

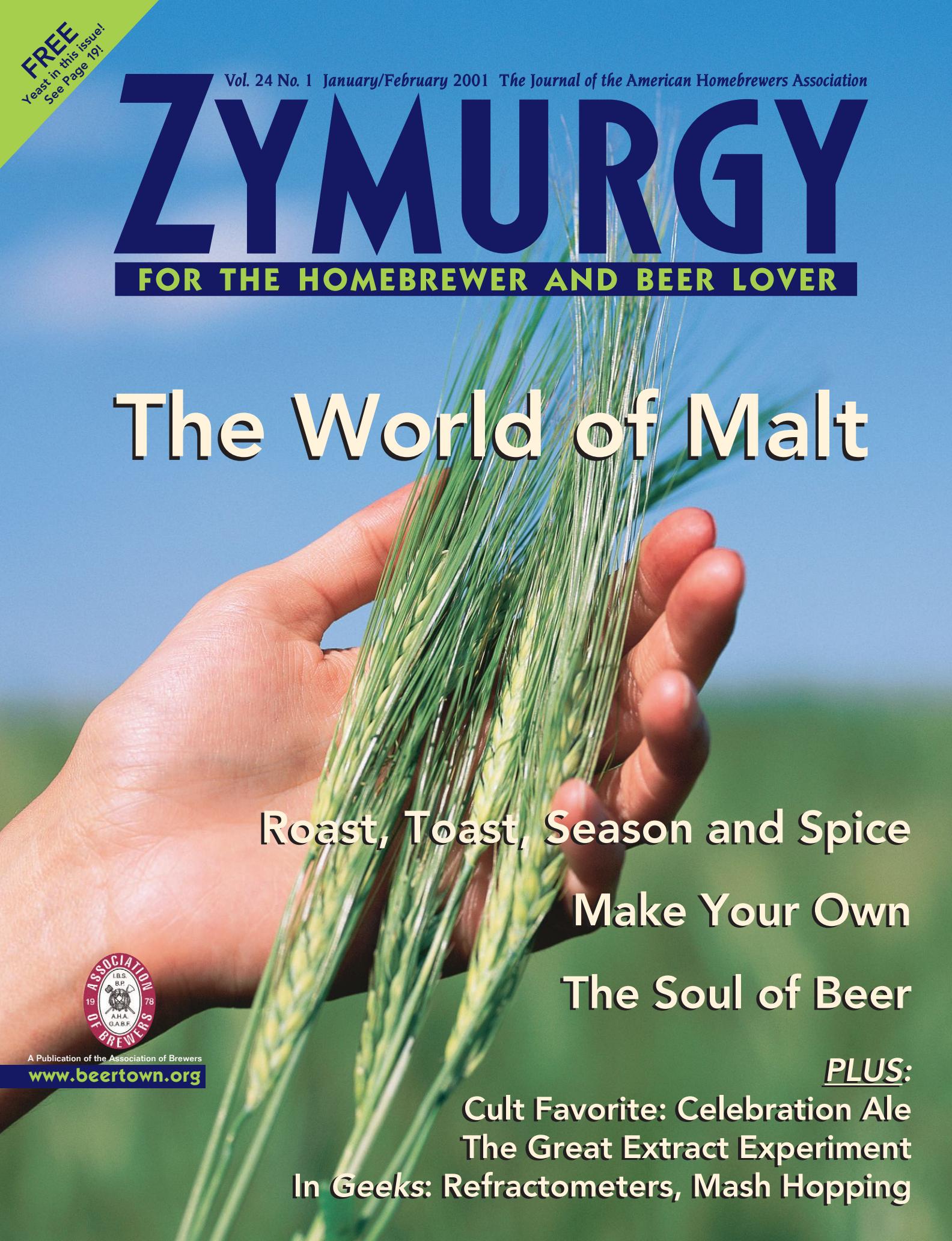
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See Page 19!

Vol. 24 No. 1 January/February 2001 The Journal of the American Homebrewers Association

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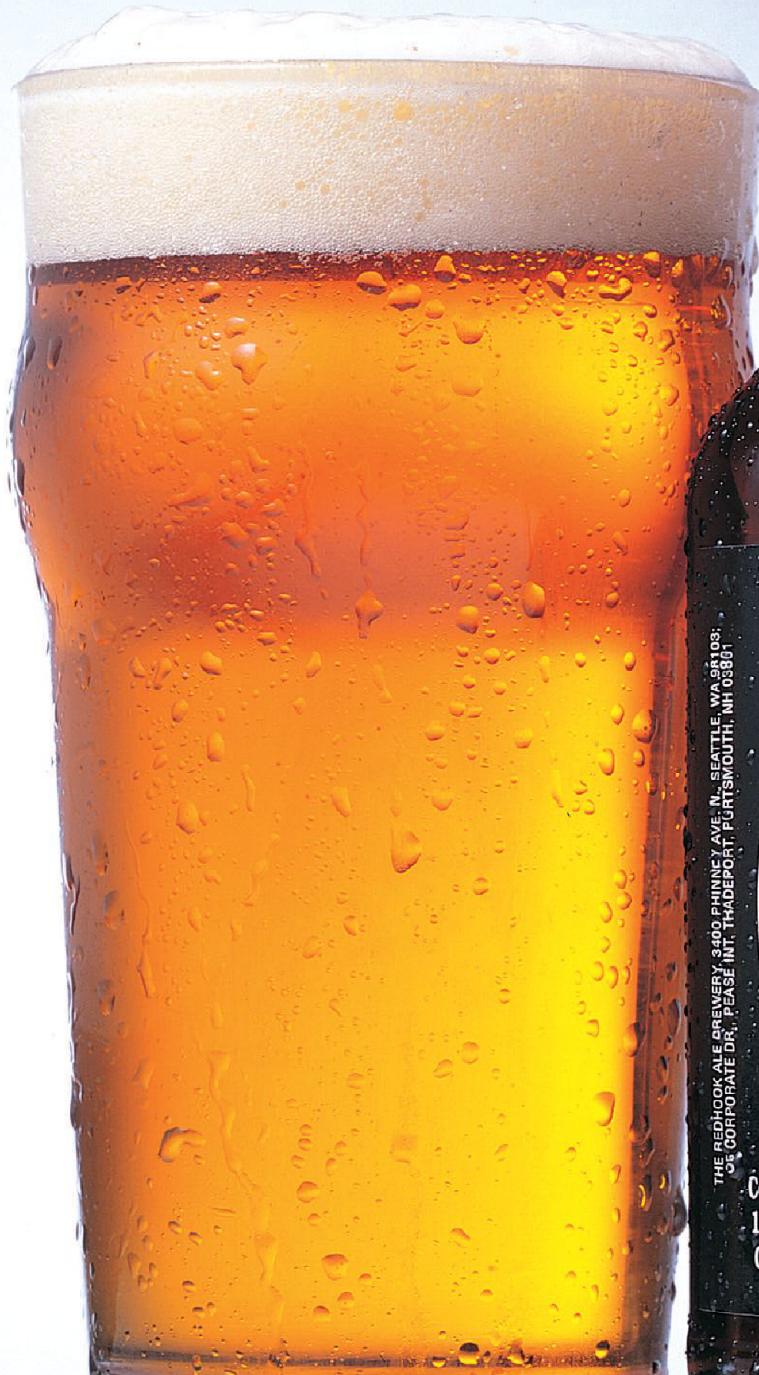


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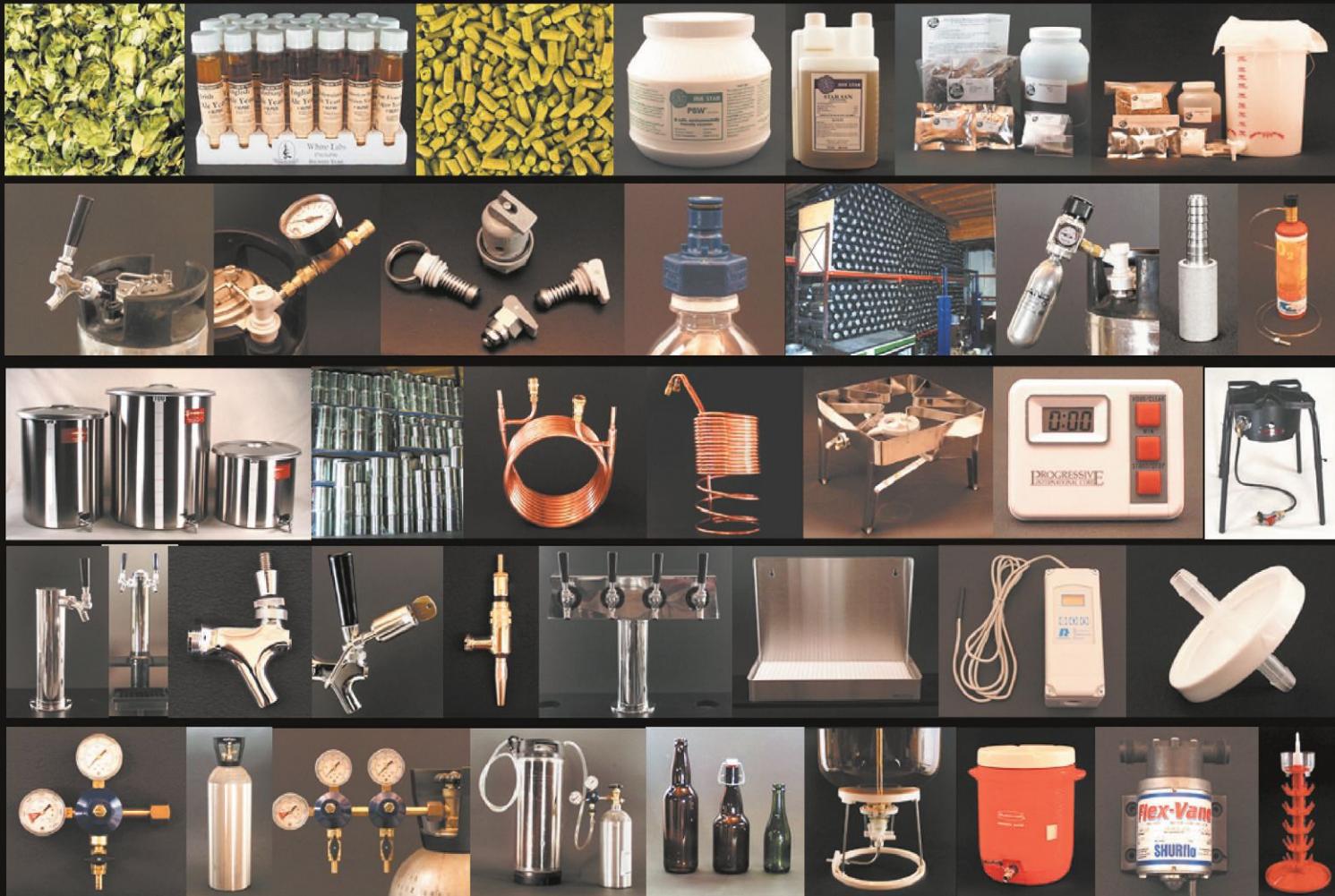
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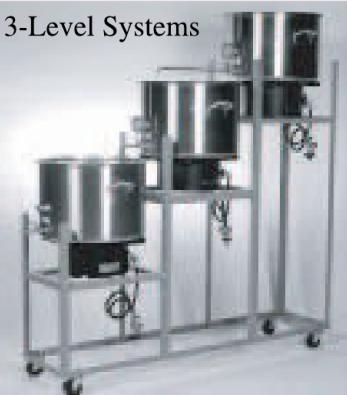
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To promote public awareness and appreciation of the quality and variety of beer through education, research and the collection and dissemination of information; to serve as a forum for the technological and cross-cultural aspects of the art of brewing;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

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American Homebrewers Association National Homebrewers Competition

It's time to start getting those entries ready for the 23rd annual American Homebrewers Association National Homebrew Competition (NHC). This competition is the granddaddy of the homebrew world. In the previous 22 years, judges have evaluated 36,143 homebrewed beers, meads and ciders (and sakes for a few years). Homebrewing has come a long way since the initial competition announcement in Volume 1, No. 1 of *Zymurgy*. We have seen the rise of the Beer Judge Certification Program ensuring that the beers will be judged in a quality manner, much work done on identifying different beer styles, far greater access to better ingredients and equipment and widespread brewing information availability.

The result of all this progress is that the beer quality keeps improving. I recall my first work with the NHC in the early 1990s as a steward for the altbier table. "Thar she blows" was a common call as several beers with contamination or carbonation issues gushed to the dismay of the judge panel. As a steward, it meant get the towels and change the tablecloths. For the entrants it meant negative comments on scorecards and a score of around 19 on the 50-point scale.

Flash forward to the present. In most competitions today there are between zero and a couple of beers that have major problems. Our sanitation methods are better, our ingredients are of high quality, and our knowledge of what makes a good homebrew has improved. For a while, I used to think that the bottom end in homebrew quality is rising but I didn't see much improvement on the top end. I recalled the beautiful flavors of some of my early homebrews and some of the brews by friends and other members of Hop Barley and the Alers. As I tasted more beers I wasn't finding beers whose flavor bested the fuzzy memories of earlier days. Certainly I tasted beers that



were exceptionally clean and matched the style guidelines, but I would look down and still see my socks upon my feet.

I am barefoot once more. There are many homebrews that have knocked my socks off in the last couple years. I recently sampled a weizenbock at the Dixie Cup that had me smiling from ear to ear. I also had the opportunity to sample an American Standard Lager from Russ Bee of the North Texas Homebrewers Association that was a masterpiece—totally clean and perfectly balanced. It was a beer that would make the major breweries' heads turn. Other great beers that come to mind were a Flanders Brown I sampled at the Kansas City Regional Homebrew Competition and a classic American pilsner brewed and served as a hospitality beer during the Masters Championship of Amateur Brewing II. (A quick aside—we are looking to hear stories of the great homebrews you've tasted lately. Please send us stories of beers you've had and the name and contact info of the brewer.)

The NHC is your chance to put your brewing efforts up against the best from homebrewers from around the country. If your beer or mead or cider is good enough to win a medal, you gain national recognition as a great brewer and personal satisfaction of succeeding against some of the best and most committed brewers there are in the

United States, Canada and other nations. An NHC medal is a huge accomplishment. The best of show winners become Homebrewer of the Year, Meadmaker of the Year and Cidermaker of the Year. I look forward to tasting a few of your entries.

This issue of *Zymurgy* has the entry form for the NHC. Please photocopy it and fill it out for each beer you will be entering. In order to save member dues, sponsor dollars and space in *Zymurgy* for more content, we have not included the full NHC Rules and Regulations in the magazine. The NHC Rules and Regulations document will be available online at www.beertown.org or through our member services department at 888.UCANBREW by the end of January. The NHC Site Locator Map of exact addresses to ship entries will again be a page in the March/April *Zymurgy*, so that we are less at risk of late changes. The entry arrival window is April 4th to the 15th, so get ready to fire up those burners.

Of course the second round judging and awards ceremony will be held at the...

AHA National Homebrewers Conference

As I mentioned in the last issue, we are headed to that hotbed of real ale, Southern California. The place is the beer hotel, also known as the Sheraton Four Points LAX. The dates are June 21 to 23, 2001, so plan some vacation time around the best event of the year for homebrewers. The event will follow the successful model established in Kansas City and Michigan of an event planned and coordinated by local AHA members, adding heart and humor to an already fun event. We'll have more information on www.beertown.org by the end of January.

Branding the Association of Brewers

As you are likely aware, the AHA is one of the four divisions (*continued on page 57*)

BY RAY DANIELS

Santa Must be a Homebrewer

Now you would think that Santa Claus might be a homebrewer.

I mean let's face it, his work is seasonal, so he probably has lots of leisure time for nine or ten months of the year. Furthermore, one suspects that the selection of hobby-type diversions at the North Pole might be somewhat limited. After all, riding the sleigh and testing toys is work—and there is only so much you can do with snow before you start looking for an indoor activity with some adult appeal.

Next, his physical features match up with those of most homebrewers. Facial hair: check. Rotund midsection: check. Red cheeks (at least in the evening): check. Jolly personality: check, check!

These days I hear that Santa is even on the Internet, so that matches up with homebrewer demographics as well.

Next we consider his environment. He lives in a cold climate where maintaining cool fermentation and lagering temperatures shouldn't be too much of a challenge regardless of the season.

And perhaps most importantly, the selection of good brews at the North Pole liquor store is probably pretty lousy. Elves, after all, are renowned whiskey drinkers.

Finally, I have met more than one homebrewer who got started when Santa brought them a copy of Charlie Papazian's *The Complete Joy of Homebrewing*. Many of these folks have repaid Santa over the years by leaving him a bottle or two of homebrew by the tree on Christmas eve. Thus we know that Santa has had the opportunity to learn about homebrewing the same way that most of us did: by reading about it and tasting a few brews.

Clearly Santa shouldn't have any trouble getting good homebrew supplies via mail order. Given all the stuff he has to have shipped up there to make toys, feed reindeer and repair sleighs, you gotta believe there is



a UPS substation nearby. Failing that, you figure that sleigh is empty by Christmas morning and he could probably load it up with supplies for the return trip. (Who cares if all the homebrew shops are closed on Christmas morning—there's got to be at least one with a chimney!)

Following this line of thought, I've often wondered what sort of homebrew Santa would drink at an important moment. Maybe a nice hoppy ale to get the blood flowing for the big trip; perhaps a long-lagered doppelbock to relax with afterwards. And how about a classic American Pilsener as a session beer when ensconced in front of the TV for the finals of the Reindeer Games?

At one point I thought the old guy probably took a six-pack with him in the sleigh—maybe some weizens to quench his thirst and rinse away the chimney soot. But I guess with DUI laws what they are these days, even Santa has to be careful when he takes the reins.

But all of these thoughts about what Santa might brew and drink are little more than that. Until recently, I only supposed that Santa was a homebrewer. Mind you, this was an act of faith. My own gift-exchange interactions with Saint Nick

haven't given much support to this hypothesis until recently.

Take for instance the first time I asked for a homebrewing item for Christmas. This was a good five or six years ago now and I wrote my usual letter to Santa asking for a good recipe calculation software program—I figured he would know as well as anybody which one to pick.

Well to make a long story short, things didn't turn out right. I don't know if Santa never got my letter or whether he found out about that six-pack of Celebration ale that I liberated from my brother's house when he wasn't looking, but ole Santa didn't really come through for me. Instead of software, all I got was a lame little slide-rule kinda recipe calculator thingy that just tells you what kind of malts and hops to use in a few common beer styles. Jeez, you'd think that Santa had never seen a copy of *Designing Great Beers*. (And I know he has delivered a few of those to people during his rounds.)

Of course that was a mysterious year in another way as well. The manager at the local homebrew shop told me that my wife had been in the store on Christmas eve—and she didn't even give me anything homebrew related that year. Go figure.

After that, I decided that I shouldn't count on Santa to bring me anything specific for homebrewing. I'm game to brew with just about any ingredient and always happy to try out new equipment. So the next year, I decided I would just ask for a "homebrew surprise."

I don't know. Maybe I'm over-estimating Santa's worldliness on account of his annual travels and all the letters he gets from many different folks. Maybe I'm counting on getting just a little bit too much mental bandwidth from Mr. C when he has a world of people to deal with. Maybe he's just not a very creative guy. Whatever.



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What I got that year was a fifty-pound bag of Belgian pale ale malt. OK, so it's not chopped liver. But I had brewed plenty of beers with that malt—in fact I still had five pounds of it in the basement on Christmas morning. I had been hoping for something *different*; something that would stretch my imagination; something that would challenge my brewing skills. But instead I got pale malt.

I did a fair amount of mumbling on Christmas morning that year involving "Santa," "pale malt" and words like "boring," "uninspired" and even "stupid." My wife kept glaring at me and at dinner she pulled the turkey wishbone with my brother instead of me. And she let him win, too. Go figure.

You can see how my faith in Santa's homebrewer status might have been shaken by these events. Anybody who has ever opened a copy of *Zymurgy*, read a few chapters of Papazian or lurked on Homebrew Digest or rec.crafts.brewing could have come up with more inspired homebrewing gifts. Heck, I've heard other guys talk about cool stuff that Santa brought them. Why was he dissing *me*?

For a couple of years, I decided to steer clear of the homebrew topic with Santa. I got some new clothes, some consumer electronics gadgets and a nice set of knives for the kitchen. But eventually I ran out of stuff that I wanted that wasn't related to homebrew. So this year I decided to give it another try.

The economy has been good and I'm in need of some equipment upgrades, so I decided to stop beating around the bush. Time to be direct, I thought. Time to tell him exactly what I want and see what happens. Time to ask for the moon.

So here's what I wrote on my list:

"One brewery, miniature; designed to fit my available space and fully self contained. Copper or stainless steel construction. Mash-lauter tun, kettle/whirlpool, with suitable plumbing, pumps etc. Matching fermentation vessels required. Am willing to receive one piece each year until full system is assembled."

As the big day approached, my mind began to swim with the possibilities. I started to envision a neat stainless steel brewing vessel nestled amongst the branches of the Christmas tree. I started to measure that special corner of the basement where I might fit a three-tier keg-based system. I cruised web sites calculating the total current that would be drawn by a couple of 1,500 rpm pumps. I savored my favorite rauchbier, wondering if it would taste different when brewed on the new system.

When at last the big day came, I scurried downstairs right behind the kids and as I turned the corner I glanced the warm-orange tint of copper cladding stashed beneath the tree. But wait, something was wrong. It was too small . . . *too* miniature.

As I drew closer, my eyes beheld not the half-barrel brewery of my dreams—indeed, not even a piece of it. Instead I found a mere model of a commercial system mounted on a walnut base.

It was beautiful, of course. I had seen such models before and admired them. They make great gifts for retiring brewers and brewery investors. But what was I going to do with this tiny little pretend system, I wondered? And furthermore, what the heck was Santa thinking?

It was at about this time that I noticed a handwritten note attached to the base of this

little trophy system. It was written in a really nice kind of feminine writing, but signed by Santa. It read:

"Dear Ray:

"Brewing is a lovely hobby, one I'm sure you will enjoy for many years to come. I have certainly enjoyed my exposure to it and especially drinking the beers. From what I've seen, it seems that the joy of brewing comes from many things. It comes from learning about beer and the science of brewing. It comes from experimenting with ingredients and styles. It comes from tasting the results and planning your next brew. It comes from competing and evaluating homebrews as a judge.

"But there is one aspect of homebrewing which you can enjoy but I cannot. You are blessed in that you have the opportunity to talk brewing with other homebrewers and you also get to enjoy the satisfaction of sharing your wares with many beer-drinking friends. From my perspective, it seems that the fulfillment you get from the hobby would be little improved by the acquisition of some pricey brewing equipment that would hide in the basement. Instead, I thought you would get more satisfaction from this little one that you could keep up here on the coffee table for all to see. Homebrewing is clearly as much a part of your household as it is mine and this little brewery allows you to declare that to everyone who walks in the front door.

