Brown & Alan Nuss representing Foam on the Range of Aurora, Colorado with their "Fat City Oatmeal Stout."

Third Place:

Michael Harrington representing the Abnormal Brewers of Normal, Ohio with his "Sweet Stout."

Homebrew Club of the Year Standings

Points	Club
6	Barley Literates Homebrew Club
6	Barley Literates Homebrew Club
6	Club Scioto Olentangy Darby Zymurgists
6	Prairie Homebrewing Companions
6	Cincinnati Malt Infusers
6	Rillito Creek Brew Club
4	Brew Rats Homebrew Club
3	Fermental Order of Renaissance Draughtsmen
3	Redstick Brewmasters
3	Foam on the Range
2	Quality Ale and Fermentation Fraternity (QUAFF)
1	Niagara Association of Homebrewers
1	Abnormal Brewers

Soul of Wit AHA Club-Only Competition

The August AHA Club-Only Competition is Witbier. The competition is hosted by

Donna Bettencourt and the Gold Country Brewers Association.

The style for the competition is Witbier, Category 19B. One entry of two bottles is accepted per AHA registered homebrew club. Entries are required to have a \$5 check made out to AHA and an entry/recipe form and bottle i.d. forms. More information on the club-only competitions and forms are available at <http://www.beertown.org/AHA/Clubs/clubcomp.htm>. Please send your entry to:

Soul of Wit
C/o Hoppy Brewing Co.
6300 Folsom Blvd.
Sacramento, CA 95819

Entries are due by August 16, 2001. Judging is slated for August 18, 2001. Email for questions is bfreeman@saccounty.net.

Gary Glass is the Membership Coordinator for the American Homebrewers Association. When he isn't homebrewing he can be found working on his Masters Thesis in U.S. History.

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BY AMAHL TURCZYN

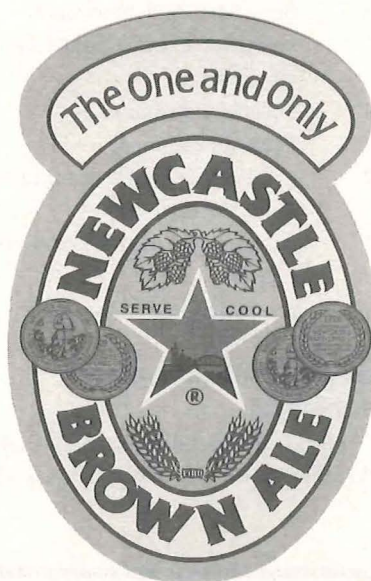
Newcastle Brown Ale

Newcastle Brown ale, or “Newkie Brown,” as it is affectionately nicknamed, has become one of the world’s most popular beers. The full, malty brew has a subtle butteriness and fruity aroma with just enough hop bitterness to finish dry and refreshing. But because of its relative lack of hop character, it is one of the most popular cooking beers. It is also a favorite accompaniment to a variety of spicy foods, and tends to be an excellent complement to pizza.

Coming up with a clone recipe for Newcastle turned out to be a considerable challenge, however, since its creator came up with an unusual method for brewing the beer. He figured that by brewing two beers of varying strength and fermenting them separately, he could produce a fruity, estery character typical of high gravity fermentations. But since he didn’t want a particularly big, sweet beer, he would blend the finished, weaker beer back in, to arrive at a medium gravity strength.

Scottish & Newcastle mention that they use high-gravity brewing to make Newcastle, but since they have a mild ale called Newcastle Amber, the theory is that they produce the stronger brown ale (which isn’t sold by itself) and simply blend it with the mild to make Newcastle. Judging from the fact that Newcastle Amber has an original gravity of 1.035, and Newcastle is listed as 1.040 to 1.045, it should be possible to recreate the traditional method by blending a “strong” wort of 1.050 with a weak wort of 1.035 in equal proportions.

For the grain bill, S&N uses two row and crystal malts, with additions of maize, torrefied wheat and cane sugar. The brewery is equipped with a cereal cooker to do the conversion of raw corn to a mashable form, but maize flakes should be easier for



homebrewers to use. While dark malts aren’t mentioned by the brewery, the characteristic deep, reddish brown color cannot easily be achieved with crystal malt alone without adding an overbalanced sweetness, so a very slight addition of black and chocolate malt is recommended. The sugar seems like an unnecessary fermentable, especially with the corn adjunct there to lighten the beer’s body.

Hops are not a huge factor in this beer, as mentioned above, so small, early charges of Goldings should be sufficient to balance the malt. Since S&N insists on bottling Newcastle in clear glass bottles, no doubt they have reverted to using refined hop oils which prevent the beer from light damage and skunking, but as homebrewers we can stick to the age-old method of hopping just as nature intended: with pellets!

You want to use a yeast with good attenuation, but that will leave a trace of diacetyl, for that distinctive buttery quality Newcastle is famous for. You also want

Newcastle Brown Ale Clone

Recipe for 10 gallons (38 L)

- 17 lb two row pale malt (7.6 kg)
- 2 lb 55° L crystal malt (0.91 kg)
- 3 oz black malt (85 g)
- 3 oz chocolate malt (85 g)
- 8 oz torrefied wheat (227 g)
- 2 oz E. Kent Goldings hops, 5% alpha acid (57 g) (90 min)
- 2 oz E. Kent Goldings hops, 5% alpha acid (57 g) (30 min)
- 1 tsp Irish moss (4.9 mL)
- Wyeast No. 1028 Special London or White Labs English ale yeast
- 0.75 c. corn sugar (177 mL) per blended 5 gallon batch, for priming

Brewer’s specifics: Mash grains at 154° F (68° C) for 60 minutes. Sparge into two kettles, one at a time, then adjust wort gravity to 1.050 and 1.035, respectively. Commence boil and add half the boiling hops to each kettle at the specified time, then half the flavor hops at the specified time. Chill to 64° F (18° C) and pitch yeast. Ferment out, then carefully blend the ales 50/50, and condition. The blended gravity should be right between the two finishing gravities.

- Boiling time: 90 minutes
- Original gravity, batch 1: 1.050
- Original gravity, batch 2: 1.035
- Finishing gravity, batch 1: 1.012
- Finishing gravity, batch 2: 1.008
- IBUs: 27 (assuming 25% utilization)

one that produces a moderate level of fruity esters. Wyeast’s London 1028 or White Labs English ale yeast both do a great job with this style.

For equipment, you may need to borrow a friend’s kettle and boiler for this one if you really want to do it right. If this is

Newcastle Brown Ale Clone

Extract Version of Newcastle Brown Ale Clone

Recipe for 5 gallons (19 L)

- 5.5 lb light dry malt extract (2.5 kg)
- 12 oz 55° L crystal malt (340 g)
- 1.5 oz black malt (43 g)
- 1.5 oz chocolate malt (43 g)
- 4 oz torrefied wheat (227 g)
- 1 oz E. Kent Goldings hops, 5% alpha acid (57 g) (90 min)
- 1 oz E. Kent Goldings hops, 5% alpha acid (57 g) (30 min)
- 1 tsp Irish moss (4.9 mL)
- Wyeast No. 1028 Special London or White Labs English ale yeast
- 0.75 c. corn sugar (177 mL), for priming

Brewer's specifics: Steep crushed specialty grains in 150° F (65.5° C) brewing liquor for 30 minutes. Remove grains, rinse with 170° F water, and bring wort up to a boil. Remove kettle from heat and add the extract, stirring to dissolve completely. Commence boil and add hops as detailed above. Chill to 64° F (18° C), pitch yeast, and ferment at 64 to 68° F (18 to 20° C).

- Boiling time: 90 minutes
- Original gravity: 1.045
- Finishing gravity: 1.012
- IBUs: 27 (assuming 25% utilization)

impossible, of course, you can simply brew the extract version, which is for five gallons. If you want to do an all-grain version for five gallons, substitute the 5.5 pounds of light dry malt extract for 8.5 pounds of two-row malt, use the same specialty malts, but half the amount for each, and add one ounce (28 g) Kent Goldings hops at 90 minutes and one ounce at 30 minutes.

As for conditioning, S&N gives their ales a few days of cold conditioning to smooth out the flavors...say 40° F (4° C) for three days.

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

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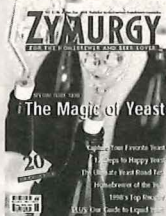
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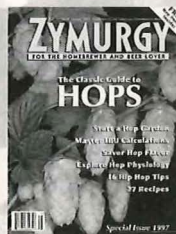
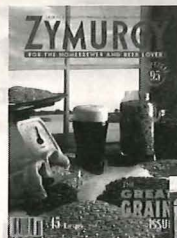
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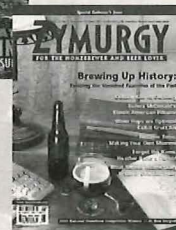
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The Strength of Squeezings: Apple Beer Formulation

Dear Professor,

I realize this may be a strange question, but in the book, *The Art of Cidermaking*, by Paul Correnty (Brewers Publication, 1995) on page 53 there is a recipe for Apple Beer which looks interesting. I am trying to figure out the approximate OG and the IBU so I can try this brew. I'm sort of new at this but am trying to learn. Maybe I should just relax and brew the recipe as stated but I'd like to know more about what I'm doing for future reference. Maybe that way I can brew all my beers better.

I plan to search for similar types of unusual brews. If you have any recipe suggestions, they would be most welcome.

Thanks,
James Arney

James, James, James,

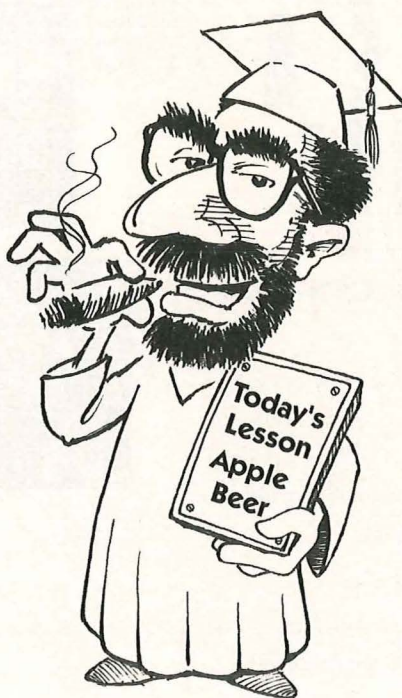
Me too! You're my kind of brewer. I like to know what I'm getting into just as you do. Flipping through the aforementioned book I see on page 16 a mention that the juice of North American apples is usually between 1.040 and 1.050. For the sake of averages let's assume 1.045. With this in mind I also take a look at other references that states one pound of corn sugar in one gallon of water gives a gravity of 1.044 (close enough to 1.045, eh?) so if the recipe calls for two gallons of juice then that's like adding two pounds of corn sugar. Putting all this into my homebrew recipe formulator software I formulate the recipe for five gallons and calculate the gravity using two pounds of corn sugar, one pound of honey and 6.6 pounds of malt extract. The result is a predicted gravity of 1.072 (18° P). What will the final alcohol be? Well if we make an assumption that you'll get about 80 percent attenuation (final grav-

ity of about 1.014 (3.5° P)) then that'll give you about 7.7 percent alcohol by volume.

Now about those hops. Let's make some assumptions. Using whole Cascade hops at five percent alpha acid and your boil is a concentrated boil of three gallons with all the fermentable ingredients in the boil (adding two more gallons of cold water in the fermenter) then your bitterness would be about 17 IBU. Here are a few more scenarios

2.0 oz. Cascade hops at 5 percent alpha acid; 60+ minute boiling time

Form	Volume boil	Bitterness
whole	3 gallons	17 BU's
whole	5 gallons	20 BU's
pellets	3 gallons	19 BU's
pellets	5 gallons	23 BU's



James my man, this should get you on the right track. And thank the lord of fermentation for dependable beer recipe software.

Sipping Cider,
The Professor, Hb.D.

At Wit's End

Dear Professor,

I need your opinion. I started a batch of Belgian White on Sunday (3/11/01). By Monday morning there was no activity at all so I opened the fermenter and stirred the batch vigorously. By Monday night when I checked it, the fermentation had gotten so active that the foamy "stuff" had gotten into the airlock and plugged it up. I was able to get the lid off and clean it up before there was an explosion. I checked the beer again on Tuesday evening and the same thing had happened only this time the top had popped off. I had the whole fermenter in a large plastic bag so I luckily had a small mess to clean. My worry is that the beer sat with the lid off the fermenter for some period of time. Will this most likely ruin the beer? The large amount of yeasty foam was not particularly good smelling, but it may just be a yeast smell. The airlock was partially plugged again on Wednesday night, so I cleaned it all up again. Do I have any chance at saving this batch?

Regards,
George Musselman
Elkhorn, NE
Well George, I'll tell ya',

I'm sure by now you're enjoying a very good batch of Belgian White beer, dispelling your previous anxieties. You're also probably practicing the mantra, "Relax. Don't worry. Have a homebrew." Right?

It's most likely that your impatience got the best of you and you really didn't have to

And thank the lord of fermentation for dependable beer recipe software.

make that stir on Monday morning. The yeast would have gotten a hold despite your worrying. Sounds like you had a bit of a conflagration with the yeast getting overactive, but that's probably okay with this "fruity" style of ale. Likely your fermentation temperatures were on the higher end of the good range to ferment and consequently you had some pretty darn active and happy yeast. Being a Belgian White beer I'm supposing you had a bit of wheat in the recipe as well. That along with warmer temperatures caused a lot of great foam in the kraeusen stage. You're also probably enjoying great head retention on your brew as well (as long as fermentation wasn't too warm).

Yeah sure, there is a degree of risk exposing your fermentation when you opened the lid, but as long as the wind and dust weren't blowing through the room and you didn't sneeze into the fermentation you are okay. I'm sure the yeast had a good hold of the wort and thus inhibited any bacteria or wild yeasts that you may have (not very likely) introduced. The nice thing about Belgian White beers is that part of the character is about being fruity and clove-like phenolics, so if any airborne contamination did occur (again very unlikely) they may have simply accented your beer in the same direction for which it was destined.

Hope you're well on the way through your next batch by now.
The Professor, Hb.D.

Life on this Planet Music

Hello Professor,

I have read Charlie Papazian's article in *Zymurgy* (March-April 2001) about the influence of music on yeast (experiment of Teo Musso de Le Baladin). I have spoken with some friends and homebrewers and we discussed one perceived problem.

Some claim that yeast are only a fungi, a more elementary form of life on this

planet. Because they are single-celled microorganisms, they do not have sensory organs of any type, therefore it is extremely difficult [to believe] that they can be influenced by the sonorous waves of music.

I wish therefore to ask if you know of some other experiment or study about the influence of music on yeast.

Thank you,
Enrico Pastori
Nerviano, Milano, Italy

Yo Enrico,

No, I don't know of any other experiments... Yes, yeast are fungi, but sound is just a form of energy waves; vibrations. Though fungi may not have ears for hearing as we do, they respond to energy input stimulus such as pressure, heat, motion, and vibrations. In my world of being I am confident that some day curious scientists motivated by fame and fortune will prove that microorganisms such as yeast are influenced by the vibration patterns of what we call music. I'll let you know if I hear of anything else and please you do the same for me.

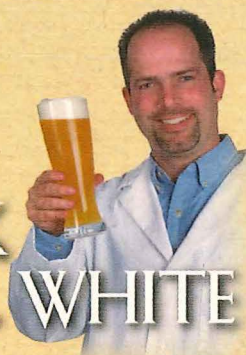
I'm all ears,
The Professor, Hb.D.

Bottom Line Barley Wine

Dear Professor:

I'm in the process of making my first Barley Wine. The recipe I used stated that my original gravity should be 1.090 to 1.094. Mine was 1.068. Perhaps this was a result of using six gallons of water instead of five gallons. The final gravity is supposed to be 1.019 to 1.024 with a nine percent alcohol by volume. It is supposed to age a minimum of one year. Because of the low original gravity I will not attain the nine percent alcohol by volume. It will probably be around six percent. Finally the question. Because of the assumed 6 percent alcohol

ASK DR. WHITE



Dear Dr. White,
I have just made my first lager. I pitched the yeast at 80° F, then brought the temperature down to 42° F. What is your opinion of this technique?

Gregg Updike

Dear Gregg,
There are several ways to start lager fermentations. My method is to let the beer stay at 70-75° until you see active fermentation. Ester production is very minimal during the lag phase. Then slowly lower the temperature (averaging 1° per hour) to 50-55°. Raise the temperature to 60-70° near the end of fermentation and leave it there for 3-4 days; this is the diacetyl rest. Then cool to about 40° over 2 days, and lager there for 2-4 weeks. Good luck.

Chris White, Ph.D.
Owner, White Labs

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should I or should I not age the Barely Wine for one year??

Yours,

Larry Fuller

Colebrook, NH

Dear Larry,

The bottom line is that if it tastes great at one month enjoy it. Will it get better at 6 percent? Can't say for sure, but if you charged it with a lot of hops I imagine it will meld and mellow a bit with three or four months of aging and be more enjoyable.

Now about your predicted gravity and the actual gravity. If you were using extracts then going from five gallons to six gallons should have got you about a gravity of 1.077. I suspect that you hadn't mixed your wort very well and as a result you measured 1.068 of a diluted wort that may have been stratified on the top of your fermenter. Now then if this were an all-grain brew and the recipe justified a 1.092 gravity and you only got 1.068 your extraction efficiency is way off. Somewhere in the neighborhood of 70 percent efficiency rather than 80 percent. Now this is okay and very plausible. But with a reasonable crush of grain and the simplest of mashing techniques (particularly if you are using a two-step mashing technique) you should get 80 percent efficiency. I use a stove-top brewpot to mash and transfer to a plastic bucket configuration to strain and lauter and I consistently get 85 percent.

So much for "what could have happened." I'm sure what did happen is that you are enjoying a great strong ale right now.

Bottoms up,

The Professor, Hb.D.

Remembering Vern and Rooting for Root Beer

Allo Perfesser:

I have a question that hopefully you can clarify for me. I recently got into the wonderful world of keggering after about five years in the hobby. My nieces, nephews, young cousins, etc. haven't really taken to Imperial Stout as quickly as I thought, so I figured I'd whip up a batch of root beer for them. I checked Mr. Papazian's Home Brewer's Companion and decided to give his MacJack recipe a shot. Normally, I like

to see a fellow Jersey Boy do good in life, but I think there's a problem with the recipe. I gave it a shot, and the results were much like eating a jar of molasses. The recipe calls for three quarts, but that is way too strong. I tried splitting the original five gallons into three batches by getting double the original amount of roots and steeping it in plain water. I got 15 gallons (with assumedly the correct amount of roots) and added some sugar to boost the sweetness. The result is closer, but the molasses is still up there. I usually don't detect molasses in root beer. I think Mr. Papazian may have been up on Mead Mountain when he wrote that recipe. His lungs and brains were probably loopy by the lack of oxygen (and good old NJ Turnpike air). If you could clear this up for me, I (and the youngsters) would appreciate it.

Thanks,

Glenn Langowski

BZ (Bachelor of Zymugizm)

Working on my MBA (Master of Brewing Artistry)

Dear Glenn,

Is it Vern I'm remembering? He and Gordon Possein were great long softball hitters in sixth grade—what a line-up. Charlie Papazian says Vern nick-named him "Spuds" in fourth grade because he had trouble pronouncing Papazian; it came out something like "potatoes," so hence spuds... oh well enough of that. Say hello.

Meanwhile, I suspect the recipe should have clarified that the molasses intended to be used is a light brown molasses. Betcha you used something akin to blackstrap molasses. Whoops. To tell the story, that recipe was adapted from Mother Earth News magazine back in the early 1970s. There are probably all kinds of molasses out there. Well now you know, go easy with the type of molasses you have or find a lighter tasting version.

Let's all root for root beer,

The Professor, Hb.D.

Send your homebrewing questions to "Dear Professor," PO Box 1679, Boulder, CO 80306-1679; FAX (303) 447-2825 or professor@noh.org via e-mail.

A History of Spontaneous Fermentation

Serendipitous combinations of alcohol-producing yeast and sugary liquids no doubt led to man's discovery of ethanol. These include:

Beverage	Substance
Mead	honey and water
Wine	crushed grapes
Cider	crushed apples
Beer	grain and water
Sake	cooked rice and water

- Spontaneously fermented examples of many of these beverages can still be found today.
- Where conditions allowed, bacteria thrived along with yeast. Their flavors became accepted as a part of the beer profile.
- For centuries, a stick or plank transferred fermentative power from beer to beer. Brewers called the mysterious fermentation stuff "God is good."
- Only in the last 125 years have brewers been able to identify and isolate the microbes feasting on their beers.

That's the Size of It

<i>SACCHAROMYCES CEREVISIAE</i>	6-8 MICRONS
<i>LACTOBACILLUS</i>	2 MICRONS (LENGTH)
<i>ACETOBACTER</i>	0.6-1.0 MICRON
<i>BRETTANOMYCES LAMBICUS</i>	20-30 MICRONS (LENGTH)
<i>ASPERGILLUS ORYZAE</i>	40-50 MICRONS (LENGTH)

It's Natural!

The bacteria and yeasts that play a role in production of some beers also aid in the production of other food products, including the following:

Vinegar	Bread
Cheese	Yogurt
Pickles	Soy Sauce
Sauerkraut	

Like beer, nearly all these foods were "discovered" by spontaneous and serendipitous combinations of the organisms with the various foods.



We would like to extend a special thanks to Wyeast Laboratories for help in preparing this edition of Fast Facts.

