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Vol. 26 No. 1 January/February 2003 The Journal of the American Homebrewers Association

ZYMURGY

FOR THE HOMEBREWER AND BEER LOVER

Brewing by the Numbers

Recipe Formulation
Software Reviewed

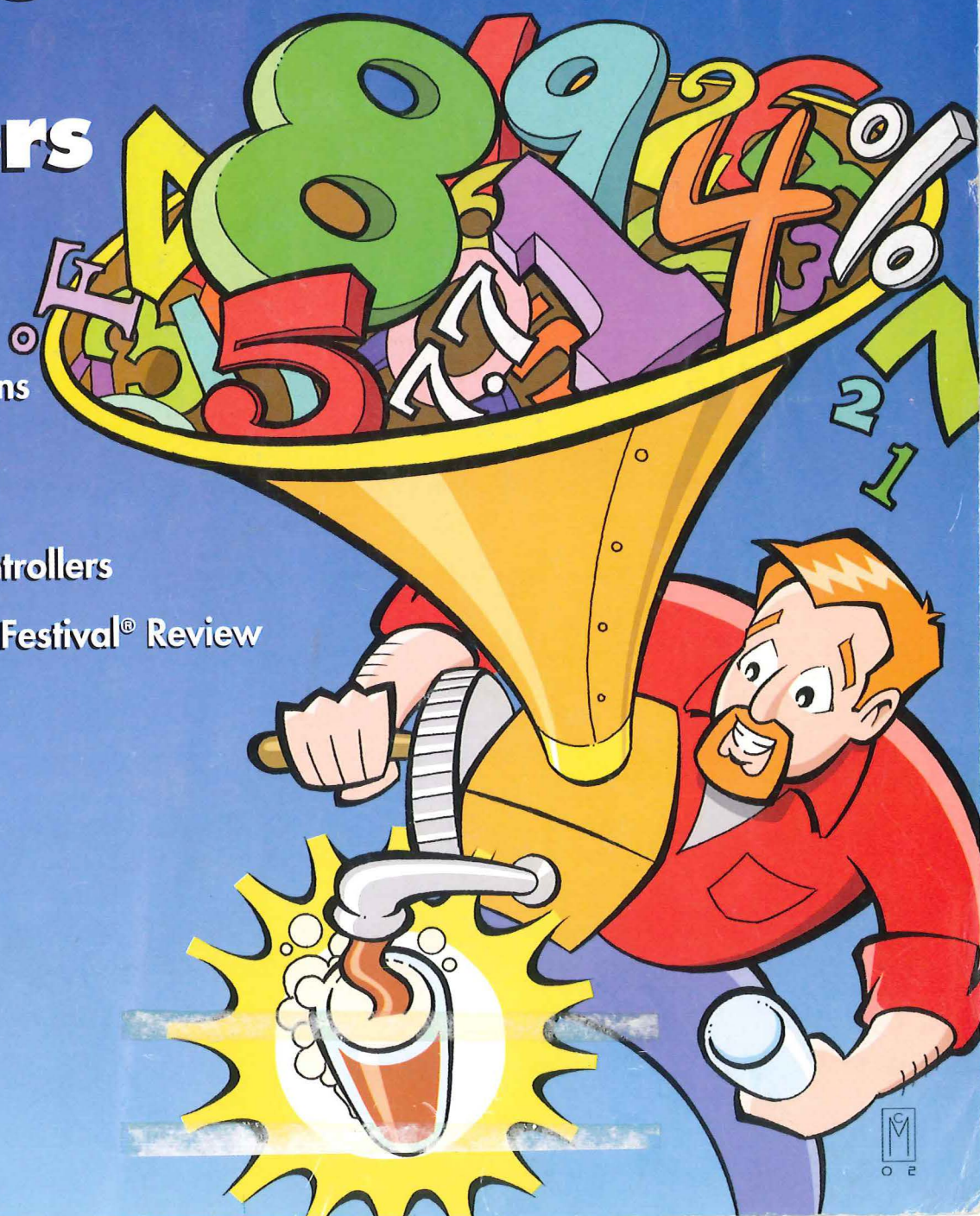
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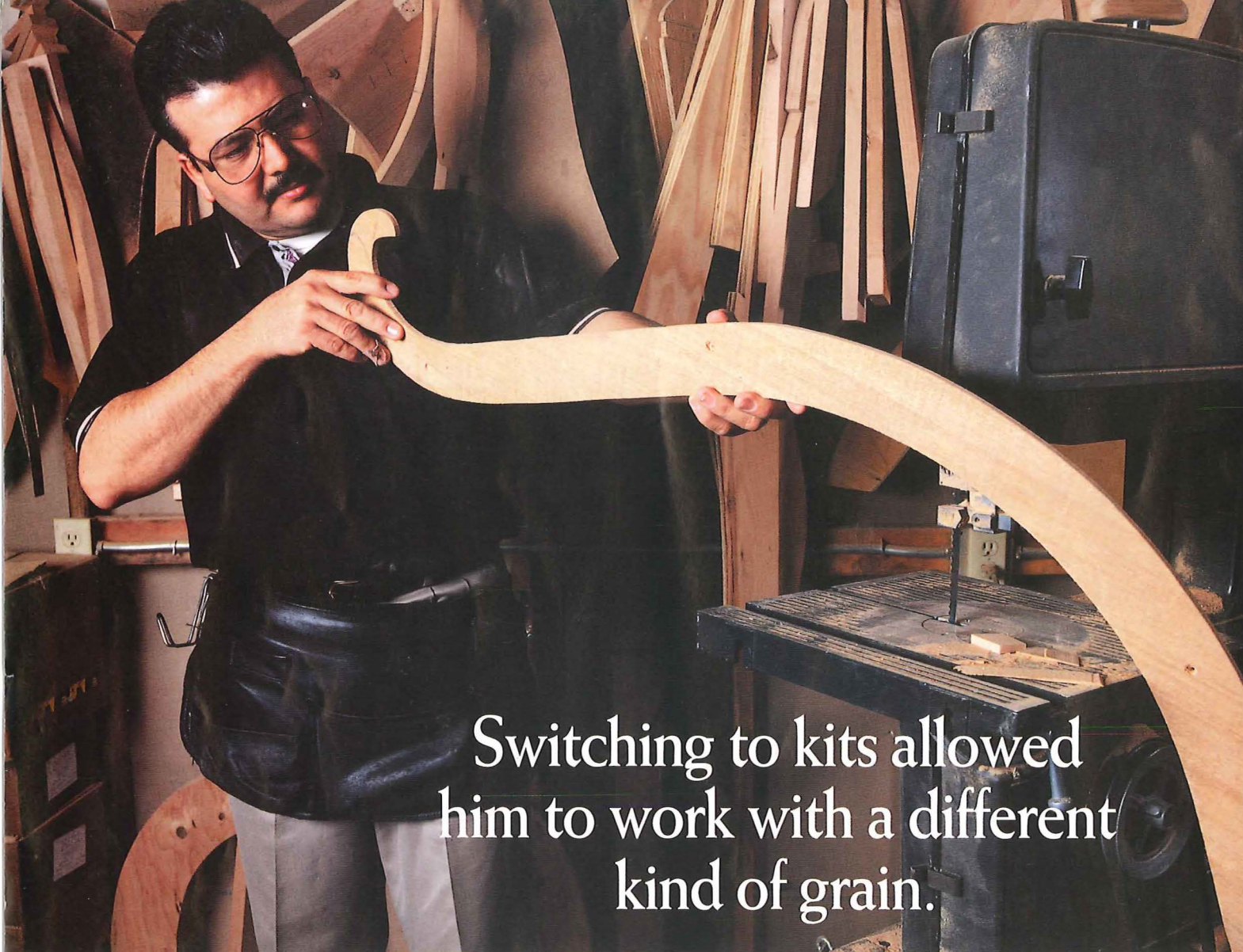
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A man with a mustache and glasses, wearing a dark shirt and a leather apron, is in a workshop filled with wood. He is holding a long, thin, curved piece of wood. In the background, there is a large piece of machinery, possibly a planer or a jointer.