"Enjoy.

"Fondly, Santa.

"P.S. I think your wife will go for the coffee table placement—just give her a big hug and a kiss to smooth the way."

And you know what? Old Santa was right. When I looked up, my wife was standing next to the coffee table with a big smile on her face—almost like she had read the note before I did. We exchanged Christmas greetings and then put that little brewery in its new home.

I may not have gotten my fantasy brewing system, but somehow it still turned out to be the best little Christmas that we have had in years. I hope you found joy and merriment in the spirit of homebrewing this Christmas as well. Cheers.

Zymurgy Editor-in-Chief Ray Daniels celebrates holidays with his family in Chicago.

Dear Editor:

We're just getting our home brewery onto a keg system and I really don't want to drill a hole through our fridge to tap into the carbon dioxide (I will if we have to of course—you gotta have your priorities, right?)

My question is, can carbon dioxide be refrigerated or is it going to affect the quality of our beer? Our beer will be ready to keg up in 2 days, so I only have that long before my beer brewing partner starts drilling. Please help!

Shane Freer

P.S I've been told we can put dry ice into our bottles to carbonate them. True. How much?

Shane,

We seem to recall that this subject was discussed at some length on the Homebrew Digest at one time, but can't recall what was concluded. Try searching the archives on <http://www.hbd.org/hbd/>. If you are unable to find a solution, just do what we do: keep the CO₂ tank outside the fridge and gas the kegs from time to time when they start losing pressure.

As for the dry ice in bottles, we've heard this doesn't work. The problem is that the dry ice changes from solid to gas faster than it can dissolve into the beer. The result is glass hand grenades—exploding bottles. Experimentation is not recommended.

Editor

Dear Editor:

Does anyone possess an index to **Zymurgy**, either on line or otherwise that you know of? I'm a new member who's come into a stash of old **Zymurgys** who believes that no matter how much info you



have, if you can't access it, it doesn't matter. I've started subject indexing but would hate to duplicate the effort unnecessarily.

Thanks, enjoy your writing,

Todd

Thanks for the kudos, Todd. We're not aware of any currently available **Zymurgy** index. Although it seems that some enterprising soul has performed this labor of love, we can't seem to find the information at present. Perhaps one of our readers will respond with this information.

Editor

Dear Editor:

My wife is allergic to barley, wheat, rye and oats but used to like my homebrew. Is there any way of using rice or maize as a substitute for the malted barley? The grain is readily available but not as malt. I don't even know if rice and maize do "malt". Any suggestions?

Noel Debbage

Noel:

Our suggestion is to make her some mead. The May/June 2000 issue of **Zymurgy** provides all the information you need.

You'll get nowhere with corn. With rice you could make sake, but it isn't simple. If you are interested in checking it out, track down Fred Eckhardt's book *Sake*.

Editor

Dear Editor:

Is there a standard formula that is used to convert Alcohol by Weight figures to Alcohol by Volume? All of our calculations have been done by weight but everyone wants ABV info.

Thanks,

John

John:

We have always used the approximate conversion of ABW x 1.25 = ABV. More precise conversions may be used in professional brewing, but this is close enough for homebrew.

Editor

Dear Editor:

How might I go about purchasing a single copy of **Zymurgy**?

For that matter, I wish there were a way to subscribe to **Zymurgy** without becoming a member of the AHA.

Thanks,

Alan

Alan:

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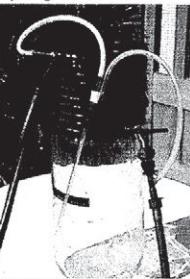
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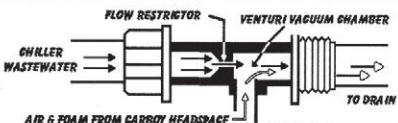


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responsibilities. Also, the AHA staff and board will be reviewing membership options in 2001.

Editor

Dear Editor:

I read the article in Nov/Dec 2000 Zymurgy on calibrating a SABCO RIMS and I think you should try to mention the RIMS made by ABT. I purchased one and I think it is a much more affordable option to most homebrewers. Frankly, after having seen the SABCO unit, I think I like my setup better.

Just a thought....

Rich Sieben

Rich:

Thanks for the reminder. Mention made.

Editor

Hey brewers! Do you make your own beer bottle labels?
If so, send us a sample in color or black and white. Every issue, we run a few just to make the letters section more interesting. Provide us with your name, address and homebrew club name (if any) and we'll make sure to mention your name. Send labels to Attention S. Johnson, Association of Brewers, PO Box 1679, Boulder, CO 80306-1679.

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BY PAUL GATZA

The Dixie Cup

Longtime BJCP Gulf Coast regional rep and Foam Ranger Steve Moore asked me at the conclusion of the Dixie Cup, "How does the Dixie Cup compare to other homebrew competitions?" I answered that it and the Bluebonnet Brew-Off are always the two largest single-site homebrew competitions in the country, and that the people who attend are really fun. I also noted that the program runs late and that I had never been to a competition that does not assign tables in advance, but functions as a large judging team that comes up for a new category when the previous one is finished, until the competition is done. Steve replied, "you have to admit that we put on the goofiest competition, right?"

Certainly the Dixie Cup is the goofiest competition I have been to (although I would like to attend Spooky Brew one of these years). Several years ago the Dixie Cup added a "Big and Stupid" category. One year featured malt liquors that were required to be submitted in bottles over 25 oz in size—these were then wrapped in brown paper bags and served to judges outside by the dumpster. This year the Big and Stupid category was for "Imperial Beer—the Beer that Goes to Eleven." The category was won by Jimmy Paige with his "Imperial Stormtrooper." The North Texas Homebrewers Association, led by the brewing efforts of Russ Bee and Jim Layton, won the Dixie Cup. Roy Rogers of the Kuykendahl Gran Brewers (KGB) won best of show with a Northern English brown ale.

The Dixie Cup is part of the Gulf Coast Circuit. The Dixie Cup (Houston), the Bluebonnet (Dallas area), the Crescent City (New Orleans) and Sunshine Challenge (Orlando) received over 2,500 entries in 2000 between the four events on the circuit. Many brewers travel to the other competi-

The Dixie Cup and the Bluebonnet Brew-Off are always the two largest single-site homebrew competitions in the country.

tions and award ceremonies, and the spirit of comradery and friendly competition runs high. Dixie Cup director Bev Blackwood and the Foam Rangers, along with help from the Mashtronauts and Kuykendahl Gran Brewers (KGB) did an outstanding job putting on a great competition, a Beer Judge Certification Program exam and reception at DeFalco's Home Wine and Beer Supplies hosted by Scott Birdwell, a pub crawl, the awards ceremony and an educational program with Fred Eckhardt, Steven Beaumont and Dr. Paul Farnsworth, with Louis Bonham helping out with his portable beer evaluation lab.

The judging was carried out very differently at the Dixie Cup than other competitions I have been to. Judges are not pre-assigned categories, but come up to get assignments whenever they are free. At 721 entries, the first round is judged in pieces before the Dixie Cup weekend and then onsite at the Dixie Cup. I was able to move through five first round flights on one day and one on the next, followed by a second round and the best of show. The looseness of judge assignments fostered a team approach and a mentality that "we will judge until it's all finished." Judging went

past midnight, because there were that many beers to judge. I quickly learned about Dixie Cup Standard Time, which is the time zone in which the earliest scheduled items start relatively near the time they are planned for and the latest items start much later than the schedule suggests. Fred Eckhardt's beer and cheese tasting started about 12:30 a.m. and Fred had his next speaking slot at 9 a.m. He pulled it off with style, grace, beer and coffee.

The theme for the 17th annual Dixie Cup was "The Dixie Cup Sells Out." The logo was a picture of Fred Eckhardt on a 17-dollar bill. Raffle items of brewing ingredients, equipment, brewery signs, trays, umbrellas, glassware, barbecue equipment, and inflatable dinosaurs holding inflatable bottles were recruited in abundance. The commemorative glassware was a Michelob Ales & Lagers shaker glass. The commemorative beer was Budweiser with the Dixie Cup dollar affixed to the back. Each fifteen minutes of the program was brought to us by one company or another. The favorite of the weekend was the Flatulence Filter—a real product that appears to be a cushion that absorbs 90 percent of flatulence odor.

2001 AHA Club-Only Competitions Styles

Month	Style or Name	Cat.#	Host
February	European Dark Lager	13	DerbyBrew Club
March.....	Stout	16	Niagara Assn. Of Homebrewers
May	Bockanalia	14	Cincinnati Malt Infusers
August	Witbier	19B	Gold Country Brewers Assn.
October	California Common	6C	Maltose Falcons
December.....	Mild Ale	10A	Brewers United for Real Potables



The American Homebrewers Association would like to thank Leo Vitt and the Minnesota Timberworts for hosting the Best Of Fest AHA Club-Only Competition on November 4th.

I'll pass the information on to Julia Herz and perhaps we can get them as a **Zymurgy** advertiser, as a public service to our family and friends.

A goofy time was had by all.

Best of Fest AHA Club-Only Competition

The American Homebrewers Association would like to thank Leo Vitt and the Minnesota Timberworts for hosting the Best Of Fest AHA Club-Only Competition on November 4th. This competition was the second of our annual cycle of six club-only competitions. 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 23 entries in the Best of Fest AHA Club-Only Competition.

Congratulations to the following winners:

First Place

A.J. Zanyk of Granview, OH, representing the Scioto, Olentangy and Darby Zymurgists (SODZ) with "Maerzen #3."

2nd Place:

Charlie Milan of Baton Rouge, LA, representing Redstick Brewmasters with "Bayou Fest."

3rd Place:

The Niagara Association of Homebrewers of New York State with "Festivus Octoberfest."

Homebrew Club of the Year Standings

Points Club

6	Prairie Homebrewing Companions
6	Scioto, Olentangy and Darby Zymurgists (SODZ)
3	Fermental Order of Renaissance Draughtsmen
3	Redstick Brewmasters
1	Niagara Association of Homebrewers
1	Quality Ale and Fermentation Fraternity (QUAFF)

Dunkelmania

AHA Club-Only Competition

The February AHA Club-Only Competition is European Dark Lagers. The competition is hosted by Chris Kaufman of the Derby Brew Club, the 1997 AHA Homebrew Club of the Year.

One entry of two bottles is accepted per AHA registered homebrew club for category 13A Munich Dunkel or 13B Schwarzbier (Black Beer). 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://beertown.org/AHA/clubcomp.htm>. Please send your entry to:

What's Brewin'

575 W. Douglas Ave.
Wichita, KS 67213

Entries are due February 21, 2001. Judging is tentatively slated for February 24, 2001.

Homebrewer Paul Gatzka is the softball coach for Hop Barley and the Alers, a Boulder, CO homebrew club.

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BY JAY ANKENEY

The Great Malt Extract Experiment

Be it liquid or dry, malt extract is the mother's milk of beginning homebrewers. But all too often as we advance in our beer appreciation and brewing skills we forget the thrills of our zymurgical childhood and the relatively simple joys this inviting gateway to the joys of homebrewing provided us. So in this issue we are going to start an ongoing series of Extract Experiments by inviting a team of five experienced brewers to brew beer starting with the same brand of basic malt extract and comparing the results and sharing the recipes.

For this first Extract Experiment, we used Coopers Bitter hopped extract not only because of the good luck I've had with it in several regional homebrew competitions but also because this is the world's only malt extract made for homebrewers at a real brewery, the Coopers Brewery in Adelaide, Australia, founded by Thomas Cooper in 1862. In fact, as Mark Henry of Cascadia Importers, the North American importers of Coopers products tell us, the brewmasters at the Coopers brewery don't know if the wort in their kettles is destined to be fermented into Coopers Sparkling Ale, the most popular beer in South Australia, or intended to be centrifuged and evaporated at less than 167° F (75° C) into Coopers malt extract. That's about as close to full scale brewing processes as a homebrewer can ask for in their basic ingredient.

Coopers Bitter malt extract is made exclusively from Australian two row Schooner malt and some Crystal malt, and hopped at 32 IBUs with whole Pride of Ringwood hops. It has an SRM color rating of 15. As packaged, Coopers Bitter is referred to as a kit because a packet of dry yeast and an instruction sheet are tucked under the plastic lid topping the 4 lb (1.8 kg) can. The extract for this experiment was donated by Steinbart Wholesale.



The members from left to right are: Bill Krouss, Jay Ankeney, Jason Rosenfeld, Dan Hakes and Ron Cooper.

For our first Extract Experiment, I invited four other members of my local homebrew club, The Strand Brewers' Club here in the South Bay outside of Los Angeles, to see if they could design different styles of beer based on this product. The group included experienced all-grain brewers Dan Hakes, Bill Krouss, Ron Cooper, Jason Rosenfeld. I was the lone confirmed extract aficionado in the group.

After some group consultation, we felt it was only proper that one of us should try to follow the no boil recipe that came with the kit's instructions as a base for the Coopers Bitter style, and that was left to me by default. Then Dan decided to go for a Belgian dubbel, Bill conjured up an IPA recipe, Ron set his sights on an extra special bitter, and Jason took a can of Coopers Dark to try and augment his Coopers Bitter into a porter.

Here are the recipes we brewed along with our observations about the results for each beer.

Jay's No Boil Bitter

Ingredients

- 1 can (4 lb or 1.8 kg) Coopers Bitter malt extract
- 2.5 lb (1.1 kg) sugar
- 1 packet Coopers dry yeast

Brewing Procedure: I approached this no-boil brew with some trepidation, but decided to follow the directions to the letter. This involved dissolving the can of Coopers Bitter extract and 2.5 pounds of sugar in 2 quarts (1.9 liters) of boiling water into the fermenter. Then, without any further boiling, I poured in 4.5 gallons (17 liters) of cold tap water. No hops were added since this was a hopped extract. My only deviation from the recommended preparation was to pre-boil and re-cool the tap water to remove chlorine.

Total time of concoction was about 10 minutes but the wort needed to sit for an

After this experience, all of the Extract Experiment Team were much more enthusiastic about extract brewing and the potential complexity that could be achieved using the same basic ingredient.

hour in a chilled bath to get down to 75° F (24° C). Australian tap water must be much cooler than ours. My trepidation spiked again as I poured in the dry Coopers yeast from the supplied kit packet. Dry yeast has a poor reputation among experienced homebrewers and I feared that it would doom this batch. But the next morning, seven hours later, the wort was amazingly at lively krausen with a thick head of foam.

Fermentation: 10 days at 70° F (21° C)

Original gravity: 1.044 (11° P)

Final gravity: 1.002 (0.5° P)

Evaluation: Surprisingly clean. Also, considering no extra hops were added, surprisingly hoppy. But then again, not very

complex in flavor profile. More of a Special Bitter based on taste and O.G., but a surprisingly tasty beer. To be fair, however, when it was entered as a Special Bitter into the Pacific Brewers Cup competition in September, the judges only gave it an average of 21.5 points. Frankly, considering how this batch violated nearly all of the commonly accepted precepts of good homebrewing techniques, I was somewhat relieved to find the Emperor still had clothes.

Dan's Belgian Dubbel

Ingredients:

- 2 cans Coopers Bitter malt extract
(8 lb or 3.6 kg)**
- 1 lb (0.45 kg) Belgian Aromatic malt**

- 2 lb (0.9 kg) Belgian amber candi sugar**
- 0.5 oz (14 g) Styrian Goldings hops (60 min)**
- 0.5 oz (14 g) Challenger hops (60 min)**
- 0.5 oz (14 g) Styrian Goldings hops (30 min)**
- 0.5 oz (14 g) Styrian Goldings hops (15 min)**
- White Labs Trappist (WLP 500) yeast**

Brewing Procedure: Dan raised 4.5 gallons of water to 115° F (46° C) before adding the Coopers extract to prevent caramelization, then suspended a separate pan over the brew kettle for his mini-mash. In it he covered the Belgian aromatic malt with some of the wort and heated it to 158° F (70° C) for 15 minutes. When the wort was at full boil he strained the grains using a large colander, rinsing it several times with hot wort. After 45 minutes he added the Belgian amber candi sugar to the pot.

Fermentation: 12 days at 70° F (21° C)

Original gravity: 1.076 (18.5° P)

Final gravity: 1.018 (4.5° P)

Evaluation: This beer had a pleasing malt aroma, a slight bit of fruity esters, and a nice firm head. The color and clarity were right on the style profile but the hop bitterness was too high for a Belgian Dubbel. Dan would recommend an unhopped extract to get closer to style. We generally felt this beer would get better with time as the hops mellowed.

Bill's India Pale Ale

Ingredients:

- 2 cans Coopers Bitter malt extract
(8 lb or 3.6 kg)**
- 3 lb (1.4 kg) Munich malt**
- 5 lb (2.25 kg) 40L crystal malt**
- 1.25 oz (35 g) Columbus hops (60 min)**
- 0.5 oz (14 g) Cascade hops (30 min)**
- 0.25 oz (7 g) Columbus hops (30 min)**
- 1 oz (28 g) Cascade hops (10 min)**
- 0.5 oz (14 g) Cascade hops (steep)**
- 0.25 oz (7 g) Columbus hops (steep)**
- 1 oz (28 g) Cascade hops (dry hop)**
- 0.25 oz (7 g) Columbus hops (dry hop)**
- White Labs California ale yeast (WLP001)**

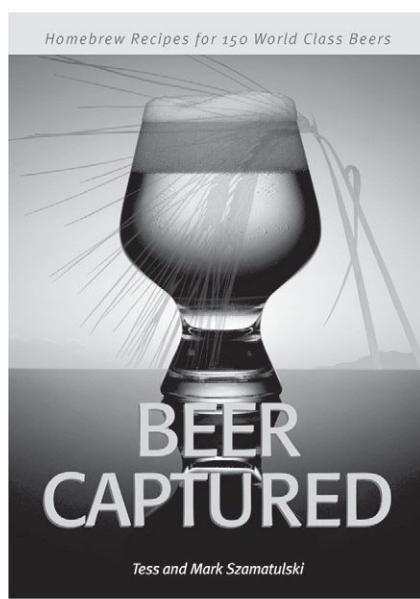
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Brewing Procedure: Bill put his crushed grains in a nylon bag and soaked them at 158° F (70° C) in 1 gallon of water for 30 minutes before a 200° F (93° C) sparge. He then poured the liquor into his brew kettle and added 4 gallons of water and the Coopers extract.

Fermentation: 7 days primary, 9 days secondary at 70° F (21° C)
Original gravity: 1.056 (13.8° P)
Final gravity: 1.006 (1.5° P)

Experiment Team evaluation: As you can imagine from the hop schedule, the first reaction was "Wow! really hoppy!" Other comments were: Toasted malt, some burnt flavors appear at beginning. Finishes very bitter, too much for style. The hop flavor was lower than the nose would lead you to expect, but what is there is nicely floral.

Ron's Extra Special Bitter

Ingredients:

2 cans Coopers Bitter malt extract (8 lb or 3.6 kg)
 2 lb (0.9 kg) light crystal malt
 8 oz (0.25 kg) amber crystal malt
 8 oz (0.25 kg) flaked maize
 0.5 oz (14 g) East Kent Goldings hops (60 min)
 1 oz (28 g) English Fuggles hops (60 min)
 0.5 oz (14 g) East Kent Goldings hops (30 min)
 1 oz (28 g) East Kent Goldings hops (2 min)
 0.5 oz (14 g) Cascade hops (dry hop)
 1 tsp gypsum
 0.5 tsp Epsom salt
 White Labs English Ale Yeast (WLP002)

Brewing Procedure: Ron put the grains and maize in a mini-mash for 30 minutes and sparged them into his brew kettle with 170° F (77° C) water and brought the total volume up to 5.5 gallons. Ron dry hopped with a vodka slurry containing 0.5 oz (14 g) of Cascade hops.

Fermentation: 11 days at 75° F (24° C)
Original gravity: 1.057 (14° P)
Final gravity: 1.015 (3.8° P)

Experiment Team evaluation: It was pretty light for an ESB but had a good full body.

The hopping was especially successful and the malt flavor had some nutty overtones. Altogether this was one of the best tasting beers of the experiment.

Jason's Porter

Recipe:

1	can Cooper's Bitter malt extract (4 lb or 1.8 kg)
1	can Cooper's Dark unhopped malt extract (4 lb or 1.8 kg)
1	lb (0.45 kg) American crystal malt
1	oz (28 g) Target hops (60 min)
0.75	oz (21 g) Fuggles hops (30 min)
0.75	oz (21 g) Fuggles hops (15 min)
	White Labs English Ale Yeast (WLP002)

Brewing Procedure: Jason started by boiling 4.5 gallons (21 liters) of water into which he poured the 2 cans of extract. Another 2 gallons (7.5 l) of water were heated to 160° F (71° C) for the 1 pound (0.45 kg) of American crystal grains which after 20 minutes were sparged through a sieve into the boil kettle with another 2 quarts of water at 162° F (72° C).

Fermentation: 8 days at 75° F (24° C)
Original gravity: 1.068 (16.8° P)

Evaluation: Jason presented his porter counter-pressure filled bottles and the general consensus was that its roasty profile tasted more like a Stout. It was totally opaque, with a good firm head.

Conclusion

After this experience, all of the Extract Experiment Team were much more enthusiastic about extract brewing and the potential complexity that could be achieved using the same basic ingredient. The no-boil brew was a revelation, but nothing that could compare with the more formally brewed batches. If any other clubs are interested in participating in a future Extract Experiment, contact me at Jayankeney@aol.com.

Jay Ankeney has been a homebrewer since 1986 and has won over 70 awards in sanctioned homebrew competitions. He is a member of The Strand Brewers' Club and The Maltose Falcons Homebrewing Society, and the author of *Easy Beer* published by Anthem Enterprises.



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CALENDAR

AMERICAN HOMEBREWERS ASSOCIATION

JANUARY

- 13** 3rd Annual Minocqua Ice Cold Beer Fest, Minocqua, WI. Proceeds will go to supporting home health & hospice care in Wisconsin's northwoods. Contact Rick Mayer at 715-358-3040, brewdude@newnorth.net.
- 20** Big Bend Brew-Off 2001, AHA SCP, Tallahassee, FL. Entries due 1/2/01-1/12/01 with \$6 entry fee. Contact John Larsen at 850-422-3625 or 850-219-1310, jlarsen@nxus.com, www.nfbl.org.
- 28** Meadllennium 2001, AHA SCP, Orlando, FL. Entries due 1/9/01-1/23/01 with \$6 entry fee. Contact Ron Bach at 407-696-2738 or 407-897-288 x 104, mead@cflb.org, www.cflb.org/.

FEBRUARY

- 4-10** The Coconut Cup, AHA SCP, Miami, FL. Entries due 1/21/01-2/3/01 with \$6 entry fee. Contact Joe Berryman at 305-274-8218, jmbman@bellsouth.com, http://hbd.org/mash/cococup.htm.
- 11** Fur Rendezvous, AHA SCP, Anchorage, AK. Entries due 2/10/01 with \$4 per entry. Contact Steve Schmitt at 907-243-0777, sschmitt@alaska.com, www.corecom.net/~homebrew/.
- 15-16** Florida State Fair Homebrew Competition, AHA SCP, Tampa, FL. Entries due 1/1/01-2/5/01 with \$6 entry fee. Contact Ken Koenig at 813-961-1775 or 800-226-5627, ken.koenig@baycare.org, www.tampabaybeers.org.