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Fast Facts

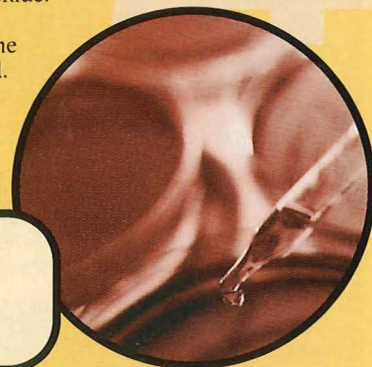
A MASS OF MICROBES

- Microbes are the oldest life form on earth. Fossils of single-celled creatures date back at least 3.5 billion years! We humans only came on the scene about 2 million years ago.
- Bacteria are found in every climate and environment on earth from arctic ice to volcanic vents.
- A single teaspoon of topsoil contains more than a billion bacteria.
- A teaspoon of topsoil contains about 120,000 fungi.



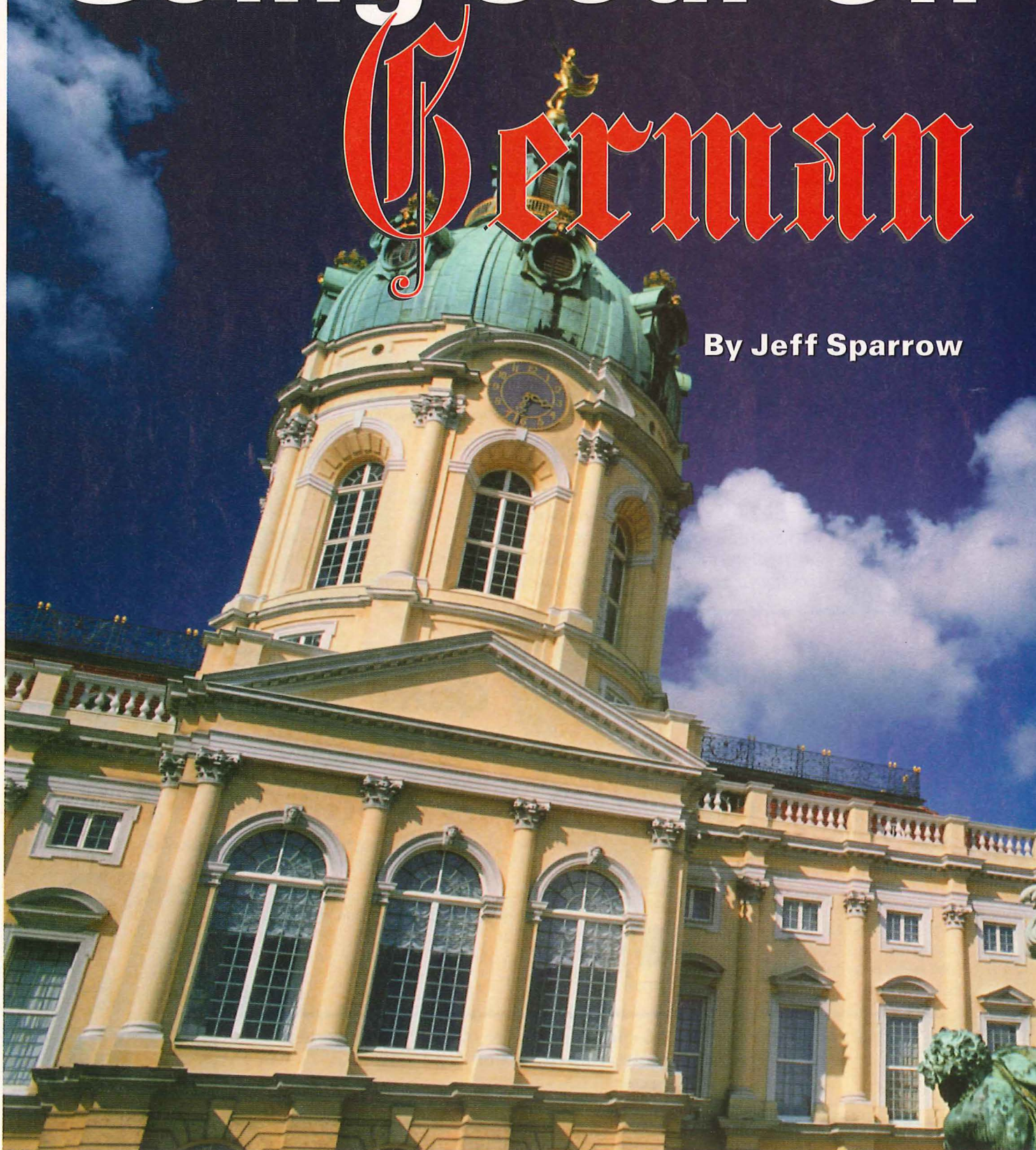
Quite an Appetite

- Yeast are cannibals: when lacking food they consume the remains of their brethren for nutrients.
- In addition to sugar, yeast require nitrogen—in the form of amino acids—and oxygen for their growth.
- One pound of glucose (sugar) produces about one half pound of ethanol and one half pound of carbon dioxide.
- During fermentation, one yeast cell can consume up to 8 million molecules of glucose per second.



Going Sour On German

By Jeff Sparrow



Beer

Berliner weisse, a crisp, refreshing wheat beer with a quenching sour character can, by German law, be produced commercially only within the city of Berlin. Seemingly more Belgian than German, it is fascinating that this beer style is produced in the same country that also gives us many of the cleanest beers in the world. It is primarily enjoyed in the cafes of Berlin, as you would never see one being consumed in the beer gardens of Munich. Whether because of its misfit status in its homeland or simply because its production is little understood, this style is mostly ignored by homebrewers.

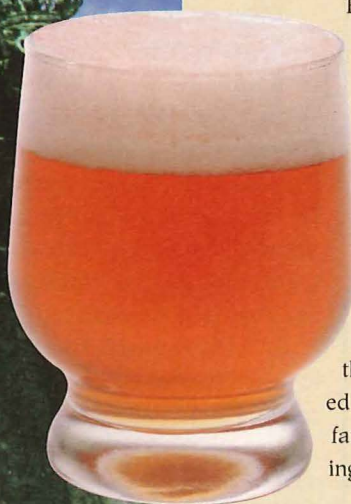
A Short History Lesson

While its precise origins are unknown, some think this style may owe its beginnings to the Senne Valley near what is now Brussels and its lambic beers. Some references date weisse as far back as the 1600s when the Huguenots—religious refugees from France and Switzerland—migrated through Flanders on their way to Berlin. Like lambic, the Berliner weisse recipe includes a portion of wheat. Another similarity is that fermentation involves not only a traditional top-fermenting ale yeast (*Saccharomyces cerevisiae*), but also an acid-producing bacteria (*Lactobacillus delbruckii*). Analyses from the late 1800s also indicate the presence of other yeasts and bacteria such as *Brettanomyces* and *Pediococcus* species.

While the lambic connection is romantic, lactic acid bacteria are commonly found on raw grain and all the species connected to this beer are well-known brewery pests. Thus it is likely that the mixed fermentation of this Berliner style evolved naturally from the unsanitary brewing procedures employed long before the involvement of yeasts and bacteria in brewing were understood. Clearly however, the survival of the style must be traced to consumer acceptance of the resulting product and we have some notable indications that this has long been the case. The most celebrated drinker of Berliner weisse was Napoleon, who in about 1806 is credited with describing this beer as “The Champagne of the North.”

At one time, as many as 700 different breweries made beer in this style. Yet despite its long and somewhat colorful history, today only two breweries still regularly produce Berliner weisse: Kindl Brauerei and Schultheiss Brauerei. Perhaps things would have been different if JFK had only said, “Ich bin ein Berliner weisse?”

Kindl Weisse is the only one of these two available in the US and is imported by B. United of New York. It is straw-colored in appearance and generally clear. As you would expect from a beer once compared to champagne, it can be rather bubbly and produces a dense, white head that may quickly fade. It is crisply dry and sour but without the overly acidic taste that often characterizes a proper lambic. B. United recommends serving Kindl Weisse with highly fatty foods since the acidity will cut the thick filling flavors and mouthfeel.





Producing Berliner Weisse

In Germany this style falls into the Schankbier classification, denoting an original gravity of 7-8° Plato or 1.028-1.032 S.G. The finished beer has an alcohol content of 3.0-3.2 percent alcohol by volume. Over a century ago there were many types of Berliner Weisse including a Starkbier of 1.064-1.072 S.G. but shortages of wheat during the First World War caused brewers to lower the strength.

Unlike lambic, which uses unmalted wheat, Berliner weisse employs the malted commodity. Historically the wheat accounted for the majority of the grist, with proportions as high as 80 percent noted in the late 1800s. Today's brewers use quantities that equal just 30 to 50 percent of the grist with the remainder composed of pilsener malt. The proportion of wheat malt used in Kindl Weisse is on the low end of the modern range while Schultheiss comes in at the higher end. In both cases, the finished beer color is very light, about 2-3 SRM or 4-5 EBC. It will be difficult to achieve this color with malt extract, but for those who wish to try I would recommend the palest dry extracts you can find.

The hopping level is low, approximately 5-9 IBU. Given the acidic tartness of the beer as well as its low gravity, little bitterness is needed to counter the sweetness of the malt. In addition, brewers believe that alpha acids inhibit *Lactobacillus* growth. Berliner weisse brewers take a unique approach to hopping by adding whole hops to the mash. Mashings made with the high proportions of wheat seen historically would have been easier to lauter when the hops were added this way. Keep in

mind when calculating your hopping levels that utilization is extremely low when the hops are added in this manner. I would approximate utilization as low as 12 to 15 percent. Malt extract brewers must simply keep in mind the low IBU level.

A triple decoction mash has traditionally

been used for making Berliner weisse. At least one procedure indicates that the hops were added to the first decoction and thus boiled for about 15 minutes before being added back to the mash. Of course the key driving force behind decoction mashing historically was the use of undermodified malts. Today, a multiple-step infusion mash is probably sufficient and indeed this is the technique used by the Schultheiss Brauerei. Unlike the lambic, which has unmalted wheat to convert, all of our grains are reasonably modified. Of course if you want to decoct, go for it.

Now it's time to boil the beer, right? Well, not exactly. Historically, these worts were not boiled at all. Instead, the wort was run off, cooled and sent directly to fermentation. While this creates ideal conditions for *Lactobacillus*, it also favors the growth of other organisms that may be present in unboiled wort. Today, the Kindl Brauerei boils for only 15 minutes to achieve wort sterilization. Kuplent, in his



Unter der Linden Weisse

My general step-infusion recipe. Experiment for yourself.

- 50% German Wheat malt
- 50% German Pils malt
- Target gravity 1.030 (7.5° P) - you best know your extraction
- 1 oz. (28 gms) leaf hops at about 5.0% alpha acid (type really doesn't matter)
- Use 1.33 quarts (1.25 l) of water per pound of grain
- Mash for 10 min. at 99° F (37° C)
- Mash for 20 min. at 126° F (52° C)
- Mash for 45 min. at 144° F (62° C)
- Mash for 30 min. at 162° F (72° C)
- Mash out at 172° F (78° C) for 10 min
- Sparge at 180° F (82° C).

The amount of sparge water depends on how much mash water you started with. Top up your kettle as necessary. Simmer wort in kettle for 30 minutes at 194° F (90° C). Cool to 65° F (19° C). Pitch *Lactobacillus*: 500 ml of 1.030 (7.5° P) starter wort inoculated with a 50 ml (1.7 oz) culture. Wait 2-3 hours before pitching yeast. Pitch top-fermenting ale yeast: 500 ml of 1.030 starter wort inoculated with a 175 ml (6 oz) culture. I use a Kolsch yeast.

Ferment above 68-70° F (20-21° C) for five days. Ferment in secondary for one to three months at 66-68° F (19-20° C). (If you choose not to go with a *Lactobacillus* culture you may add your food-grade lactic acid from here on.)

Prime with 4.375 oz. (125g) dextrose and a fresh Kolsch yeast. Age at least three months before serving. Save me a bottle!

widely respected article on Berliner weisse, cites one source that recommends sparging with boiling water to keep the runoff above 176° F (80° C). While this practice may extract some tannins from the grain, they may actually enhance the dry mouth-feel expected in this style. A third option is heating the wort to about 190° F (88° C) for 30 minutes. Keep in mind that since the boil is short or nonexistent, you have little or no evaporation. As a result both the volume and gravity of the wort you run off from the mash should be what you want to begin the fermentation with.

Berliner weisse is fermented with a combination of top-fermenting ale yeast (*Saccharomyces cerevisiae*) and lactic acid producing bacteria (*Lactobacillus delbrueckii*). Unlike lambic, where each organism appears to take its turn producing flavors, these two organisms work as a tandem. The precise strain of bacteria is important as not all produce flavors found to be pleasant in beer. Once your wort is cooled, inoculate with the *Lactobacillus*. Let it sit for a few hours before pitching your ale yeast. One reason we usually want primary fermentation to begin quickly is to stop the development of unwanted organisms—the exact opposite of what we want to do with this beer.

Despite the name, you do not want to use a “German Wheat Beer” yeast to produce this style. Beers with that label are intended for making Bavarian-style Weizens that include a pronounced phenolic-clove character as well as significant banana flavors. These attributes do not belong in a Berliner weisse.

Before pitching, cool your wort to at least 68° F (20° C) and ferment anywhere from 57-77° F (14-25° C). Both Warner and Kuplent prefer the low- to mid-points of this rather broad range while Jackson and B. United refer to the mid- to upper-temperatures for fermentation at the Kindl and Schultheiss Braueries. The amount of acid produced depends on the fermentation and pitching temperatures as well as pitching rates. The higher the temperature and the more *Lactobacillus* you pitch the more acid will be pro-

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duced. A ratio of 5:1 ale yeast to *Lactobacillus* is a good median but such precision can be difficult to achieve at home. Given the nature of these organisms, starters for both yeast and *Lactobacillus* are required. I simply begin with a bigger yeast culture than bacteria before making the starters. Give the *Lactobacillus* starter some time to grow. A healthy top-fermenting yeast starter will quickly try to kill off any competition for its food source. See the recipe for my usual volumes. Experiment with the temperature and pitching rates to your taste for sourness and acidity.

So, do I really have to use this *Lactobacillus* stuff? Well, yes, if like me you produce beers to see if you can do it in a particular way. I find that challenging styles such as this help me to break the monotony of a steady diet of “heat the water, mash at 154° F,” etc. That’s not to say you can’t take a shortcut and still produce a reasonable batch. Many homebrewers are unable or unwilling to go to these lengths to produce a beer. Their option is to add food-grade lactic acid to their secondary or their beer just prior to bottling. Some homebrew suppliers stock small five ounce (148 ml) bottles of 88 percent lactic acid that is basically the correct amount for a five gallon

batch. My experience is that you will get the sourness from the acid but not the complexity that the bacteria will produce. Neither will your beer change and develop as much over time as the beer matures. If you are using malt extract however, this may be the way to go as extract worts may lack the nutrients needed from proper *Lactobacillus* growth.

This style is about acidity and sourness. Whichever option you choose, some sort of method must be used to impart ample amounts of these flavors to your beer. If the sourness in your genuine Berliner weisse is lacking, the problem most likely stems from unhealthy or underpitched *Lactobacillus* or your top-fermenting ale yeast overpowered your bacteria (or you simply did not add enough lactic acid.) The complete flavor profile can take some time to develop. An overpowering or unpleasant sourness can be caused by just the opposite. That, or some unwanted organisms have joined with the *Lactobacillus delbrueckii* in souring your beer. This is one reason a sour mash is not used in the production of Berliner weisse. The appropriate levels of acidity would be difficult to reach—particularly at home—without other bacteria becoming involved. Also,

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The Kühle

Blonde of Berlin

"Berlin is the city of all others where the 'Kühle Blonde,' or 'cool fair maiden' as weissbier is poetically termed by its admirers, is obtained in the greatest perfection, and where "bier stubes" offering no other beverage but this to their customers, abound. Weiss bier is invariably kept in stout stone bottles, doubtless because the large quantity of carbonic acid (CO_2) it contains would invariably burst them if they were of glass. The guests being past middle age, if three score and ten be taken as the standard of human existence, their rosy gills and capacious waistbands attesting a familiarity with, at any rate, some of the good things of life. In front of every one stands a gigantic tumbler which might be fitted with ease on an ordinary head, and which contains a liquid pale and clear as Rhine Wine, surmounted by a huge crown of froth not unlike a huge cauliflower. This famous "weiss," the mere mention of which suffices to send a Berliner into raptures.

"A quart bottle of the beer scarcely fills more than a third of the huge glass, its voluminous head of froth not only occupying all the remaining space, but foaming over at the sides; hence the necessity for such capacious receptacles, which a novice is only able to raise to his lips by the aid of both hands. Not so, however, the experienced beer toper, who by long practise has acquired the knack of balancing as it were the bottom of the glass on his outspread little finger while he clutches the side with the remaining fingers and thumb of the same hand, and thus conveys the huge tumbler to his lips. With the habitual Weiss Bier drinker a preliminary nip of kümmel [caraway schnapps] is derigeuer, and after he has partaken of this he will lap up his four quarts of Kühle Blonde as readily as his native sand sucks in a summer shower, exciting his thirst perhaps once or twice during the operation by some salted delicacy such as a lamprey. Weiss bier is drunk by preference when it is a certain age, and in perfection it should be largely impregnated with carbonic acid, and have acquired a peculiar sharp dry and by no means disagreeable flavor. To the ordinary unstrung Berliner, a moderate quantity of the "weiss" is as soda and brandy to a blasé Englishman. After an evening of excess, the following morning his steps invariably lead to the weiss bier stube, there to quench his feverish thirst with a draught of Kühle Blonde, and stimulate his palled appetite with "knoblauch-wurst," a delicacy of the favorite sausage type fried with garlic."

—Henry Vizetelly, 1875



the *Lactobacillus* would be killed during the sterilization of the wort.

You can keep this beer in a secondary for long periods of time. I generally have done one to three months, but Schultheiss will age their beer for up to one year. At the Kindl Brauerei, there is only a cold maturation period of one week at 32° F (0° C). This is a highly attenuated beer and the final gravity is as low as 1.002-1.006 SG or 0.5-1.5° Plato. Lactic acid bacteria must ferment a carbohydrate source so they will go on looking for the few remaining sugars to consume—some that the top fermenting yeast can not digest—long after primary fermentation is complete for an apparent attenuation of greater than 98 percent. The acid levels are, much like with lambic, important to contribute to the mouthfeel so the beer does not resemble water.

Bottle your weisse like any other beer. Unless you saved a couple of quarts of unfermented wort from your brew, you will prime with sugar or malt extract. Warner, in his book on German Wheat Beer, recommends about 4.1 volumes of CO_2 , similar to a German Weizen. The Kindl Brauerei bottles with an even four volumes. Many brewers are afraid of increasing lactic acid levels after bottling since bacteria will go right on multiplying, different than yeast. Indeed, Kindl Weisse is filtered but this is probably to get a consistent product. The amount of acid produced has already been decided by your pitching and fermentation parameters. Schultheiss actually adds a fresh *Lactobacillus* culture prior to bottling (so it may be a good candidate for a yeast culture) and stores them at up to 77° F (25° C) for several weeks before selling the beer. Kindl Weisse is krausened with a top fermenting yeast and then warm-conditioned in the bottle for four weeks at 68-77° F (20-25° C). *Lactobacillus* inhibits the growth of yeast so depending on how long you aged your beer in the secondary you, like the Kindl Brauerei, may also choose to use a bottling yeast.

According to Jackson, the Schultheiss Brauerei blends a small portion of three- to six-month old wort with a new batch during primary fermentation. During bottling, the beer is then blended with a portion of wort that has fermented for only one day. This krausening is reminiscent of the blending of old and young lambics prior to bottling (as gueuze) to provide carbonation, efferves-

PHOTO COURTESY OF KENDALL SMITH
BEER PHOTO COURTESY OF BOB GOLDMAN

cence and complexity. Blending may be an interesting experiment for the advanced—and patient—homebrewer.

Like most beers, Berliner weisse is best stored around 50° F (10° C). Like most homebrewers, however, I don't have much control over the temperature of my cellar. It reaches a reasonable high temperature of about 68° F (20° C). This beer is warm-conditioned, so moderately higher temperatures are unlikely to have an extremely negative affect. I've not had any batches go odd in the cellar (no more so than they began!) Kindl Weisse becomes flowery after an extended maturation. According to the Kindl Brauerei, their beer will keep comfortably for two years or more in cellar conditions, so don't drink yours all in one place.

Enjoying Your Brew

The lasting fun of this style doesn't stop once the beer is produced and possibly aged. How many beers can you mix with fruit syrup and drink with a straw—yes, a straw—and still sit in beer-geek pride amongst the stares of the folks in your local? I think the Berliners' use of a straw demonstrates just how thirst quenching this beer is considered. It is often served in a large, stemmed glass resembling an ice cream schooner. Drink it like a nice, fizzy phosphate!

For Gueuze fans, such as myself, this beer can be enjoyed on its own. A mixed drink booklet from the Kindl Brauerei suggests using Kindl Weisse as a mixer with a variety of other beverages to create unique quenching and refreshing "cocktails". The most common is with some form of raspberry syrup—in German they say, "mit schuss." Make sure you don't get a syrup that is too heavy or it will settle to the bottom instead of mixing with the beer. My preference is woodruff syrup. Woodruff is an herb with a sweet vanilla taste and aroma. The only place in the US to find woodruff syrup seems to be from the bars (or distributors) who sell Kindl Weisse. Too much syrup kills the style but the right amount will give a pleasant sweetness.

Those who don't like fruit in their beer at all but still find the weisse too tart may add varying amounts of Pils. During a visit to Berlin a number of years ago I was surprised to see a drinks menu recommend the beer with a shot of (presumably caraway)

schnapps. Why not experiment for yourself and try something different? I'm convinced drinking this sweet, colorful beer is a good ice-breaker in a pub with the ladies but, alas, I have no results to support my claim.