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

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Richard Neill
"Weekend Telegraph" (April 99)

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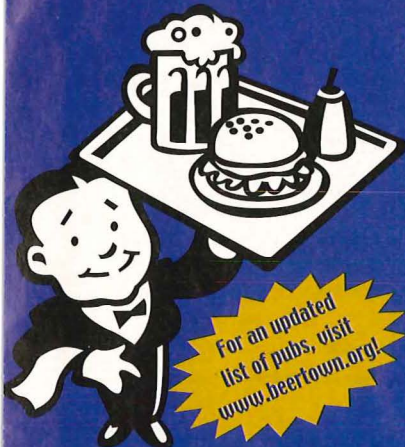
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ZYMURGY®

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

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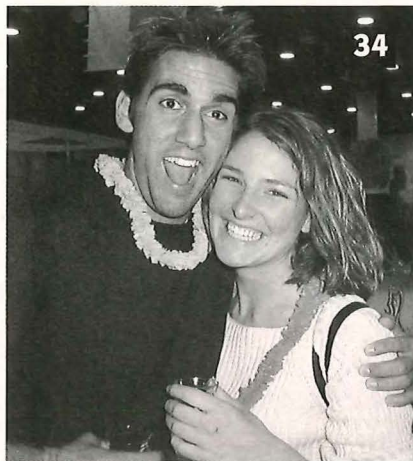
Vote for your favorites. Vote for the all-time greats. And then watch these pages for the results—and recipes for cloning the greats.

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BY PAUL GATZA

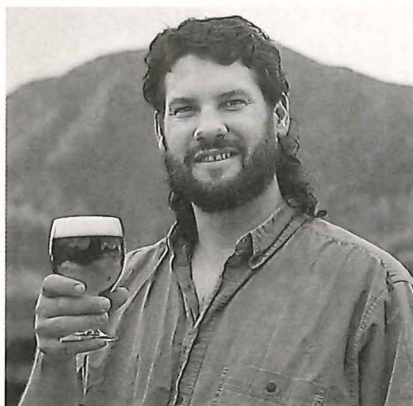
The National Homebrew Competition

Greetings, everyone. I hope your holidays have been as hoppy as mine. The holiday season is a time of socializing, fun and beverage sharing as we become closer as families and communities. Now that we are rolling into 2003, many brewers turn a share of their attention to the National Homebrew Competition.

Of course, several of the stronger styles, meads and complex beer styles may benefit from extended fermentation and conditioning periods; however, many of the entries in the ale and lager styles will be brewed in January, February and early March. Now is the time to finalize your recipes and schedule the optimum brewing date.

Gary Glass has done an outstanding job coordinating the first- and second-round judging sites for the National Homebrew Competition the past few years. Gary relies on extensive communication with first-round site directors, association staff and entrants in order to keep the hundreds of details sorted out. Gary's new challenge this year will be to address the growth of the competition. A few years ago, we eliminated a judging site due to declining entries. Now we are adding another site so that our current judges are not overtaxed. (This is a different form of beer taxation.) In addition, the California site will be judging specific categories in one of two judging locations to allow for more judges to participate.

The growth of the National Homebrew Competition can largely be attributed to the strength of clubs making concerted efforts to perform strongly on the national level. Clubs such as the Internet-based Brew Rats, the Maltose Falcons, the Oregon Brew Crew, the KC Bier Meisters and two-time reigning Homebrew Club of the Year, QUAFF, will be showing the quality of technical expertise of their beers. I would hope that the Urban Knaves of Grain and the Chicago Beer Soci-



ety will be entering in numbers again, so that we will have a greater chance of a strong local showing during the awards ceremony after the second round.

25th Annual National Homebrewers Conference

The National Homebrewers Conference is set for June 18 to 21, 2003 at the Holiday Inn in Rosemont, Ill. It is just a quick shuttle or Blue Line train from Chicago's O'Hare airport to the hotel, so the conference will be very accessible. Wednesday June 18 will feature an alternative transportation pub crawl featuring award-winning Chicago-area breweries, including Rock Bottom and the

rightfully famous Goose Island. Other events include the always-fun Beers Without Borders (Club Night), the Grand Banquet where the awards from competition are presented, and other annual AHA awards. The local conference committee, chaired by Jeff Sparrow, has redesigned our traditional schedule. The awards ceremony is moving to Friday night, and Saturday night will be a Beer and Food Festival that will hopefully expose a large group of the general public to how well certain beers pair with certain foods. The Chicago-area clubs, notably the Chicago Beer Society, have gained extensive experience over the years in producing high-quality events such as the



Cincinnati's Bloutarian Brewing League gathers with its ceremonial brewing kettle in preparation for a mass appearance at the upcoming National Homebrewers Conference.

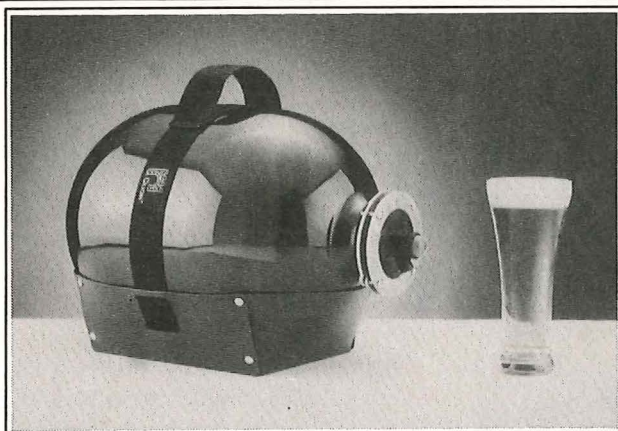
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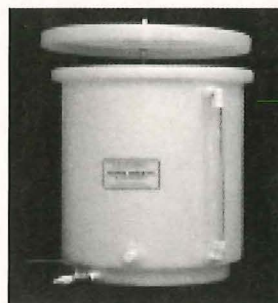
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Ironing out the Bugs in the Pub Discount Program

One of the areas we are working on in the pub discount program is on the education of restaurant staff that the program is in place at their establishment and what the specific details are. In a few restaurants, there has been a disconnect from what the restaurant management has agreed to and what the servers know about it. In November we distributed posters for each establishment intended to be posted at the time clock or other prominent staff area that helps put the program in front of server and management eyes even when it is not being taken advantage of several times per day. One issue we have heard from servers is the concern on any discounting program of people tipping on the revised amount rather than on the full, pre-discounted value. So please tip well, so that staff is on board and happy when they see an American Homebrewers Association member. And the more you use those cards, the more it is of value to the restaurants involved—so support your local brewery. Another stage of the program we are currently working on is to get finer beer bars on board.

Important Dates for 2003

April 9-18: National Homebrew Competition First Round entries due.

May 3: National Homebrew Day/AHA Big Brew

June 9-13: National Homebrew Competition Second Round entries due for first round advancers.

June 18-21: AHA National Homebrewers Conference

August 2: Mead Day

September 25-27: Great American Beer Festival

November 1: Teach a Friend to Homebrew Day

I look forward to sharing a homebrew with you in 2003.

Paul Gatz is the director of the American Homebrewers Association.



BY RAY DANIELS

Of Danish Handbeer and Dogma: How Relaxed is Your Brewing?

Every now and then something still surprises me. Let's face it, the brewing world, while wide and diverse, is a much smaller place than say banking or software engineering or even bicycle racing. I have had a number of years to get the lay of the land and I like to think that I know what is going on out there not only in the U.S., but in the world of homebrewing generally. That's why a recent e-mail from Gregg Glaser of *All About Beer* caught me by surprise. In it he related information regarding the current debate in Danish homebrewing (which they call "handbrewing") regarding the "Dogma" versus "High Tech" schools of brewing.

It seems that in Denmark, a school of simple and basic movie making (available light, no music, handheld cameras) has arisen to critical acclaim and taken on the moniker of "Dogma." Some of the handbrewers there have applied the idea to homebrewing as a contrast to the "High Tech" or geekified approach to making beer. Okay, so far mildly interesting. Then Gregg tells me that the voices they identify with these two approaches to brewing in Denmark are Charlie Papazian (Mr. Dogma) and myself (Dr. High Tech). THAT surprised me. And it got me to thinking . . .