- 16-17** 8th Annual Peach State Brewoff, AHA SCP, Atlanta, GA. Entries due 2/2/01-2/11/01 with \$7 each for 1-2 entries, \$5 each for 3 or more. Contact Marlon Hurst at 770-761-9448, mghurst@hotmail.com, www.coverthops.com/.

- 16-17** Kansas City Biermeisters 18th Annual Regional Competition, AHA SCP, Shawnee, KS. Entries due 1/20/01-2/3/01 with \$6 entry fee. Contact Mike Porter at 913-422-8810 or 913-442-5998, mike@dynamicanalysis.com, http://kcbiermeisters.org.

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MARCH

- 10-11** 15th Bluebonnet Brew-Off, AHA SCP, Irving, TX. Entries due 2/10/01-3/2/01 with \$7 entry fee. Contact Dave Dixon at 817-318-1495 or 817-931-1768, ddreaded@home.com, http://welcome.to/bluebonnet.
- 11** 4th Annual Eastern Connecticut Homebrew Competition, AHA SCP, Willimantic, CT. Entries due by 3/9/01 with \$5 entry fee. Contact Paul Zocco at 860-456-7704, zoks.homebrewing@snet.net or Bruce Stott at 860-871-9111
- 17** Shamrock 2001, Raleigh, NC. Contact Larry Matthews at 919-362-9407, lmatt@ipass.net, www.hbd.org/carboy.
- 24** NetWort VI Cyber Challenge, AHA SCP, Throughout U.S. Entries due 2/13/01-3/3/01 with \$5 entry fee. Contact Stephen Gale at 973-347-7479 or 908-879-9565 x 22, steve@cmg.net, www.cmg.net/belgium/clubhub/.
- 24** The Drunk Monk Challenge Y2K+1, AHA SCP, Warrenville, IL. Entries due 3/5/01-3/17/01 with \$6 for the first entry, \$4 for each additional entry. Contact Joe Formanek at 630-378-4694, Jformanek@griffithlabs.com, http://home.earthlink.net/~mkennst/u/kg.html.

APRIL

- 20-29** AHA National Homebrew Competition—First Round, AHA SCP, 8 regional sites in the U.S. and Canada. Entries due 4/4/01-4/13/01 with \$8 for AHA members, \$12 for non-members per entry. Entry forms can be found in this *Zymurgy*. See www.beertown.org for Rules & Regulations or contact Gary Glass at 1-888-UCANBREW, gary@aob.org for more information. Send-to site map will appear in the March/April issue of *Zymurgy*.



AMERICAN HOMEBREWERS ASSOCIATION

• KUDOS • SANCTIONED COMPETITION PROGRAM

• APRIL 2001 •

Slurp & Burp Open
McMinnville, OR — Curt Hausam of Salem, OR won best of show.

• MAY 2000 •

Green Mountain Homebrew Competition
Burlington, VT, 297 entries — Brian Newton of Groton, NH won best of show.

• JULY 2000 •

Mother Lode Fair Homebrew Competition
Sonora, CA, 37 entries — Keith E. Tucker of Sonora, CA won best of show.
Oregon State Fair Amateur Beer Competition
Salem, OR, 161 entries — Ted Hausotter of Dundee, OR won best of show.

• AUGUST 2000 •

Buckeye Brewer of the Year
Willoughby, Ohio, 43 entries — Jim Artman of Ashtabula, OH won best of show.

• SEPTEMBER 2000 •

Santa Cruz County Fair Homebrew Competition
Watsonville, CA, 58 entries — Michael Neuman of Salinas, CA won best of show.

6th Annual Brewers Dream Homebrew Competition
Libertyville, IL, 61 entries — James Matyus of Waukegan, IL won best of show.

S.E. Alaska's Autumn Pour Homebrew Competition
Juneau, AK, 51 entries — Sean McLaughlin and Forrest Jones of Juneau, AK won best of show.

Mid South Fair Homebrew Contest

Memphis, TN — Wade Gowan and Jim Bell of Memphis, TN won best of show.

Pacific Brewers Cup

Los Angeles, CA, 207 entries — Jason Rosenfeld of Redondo Beach, CA won best of show.

Barley Literate Oktoberfest
San Marcos, CA, 91 entries — Antoinette Hodges of Carlsbad, CA won best of show.

5th Annual Music City Brew-Off

Nashville, TN, 104 entries — Dale Brown of Aurora, CO won best of show.

• OCTOBER •

Fish & Brew

Forks, WA — Phil Ullrich of Iowa City, IA won best of show.

10th Annual Northern New England Homebrew Competition

Rockport, ME, 373 entries — Tom Miklinevitch of W. Redding, CT won best of show.

Tournament of Taste

Bonner, KS, 42 entries — Steve Weilert of Fort Scott, KS won best of show.

Schleswig Wine & Bier Contest

Schleswig, IA, 80 entries — Bill Pierce of Des Moines, IA won best of show.

AHA SCP = American Homebrewers Association Sanctioned Competition Program

The Calendar of Events is updated weekly and is available from the Association of Brewers: info@aob.org or www.beertown.org on the web.

To list events, send information to *Zymurgy* Calendar of Events. To be listed in the March/April Issue (Vol. 24, No. 2), information must be received by January 12, 2001. Competition organizers wishing to apply for AHA Sanctioning must do so at least two months prior to the event. Contact Gary Glass at gary@aob.org; (303) 447-0816 ext. 121; FAX (303) 447-2825; PO Box 1679, Boulder, CO 80306-1679.

BY AMAHL TURCZYN

Coopers Sparkling Ale

As a rule, I try not to buy beer, preferring to make my own either at the brewery or at home. But every once and a while I'll indulge, and one of my favorite beers is Coopers Sparkling ale. That may be because it reminds me so much of well-made homebrew. It's a unique style, dry and crisp like a lager, complex and fruity like a British-style ale, yet hazy and slightly yeasty like a hefe-weizen. The addition of cane sugar gives the beer a slightly cidery note as well as a light, dry finish, and the proprietary yeast strain (which Coopers is kind enough to include in each bottle) contributes a banana-and-apple aroma. Frankly, I'm amazed this beer isn't more popular in the U.S.—perhaps Americans are put off by the fact that it isn't brilliantly clear, but at least homebrewers should take comfort in the fact that Coopers is bottle-conditioned, with live yeast in the bottle. Who'd want to crack open one of those run-of-the-mill sterile-filtered Australian lagers when a beer as complex and refreshing as this is available?

Two-row barley and crystal malt make up the grain bill, and while I'm fairly certain Coopers does not use wheat malt for their Sparkling ale, I think a small addition adds character and head retention. Cane sugar makes up about 15% of the grain bill, and Pride of Ringwood hops are used for both bitterness and flavor. Coopers is not a hoppy beer, relying instead on the sugar for balancing dryness.

Yeast, as usual, is probably the most important factor when trying to replicate this classic. The available pure yeast cul-



PHOTOS COURTESY
OF CASCADIA IMPORTERS

Frankly, I'm amazed this beer isn't more popular in the U.S.—perhaps Americans are put off by the fact that it isn't brilliantly clear, but at least homebrewers should take comfort in the fact that Coopers is bottle-conditioned, with live yeast in the bottle.

Coopers Sparkling Ale Clone

Recipe for 5 gallons (19 L)

6.5lb pale malt (3 kg)
0.5lb 30°L crystal malt (0.23 kg)
0.5lb wheat malt (0.23 kg)
1lb cane sugar
1oz Pride of Ringwood pellet hops,
10% alpha acid (28 g) (60 min)
0.5oz Pride of Ringwood pellet hops,
10% alpha acid (28 g) (30 min)
0.5oz Pride of Ringwood pellet hops,
10% alpha acid (28 g) (15 min)
Australian ale yeast
0.75c. cane sugar (180 mL), for priming

- Boiling time: 90 minutes
- Original gravity: 1.045
- Finishing gravity: 1.008

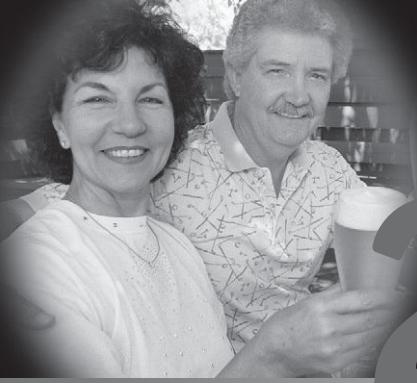
Mash grains at 150° F (65.5° C) for 60 minutes. Ferment at 68 to 72° F (20 to 22° C) until completion. Bottle condition and allow to warm-condition at fermentation temperature for two weeks; ale should remain hazy. Chill and enjoy!

Extract method: Omit wheat malt. Crush and steep crystal malt in 150° F (65° C) brewing water for 20 minutes. Strain, add 1 can (3.3 lb, 1.5 kg) Cooper's light malt extract, and bring to a boil. Pitch and ferment as above.

tures designated as Australian ale yeasts have not impressed me as much as the original strain, so if you feel up to culturing from a bottle, that's the way to go. Unfortunately, given the shipping time from its place of origin in Adelaide, fresh Coopers can be difficult to find, and that makes culturing riskier. Speaking with a homebrewer from Australia, I learned that Coopers fans who homebrew regularly culture the multi-strain yeast from the bottles with great success. (But then again, they get those nifty pull-top one-liter stubbies, and they get them fresh; i.e. more yeast, and better yeast.) He also mentioned that if you do get a good batch of Coopers yeast going at home, it shouldn't be used more than about five generations, as the fruity characteristic gradually disappears... his theory was that the cleaner ale yeast strains take over. Of course, if you don't feel like culturing, most of the major yeast labs carry an Australian strain, and these have many of the same powdery, fruity characteristics as the original.

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





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For complete rules and regulations visit www.beertown.org or call 1-888-U-CAN-BREW (U.S. and Canada only) or 303-447-0816. To find your entry site, check the Site Locator Map in the March/April 2001 issue of Zymurgy.

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A Division of the Association of Brewers



AHA NATIONAL HOMEBREW COMPETITION 2001

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Section A: Brewer Information

1. Name _____
2. Additional Brewer(s) _____
3. Address _____
4. City _____ State/Province _____ Zip/Postal Code _____
5. Country _____ Phone (H) (_____) _____ (W) (_____) _____
6. E-mail _____
7. Are you a member of an AHA Registered Homebrew Club? Yes No
If "yes," what is the name? (Please spell out full name of the club. Do not abbreviate.) _____
8. AHA Membership Number _____
9. New or Renewing Member Yes (separate \$33 check enclosed) Non-Member
10. Entry Fees Enclosed. AHA members pay \$8 per entry : _____ no. of entries x \$8 = \$ _____ total
Non-members pay \$12 per entry: _____ no. of entries x \$12 = \$ _____ total
Canadian members use exchange rate of 1.4 (i.e., \$8 x 1.4 or \$12 x 1.4).

11. This is the _____ time I have entered the AHA National Homebrew Competition

Section B: Entry Information

12. Category and Subcategory (Print full names) _____
13. Category (1-29) _____
14. Subcategory (a-e) _____
15. Name of Brew (optional) _____
16. For Mead and Cider (check one): Dry Medium Sweet
17. For Mead and Cider (check one): Sparkling Still
18. SPECIAL INGREDIENTS:
If you have entered in any of the following categories 20c, 21, 22, 23b, 24, 25, 26, 27, 28b, 28c, 29 refer to part II of the Rules and Regulations and the BJCP Guide to Beer Styles at www.beertown.org for instructions on filling out this table. The judges will use this important information for evaluating entries in these categories. Leave this table blank if you have not entered the above categories. Entrants of Historical Beers are asked to provide the historical beer style and information on the style profile and history as an aid to judges.
Classic Style (if applicable) _____
Special Ingredient(s) _____

Duvel

Brewery Ommegang produces some of the finest Belgian beers available in the United States, which is surprising, since their brewery is located not in Belgium, but in Cooperstown, NY. Hennepin, a perennial favorite with Belgian Abbey and Trappist ale fans, is the brewery's lightest offering—few Chimay fans could claim any disappointment with the stylish and complex quality of this beer. So Ommegang brewer Randy Thiel was a natural choice for pestering about his favorite beer. And naturally, he chose a Belgian classic: Duvel.

It wasn't always so. Thiel's interest in Duvel came about slowly, and as he was first drawn into the colorful world of Belgian beers, the brews that most inspired him were Abbeys, dubbels, trippels, and lambics. These are the beers that stand out in a crowd, packing huge and distinct flavor characteristics as well as a host of heavenly aromas as varied and diverse as the ales of Belgium themselves. Duvel, Thiel admitted, seemed at first to pale in comparison to these heavyweights, but the more he tasted it, the more its finer, more subtle qualities enticed him. As a professional brewer, he appreciated Duvel's delicate balance of pear, honey and apple flavors, hop and malt aromas and its innocuously pale-gold color, as well as how difficult it would be to make such a beer.

But Duvel is far from innocent. Now one of Belgium's best-selling beers, Duvel (the name means "Devil") is 8.5% by volume, and although one may feel perfectly comfortable quaffing it with abandon in the heat of summer, such incautious enjoyment is not without risk! The Devil will have its due.

Nowadays, Thiel speaks with Duvel brewers at the brewery in Moortgat fairly regularly, mainly about the consistency and quality of Duvel that is imported to the



US. Both Ommegang and Duvel have recently changed their cork suppliers, for example—the breweries agreed that a switch from agglomerated corks to the newer Altec cork design has improved product quality. Some larger corked bottles of Duvel were losing carbonation due to cork shrinkage. (In fact, carbonation is the only difference between imported Duvel and the Belgian product—American Duvel is carbonated less, to suit our flatter palates.) Another reason for the cork switch is a compound called TCA (tri-chloryl anisol) which is found sometimes in agglomerated corks, and can contribute to a musty, cellar-like flavor sometimes associated with French-brewed *biere de gardes*.

Brewing up this devil of a beer at home requires some finesse: the finest and palest Pilsener malt, the freshest Goldings hops (preferably Styrian) and of course a cultured

Duvel Clone

Recipe for 5 gallons (19 L)

9.75	lb Belgian Pils malt (4.4 kg)
8oz	2.5°L crystal malt (227 g)
6oz	Belgian aromatic malt (170 g)
2	lb corn sugar (0.9 kg) (15 min)
2	oz Styrian Goldings hops, 5% alpha acid (57 g) (90 min)
0.5	oz Styrian Goldings hops, 5% alpha acid (14 g) (30 min)
1	oz Saaz hops, 3.5% alpha acid (28 g) (15 min)
0.5	oz Styrian Goldings hops, 5% alpha acid (14 g) (5 min)
1	tsp Irish moss (4.9 mL)
1lb	corn sugar (0.45 kg), in secondary
	Recultured yeast from a bottle of Duvel
0.75c.	corn sugar (180 mL), for priming

Brewer's specifics: Mash grains at 150° F (66° C) for 60 minutes. Sparge, boil 30 minutes, and add hops at indicated intervals. Do not add corn sugar until 15 minutes before the end of the boil (a darker color and caramelized flavors can result from adding sugar too early.) After a two-hour boil, whirlpool and rack off of break material, then chill to 70-75° F (21-24° C), and pitch 1 qt. of active yeast culture. When fermentation is complete, rack along with a boiled solution of 1 lb corn sugar (0.45 kg) and allow to ferment again. When the second fermentation is complete, cold-condition the beer for 4 to 6 weeks at 35° F (1.5° C). Bottle with corn sugar and allow to mature at 70°F (21° C) for an additional 4 weeks.

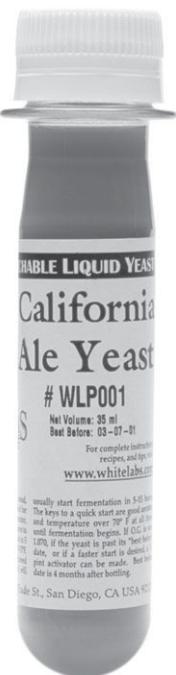
- Boiling time: 90 minutes
- Original gravity: 1.080 (19.5° P)
- Finishing gravity: 1.012 (3.0° P)

sample of the incomparable Duvel yeast. Fortunately, all of these things are quite obtainable by home brewers. Sugar, according to Thiel, is an integral part of the beer, adding

lightness of body and color, and increasing alcohol. But it need not be special, imported Belgian candi sugar. Corn sugar is neutral-flavored and colorless, it ferments predictably, and is fine for an authentic-tasting Duvel recipe. Note that the recipe calls for sugar to be added in three stages: once in the boil, once during fermentation, and once for re-fermentation in the bottle. This triple-fermentation schedule is very similar to that used for Duvel's production at Moortgat.

The yeast, as with any Belgian ale clone, is the tricky part. Fortunately, Duvel still uses its multi-strain ale yeast for both primary and bottle conditioning. So with a quart or so of pre-made, sterile wort of a gravity of 1.050, a fresh bottle of Duvel, a clean and sanitary "lab" in which to work, and a little patience, live cells from the bottle can be propagated up to a pitchable volume. For more specific information on propagating yeast from the bottle, check out *Yeast Culturing for the Homebrewer*, by Roj Leistad, or *Zymurgy*, Nov-Dec 1998.

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



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Frequently Asked Questions About the American Homebrewers Association

Who owns the American Homebrewers Association?

The American Homebrewers Association is a division of the Association of Brewers, a not-for-profit corporation registered in the state of Colorado.

OK, so who owns the Association of Brewers?

Actually no one. Because the Association was organized and is operated as a not-for-profit organization, no individual or entity has any claim to ownership of the association or its assets.

Why isn't the American Homebrewers Association an independent corporation?

Charlie Papazian and others originally founded the AHA in 1978. At that time, its only focus was to address the interests of homebrew hobbyists. In the years that fol-

lowed, the craft brewing business began to develop and many of the pioneers were former homebrewers. Many of these new professional brewers continued to look to our association for assistance and information about their new job and business. In 1983, the expanded breadth of the association's activities led to a reorganization. Rather than form separate corporations for each area of the association's activities, the board of directors chose to set up separate divisions within a single corporation. Over the years this has proven to be a good decision as it has helped to reduce overhead and operating costs while allowing for synergy between professional, hobby and consumer interests.

What are the other divisions of the Association of Brewers?

In addition to AHA, the Association of Brewers includes: 1) the Institute for Brew-

ing Studies which serves the brewing and business interests of professional brewers; 2) Brewers Publications which publishes books on brewing and beer; and 3) Brewing Matters which organizes the Great American Beer Festival® and the World Beer Cup®.

OK, so if no one owns the Association, who directs its activities?

From the beginning, the corporation has been governed by a board of directors. According to the bylaws of the corporation, they are responsible for directing the management of the corporation's activities and the use of its assets.

Who is on the board of directors?

The board has 19 members, 10 of whom come from the individual divisions. These ten representatives come from the membership or constituency of the operating divisions—usually elected by (continued on page 56)

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Ways to Skin a Cat

Dear Professor Surfeit,

Living in North Carolina and not having a dedicated refrigerator, I would still like to cold ferment an Alt or perhaps a lager. The plan is to wait 'till winter and ferment in my garage, but I'm concerned with temperature fluctuations. If I keep my fermentation vessel in a large bucket of water, will this keep the temperature stable? Of course, I won't be doing this in the dead of winter when chances of sub-freezing temps are likely. If not water, how about Styrofoam? Any other advice would be appreciated. Think I'll relax and have a homebrew....

Galen Maxwell
Goldsboro, NC

Galen,

You are on the right track. There are many ways homebrewers have devised to keep fermenting or lagering beer at cool and constant temperatures. Obviously the easiest is to find an extra refrigerator or chest freezer to which you can attach a thermostat that regulates on and off power to the unit. Your water idea is a good one but will only go so far. The volume of water around your fermenter will help stabilize temperature fluctuations, but eventually the water will seek the temperature of the environment. Back in the old days of American Homebrewers Association, I recall one of the original homebrew legends Al Andrews of Riverside, California and his creative gadgets. It's hot in southern California where he lives. He had his lagering carboys immersed in water, but he also had rigged the refrigeration unit of a discarded water fountain to his water bath. He adjusted the controls thermostatically such that the refrigeration unit would kick in and recirculate cold water around the fermenters as needed. Good insulation around the water container will obviously control your energy costs.

ILLUSTRATION BY JOHN MARTIN

Hey. And in the dead of winter you have the reverse problem... keeping the temperature high enough. Put your fermenter in an insulated space. The smaller the better. Thermostatically control the power to a simple 100-watt light bulb. The heat from the light should maintain the temperature.

You can take these ideas literally or think about the principals and find or build the system that suits your interests.

*Howlin' at the moon,
The Professor, Hb.D.*

Who you gonna call? Gangbusters!

Dear Guru,

I recently brewed a five gallon batch of all-grain pale ale, using Charlie Papazian's Amazing Pale Ale as a base. Specifically, I used 7 lb pale 6 row (3.18 kg), 0.75 lb 40L crystal malt (0.34 kg), 2 oz Cascade (boiling) (57 g), 0.5 oz Tettnang (flavor) (14 g) and



0.5 oz Tettnang (aroma) (14 g). The mash was a little cold and I believe that was the reason for a total mash time of around 1hr and 20 minutes. Normally I've done it in 40 minutes but conversion just seemed to take its time. I then pitched around 20 fl oz of yeast from the bottom of a basic stout primary, directly into the primary of the Pale Ale.

I used a blow off system (a tube into a bottle of sterilizing solution) instead of my usual fermentation lock; unfortunately I did not get an airtight lock and so could not detect fermentation after the first day.

I took off the top of the fermenter to take a peek and so to my dismay no big frothy head, but a vigorous fermentation that looked like somebody had just dropped a couple of Alka Seltzers in my brew.

There is obviously something happening—whether it is bacterial infection or just the yeast as it came from a previous brew though, I don't know. As I said, my main concern is the lack of a physical krausen or frothy head as I have seen in other brews with this strain of yeast (Nottingham).

Should I spend the next couple of weeks with sleepless nights or should I just relax don't worry and have a homebrew?

Many thanks in anticipation of your reply.

Paul McHugh
Lake Worth, Florida

Hi Paul,

You already got an answer from Ray Daniels who says:

"Not sure what is going on here, but it sounds like you do have a fermentation—perhaps still in early stages. One issue is trub—the protein gunk that settles to the bottom of the primary before the yeast gets there. If you collected from a primary with a lot of trub, you might have gotten mostly trub with not much yeast. This is one reason why you'll generally get better yeast

harvests off the bottom of a secondary fermenter rather than the primary. At this point, I would maybe give it a gentle swirl to mix things up and then let it go.

"Whatever you do, don't lose sleep over one brew. Have a couple from your last batch and relax."