Like other "sour" beers, Berliner weisse is a disappearing style. The two breweries that still produce it do so only in small quantities. As homebrewers, however, we do not face the same reasons for producing particular beer styles. Weisse can be a simple undertaking or an interesting experiment in fermentation. Those who are looking for a different type of brew and have a "sour disposition" need look no further.

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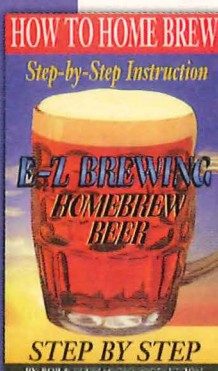
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Jeff Sparrow has been a homebrewer for 10 years and is currently the President of the Chicago Beer Society and a Regional Coordinator for the National Homebrew Competition. His favorite styles to brew and drink are generally Belgian ales but he recently took a best of show type award with a Berliner Weisse. His frequent travels have taken him around the world to try different beers at their source and talk with their brewers. When not drinking beer he is usually on his bicycle trying to work it off.

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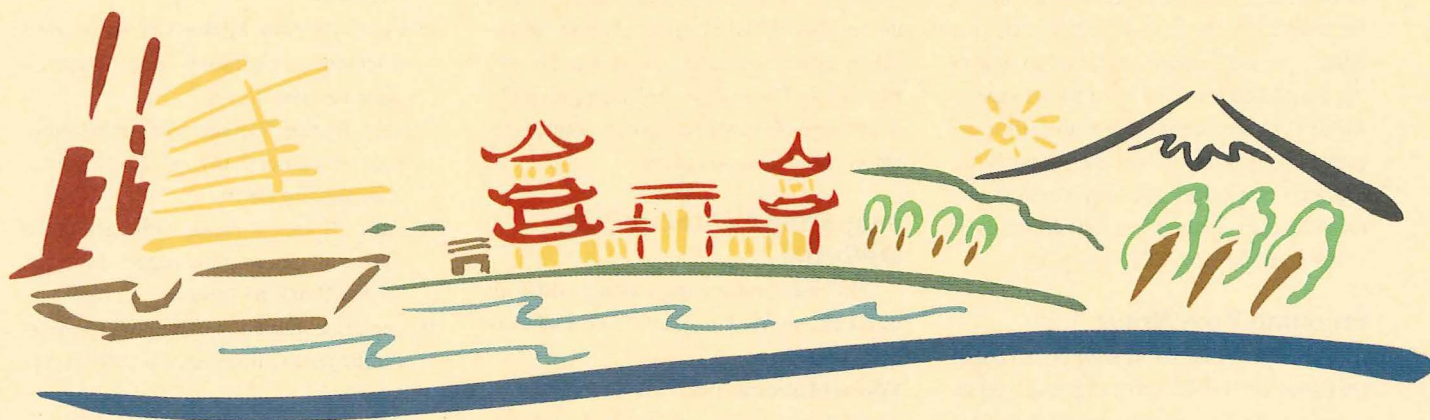
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The Subtle



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The beverage known as sake (pronounced sah-keh) has a long and noble history in Japan. It is one of a group of alcohol products made from rice. Technically, since sake is made from grain, it is a beer; but there is far more to it than that. This is no ordinary beer. Indeed, many believe it is the most complex alcohol beverage on the planet.

For starters, sake has much more alcohol than beer—or even wine. In addition, there are some 600 compounds in sake giving it a subtlety that is legendary. This alone makes it a fun beverage to brew or to drink. Moreover, to simply sit and savor sake has intrigued many an ancient poet, and there is much to savor and contemplate. Actually, the Japanese have a whole vocabulary to describe the various subtleties of sake—I'll introduce you to some of their terms as we go along.

Modern Japanese sake was first produced and developed from the 12th to the 16th centuries. *Seishu* (refined sake) is the result of a triple ferment. First, the starch in the rice must be made fermentable. This was accomplished originally by the growth of a natural mold (called *kamutachi* in Japanese and *Aspergillus oryzae* by scientists) which changes starches to fermentable sugars. The presence of sugar attracted natural souring bacteria (*Lactobacillus* species) acidifying the mass and setting the stage for a natural yeast (*Saccharomyces cerevisiae*) fermentation to take place changing those sugars to alcohol and carbon dioxide. By the end of the 16th century, a technique known as the “doubling process” had been developed which makes it possible to produce sake with 20 to 21 percent alcohol by volume (abv).

Thus we see that five elements—rice, water, mold, bacteria and yeast—set the stage for a triple simultaneous multiple parallel ferment. (Really!) Three different fermentations all at once! How can anyone resist brewing such a beverage?

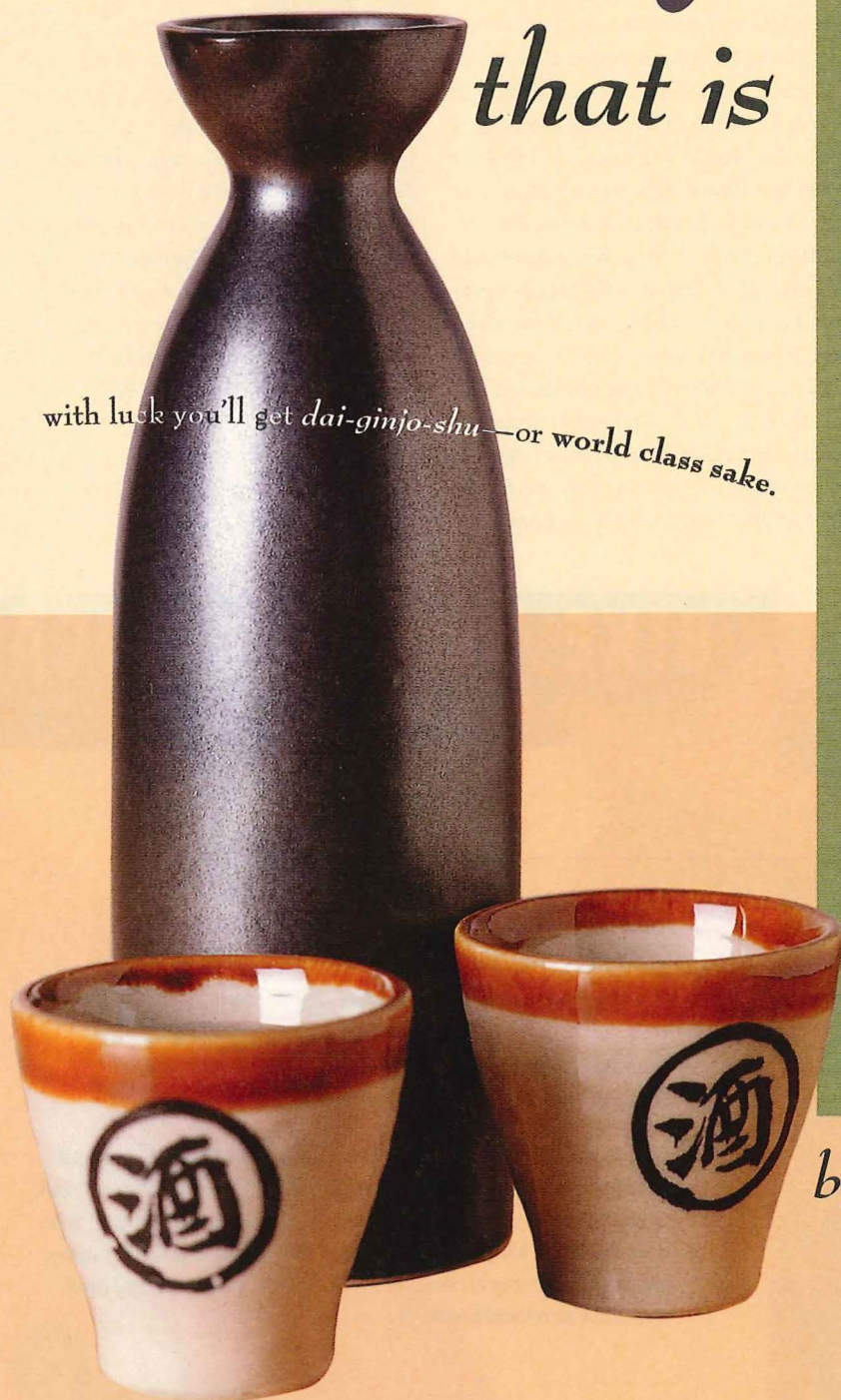
Sake—A Historical Perspective

The whole category of beverages made in this way includes sake and many others. I call this beverage class “*jiu*” (pronounced “joe”) after its Chinese name, for which the Japanese word is “*shu*” (pronounced “shoe”). Sake is arguably the most complex member of the *jiu* group.

Glory

that is

with luck you'll get *dai-ginjo-shu*—or world class sake.



S

A

K

E

by Fred Eckhardt

The Chinese wrote about *jiu* at least as long ago as 1,700 BC—that's nearly 4,000 years ago! Thus for several millennia, Chinese poets have waxed long and enthusiastic on the delights of *jiu*. My favorite of these is Li Bo (T'ang dynasty, 9th century) who wrote, "The rapture of drinking, and *jiu*'s dizzy joy, no sober man deserves to enjoy."

The Japanese version of *jiu*, refined sake, is more recently on the scene. They no doubt discovered crude sake on their own. Such ancient sake was a product similar to today's *doburoku* (single-stage homebrewed farm sake). It was usually eaten, or slurped, from a rice bowl, as a mushy rice and alcohol mash, with some six to nine percent abv. *Doburoku* is still consumed in this fashion, even today. Actually, there are ancient sake cups (dating from the 5th century) with a "straw" built into the bottom of the vessel to assist this type of consumption.

By the 12th century, the Chinese had developed some innovations to enhance their product and the Japanese picked up

on these. The multiple-step doubling system which we will discuss below was probably one and pasteurization another.

The upside of all this was that by the end of the 16th century the Japanese had developed something close to the modern method of brewing their sake. This brewing system, aside from the understanding of the various microorganisms involved and the interjection of a number of modern refinements, has remained pretty much the same for the last four hundred years!

The ancient Japanese book *Tamon'in Nikki* tells of monastic sake brewing at Nara's Koufukuji Temple in 1599. It details the doubling system still in use today and also describes the use of *hi-ire*—a heating process that was essentially pasteurization. Use of this process predates Pasteur by nearly three hundred years. Pasteurization of all *jiu* was essential because ancient sake contained live *Lactobacilli*, which can swiftly sour any alcoholic beverage. The Asians of that era had no insight as to why they were pasteurizing *jiu*. Hence, no precautions were

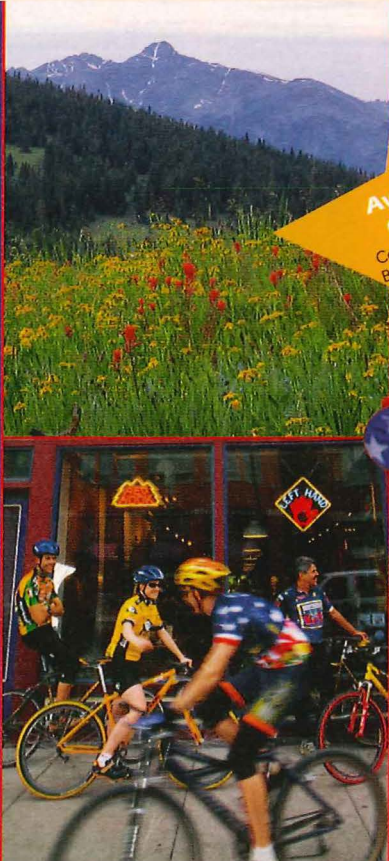
taken against reinfection and the cooling sake was exposed to the same bacteria when returned to the original vessel. The end, of course, is that they had to heat the stuff quite regularly, and at great expense. This may be why sake came to be consumed warm. Only in the last century (the 20th) have we really begun to explore room temperature and chilled sake service.

Modern sake has a rich history of ceremonial service. You don't just pour it and slug it down. One never drinks alone, and one never drinks without a food accompaniment. The ancients were very careful about these niceties. In modern times we have found that many sake types are best when served at room temperature, or chilled but a few are served warm, especially in winter. Incidentally, hot sake is a worse abomination than even light sake. Sake can be heated, but when it gets to about 135° F (57° C) it turns bitter. Most brewers recommend 120° F (49° C) as the maximum serving temperature for their sake.

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The Ingredients In Sake

As mentioned earlier, sake actually has only two substantial ingredients: water and rice. The microorganisms constitute additional components of the production.

Water. Water is the largest item. As with beer, water quality is extremely important. The brewer searches for *miyamizu* (heavenly water), which is relatively soft water (50-70 ppm hardness) with phosphates, potassium, medium amounts of sodium and calcium chloride, plus magnesium salts and, most

important, it must have no iron. As with beer, sake brewers don't hesitate to add water adjustment salts.

Rice. Rice is the base ingredient. The sake brewer searches for rice with a heavy individual grain mass. This narrows down to short-grain "pearl" rice only, no long-grain rice. Heavenly water needs special brewing rice (*shizoomai*), and the best of these is the fat-grained *yamada nishiki* ("mountain brocade"). A major text on rice tells us, "...rice has neither a characteristic flavor nor a pro-

found effect on the flavor of sake." Flavor comes from the brewing process.

Brown (unpolished) rice is less suitable for brewing than one might imagine. The main purpose of polishing rice is to reduce, or even remove, undesirable elements—crude fat and protein. Rice polishing in Japan goes clear back to at least the late 16th century. It was a labor intensive process to be sure. The quality of the sake depends to a great extent on the rate of polish, according to this formula:

S A K E S T Y L E S

When one considers that sake has only three ingredients (water, rice and microorganisms) we find a remarkable range of presentation possibilities—styles, if you will. Space here permits touching on only a few possibilities.

There are of two general types here. *Junmai-shu* (rice-only sake), with ingredients rice and rice *koi* only. *Junmai* sake is the only type allowed into this country, and is the only style brewed by U.S. sake brewers. A second type, *honjoozoo-shu* has alcohol added back.

In addition to ordinary regular-strength sake (*futsuushu*) there are some specialties. Brown rice sake is seldom brewed, but is popular with health food aficionados. *Nama-shu* (unpasteurized) sake can be delicious, especially when it is drawn off from the first flow in the press. However, most *nama* is found bottled at reduced strength about 14 percent—rather wimpy stuff. *Nama-shu* must be stored and kept refrigerated and is almost always served chilled.

Nigori-shu. Nigori sake is taken out of the *moromi* (main ferment) near its end, after pressing. It has some noticeable sediment and is sometimes unpasteurized (needs refrigeration). When serving, *nigori* sake is first shaken to mix the sediment.

Any sake can be finished out at almost any strength below 20 percent. That means the sake can have a second life, depending on the brewer's desires, so a sparkling sake is not out of the question.

Genshu is full strength sake. At the finish of the ferment, the alcohol content may be as strong as 20 percent abv. If the sake is to be used at that point, it is called *genshu* or full-strength sake. This is quite a delight, but one can drink only sparingly of such an intense beverage.

Futsuushu or regular strength sake is diluted to a more reasonable alcohol strength. Most sake types can be presented at either *genshu* or *futsuushu* strength. These days the *futsuushu* or regular strength sake is usually 15 to 16 percent abv, although one sometimes finds sake (light sake?) presented at a mere 13 percent alcohol.

Ginjo-Shu, The New Image Of Sake

Sake quality increases as its rice is polished to greater levels. This requirement for ever more polishing has brought about the introduction of new rice strains featuring fatter individual kernels with large starchy centers, the better to survive the intense polishing operations.

Today, special yeast strains are employed to enhance the character of the final product in the form of esters developed during the long, slow, cold ferment. The resulting *ginjo* sake ("singing brew"), is made from highly polished rice (to less than 50 percent) and is enormously complex in its flavor nuances. This reflects the fact that the beverage has been produced in such a way as to leave only the purest of flavor elements, and then fermented with yeasts that supplement this pure character with elegant floral and fruity esters. These and the even rarer *dai-ginjo* ("great singing brew") sakes are made with rice polished to 40 percent or even lower. They are the most expensive and complex sakes of all.

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From this formula we see that rice with a high rate of polish number (say 90 percent) actually has more of the original grain left than one with a lower number (say 70 percent). Ordinary dinner rice is polished to 93 or 95 percent—so it still has most of the original grain mass. Standard sake needs 70-75 percent polish, superior sake 50-60 percent polish, and *dai-ginjo* (premium quality) sake more polish than even that, sometimes to 30-40 percent. Thus 50 to 70 percent of the original weight of the rice may be removed in making the rice suitable for sake brewing.

Another important element in sake production is *koji*. *Koji* is rice impregnated with the mold *Aspergillus oryzae* in a process that takes about 48 hours. The polished rice is steeped in cold water and then steamed (not cooked) and cooled, before the *Aspergillus* spores are sprinkled over shallow mounds of rice, and kept warm at about 90° F (32° C).

Modern Sake Production

The brewing process is based on four stages. Stage one is the production of *koji*. Stage two is the yeast starter mash, (*moto* or *shubo*) involving the addition of *koji* and water to steamed and cooled rice.

Stage three is the main mash or *moromi* buildup. When the yeast mash is ready, the *moromi* buildup goes forth as a doubling in each of three steps over a four day period. The first of these, *soe* (first addition), roughly doubles the yeast mash. The next day, *naka* (middle addition) again doubles the

volume and content of the mash. The process continues for two more days until the third addition (*tomezoe*), which again doubles the volume and content of the mash to reach its final dimensions. This three-stage doubling process is the key to the production of refined Japanese sake. The doubling system allows a steady and gradual conversion of starches to fermentable sugars so that the yeast can develop an increasing tolerance for alcohol.

Stage four, the main ferment (*hakko*) goes on for another 15 to 19 days or so. By that time some corrections may be necessary. These corrections are called the adjustment stage or *yodan*, the fourth addition.

After fermentation clear sake is separated from the expired rice solids and transferred to closed fermenters for secondary ferment and maturation for another 30 to 40 days. At this point the sake is pasteurized to destroy yeasts, enzymes and harmful microorganisms. The finishing process involves blending, further addition of water to adjust the final alcohol content, and filtration or fining.

What It Takes To Brew Good Sake At Home

What about the problems of brewing a simultaneous multiple parallel ferment in the home? It really is no more difficult than brewing all-grain beer.

All the high quality ingredients will again be available this fall (sake IS seasonal due to the rice crop and the best sake is winter cold-brewed).

Today, we have access to very high quality ingredients, including fine brewery *koji* from SakeOne out of Hillsboro, OR. There's also good sake yeast, the K-9 strain from Japan via SakeOne, produced by Wyeast. But best of all we have highly polished sake-quality rice of the new fat grained *Akito Machi* strain of *Shuzomai* grown in California and polished to 60 percent. Good ingredients are available through Portland's F.H.Steinbart Co. (800-638-2897) and other fine suppliers. We hope to get some of the

California sake brewers to participate in this program by marketing their own rice and *koji* to sake homebrewers as well, via a variety of retailers.

The recipe for sake is not for sale. It's free. A recipe is furnished with your supply purchase. You can also request a copy from me via email—see the end of this article for details.

The equipment you'll need is detailed in the recipes, but here's a basic list: two food-grade, plastic open-topped primary fermenters, a plastic sheet to cover same; several closed secondary storage vessels; plus plastic siphon hose, and fermentation locks. You will also need a way to steam your rice. The ideal solution is a fairly large double- or triple-deck steaming vessel of at least 2-gallon capacity (18 inch (45 cm), found in Asian grocery stores). A small plastic or wood wine press would also be useful as would a specific gravity hydrometer. Most of this equipment is found at any beer or winemaking supply store.

Sake brewing takes a bit longer than all-grain brewing, but the individual steps are much simpler. The hard part is doing things in the right order. You will have better success brewing sake if you take the trouble to make up a "Sake Brewing Time Table" in advance, and by all means keep a log.

Conclusion

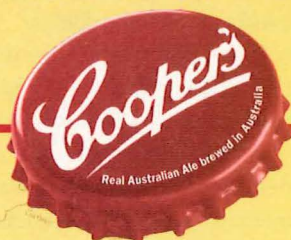
This has been a whirlwind review of sake and sake making—I hope it will encourage if not inspire you to start making sake of your own. One way to get further involved right away is the Sake Digest on the Internet. Send a one word message "subscribe" (without the quotes) to sake-request@hbd.org.

Fred Eckhardt lives and drinks beer and sake in Portland, OR, and he can be reached via email Fred@aob.org. For recipes, send a one word message (without the quote marks): "Recipe2" (2-gallon), "recipe5" (5-gallon), "recipe-koji2" (2-gallon with koji making directions) or "recipe-koji5" (5-gallon with koji making directions).

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Australian for Homebrew



BY GREG KITSOCK

Coopers Brewery in Adelaide, Australia is noteworthy for at least three reasons.

First, it's Australia's last family-owned regional brewery. A fifth generation is now at the helm, making distinctive beers in the suburban community of Leabrook, a once-independent town that got swallowed up by the nearby metropolis. The new guard include technical manager Timothy Cooper, a cardiologist who moonlights at a local hospital.

Secondly, Coopers makes the archetypal example of Adelaide sparkling ale, the only indigenous beer style from the Australian continent.

Thirdly, Coopers may very well owe its existence to the international homebrewing community.

Coopers was feeling pressure during the seventies, trying to survive in the face of intense competition from mammoth lager brewers and the high rate of taxation that the Australian government slaps on beer. (In 1970, it was estimated that 48% of the retail price of a bottle of ale went towards excises and

other taxes. That figure is well over 50% now.)

In 1973, Australia eased restrictions on homebrewing, allowing amateur brewers to produce full-strength beer. Coopers decided to tap into the market by selling its wort in 20-liter plastic bags. All homebrewers had to do was add yeast, allow 4-6 days for fermentation, then give the beer an extra two weeks of aging in the bottle before drinking. There was no attempt at aseptic packaging, however, and the wort had to be sold locally, lest it start to ferment in the bag.