The one word we all associate most with Charlie is "relax." And I'll be the first to admit that much of what I have written about brewing is not particularly relaxed, unless you find charts, graphs, equations and physics to be the soulful equivalent of a warm cup of hot cocoa. But in thinking about the way that I brew these days, I must say that it is remarkably casual and, indeed, relaxed. And then it occurred to me that I wasn't always that way and as I pondered that, I came up with a general theory about brewing and relaxing that I'd like to share with you.



A Little Learnin' is a Dangerous Thing

Knowledge is a powerful thing—but acquired in small doses, it can cause more problems than it solves. How many beginning homebrewers get the message that air is bad for beer, but miss the fact that aeration of the wort right before pitching the yeast is critically important? I certainly went down that track for a bit when I was first starting out. Sanitation is also essential to the production of good beer and while some remain too casual about this, others take it to the opposite extreme. I once knew a guy who spread sterile surgical drapes on the counter and donned rubber gloves before touching any brewing equipment. He probably held his breath too.

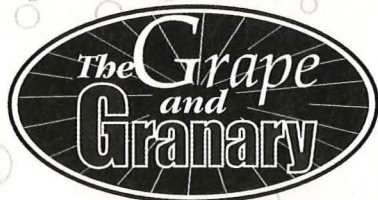
As a result of this "little knowledge" phenomenon, I regularly see homebrewers obsessing and stressing about one issue or another that they have heard about but don't completely understand. On the other hand, I know a lot of veteran brewers who possess extensive brewing knowledge and

they seem to be very relaxed about the whole thing. The difference here relates to extent of knowledge—some acquired via study, some from years of brewing and talking to other brewers. While at a certain point learning more about brewing science only serves to increase anxiety and concern, there is a point at which that trend reverses itself and increased knowledge actually makes you a more relaxed brewer.

Based upon this observation—and mindful of my newly acquired responsibilities as "Dr. High Tech"—I decided it was only right that I should develop a graphic model of the phenomenon for the benefit of others. Thus, I give you Figure 1: The Homebrew Knowledge-Effect Curve (see page 8). The curve graphs two quantities versus time. The first measure is "brewing knowledge" as acquired by brewing, reading and conversing with other brewers. For most people, it follows a predictable pattern based upon the total time they have dedicated to brewing. As with many things it begins with a lag phase where knowledge—although at first great compared to prior levels—is assimilated slowly and gradually. At some point, if a brewer is interested enough in brewing, he or she will enter a log phase of knowledge acquisition, gobbling up everything they can find, reconciling contradictory statements and generally seeking to achieve a comprehensive internalized perspective on brewing. Finally, once a certain level of knowledge is reached, the brewer enters a steady state where additional knowledge is assimilated only slowly. This final stage usually lasts for the rest of the individual's involvement with brewing.

At each point along this knowledge curve, we can define a quantity that is best expressed as the reciprocal or opposite of relaxed: $1/\text{relaxed}$. As this quantity increases, relaxation declines. Qualitatively, it

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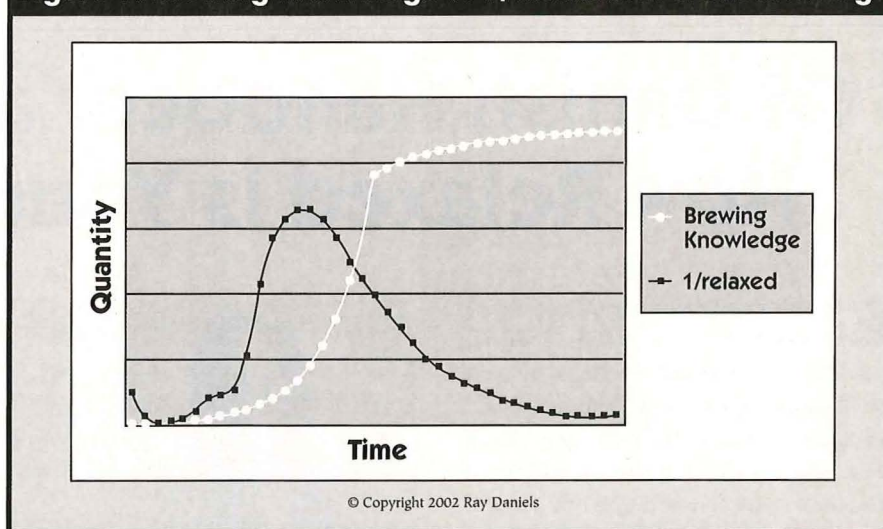
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starts from the base state of "relaxed" and moves on to "ill-at-ease" before ascending to "filled with trepidation" and peaking at "catatonic with concern."

As is clearly shown in the Homebrew Knowledge-Effect Curve, 1/relaxed varies substantially and non-linearly with brewing knowledge. Many homebrewers experience a level of anxiety regarding their first brew or two. This is natural when you undertake any new activity. With a first successful batch or two, the initial concern disappears and the most relaxed state of homebrewing may be achieved. As brewers continue to brew and acquire knowledge about brewing, they will have a failed batch or two and hear about a few things that concern them but which they do not understand. This raises 1/relaxed modestly, but does not render the brewer dysfunctional. Indeed some brewers exist for many years in this state and make very good beer owing to the extra vigilance that their elevated 1/relaxed state induces.

Brewers who continue to acquire knowledge eventually hit a zone where

Figure 1: Brewing Knowledge v. 1/Relaxed in Homebrewing



1/relaxed increases more rapidly than knowledge. Without a doubt, this is a "bad place." Anxiety is high and only seems to increase as more knowledge is acquired. Brewing seems impossibly complicated and the results, no matter how good, always seem to have a flaw. At this stage some homebrewers retire from brewing, preferring instead to drink and criticize others' beers. They see this as a refuge from the psychological strain of self-criticism that inevitably accompanies skill development in any endeavor. Fortunately, most brewers persist through this stage and pass the break point where 1/relaxed begins to decline again even as brewing knowledge continues its logarithmic climb. Eventually 1/relaxed returns to more normal and easily manageable levels where brewing can be enjoyed.

This final state is a "good place" and one where many homebrewers of all stripes reside. They have heard about all the various issues that relate to beer quality from mash pHs to hot side aeration and pitching rates to diacetyl rests. They may not have mastered all—or even any—of the science behind these issues. But for each, they have made their peace, having learned through experience combined with acquired knowledge what procedures work well for them and having developed a sense for when they can wing it and when they need to toe the line to make sure that they don't create a problem during the brew.

The Ultimate Relaxation

To my mind, great knowledge is the ultimate refuge of relaxation for a brewer. Every craftsman must possess an intimate knowledge of his or her ingredients, tools and processes. For some brewers this knowledge is largely theoretical or book learned; for others it is grounded wholly in experience. Nonetheless, once such mastery is achieved, the brewer can manipulate his or her tools with confidence and ease. Of course this doesn't mean that they always produce great results—everyone experiments and goofs from time to time. But it does mean that they know far better what to expect when they experiment: what variations and combinations work, which have a chance of success and which are just wild-assed, off-the-wall crapshoots.

So there you have it: the Homebrew Knowledge-Effect Curve. I hope seeing it laid out will help you to understand your place in the brewing knowledge lifecycle. When it does, I think you'll see that there are many good places to be in homebrewing and if you don't happen to be in one of them right now, you should be soon. So keep on brewing and reading and talking and thinking. Your next great beer is right around the corner.

Ray Daniels is a certifiably geeky homebrewer and lifetime brewing student who ponders the mysteries of brewing in his basement office and brewery in Chicago. ☺

Getting a Little More Wood on Your Beer

Dear Zymurgy,

I just wanted to add my two cents after the September/October 2002 issue. I found a great book for the maintenance and care of oak barrels, *Cooperage for Winemakers* by Schahinger and Rankine, from Ryan Publications. I got my copy from *Practical Winery and Vineyard* magazine for about \$20.