Ray's advice is sound. My take on the situation is that with having pitched an extra

ordinary amount—20 ounces! to be exact—of yeast, it's pretty likely your primary fermentation took off like a bomb in your sleep. I suspect that there is evidence of the krausen you are looking for along the sides of your fermenter in the form of a line of brown residue. It happened so vigorously and fast it was over during the night you slept soundly. This is very common, especially at warmer tempera-

tures and with healthy doses of either dried yeasts or sediments from the primary (which are usually more active and ready to go than the purer (as Ray correctly suggests) sediment off of a secondary).

Obviously you got fermentation. And I bet you simply missed the short period of krausen with this batch.

Going Gangbusters
The Professor, Hb.D.

Mead Me in a Dark Valley

Dear Professor!

I'm a home meadmaker, active on the Mead-Lovers Digest, and also involved in private research into the history and traditions of mead. The story of mead is a fascinating one but unfortunately hard to piece out in the bits and snatches available in most texts. What especially interests me in my research is anecdotal material. There's plenty of that on the Internet, but what I am trying to track down are the stories of old time meadmakers, homebrewers, country wine-makers, beekeepers, and so on. It's important material but I've found that its value is often neglected. That's where real tradition comes to the front—something like the difference between reading the history of a country and then listening to its folk music.

Would you mind if I asked you a few questions? I am well aware of how busy your schedule is, but anything you've heard or learned in your travels I'm sure would be of value.

In *The New Complete Joy of Home Brewing* and the chapter on meadmaking in the reprint of Robert Gayre's book, it's mentioned that many meadmakers had a preference for the lighter honeys but then countered by pointing out that it was more likely that tradition dictated the use of what ever honey was available in the area. I found this interesting, especially given mead's reputation in older texts of being difficult to work with. Today we know that the lighter color honeys are more lacking in essential nutrients than the darker honeys, and that boiling drives off even more nutrients such as proteins and amino acids, lowering the free amino nitrogen content of the honey.

Choosing light honeys and then boiling them would certainly (*continued on page 55*)

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BREW KING

Fast Facts



SOME COMMON MALT ANALYSES

Moisture Content:

Indicates the portion of grain weight attributable to water. This value is commonly around four percent. Higher values would throw off recipe calculations and, at extreme levels, may lead to rapid deterioration of the malt during storage.

Extract:

This tells what portion of the grain weight can be transferred into the wort during mashing and lautering. Four different measures are used based upon the starting grind (fine or coarse) and moisture content (dry basis or "as is"). The "Coarse Grind/As Is" measure generally gives the most useful measure for small brewers.

Fine/Coarse Difference:

The difference in extract produced by fine and coarse grinds of the same malt. The lower this number, the more

highly modified the malt. Values over 2.0 are generally considered unacceptable.

Color:

The color assigned to a malt is the color of the un-boiled wort from a laboratory mash.

Protein content:

The protein content of malts may range from 9 to 13 percent but are more commonly in the 10 to 12 range. Higher values may indicate greater ability to convert adjunct grains such as corn and rice but will also increase the possibility of beer haze.

Diastatic Power:

A measure of the malt's ability to convert starch to sugar. Values in the range from 120 to 145 are seen, with higher values indicative of greater conversion power.

DOING IT ON THE FLOOR

Craft brewers often hear about "floor malted" grains. Such grains have been germinated on a solid concrete floor in thin layers and turned by hand. By contrast, most malt today is processed in a pneumatic germination system that employs a perforated floor (much like a lauter tun) and uses mechanical turning mechanisms. The perforated floor is used to circulate humidity- and temperature-controlled air through the three-foot deep beds of malt in order to control malting conditions while supplying oxygen and removing carbon dioxide.

Kilning

During the drying portion of the kilning process, approximately 4.1 gallons of water is removed from each bushel of barley.

Overall, kilning of pale or lager malt requires about 60,000 BTUs of energy in theory and between 80,000 to 100,000 BTUs in practice.

Grain Measures

1 U.S. bushel (bu) = 1.244 cubic feet

In grain transactions, the bushel measure has been assigned a weight value. Some of these values are as follows:

1 bushel of barley = 48 lb

1 bushel of malt = 34 lb

1 bushel of caramel malt = 30 lb

1 bushel of black malt = 26 lb

1 bushel of wheat = 60 lb



Malting Loss

When a kernel of barley is transformed into malt, its weight decreases by 15 to 20 percent. This reduction in weight is known as the "malting loss." When a large sample of barley is processed into malt, the losses come from these sources:

- Cleaning of the barley (stones, stems, etc.): ~10%
- Chaff and soluble material removed during steeping: ~1%
- Respiration losses, rootlets, etc.: ~7%

Respiration

2.1 lb starch + 2.5 lb air → 3.4 lb carbon dioxide + 1.2 lb water + 16,000 BTUs of heat

As the barley kernel respires during steeping and germination, it converts a portion of its starch reserve according to the following formula:

Every Brewer His Own Maltster

Specialty malts—and beers that combined different types of malt—have only come into being since 1700. Before that, malting was the main way that a brewer influenced the flavor of his beer. Of course malt still plays a key role in beer flavor and many of the world's best brewers still make their own malt. Certainly big brewers like Coors and Anheuser-Busch malt a substantial portion of their own barley in germination boxes that are as big as an Olympic swimming pool. But some small brewers still make their own malt as well. In the town of Bamberg, Germany, smoked-beer makers Spezial and Schlenkerla make their malt in germination boxes no bigger than a twin bed.

ROAST, TOAST,

Back in the proto-crustacean days of homebrewing—so long ago that this very publication was printed on earth-brown paper, with three holes punched down the side—access to specialty malt was pretty limited. You had pale, black and some sort of ill-defined crystal malt on the shelves. Nowadays, many maltsters have gotten into the homebrew trade, and dozens of malts are available to brewers who care to search them out.

But availability is spotty, and some types, such as brown malt, hugely popular a couple of centuries ago, are nearly impossible to find. If you want to seriously delve into certain historical styles—porter for example—these antique specialty malts are absolutely essential. The solution is to learn to create your own specialty malts from widely available pale varieties. It's not all that difficult, and adds an extra reward to the satisfying act of brewing your own. Even fair-

ly complex specialties like crystal can be tackled with aplomb. Beyond roasting, smoking adds another layer of flavor and is also a key player in certain historical styles.

First a little chemistry. Nearly all flavors we associate with malt are the result of a complex cascade of chemical events collectively known as the Maillard browning. It's a hopeless tangle of chemical reactions, not fully understood by science. A diagram (page 29) is presented here for your amusement.

The key thing to know is that when you combine amino acids (the component parts of protein) with any sort of sugar, and add heat and moisture, you get a collection of chemicals that fall into two groups. First are the lighter components, responsible for aroma and flavor. These are typically cyclic molecules containing either nitrogen, sulfur, or oxygen. Categories include groups with names like pyrazines, furanones, pyridines, and pyrroles. These are potent aromatic

chemicals; some have detectable thresholds as low as 0.002 parts-per-billion! Second is a group called melanoidins, a gooey stew of large polymeric molecules of undeciphered structure. These are responsible for virtually all beer color and can range from red to yellow, but not much else.

The flavors from Maillard browning can range from bready, malty, caramelly, toffee-like, through nutty, toasted and on to espresso-like to roast (yes, coffee flavor, like many others, is largely Maillard derived).

In addition to flavors derived from malt kilning, Maillard chemistry affects brewing in other ways. Kettle caramelization, which enhances maltiness, is an important one, most dramatically apparent in decoction beers, which have had the malt itself boiled as part of the mashing scheme. And as you probably know, dark malts lead to a greater acidity in the mash, and have components that are protective of the effects of oxidation.



Season & Spice

Another effect, more relevant to most home-brewers, is the staling that occurs in liquid malt extract. While it is true that there isn't much heat involved, contact time is obviously long, and the concentration of water in liquid extract turns out to be right where you'd want it to maximize Maillard browning, although it's clearly a negative in this context.

Now it's not important that you remember all of this stuff, but you should depart this little chemistry lesson with one crucial tidbit: each different combination of time, temperature, moisture, pH, concentration, and specific mix of sugary and nitrogenous material will yield a different blend of flavors and aromas at the end. This is why different malts of the same color can taste very different, and differences between beers of the same color can be even more dramatic.

The differences are evident in the taste of the malt itself. As a demonstration, try to obtain several crystal malts in the same color range. Taste the English against the German against the American. The differences stem not so much from the barley varieties, but to the specific methods of kilning employed.

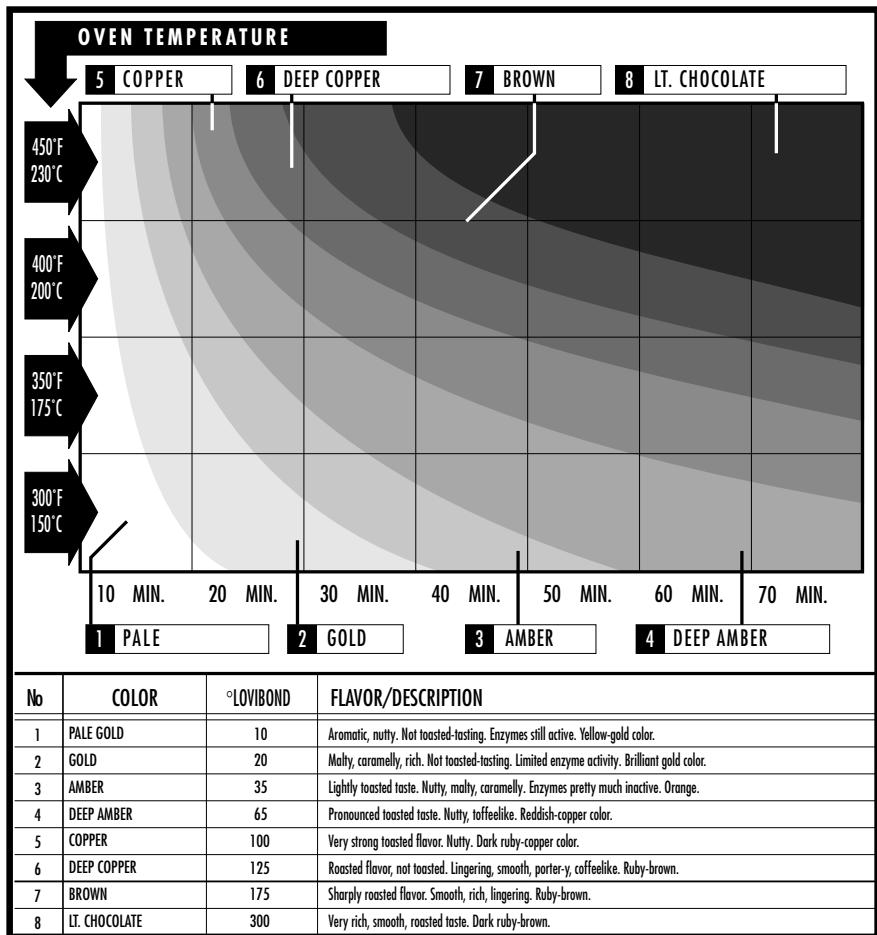
As a truly startling comparison, sample some DeWolf-Cosyns "aromatic," beside some of the same maltster's "biscuit." The former, being roasted moist, is much softer and caramelly, a sort of a dark Munich, in sharp contrast to the sharp toastiness of the latter, close to a type known in English brewing tradition as "amber," and which was a component of early porter and brown ale recipes.

Roast Your Own

You can make a variety of malts which once were commonplace, but now may be nearly impossible to find in the homebrew marketplace. The brewing industry long ago decided that the least expensive way to make beer was to use a large amount of the palest malt available, and get the color

I'm especially fond of toasted oats, which I use in porter, stout, brown ale, and the like. I usually just wait until the kitchen smells like cookies, then declare the oats done.

BY RANDY MOSHER



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from the smallest amount of colored malt needed, and the expensive, poor-yielding brown and amber malts were jettisoned. Stout and porter recipes typify this shift, and were in fact the test bed for the machinations of brewery accountants as beer became industrialized. At one point in its history, porter contained one-third brown malt, one-third amber malt and one-third pale malt, but over a couple of hundred years the specialty component was reduced to a very dark 10 percent.

But as a homebrewer, ever adventurous, and even contrary, you have the luxury of brewing whatever tastes best, the extra two dollars be damned!

This kilning procedure is what I have worked out for my own tastes and purposes, but it should prove a good starting point for anyone interested in experimenting with roasting malt at home.

I simply use a commercial cookie sheet, about an inch deep. You can use a cake pan

if you like, but don't pile the malt up more than an inch high, and spread it evenly to ensure even roasting. I use my regular oven, but we've recently installed a new convection oven, which should do a more even, consistent job in somewhat less time.

I start with uncrushed pale or pils malt—it doesn't seem to matter which. See the chart for an APPROXIMATE guide to times, temperatures and colors (this page) for malts roasted dry. Be sure your oven is fully pre-heated. If you aren't sure of your oven, use an oven or barbecue thermometer to check the settings. Be sure to check the malt, cutting or biting through to check color, as husk color can be quite misleading. As with any cooking it's a good idea to taste as you go, as soon as the sample has cooled enough to do so.

I try to turn the malt about every 15 minutes to keep it even. When you've determined it's done, take it out of its roasting pan and allow to cool rapidly.

There are a couple of notes:

- Malt will brew much darker than it looks. Munich malt has just the palest sort of pinkish-amber color inside, yet will make a full amber beer. Amber malt has a rosy copperish tinge, yet will make a rich brown beer.

- Roasting will create some very harsh aromatics in addition to the pleasant ones. Be like the pros and let your roasted malt sit for a couple of weeks to off-gas and mellow. I find the malts in the copper-brown range especially in need of this.
- You can roast moist or dry, which will change the flavor, as explained above. To moisten the malt, soak for an hour or so. You don't want to saturate it, just get it damp, but a quick spritzing won't do it. Be aware that roasting times for moist grain will be much longer, at least until the grain dries out. Moist-roasted malts will supposedly have their enzymes destroyed at lower temperatures than dry, although this is not something I have tested for in my experiments.

I have also roasted some other malts and grains with good results. Malted wheat produces a different taste than malted barley, and I'm especially fond of toasted oats, which I use in porter, stout, brown ale, and the like. I usually just wait until the kitchen smells like cookies, then declare the oats done. The amazing aroma really carries through into the finished beer, and can add a considerable dose of character. Oats do not keep well, as the oil in the germ goes rancid, and this is accelerated after toasting, so don't let them sit around more than a month or so.

Crystal Malt

Crystal malt was developed in the late 19th century. There are many possible variations, but all possess intense, candy-like, caramelly flavors. Because they're essentially already mashed, they may be added directly to the kettle, a boon to extract brewers looking to add depth of flavor to their beers without going through the trouble of mashing.

This procedure is a little more complex than simple roasting, as the malt is actually mashed right in the husk. The idea is to convert the starches to sugars, then roast the sugars, which gives a decidedly different effect. It's not too difficult to do, but you will need an accurate thermometer.

Soak the malt for 24 hours in good clean drinking water. Drain, then put into an ovenproof casserole or bread loaf pan. You want to make the most compact mass you can to minimize water loss at first. Cover the pan with foil, with your thermometer sticking out, if possible, and place in a 175° oven. Check the temperature periodical-ly—you're aiming for 150-160° F in the center of the malt. When you've reached this, turn the oven down or off, and allow the malt to sit undisturbed for an hour.

Then, heat the oven back to 175° F. Take the malt out of the pan and spread it onto a cookie sheet or cake pan. It should taste sweet, but will be pretty mushy at this point. Put it back in the oven and cook for half an hour, then raise to 350° F, and roast until the desired color is reached, which could take an hour or even two. Note that not much color will develop until the malt starts to dry out, then roasting will proceed rapidly. Be sure to check every 10-15 minutes as you go.

Note: I haven't tried it, but there's no reason why wheat shouldn't crystallize. Whatta weizenbock!

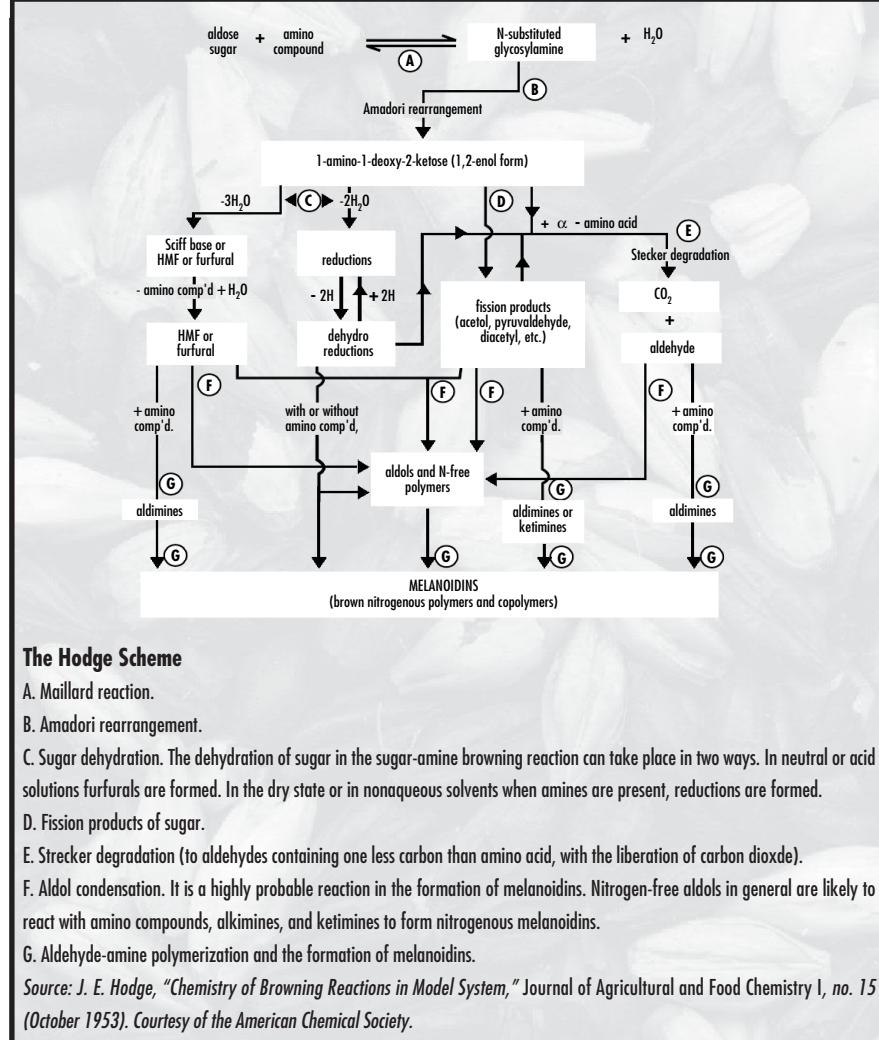
Smoking

As soon as technology allowed, sensible brewers nearly everywhere rushed away from smoky malt as fast as they could go. However, smoke beers persisted in some rural backwaters, and remain still in Bamberg, Germany, where they are what the town is most famous for, and in many rustic Scandinavian farmhouse brews such as the Swedish *götlandsdricka*, made with birch bark-smoked malt.



Illustration 1

Basic Food Chemistry



The Hodge Scheme

- Maillard reaction.
- Amadori rearrangement.
- Sugar dehydration. The dehydration of sugar in the sugar-amine browning reaction can take place in two ways. In neutral or acid solutions furfurals are formed. In the dry state or in nonaqueous solvents when amines are present, reductions are formed.
- Fission products of sugar.
- Strecker degradation (to aldehydes containing one less carbon than amino acid, with the liberation of carbon dioxide).
- Aldol condensation. It is a highly probable reaction in the formation of melanoidins. Nitrogen-free aldols in general are likely to react with amino compounds, alkamines, and ketamines to form nitrogenous melanoidins.
- Aldehyde-amine polymerization and the formation of melanoidins.

Source: J. E. Hodge, "Chemistry of Browning Reactions in Model System," Journal of Agricultural and Food Chemistry I, no. 15 (October 1953). Courtesy of the American Chemical Society.

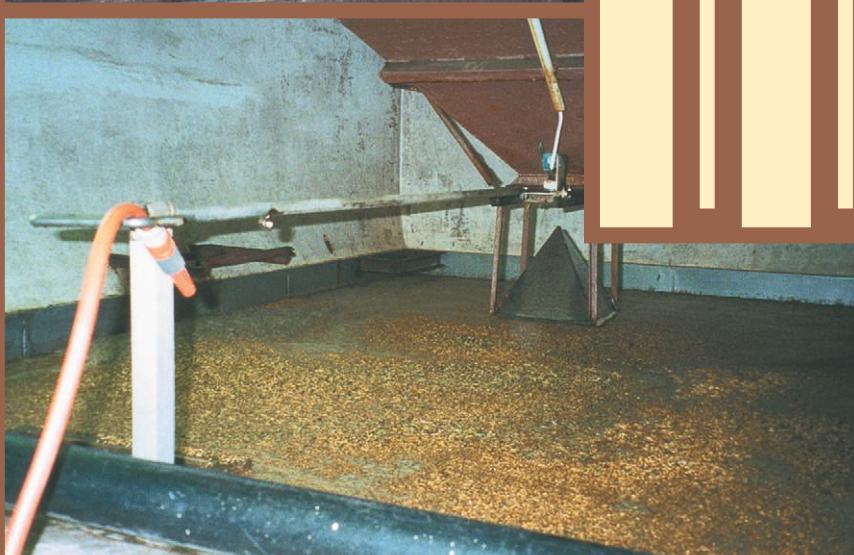
This is also easy to do at home. I now have a pretty snazzy home-built barbecue smoker, complete with Tri-Clover® fittings to match my brewing gear, but I have gotten very good results with a humble Weber kettle. Build a small fire on one side of the grill, with maybe six briquettes or the equivalent in chunk charcoal. I use some shallow pans made from bronze window screen, strengthened with a little wood around the edge. As with roasting, don't pile the malt too deep. Place the malt trays on the other side of the grill, not directly over the fire (See Illustration 1). Place the vents so the smoke has to go over the malt to escape. place your chips or chunks directly on the coals and let 'em smoke. Briquettes usually last about half an hour, so replace them as they wink out. I usually let the malt smoke for an hour.

There is not a single incontrovertible fact

in all of barbecuing, and choice and handling of wood is among the most contentious. So, I'll simply tell you my shallowly held convictions, and if you are of a different faith, follow your own particular bliss in this regard.

I do believe wood choice matters. Oak, pecan, and to a lesser extent, hickory, are sharp and pungent, and I find them appropriate for the tradition of Bamberg Rauchbiers. Maple, alder, and apple are sweeter, with the fruit woods a touch spicy, even. Beech (the traditional Bamberg wood) is a little oaky, but more dry and clean. Birch (especially the bark) will give a certain wintergreen flavor that works nicely with juniper. Here's another only partially tested idea: smoke some malt with juniper berries, which is the way Black Forest Ham is smoked. In no event should you use (*continued on page 58*)

INTRODUCTION



to



HOM

By George de Piro

ON



IN



malting your own grain is labor intensive, time consuming, and infinitely more fun and educational than reading a book (or magazine article!) about it. An in-depth knowledge of malt is key to formulating outstanding beers. To truly understand the malting process one must get one's hands dirty and actually do it.