Coopers undoubtedly approached the new venture with a little trepidation. After all, every gallon of homebrew potentially meant that beer drinkers were drinking a gallon less of Coopers' beers. "The larger brewers were not impressed by the appearance of the packs ..." writes Alison Painter in the corporate biography *Jolly Good Ale and Old*.

However, the homebrew business proved lucrative enough that



Cult Classics / COOPERS BREWERY



Nationalist's Fervor Russian Imperial Stout

In addition to its recipe kits, Coopers also offers seven varieties of unhopped malt extract for homebrewers who wish to exert a greater control over the final product. This recipe, supplied by sales manager Mark Henry of Cascadia Imports, won first place in the 1996 regionals of the American Homebrewers Association National Homebrew Competition.

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

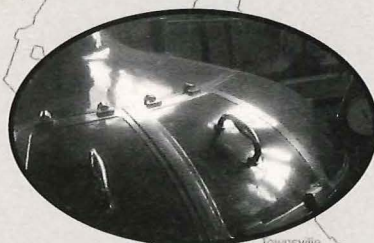
- 9.9 lb Coopers Light malt extract (4.45 kg)
- 2 lb dark dry malt extract (0.9 kg)
- 1 lb 80° Lovibond crystal malt (0.45 kg)
- 1 lb DWC Special B malt (0.45 kg)
- 1 lb DWC chocolate malt (0.45 kg)
- 1 lb roasted barley (0.45 kg)
- 1 lb invert sugar (0.45 kg)
- 2 oz Target or Northern Brewer leaf hops (57 g)
- 2 oz Cascade leaf hops (57 g)
- 14 grams Coopers ale yeast (preferred) or White Labs California Ale yeast
- 1/2 cup dry malt (priming)

- Original specific gravity: 1.098 (23.5° P)
- Final specific gravity: 1.025 (6.3° P)
- Boiling time: 60 minutes
- Primary fermentation: 7-10 days at 66-72° F (18-22° C), if Coopers ale yeast is used; otherwise, 7-14 days.
- Secondary fermentation: at least 10-12 days at 66-72° F (18-22° C); "there's no harm in going as long as 21 days," says Henry.

Brewer's specifics

Steep crystal, Special B, and chocolate malts and roasted barley in 150-180° F (66-88° C) brewing water (amount of water determined by size of your pot) for 15-20 minutes. Then remove. Mix in malt syrups and dry malt, bring to boil. After hot break, add Northern Brewer and 1 oz Cascade hops and boil 45 minutes. With 20 minutes remaining in boil, add last ounce of Cascades. Add invert sugar with 5 minutes remaining in boil.

Cool wort in pot, then transfer to fermenter, top up if necessary. Pitch yeast when temperature falls below 80° F (27° C).



are purchased by homebrewers in Canada and only 5% by U.S. homebrewers. "The U.S. is the only country in the world where homebrewing is primarily a hobby instead of an economic necessity," asserts Henry. In countries like Canada, Italy and the Scandinavian nations, he explains, a combination of factors—high taxes, restrictive anti-alcohol laws and lack of good beer—force people into making their own. Most of these homebrewers don't want to invest \$600 in stainless steel equipment and spend hours following elaborate mashing procedures. They want an easy way to make good, if not too challenging, beer.

Coopers' kits fill the need admirably, Henry believes.

Many companies produce malt extract, he continues, but their major customers are usually food manufacturers like confectioners and cereal companies. ("The sweet coating on Kellogg's Frosted flakes is malt extract.") These companies often mash at higher temperatures in the 158-165° F range. This produces a lot of non-fermentable dextrins, adds Henry. Coopers, he maintains, makes a superior product simply because it is a brewery, and its malt extract is intended to be used for beer. Coopers does sell malt extract to the food industry (you can buy it in 130- and 300-kg drums), but the homebrewing community has always been Coopers' bread and butter.

The Australians are prodigious beer drinkers. A few years ago their annual per capita consumption was cited as 110 liters (about 29 gallons), although health concerns and harsh DUI laws may have driven this down since then.

But the land down under is noted more for quantity than quality. American beer drinkers associate Australia first and foremost with Foster's, a mass-market lager touted relentlessly by actor Paul Hogan of *Crocodile Dundee* fame. Ironically, Foster's was founded by a pair of American brothers who spent less than two years in Australia before selling the brewery. The Foster's sold in this country is brewed under license in Canada.

Another name that springs to mind is Alan Bond, who created Australia's second largest brewing company by merging Swan Breweries with Castlemaine Toohey. Bond, at the zenith of his power, also owned the

in 1984 Coopers began selling malt extract in steel cans with a foil-wrapped packet of dry yeast. The exact manufacturing details are a proprietary secret, but the wort is centrifuged and vacuum-boiled to a honey-like consistency, and pasteurized before sealing. Today, Coopers' homebrewing kits are sold throughout Australasia, Southeast Asia, North and South America. The company holds an estimated 80% share of the home market for such kits and 35% of the world market.

Coopers markets six basic kits for recreating recipes that the brewery currently brews or has brewed at some time in the past. All of these contain 100% Australian

ingredients, including Pride of Ringwood hops and a vigorous, proprietary yeast strain that Coopers has been using for nearly 90 years. The brewery also offers four master homebrewer kits with a more international slant, incorporating European yeast varieties. By the time you read this, Coopers will have released its eleventh homebrew kit, for a light lager called Canadian Blonde.

"The U.S. market is not Coopers' strength," admits Mark Henry, whose company Cascadia Importers is the official North American importer for Coopers' homebrew products. Henry estimates that he sells 200,000 kits a year. Of these, 95%



G. Heileman and Pittsburgh Brewing Companies in the United States. The master yachtsman and art collector (he once paid \$69.5 million for Van Gogh's *Irises*) fell on hard times, however, and sold his brewery holdings to the New Zealand conglomerate Lion Nathan. Bond is currently serving a seven-year prison term for corporate fraud. Reportedly, he's found a second career dabbling in oil and water colors. His best-known work is a portrait of soccer star Peter Madera, which hangs on the wall of a brothel in Perth.

Whether Alan Bond will rebound is unknown, but Thomas Cooper certainly endured more than his share of adversity, and came out ahead.


Cooper was born in Yorkshire, England, the same region that produced Captain James Cook, who in 1779 claimed Australia's east coast for Great Britain. Cooper and his wife Ann emigrated to South Australia in 1852, most likely because the colony offered economic opportunities that their native England could not. The voyage over lasted 86 days, according to Painter's book, and was marred by tragedy when the Coopers' infant daughter Sarah Ann died. Ann Cooper, however, gave birth to a baby

girl while at sea, which she named after her deceased child.

Thomas Cooper had no experience brewing, and initially worked as a shoemaker, a mason and a dairyman. His wife, however, was the daughter of an innkeeper, and had probably picked up the skill of making beer. At any rate, when Ann Cooper fell ill in 1862, Thomas used her recipe to whip up a batch of stout as a tonic. His neighbors comment-

ed so favorably on the beer that they launched Cooper on a new career.

Brewing was not easy in South Australia. Temperatures during the summer could reach upwards of 120° F, and the searing wind sapped the vitality of the settlers. In an age before microbiology and refrigeration, brewing was a chancy endeavor. Ale frequently turned out "ropey" ... that is, bacteria produced a foul taste and strings of



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solid matter that made the beer repulsive even to look at. High fermentation temperatures resulted in an abundance of fusel alcohols ... longer-molecule alcohols which give beer a solvent-like flavor and may induce head-splitting hangovers.

Cooper originally boasted of using only barley and hops in his beer. Poor-quality malt, however, induced him to experiment with cane sugar, which, he found, produced a better product. Besides supplementing the malt, Cooper began using sugar to prime the beer fermenting in the hogsheads. This resulted in a livelier carbonation, as well as a higher alcohol content that helped safeguard against infection. Even today, the brewery brews its Coopers Sparkling Ale with 18 percent liquid cane sugar.

Within a few years, Cooper was brewing ale of a sufficiently high quality that he numbered among his customers the Lord Bishop of Adelaide. Cooper, however, would not sell to public houses. As a devout Methodist and lay preacher, he probably regarded such establishments as dens of immoral behavior. In the long run, his scruples would benefit the brewery. Lacking any tied houses, Coopers Brewery was a less inviting target for takeover during the great mergers of the twentieth century.

On the frontier, hardship and opportunity often went hand in hand. In 1869, accumulated debts forced Cooper to forfeit his property and equipment. He quickly rented a building elsewhere and resumed brewing. In 1872 his wife Ann died after a sudden ill-

ness. Cooper married a second time in 1874. His new bride, Sarah Louisa Perry, bore him seven more children to add to the seven surviving offspring from his first marriage.

By 1880 Cooper was prospering sufficiently that he moved his operation to a larger site on Statenborough Street. What's now a tree-lined residential suburb of Adelaide was then bushland. Homing pigeons were sometimes used to relay messages between the brewery and Cooper's cottage in Summertown, about five miles away. When he died in 1897, Cooper left a modest inheritance to his family. He had survived 10 of 19 children from two marriages, but that still left plenty of heirs to carry on the business.

The twentieth century brought new business opportunities, but there some bumps along the way. Australian Prohibitionists (called "wowsers") managed to push through laws hampering the beer trade. The most infamous was the Licensed Victuallers Act of 1915, which stipulated that all bars had to shut their doors by 6 p.m. Like many anti-alcohol measures, this one backfired in its intent. Suzanne Welborn, in her book *Swan: The History of a Brewery*, describes the aftermath:

...the "six o'clock swill" with all its reeling consequences dramatically changed the previous warmth and quiet friendliness of pub life. Travelling entertainers disappeared along with billiard rooms and dart clubs as extended bar rooms tried to cope with the overwhelming crush of workers who stormed the doors from 5 to 5:30 p.m.

Enacted as a wartime measure to keep the troops sober, the six o'clock swill amazingly lasted until 1968, when legislation extended pub hours to a more reasonable 10 p.m.

The Great Depression of 1929 hit Coopers hard, as unemployed workers no longer had pocket money to spend on beer. As an economy measure, many purchased homebrew kits from their local grocer for making "Dinkum Beer." The instructions, if followed, would produce 2-4 gallons of a weak brew not more than 1.15% abv, which was the legal limit on homebrew at the time. Many amateur brewers, however, quickly learned that by doubling the ingredients, they could produce a more intoxicating beverage.

Liberty Light Golden Ale

This easy-to-brew formulation is by Brent Rannow, who used to manage Evergreen Brewing Supply in Bellevue, WA., the homebrew shop that Mark Henry operated between 1991 and 1999. "We used to do this a lot during the spring, when we were really busy," recalls Henry. "We could make it in a hurry so we wouldn't run out of beer."

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

- 4 lb Coopers Lager kit (1.8 kg)
- 1 lb light dry malt extract (0.45 kg)
- 0.5 lb corn sugar (0.23 kg)
- 0.5 lb 10 Lovibond crystal malt (0.23 kg)
- 0.5 lb carapils malt (0.23 kg)
- 1 oz Liberty or Hallertauer pellet hops (28 g)
- Coopers ale yeast

- Original gravity: 1.040 (10° P)
- Final gravity: 1.012 (3° P)
- Primary fermentation: 2-7 days at 66-72° F (18-22° C).
- Secondary fermentation: No secondary necessary, but Henry advises allowing to sit 5-6 days for clarification before bottling.

Brewer's Specifics

Steep crystal and carapils in 150-180° F (66-88° C) brewing water (amount of water determined by the size of your pot) for 15-20 minutes. Then remove. Mix in dry malt extract. Bring to soft boil, watch for boilover. Add hops and corn sugar. Boil for 5 minutes. Remove from heat and mix in the Coopers Lager-Kit. Cool wort in pot to room temperature. Transfer into fermenter. Aerate well, then top up to 5 gallons. Pitch yeast when temperature falls below 80° F (27° C).



In many respects, Coopers almost had to be dragged kicking and screaming into the twentieth century. Until 1957, the brewery actually labelled all its bottles by hand. Coopers didn't introduce lager to its portfolio until 1968. As late as 1982, Coopers' ales underwent secondary fermentation in 800-gallon wooden vessels called "puncheons." These have since been replaced with standard cylindroconical fermenters. Furthermore, it wasn't until the 1980s, with the purchase of thousands of kegs, that Coopers got into the draft beer business. For most of its history its celebrated ale and stout were available only in bottles.

Once a quaint anachronism, Coopers now enjoys a cult following in both hemispheres. Last year, Wine Is Fine, Inc. (dba Preiss Imports) in Ramona, CA. obtained the right to import Coopers' beers into the United States. "We're walking our way across the country," says office manager Sheila Walker, noting that the 12 oz. stubby bottles are already available in well over half the fifty states.

Coopers Sparkling Ale is ironically named. The bottle-conditioned beer (5.8% abv, OG 11.8 ° Plato) is a hazy gold color and pours with a very noticeable sediment. In a land used to crystal clear lagers, it can be very offputting. "Some barmen will put a bottle on its side and roll it over the bar to mix up the sediment. Others will carefully decant," John Taylor, manager of Coopers Fine Foods division, said during an American tour several years ago. Diehard lager drinkers have been known to refer to the ale as "lunatic soup."

Questioned about Adelaide sparkling ale as a distinctive style, Taylor suggested that it was essentially an English bitter adapted to a hotter, drier climate. Coopers Sparkling Ale is brewed from a grist of pale and crystal malts. The barley is grown in low-rainfall districts north of Adelaide and is prepared by a division of Coopers called Adelaide Malting. (Michael Jackson has noted that the ale used to have a deeper, amber-red color, a result of the brewery blending in some stout.)

Coopers Sparkling Ale is more effervescent than the typical English ale and has less of a distinctive hop aroma. The recipe calls for about 25 IBUs worth of Victoria- and Tasmanian-grown Pride of Ringwood

hops, which give the beer a peppery flavor. (A high-alpha bittering variety, Pride of Ringwood accounts for over 90% of the Australian hop crop.)

Coopers' house yeast is a vigorous producer of esters. Jackson has described the sparkling ale as having "lots of banana notes and acidity," with hints of pear and apple as well. Roger Protz, in his *Taste of Beer*, compares it to Orval Trappist ale from Belgium.

An interesting note: importer Mark Henry, who has toured the Coopers facilities, reports that the brewery actually uses a blend of three yeast strains for its ales. Only one of these varieties, however, is propagated for use in the homebrew kits. This means that by culturing the yeast from the sediment at the bottom of a sparkling ale bottle, you can produce a somewhat different beer.

Preiss Imports also stocks two other brands. Coopers Pale Ale is essentially a lighter version of the sparkling ale (only 4.5% abv), a variation once marketed as "dinner ale." Coopers Best Extra Stout (6.8% abv, OG 14.5 ° Plato) has a smooth, rich burnt-caramel flavor with notes of coffee.

Coopers also markets a range of filtered ales and lagers not available in America. They include Coopers Light, a lager measuring only 2.9% abv. That beer was introduced in 1981 as a reaction to Australia's tough drunk-driving laws; the permissible BAC down under is only 0.05, about half of the limit in most of our states. In addition, Coopers brews the NA beer Birrell under license from the Swiss company Hürlimann, and was the original producer of the hard lemonade Two Dogs, although it gave up that product in the mid-1990s.

Coopers' food products division also manufactures non-beer items such as a line of gourmet honeys and wine vinegar.

Of all the Coopers brands we can't get on these shores, perhaps the most intriguing is Coopers Extra Strong Vintage Ale (7.1% abv). This limited-edition brew is released each year in October; the brewery recommends laying it down for up to 18 months. Demand is heavy among ale aficionados. A wooden case holding three bottles from the original batch, brewed in 1998, once fetched 1,150 Australian dollars (about \$700 in U.S. currency)

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at a charity auction in Adelaide.

Not bad for lunatic soup.

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Special thanks to Martin Morse Wooster for his assistance with this article.

Greg Kitsock is a regular contributor to *Zymurgy*.

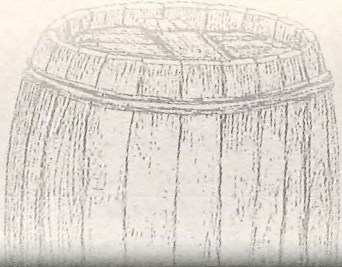




Belgian Barm & Barrels

Making Flanders Red and Brown Ale

By Matt Stinchfield



In a tradition that goes back for centuries, brewers in southwestern Belgium have made moderate-strength red to brown beers possessing the combined properties of barrel-conditioned ale, Burgundian red wine and sour fruit juice. Today the question is: Will these traditional beers survive?

October 1914. In the knee-deep muck of cold autumn rains and Belgian clay, patriotic Allied soldiers began their four-year crusade to prevent the Kaiser's forces from capturing the port cities of northern France. As it had been so many times before, Belgium was once again the stage for multinational conflict.

Soldiers in this period would likely have drunk the sour local beers to cleanse their mouths and relieve some of the pressures of the fighting. Perhaps they savored a *Ghinstens tonnebier*, *pittig bruinje* ("Ghinste barrel beer, pithy brown one" now known as Bellegems Bruin) or maybe a *Verhaeghe Pollekens tonnebier* ("Paul's barrel beer"). But they weren't drinking Paulus Oud Bruin by the Leroy Brewery in Boezinge; that brewery was a fiery casualty of the war.

Flanders is a land of reds and browns: the poppies and the earth, the red tiled roofs atop brown block homes, the red beers of Roeselare, slowly aging in brown oak tuns, and the brown beers of Oudenaarde, brewed and conditioned within the red brick walls of their traditional breweries.

Like the divisions which fought on Belgian soil, the few remaining traditional brewers of Flanders ales may be in danger of being run over by the powerful

forces of change. Beset by the onslaught of soda-sweet beers, pils beers, and commercial pressures to produce beer quickly, one is forced to wonder if the sour beers of Flanders will survive.

Among beer aficionados, sour Flanders ales are well known. Rodenbach Grand Cru, with its rich garnet tones, reveals versatile notes of sweet and sour cherries, passion fruit, a wisp of malt, Madeira, oak barrel, and a crackling, tart, lip-smacking finish. Its light, crisp body is markedly acidic. It goes well with many foods, particularly white fish, and also contributes to imaginative marinades and sauces. The Grand Cru is a bottling of the best unblended beer, typically two to three years of age.

Rodenbach's Classic is blended to a mellower acid expression (one part old sour ale to four parts young beer). This variant is quite refreshing also, but to some drinkers it lacks the mature fruit mien of the Grand Cru. The third product, Alexander, introduced in 1986 and discontinued in 2000, was a sweeter version of the Classic amended with cherry extract.

It's hard to imagine that such unique and flavorful beers are endangered, but production levels had declined to such low levels that Rodenbach "was on the point of collapse," according to Peter Buelens of the



Palm Brewery. Consequently, in 1998, Palm purchased controlling interest in the ailing institution. Rumors soon spread throughout the craft beer world that Alexander was to be eliminated and Grand Cru was to be put on probation for one year. Buelens later came forward with an open letter which decried the rumors and explained that over 240 million Belgian francs had been expended to restore the position of Classic and Grand Cru in the marketplace, both through marketing and by improvements made to the deteriorating Rodenbach estate.

Rodenbach is not the first sour beer brewery to be bought up by larger concerns. In 1990, Riva absorbed Liefmans. Goudenband, an eight percent alcohol by volume oud bruin, is now brewed at Riva's brewery in Dentergem, hauled in a sterile tanker to Oudenaarde, and fermented and bottled in the old Liefmans facility. The cooking procedures no longer include all-night simmers conducted in poorly heated kettles, but the old acidic mixed culture remains. Zulte, a smaller brewer of oud bruins, was similarly bought by the conglomerate Alken-Maes in 1988.

De Dolle Brouwers, an artisan brewery in the West Flanders community of Esen suffered, too. They obtained yeast for their sweet-sour dark beer Oerbier from Rodenbach until recently, when Palm reportedly refused to continue the practice. Just outside of Oudenaarde is the Roman Brewery, whose origins date from the 16th century. They discontinued their exquisite bittersweet chocolaty Dobbelen Bruinen in the spring of 1998, due to poor sales relative to their main line of products. Yet, in defense of the inimitable Belgian brewing industry, all of these breweries are still in operation. They have evolved due to consumer preferences, profit motives, and marketing prognostications.

So are these beers endangered? A cab driver in Diksmuide, halfway between Roeselare and Oudenaarde, said, "For some, the old brown is the only beer they ever drink." But a younger barkeep in the same town replied, "Only the old men drink this beer. Have you tried our pils? It's made just down the road." Truly, it was a good pils, but the thought of those old men dying and taking

the brown beer tradition with them left one feeling rather unsettled.

In North America, of all places, a renaissance of sour beers is underway, partly due to Belgian-trained brewers like Peter Bouckaert of Colorado's New Belgium Brewing Company. Bouckaert, whose credentials include tenure at both Zulte and Rodenbach, has been gradually expanding New Belgium's facilities to include 78 wine barrels (60 gallons each) and four 1,600-gallon oak tuns for the production of sour beers. One product of these efforts is La Folie ("the lunacy"), a sour beer with an assortment of organisms, which earned a bronze medal at the Great American Beer Festival (GABF) last year.

Bouckaert and co-brewer Phil Benstein are exploring the roles of several bacteria in lactic acid production, but mainly *Lactobacillus* and *Pediococcus*. Other "flying organisms" obtained from the American Type Culture Collection (ATCC) microbe bank and by field collection are also being experimented with. While *Brettanomyces* yeast strains also produce lactic acid, they also contribute goatly or horsey aromas that

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are generally sought after more in lambics than in sour browns. "It's a whole zoo here," says Benstein. Sour beers in general, he hopes, will add "a whole new dimension to the American beer market."