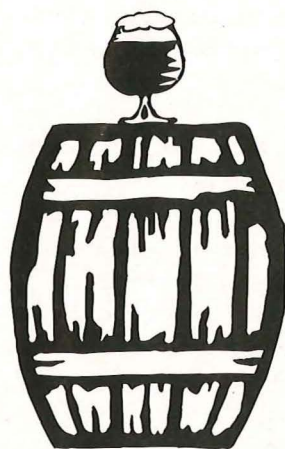
I bought a 15-gallon Limousin oak barrel from St. Pat's of Texas about two years ago for the purpose of making p-lambics (sic). Initially I filled it with hot water to swell the joints. It leaked slightly (this is normal) then tightened up nicely after a day. I built a cradle for it—out of some plywood and two-by-fours—that also accepts a hand truck underneath to move it if necessary. To avoid “pencil beer” I treated it with an alkaline solution to remove some to most of the oak tannins. After rinsing thoroughly, I then filled it with 5 gallons that had been fermenting in a plastic carboy with oak chips and 10 gallons of fresh wort inoculated with Wyeast's Lambic Blend. About eight months later I racked off 3 gallons and force carbonated it for my own enjoyment. Wow! That was a tasty beer! I recently racked another 3 gallons and will be brewing up 6 gallons of fresh wort to top off the barrel solera-style. I'll probably use the new brew to grow up a big yeast culture for a Wit before racking it into the barrel.

Thanks for all the great articles that have given me the guts to dive headfirst into these obscure brewing techniques.

Gus Rappold
Massapequa, N.Y.

Dear Gus,

Thanks for sharing your adventures in oak with us—sounds like you are having a great time with the beers and the barrel. We're not quite sure what a “p-lambic” is—maybe those



crazy Belgians have created a new style since the last Michael Jackson book . . .

—Editor

No More Burn and Brew

Dear Zymurgy,

In the September/October *Zymurgy* there was a story on Southwestern beer and spirits which detailed burning the spines off tunas of prickly pears. I have found a better method. Pick the prickly pear tunas and place them in a plastic bag in your freezer compartment until solid. Then, let them melt to liquid and run through a juicer separating the pulp, seeds and skins and you will find that there are no spines left. The acid in the juice and the freeze and thaw dissolves the spines. This trick is much easier than burning off the spines (easier on the finger and hands also).

Bob Kiniston
Better living thru better beer

Dear Bob,

This sounds like the treatment for one of our other favorite Southwestern foods, chiles, which benefit from a similar bag-and-freeze treatment—although in that case, roasting is involved before the freezing. We're not quite sure about that dissolving part, but it sounds like it would be worth a try no matter what happens

to the spines. Pulping up a bunch of prickly pears for brewing is a bit of a chore, so anything that might make it easier is worth trying out.

—Editor

Stop Wine-ing about Kits!

Dear Zymurgy,

The article on home winemaking, “From Grain to Grapes: Winemaking for Brewers,” by Alan Moen (July/August 2002) was very interesting and full of many useful tips and techniques on the subject. Fermentation is just that, fermentation. The similarities between beer and wine production allow each and every one of us to cross over and experiment with both, and we should.

However, since most of us in the USA (99 percent) do not live near wine country it is nearly impossible for us to obtain high quality grapes for wine production. Even those lucky few that live within that region probably do not receive the highest quality grapes anyway—they go to the wineries. I agree, to make good wine one must start with good fruit and nothing beats a good homemade wine (and homebrew too!). In order to make a homemade wine, most of us must resort to using grapes that are shipped in on refrigerated trucks. We must use a selection of grapes determined by the demographics of the destination (finding Pinot Noir grapes in my area is impossible since most of the local wine-makers are Italians). We usually see grapes that are at a minimum of five days old or more, lots of raisins, mold and bitter grapes. Would our West Coast buddies use these grapes? Not likely. Since most of us do not have access to high quality grapes our only resource is to use wine kits.

I strongly disagree with the author that great wines cannot be made from kits. Great wines can be made from today's kits. Many wines produced from kits have won awards in home winemaking competitions nationwide. While attending Brew King's wine con-

ference last April, I was informed that the 2001 Ohio State Fair Best of Show winner was made from a kit wine. Before attending the conference, I was extremely skeptical on the quality of wine produced from kits. However, I was pleasantly surprised by the superior quality of the wines that I tasted. Since then, I have made several kits and all have produced exceptional wines. Wine kits have come a very long way.

Technology borrowed from Gallo has allowed wine kit manufacturers to provide kits of superior quality. Gallo, the largest wine producer in the U.S., developed a process to concentrate wine must under vacuum and low temperature. The combination of vacuum and low temperature processing allows the must to retain its full flavor and aromatic qualities. Additionally, this process allows must to be stored for further use during the year since the facility cannot possibly ferment its entire harvest at one time. Gallo knows wine.

Thanks to new technologies, today's wine kits are a far cry from the canned concentrates of yesterday. High quality fresh fruit does make the best wine but when that

option is not available today's wine kits are not far behind.

Cheers,
Ed Seaman

Dear Ed,

Hear, hear! We believe that if you haven't made a great beer or wine using a can of extract or concentrate, then you can hardly call yourself an accomplished beer or wine maker.

—Editor

Father: More Milk Wine, Please

Dear Zymurgy,

Readers of Lars Hedbor's article in the September/October issue may be interested in knowing that there was a winery in Palmer, Alaska run by a retired priest and his brother that produced a milk wine. I was impressed with their product and so decided to try it myself. (See recipe sidebar.) I found the honey and milk combination had too strong a flavor, but unlike the commercial product, it fell clear. I have made several batches using sugar instead, but all have not fallen clear. I

Milk Wine

To one gallon of milk, add:

- 2.5 tsp of acid blend
- 2.5 pounds of sugar
- 1 tsp of yeast nutrient
- 1 packet of Champagne yeast

suggest taking the cheese out as soon as it is formed to prevent a yeast flavor and then let it dry out in cheesecloth. I found powdered milk is the easiest to use, but go lightly or the flavor may be too strong.

Sincerely,

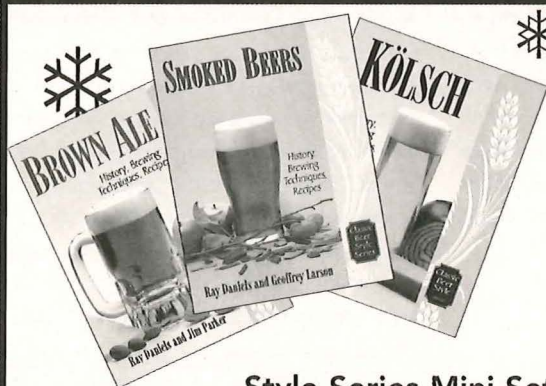
(Rev.) Ed Kline, CSB

Dear Reverend Kline,

Thanks for the blessing on fermented milk—a few of our readers actually thought we were kidding about that. As for the use of honey rather than sugar, we'll leave that to the discretion of the individual brewer: some folks like to keep company with the devil.

—Editor

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BY GARY GLASS

Brewing In the Land of the Midnight Sun

Anyone who has ever been fortunate enough to sample some Alaskan Smoked Porter knows there is some mighty fine brewing going on in Alaska. But have you ever wondered what it would be like to homebrew in the most untamed state in the Union? It can get pretty darn cold up there, as in -40° F cold (which amazingly enough is also -40° C!).

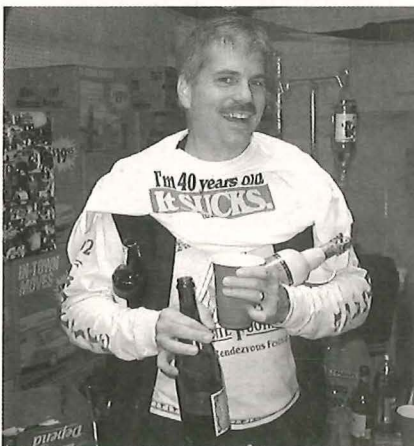
Though he continues to brew outside down to -30° F, AHA Liaison Scott Stihler of Fairbanks explains that he has to bring his brewing inside during the two weeks or so when it gets down around 40-below as propane remains a liquid at that temperature. At that time of year, Scott relates, the people of Fairbanks can entertain themselves by tossing cups of coffee into the air. Apparently the hot coffee never hits the ground—with the air so cold and dry, it evaporates almost instantly.