Like commercial malting, home malting can be separated into three basic steps: steeping, germination, and kilning.

Steeping is performed to bring the relatively dry grain to a moisture content of about 45% so that germination can commence. During this phase the grain will be alternately submerged in water and then drained and allowed to rest. The sequence and timing of these phases vary based upon the character of the barley and the preferences of the maltster. Monitoring the moisture content of the grain is critical during this phase.

During **germination**, growth of the tiny barley plant begins inside the seed and roots sprout and grow on the exterior. Physical and chemical changes take place during this growth that make the kernel suitable for use in brewing. While moisture content is still important during this phase, the goal will be to achieve a certain degree of growth. This is assessed by checking to see how much progress the acropore or barley shoot has made in growing from the root end of the kernel toward the tip. In low-modification malts, it will cover only one-half to two-thirds of the distance; in well-modified malts, three-quarters or more will be covered.

MALTING

EXAMPLE STEEPING SCHEDULES

For German 2-row Barley¹

	Time/Temp	Moisture Content at end of step
Wet Steep	4 hr @ 54° F (12° C)	32%
Couch	20 hr @ 63° F (17° C)	34%
Wet Steep	4 hr @ 54° F (12° C)	38%
Couch	20 hr @ 70° F (21° C)	40%
Wet Steep	2 hr @ 59° F (15° C)	44%

Home Malting of Harrington 2-row Barley²

	Time/Temp	Moisture Content at end of step
Wet Steep	11 hr @ ~50° F (10° C)	35%
Couch	3 hr @ ~70° F (21° C)	—
Wet Steep	6 hr @ ~50° F (10° C)	38%
Couch	5 hr @ ~70° F (21° C)	—
Wet Steep	11 hr @ ~50° F (10° C)	42.5%
Couch	3 hr @ ~70° F (21° C)	—
Wet Steep	4 hr @ ~50° F (10° C)	43.5%

In all schedules, wet steeps must include aeration every one to two hours. Couch phase must include CO₂ removal every two to three hours.

1: Adapted from Kunze, W. *Technology Brewing and Malting*. VLB. Berlin. 1996. p 124.

2: Data provided by Ray Daniels.



Overgrown malt

nations. A scale with larger capacity can be used to measure grain and malt.

Steep tank: This can be a 5-gallon, food-grade plastic bucket with holes drilled into the bottom placed into another 5-gallon bucket without holes drilled in the bottom. The old "Zap Pap" lauter tun works perfectly!

Malting floor: Aluminum roasting pans work well, as would any shallow, flat pan or plastic container. If you have a particularly clean basement floor, you could try just spreading the malt on it. Most home maltsters will opt for a container of some sort.

Household space heater: Useful for low-temperature kilning. For small batches, food dehydrators can be used.

Household fan: A fan is useful for drying malt at low temperatures prior to kilning.

Kiln: A kitchen oven can be used successfully, but temperature control is likely to be laborious and imprecise. Still it is the best most of us can hope for. There are reports of people using clothes dryers, but I have no experience with them (other than their obvious use).

Thermometer: An accurate thermometer with a temperature range of at least 45-212° F (7-100° C) is very useful. A higher range will enable you to make more accurate temperature measurements when making crystal and roasted malts.

Commercial and home malting are theoretically similar, but there are some important differences. While each lot of barley must be treated differently regardless of size, small-scale maltings can germinate much faster than larger batches. This may be due to the intensive aeration that is possible when malting small amounts of grain. Malting schedules must therefore be looked upon as guidelines rather than gospel. It is important to use your senses of taste, smell, touch, and sight to determine when to move on to the next phase. The one objective analytical tool that can help you monitor the progress of your malt is moisture content. Before we move on to discuss the three phases of malting, let's discuss this important procedure.

MOISTURE CONTENT DETERMINATIONS

The moisture content, also referred to as the *degree of steeping*, can be determined in two ways. The first is to take a sample of

Kilning dries and toasts the grain, halting growth and imparting many of the flavors we associate with malt. In most cases, drying occurs first at lower temperatures (100-120° F or 37.7-48.8° C) and toasting proceeds only after moisture content has been reduced to about 10 percent. To a large extent, the temperature of toasting determines the final character of the malt.

The equipment you need to accomplish each of these steps and produce your own

malt is in large part dependent on the amount of malt you wish to produce. You can make a pound or two using small plastic containers and other common kitchen items. For larger amounts, up to 15 lb (6.8 kg) or so, your malt can be made using stuff that most all-grain brewers already possess. Here is a basic equipment list:

Scale: A scale with the ability to accurately measure mass up to 200 g in 0.1 g increments is useful for moisture determina-

grain from the batch, weigh it, dry it and then weigh it again. This technique can be used at any time and at any phase of the malting process. Short of burning the kernels during drying, it is fairly foolproof. We'll call this the "drying method."

The second method that can be used is to entrap a small sample of grain in a perforated container (called a Bernreuther apparatus) that is included in every step of the process. By weighing the grains before processing begins and knowing their initial moisture content, you can directly determine moisture content by weighing them again at any point in the process. This technique depends on two things. First, you have to maintain exactly the same population of kernels in the container throughout the process. Second, the grains in this sample must receive exactly the same treatment as the rest of the batch so that they are representative of the whole batch. We'll call this the "direct method."

In both systems for assessing moisture content, we will be working with the same equation:

Equation 1: (weight of moist grain – weight of dry grain) / weight of moist grain x 100 = % moisture content

Using the *drying* method, a sample is accurately weighed and then placed in an oven on a baking sheet or similar device in a thin layer and heated at 212-220° F (100-104° C) for three hours. (Note the grain should not become brown or burnt during this procedure – if so, your oven may be too hot.) After the drying is complete, you weigh the grain again and use the values you have obtained in the equation above.

Using the *direct* method, you would first determine the moisture content of your barley using the drying method. The sample of grains used for this purpose would be discarded. Next you would put some barley in your Bernreuther apparatus (the perforated container), remembering that during steeping the grains will swell to occupy nearly 50 percent more space than when dry. Once you have selected the sample, weigh it and then return it to the apparatus. You will now know the moisture content of your barley and the weight of your initial sample. In

order to do calculations using Equation 1 during the malting process, you will need to calculate the dry weight of your sample using equation 2.

Equation 2: sample weight x (1 - moisture content as a decimal) = dry weight of sample

Once you begin the malting process, you will be able to remove the Bernreuther apparatus from the batch, open it, weigh the grains and then return them to the apparatus and the batch in process. The weight you determine each time will give you the "weight of moist grain" needed for use in equation 1. You will use the value for "dry weight of sample" from equation 2 for the "weight of dry grain" value in equation 1.

The primary value of the direct method is that it allows very rapid assessment of current moisture levels during malting whereas the drying method requires a three-hour delay. Also, when small batches are being produced the drying method may result in the loss of a significant amount of grain by the end of processing.

THE MALTING PHASES

Now that you are familiar with the main quantitative measure used to aid in malting, we are ready to discuss the individual phases of the operation.

Steeping is performed to bring the relatively dry grain to a moisture content of about 45% so that germination can commence. Water uptake will be influenced by several factors including: steeping time, temperature of steep water, kernel size, barley variety and character.

Steeping consists of two stages: wet steeps and air rests. During the wet steeps the grain is covered with clean, cool water. During the air rests, the water is drained from the grain to allow for respiration of oxygen and removal of carbon dioxide.

The length and number of steeps and rests can vary widely based upon the character of the barley and the maltster's preferences. Indeed, most maltsters conduct a series of pilot maltings on small samples before beginning to malt a production-size batch. This helps (continued on page 58)

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Malt

Editor's Note: The American brewing industry is populated by professionals with an incredible depth of experience as well as historical knowledge of the US brewing scene. From time to time, we hope to bring you commentary from these individuals. Here the purpose is two-fold. First, it helps our new generation of brewers better understand the history of brewing in this country. Second, we glean interesting and important insights about the art and science of brewing from those with vast experience in the subject. In this spirit, we bring you the following feature by Stroh's Peter Blum, a long-time maltster, pilot-brewer and now historian and archivist.

*L*ast year I saw an ad for European two-row malt which was not only full of errors, but also disparaged the flavor of beer produced from six-row malt. Now I know something about malt which might be of interest to home brewers. My mother's family were maltsters in the Hanna region of Moravia. I also worked part-time during college at the Barley and Malt Laboratory at the University of Wisconsin, spent a summer on the fields with barley breeders, worked in a malt house, did research on malt for Pabst Laboratories in Milwaukee, and headed a small technical group for a Chicago malt house. When that firm was bought by Falstaff of St. Louis, I shifted to pilot brewing.

First, you need to understand the botanical difference between two- and six-row species. The stem or spike of barley ends in a ribbon having a slight zigzag shape. In six-row barley, at each zig or zag, called a node, is a set of three grains, three on one side of the spike, and three, higher or lower, on the other side of the spike. Thus in six-row barley, there is one row of central kernels, and two rows of lateral kernels on each side. An illustration (page 36) from a late medieval plant book clearly shows the three rows.

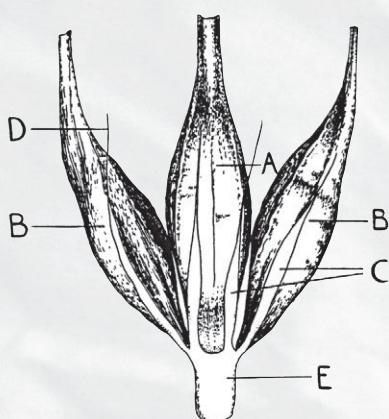
At some point in antiquity a gene appeared in some barleys that made the side rows infertile; all one sees are vestigial husks. Thus, two-row barley was born, and today, each type (two-row and six-row) is suitable for a different climate.

Barleys grown in central Europe are two-rowed, tend to be low in protein, and require a longer time to process into malt. They also do well in the cooler summers of Montana, Idaho and nearby regions. Two comments on row character, or the presence or absence of lateral kernels: Studies on isogenic lines—where everything is genetically alike but row number — have shown that this gene by itself does not affect malting quality. Also, two-row barley grown in the same area as six-row barley is also similar in malting criteria. The conclusion is that differences exist if each type is grown in the area that offers their most suitable climate and agronomic conditions.

Wisdom



By Peter Blum



Spikelet group of six-rowed barley. (a) Central kernal. (b) Lateral kernal. (c) Glumes. (d) Glume awn. (e) Rachis internode.

The vast majority of malting barley grown in the U.S. is six-rowed. The original name for that type, Manchurian, and the name of the variety commonly used right after Prohibition until the 1950s, Oderbrucker, attest to its Asiatic and eastern European origin. Decades of improvement in brewing enzymes, notably the starch-splitting alpha amylase, and agronomic qualities has produced large crops centered on the North Dakota side of the Red River valley, the border between Minnesota and North Dakota. All six-row barleys grown in the "Valley" are high in protein and produce malts with high levels of starch-degrading enzymes, and thus are suitable for brewing beer with adjunct.

Two- or Six-row malt?

A hundred years ago, when Robert Wahl and Max Henius published their classic two-volume *American Handy Book of the Brewing, Malting and Auxiliary Trades*, the greater suitability of six-row malt for U.S. type lager had already been established and was accepted by brewers, in spite of yielding less extract. Two-row barley varieties like Hanna and Chevalier were grown in some western regions, but were judged more difficult to malt and less suitable for bottled beer.

Later German barley breeders greatly improved on the malting and brewing quality of the old Moravian type. The new

variety was called Hannchen. It was an attractive grain with a finely wrinkled husk, and looked like its malt should produce a milder beer. While that impression may linger with brewers of a German background, we at Stroh could not substantiate it. In the late 1970s when we developed the super-premium Signature brand, we wanted to use the finest of ingredients, and many comparisons were brewed with various levels of two-row malt. It turned out that Signature tasted equally good with or without two-row malt. That does not necessarily mean that a home or craft brewer should not use two-row malt, if he is convinced that it makes a better beer or is perceived to be more traditional. But be aware that you often taste what you want to taste.

Now something about malt, which the Germans call "The Soul of Beer," and whose legal status was established by the Reinheitgebot of 1516. The basic process of malting has not changed in a thousand years: barley is still soaked or steeped, then germinated and then dried or kilned. Even the technology of malting in long compartments over perforated floors has hardly changed in a hundred years. Of course there now is a vastly greater scale of batch size and these days instrumentation controls many process conditions.

Freshly harvested barley germinates poorly, and must be stored for several months until a dormancy period has passed. Dormancy of six-row barleys from the Midwest is shorter than that of two-row barleys grown in a maritime climate.

Steeping on a large scale required aeration and changing of water, and used to require a minimum of two full days with a barley variety like Moravian. The historic way of germinating barley was in a shallow layer on a level floor, and as a young teenager in Moravia I have seen men empty tipable carts filled with steeped barley on a concrete floor to be leveled with wooden shovels. Floor malting was still the procedure here in the 1880s, and one sees men holding their wooden shovels in photographs of brewing crews.

Malting is a cold weather process, as germinating barley generates heat. Temperatures in the germinating barley above

about 64° F (18° C) favor rapid root growth at the expense of enzyme development and modification of the stored starch. By about 1890, floor malting was largely replaced by germination in a three- to four-foot layer, either in a long compartment of concrete walls above a perforated floor, or in large drums. Matting of the rootlets was prevented by special turning machines that crawled on rails on compartment walls, or by slowly turning the drums.

In both systems heat was removed by saturating air with moisture in spraying chambers and then drawing the air through the grain bed with large fans. It was also important to replenish moisture by sprinkling. When new malt houses were built after Prohibition for batch sizes of several thousand bushels of barley (1 bushel of barley = 48 lb or 21.6 kg), compartments could easily be built wider, deeper, and longer, but the scaling up of a 600 bushel drum proved impractical, and drum houses were abandoned.

The germination period, at one time 6-7 days, was gradually shortened to 4-5 days as better malting barley varieties were developed. At the end of germination, the stem shoot (acospire) should be about as long as the grain but still be hidden below the husk, the rootlets should not be longer than the grain and curled, and the green malt should be soft.

Germination houses built on elaborate principles or complex structures proved to be a dead end; the compartment system survived because it is reliable and flexible.

The Source of Flavor

For the home or craft brewer searching for that special flavor, the drying of green malt is of greatest interest. It is here that more color and malt flavor are formed by choosing a higher final kilning temperature, or that crystal, caramel, or black malt can be produced in special drums. The typical classic kiln has two floors of perforated sections, and green malt is dried one day on the upper kiln, then dropped to the lower floor, and finished. This has the advantage of better heat utilization, but offers little flexibility when a higher final temperature is desired for a slightly darker color, because the next batch on the upper kiln will also be affected.

Special malts require special equipment, because heat is applied at a high moisture level, and constant mixing of the green malt is essential to avoid charring. The equipment, mostly of German design, is either a rotating sphere (*Kugelbrenner*) or cylinder (*Trommelbrenner*). When I visited the family malt house as a youngster, I liked to hang

a few kernels, in the same way that maltsters like to handle the finished green malt, and after a while one builds up a sensory base of what to expect. It may not be scientific, but nevertheless it is very helpful.

One bit of advice about the use of highly flavored malts: a modest percentage tends to go a long way. Studies have shown that

"A sort of consensus emerged: if we have inherited a lemon in today's world, let us brew lemonade and be proud of it."

around the drums where caramel malt was being roasted, because of the strong aroma of fresh caramel malt. Unfortunately that aroma does not survive in the beer.

My experience has been with large producers of malt and large users of it. These large brewers develop specifications for malt that a maltster must meet. Because a large brewer turns out thousands of very large batches of the same product, uniformity is essential and these malt analyses are a safeguard against variation. Each December the technical staff of Stroh met with their malt suppliers to get a feel for the characteristics of the new barley crop, to know what brewing yield, protein, and enzyme levels were indicated by pilot malting. New specifications were then issued based on these discussions.

There are standard procedures for analyzing malt. One key group of analyses is based on small scale mashing, which yields information on extractable solids, color, and soluble protein. The amount of total malt protein gives a percentage of the amount of that protein which becomes soluble during the laboratory mash, called the S/T ratio, an important indicator for the effectiveness of the malting process and specifically for yeast nutrition and beer stability. Analyses for the level of starch-degrading enzymes are also provided.

Given the reliability, reputation, and known product of domestic maltsters, much can be taken for granted. Color of special malts should be an important criterion for the brewer, and if I had to brew with an unfamiliar imported malt, I would want to know everything possible about it. Brewers also like to examine malt, smell it and chew

drinkability is inversely related to flavor level, and Stroh's long experience with Bock is a good illustration.

Stroh had brewed a Bock at least since the 1880s, and when I came aboard in 1970 it was still a wintertime tradition—in fact it was something of a Holy Act around the brewery. Each December bags of caramel and black malt arrived, and on certain days the lauter tun taps ran dark and the aroma of caramel malt filled the kettle floor. In January when the first batch was bottled, we gathered to sample the year's Bock: dark, rich, aromatic, and a pleasure to drink. But bock was not easy to market, although distributors had been asked to order quantities they could sell. By April there were pockets of too little or too much bock, and bock just did not sell when the weather got warm.

Finally, there is the subject of all-malt vs. adjunct beers. The Reinheitsgebot, which had a lot to do with taxation as well as with purity, had been a subject for discussion by German brewers for decades. Some chafed under this restriction in modern times, while many saw it as the mark of German brewing tradition. A sort of consensus emerged: if we have inherited a lemon in today's world, let us brew lemonade and be proud of it. The problem for a large shipping brewer is that an all-malt beer can have too much "mouthfeel" and is satiating for many contemporary consumers, and worse, it has poorer flavor stability. Signature, the Stroh super-premium that was brewed with some corn grits, had a much better shelf life than Schlitz's all-malt Erlanger.

All this should not matter to a homebrewer or to a craft brewer with a local market, particularly if brewing tradition and a

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high bitterness level are being stressed. But history does not stand still. Already we are seeing larger craft breweries with larger distribution areas, and that beer with a balanced body and flavor, and better flavor stability will be more successful. Using only malt has benefits as well as drawbacks, and every brewer should be familiar with both.

Peter Blum has an extensive background in malting and brewing. His education includes a B.Sc. from the University of Wisconsin and an MBA from Washington University in St. Louis, MO. Prior to his retirement in 1989, he was engaged in brewing development as Pilot Brewery Manager at the The Stroh Brewery Company in Detroit, MI for 19 years. Since his retirement he has continued his association with Stroh as historian and archivist of the Stroh historical collection. His book, *Brewed in Detroit: Breweries and Beers since 1830*, was published by Wayne State University Press, Detroit, MI in 1999 and is now in its second printing.

A Celebration of American Hops from Sierra Nevada

BY GREG KITSOCK

Seasonal creep has affected the craft brewing industry. Breweries, to beat the competition, have been known to debut their spring wheat beers during a February snow squall. And it's hardly unusual to see the first Oktoberfest beers pop up during the dog days of August. As a rule, the department stores wait until the day after Halloween to festoon their windows with holly and candy canes, but Christmas beers, nowadays, often hit the shelves in mid-October. Is it any wonder that the public has grown blasé about seasonals?

Sierra Nevada Celebration Ale, from the Sierra Nevada Brewing Co. in Chico, CA is one winter classic whose annual appearance still prods beer lovers to get out of their easy chairs. In fact, the brand's absence has been known to cause an even bigger buzz.

In 1995, a shortage of fermentation space led the brewery to cut back on the production of the Celebration Ale and curtail virtually all shipments east of the Rockies. Paul Fichera, a CPA from Brook-

lyn, refused to take the news lying down. Via the Internet, he asked several West Coast friends to put aside four cases for him. Then he cashed in his frequent flyer miles, caught a United Airlines flight from JFK International Airport to San Francisco, and returned the same night with his foamy cargo.

Stylistically, Sierra Nevada Celebration Ale comes closest to being an India pale ale.

Some purists have argued that the caramel malt in the grist adds a little too much residual sweetness, but certainly the Celebration has more than enough hops (62 IBUs worth) to balance. In fact, David Brockington, in his article "The Evolution and Contemporary Brewing of American IPA" (*Brewing Techniques*, Sept-Oct. 1996), cites Sierra Nevada Celebration Ale as one of the first three craft brews to pioneer this substyle of IPA (the other two are the Liberty Ale, first brewed in 1975, and Bert Grant's India Pale Ale, which premiered in 1982). In 1994, Celebration won a silver medal in the IPA category at the Great American Beer Festival.





"[T]ypically aromatic and lively in flavor, with hints of oily dark chocolate and leamy hop bitterness," writes Michael Jackson in his book *Ultimate Beer*. "It's one of those magical beers where the hops and the malt just come together perfectly," says Jim Dorsch, publisher of *Mid-Atlantic Brewing News*.

Sierra Nevada Brewing Co. was founded in 1981 by Ken Grossman and Paul Camusi (Camusi has since left the business). Prior to the venture, Grossman had operated a bicycle repair shop and a homebrewing and winemaking supply outlet. Grossman picked up the art of brewing at an early age. "Ken was 15, I was 16 or 17," recalls Grossman's brother Steve. "Our mom knew about it, but we told her it was so bad we couldn't

drink it. We stored our beer in a cupboard above the refrigerator. One hot summer day, the bottles exploded. Mom thought someone was shooting at her. We got in some trouble for that."

Grossman and Camusi started Sierra Nevada on a shoestring budget of \$110,000, using castoff tankage from dairies and a used bottle filler they got cheap from the Anchor Brewing Co. Their output the first year was 500 barrels, says brewery vice president Steve Harrison. Many expansions later, Sierra Nevada is on a pace to produce 500,000 barrels this year. It's currently the ninth largest brewery in the United States.

The initial batch of Sierra Nevada Celebration Ale was brewed during the first year

of operation. Asked what inspired the brand, Harrison answers, "They've been brewing Christmas beers in Europe for centuries. It wasn't a big stretch."

Indeed, the first known instance of a special holiday brew comes from a 10th century edict issued by King Haakon the Good of Norway. Haakon had studied in England and was eager to further the spread of Christianity among his people. To ease the transition, Haakon permitted his subjects to celebrate the old Jule festival concurrently with Christmas, and bade them put aside enough grain to brew a strong winter ale. They were allowed to make merry as long as their supply of ale held out.

The word "Jule" or "Yule," incidentally, originally referred to the winter solstice, December 22. This is the day when the sun reaches its lowest ebb on the horizon. By December 25 it becomes apparent to naked-eye observers that the sun has reversed its course, and that warmer days lay ahead. This observation is the source of the winter festivals that permeate Western civilization.