Other brewers in America innovating in the sour beer arena include Dan Carey of Wisconsin's New Glarus Brewing and Tomme Arthur of Pizza Port, Solana Beach, California. Each uses a different technique to achieve the acidity. Carey conducts a primary fermentation in 3,000-gallon unlined oak wine tuns, which possess a resident population of acid bacteria and wild yeast. It required "six years of pilot brewing to figure it out," reports Carey, and that took "lots of bad beer to get you there." *Brettanomyces* is conspicuously absent at New Glarus, due to its unpredictable flavor transformations.

After the first fermentation in oak, the beer undergoes two subsequent fermentations with *Saccharomyces* yeast, with fruit being added in between. With this process the beer takes only eight weeks to reach the bottle. It's "backwards from what you find in a Berliner Weiss or a Flanders style," he adds.

Arthur, meanwhile, seeks to "blend the vision of beer making and wine making." He experiments with two types of barrels (French oak wine barrels and American oak bourbon barrels) and two approaches to creating sour beers. For his strong Belgian-styled brews he prefers the complex flavors of *Brettanomyces*, which he pitches after most of the *Saccharomyces* primary is complete. The *Brettanomyces* is preferred due to its hop and alcohol tolerance. He is using *Pediococcus* in one beer, a fruit lambic, but the risk of brewery contamination keeps him very cautious. In a wit-styled beer, Arthur has used acidulated malt (German *sauer* malt) to achieve the effect of lactic fermentation.

Asked about his roguish approach to interpreting Belgian styles, he replies that it's an "experimental process leading up to the knowledge to be able to think backwards and create a beer, like say, a Rodenbach." As in Belgium, none of these practices is considered to be right or wrong, simply different. Typically those brewers producing the most complex flavored beers are using complex assortments of organisms, however.

Old Double Brown

Recipe for 5 US gallons (19 L)

- 7.5 lb pale malt (3.4 kg)
- 1.5 lb Munich malt (0.68 kg)
- 1.0 lb CaraMunich malt (0.46 kg)
- 6 oz Special B malt (170 g)
- 0.25 lb chocolate malt (114 g)
- 0.5 lb amber Belgian candi sugar (230 g)
- 1.25 oz Slovenian Styrian Golding hops, 4.0% alpha acid (35 g) (90 min)
- 0.25 oz English Fuggles hops, 4.3% alpha acid (7 g) (30 minutes)
- Wyeast 1388 Belgian Strong yeast (initial pitch)
- Wyeast 4335 *Lactobacillus delbrueckii* (second pitch)
- 5 oz corn sugar (142 g) to prime

- Original gravity: 1.061 (15° P)
- Final gravity: 1.012 (3° P)
- Boiling time: 120 minutes
- IBUs: 28
- Color: approx. 23 SRM, dark brown

Primary fermentation: 68-72° F (20-22° C) for five to seven days, then pitch *L. delbrueckii* into the same fermenter, increase fermentation temperature to 75-80° F (24-27° C), leave for three weeks, then rack to secondary.

Secondary fermentation: 68-72° F (20-22° C) for six months, taste for acidity prior to bottling, adjust if necessary with lactic acid or by blending with a non-acidified batch.

Brewing a Lactic Sour Beer

If one can visualize a beer that is something like an abbey brown ale and something like a sour cherry lambic and perhaps a bit like a chocolaty English porter, one can appreciate the complexities inherent in an oud bruin. Lactic sour beers can be produced in a few months using ersatz methods, or over the course of several years by ripening in oak or chestnut barrels and blending older, acidic batches with sweeter,

younger ones. No doubt the latter poses a challenge for pro brewers and homebrewers alike. The first decision the brewer faces is how to achieve the acidity.

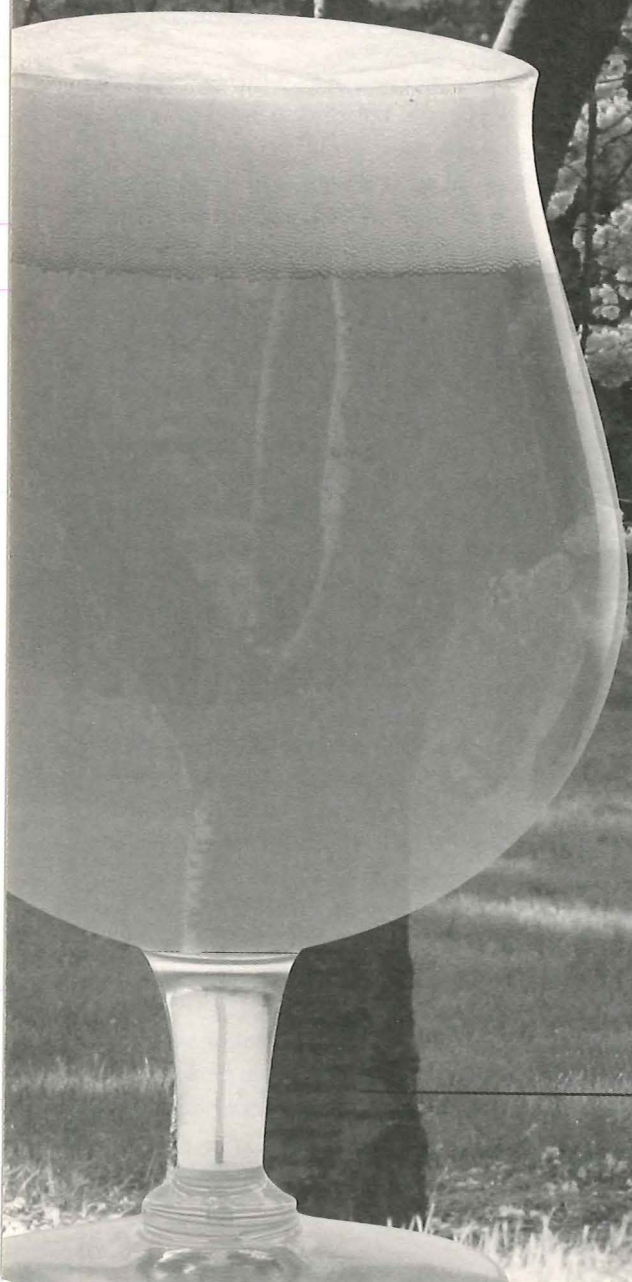
There are at least three traditional ways to produce a lactic-soured beer. The first is to conduct a controlled fermentation using separate additions of traditional ale yeast and a lactic producer. The second is to favor a more wild approach, wherein a combined culture is used and a more acidic fermentation occurs in barrels or tanks for a length of time. Finally, the shortcut method uses an addition of food grade lactic acid to the beer to create the desired level of acidity. Perhaps surprisingly, sour beers produced in Belgium may be made by any of these methods. Furthermore, it is common for old beer (which has often resided in oak or steel vessels) to be blended with young beer to achieve the right level of sweetness, fruit esters, and acidity.

Two other methods which may be of interest to the homebrewer involve creating a sour mash using acid malt or allowing the fresh wort to sour with a warm temperature (>90° F or 32° C) lactic fermentation. If the wort is allowed to sour before the pitching of traditional ale yeast, pH can be monitored, and when the wort reaches the desired acidity, say a pH of 3.8, the wort can be boiled, cooled and pitched with a neutral strain of ale yeast.

Regardless of the method(s) chosen, the brewer should recognize that the acidity of these beers is principally lactic. Low levels of acetic acid are present in some examples, but the horsy, barnyard aromas and complex acid mélange of lambics are not typical here.

Most lactic acid-producing organisms are limited by hop levels and alcohol (as well as by pH and temperature, to a lesser degree.) Those wishing a very sour red beer may wish to start with low hops and introduce the lactic organism early, while an oud bruin with just a trace of balancing acidity should be mostly fermented out prior to the introduction of *Lactobacillus*. Furthermore, if the beer doesn't hit the desired acidity level, blending with a different batch or supplementing with food grade lactic acid can often be done with excellent results. (continued on page 63)

The Culture of **LAMBIC**



BREWING

Brewing is a very ancient art, which predates written records, and some estimate that it began as early as 15,000 BC, with some of the earliest recorded evidence arising from a pottery fragment from around 6,000 BC (Hardwick 1995). These primitive beers—made using a lambic-like “open air” inoculation—allow us to argue that lambic is the oldest beer style.

The most difficult task in lambic brewing is not obtaining the raw materials such as Belgian wheat or barley, but getting and managing the multitude of microorganisms which are a crucial part of the process. A complicating factor is that fact that Belgian brewers are generally secretive about their processes (Rock 2001). Indeed, several lambic brewers have told me that it is only possible to brew a true lambic in the Senne Valley. While I agree that the appellation of “Lambic” belongs to that area, there is no doubt we can produce a similar beer given an understanding of the fermentation process.

It is in the Senne Valley, also known as Payottenland, that a large variety of microorganisms live which provide the real heart of lambic ales. Many of these organisms once came from local orchards but have now become permanent residents of the breweries. This is fortunate since many of the orchards no longer exist.

The fermentation of lambic begins when a dextrinous wheat wort is placed in a coolship (a shallow, large-surface area container open to the air) to rest overnight and begin the inoculation process. The brewer adds no yeast to the wort. Instead, the wort-fermenting organisms come to it through the air—from nearby fields and farms and indeed from the studiously unkempt rafters of the brewery itself.

To achieve inoculation with the proper balance of microorganisms, lambics are brewed only during the cooler seasons of the year. Although some argument exists about the details, lambic fermentations can be divided into four main phases.

The first phase includes approximately the first month after brewing, and it marks the butanediol ferment. This is a mixed acid-producing ferment initiated largely by a variety of enteric bacteria, such as *Escherichia coli*, *Klebsiella*, *Hafnia alvei*, *Citrobacter freundii*, and *Kloeckera apiculata*, *A-D* bacteria, with *Enterobacter cloacae* being the most frequently found, followed by *K. aerogenes*. These bacteria die out generally within 30 or 40 days, which is a very good thing because they can be associated with serious infections in humans (Tanaka 1989). I do not recommend experimenting with these organisms in homebrewing.

With authentic lambic the enteric stage is where much of the sourness evolves, as the bacteria ferment glucose into 2,3-butanediol and ethyl acetate. Formic, acetic, lactic, succinic, and other organic acids also evolve at this point, which is why it is called a “mixed acid” fermentation. These acids, along with ethyl acetate and higher alcohols comprise the aromatic profiles in 40- to 60-day-old lambic.

To produce a similar complexity without biological acidification, winemakers add “acid blends” to their grape juice musts. Home lambic brewers may do the same—just be sure to use a blend as single-acid additions (e.g. lactic acid) can be very one-dimensional.

The early appearance of “normal” fermentation is generally the breakdown of formic acid into hydrogen and carbon dioxide during this period and is largely responsible

By John L. Isenhour, Ph.D.

for the early foaming. Dimethyl sulfide (DMS) is also produced in relative abundance. An attenuation of around 15 percent is achieved and the pH drops to about 4.4.

The yeast strain *Kloeckera* is present during the enteric phase. This strain is sometimes cultured by homebrewers and added to the ferment. Although the end result is not a strong flavor, it does secrete proteases into the wort that may break down proteins.

As mentioned, the acids provide a blend of sour tastes, and I have detected enteric aromatics in several of the more exotic lambic products. Homebrewers usually use a *Pediococcus* strain to obtain most of the sourness, although *Acetobacter* is relatively easy to induce, but this vinegar flavor can get out of control easily.

When I was brewing lambic styles professionally, I found it was important to age the beer to the correct sourness point, drop the temperature and sell it off before it became too tart. Commercial lambic brewers typically have many barrels and blend to get the correct profile. If a batch gets too acidic it may be used to wash the brewery. Some lambic producers do not brew at all, but buy inoculated wort from a variety of brewers and blend, resulting in some of the best lambics available.

The next phase is the alcoholic ferment which begins in a few weeks as the yeast population begins to increase. There are a variety of yeasts that contribute to the ferment at this point: *Saccharomyces globosus*, *S. dariensis*, *S. uvarium*, *S. bayanus* and *S. cerevisiae*, *Candida*, *Torulopsis*, *Hansenula*, *Saccromyces* and *Schizosaccharomyces*. The beer attenuates to about 55 percent and the pH drops to around 4.0. Homebrewers can use a regular ale yeast for this phase. I have not noticed much difference in which strain of brewer's yeast is added because any character will be stripped away or masked by other characteristics.

The third phase is where lactic acid is produced. Generally from 90 days until around 250 days is the lactic acid phase, characterized by an increase (5 to 6 grams per liter) of lactic acid, and a decrease in pH to around 3.2. *Pediococcus damnosus* is the major souring organism, though some *Lactobacillus* have also been isolated. This is

one of the easier phases for the home brewer, as she can add cultures as needed. Lactic acid producers are typically slow growing.

In phase four, during and after lactic fermentation, a secondary alcoholic ferment, lasting up to the eight-month mark occurs. Ethyl lactate increases and a large amount of attenuation occurs. Real attenuation increases to 80 percent and ethyl lactate increases an order of magnitude. The barnyard aromatics and some smoky aromas may develop. Phase four fermenters include *Brettanomyces bruxellensis* and *Brettanomyces lambicus*.

**It is not so much the
brewing technique as it
is the collection of
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then is what do you have
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collection of bugs?**

During interviews with Belgian lambic brewers, I have found that there are significant differences in the interpretation of the lambic brewing tradition. On the one hand are brewers such as Cantillon of Brussels, who are staunchly traditionalist in their methods. The brewery runs according to seasons, where only bottling is done during the summer months and brewing occurs in the winter. The equipment is truly museum grade, with large gearing and belt drives everywhere, and when the roofing tiles were replaced, the originals were placed such that they were still exposed to the interior of the coolship area. The wooden fermenters have square bung holes, in which cloth-lined bungs are placed, allowing gas to escape (and exchange).

An alternative approach is found at Drie Fonteinen of Beersel which takes a more pragmatic view of technology. Wooden casks are obtained from Pilsner Urquell, refrigerated warehouses control the temperature, rubber bungs with the familiar air locks are found, and the brewery is of modern design, a pilot brewery having been obtained from Interbrew and put to good use. All of this supports my thesis that it is not so much the brewing technique as it is the collection of "bugs" that results in the unique qualities of the brew.

The Big Question then is what do you have to do to get the needed collection of bugs?

Lambic Fermentations at Home

Homebrewers can purchase pure cultures of at least some of the organisms involved in lambic production. Alternately, they can culture mixtures of appropriate organisms from commercial lambics. I have found that Old Beersel, Hanssens and Cantillon all contain organisms that can be cultured out of the bottle.

You do not need to worry too much about the pitching rates as compared to ale and lager brewing, although I have had good success with using comparably-sized starter cultures. Many of the organisms involved in lambic fermentation are slow growing, meaning you need to be patient with culturing and especially conditioning in carboys or casks. Be prepared for a batch of lambic to take eight to 24 months in total. Bottle culturing is a great cause for purchasing multiple bottles of lambic! My most successful batches have been fermented using yeast and bacteria cultured from bottles of unfiltered Boon gueuze. Unfortunately, this beer seems to be arriving in the States now in a filtered version. Cantillon is another good source for starter organisms as well as Hanssens, but on occasion I've had these turn incredibly sour in a short period. I am currently experimenting with Old Beersel cultures and a yeast-like organism is evolving rapidly.

One note of advice, which I learned while brewing this style professionally: if the beer starts getting too sour, chill it down to slow the process and sell it (or in the homebrew case consume it), quickly. On the other hand,

a trick I learned from a brewer at Rodenbach is that if it is not sour enough, you can bubble air into it to increase acidity.

If the cultures you grow from commercial bottles of lambic do not have the desired complexity, you can order pure cultures of individual organisms to enhance your ferment. Because the fermentation goes through phases of activity, there has been debate concerning scheduled inoculation of the various organisms and what timings best mimic the natural process as it occurs in a real lambic brewery. I have tried a variety of pitching schedules, generally using a top-fermenting yeast first, and almost any variety will work. I prefer an American type ale yeast. Follow this with an addition of a *Pediococcus* for sourness, then *Brettanomyces*. With a good starter from a real lambic culture, you will probably do just fine with no other organism additions, although I recommend adding an ale yeast.

Temperature is important in lambic brewing, and varies from other styles of brewing due to the fact that different organisms tend to have different preferences for growing. In general, Belgian lambics are not typically brewed in the summer because of the balance of organisms are not appropriate, but once fermentation starts, some lambic brewers judge the beer's progress by "summers." The natural temperature variation affects the progress of the fermentation. My lambics seem to do well with a seasonal flux of between 50° F (10° C) and 75° F (24° C).

Depending on what your climate is like, your practices may vary. Avoiding extreme temperatures is all that I have found to be necessary. Always control rapid temperature swings to avoid shocking whatever microorganism may be in its dominant growth stage at the time. When fermenting lambics at home, use a single-stage fermentation and do not rack the beer—this accommodates the natural "rhythm" of the various organisms and allows them to feast upon the material left by the previous phase.

Recipe Formulation

Lambics are made from between 30 and 40 percent unmalted wheat, two-row malt and sometimes some six-row malt. These

Lambic Tips

The following notes apply to any general lambic recipe.

Pitch with your cultured-from-the-bottle lambic blend yeast starter. If you prefer to use your own pure cultures, pitch in the order below with a few weeks in between or according to your preference. Be sure and have at least:

- Ale yeast — any healthy yeast will do because the character will be lost in the course of fermentation.
- A *Pediococcus damnosus* strain for lactic sourness.
- *Brettanomyces bruxellensis* and/or *B. lambicus* for the horse blanket/barnyard notes.

The above items can be used in addition to your bottle-cultured mix if you so desire.

Plastic fermenters may be desirable because they tend to allow small amounts of atmosphere to enter the fermentation. This mimics the porosity of the traditional oak casks and the oxygen is thought to promote the formation of the pellicle and complex flavors associated with *Brettanomyces* and oxidative yeasts.

- Do not rack the brew. It should remain in the same vessel until bottled.
- Be prepared to wait! Lambic takes many months to mature.
- If you want to make a fruited version, add the fruit after you have a clean, flavorful lambic.
- Use caution when sanitizing to prevent contamination of other brews. It is a good idea to designate certain equipment for lambics only, particularly porous pieces like airlocks, siphon tubes, stoppers and racking canes.

beers can also be brewed very successfully from malt extract. In terms of unmalted wheat, some of the Belgian maltsters report fairly large sales of malted wheat to lambic producing breweries, so relax and don't worry too much. Generally, soft white wheat is used as opposed to the hard winter red. Although the prescribed mashing methods can become laborious, it is also possible to make a lambic using wheat malt extract. Always use fresh extract if it is a liquid extract. Successful lambics can have a pretty large variation in recipe and technique.

If you are a purist, you will want to use unmalted wheat and the so-called "turbid mash" schedule—a sort of inverse decoction where the thin part of the mash is periodically boiled thus killing off the mash enzymes. This process creates a wort high in starch, dextrin, free amino nitrogen and protein. The mixed-culture fermentation and long aging process will take advantage of this type of wort.

Hops used in lambic brewing typically are aged to the point where no other brewer would use them—indeed it has been debated whether hops are needed at all in lambics. It appears that even though the normal aromatic and bittering properties are gone, terpene components remain. The amount of boiling hops is higher than usual—several ounces per five gallon batch, with no late additions.

You may be able to buy older hops at a homebrew supply store for a good price or find them in health-food stores. You may be able to achieve rapid aging of hops by baking them prior to use. If you try this, bake them on a low setting until the aromatics are completely absent. It also is possible to use a smaller amount of low-alpha acid (2 to 5.5 percent alpha acid) "noble-type" hops in the beginning of the boil to achieve adequate results. Just avoid adding bitterness, which will interfere with the flavor profile. I have had good results using no hops at all, it just feels funny.

With regard to water: if your water source makes good ale it should suffice for lambic. Jean-Xavier Guinard writes in *Lambic* (Brewers Publications, 1990), "Most lambic brewers use well water that does not have any outstanding qualities."

Finally: The Fruit Thing

One of the novel attributes of lambics is that you can add fruit to them and, because of the sour nature of the beer, the result is complimentary. Make sure you have a good unflavored lambic before you add the fruit. A poor lambic base makes poor fruited lambic. This might mean waiting a year to find out, but it will be worth it. "Kriek" is the Dutch word for "cherry" and this is the original fruited lambic. Today a variety of fruits are now used by some breweries, (continued on page 56)

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.

Lauter Dynamics: Design Priorities Based on Fluid Flow Studies

By John Palmer and Brian Kern

The two most common types of lautering systems used by home brewers are false bottoms and pipe manifolds. We have conducted laboratory and numerical studies to examine the fluid flow properties of these systems with the ultimate goal of understanding the influence of different lautertun designs on brewing efficiency.

We are presenting the results of our studies in two articles. This article will describe the methods and results of the lautertun flow simulations. In a future edition of "For Geeks Only," we will present the results of our mathematical modeling study.

Brewing Efficiency and Lauter Flow

Brewers are generally concerned with the extraction efficiency of their mashing and lautering techniques, since this efficiency determines the cost of the ingredients that go into a brewing session (and also scores bragging rights in some circles). Generally, in brewing, "efficiency" is the amount of extract actually removed in the brewhouse compared to that removed by a laboratory mash.

Since lautering rinses extract from the grain bed, the quality of lautering has a direct effect on the degree of extract. Ideally, lautertun rinsing is uniform throughout the grain bed. When this occurs, the maximum amount of extract is removed without over-sparging any section of the mash. Based on this logic, we

have conducted a series of studies looking at issues of fluid flow in the lautertun.

Laboratory Simulation

The first technique used to evaluate the fluid flow during lautering was a bench-top simulation similar in scale to that operated by many homebrewers. The hardware used was a 1.4-cubic foot (0.04 cubic meter) glass-walled aquarium (actual width x height x length measurements 10 x 12 x 20 inches or 25.4 x 30.5 x 50.8 cm). For each trial, this vessel was fitted with either a false bottom or one of several different pipe-manifold configurations.