Go a few hundred miles south to Anchorage and you will find one of the most active clubs in the United States. The 140 members of the Great Northern Brewers Club (GNBC) don't just put on an annual competition, they put on *four* annual competitions. These include the Fur Rendezvous in February, the Snow Goose Break Up in April, the Alaska State Fair Competition in August and the Humpy's Big Fish in December. This year the club has added a side competition to the Humpy's Big Fish: the Great Alaska Vegetable Beer Challenge, open to GNBC members and requiring that entries be brewed with Alaskan grown vegetables.

Club members also volunteer to help with the Winter Beer & Barleywine Festival put on by Humpy's Great Alaskan Alehouse each January. This festival has drawn beer luminaries such as Michael Jackson and Charlie Papazian in addition to the 3,500 attendees, 40-plus breweries and 175 dif-



The Great Northern Brewers. First row (from left to right): Rick Levinson, Rick Rogers and Gary Klopfer. Top row (left to right): Richard Girard, Bruce Mills, Jim Roberts, Rich Tomory and Mike Hartman.



Former Great Northern president Steve Schmitt, just before dropping into the wheelchair brought in for his 40th birthday.

ferent beers. The club participates in Big Brew each year and this past year managed to top all Big Brew sites by brewing up a huge 365 gallons! The water necessary to chill that much homebrew turned host Rich Tomory's lawn into a swamp.

Their brewing isn't too shabby either. In the 2002 National Homebrew Competition, club members took 17 ribbons in the first round, and the club's Pete and Aimee Devaris each took a gold medal in the second round. Mark Ryan has placed twice in AHA Club-Only competitions. The Great Northern Brewers managed to place an impressive eighth in the 2001-2002 AHA Homebrew Club of the Year standings, and are planning to intensify their efforts to bring the trophy to Anchorage in 2003.

These aren't your average, everyday homebrewers, though. Those northern climes—days without sun and nights without stars—must have some kind of warping effect upon people up there. According to GNBC president Breck Tosevin, club members make some odd brews, among them beers made with birch syrup and what Breck could only describe as "strange smoked beers."

When former club president Steve Schmitt turned 40, the club was there to help welcome him to middle age. Steve was given the opportunity to rest his weary bones in a wheelchair complete with a 40-ounce I.V. of Colt 45. All those 40 and over

2002-2003 Homebrew Club of the Year Standings

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

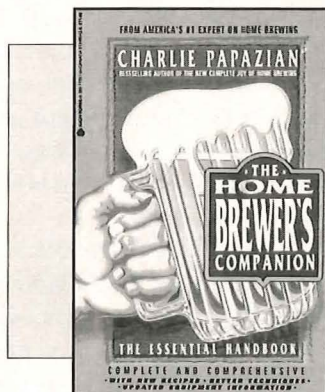
attending the party joined Steve in donning Depends adult diapers over their pants—you know, just in case. Every year, the Fur Rendezvous Competition includes a group costume contest. Some GNBCers participated in a costume entitled “Alaska’s Very Natural Pipeline” in which the group was joined by tubing inserted into their...well, you get the picture.

Another former club president, Jim Roberts, runs a weekly column in the *Anchorage Press*, a free weekly paper, called

Dr. Fermento. The columns appear with pictures of Dr. Fermento garbed in a white lab coat with round, dark-rimmed glasses and hair standing straight up, reminiscent of Johnny Rotten of the Sex Pistols. Dr. Fermento’s words of beer wisdom to the people of Anchorage include statements such as his description of Anheuser-Busch’s new low-carb offering, Michelob Ultra, “True, it’s crisp and lively—but so is club soda.” In another episode, Dr. Fermento describes a certain Belgian Ale as a cure for hair loss in gnomes.

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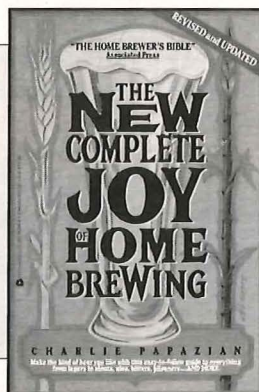
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Strong Belgian Ale Club-Only Competition

The AHA thanks Mike Moranz and the Minnesota Home Brewers Association of Minneapolis, Minn. for hosting the Strong Belgian Ale Club-Only Competition October 5 and 12, 2002. This was the second of six competitions in the August to May 2002-2003 cycle with points going toward the Homebrew Club of the Year trophy. Points are awarded on a 12-8-4 basis for first, second and third place in the club-only competitions. First, second and third in the first and second rounds of the AHA National Homebrew Competition earn points on a 6-4-2 basis. The club whose members have amassed the most points over the year will be crowned the Homebrew Club of the Year at the AHA National Homebrewers Conference in Chicago June 19-21, 2003.

Of the 37 entries the winners were:

First Place

Victor Perrotti of Norfolk, Va., representing the Hampton Roads Brewing and Beer Tasting Society

Second Place

Mark Ryan of Anchorage, Alaska, representing the Great Northern Brewers

Third Place

Al Boyce of Minneapolis, Minn., representing the Minnesota Home Brewers Association

Marc Hayden of the Strange Brew club in Newberg, Ore., took Honorable Mention.

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

You can check out Dr. Fermento’s columns online at www.anchoragepress.com.

GNBC member Tim Hiltz runs a column in the club newsletter entitled “Ask Foamy!” In one edition Foamy is asked questions regarding a wine cooler-swilling, IQ 50 girlfriend. In another, Foamy is questioned about bruises on the forehead and knees resulting from drinking cheap beer (Foamy astutely points out that the bruises are the result of passing out). While I have come to doubt the veracity of the questions posed to Foamy in the GNBC newsletters, I’ve always gotten a good laugh out of them.

Bitter & English Pale Ales AHA Club-Only Competition

The January/February AHA Club-Only Competition is Bitter & English Pale Ales. The competition will be hosted by Leo Vitt and the Minnesota Timberworts of Rochester, Minn.

The style for the competition is Bitter & English Pale Ales, BJCP Category 4. One entry of two bottles is accepted per AHA registered homebrew club. Entries require a \$5 check made out to AHA and an entry/recipe form and bottle ID forms. More information on the club-only competitions and forms are available at www.beertown.org/AHA/Clubs/clubcomp.htm. Please send your entry to:

AHA COC
James White
Lakeview Technologies
3535 40th Ave NW #200
Rochester, MN 55901

Entries are due by January 20, 2003. Judging is slated for January 25, 2003. E-mail for questions or those interested in judging is lvitt4@yahoo.com.

The club is involved in a number of activities beyond just competitions. Back in the late-1970s, the club's founding president, Pat Oldenburg, went down to Juneau to lobby for the legalization of homebrewing in Alaska. Thanks to her efforts, Alaskans are free to brew at home. The club also runs an annual Beer Judge Certification Program course and exam. Around a quarter of the 140 members are already BJCP judges, five or six of which are national ranked judges. The club conducted a Belgian Yeast Experiment for *Zymurgy* that ran in the November/December 2001 issue. Every year they have a summer campout and a winter retreat. The halibut charter is not recommended for those with weak stomachs, but anyone who isn't prone to seasickness can enjoy a day of fishing and beer drinking on a chartered fishing boat. In addition, the club has taken over the theater at the Moose's Tooth Brewing Company for movie nights featuring *Blazing Saddles* and *The Adventures of Buckaroo Banzai Across the 8th Dimension*.