The English in bygone centuries toasted the season with a potent punch called "was-sail" (from the greeting "waes hael," meaning "be healthy"). The composition varied, but the essential ingredients, according to John Bickerdyke in his *Curiosities of Beer and Ale*, were "strong ale, sugar, spices, and roast apples." He writes further, "It can easily be understood that when ale was for the most part brewed without hops, and consequently rather insipid in taste, many people...would put nutmeg, ginger and other spices into their ale. It is not unlikely that the introduction of hops was the cause which ultimately led to beer cups going out of fashion."

In the United States, perhaps the most famous winter seasonal of the pre-micro-brewery age was the Ballantine Burton Ale from P. Ballantine & Sons of Newark, NJ. This beer—which was not commercially sold, but given away to brewery executives and other VIPs—was brewed with gypsum-enriched water, generously dosed with hop oil and aged in wooden barrels for up to 20 years before bottling. (In 1997, at a breweriana show, this writer got a chance to uncaps a vintage-dated bottle of the Ballantine Burton, which was brewed May 12, 1934 and bottled December 1946. The hops

New American Ale

Jim Busch
Colesville, MD

Jim Busch took up the homebrewing hobby in 1988 after he received a True Brew American Dark kit as a Christmas present. He switched to all-grain brewing within six months, and in 1992 custom-fabricated a one-barrel brewhouse in a shed in his mother's backyard. In 1995, he brewed "Espirito de Boire," a Belgian-style strong spiced ale that was given out as the commemorative brew at the American Homebrewers Association convention in Baltimore, MD. That same year, Busch turned pro: he's a member of the board of directors for Victory Brewing Co. in Downingtown, PA, and also does test brews of new recipes.

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

8 lb pilsner malt (3.6 kg)
0.5 lb Cara-Vienna malt (0.23 kg)
0.25 lb Cara-Munich malt (0.11 kg)
0.25 lb Munich malt (0.11 kg)
2 oz Centennial hops (about 10% AA) (57 g)
2.5 oz Cascade hops (about 6% AA) (71.3 g)
1.5 tsp gypsum (useful for soft water supplies)
(7.4 mL) Wyeast No. 1056 American ale yeast

- Original specific gravity: 1.055
- Final specific gravity: 1.012
- Boiling time: 90 minutes
- Primary fermentation: 3-5 days at 65° F (18° C)
- Secondary fermentation: about 7 days at 65° F (18° C)

Brewer's specifics

Combine 3 gallons of water (11.4 L) heated to 155° F (68° C) with the malt and gypsum. Hold at 144-146° F (62-63° C) for 15 minutes, then boost to 156° F (69° C) for another 30 minutes. Boost to 170° F (82° C) and lauter. Boil for 90 minutes. Add 1.5 oz (43 g) of Centennial hops 30 minutes into the boil, and another 0.5 oz (14.3 g) of Centennial 60 minutes into the boil. Add 1 oz (28.5 g) of Cascade hops five minutes before the end of the boil, and another oz (28.5 g) of Cascade at knockout. Chill, oxygenate well and pitch 1 qt (.9 L) of yeast starter. Ferment to completion, and add 0.5 oz (14.3 g) of Cascade hops for dry-hopping, or keg and add hop bag to keg. Carbonate to 2.6 volumes, or serve as cask ale at 1.3 volumes.



had largely dissipated and a burnt-caramel flavor typical of oxidation dominated the beer, but after more than 60 years, this amazing brew was still drinkable!

The Ballantine brewery went out of business in 1972, and the American brewing industry largely abandoned the tradition of making hearty holiday beers. Only the packaging reflected the season—a Currier and Ives scene on a six-pack holder or Spuds Mackenzie in a Santa Claus hat. In 1981, when Sierra Nevada started brewing, the only U.S. breweries doing a genuine holiday beer were Anchor Brewing with its "Our Special Ale" (which was then a dry-hopped, top-fermenting beer that later became Liberty Ale) and the F.X. Matt Brewing Co. in Utica, NY with its annual dark lager.

It's interesting to compare Anchor and Sierra Nevada. Anchor's Our Special Ale, since 1987, has been a spiced ale whose recipe varies from year to year. After the holiday season, brewery owner Fritz Maytag retires the recipe and is as loathe to reveal the formula as the Coca Cola Company would be to make public the composition of its sticky, brown syrup.

Sierra Nevada's Steve Harrison, on the other hand, insists that the Sierra Nevada Celebration Ale is "basically the same beer" today as when it was first brewed in 1981. The formula is attached to the brewhouse wall. "We don't protect it, it doesn't mean much," asserts Harrison. "The brewing process, the equipment and the training of the brewers are all just as important as the formula. If you were to brew the same recipe somewhere else, you'd wind up with a different beer."



Ken Grossman mans the Sierra Nevada cellars.

Sierra Nevada Celebration Ale is brewed from 2-row pale, caramel and dextrin (cara-pils) malts, with an original gravity of 16° Plato and a final gravity of 3.8-3.9° Plato, resulting in an alcohol content of about 6% abv. Hopping consists of Chinook for bittering, Cascades in the finish, and Centennial and Cascades for dry-hopping. All are whole-flower; the brewery uses no hop pellets or extracts.

Celebration Ale is fermented with the same Chico ale yeast that's used for the Sierra Nevada Pale Ale. Primary fermenta-

tion takes place over six days, at a temperature of 68° F (20° C). Afterwards, the beer is transferred to a 400-barrel Unitank, into which bags of hops have already been lowered via a steel chain. Altogether, the beer spends 18 days in intimate contact with the hops. During the secondary fermentation, the temperature is gradually lowered to 30° F, a procedure that allows unwanted flavor elements like diacetyl to bubble off.

The carbonation is all-natural, from the addition of fresh yeast and sugar to the bottle or keg. One advantage of bottle-conditioning

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is that the yeast metabolizes oxygen trapped in the bottle, which would otherwise react with the beer to give it a harsh, cardboardy taste. "We have ridiculously low oxygen levels: 10 parts per billion, compared to an industry standard of 500 parts," asserts Harrison. "We're by far the most sophisticated brewery in the world when it comes to bottle-conditioning."

The bottles are allowed to sit for two weeks before being shipped to the distributors. Brewing starts in mid-September, as soon as the year's hop crop becomes available, and takes place over eight weeks. The beer hits the market around late October or early November. "We're out of it before Christmas," says Harrison.

Although Michael Jackson has maintained that Sierra Nevada Celebration is brewed to a different specification each year, Harrison insists that the perennial favorite is basically the same as when it was first brewed in 1981. "We're infinitely more sophisticated brewers now than when we began," adds Harrison. "Little components have changed, like the amount of dissolved oxygen and the temperature control." Also, hops, like wine grapes, differ from year to year in flavor characteristics as a result of the weather, pests, and other factors.

"In 1999, the hops had a little less alpha acid, and the beer was smoother than the year before," recalls Harrison. "Some years, the

aroma is so overwhelming that it's better if you age it a few months." The brewery may try to compensate by altering the bittering hops, but the Cascades are a constant, he asserts.

Harrison declines when asked if he has a favorite vintage. He feels that vertical tastings are useless, because they'll only reveal how the hop aroma and flavor decline with time, not how the beers tasted when they were fresh. He also prefers not to discuss shelf life. "We pull it off the shelves after six months, although some people feel it's still good to drink after two years."

Sierra Nevada Celebration Ale has been the source of inspiration for many well-hopped ales, at both the amateur and professional level. "Beers like Anchor Liberty and Sierra Nevada Celebration inspired us to use those kinds of hops and experiment with dry-hopping," commented homebrewer Jim Busch, who now does pilot brews for Victory Brewing Co. in Downingtown, PA and serves on that company's board of directors.

Clipper City Reserve Winter Ale, from the Clipper City Brewing Co. in Baltimore, MD, has gained a reputation among its fans as a "Sierra Nevada Celebration of the East." Owner Hugh Sisson tends to play down the connection. "We brew it as a thank you to our customers for supporting us during the year. It's stylistically similar to the IPA that we do during the year, but there's more of it."

Head brewer Scott Dietrich, however, admits, "I'd be lying if I said I wasn't inspired by Sierra Nevada Celebration Ale." The Clipper City Winter Reserve contains 10% English crystal malt (as opposed to 100% American malts for Celebration), and is not dry-hopped. It is, however, bottle-conditioned and has the same huge, resinous Pacific Northwest hop bouquet from the use of whole-leaf Centennial hops in the hopback.

Bob Tupper, who conducts beer tastings at the Brickskeller Restaurant in Washington, DC, launched Toppers' Hop Pocket Ale in 1994 after "logging 1,000 miles and visiting 50 liquor stores throughout the Northeast" in a futile effort to find Sierra Nevada Celebration Ale the previous year. He and his wife Ellie have the beer brewed at the Old Dominion Brewing Co. in Ashburn, VA. The Hop Pocket Ale measures about 60 IBUs, and contains a complex blend of Galena, Willamette, Mt. Hood and Cascades. It's both dry-hopped and bottle- and keg-conditioned.

Sometimes, brewers have been a little bit too eager to pay homage to Sierra Nevada's famous seasonal. "Some people think Celebration is a style," says Steve Harrison. "Occasionally, we have to send out letters to keep other breweries from using the Celebration name."

Harrison isn't worried about the proliferation of highly hopped ales, however. "You see a lot of Zinfandels, you see a lot of Cabernets," he muses. "We think that there's room for everyone."

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

The Use of Handheld Refractometers by Homebrewers

By Louis K. Bonham

While most of us use hydrometers to assay the gravity of wort and beer, few of us particularly like doing so. Hydrometers can be inaccurate and tricky to read properly, and proper testing by hydrometer requires several minutes. Worst of all, hydrometer testing often requires about a cup of beer per test. Fortunately, an alternative exists that is easy to read, can give acceptably accurate results in a matter of seconds, and requires only a few of drops of sample, namely the handheld refractometer.

A Quick Primer on Refractometers

As a general rule, the denser a liquid is, the slower light will travel through it. Refractometers use a prism to measure the extent of this phenomenon, in that denser liquids on one surface of the prism will refract (i.e., bend) light more than less-dense liquids. Most modern analytical refractometers quantify these measurements in terms of refractive index, which is the ratio of the speed of light in a vacuum to the speed of light in the solution. (Pure water, for instance, has a refractive index of 1.33299 at 20° C (68° F).) However, refractometers can also be calibrated in terms of concentrations of specific solutions at a given temperature. Thus, refractometers are available that are calibrated in terms of concentrations of salt, antifreeze, cutting oils, water content of honey, urine specific gravity, etc. The refractometers most familiar to brewers are calibrated in degrees Brix (percentage sucrose by weight at 20° C (68° F), a scale

not materially different from degrees Balling or degrees Plato). Most craft and amateur brewers are familiar with handheld Brix refractometers, which are widely available and typically cost about \$100-150.

Using a Refractometer to Measure Unfermented Wort

The most common use of a refractometer by craft or amateur brewers is to assay the gravity of unfermented wort during the mash, sparge, or boil, or before fermentation has started in earnest. The process is very easy—simply place a drop or two of the sample on the refractometer's sample window (which should be clean and dry), close the prism or cover plate, and read the refractometer by looking through the eyepiece. While the process is very easy, there are several important things to remember in order to get accurate results.

First, while degrees Brix and degrees Plato are essentially the same in an absolute sense (both are scales of percentage sucrose at 20° C (68° F)), a refractometer reading in Brix is not the gravity of wort in degrees Plato. This is so because the Brix refractometer scale is based on the refractive indices of pure sucrose solutions, while wort is composed of numerous compounds that have different refractive indices than sucrose. For example, a 15% maltose solution has a refractive index of 1.3562 at 20° C (68° F), whereas a 15% sucrose solution has a refractive index of only 1.3557. Such a maltose solution would thus measure 15.3°

Brix by hydrometer even though its specific gravity is only SG 1.0605 (14.75° P).¹

Fortunately, various formulas have been empirically derived to adjust for these differences between wort and sucrose. One easy-to-use formula that converts Brix refractometer readings of wort to the approximate actual gravity in degrees Plato is:²

$$\text{Refractometer reading (in degrees Brix)} + 1.04 = \text{Wort gravity (in degrees Plato)}$$

Thus, a wort that reads 15.6° Brix is approximately 15.0° Plato (SG 1.061). I have found that this formula typically gives results that are within 0.2° P (SG 0.0008) of the measurements of the wort gravity by narrow scale hydrometer or other reference method.

Second, if you think in terms of specific gravity instead of degrees Plato, remember that the shortcut of multiplying Plato gravity readings by 4 to get the number of specific gravity "points" does not always hold true. While this shortcut is acceptably accurate for worts up to 13° P (SG 1.052), it yields



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results that are increasingly inaccurate for heavier worts, and will produce errors of more than 4 specific gravity points for very high gravity worts (e.g., worts over 24° P (SG 1.100)). As a result, readings above 13° P should be converted using ASBC tables, one of the various conversion equations³, or a brewers' calculation program.

Third, while one generally need not be concerned with the temperature of the sample (the thermal mass of the refractometer will bring the temperature of the drop of sample to ambient in a few seconds), taking the reading at an ambient temperature other than 20° C (68° F) can skew refractometer readings in the same way (and to about the same extent) as sample temperatures skew hydrometer readings. Fortunately, this is easy to remedy. Before reading your sample, take a reading of a sample of distilled water, and "zero" the refractometer either way by using the adjustment screw or by noting the amount of offset and adding / subtracting this amount from the sample readings. While this method is not as accurate as calibrating the refractometer and taking all measurements at exactly 20° C (68° F), it gives acceptably accurate results in the gravity and ambient temperatures ranges typically encountered.

Using the Refractometer to Measure Gravity and Alcohol

Once fermentation starts, use of a refractometer to measure the gravity of the beer becomes more difficult. This is so because although ethanol has a lower specific gravity than water, it has a higher refractive index. As a result, the refractometer reading of a fermenting beer will appear to show a gravity that is significantly higher than it actually is.

This difference, however, can be used to measure the alcohol content of beer. Refractometer readings coupled with specific gravity measurements have been used for decades to calculate the alcohol and real extract contents of beer,⁴ and indeed was adopted as the official method in Germany in 1939.⁵ Further, using Balling's formula the original gravity can then be estimated from the measured specific gravity of the beer and its calculated alcohol content.⁶ Similarly, if one knows the original gravity of

the beer and its refractometer reading, one can work backwards through these formulas to estimate the beer's present gravity.

Over the years, there have been a number of formulas derived for these purposes. Starting with the Berglund, Emlington, and Rassmussen regression equation cited by DeClerk, and using conversions equations by Seibert⁷ and deLange,⁸ I have derived the following formulas using metrics commonly used by craft and amateur brewers:

$$\text{ABV} = (277.8851 - 277.4 (\text{SG}) + 0.9956 (\text{R}) + 0.00523 (\text{R}^2) + 0.000015 (\text{R}^3)) \times (\text{SG} / 0.79)$$

$$\text{SG} = 1.001843 - 0.002318474 (\text{OG}) - 0.000007775 (\text{OG}^2) - 0.000000034 (\text{OG}^3) + 0.00574 (\text{R}) + 0.00003344 (\text{R}^2) + 0.000000086 (\text{R}^3)$$

Where:

ABV = Percent alcohol by volume

**SG = Specific Gravity of the Beer
(in specific gravity units)**

**R = Refractometer reading of the beer
(in Brix)**

**OG = Original gravity of the beer
(in degrees Plato)**

Obviously, using these formulas with a computer program or programmable calculator is considerably easier than doing the calculations manually.⁹ It should also be noted that general formulas such as this are never as accurate as measuring gravity or alcohol content directly using reference methods; indeed, the ASBC refractometry protocols assume the use of recipe-specific calibration curves constructed from such direct measurements.¹⁰ Nevertheless, these formulas typically produce results that are within 0.2° P (SG 0.0008) for specific gravity and 0.25% ABV for alcohol, which is probably good enough for most craft and amateur brewers. Steven D. Gardner has come up with a much a simpler set of formulas,¹¹ based on equations derived by Roberts & Stewart:¹²

$$\text{ABW} = 1.09 (\text{R}) - 1.13 (\text{SG})$$

$$\text{SG} = 1.53 (\text{R}) - 0.59 (\text{OG})$$

Where:

ABW = Percent alcohol by weight

**R = Refractometer reading of the beer
(in Brix)**

**OG = Original gravity of the beer
(in degrees Plato)**

**SG = Specific gravity of the beer
(in degrees Plato)**

I have found that these formulas produce estimates that are slightly less accurate than the equations based on the Berglund, Emlington, and Rassmussen regression equation. However, such estimates are also probably close enough for amateur brewers, and these equations are considerably easier to use if you do your calculations manually.

No matter which equations you use, remember that garbage in = garbage out. If you wish to calculate the alcohol content of your beer from refractometer readings and specific gravity measurements, it is absolutely essential that the specific gravity readings be as accurate as possible.¹³ A mistake of only 0.25° P (SG 0.001) in your hydrometer readings will, for instance, yield a corresponding error of about 0.25% ABV. Make sure that your refractometer is calibrated at the ambient temperature, and make sure the window surface and cover plate are scrupulously clean and dry before each use.

Conclusion

Handheld refractometers can be a convenient way to quickly take reasonably accurate gravity readings throughout the brewing process with very small samples. Their only downside is that they do cost considerably more than hydrometers.

Louis K. Bonham is an attorney with the firm of Holmes & Bonham, specializing in intellectual property litigation. He is a member of Houston's Foam Rangers, a member of the AHA Board of Advisors and is the founder of the Masters Championship of Amateur Brewing ("MCAB"). A past columnist for Brewing Techniques Magazine, he was awarded a Gold Quill and Tankard award by the North American Guild of Beer Writers in 1998.

Endnotes

1. CRC Handbook Of Chemistry & Physics (CRC 1973, R. Weist ed.) at pp. D209-10 (Table 29 (Maltose)).

2. Roberts, F. & Stewart, T., "Practical Application of the Hand Refractometer to Brewing Operations", in proceedings of the 1950 ASBC Meeting, pp. 118-22.
 3. Seibert, K.J., "Routine Use of a Programmable Calculator for Computing Alcohol, Real Extract, Original Gravity, and Calories in Beer," 38 ASBC Journal 27- 33 (1980). Professor Seibert has derived the following highly accurate formula for converting degrees Plato to specific gravity:
- $SG = 1.000019 + 0.003865613(P) + 0.000001296425(P^2) + 0.00000005701128(P^3)$
4. See, e.g., DeClerk, J. A *Textbook of Brewing*. Chapman & Hall, London. 1958. p 422-23.; ASBC *Methods of Analysis*, Method Beer-4(C) (Alcohol Measured Refractometrically) (ASBC 1992, J. Thorn ed.), Koessler & Hagen, "Determination of Original Gravity and Alcohol Content of Dark Starkbiers with the Refractometer," *MBAA Tech. Q.* 36:231.; Roberts & Stewart, *supra* n. 2.
 5. DeClerk, *supra* n. 4.
 6. *Ibid.*
 7. Seibert, *supra* n.3 (Refractometer Scale to Refractive Index).
 8. In a private communication, A.J. deLange derived the following equation that converts Brix measurements to their refractive index values, based on the data in the CRC HANDBOOK, *supra* n. 1, p. E224: RI = 1.333 + 0.0014323 (B) + 0.0000055752 (B2)
 9. A great freeware program for this purpose is Engi-Cal, which can be downloaded free of charge from: <http://ptty.loxinfo.co.th/~jburen/engineer.htm>
 10. ASBC Method Beer-4(C), *supra* n. 4
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 12. Roberts & Stewart, *supra* n. 2.
 13. For a description of the proper way to take accurate hydrometer readings, see ASBC, Method Beer-3



Observations on Mash Hopping

By Marc Sedam

Every brewer knows when to add hops in the wort. You need some for the long boil to bitter the beer, some between 10-20 minutes from the end of the boil for flavor, and a handful at the end of the boil to get the

intoxicating aroma into the beer. The hop-heads among us even dry hop beer for that extra something in many pale ales. Oh, and of course you can add hops to the mash.

The mash?

Hops in the mash have a history in brewing. I first came upon this concept while trying to make the ultimate Berliner Weiss. Eric Schneider's article on Berliner Weiss in *Brewing Techniques* a few years back mentioned that aged leaf hops were often placed in the mash to aid in filtration. My attempt at the recipe came out well, but the concept

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of adding some hops to the mash was intriguing. What would hops do in the mash? Could you use pellets?

My first mash-hopped brew was a simple lager made using 10 pounds of pilsner malt, two ounces of Hallertauer Hersbrucker in the mash, and an ounce of Bullion in the boil for bittering. The resulting beer was shocking. It had hop aroma and flavor that I'd never been able to get in a beer before. When the beer was warmed up a bit one whiff put me closer to a hop field than I'd ever had in a glass.

I continued to experiment with the amounts of hops to use in the mash, trying to make recipes I knew so I could subjectively predict the bitterness contributed. Pilsners, brown ales, barleywines, and pale ales—all of these styles seemed to benefit from mash hopping. A few postings to the Homebrew Digest (<http://www.hbd.org>) led me to Paddock Wood Brewing Supplies, a homebrew shop in Canada run by Stephen Ross. Little did I know that Stephen had been dabbling in mash hopping as well and had some information up on his website (<http://www.paddockwood.com>). I began to share what I was doing with other homebrewing web groups and convinced a few people to give it a shot. Many were impressed with the result. Some were not. I encouraged people to write me with their experiences and asked for as much detail on the brewing process as they could remember. Several emails were swapped over the next few months and some "best methods" began to emerge.

How Do You Mash Hop?

Not all beers are worth mash hopping. But those beers that are characterized by hop flavor or aroma certainly seem to benefit. My Classic American Pilsner really shines when mash hopped. Others have tried it in a decoction and, other than a slightly increased bittering contribution of the mash hops, enjoyed the results. I have a few simple rules for converting a normally hopped beer to a mash-hopped brew:

1. Replace the amount of flavor and aroma hops with 1.5x the amount of mash hops. For example, if your recipe calls for an ounce of Saaz as a flavor addition and another ounce for the aroma addition, you would add three ounces of Saaz to the mash. Hops are added directly to the mash at dough-in.

2. Use pellets. I have mash hopped with leaf and with pellets and the pellets give much better results. This could be because the hop oils are more exposed in the pellets through processing.

3. Add slightly more bittering hops. Current observations indicate that mash hopping provides almost no bitterness to the finished beer. Thus when you move hops from the boil to the mash, you must compensate for the bitterness that is lost. I do this by calculating the IBUs that would have been contributed to the original recipe by the flavor and aroma hops and then increasing the bittering hop addition accordingly.

4. Sparge, boil, chill, ferment, enjoy! That's it. After adding hops to the mash, the rest of the brewing cycle proceeds as normal. Surprisingly, the hops do not get in the way of lautering. I always start the lauter slowly, but have never had a stuck mash since starting mash hopping.

Why Does It Work?