The media used for these tests is composed of three parts: grains and water to simulate a brewery mash and dye to allow assessment of flow patterns. The grains used were



Figure 1 - Corn cob media used in lautertun

an inexpensive ground-up industrial corn cob material similar in size to crushed malt. This corn cob grain bed is similar in hydraulic permeability to a real grain bed, and the permeability is stable (i.e., the corncobs don't swell significantly), making it ideal for comparing various flow conditions on a consistent basis from one trial to the next. The water was mixed with the corn cob much as it would be for a mash. Finally, dye was added to the sparge water to allow visualization of the fluid flow during the lautering. We used the dye to give us a visual representation of the fluid flow, rather than performing an actual mash and looking at the amount of sugar extracted.

The grain bed was placed in the aquarium with either a manifold or false bottom beneath it. The depth of the grainbed was eight inches, and there was about two inches of free-standing water maintained above it by sparging. After the food coloring dye was mixed into the free-standing water layer (the sparge water), the outlet valve was opened to a flow rate of about one quart per minute.

We evaluated the performance of each lautertun system by watching the sparge dye



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.

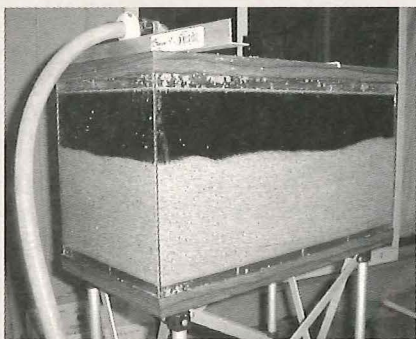


Figure 2 - Experimental setup showing dyed sparge water before flow begins.

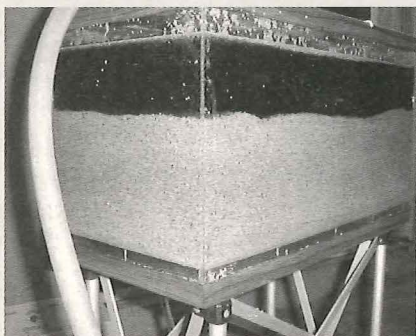


Figure 3 - False bottom flow showing uniform flow at all areas of the tun.

move into and through the grain bed. If the dye did not flow into an area of the grain bed (e.g., the corners), then clearly the system in question did not do an effective job of rinsing extract from these areas. Thus, the dye flow observations provided a qualitative evaluation of the fluid flow differences inherent in different manifold and false bottom designs.

False Bottoms

In the experiments using a false bottom, the sparge dye moved uniformly down and through the grain bed. Observations through the glass bottom of the test vessel showed that dye was drawn from all areas of the false bottom without regard to the position of the drain tube. Even when the pickup tube was moved off-center to one end of the tun, flow through the false bottom maintained a uniform appearance. This observation answered one of the questions we had about lauter tun design: whether drain position impacts the flow of sparge liquid through the grain bed.

While the fluid flow was uniform throughout the bulk of the grain bed, the flow down along the corners of the tun (within about one-half inch of the corners) was faster. The

field of fluid dynamics explains this as a "boundary effect," in which the fluid flow resistance decreases at the wall due to a lack of interlocking particles. In effect, the smooth wall breaks the strainer effect of the grain and provides a ready pathway for the flow of liquid. This is one factor that contributes to faster flow at the corners.

It is often difficult to acquire a false bottom whose edges conform tightly to the tun walls, especially in the corners. This fact leads to the occurrence of gaps between the false

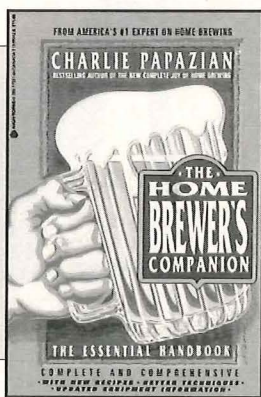
bottom and the wall where liquid will prefer to flow. These low-resistance paths can result in some percentage of the sparge water taking a short cut through the grain bed, which decreases the yield from each volume of wort collected. Our conclusion is that false bottoms should be fitted closely to the tun in order to minimize this effect.

Manifolds

Laboratory simulations with various manifold configurations compared lauter

BREW YOUR OWN — WITH HELP FROM THE EXPERT!

Charlie Papazian, America's leading authority on home brewing, offers readers two comprehensive, in-depth guides to brewing everything from the lightest lager to the darkest stout.

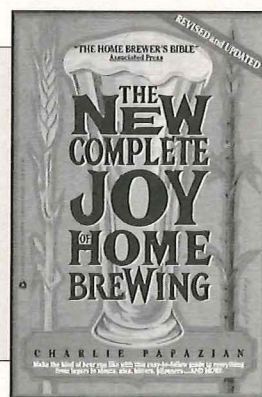


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flow between the different configurations and compared manifold performance with that of a false bottom.

We evaluated several manifolds with different numbers of pipes and different spacing configurations. The manifold investigation determined that the more pipes, the better: flow is always more uniform for a larger number of pipes. Of the spacing configurations we tried, the most effective was a configuration we called a "balanced" spacing. A balanced spacing is one where the distance from a wall to the nearest pipe is

half the spacing from one pipe to the next. For instance, in our 10-inch wide tun, with a two-pipe manifold, the pipes are positioned at 2.5 inches and 7.5 inches — the balanced spacing means that the 2.5-inch wall-to-pipe spacing is half the 5-inch pipe-to-pipe spacing.

In a false-bottom design, the entire grain bed stays above the slotted plate. But in a manifold design, the manifold is immersed in the grain bed and surrounded on all sides by the mash. In trials when we raised the manifold two inches above the floor, we did

not see dye entering the grain below the manifold. This implies that any grain below a manifold is inadequately sparged. To satisfy our curiosity, we angled the tip of the manifold down by 10 and 20 degrees. With the angled manifolds, grain that was under the manifold, but higher than the lowest point of the manifold, did have dye flowing through it.

Conclusions

Overall, our experiments with dye-based laboratory simulation of a homebrew lauter led us to the following conclusions:

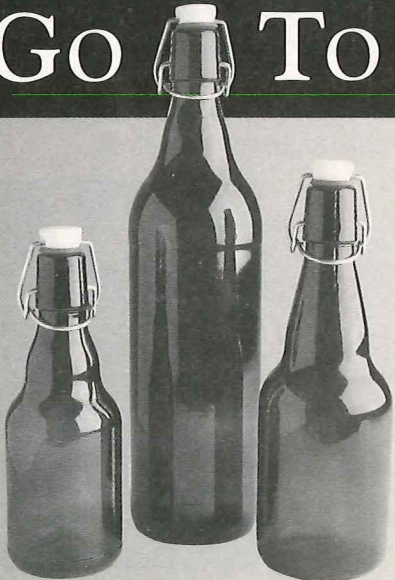
- False bottoms deliver a more uniform flow through the grain bed than do pipe manifolds. In false bottom systems, pickup tube location doesn't affect the flow. False bottoms should be fitted well to the walls of the mash tun.
- In manifold systems, the more pipes (i.e. the smaller the pipe-to-pipe spacing), the better.
- In manifold systems, a balanced spacing (see description above) between the pipes gave the most uniform dye flow across the grain bed.
- Grain below manifolds is inadequately sparged. Manifolds should be placed as low as possible in the lauter vessel to minimize the amount of undersparged grain.

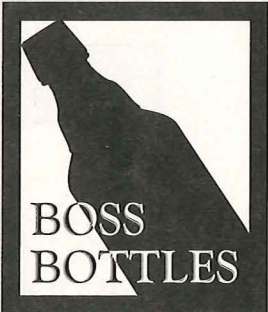
It is difficult to take these qualitative conclusions and make detailed decisions, since any advantage must be weighed against the cost and complexity of its implementation. In our next contribution to "For Geeks Only," we will present the quantitative results of our mathematical modeling studies, where we derive the flow volume and uniformity of sparging numerically for several thousand lautering designs — all without leaving the comfort of our keyboards.

John Palmer is a metallurgical and welding engineer currently employed by 3M Corporation. He has been brewing for 9 years and has written an online book for new homebrewers titled, *How To Brew*. It is located at www.howtobrew.com John lives in Monrovia, CA.

Brian Kern is a member of L.A.'s Maltose Falcons homebrew club and a graduate student in astrophysics at Caltech. Brian only recently discovered that his tinkering and mathematical modeling skills would find a happy home in the world of homebrewing (at least in the geeky part).

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BY CHARLIE PAPA ZIAN

Great American Beer Festival® Festival Ale

The Great American Beer Festival speaks for itself. Anyone who has ever been knows that never are so many great beers on tap under one roof for three glorious days, except at the Great American Beer Festival. The event held annually in Denver, CO will be celebrating its Twentieth Anniversary, September 27-29, 2001. Two decades of greatness showcasing the evolution of American beer culture at its best. This year will not be an exception with an anticipated 1,400 beers from over 300 breweries throughout the United States. I'll be there and looking out for the likes of you!

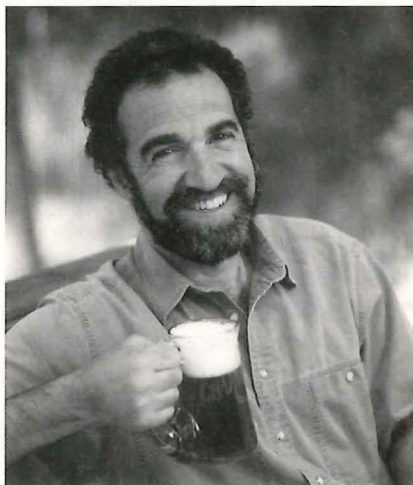
There'll be lots to celebrate and one of the ways we'll be celebrating 20 years will be with a commemorative beer called "Festival Ale" brewed by the Left Hand-Tabernash Brewing Company in Longmont, Colorado. We're formulating a medium-high gravity American type golden ale with hops not normally found in most American ales. Gone are Cascades, Centennial, Chinook. There are plenty of those kinds of ales available. We're approaching this ale with smooth and floral American grown Mt. Hood and Santiam (a replacement for rare American Tettnanger) hops. You'll note the adequate malt and alcohol, but it's designed to quench August and September thirsts in the Denver metropolitan area. With high drinkability in the Mile High City, we hope you'll try brewing this at home and come to the fest to share a sample with me.

Here's a homebrewed version of what we're aiming at. Let's cut the shuck and jive and get on with the recipe. Get brewing!

Great American Beer Festival Festival Ale—Homebrewed Version Malt Extract Version

Ingredients and recipe for 4 U.S. gallons (15 L)

6.6 lb pale/light malt extract syrup



- (3 kg)
- 0.75 lb 40° L crystal malt (340 g)
- 0.5 Tbs gypsum as necessary for water lacking calcium and sulfate ions (optional)
- 0.6 oz Mt. Hood (3.6 HBU/101 MBU) pellets (17 g) 60 min.
- 0.6 oz Mt. Hood (3.6 HBU/101 MBU) pellets (17 g) 30 min.
- 0.75 oz Santiam (3.3HBU/92 MBU) pellets (17 g) 30 min.
- 1 oz Santiam (5.5 HBU/154 MBU) pellets (28 g) 2 min.
- 0.25 tsp powdered Irish moss
- 0.6 cupcorn sugar (145 mL) to prime American ale yeast

- Original gravity 1.062 - 1.066 (15.5-16.5 B)
- Final gravity 1.018-1.022 (4.5 -5.5 B)
- IBUs—about 37
- Approximate color: 13 SRM (26 EBC)
- Alcohol: 6% by volume
- Apparent yeast attenuation: about 72%

Add the crushed crystal malt to one gal (3.8 L) of 160° F (71° C) water. Let steep for 30 minutes. Afterward strain out the spent grains, sparge with hot water and collect the liquid extract. Add 1.5 gal (6 L) additional water, the malt extract syrup and the 60-minute charge of Mt. Hood hops. Bring to a boil and continue to boil for 30 minutes. When 30 minutes remain add the 30-minute charges of Mt. Hood and Santiam hops. Continue to boil. When 10 minutes remain add Irish moss. When two minutes remain

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:

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

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

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

METRIC BITTERNESS UNITS (MBUs)

are equal to the number of grams of hops multiplied by the percent alpha acid.

add the final ounce (28 gm) Santiam hop pellets. Cool the wort to about 70 to 75° F (21-24° C). This can be done simply by immersing the brewpot (with lid on) in a bath of cold running water for about 30-45 minutes. Other means of chilling can be used if desired.

Final primary batch size is four gallons (19 L). Add additional cold water to achieve this volume. Aerate the wort very well. If using dried yeast, rehydrate the yeast in 100° F (38° C)—yes 100° F—water (and only water) for 10 minutes. Add rehydrated slurry or a liquid yeast starter culture when temperature of wort is about 70 or 75° F (21-24° C). Preferably begin and continue the fermentation at 70-72° F (21-22° C). After primary fermentation is complete rack (transfer) the beer into a secondary fermenter and if possible chill the beer in the secondary to temperatures in the 55° F (13° C) range for about a week to ten days. Bottle with corn sugar. Age and carbonate/condition at temperatures below 70° F (21° C) and then chill for storing.

Great American Beer Festival Festival Ale—Homebrewed Version Mash-Extract Version


Ingredients and recipe for 5.25 U.S. gallons (20 L)

- 4.5 lb pale ale malt (2 kg)
- 1 lb 40° crystal malt (0.45 kg)
- 0.5 lb Belgian aromatic malt (230 g)
- 3 lb extra light dried malt extract (1.36 kg)
- 0.5 Tbs gypsum as necessary for water lacking calcium and sulfate ions (optional)
- 0.75 oz. Mt. Hood (4.5 HBU/126 MBU) pellets (21 g) 60 minute boiling
- 0.75 oz. Mt. Hood (4.5 HBU/126 MBU) pellets (21 g) 30 minute boiling
- 0.75 oz. Santiam (4.5 HBU/126 MBU) pellets (21 g) 30 minute boiling
- 1 oz. Santiam (5.5 HBU/154 MBU) pellets (28 g) 2 minute boiling
- 0.25 tsp powdered Irish moss
- 0.75 cup corn sugar (180 ml measure) to prime, or 0.33 cups corn sugar (80 ml) for kegging American ale yeast
- Original gravity 1.058-1.062 (14.5-15.5 B)
- Final gravity 1.014-1.018 (3.5 - 4.5 B)
- IBUs—about 36
- Approximate color: 12 SRM (24 EBC)
- Alcohol: 6% by volume
- Apparent yeast attenuation: about 75%

For maximum extraction efficiency (85%) and excellent head retention a two-step infusion mash is used. Add six qt (6 L) of 151° F (66° C) water to the six pounds of crushed grain (2.7 kg) stir, stabilize and hold the temperature at 133° F (56° C) for 30 minutes. Then add three quarts (3 L) of 200° F water to the mash, mix well and stabilize temperature at 156° F (69° C) for another 30 to 40 minutes. Then raise temperature to 167° F (75° C), laut and sparge with three gallons (11.5 L) of 170° F (77° C) water. Collect about 3.5 to 4 gal (13 to 15.5 L) of runoff. Add the three pounds of extra light dried malt extract.

Add the first 60-minute charge of Mt. Hood hops. Bring to a boil and continue to boil for 60 minutes. When 30 minutes remain add one ounce each of Mt. Hood and Santiam hops. Continue to boil. When 10 minutes remain add Irish moss. When two minutes remain add the final one ounce (28 gm) Santiam hop pellets. Cool the wort to about 70 - 75° F (21-24° C). This can be done simply by immersing the brewpot (with lid on) in a bath of cold running water for about 30-45 minutes. Other means of chilling can be used if desired.

Final primary batch size is 5.25 gallons (19 L). Add additional cold water to achieve this volume. Aerate the wort very well. If using dried yeast, rehydrate the yeast in 100° F (38° C)—yes 100° F—water (and only water) for 10 minutes. Add rehydrated slurry or a liquid yeast starter culture when temperature of wort is about 70 to 75° F (21-24° C). Preferably begin and continue the fermentation at 70-72° F (21-22° C). After primary fermentation is complete rack (transfer) the beer into a secondary fermenter and if possible chill the beer in the secondary to temperatures in the 55° F (13° C) range for about a week to ten days. Bottle with corn sugar. Age and carbonate/condition at temperatures below 70° F (21° C) and then chill for storing.

World traveler Charlie Papazian is the founding president of the Association of Brewers and the author of numerous bestselling books on homebrewing. His most recent books are *Home Brewers Gold* (Avon, 1997), a collection of prize-winning recipes from the 1966 World Beer Cup Competition, and *The Best of Zymurgy* (Avon, 1998) a collection of the best articles and advice from 20 years of *Zymurgy*. 

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Included in the excellent recipes here is a particularly special brown ale recipe brewed by Steve Jones. What is unusual about this beer is the technique Jones used to brew it. Unsatisfied with a simple infusion mash, Jones sought to recreate the method used to brew one of the most popular ales in history, Newcastle Brown Ale. He uses two kettles simultaneously, one for a strong brown ale, the other for a weaker one. The finished beers are then blended together to produce one medium-strength ale. This technique brings out some subtle fruity qualities from the strong ale fermentation which would not otherwise occur. Here's what Jones has to say about his "Northern English Brown:"

"I brewed 10 gallons of this beer in October or November of 1999 for a friend's college graduation party in December of that year. One of his favorite beers is Newcastle, so I tried to emulate it. Basically what I did is to collect the first half of the wort into one boiler and the 2nd half into another boiler." For more on this novel approach to brown ale, see Clone Beers on page 12.

India Pale Ale



BRONZE MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Bill Wright, Juneau, AK

"Hop Garden IPA"

IPA

Ingredients for 6 U.S. gal (22.7 L)

- 15 lb 2-row malt (6.8 kg)
- 1 lb 40° L crystal malt (0.45 kg)
- 1 lb dextrin malt (0.45 kg)
- 1 oz Chinook whole hops, 12.3% alpha acid (28 g) (75 min.)
- 1.5 oz Cascade whole hops, 7% alpha acid (43 g) (30 min.)
- 1.5 oz Cascade whole hops, 7% alpha acid (43 g) (15 min.)
- 3 oz Cascade whole hops, 7% alpha acid (85 g) (steep, 5 min.)
- 2 oz Cascade pellet hops, 4.6% alpha acid (57 g) (dry)
- 0.5 oz Munton Gold dry ale yeast (14 g)
- Forced CO2 to carbonate

- Original specific gravity: 1.065
- Final specific gravity: 1.014
- Boiling time: 90 min.
- Primary fermentation: 4 days at 68° F (20° C) in glass
- Secondary fermentation: 8 days at 64° F (18° C) in glass

Brewer's Specifics

Mash grains at 153° F (67° C) for 60 minutes.

Judges' Comments

"Nice citrusy hop aroma. Malty flavor, high hop flavor, and bitterness, balance toward hops. Nice, well-made beer."

Brown Ale



BRONZE MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Steve Jones, Johnson City, TN

"English Brown Ale"

Northern English Brown Ale

Ingredients for 10 U.S. gal (37.85 L)
(double boil recipe)

- 18 lb 2-row pale malt (8.16 kg)
- 2 lb 40° L crystal malt (0.91 kg)
- 1.5 lb flaked barley (0.68 kg)
- 10 oz chocolate malt (283 g)
- 2 oz E. Kent Goldings whole hops, 5.2% alpha acid (85 g) (60 min.)
- 2 oz E. Kent Goldings whole hops, 5.2% alpha acid (57 g) (10 min.)
- 2 oz E. Kent Goldings whole hops, 5.2% alpha acid (57 g) (5 min.)
- Wyeast No. 1028 London ale yeast
- 2.1 vol. forced CO2 (to carbonate)

- O.G. (batch 1): 1.068
- O.G. (batch 2): 1.034
- Final specific gravity (batch 1): 1.016
- Final specific gravity (batch 2): 1.009
- Boiling time: 60 min.
- Primary fermentation: 7 days at 65° F (18° C) in glass
- Secondary fermentation: 7 days at 65° F (18° C) in glass

Brewer's Specifics

Collect the first 6.5 gallons (24.6 L) into one boiling kettle #1, then the second 6.5 gallons into #2. Bring both kettles to a boil. Add 2 oz (57 g) hops to the #1 kettle and 1 oz (28 g) to #2.

Judges' Comments

"Nice, clean beer. I'll have another."
"A nice, drinkable beer."

New Entrant



BRONZE MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Robert Neubauer, Trenton, MI

"Beginner's Luck Koelsch"

Kölsch

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

- 8.5 lb Pilsner malt (3.86 kg)
- 1 lb Munich malt (0.45 kg)
- 1 lb wheat malt (0.45 kg)
- 0.5 lb dextrin malt (0.23 kg)
- 0.5 oz Hallertauer whole hops, 4% alpha acid (14 g) (60 min.)
- 1 oz Tettnanger whole hops, 7.5% alpha acid (28 g) (60 min.)
- 0.5 oz Hallertauer whole hops, 4% alpha acid (14 g) (5 min.)
- White Labs WLP 029 German Ale/Kölsch yeast
- 1 cup corn sugar (237 mL) (to prime)

- Original specific gravity: 1.047
- Final specific gravity: 1.006
- Boiling time: 60 min.
- Primary fermentation: 11 days at 62° F (17° C) in glass
- Secondary fermentation: 18 days at 58° F (14° C) in glass

Brewer's Specifics

Heat 3.5 gallons (13.25 L) water to 132° F (56° C). Add two tsp. (10 mL) gypsum. Add grain and stabilize at 126° F (52° C). Hold for 30 min. Heat mash to 145° F (63° C) and hold for 90 min. Heat mash to 170° F (77° C) and hold for 10 min. Sparge to create 6.3 gal. (23.8 L) of wort. Boil, add hops and 0.25 oz. (7 g) Irish moss 10 min. before the end of the boil. Cool to 65° F (18° C) and pitch yeast.