2003 AHA Club-Only Competition Styles

Month	Style or Name	Cat.#	Host
Jan/Feb	Bitter & English Pale Ale	4	Minnesota Timberworts
Mar/Apr	Brown Ale	10	Prairie Homebrewing Companions
May	English & Scottish Strong Ale	11	Rillito Creek Brew Club
August	European Pale Lager	2	Foam on the Range
Sept/Oct	Specialty/Experimental/Historical Beers	24	Colonial Ale Smiths & Keggers
Nov/Dec	Koelsch & Altbier	8	Pacific Gravity



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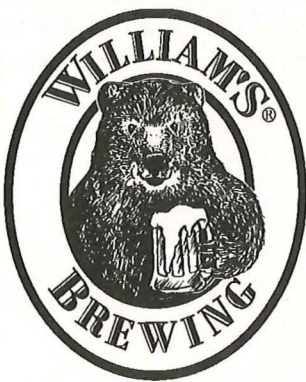
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Getting back to Fairbanks, this town of 33,000 is home to the Zymurgist Borealis homebrew club. Here is a club that is pretty much on the opposite end of the spectrum of the Great Northern Brewers. They do not have membership dues, they do not have officers—well, except for the club president, Roger Penrod, who was elected for life back in 1991 when the club was founded—and they do not even have club meetings. The 20 or so club members get together for Big Brew in May, a picnic held around the Autumn Equinox, and for their annual competition, the E.T. Barnette Homebrew Competition held in July. This competition, run by Scott Stihler and his wife Chérie (aka the “prize goddess”) with the help of the Silver Gulch Brewing and Bottling Co., consistently attracts the highest quality entries of any of the Alaskan competitions. E.T. Barnette also draws many out of state entries—nearly 50 percent of the total—despite the high cost of shipping entries to Alaska. The reason for this is the rather unusual best of show prize of \$500 cash!

Even though the club isn't all that active, that does not mean the members are inactive. Club member Clif Moore was so into his brewing that he started malting his own barley back in 1997. Clif takes his malting seriously, maybe *too* seriously: he expects to malt somewhere between 10 and 20 tons of barley in the next year. He currently already has more than 20 tons of barley waiting to be malted—perhaps this hobby has gotten a bit out of control. Clif hopes to start selling Alaskan-grown malted barley to breweries throughout the state. We wish Clif the best of luck in turning his malting hobby into a serious business. You can check out pictures of Clif's giant scale home malting process at www.alaskamalt.com/.

By the time this issue hits your mailbox, the GNBC Fur Rendezvous Competition will be rapidly approaching. The entry deadline is February 8, 2003 and the entry fee is \$4. For more info, check out the AHA homebrew calendar on www.beertown.org or go to the GNBC site at home.core.com.net/~homebrew/.

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

www.bacchus-barleycorn.com

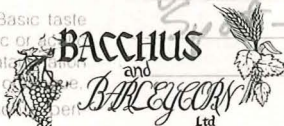
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BY OUR READERS

Kim Chee Whiz Beer

Dear Professor,

From the grind to the quaff, brewing is quite an endeavor. I'm fairly new to this stuff, and have had many successes and a few good tries at brewing a variety of fermented beverages. My question centers on the use of organisms other than the familiar *Saccharomyces* yeast to ferment worts.

I like the ease of a packet of dry yeast just as much as the next brewer, but the uniqueness of working with other species has proved too interesting to ignore. *Lactobacillus*, the "bad guy" in many breweries, is useful for its delightful sour complement to the bitter/malt profile in some beers. It also provides lactic acid as a natural preservative and health tonic. Lacto-fermented foods such as sauerkraut, yogurt, Kim chi, etc. are well known for their health giving properties and their contribution to the natural flora and fauna of our digestive systems. The same must be true for beers fermented with these lacto-bacteria and other creatures.

I wonder, though, in beers such as Berliner Weisse and lambic, how we can know the alcohol content. Since these organisms produce lactic acid and other compounds besides alcohol, how does this affect the final gravity? Does lactic acid have the same specific gravity as alcohol and, if not, how can one reliably calculate alcohol content of beers fermented with these other organisms using the typical starting gravity minus final gravity formula? I can't find an answer anywhere. On a final note, what is the hop utilization percentage when the hops are merely steeped for extended periods (one hour or more) in the wort after removing from heat? I know it must be fairly significant, because on a few occasions I have left the finish hops to steep this long and it has seemed to contribute some bitterness.

Having fun with a brewpot in Oregon,
Austen Ferris

Dear Austen,

Nice challenging questions. You're trying my skills. I don't know exactly how much the formation of lactic acid decreases any alcohol content in beer. The degree of acidity that may be produced in so many "sour style" ales is probably low enough that it really does not significantly impact the percentage of alcohol in the final product. I imagine that if you start producing amounts of lactic acid that significantly decrease the alcohol content, then you have rendered a beer that is essentially not drinkable. So among the 10,000 or so Zymurgy readers there must be someone out there who knows whether I'm on track or not. Let's hear from you.

Steeping hops after the heat has been turned off will contribute to bitterness, but it may not be isomerized hop bitterness. Isomerized hop bitterness is what you get when boil-

ing for extended periods. Oils and resins also have hop flavors that migrate out of the hop, especially during steeping as you have suggested. Some of these hop flavors have bitter flavors with grassy, resin-like characters. They may be desirable or undesirable depending on your personal taste preferences.

Lactically yours,
The Professor, Hb.D.

Watermelon Mead

Dear Professor,

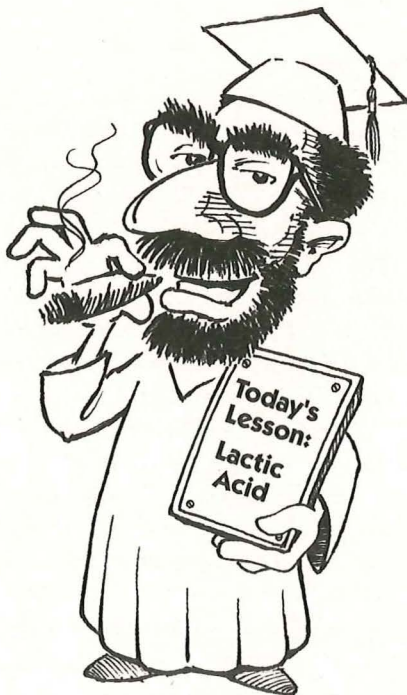
I love making meads. Every summer I take time off from making beer; too hot to be standing around a burner for long periods of time. However, I do make a couple of meads: short boil and few ingredients. My question is about watermelon. For a while now I have wanted to make a watermelon mead. I would rather use real watermelon than some type of extract. Can you help me figure out how to use it, if it can be done at all? I know watermelon juice is mucilaginous and I would rather not have watermelon Jell-O in my bottles.

Sincerely,
Tim Harris
Winston-Salem, N.C.


Hiya Tim,

I've had plenty of succulent, sweet, luscious watermelon juice dribble down my chin and I never considered the juice to be mucilaginous. Perhaps you're confusing this with prickly pear cactus? Anyway, my simple suggestion would be to simply juice the watermelon or process it in a food processor or blender, adding the juice and pulp at the end of the boil. Let it steep for 10 minutes without any additional heat. And keep on making mead.


Keeping the flies away with watermelon,
The Professor, Hb.D.



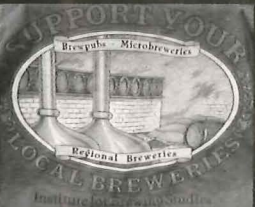
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Temperature Gradients

Dear Professor,

I recently switched to a stainless steel keg mashing system so that I could have more control over my mash temperatures. I am using a Fluke thermometer with submersion probe (which is a very accurate instrument) and am reading a 10-degree temperature differential or more. In the final rest stage near the sides of the tun where the stainless steel retains heat very well I am reading 165° F (74° C), while in the center of the tun above my false bottom I'll read a temperature of 145° F (63° C). I have no idea what temperature to go on. Stirring does not help either because the sides retain so much heat that it just reheats the mash to the same temperature. I am theorizing that the warmer parts of the tun are converting very well, while the cooler parts aren't converting at all and when mixed all together everything turned out fine.

How can I obtain a number that accurately represents different places and levels of the tun that I can rely on for conversion calculations? I want to obtain maximum efficiency and it seems that I switched to a keg to do this and it's heading me in the opposite direction.

Very frustrated,
 James Christopher
 Denver, Colo.

Dear James,

Now let me get this straight. You are mashing in a stainless steel vessel. I'm assuming you are not applying any heat once the mash is in the vessel. The surrounding air is cooler than the mash (I hope I'm right about this, otherwise I give up right now). Things seem bass ackwards to me. Normally you'd be losing heat to the outside and the edges of the mash vessel would be cooler as you get heat loss on the perimeter.