The short answer is that I don't know. Traditional beers generate hop flavor and aroma through late hop additions because the volatile oils that provide these properties are driven off in the boil. Mash hopping is targeting the aromatic oils and not the bittering resins. Mash-hopped beers have plenty of hop flavor and aroma, yet the wort is boiled for over an hour. My main theory is that the otherwise volatile hop oils are stabilized during extended periods at mashing pH (5.2-5.5). A reason to believe this theory is found in Jean DeClerck's classic *Textbook of Brewing* (1957). DeClerck states that hop aromatic oils form chemical bonds at higher pH values and lower temps than found in boiling wort. The bonds which are formed are not broken during the boil; hence the permanent aromatic profile. DeClerck even suggested steeping hops in warm water. So the mash provides an attractive temperature and pH profile to allow the hop aromatic oils to form permanent bonds and making them less volatile. Even the eventual boil of the wort isn't enough to drive off the aromas. Again, this is my theory that seems to have a toehold in previous scientific observation. But this is far from the definitive answer.

I have done ten mash-hopped beers and the other feedback I've received gives a sample size of over 50 batches. Most folks report achieving a smoother hop flavor and aroma. In addition, of course, everyone gets less debris in the kettle since the hops are added to the mash and not the boil. This helps to increase wort yield and I've eked out an extra quart of wort on each batch due solely to this effect.

I have received other feedback on mash hopping from personal emails and public postings on the HBD. Some people have not seen a great effect from trying the process. Most of these were attributed to using too few hops in the mash. But there are still others who don't have an explanation. Other factors such as water chemistry and mash pH may play a role, but these would require further exploration.

Summary

Mash hopping isn't for every beer and it may not be financially sound for commercial breweries. But home brewers should certainly try the process once to test it out for themselves. As most of what is presented here has come from experimentation by myself and others, I'd be happy to hear about your experiences. I always appreciate feedback from those who have tried it and someday hope to have a mash-hopped beer analyzed for content to empirically determine what's happening.

Marc Sedam, a.k.a. "The Alechemist", lives in Chapel Hill, NC. He is a frequent contributor to online brewing communities and previously wrote for *Brewing Techniques*, winning a 1999 Quill and Tankard Award for an article on water chemistry. He can be reached at alechemist@homebrew.com.



BY CHARLIE PAPAZIAN

Beyond the Ordinary Ordinary

I love my English ales. I often like the ales in England too. My first trip to the United Kingdom was in 1981 to attend the Campaign For Real Ale's (CAMRA) Great British Beer Festival. Upon my arrival I soon learned that I had been invited to be one of the three judges determining the best of class for several real ale styles. The event and beers were so inspiring; I came home with the idea of establishing the first Great American Beer Festival.

But I digress, as I sip on my beyond-the-ordinary Ordinary ale. I'm finding my own English style ales to be my preference—most of the time—well at least in this part of the world. It has been a very rough few years for the British brewing tradition. Some of the most classic of ales are ghosts of their proud tradition. And worse, pubs that do serve what real ale is available are often not serving their ales in the best of condition. I've recently had two classic examples served in ruins: Fullers ESB and Bass Ale—both were pitifully undrinkable in a downtown London pub. Sour and or full of diacetyl (an intense butterscotch) I left full pints on the bar and settled for a Guinness, which I wasn't quite in the mood for but enjoyed as my third choice of the moment.

The example of tradition gone awry is common throughout the U.K. Not only does the beer have to be brewed to excellence, but also it must be kept in proper condition and the tapping plumbing needs to be maintained. My experiences left me with the impression that the U.K. is in the midst of major apathy with regards to its real ale traditions—despite the best efforts of CAMRA.

My personal opinion is that CAMRA's zeal for tradition has not taken into consideration that real ale consumption continues to decline—and without the ubiquitous consumption from which the tradition was derived. Real ale in pubs simply does not get

enough attention from consumers and barkeepers. When the cask of real ale does not get consumers' attention, then the product eventually goes bad. Dumped beer is money down the drain. You can figure out the rest.

Meanwhile it gets me to thinking that without some compromise of tradition in the market place the number of good quality real ales served will continue to dwindle. And many that are forced through the taps will turn off new consumers, as they have momentarily turned off this veteran consumer.

I brew what I consider authentic real ales at home. The only difference is that I force the beer out with carbon dioxide, thus avoiding the introduction of airborne microorganisms that eventually ruin good ale. Okay, okay. I will be the first to champion the real ale tradition—when it works. But my real ale stays on tap for a month, while I also enjoy several other styles of ale and lager—all on tap. So I keep the beer a bit colder and push it out with carbon dioxide. Technically it ain't real ale.... But wait a minute—I could serve a real real ale if I wanted to—and I bet with a little innovation it would be served several weeks, perhaps a month without going off.

How? Well I'd have to push the ale with air, right? That isn't too hard to do. Some sterile cotton or other filtering aids in the air lines would do the trick. But the thing is, I don't push with air. Why? Because I love my "real ale" the way I make it and choose to serve it. That's me... but what about you?

Meanwhile, while touring the countryside along the river Thames west of London I was absolutely thrilled to encounter the ales of the Brakspear Brewery, Henley-on-Thames. It's not everyone's favorite ale, but it certainly livened my heart as I enjoyed the rich taste of East Kent Goldings hops and the full flavor of skillfully brewed ales. Both

on tap in real ale form and equally as well in bottles, I found the malt and hop character I seek in English ales. What was most extraordinary was that I especially enjoyed the Ordinary, likely brewed at 1.038 or thereabouts, low in alcohol, but high in flavor profile. Keep in mind that this is a full flavored ale that you won't find in most American brewpubs or in a craft brewed bottles. How many craft "pale ales" can you name that start with gravities *below* 1.040? It hardly happens. But to tell you the truth you CAN get a full flavor and satisfying ale at these low gravities.

Here are a few observations I made during my tour of their extraordinary 100-year plus brewery. They condition their water to be sure that there is enough calcium and sulfate. They use invert sugar #2 (a brown sugar, rich in toffee-like flavor) as an adjunct. Much of their hops are whole East Kent Goldings aged in a cold room as long as 6 to 9 months. After pitching the yeast, the beer is allowed to begin the fermentation only 24 hours before it is transferred (with no regard for air pickup) into another open fermentation tank.

My novice assessment: The invert sugar #2 lends a rich flavor to even their mildest ales. Aging their Kent Goldings hops at cold room temperatures enhances cold oxidation and promotes good flavor. American brewers are so obsessed with fresh hops and oxygen barrier packaging that the positive evolution of flavor in an oxygen environment under proper conditions is all but lacking in most American "English-style" ales. During the transfer of the barely fermenting wort, much oxygen is picked up. This creates a complex mixed fermentation-respiration cycle which seems to positively affect the character of this ale. The anomalies of Brakspear will never be studied in today's brewing research laboratories, simply because their methods do not

agree with modern brewing and fermentation theories and philosophies. Too bad. There is much that could be learned from breweries like Brakspear—making superb world-class beers, differently than the learned and the scholarly trained.

I love their ordinary and have come close, but not exactly, to copying Brakspear's Ordinary. I'm very happy with this ale. I did not transfer after 24 hours. But you can. My hops are kept "fresh" in the freezer sometimes for over a year. My brews

still lack the intensity of Brakspear's Golding hop character, but I did the best with what I had. And as for the invert sugar #2, I couldn't find it here in Boulder, CO. But what seems an excellent substitute is very dark "Rapidura." This is dried and granulated pure cane sugar juice from Brazil. Sucanat is another type of cane juice sugar, but not as full flavored as *rapidura*. Available at health food stores or in the "natural sugar" section of your more "nature-conscious" grocery store.

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

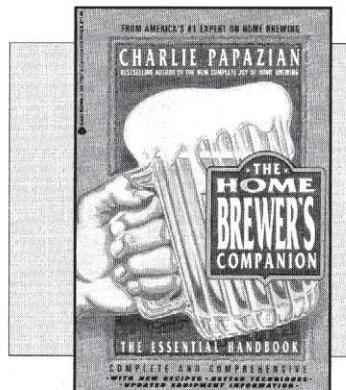
Beyond the Ordinary Ordinary *Malt extract version*

Ingredients and recipe for 3.75 U.S. gallons (14 L)

- 1 3.3 lb can (1.5 kg) pale/light malt extract syrup
- 0.5 lb (225 g) English crystal malt (15 to 20 L)
- 6 oz (170 gm) Rapidura (Brazilian dark cane sugar juice, dried and granulated) or British invert sugar #2.
- 0.5 Tbs gypsum as necessary for water lacking calcium and sulfate ions (optional)
- 1 oz (28 g) Kent Goldings (5 HBU/140 MBU) whole hops (60 min.)

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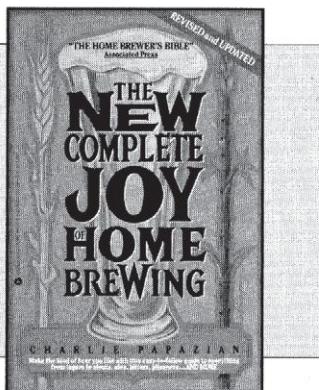


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HOMEBREW BITTERING UNITS (HBUs) are a measure of the total amount of bitterness in a given volume of beer. Homebrew Bittering Units can easily be calculated by multiplying the percent of alpha acid in the hops by the number of ounces. For example,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

AVON BOOKS
The Hearst Corporation

- 1 oz (28 g) Kent Goldings
(5 HBU/140 MBU) whole hops
(5 min.)
- 0.4 oz (11 g) Kent Goldings hop
pellets dry hop
- 0.25 tsp powdered Irish moss
- 0.5 cup (120 ml measure) corn sugar
(priming bottles) or 0.25 cups
(50 ml) corn sugar for kegging
- Wyeast Thames Valley Ale Yeast
1275 or White Labs English Ale
Yeast
- Original gravity: 1.038-1.040
(9.5-10° P)
- Final gravity: 1.006-1.008
(1.5-2° P)
- IBUs: about 30
- Approximate color: 8 SRM
(16 EBC)
- Alcohol: 4% by volume
- Apparent attenuation: about 80%

Add the crushed crystal malt to one gallon (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 one gallon (3.8 L) additional water, the malt extract syrup, Rapidura, gypsum (optional) and one ounce (28 g) hops. Bring to a boil and continue to boil for one hour. When 10 minutes remain, add Irish moss. When 5 minutes remain, add the remaining one ounce (28 g) whole hops. After a total wort boil of 60 minutes turn off the heat. Then strain out and sparge hops and direct the hot wort into a sanitized fermenter to which 1.5 gallons (5.7 L) of cold water have been added. If necessary add additional cold water to achieve a 3.75-gallon (14 L) batch size. Add a starter culture of yeast when temperature of wort is about 70° F (21° C). Preferably ferment in the 70-72° F (21-22° C) range for about 4-6 days or until fermentation is complete and appears to clear and darken. At this point rack (transfer) the beer into a secondary fermenter and add the 0.4 ounce (11 gm) Kent Golding hop pellets. For best results secondary "cellar" or age for 7 days at 50° F (10° C) to help drop yeast out of suspension but this is not at all crucial to the quality. Bottle with corn sugar. Age and carbonate/condition at temperatures between 70 and 72° F (21-22° C).

Service is your choice. Go traditional and drink it up in 3-4 days or keep it cooler and avoid introducing airborne microorganisms and enjoy for weeks on tap. Bottles are enjoyed as you would any homebrew; beyond the ordinary.

Beyond the Ordinary All-grain version

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

6.5 lb (3 kg) English 2-row pale malt



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0.33 lb (150 g) English crystal malt
(15 to 20 L)
6 oz (170 g) *Rapidura*
(Brazilian dark cane sugar juice,
dried and granulated) or British
invert sugar #2.
0.5 Tbs gypsum as necessary for water
lacking calcium and sulfate ions
(optional)
1.4 oz (40 g) Kent Goldings
(7 HBU/196 MBU) whole hops
(60 min.)

1 oz (28 g) Kent Goldings
(5 HBU/140 MBU) whole hops—
(5 min.)
0.5 oz (14 g) Kent Goldings hop
pellets (dry hop)
0.25 tsp powdered Irish moss
0.75 cup (180 ml) corn sugar (priming
bottles) or 0.33 cups (80 ml) corn
sugar for kegging
Wyeast Thames Valley Ale Yeast
1275 or White Labs English Ale
Yeast

- Original gravity: 1.038-1.040
(9.5-10° P)
- Final gravity: 1.006-1.008
(1.5 -2° P)
- IBUs: about 30
- Approximate color: 6 SRM
(12 EBC)
- Alcohol: 4% by volume
- Apparent attenuation: about 80%

A simple one-step infusion mash is employed to mash the grains. Add 8 quarts (7.5 L) of 170° F (77° C) water to the crushed grain and gypsum (optional), stir, stabilize and hold the temperature at 155° F (68° C) for 60 minutes. Then raise temperature to 167° F (75° C), lauter and sparge with 4 gallons (15 L) of 170° F (77° C) water. Collect about 5.5 gallons (20 l) of runoff.

Add *Rapidura* and one ounce (28 gm) hops. Bring to a boil and continue to boil for one hour. When 10 minutes remain, add Irish moss. When 5 minutes remain, add the remaining one ounce (28 gm) whole hops. After a total wort boil of 60 minutes turn off the heat. 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 (20 L). If necessary add additional cold water to achieve this volume. Add a starter culture of yeast when temperature of wort is about 70-75° F (21-24° C). Preferably ferment in the 70-72° F (21-22° C) range for about 4-6 days or until fermentation is complete and appears to clear and darken. At this point rack (transfer) the beer into a secondary fermenter and add the half-ounce (14 gm) Kent Goldings hop pellets. For best results secondary "cellar" or age for 7 days at 50° F (10° C) to help drop yeast out of suspension but this is not at all crucial to the quality. Bottle with corn sugar. Age and carbonate/condition at temperatures between 70 and 72° F (21-22° C).

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) and *The Best of Zymurgy* (Avon, 1998).



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BY AMAHL TURCZYN

With 2,668 entries for last year's National Homebrew Competition, putting the event together is obviously no small task. Without the continuing support of the event sponsors, the NHC would not happen. Entry fees are actually a small part of the total revenue necessary to fund the event. It takes site sponsors to host the first round competitions, and category sponsors to help fund first and second round event operations & supplies, phone calls, shipping, certificates and first-round awards, as well as staff time. Since the top awards from the second round are perhaps the most demanding part of this event in terms of sponsorship, we'd like to take this opportunity to thank the following organizations for helping to make the NHC awards happen:

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We couldn't have done it without them, so please support the National Homebrew Competition by supporting them!

English and Scottish Strong Ale



BRONZE MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Tom Miklinevich, West Redding, CT

"Up Your Kilt, Scotty!"

Strong Scotch Ale

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

15 lb Golden Promise malt (6.8 kg)
 3 lb Munton's amber dry malt extract (1.36 kg)
 1 lb Munich malt (0.45 kg)
 8 oz German wheat malt (0.23 kg)
 6 oz Belgian aromatic malt (170 g)
 4 oz roast barley (113 g)
 4 oz Special 'B' malt (113 g)
 3 oz Northern Brewer whole hops, 7.2% alpha acid (85 g) (90 min.)
 0.33 oz E. Kent Goldings whole hops, 5.2% alpha acid (10 g) (60 min.)
 Wyeast No. 1728 Scottish ale yeast
 2.5 vol. forced CO₂ to carbonate

- Original specific gravity: 1.100
- Final specific gravity: 1.024
- Boiling time: 90 min.
- Primary fermentation: 14 days at 65° F (20° C) in glass
- Secondary fermentation: 14 days at 65° F (20° C) in glass

Brewer's Specifics

Mash grains at 154° F (68° C) for 120 minutes. Sparge, add extract, and proceed with boil.

Judges' Comments

"I like this beer. I would make it darker, but so what! Nice beer."

"Appropriate caramel sweetness and proper balance. Nice job."

Bitter and English Pale Ale



SILVER MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Ken Brown, Fremont, CA

"Ridgewood E.S.B."

Strong Bitter/English Pale Ale

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

8 lb Maris Otter pale malt (3.63 kg)
 2 lb light Munich malt (0.91 kg)
 1 lb 15° L crystal malt (0.45 kg)
 0.75 lb 80° L crystal malt (0.34 kg)
 0.5 lb DWC aromatic malt (0.23 kg)
 0.75 oz Fuggle pellet hops, 4.3% alpha acid (21 g) (60 min.)
 1 oz E. Kent Goldings pellet hops, 5.1% alpha acid (28 g) (30 min.)
 1 oz E. Kent Goldings pellet hops, 5.1% alpha acid (28 g) (10 min.)
 1.5 oz E. Kent Goldings pellet hops, 5.1% alpha acid (43 g) (dry hop)
 White Labs English ale yeast (1 qt. starter)
 0.5 cup corn sugar (118 mL) (to prime)

- Original specific gravity: 1.067
- Final specific gravity: 1.019
- Boiling time: 70 min.
- Primary fermentation: 10 days at 65° F (18° C) in glass
- Secondary fermentation: 10 days at 64° F (18° C) in glass

Brewer's Specifics

Mash grains for 1.5 hours at 156° F (69° C).

Judges' Comments

"Malt is very nice in flavor. Good caramel sweetness. Good beer! I really liked the malt/hop balance!"

"Very well-brewed beer. I could drink a lot of this beer."

Specialty/Experimental/ Historical Beer

BRONZE MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Brad Reeg, Chicago, IL

[Untitled]

Rye Beer with Weizen yeast

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

- 5.5 lb Pilsener malt (2.5 kg)
- 4 lb rye malt (1.8 kg)
- 0.5 oz Hersbruck whole hops,
3.2% alpha acid (14 g) (60 min.)
- 0.5 oz Hersbruck whole hops,
3.2% alpha acid (14 g) (45 min.)
- White Labs WLP 300 Weizen yeast
- 1 cup corn sugar (177 mL)
(to prime)
- Original specific gravity: 1.052
- Final specific gravity: 1.012
- Boiling time: 90 min.
- Primary fermentation: 14 days at
65° F (18° C) in glass
- Secondary fermentation: 22 days
at 65° F (18° C) in glass

Brewer's Specifics

Employ a single decoction mash as outlined in page 63 of Eric Warner's Classic Beer Style Series book *German Wheat Beer*.

Judges' Comments

"Spicy, pungent and flavorful, with a clean, dry finish. I liked it!"

"Good job! Not strongly differentiated from a Weizen, but a pleasant, drinkable beer."



Every gold-medal winning recipe from the AHA 2000 National Homebrew Competition was printed in the 2000 September/October Zymurgy (Vol. 23, No. 5) "Winners Circle."

German Amber Lager

SILVER MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Mike Porter, Lenexa, KS

"Mill Rd. Lager"

Vienna Lager

Ingredients for 10 U.S. gal (37.85 L)

- 20 lb DWC Pilsener malt (9 kg)
- 0.75 lb 10° L crystal malt (0.34 kg)
- 0.5 lb Scottish malt (0.23 kg)
- 0.5 lb Special 'B' malt (0.23 kg)
- 0.5 lb melanoidin malt (0.23 kg)
- 2 oz Tettnanger whole hops,
3% alpha acid (57 g) (45 min.)
- 1.5 oz Styrian Goldings whole hops,
3.6% alpha acid (14 g) (30 min.)
- 2 oz Saaz whole hops, 3.9% alpha
acid (57 g) (15 min.)

Wyeast No. 2206

Bavarian lager yeast

Forced CO₂ to carbonate

- Original specific gravity: 1.62
- Final specific gravity: 1.018
- Boiling time: 60 min.
- Primary fermentation: 14 days at
54° F (12° C) in glass
- Secondary fermentation: 14 days
at 54-40° F (12-4° C) in glass
- Tertiary fermentation: 28 days at
34° F (1° C) in glass

Brewer's Specifics

Mash grains for 60 minutes at 154° F (68° C).

Judges' Comments

"Very nice, well-made beer. No suggestions to change."

"Lovely aroma, but bitterness keeps malt flavor from showing through as well as it could. Extremely drinkable."

Spice Mead

SILVER MEDAL

AHA 2000 NATIONAL HOMEBREW COMPETITION

Bob Grossman, Haddonfield, NJ

"Zinger Champagne"

Still Metheglin

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

- 30 lb alfalfa honey (13.6 kg)
- 6 oz fresh chopped ginger (170 g)
- 1 oz Curacao bitter orange peel (28 g)
- 2 oz coriander (57 g)
- 9 bags Celestial Seasonings Lemon Zinger™ tea
- 1 tsp Oakmore oak chips (4.9 mL)
- 2 oz Beverage People mead yeast
nutrient (57 g)
- Wyeast No. 1968 ESB ale yeast

- Original specific gravity: 1.090
- Final specific gravity: 1.046
- Boiling time: 2 minutes
- Primary fermentation: 2 weeks at
65-70° F (18-21° C) in glass
- Secondary fermentation: 4 months
at 65-70° F (18-21° C) in glass

Brewer's Specifics

Bring 8 gallons (30.28 L) of water to a boil. Add honey and dissolve. Bring back to a boil for 2 minutes and skim. Add all spices and tea bags. Force chill to 70° F (21° C). Oxygenate with O₂ for 2 minutes. Pitch yeast.

Judges' Comments

"Good mead. A bit sweet. Try less honey and ginger. Ginger aroma is too strong."

"Nice flavor but a little on the sticky side. Ginger dominates a bit too much."

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

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Dear Professor (from page 24)

create problems with a honey must far too low in nutrients to ferment properly. Even more interesting is a note in *The ABC and XYZ of Beekeeping* that the darker honeys are preferred by Europeans in meadmaking. I wonder if the Europeans, with their darker honeys, had better luck than what we seem to have had during the early years of meadmaking in this country.

What has been your experience here? When were meadmakers talking about the lighter honeys being best for meadmaking? Who were these meadmakers—farmers, beekeepers, homebrewers? How have these trends changed since then? My impression is that meadmakers today are more interested in a greater variety of different honeys than in the past, looking for more unique flavors in honey and not necessarily the flavors of the lighter honeys. What have you found?

Dan McFeeley
mcfeeley@keynet.net
Kankakee, IL

Dan my man,

Sounds like you should be writing an article about all this lore you've been digesting. It sounds fascinating. You're asking my opinion about my experience with darker honeys. Well to tell you the truth, I've always been fortunate to have access to lighter honeys and thus my experience with darker honey is limited to say the least. Also, boiling and skimming (which many mead makers avoid) can remove proteins and free amino nitrogen (FAN), but shouldn't "drive off" nutrients present in the honey.

My first encounter with the concept of the direction of using lighter honey came from my visit with Leon Havill (www.ctv.co.nz/mead/ email: mandalea@xtra.co.nz) in 1983. Leon and his wife Gay, run Havill's Mazer Meadery in Rangiora, New Zealand and have been doing so for over 25 years. He is one of those legends that you'd appreciate talking to. He is full of historical knowledge and a wealth of experience. One of his principal references was Lt. Col. Gayre's Wassail, In Mazers of Mead, which the Association of Brewers' Breweries Publications reprinted in the mid 1980s as Brew-

ing Mead. Leon really read into this book and did further research on the hundreds of references. From his research and experimentation he was my mentor in championing the merits of lighter honey.