Judges' Comments

"Nice clean maltiness, some fruitiness, firm hop to finish. Dry, crisp finish. Maybe just a bit more malt to balance a bit better. Good, clean ferment."

"Light fruitiness. Good balance-malt is

Spice/Herb/ Vegetable Beer



SILVER MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Brad Reeg, Chicago, IL

[Untitled]

Spiced Ale

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

- 9 lb pale ale malt (4.08 kg)
- 2.5 lb 40° L Crystal malt (1.13 kg)
- 1 oz Fuggle whole hops, 4% alpha acid (28 g) (60 min.)
- 0.5 oz Kent Goldings whole hops, 5% alpha acid (14 g) (60 min.)
- 1 oz Kent Goldings whole hops, 5% alpha acid (28 g) (35 min.)
- zest of 4 oranges
- 2 tsp allspice, ground (9.9 mL)
- 0.5 tsp ginger, ground (2.5 mL)
- 0.5 tsp nutmeg, ground (2.5 mL)
- 0.5 tsp cinnamon, ground (2.5 mL)
- 0.5 tsp cardamom, ground (2.5 mL)
- 0.5 tsp coriander, ground (2.5 mL)
- Wyeast No. 1968 Special London ale yeast
- 0.75 cup corn sugar (177 mL) to prime

- Original specific gravity: 1.061
- Final specific gravity: 1.016
- Boiling time: 90 min.
- Primary fermentation: 15 days at 65° F (18° C) in glass
- Secondary fermentation: 19 days at 65° F (18° C) in glass

Brewer's Specifics

Mash grains at 158° F (70° C) for 60 minutes. Add half of each spice addition five minutes before the end of the boil, and steep the rest after the boil is finished.

Judges' Comments

"Quite drinkable. Could not identify a base style, but that's not important. I would like to have it on my shelf."

"Spices come through and are generally harmonious. Bittering of base beer is a little high-shifting the balance more to malt would help support the spices."

Cider



BRONZE MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Bruce Franconi, Red Hook, New York

[Untitled]

Spiced Cider

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

- 5 gal. fresh squeezed cider from Northern Spy apples (19 L)
- 2.5 tsp yeast nutrient (12.3 mL)
- 0.25 tsp potassium metabisulfide (1.2 mL)
- Red Star Premier Cuvee wine yeast
- 2 Tbs sugar (29.6 mL)
- 0.5 tsp yeast nutrient (2.5 mL)
- 1.5 cup sugar (355 mL)
- 0.5 cup mulling spice blend (118 mL)

- Original specific gravity: 1.055
- Final specific gravity: N/A
- Boiling time: N/A
- Primary fermentation: 8 days at 72° F (22° C) in glass
- Secondary fermentation: 21 days at 72° F (22° C) in glass

Brewer's Specifics

Mix the first two ingredients and add the sulfites. Leave the mixture overnight to allow the SO₂ to evolve and sanitize the solution, then after 24 hours, stir well to get rid of any remaining gas. Dissolve yeast in one cup warm water, two tablespoons sugar and 0.5 tsp. yeast nutrient. Pitch yeast into cider must and commence fermentation. Ferment for two weeks in primary, then rack to secondary and let sit for two months until it is finished and clear. Let it sit in a cool place for a while and then warm up, allowing a malolactic fermentation until the cider is finished and clear again.

Siphon the cider from the carboy into a soda keg. Dissolve 1.5 cups sugar in 1.5 cups water and add to the cider to balance the tartness and sweetness. Make a tea by steeping 0.5 cups mulling spices in one cup water. Strain out spices and add to the keg, to taste. Force carbonate and bottle.

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



JUNE

21-23 AHA National Homebrew Competition 2001, Second Round, **AHA SCP**, Los Angeles, CA. Advancing entries due 6/11-6/15. Contact Gary Glass at 303-447-0816 x 121, 1-888-U-CAN-BREW, gary@aob.org, <http://beertown.org/AHANHC/2001/>.

21-23 AHA National Homebrewers Conference, Presented by Rogue Ales, Los Angeles, CA. This year's conference will take place at the Four Points Sheraton LAX. Plans include a club hospitality suite, a club night, a Southern California pub crawl, the National Homebrewing Competition, and a variety of educational lectures and workshops, plus the LA Brewers Open - part Real Ale Festival, part Draft Beer Festival, part Commercial Beer Competition with awards for brewers. Contact Paul Gatz at 303-447-0816 x 122, 1-888-U-CAN-BREW, paul@aob.org, <http://www.beerodyssey.com/>.

29-30 Mother Lode Fair Homebrew Competition, **AHA SCP**, sponsored by Parrott's Ferry Home Brew Club. Entries due 6/5-6/19, \$5 entry fee. Contact Harvey Hickley at 209-533-0360 or hkyfmly@goldrush.com.

JULY

7 14th Annual Southern California Regional Homebrew Championships, **AHA SCP**, Corona, CA. See IEB web page for details at www.hopheads.com or call Brandon at 909-737-6869, bnss1@earthlink.net. Entries due 6/15-7/7 with a \$5 fee.

8 Summer Cap Off 2001, **AHA SCP**, Ceres, CA. Entry fee of \$5. Entries accepted 6/19 - 6/29. Contact Wayne Baker, 209-538-2739, BarleyLW@aol.com, or visit the website www.jps.net/randy/.

13-14 7th Annual Commander SAAZ Interplanetary Homebrew Blastoff, **AHA SCP**, Melbourne, FL. Entries due 7/1-7/9, \$6 entry fee. Contact Lynn Seelos at 321-724-1312, lrseelos@aol.com.

13-14 E.T. Barnette Homebrew Competition, **AHA SCP**, Fox, AK. Entries due 7/3-7/11, \$5 per entry. Contact Scott Stihler at 907-474-2138, lrseelos@aol.com, <http://www.mosquitonet.com/~stihlerunits/ScottsDen/Beer/Events/Events.html>.

14 Oregon State Fair Amateur Beer Competition, **AHA SCP**, Salem, OR. \$6 per entry, deadline is 7/10. Contact Curt Hausam, 503-378-0774, work or 503-947-3247, info, Biersudz@aol.com.

14 Mt. Brewer Open 2001, Huntington, VT, **AHA SCP**. This event is a fundraiser for Huntington Museum Of Art. Entries accepted 6/25 - 7/6, \$5 each. Contact Jeff Boggess at 304-744-7535 or Brudn@charter.net.


21 Ohio State Fair Homebrew Competition, **AHA SCP**, Columbus, OH. Entries accepted 4/15-6/20, \$5 entry fee. Contact Brett Chance at b.chance@expo.state.oh.us, or 614-644-4126.

AUGUST

4 6th Annual Montgomery County Agricultural Fair Homebrew Competition, **AHA SCP**, Gaithersburg, MD. Entries due 7/28 with \$5 entry fee. Contact Bill Lawrence at 301-963-9314, billyl@erols.com, or http://members.tripod.com/~G_A_B_S.

8 San Mateo Co. Fair Amateur Home Brewer Contest, **AHA SCP**, San Mateo, CA. California amateur homebrewers only, entries due 7/07, \$4 fee. Contact Jennifer Burleson at burleson@smexpo.com, www.SanMateoCountyFair.com, or (650) 574-3247.

11 New York State Fair Homebrew Competition, **AHA SCP**, Syracuse, NY. State residents only. 1st entry \$6, add. entries \$4. For info, please call 315-487-7711 ext. 1339, Agsiute@nysnet.net, or www.NYSFair.org.



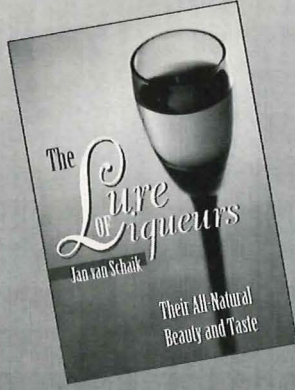
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- 12** Kentucky State Fair Homebrew Competition, **AHA SCP**, Louisville, KY. Entries due 8/11. Contact Bob Reed at 502-367-5190, tobias@igLou.com, www.kyfairexpo.org/statefair.
- 14** Wild Brew Three, **AHA SCP**, Tulsa OK. Sponsored by the Fellowship of Oklahoma Ale Makers. Entries due 7/27, with a \$6 fee. Contact Jeffrey Swearingin tswearengin@TAASCFORCE.com, www.frontpage.webzone.net/dcm/oam.htm, or 918-250-2661.
- 24** Colorado State Fair Homebrew Competition, **AHA SCP**, Pueblo, CO. Entries accepted 8/13-8/17, \$5 entry fee. Contact Susan Dickman at 719-561-8484 x 2080, susan.csf@coyotenet.net.
- 25** Great Southern Beer Festival, Memphis, TN, **AHA SCP**. Sponsored by the Bluff City Brewers. Entries accepted 8/13-8/18, \$5 each. Contact Jay Grabowski, 662-449-0493, jgrabowski@aol.com, or www.memphisbrews.com.
- 26** Western Washington Fair Amateur Beer Competition, **AHA SCP**, Puyallup, WA. Entry deadline 8/18, \$4 per entry. For more info call 253-841-5017, or pat@the-fair.com.

AMERICAN HOMEBREWERS ASSOCIATION

• KUDOS •

SANCTIONED COMPETITION PROGRAM

• **OCTOBER 2000 •**
Hoppy Halloween Challenge
 Fargo, ND, 169 entries - Arlin Karger/ Ray Taylor, of Moorhead, MN won best of show.

• **FEBRUARY 2001 •**
8th Annual Peach State Brewoff
 Atlanta, GA, 265 entries - Douglas McCulloch of Indian Springs, AL won best of show.

Florida State Fair
 Tampa, FL, 335 entries - Steve Vallancourt of Montuende, FL won best of show.

War of The Worts VI
 Springhouse, PA, 249 entries - David Houseman of Chester Springs PA won best of show.

• **MARCH 2001 •**
***Hurricane Blowoff 2001**
 West Palm Beach, FL, 137 entries - John Peterson of Jupiter, FL won best of show.

***Drunk Monk Challenge**
 Warrenville, IL, 504 entries - Nick and Nancy Edgington of Lake Grove, NY won best of show.

***March Mashness**
 St. Cloud, MN, 127 entries - Steve Piatz of Eagan, MN won best of show.

***Kona Brewers Festival HBC 6th Annual**
 Kona, HI, 138 entries - Robert Kauffman, of Lafayette, CO won best of show.

***Heartland Homebrew Competition 2000**
 Des Moines, IA, 124 entries - Steve Piatz of Eagan, MN won best of show.

***Greater Montreal Annual Homebrew Competition**
 Montreal, Quebec, 47 entries - Luc Boivin of Blainville, QC won best of show.

***Slurp & Burp Open**
 McMinnville, OR, 300 entries - Marc Hayden of Sherwood, OR won best of show.

• **APRIL 2001 •**
***Snow Goose Spring 2001 Breakup HBC**
 Anchorage, AK, 23 entries - Jason Ditsworth won best of show.

***10th Annual B.O.S.S Chicago Cup Challenge**
 Blue Island, IL, 210 entries - Jeff Sparrow of Chicago, IL won best of show.

***Maltose Falcons Mayfaire**
 Cowaga Park, CA, 252 entries - Mike Riddle/Jonathan Deeds of Napa, CA won best of show.

***Quad-States Brewers Challenge**
 St. Joseph, MO, 24 entries - Andrew Bales of Lees Summit, MO won best of show.

AHA SCP = American Homebrewers Association Sanctioned Competition Program. For a complete listing of events, see www.beertown.org. To list events, send information to **Zymurgy** Calendar of Events. To be listed in the September/October Issue (Vol. 24, No. 5), information should be received by July 11, 2001. 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.

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BY AMAHL TURCZYN

Tomme Arthur's Saison

Tomme Arthur, brewmaster at the Pizza Port/Solana Beach Brewery, has a great affinity for real ale, and has won multiple awards at the Real Ale Festival in Chicago. Recently, however, he's had a fascination with Belgian ales, and while this may come as a surprise for real ale aficionados, there are really a lot of similarities between his favorite Belgian style, Saison, and the hand-crafted, naturally carbonated British ales. Specifically, Arthur mentioned the seasonal Saison D'Erezée beers from Brasserie Fantôme, a small artesanal brewery in the village of Soy, Luxembourg. According to John Woods and Keith Rigley, in their wonderfully informative book, *The Beers of Wallonia*, Fantôme brewer Dany Prignon uses local plants, flowers and herbs from each season to flavor his Saison ales, and names them "Printemps", "Ete", "Automne" and "Hiver", after the French names of the seasons. Not only that, but the recipes vary from year to year, also according to which herbs are available at the time he is ready to brew. This makes for highly distinctive, highly varied beers—no worries about product consistency here.

It was one of these beers that inspired Tomme Arthur. He said it was the Saison d'Erezée Automne, and possessed "an intensely dry, chalky, minerally bitterness." Brewed with dandelions, it was eight percent alcohol, amber in color, and not terribly hoppy at around 35 IBUs, but from the herbs and flowers added, it had a "completely different kind of dryness." This freedom of ingredients is not uncommon in Wallonia, where the style originated. This inspired Arthur to brew his own version of this Saison at his brewery in the US, and that is the recipe below, which he was kind enough to share with *Zymurgy* readers.

With a nod towards other Saison-style beers like Brewery Ommegang's "Hen-nepin," Brasserie Vapeur's famous "Saison



de Pipaix" and Dupont's classic "Saison DuPont," Arthur's version is a light, wonderfully complex and spicy brew, meant to be consumed fairly young, as the herbs and spices tend to mellow with age. Arthur also says that this is the version served on tap at Pizza Port, and that bottle conditioning will result in a much drier beer, though you may prefer this variation.

The base malts are fairly standard, with DeWolf-Cosyns as the featured pilsener malt, but the spices are a bit exotic. Fresh grated ginger is added in three additions, sweet orange peel, chamomile, (and again, fresh is best if possible), along with ground coriander seed, black pepper and grains of paradise.

Hops are moderate in this beer, taking a back seat to the character of the yeast and the herb and spice flavors. Styrian Golding is used sparingly, in an early kettle addition, and in the steep.

The yeast Arthur prefers is White Labs Saison yeast, though it can be quirky, to say the least. Several brewers using this strain professionally have claimed to have problems with slowed attenuation halfway through the primary fermentation. The best way to overcome this problem according to Arthur is to pitch a very healthy amount at a relatively high temperature (70 to 75° F or 21 to 24° C), and allow the beer to generate its own heat during the course of the ferment, even as high as 80° F (27° C). You may also want to consider the use of a yeast nutrient, just to make sure. But the results of the finicky strain are spectacular—this Saison yeast exhibits such wonderfully authentic Wallonian character, you'll swear you're sipping a frothy tumbler of local country ale in the middle of a Belgian hay field.

As for conditioning the beer, Arthur recommends cold storage: about 40° F (4° C) for six weeks will help to blend the flavors and allow the beer to clarify. With



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Tomme Arthur's Saison

Recipe for 5 gallons (19 L)

- 8 lb DWC Belgian pilsener malt (3.63 kg)
- 3 lb red wheat malt (1.36 kg)
- 8 oz flaked wheat (227 g)
- 8 oz flaked oats (227 g)
- 0.75 lb dark Belgian candi sugar (0.34 kg)
- 0.5 oz fresh grated ginger (80 min)
- 0.5 oz fresh grated ginger (45 min)
- 1 pinch fresh grated ginger (steep)
- 0.5 tsp ground black pepper (45 min)
- 0.5 tsp ground grains of paradise (45 min)
- 1 tsp ground coriander seed (45 min)
- 0.25 oz sweet orange peel (steep)
- 0.5 oz chamomile (steep)
- 2 oz Styrian Goldings hops, 4% alpha acid (57 g) (90 min)
- 2 oz Styrian Goldings hops, 4% alpha acid (57 g) (steep)
- yeast nutrient
- White Labs Saison ale yeast
- 0.75 cup corn sugar (177 mL) to prime

Brewer's specifics: Mash grains at 149° (65° C) and hold for one hour. Sparge and boil collected wort for a total of two hours. Chill to 70-75° F (21-24° C) and pitch yeast slurry. Two weeks at 70-80° F (21-27° C) should be sufficient for primary fermentation. Then the beer can be racked into secondary containers and conditioned at 40° F (4° C) (if possible) for four to six weeks.

- Boiling time: 120 minutes
- Original gravity: 1.067
- Finishing gravity: 1.012
- IBUs: 20-25

For an extract version, substitute 5.75 lb (2.6 kg) extra-light dry malt extract and 2 lb (0.45 kg) dry wheat malt extract for the malted grains, and bump the bittering hops up to 2.5 oz (71 g). Omit the flaked grains. Add extracts and candi sugar and proceed with a 90 min boil, adding hops and spices at the designated times.

patience, the beer should finish fairly dry, at about 1.012 (3° P). If it's much higher than that, you may be rushing the yeast, and you might get some over-carbonated bottles if you choose to bottle condition with priming sugar.

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

The Culture of Lambic (from page 45)
even banana, which I personally would find hard to put into a good lambic.

The classic fruit in Belgian lambic was the Schaarbeek cherry, a small, dark, sour cherry with a large pit. The demand for krik has grown so much that lambic brewers are now importing cherries. Traditional lambic brewers use only real fruit, although some breweries use fruit syrup. I have seen breweries using dried fruit with good success.

I prefer sour cherries because they don't impart the cough-drop aroma and flavor of some cherry extracts. The real fruit flavor more closely matches a traditional krik. Use a minimum of two to three pounds (0.91 to 1.36 kg) fresh or freshly frozen cherries per gallon. If you prefer a sweeter cherry effect, by all means experiment. A wide variety of cherry products are available: cherry extracts, dried cherries, canned cherries, cherry juice, fresh cherries.

Raspberries are another fruit added to lambic beers. I've seen recipes using two to five pounds of raspberries per five gallons, but a good place to start is with 1.5 to 2.0 pounds (0.69 to 0.91 kg) per gallon. In general, the amount of fruit per gallon in lambics is higher than other fruit beers because fruit character tends to fade during the lengthy aging periods.

Peach is a recent addition to the lambic offerings—its stronger flavors fade, but I have a batch that has three years on the fruit where the effect is well rounded but subtle. You can add flavor (literally) by adding a small amount of juiced fresh fruit immediately prior to bottling to enhance the flavor but be aware of the extra sugar content in the bottle fermentation.

With this basic information, you can begin to explore lambic production. In order to get started, you'll need to buy and drink a range of lambics so that you can grow the organisms living in their lees. Like most aspects of brewing, this iterative process of drinking and brewing is what makes the hobby such a joy.

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historic times to the beginning of brewing science and technology; a critical essay. Chicago,: Alumni ass'n of the Wahl-Henius institute of fermentology.

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BY AMAHL TURCZYN

Australian Government Forced to Scrap Beer Tax Increase

Prime Minister John Howard's conservative coalition recently cut a deal with the minority Australian Democrats party that will reduce beer prices by 11 Australian cents (5 cents US) for a glass of normal-strength beer and by up to 15 Australian cents (15 cents US) for low alcohol beer. This price reduction applies only to beer sold in bars. The deal came after the Democrats and the opposition Labor Party joined forces in the Senate to block legislation aimed at

increasing tax on beer retroactively

from last July. Treasurer Peter Costello, the government's finance minister, accused the Labor party of irresponsible, economic populism. "A political party that on the one hand wants to say to you 'oh, we are worried about the currency, so worried that what we need is more free beer,' is a political party that has no credibility," Costello told reporters. The new legislation also sets up an Alcohol Education and Rehabilitation Foundation which will be funded out of the estimated 185 million Australian dollars (US\$90.5 million) collected since the tax rise last July. A small amount of cash also will be allocated to a program for restoring and preserving historic bars in rural Australia. Opposition treasury and economics spokesman Simon Crean said the government had made yet another policy U-turn due to the pressure put on it by Labor and brewers. In recent months the government has been forced into embarrassing policy changes on fuel tax and sales tax red tape following two state election defeats for Howard's Liber-



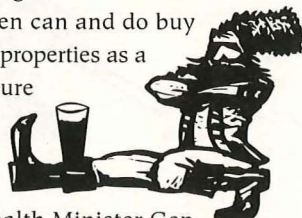
al-National coalition and a slump in opinion polls.

Meanwhile, with the threat of higher beer taxes, many beer-drinking Australians have already taken matters into their own hands and have decided to turn to homebrewing. The country's largest grocer says that sales of beer brewing kits have jumped 55 percent since the tax was instituted last July.

Russian Government Denounces the Evils of Beer

The Russian Health Ministry wants to crack down on beer drinking, saying it is a deadly addiction sweeping the country. Each year Russians drink a billion litres of vodka (and the home-brewed version) which kills 22,000 citizens over the same time but, according to the BBC, the call is out to ban beer ads aimed at young people and outlaw high alcohol brands. Drinking is very much part of the Russian culture and in Moscow young people can be seen, at any time of the day, clutching bottles of beer. This is not seen as a problem by most as, curiously, Russia does not class beer as alcohol, despite some brands being twice the strength of imports. The BBC reports it as being regarded as a soft drink that children can and do buy and whose properties as a hangover cure are widely praised.

However, Deputy Health Minister Genady Onischenko has declared war on beer, saying it is threatening to become a deadly addiction in a country already too fond of its drink. Dmitri Sitnikov, of the Bravo brewery, said that beer was a healthy alternative to vodka. "Young people are choosing beer over vodka because



it is trendy. Vodka is part of the Soviet era," he said. Onischenko faces an uphill battle. Not only is there opposition in the streets and the breweries, but also in the Kremlin. President Vladimir Putin is reported to prefer beer to vodka.

Hide the Beer Bottle

Shortly after being loaded onto a transport truck, 320,000 bottles of Sam Adams beer were dumped into a landfill in Westmoreland County, PA. Work crews discovered that the truck had only a few hours before been used to carry waste asbestos.