I'm either totally lost on this one or I might dare ask the question: Where in the center are you measuring the temperature? Near the surface? Near the bottom? If either one of these, then there may be a reason for accelerated heat loss near the surface—which is very likely if you are losing vapor to cooler air, and losing heat from the bottom if you are resting on a cool surface.

Otherwise stumped, I'd suggest you insulate the mash tun, sides, top and bottom. Rest the mash vessel on a piece of Styrofoam or wood. Wrap a befty blanket around the sides (or fit wood insulation around the vessel). And surely insulate the lid from the environment. This should stabilize the temperature throughout.

*A little unstable I am,
 The Professor, Hb.D.*

Fine Filtration . . . Not!

Hey Prof.,

I have been brewing for eight years now, and have roughly 48 brews under my belt. (I didn't drink all that myself.) **Zymurgy** has in the past had articles on kegging beer, but it would be great to have more education on how to do it professionally.

Here is the example: I started to filter down to one micron. I know I have to drop the temp to get the cold haze out. But do I then go back to room temperature to get the corn sugar in for carbonation? Then there is the pressure of the CO₂! What is the percentage of homebrewers in North America that use kegs?

Thanks,
 Jim Peterson
 Santa Barbara, Calif.

Whoaaaaa Jimbo,

Hold your horses. Don't touch that filter. Don't make a move or it's curtains. If you want to do a one micron or less filter, you're going to be filtering out a significant amount of yeast—and perhaps all of it. And if you add corn sugar after filtering you will end up making sweeter beer, because you won't have enough yeast to condition under normal homebrewing conditions. But then you are surely one step ahead of this old professor and had planned to add more yeast after filtering. Right? But then what was the purpose of filtering?

Lots of us North Americanos are using kegs, I'm certain of that. My preference is to chill the keg after it has naturally carbonated and let a few weeks precipitate haze and yeast so it settles out, providing me with a beer that's clear enough.

*Hazy. Hazy about you, I'm hazy...
 The Professor, Hb.D.*

Pooped Out Yeast

Dear Professor,

I have lately been having a problem with fermentations that is troublesome and on which I would like to ask your opinion. When I add the yeast starter, fermentation usually takes off in 12 to 20 hours and goes very vigorously for a couple of days. Then it slows to a crawl, often leading to two-plus week fermentations. If after about a week I check the gravity, it is typically high. For example, a beer I am now working on started at 1.064 and was expected to finish at 1.010 to 1.014. After a week, it was down only to 1.034. Many of my fermentations have been stopping altogether in the mid 1.020s after one of these very fast then very slow fermentations.

I have considered several possibilities (other than the "my yeast hates me and does this for spite" hypothesis). One is that my mash (single infusion mash at 152 to 155 degrees) has generated higher levels of complex oligosaccharides that are acted upon by the yeast slowly if at all, raising the gravity but not contributing to the fermentation. A second hypothesis is that since my carboys are 5-gallon, they are very full and I use a blowover tube for the first few days. It looks to me like the krausen carries yeast out of the beer and into the blowover waste. I had always supposed these to be dead cells but since I am making ales, it would make sense to me that the live and active top yeast could get blown over in this way, reducing the amount of yeast in the fermenter. Or is there some other explanation I have overlooked? I would appreciate your thoughts.

Thanks,
Bill (Wild Willy) Winter

Dear Wild Willy,

My bet is that you haven't aerated your wort well enough. You have all the symptoms of this ill effect. The yeast doesn't have enough oxygen uptake at the start. They go gangbusters at first, but then simply poop out for lack of energy reserves. I think shaking that carboy or aerating in other ways needs to be part of your regime. That should solve your problem.

*Whole lot of shaking needs to be goin' on,
The Professor, Hb.D.*

Gott Beer?

Dear Professor,

I'm interested in adding a mash tun to my brewery and have been considering using the typical 5- to 10-gallon (like Igloo or Gott/Rubermid) beverage coolers fitted with a false bottom for lautering/sparging. The concern I have is that none of these coolers are recommended by the manufacture's for liquids as hot as 170° F (77° C). I'm not sure whether their reservations are based upon some physical problem that these coolers have with hot liquids or if there is a potential health problem associated with such hot liquids in these plastic vessels. My concern is that hot liquids may leach plasticizers from the cooler into my wort. Please advise.

Wayne Borth
Homebrewers On Pacific Shores (HOPS)
Honolulu, Hawaii

Dear Wayne,

The risk of leaching harmful plasticizers into food at temperatures greater than 170° F (77° C) would be a risk too great to take for a corporation manufacturing food-grade coolers. That's what I think. I also think what they are referring to is some structural deformity or damage at higher temperatures. As products are made cheaper and cheaper you can imagine that they don't hold up as well beyond the limits of the temperatures they recommend.

Try it and see. If it melts down, it's just an indication that you might need to look at alternatives, though you shouldn't have to go over 167° F (75° C) to "mash out." Sprinkling 170° F (77° C) water on the cooler grain bed will stabilize below the 170° F threshold you are indicating.

*Not a leach,
The Professor, Hb.D*

Sparkling Honey Fermentations

Dear Professor,

I've made two sparkling meads with no problems, but I am wondering if there is an upper limit on finish gravity that one needs to worry about when turning a mead into a sparkling mead via natural means, i.e. adding corn sugar. The ones I



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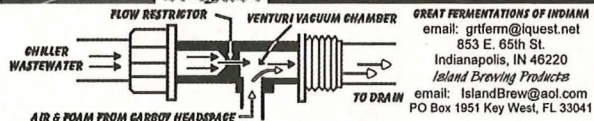
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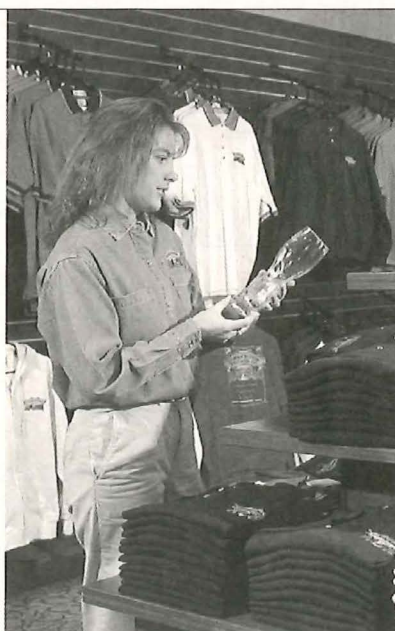
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did were from your book and the FG was below zero when I bottled. Any advice, oh great one?

Thanks much,
John Curtis
Las Vegas, Nev.

Dear John,

Mead and honey have a fermentation mind of their own. When it's done it's done. That's all I can say and be sure of. But when it's not done, it may appear to be done, and that is deceiving. Final gravities below 1.000 are typical for sparkling meads with original gravities below 1.100. My limited experience seems to indicate that most meads over 1.100 will drop at least 100 points, that is 0.100 points of gravity or 25° Balling/Plato before they begin to think about pooping out. So a 1.120 mead might typically go down to about 1.020. Anything higher is something to take caution with as the corn sugar you add is easily fermented, while the remaining honey sugars could continue to ferment over a longer period of time. Honey, as I said in the beginning, has a mind of its own. Don't worry. Use corn sugar in the amount appropriate for your batch size and it will carbonate just fine... especially if the FG was below 1.000.

The Professor is
Hb.D.

Film Exposure

Dear Michael,

I am an avid homebrewer living in Johannesburg, South Africa. In my limited home brewing experience it has occurred on several occasions that I end up with a white film covering my beer after primary fermentation. I use a plastic bucket for fermentation with an airlock in the lid, which seals completely. Sometimes the film on the top can be quite thick and almost looks like sour milk. Is this normal? Should I be concerned? I have bottled it on occasion and it tastes fine but it has also gone sour on me.