I would tend to agree with you that the use of all kinds of honeys are integrated into amateur meadmaking. Variability from batch to batch is not an issue on an amateur level. Consistency is an issue commercially—the lighter honeys, I imagine, offer more consistency in final flavor profile—very important in the way that mead is marketed today.

Personally I think meadmakers would be far better off marketing mead as a "vintage" or better put, a "mélange" product, with expected variation from year to year and maybe even batch to batch.

Well that about wraps it up for now.

Mead, Forgotten, not.
The Professor, Hb.D.

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

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American Homebrewers Association

(from page 22)

the division's board of advisors—to ensure that their needs and interests are directly heard at the board level. Thus the board of directors includes three representatives each from the American Homebrewers Association, Institute for Brewing Studies and Brewing Matters as well as one representative from Brewers Publications. A complete list of the directors is given below.

How many full time employees does the Association of Brewers have?

Currently there are 24 full time employees at the Association, covering all of the divisions and departments.

You have explained the four divisions, but what do you mean by departments?

The Association of Brewers employs people in departments that provide support for the four operating divisions. The departments include marketing, member services, finance and accounting, human services, events, web

development, information technology, graphic production and design.

Do all of the divisions and departments (and all of the employees) work in the same office?

Yes. The Association of Brewers has 5,800 square feet of office space at 736 Pearl Street in Boulder, Colorado. We all work together within an area small enough to carry the sound of a bottle being opened from one corner of the building to the other.

Who selects and hires the President of the Association of Brewers?

The Board of Directors of the Association.

How is the management of the Association structured?

The Vice President and Financial Director report to the President of the Association. The Vice President manages the directors of all of the departments and divisions.



It's the Beer Talking (from page 4)

of the Association of Brewers (AOB). The other divisions are the Institute of Brewing Studies (to represent commercial brewers interests), Brewers Publications (our book publishing arm) and Brewing Matters (Great American Beer Festival and World Beer Cup). Our divisions have some awesome brands that are recognized across North America, such as the American Homebrewers Association®, **Zymurgy**®, *The New Brewer*, NHC, National Homebrewers Conference, Classic Beer Styles Series, World Beer Cup®, Great American Beer Festival, Craft Brewers Conference and BrewExpo America. Our problem is that brewers, those in the business of beer and the public, don't associate one brand with the others. Another problem is that our divisions have not functioned cohesively together as one unit, for example, we did not integrate the American Homebrewers Association membership into the work of the Institute of Brewing Studies membership to rally support for American Beer Month last July.

There are many benefits one branch of Association of Brewers' members can provide the other branches to improve the image of beer in our society and to build brewing communities. One change we'll be undergoing here is that AOB staff and our constituent divisional boards of advisors will be discussing ways to become more cohesive as an overall unit so that each division's constituents can benefit from the work and programs of each of the other divisions. The result will likely start with items like an AHA night at a local brewpub, some changes in the mastheads and cover words of **Zymurgy** and *The New Brewer* or a national mobilization of AHA members in support of American Beer Month. As we make the Association of Brewers brand more visible, we should be able to raise more in sponsorships and be more influential on political fronts if necessary, such as on homebrew legalization or other alcohol issues.

AHA Goals for 2001

Well I have touched on the subject of goals and still have a couple of sips of porter to go, so I think I'll provide a short list of what I have as goals for the American Homebrewers Association in 2001.

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1) **Membership**—To boost membership to a level that allows us to do more to promote the hobby to the non-brewing members of our communities and to continue to run quality programs for homebrewers. Membership is currently around 10,000. I would like to see our membership list climb to 12,000 by the end of 2001. Please encourage AHA membership to your brewing friends.

2) **Zymurgy**—To build on the strides we made with **Zymurgy** in 2000. Hopefully he won't edit this out, but Ray Daniels' work on **Zymurgy** has been outstanding in my opinion in terms of technical quality, balancing the interests of all levels of brewers and diversifying our author base through the membership.

3) **Integrating the AHA within the Association of Brewers to support all beer communities**—To reaffirm the connections and serve as a supporting forum for the beneficial relationships between homebrewers, clubs, supply shops, manufacturers and craft brewers.

4) **Becoming a grassroots association**—We have made several steps in empowering members as volunteers in the National Homebrew Competition, the National Homebrewers Conference, the club-only competitions, and through other projects such as Big Brew and Teach a Friend To Homebrew Day. We have opened up the AHA board of advisors to have major input, be elected by the members and have representation on the AOB board of directors. The next step is for us to encourage liaisons in different parts of the country to build membership, table at events, represent AHA with local media and handle local membership problems, concerns and creative ideas.

I envision about fifty liaisons around the country. I had this same goal for 2000, and progress has been slower than I hoped due to the workload. With the increasing level of help we already get from the board of advisors and volunteers, Gary and I should have more time to set this up in 2001.

5) **A great National Homebrew Competition**, National Homebrewers Conference in Los Angeles June 21-23, Big Brew and Teach a Friend to Homebrew Day, legalizing homebrewing in all fifty states and better support for homebrew clubs and retailers.

So as not to be so serious in my article, my porter that accompanies me on this journey recommends that I lighten it up some at the end...

Update on Fluffy the Bear

On my recent trips to the Dixie Cup, the Great American Beer Festival and a pre-conference trip to Los Angeles, I got two main questions. One was, "How is the AHA doing?" and the other was "What is Fluffy the Bear up to?" This issue of **Zymurgy** hopefully answers the first question. Fluffy came into the mudroom once this year to pick up the sack of birdseed we left there one night. When I found it between the house and car the next day, my guess was that my wife Jean had dropped it on the way in. It was either Fluffy or eight very strong squirrels. Fortunately she left the door on its hinges this year. Yes, Fluffy is a she. My neighbors saw Fluffy with a cub climbing down our big, old ponderosa pine in mid-October. I am hoping the prickly pear fruit leftovers from yesterday's juicing don't draw her for a return visit.

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

Roast, Toast (from page 29)

pine, spruce, or other softwoods, as they'll impart resinous, creosote flavors, resulting in—technically speaking—yucky beers.

As for wet or dry wood, I haven't yet seen the value of soaking my wood. It's just going to dry up and burn eventually, isn't it?

If you wish, you can heat things up a bit and let your malts toast while they smoke. Just stir the malt every now and then to keep it from scorching, and observe the waiting period noted above before using it to brew a batch.

Once you start roasting and smoking your own, you'll find that these techniques can be a valuable tool in your search to create unique, delicious, homebrewed beers. I wish you happy roasting, smoking, brewing, and of course, drinking!

Randy Mosher has been a homebrewer for seventeen years and a National Beer Judge for more than ten. Author of *The Brewer's Companion*, and the homebrew columnist for *All About Beer* magazine, he has lectured on beer and brewing around the country. In real life he does branding and packaging design, specializing in small breweries.

Home Malting (from page 33)

them to determine the best steep/rest schedule and germination conditions. Figure 1 shows some steep schedules that have proven successful with US-grown Harrington barley.

Now, here's my basic procedure for steeping using a Zap-Pap double-bucket style mashtun. The grain is placed in the bucket that has holes drilled in the bottom. This bucket is then placed into the "unholy" bucket. The grain is covered with cool water (50-55° F) and rinsed with a continuous overflow of water for about 15 minutes to remove debris. After the grain is clean enough for your tastes, it is left covered with cool water to steep. After an hour, the interior bucket is removed from the outer and set down. The oxygen-depleted steep water is dumped out and the wet grain is poured back and forth between the buckets several times to ensure thorough aeration. It may then be covered with fresh, cool water again.

This aeration should be performed every hour for the first few hours of the first wet steep. The moisture content of the grain can be assayed at the end of the steep and may

be as high as 30%. After the grain has been steeped, the water is drained off, the grain turned, and is then allowed to remain in the steep vessel without water for the first air rest.

During the air rest the grain continues to absorb the moisture adhering to it and germination begins. The respiring grain will generate a fair amount of heat and carbon dioxide and may become dry to the touch. Frequent turning and rinsing with cool water will keep the grain aerated and moist.

Be sure to smell, feel, and taste the grain during this process. The grain should not smell or taste sour or rancid at any time. It should taste clean and grainy. As germination begins it will take on an odor similar to cucumbers or unripe apples. This is your sign that everything is going well.

Near the end of steeping, the grain will show the first signs of germination, namely *chitting*. Chitting is when you see a small white spot or bump at the broad end of the barley kernel. This whitish structure is the rootlet beginning to emerge.

Once your grain achieves the target moisture level it is time to move on to germination.

Germination in traditional maltings occurred on a malting floor. At home, you are not likely to want to spread malt all over your house to allow it to germinate. Not only would this be of questionable sanitation, but the people you cohabit with may be justifiably annoyed, and your dog will find the malt delicious.

Shallow aluminum roasting pans or plastic bins (available at fine supermarkets and hardware stores everywhere) are ideal for germinating small quantities of grain. Transfer the moist grain to the malting pans in layers about 2" (5 cm) deep and watch the fun unfold.

During germination, the rootlets which began to emerge in the steep tanks grow rapidly. To keep them from tangling into an inseparable clump, the malt must be gently mixed and turned at least twice a day. Also, the grain must be misted with cool water frequently to maintain the desired moisture content. Finally, the temperature of the grain should be maintained in the range from 55-65° F (12.8-18.3° C).

The temperature during germination has a big effect on the quality of the malt. Those practicing floor malting tend to keep the

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grain cooler than their counterparts using modern methods. Although germination proceeds more rapidly at warmer temperatures, those who practice floor malting believe that cooler temperatures yield a malt of higher quality. Commercial maltsters must therefore strike a balance: they want to use the warmest temperature that will produce quality malt in order to speed production of the malt.

Speed and economics should not be a concern for the home maltster. Low temperatures help to ensure even moisture distribution within the seed and more even modification. Steeps should be kept around 50-55° F while the germination should also be kept as close to 55° F as possible. Frequent turning of the malt, keeping the germinating malt in a thin layer, misting with cool water, and keeping the malt in a cool room will all work to realize this goal. The germinating grain can be as much as 10° F warmer than the air temperature, even when spread in a thin layer, so it is important to keep track of the temperature of the grain rather than the air.

The embryonic plant, or *acospire*, grows using some of the energy stored in the starch of the endosperm to fuel its development. In wet grain, the acospire can be visualized beneath the husk on the dorsal side of the kernel. The amount of acospire growth is related to the degree to which the biochemical changes occur in the grain. These changes are referred to as *modification*.

The degree of acospire growth is related to the degree of modification. The longer the acospire, the more modified the malt. Maltsters usually halt germination when the acospire length is between 75-100% of the length of the malt.

To determine average acospire length, you will want to select a small handful of kernels and determine where the acospire is in each one. In damp germinating malt, you can usually see the acospire quite clearly through the barley husk. Ideally, what you will find is that most of the acospires are about the same length, but this is not always the case. At home you may find that your grains have widely differing acospire lengths. If you simply allow the slowest pieces to achieve acospire growth of 75 percent of total length, the

faster pieces will be overgrown. If the acospire is allowed to grow too much, it will consume a lot of the starchy endosperm to fuel its growth, substantially reducing the extract available to the brewer. As a result, it is best to examine a cross section and put a halt to germination when the average hits about 75 percent.

If you have a significant portion of the grains with short acospire growth, you may need to use a protein rest or even a decoction mash to maximize extract from the grain during mashing. Since almost all of today's commercial malts are well-modified and need no protein rests, producing your own under-modified malt is a way to more accurately replicate brewing techniques and beers of old.

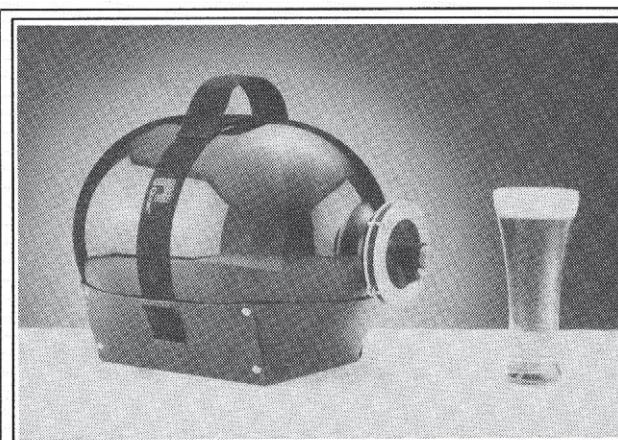
The amount of time it takes for the grain to become adequately modified is highly variable with a range from a few days to as much as a week. The grain should be inspected frequently to determine when it is time to halt germination—a step that is achieved by drying the grain.

Kilning conditions are determined by the type of malt that is being made and the

restrictions of your home kiln. Diastatic malts¹ such as pilsner and pale are dried to a moisture content of about 10% at relatively low temperature before being kilned off at 150-185° F. It is important that the malt be fairly dry before the temperature is raised to preserve the enzymes.

The most reliable way to do this at home is to simply dry the malt at warm room temperature until it is at a moisture content of about 10%. A space heater and household fan can be used to heat a room to 80-90° F and blow warm air across the green malt. Depending on the relative humidity, the malt will dry to 10% moisture in a day or so. Use the moisture determination assay to track moisture content.

Once the malt is at 10% moisture, it is ready to kiln at higher temperatures. The desired color of the malt determines the kilning temperature used. Most pilsner malts are kilned off at no higher than 185° F (85° C) for four to eight hours. Deeper color and toasted flavor is developed by kilning at higher temperatures for longer periods of time.



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Kilning the grain at too high a temperature for too long will reduce (or eliminate) its diastatic capacity. If the grain is still moist when kilned, the damage to diastatic enzymes will be even greater. The malt must be turned during drying and kilning to ensure even temperatures.

Of course the green malt does not need to be kilned at all. The lightest-colored malt achievable is simply dried at warm room temperature. This very pale malt is called *wind malt* or *sun malt* depending on your climate. While this practice was followed by early home brewers, it has a few shortcomings. First, you will probably not be able to dry the malt enough to ensure biological stability during storage. Thus unkilned malts should be used within a few weeks of production. Second, there is a flavor impact as much of the cucumber-like green malt character that is normally kilned off will remain in the wind malt. Whether or not this is desirable is up to the brewer that will use the malt.

Crystal malts are a bit more difficult to make. The wet malt is sealed in a container and heated to saccharification temperature

(145-155° F, 63-68° C) until it tastes sweet (1-4 hours). This saccharifies the starch in the endosperm in the exact manner that occurs in the mash tun. The sweet grain is then heated to higher temperature and allowed to dry by increasing ventilation. The higher the temperature, the deeper the color of the crystal malt. The interior of the grain will take on a glassy appearance and be hard to the tooth if all goes well. Thus far, I have not perfected a technique for making crystal malt at home. The crystal malts I produced were a bit withered looking, but tasted wonderful. Fresh crystal malt is something every brewer must experience!

Toasted malts, like Victory malt, and deeply roasted malts like chocolate and black malts are produced by kilning malt at higher temperatures—although care must be taken to ensure that you do not ignite or char the malt.

Munich-type malts are more difficult to produce at home because it is necessary to exercise relatively fine control over the kilning temperatures and moisture content of the malt. The manufacture of Munich-type

malts is closely related to that of crystal malts, but they are treated in a manner that preserves much of their diastatic ability.

The procedure for Munich malt outlined in Kunze's *Technology Brewing and Malting* explains that the green malt is dried to about 25% moisture at no more than 104° F (40° C) before being heated to 140-149° F (60-65° C) over a period of 9 hours. The malt is then cooled to 122° F (50° C) and allowed to dry to about 12% moisture. It is then heated back to temperatures up to 220° F (105° C) to develop the malty-tasting melanoidins and dry the malt to the final moisture content of about 3%.

ACROSPIRE REMOVAL

To avoid a bitter or astringent taste in your beer, dry, malted grain should undergo a final separation from the rootlets and acrospires. A quick home method for removing this chaff is to rub the malt around in a kitchen strainer, allowing the finer material to fall out. With larger amounts of malt, it may be quicker to fill an empty pillowcase with malt and bang that around on a hard surface until the chaff comes off, then use the strainer to separate it.

CONCLUSION

Malting at home is not quite as easy as brewing, but the experience and knowledge you will gain are priceless. Malt is the chief influence on beer color and a critical component of beer's flavor profile. Increasing your knowledge of malt by making it yourself can only make you a better brewer, and if prohibition should ever again rear its ugly head, you'll be that much better prepared!

The author gives many thanks to Roger Briess and Jim Basler at Briess Maltings for their support of his home-malting endeavors. They provided grain, knowledge, laboratory analyses, and chocolate-covered malt balls that were invaluable.

George de Piro is the head brewer of the C.H. Evans Brewing Company at the Albany Pump Station in New York, a former author for *Brewing Techniques* magazine and a past president of the Malted Barley Appreciation Society, Brooklyn's best homebrew club.

¹ Diastatic malt is one which contains the enzymes needed to convert starch into sugar during mashing.

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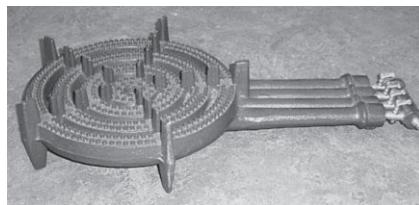


Get Lit with Lady Liberty Tap Handle

Hankscraft Motors, Inc./AJS & Associates, Inc. has created a first-of-its-kind tap handle to help New York brewery Rheingold re-introduce its product to the market. The Statue of Liberty tap handle was designed with the addition of a tip switch to light up the "flame" when a beer is poured. Creating the handle with the tip switch was a first for the company, but that was not the only challenge. "We had to make the torch handle look lifelike and not too bulky. So we had the hand professionally sculpted. We then used the sculpture to make a mold for the urethane," explained David Schield, the director of marketing and creative services at Hankscraft. "The other challenge was, while keeping the handle a realistic size, we also had to make it large enough to accommodate a battery pack which lights up a yellow LED inside the frosted flame when you pour a beer." The tap handle, which took several months to perfect, measures 13" high and 4" wide, and is colored the same green as the actual Statue of Liberty. www.hankscraft-motors.com

Canadian Beer Causes Soldier to Assault Cop?

An Army cook named Jason Dalga received a fine in Canada after causing a disturbance and assaulting a police officer. Dalga claimed that Canadian beer has a higher alcohol content than the American beer he was used to, and that was the reason he resisted arrest and assaulted the Canadian officer. He later pleaded guilty to causing the disturbance and was fined C\$375, according to Ontario police spokesman Mike Weaver.



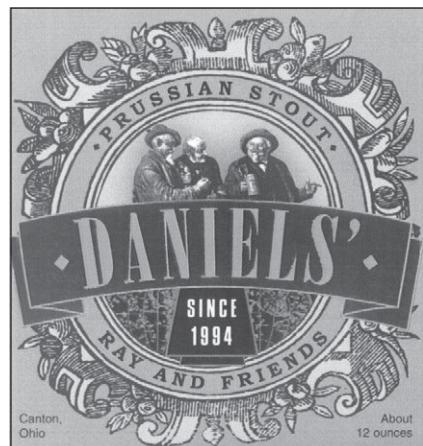
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Will The Real BoDean's Please Stand Up

Virginia-based BoDean's Sauces, a company that has been making barbecue sauces under that name since 1994, has a

bone to pick with the Boston Beer Company. The sauce producer, who is suing the makers of Samuel Adams beers over the BoDean's name, claims that Boston Beer has marketed its Twisted Tea as "appropriate for barbecues," according to the lawsuit filed Monday in U.S. District Court in Alexandria, VA. The suit also claims that the beer company's tea has similar packaging to that of BoDean's barbecue sauces. The music group The BoDeans has also sued Boston Beer over the name.



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President Signs Federal Alcohol Limit Bill

President Clinton has signed a bill designed to toughen the national standard for drunken driving, forcing states to lower their legal blood alcohol limit or lose millions of dollars in federal highway construction money. Clinton said that the lower limit of 0.08% will save 500 lives per year. "This is a very good day for the United States," Clinton said. He said the new standard is "the biggest step to toughen drunk driving laws and reduce alcohol-related crashes since a national minimum drinking age was established a generation ago."

Nineteen states and the District of Columbia currently have a 0.08 percent limit. Thirty-one states define drunken driving as 0.10 limit blood alcohol content or do not set a specific standard.

States that fail to adopt the 0.08 standard by 2004 would lose 2% of their highway money. The penalty would grow by an additional 2% each year up to 8% by 2007. States that adopt the standard by 2007 would be reimbursed for any lost money.

Says Jeff Becker of the Beer Institute, "The inclusion into the Transportation Appropriations bill of federal legislation mandating states to adopt a 0.08 blood alcohol content (BAC) standard for intoxication is disappointing, primarily because it is a step in the wrong direction and fails to focus on the real source of the drunk driving problem, namely the chronic, repeat offender, whose BAC is at or above 0.15."

The American Beverage Institute, an association of restaurant operators, called the new law "an attack on social drinkers." It said a 120-pound woman who drinks two 6-ounce glasses of wine over a two-hour period could face arrest and mandatory jail or loss of her license. "This law will arrest people who are not part of the drunk driving problem," said ABI spokesman John Doyle.

MADD (Mothers Against Drunk Drivers) contends a 170-pound man would have to have four drinks in an hour on an empty stomach, and a 137-pound woman three drinks in an hour, to reach 0.08.

Amahl Turczyn is the associate editor of Zymurgy magazine.

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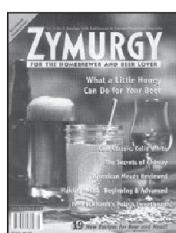
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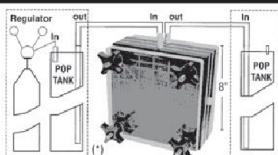
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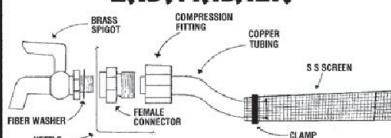
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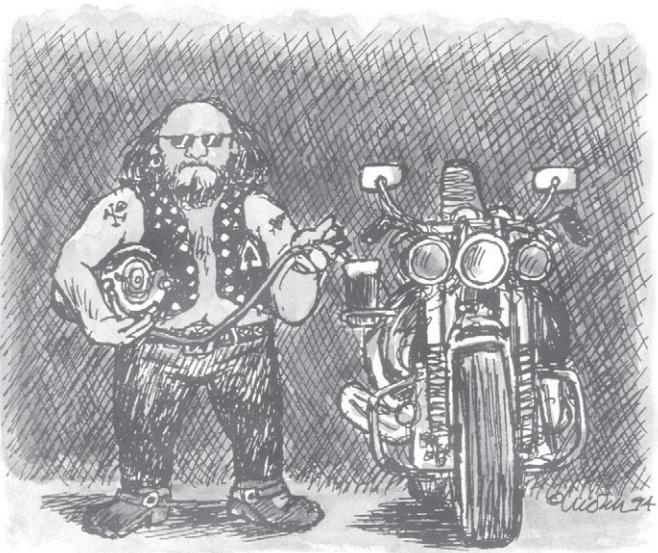
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