Meanwhile, in Australia, a beer delivery truck carrying 24,000 bottles reportedly lost a wheel and plunged into the Tweed river north of Sydney. When the truck owner failed to post security guards near the crash site, local residents began diving to recover as many bottles as they could. The truck was apparently recovered later, but through the Easter holiday weekend, people were donning scuba gear to get at the bottles. One man said he got away with 400 bottles. Although technically this is theft, local police say it is doubtful they will be chasing people down for convictions.



Don't BYOB to the Winter Games

Utah's liquor enforcement board has made it clear to the International Olympic Committee that Olympic contingents are not allowed to bring liquor to next February's Winter Games. According to state law, bringing alcoholic beverage into Utah is a misdemeanor for anyone who is not a licensed dealer. The penalty is up to six months in jail and a \$1,000 fine. Utah controls the sale of

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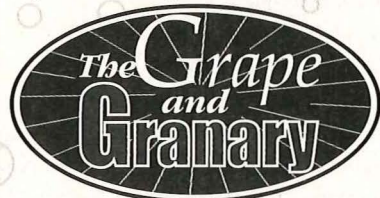
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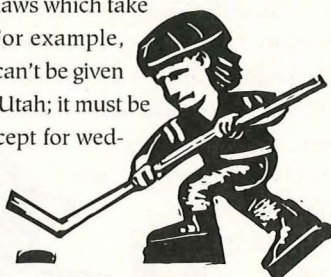
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every bottle of beer, liquor or wine inside the state. That means members of the IOC can't bring champagne to their hotel suites from anywhere out of state. "It's a rude awakening for some of them," said Earl Dorius, licensing attorney for Utah's Alcoholic Beverage Control Department. "There have been a few who have asked, 'How do we arrange shipping of our product?'" Oddly enough, the Utah ABCD does take special orders. In fact, special orders manager Dennis Kellen has been in contact with the Austrian trade

commission, the Swiss consulate, the Swiss Olympic committee and Germany's Thuringen region. But it's up to those foreign organizations to steer Utah to the liquor importer who can ship their beverage of choice. Kellen says it shouldn't be a problem, except for perhaps a beer available only on tap. Foreign organizations have been calling almost daily since January about Utah's strict liquor laws, Dorius said. The Salt Lake Organizing Committee has been referring foreign delegations to Utah's liquor department and to Salt Lake City lawyers who specialize in the law.

And shipping alcohol is only half the battle—serving it within the state presents its own set of hurdles. The delegations have been booking restaurants, hotels and golf courses where they can host invitation-only parties, like the "Heineken House" at the West Ridge Golf Course. But depending on who is invited to these functions, there are various laws which take effect. For example, alcohol can't be given away in Utah; it must be sold, except for weddings where guests can



imbibe at no charge. And selling drinks requires a special permit good for only 72 hours. So an Olympic host who isn't getting married will have to patch together a consecutive string of 72-hour permits from multiple groups to span the 17 days of the Winter Games if he wants to have, or rather sell, drinks at the party. Who's idea was it to have this thing in Utah, anyway?

Study Finds Beer Helps Protect Against Free Radicals

A recent study by Italian scientists has found another health benefit to drinking beer. Polyphenols, substances found naturally in beer, apparently protect people from free radicals. So what exactly is a free radical?

Simply stated, a free radical is an atom or molecule with an unpaired electron. Unpaired electrons make for very unstable, highly reactive atoms and/or molecules. (Paired electrons are the characteristic of a far more stable state.) A charged atom (or group of atoms) is properly referred to as an ion. A free radical is a species bearing an unpaired electron. Free radicals have no charge; they are electrically neutral. Researcher and writer Michael Dye explains it this way:

"This is a very hazardous, unnatural and unstable state, because electrons normally come in pairs. This odd, unpaired electron in a free radical causes it to collide with other molecules so it can steal an electron from them, which changes the structure of these other molecules and causes them to also become free radicals. This can create a self-perpetuating chain reaction in which the structure of millions of molecules are altered in a matter of nanoseconds (a nanosecond is a billionth of a second) wreaking havoc with our DNA, protein molecules, enzymes and cells." They have also been found to contribute to the development of circulatory disturbances and diseases of the cardiac region.



Polyphenols, according to the study, improve the body's natural immunities against aggressive environmental influences like free radicals. This provides a further explanation of the fact that moderate beer drinkers run a much lower risk of diseases of the cardiac region and circulatory system than do teetotalers.

Amahl Turczyn is the associate editor of Zymurgy magazine.

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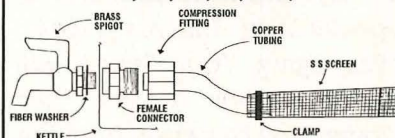
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Special Issue Coming Up!

The September-October Issue of **Zymurgy** is our annual special issue. This year's topic, "Packaging Your Beer," will cover every option for homebrew dispense, from the usual bottles and corny kegs to German mini-kegs, plastic pigs and even real ale casks. Don't miss this special collectors edition of **Zymurgy**!

It's the Beer Talking (from page 4)

have a strong American Beer Month message due to the presence of committee chair Larry Bell and guild leader Fred Buelmann. Some breweries are offering discounts for American Beer Month or AHA members during July, and some of the finer beer bars will be taking imports off line for the month to be replaced by American craft brews.

Well, my glass is empty now, so it's off to the fridge for another homebrew. Next time you pop one open, I hope you'll spend a few

minutes thinking about how you can celebrate American beer month this July. Check the website or contact your state brewing guild for how to get involved or come up with your own idea and run it by your local breweries in grassroots fashion. Finally, take the American Beer Month pledge and enjoy the rich variety of both homebrewed and commercially produced American beers during the month of July.

Homebrewer and former homebrew shop owner Paul Gatz is the Director of the AHA.

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Belgian Barm & Barrels (from page 41) Flanders Red Ale

The red aspect of Flanders sour ales arises from some combination of Vienna malt, long boils, and wood barrel conditioning. The base malt is typically two-row pale or pilsner malt. Small amounts of caramel malt and flaked maize may be used, the latter reducing the body and giving a slow-fermenting sweetness that can be attacked over time by the more fastidious acid-forming organisms. If oaken barrels can be used, they will allow slow diffusion of oxygen into the beer, which will allow slower organisms to produce the characteristic fruit ester flavor components.

In the example provided, Rodey-o-Red, the traditional Vienna malt approach has been enhanced by a slow, two-hour boil and the addition of sour cherries in the secondary fermentation. If sweet cherries or black cherries are used, the beer will take on an overbearing cherry pie aroma that differs from authentic examples. The amount of cherries used can vary from one to three pounds per gallon, depending on the desired character of the final product and the brewer's checkbook. By using acid malt, the brewer can avoid the common concern of bringing *Lactobacillus* cultures into the home brewery. If, after using the acid malt and the sour fruit, the beer does not achieve the desired level of acidity, the brewer conducts taste trials with various amounts of supplemental lactic acid until the desired acidity is discovered.

Old Brown Ale

One of the great strong oud bruins to be lost in recent years was the Roman Dobbel Bruinen. This eight percent abv, chewy beer featured bittersweet dark chocolate, espresso, caramel and toffee notes with a lingering dark berry tartness that was ultimately washed away by a clean hop bitterness. To brew a similar beer at home, follow the recipe here for Old Double Brown. The homebrewer may use any technique desired to create the moderate acidity, but it is suggested that the fermentation move towards completion with a malt-favoring, neutral flavored ale yeast, followed by addition of a lactic acid fermenter.

Understand that with time in a barrel, this beer will first become more acidic, then

will slightly back off as fruit components are formed. The value of allowing this beer to receive some slight contact with air during a year or more in conditioning cannot be over emphasized, nor can the importance of sanitation of brewing equipment when working with lactic organisms.

Conclusion

Brewing a tasty Flanders-styled sour ale requires a moderate degree of skill and a patient brewer, but the rewards of personal satisfaction and a great tasting beer are worth the effort. Good results can be had by artificially acidifying the base beer, although the true complexity of these beers is brought out over time by utilizing a multiple-strain fermentation.

When traveling in Flanders, one is taken by the near flatness of the countryside. The

beers here, however, are anything but one-dimensional. Some are bold refreshers: bright red, light bodied and intensely sour. Others may be dark brown to black with complex malt underpinnings and mere traces of acidity. Whatever they are called: red ales, *oud bruins*, or Flanders ales, these are beers as idiosyncratic as the better known lambics of central Belgium, as assertive as the political opinions of the Flemish, and as complex as Belgian history itself. During World War I our forefathers helped protect Belgium from destruction by foreign invaders. Do your part to preserve one of Belgium's traditions in this more peaceful time: recreate the sour red and brown beers of Flanders.

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- Matt Stinchfield is a freelance safety professional, beer writer, and homebrewer. He has twice won Best of Show awards for his Flanders-styled *oud bruins*. When he's not developing brewery safety programs, he leads trips into the European countryside searching for rare beers. Reach him at matts@brewingnews.com.**

Rodey-O-Red

Recipe for 5 US gallons (19 L)

- 1 lb acid (sauer) malt (0.45 kg)
- 4.25 lb pilsner malt (1.9 kg)
- 1.88 lb Vienna malt (0.85 kg)
- 0.75 lb CaraVienne malt (340 g)
- 0.25 Special B malt (114 g)
- 1.25 flaked maize (0.57 kg)
- 0.75 oz German Hallertauer hops, 4.0 % alpha acid (21 g)
- (120 min)
- 6-12 lb crushed sour cherries with pits (2.7-5.5 kg), in secondary
- 0.75 cup corn sugar (140 g) to prime

- Original gravity: 1.052 (12.8° P) (before cherries)
- Final gravity: 1.008 (2° P)
- Boiling time: 120 minutes
- IBUs: 16
- Color: approx. 10 SRM, deep ruby

Primary fermentation: 68-72° F (20-22° C) for two weeks

Secondary fermentation: 68-72° F (20-22° C) on cherries, until cherries sink

Tertiary fermentation: 50-60° F (10-15° C) until bright, at least 6 months

BY JEFF ROSENMEIER

Tumu Nu

As our twin engine plane landed on the island of Atiu, part of fifteen Cook Islands in the South Pacific, my wife and I gazed out the window, anticipating the week ahead.

My wife wanted to come to the island of Atiu because of its pristine and empty white sand beaches. As much as I like empty beaches, I have to be honest—I came for the beer. In researching this island, I read of a culture where the men gathered in what translated to “Bush Beer Schools.” These meetings, once stifled by the missions, were apparently to share wisdom and discuss local affairs while sipping a special homebrew.

As we returned from a treacherous hike through an extinct coral reef and deep into the island’s limestone caves, our guide asked us who in the group would be participating in the Tumu Nu. I eagerly raised my hand and the rest of the group looked at me as if to say maybe I was a bit too eager. They didn’t seem as enthusiastic as I. Were they afraid of the strength of the brew on an empty stomach? Or had they started to believe the historic tales of cannibalism and chosen not to take the chance? It looked like we would be the only takers.

The rest of the group waved as my wife and I jumped off the pickup truck and walked towards a thatched roof structure with several men huddled in a circle. There are apparently eight Tumu Nus on the island of Atiu. This was to be our first. The guides had set up for us to visit the “Aretou Tumu Nu,” or roughly translated, “Sam and the Boys.” Our guide quickly introduced us to everyone and left us to the experience.

After the common questions about where we were from, etc., we got to the reason that I was there. The “boss” of the Tumu Nu signaled to the “barman” who



promptly scooped the nectar from a familiar homebrew bucket into a small coconut cup and extended it towards me with a smile. After a nod to the barman and a glance at my wife, I threw back the liquid brew. It had a fruity, refreshing taste with a warm finish of alcohol. If I were to guess, I would say it contained malt with sugar as an adjunct. It was definitely worth another glass or two.

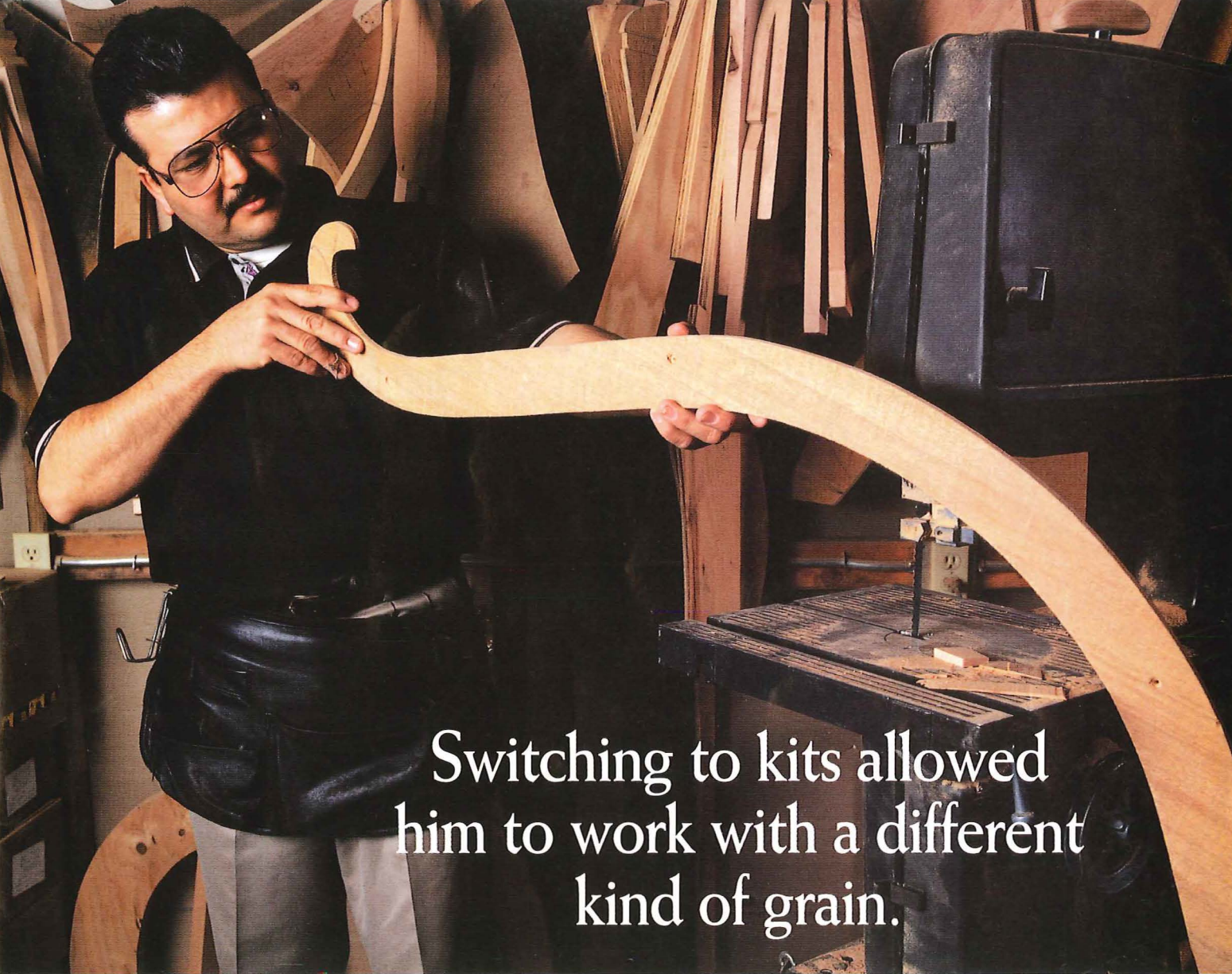
The cup continued around the circle and our friends each addressed the Tumu Nu, giving a brief description about their families and occupations. We were then asked to tell them more about ourselves and our impressions of their beautiful islands. With each round of the cup, communication became easier.

After getting to know everyone while eating fresh coconut and drinking the bush beer, Sam and the Boys did what they were apparently famous for...local music. We were treated to some wonderful island music and were amazed at their command of the local instruments. Our guide returned to retrieve us before the unknown strength of the Bush Beer took too much of a toll. We kindly handed the “boss” a little something to help them brew the next batch and said our goodbyes.



That week we had the pleasure of visiting two of the other Tumu Nus on the island, each one being as genuinely unique as the first. We’d like to thank all of the people we met in Atiu and the other Cook Islands. We had an experience that will not be forgotten.

Jeff Rosenmeier (jeff@rosenbrau.com) has been homebrewing for 7 years and currently resides with his wife in Henley-on-Thames, UK.



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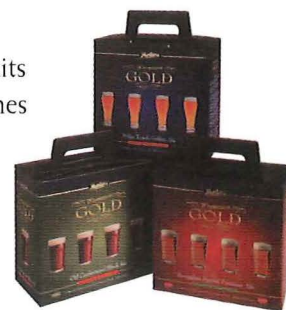
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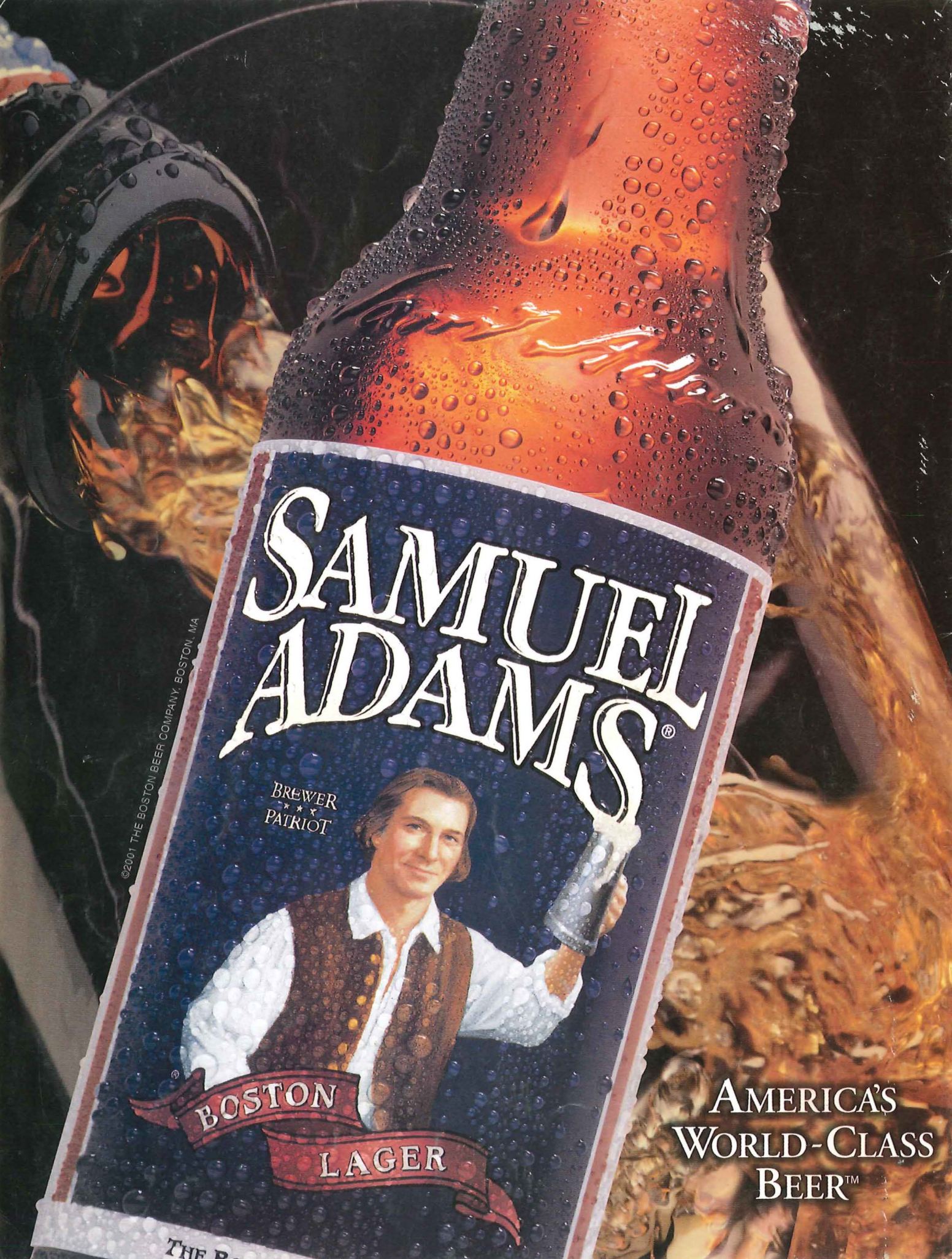
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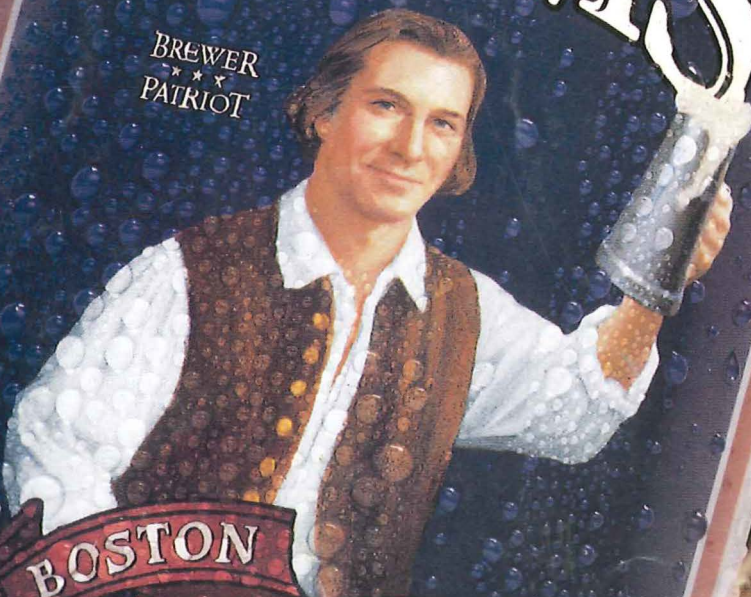
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