Your comments will be appreciated,
Athol Henwick

Dear Athol,

Michael Jackson received your question and passed it on to me for answering. This is a simple problem to diagnose and also fix. You have a combination of wild yeast and bacteria infecting your homebrew. If the plastic bucket is still in good shape and does not have any stains or scratches in it then you have a reasonable chance of disinfecting the surface with a weak chlorine bleach solution. Disinfect the lid and everything that ever comes in contact with the beer before and during fermentation. If you have another film attack, then get a new fermenter—it is beyond hope. Keeping your fermentation equipment clean and sanitized is your number one priority. After that brewing great beer is that much easier.

Squeaky clean,
The Professor, Hb.D.

Hot Fizzless Beer

Dear Professor,

Question, learned professor: I live in the metro Phoenix area and as you know it gets very hot here. I normally stop brewing in the summer months because I have no place to keep my brew except in my garage and it can get to 100° F (38° C). But this year I decided to try brewing a 5-gallon batch of Export Lager. I carbonated with sugar and after two weeks the brew is flat. Normally by this time it has created its "fizzzz." Could the heat have destroyed the carbonating process?

Help!
P.V. Baker

Dear P.V.

Temperatures over 100° F would never do much for the flavor of beer. I don't know if it killed your yeast, but you could drop a few grains of dried ale yeast into each bottle, recap and cool down the temp to below 75° F if you can. Wait a week and that should do it, unless there's something going on with leftover sanitizer in your bottles that may have killed all activity.

Hope that helps,
The Professor, Hb.D

Hop Tremors in the Bay Area

Dear Professor,

Here is a follow-up to your reply to Jon Bright on the subject of "Imperial IPAs." I don't know what Jon's friend was served, but the San Francisco Bay area is ground zero for the so-called double IPA craze. Our local, the Bistro in Hayward, actually held its second annual Double IPA Festival last February. There were no fewer than 16 "double IPAs" served, mostly from West Coast breweries (a real good time for a designated driver). According to information supplied by the brewers, these brews ranged from 7.5 to 9.7 percent abv (most in the 8s), with IBU levels of 75 to 132 (I'd be happy to e-mail you a list of the beers and specs, if you'd like).

I agree with you that the modern American barleywine is sort of an amped-up IPA, Sierra Nevada's Bigfoot perhaps being the benchmark of that style. However, there are some differences between West Coast barleywine and the average double IPA. Although double IPAs have approximately the same alcohol range (one of the most popular Bay Area DIPAs is usually about 10.2 percent abv; my wife once brewed a stunning one at 11.7 percent abv), most double IPAs have much less body, malt complexity and fruitiness than West Coast barleywines. My impression is that DIPAs are exceptionally well attenuated, because many of them really drink just like a "normal" IPA (until you stand up). One might guess that most DIPAs are brewed from less dextrinous wort than the average barleywine. As for hop levels, the hoppiest barleywines do not concede anything to DIPAs. I tried Bigfoot 2002 at the Bistro along with two of my favorite DIPAs and I'd have to say that it delivered every bit of the hop punch and then some. It also had significantly more complexity in the malt end than the DIPAs and more body.

Hoppy Daze to You,
John Wakabayashi

Dear John,
Thanks for the update.
The Professor, Hb.D.



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WHAT TO EXPECT WHEN YOU'RE EXTRACTING

Does the thought of calculating a grain bill for all-grain brewing make your head spin? How much grain should you use? Don't different grains have different yields? How do you decide?

The answer is a malt analysis sheet that you should be able to obtain from your homebrewing supply shop. These information sheets from the maltster describe the amount of extract that each lot of malt can yield. Unfortunately, calculating your OG from several malt analysis sheets is not as straightforward as for malt extract. When you target an OG with malt extract, it's as simple as multiplying the weight of the extract in pounds by its yield (36 gravity points per pound per gallon for liquid malt extract or 42/lb/gal for dry), and dividing by the recipe volume. For example, 6 pounds of liquid malt extract (36/lb/gal) for a 5-gallon batch equals an OG of $6 \times 36 / 5 = 43.2$ or 1.043. To calculate an OG from the yield information on a malt sheet, we will need to convert that information to potential gravity points and learn how to calculate an efficiency factor that tailors that yield to our own brewery. Once we understand malt yield and efficiency, we will be able to calculate a grain bill to hit any gravity.

Extract: Fine, Coarse, As-Is and Dry

While the concept of points per pound per gallon is easy to work with, a malt analysis sheet does not give the malt's yield in these units. Instead, what you will most likely see for North American and European malts is a number called "extract."

When a malting house analyzes a malt sample to determine its extract yield, it conducts a laboratory mash, sometimes known as a "Congress mash" (named for the European Brewing Congress, or EBC, of 1975 which first standardized the procedure). These days, both the U.S. and European brewing chemists use the same infusion procedure for this laboratory mash. The pro-

cedure mixes precise amounts of ground malt and distilled water to achieve a 45° C (113° F) rest. After 30 minutes, the mash temperature is raised 1° C (1.8° F) per minute until it reaches 70° C (158° F) where it is held for one hour. The resulting wort is weighed to determine the amount of soluble material extracted. The soluble extract is expressed as a percentage of the grain original weight.

So, "extract" tells the percent of grain weight that can be transferred to your wort as soluble extract. Simple enough—except that a given malt analysis may give extract in any one of four standards based on two possible grinds (fine or coarse) and two different moisture states (dry or as is). (See Figure 1) Before we can start to calculate a grain bill, we need to understand how these values are determined and the differences between them.

Fine Grind, Dry Basis (FGDB). This extract is considered the maximum possible soluble extract that the malt can yield when mashed. This is because the malt is ground more finely than it would be in normal brewing and the water weight is subtracted from the malt value in the calculations. Since moisture can vary between malts and between samples, this is the number you will most consistently see on an analysis as it corresponds to a malt that has been oven-dried to zero moisture.

Fine Grind, As-Is (FGAI). This measure is called "As-Is" because even properly kilned malt contains about 4 percent moisture by weight, although it can range from 2 to 10 percent. To compare different lots of malt with different moisture levels, the moisture content needs to be accounted for in the extract calculation. I will explain how to use these numbers in your OG calculations in a minute, but first let's look at the other extract parameters you may see.

Coarse Grind. Coarse grind represents a mill setting that is closer to what most breweries would use. The same mash method

By John Palmer



is used to determine a coarse grind, as-is (CGAI) extract and the moisture is measured separately to calculate the dry basis value. Most brewers consider the CGAI a more realistic number for gauging the extract potential of a malt, but it's still a laboratory value that very few professional breweries could attain in practice.

Coarse grind extract is not measured for most specialty malts due to the extra time and difficulty of filtering them (about two hours per sample). Since specialty malts usually represent only a small percentage of the grain bill, professional brewers are not as concerned about the yield of these malts. As a result, the standard parameter of FGDB is the value that is determined for specialty malts like caramel, chocolate and roast.

Fine/Coarse Difference. The F/C Difference value is simply the percent difference between the fine and coarse grind extract numbers. This value allows the brewer to quickly convert between the two parameters. For example, looking at the numbers for Munich malt in Table 1, the percent extract for coarse grind, dry basis, is 1.1 percent less than the percent extract fine grind, dry basis, as indicated. The F/C Difference also serves as an indicator of malt modification, although the soluble/total protein ratio is most often used. (See sidebar)

Hot Water Extract (HWE).

This parameter may be seen on malt analysis from the UK, where they utilize a single temperature infusion mash method that differs from the ASBC and EBC Congress mash methods. HWE (As-Is) is measured as liter-degrees/kilogram, and as a unit, it is equivalent to points/lb/gal (gallon-degrees/pound) when the metric conversion factors for volume and weight are applied. (Combined Factor: $HWE = 8.345 \times \text{points/lb/gal}$). However, the grind/mash procedures for HWE and percent extract differ enough that the measurements are not actually equivalent, even though they are close. The best analogy I can think of is trying to compare the power ratings of a race car to a farm tractor—power is power, but

the way it is expressed and utilized is different. That being said, if you get a malt sheet for Pale Ale malt with an HWE (As-Is) of 308 liter°/kg, the conversion of that number by 8.345 to 37 points/lb/gal is close enough for homebrewing purposes.

Converting Extract to Points Per Pound Per Gallon

In a Congress mash, each grain will yield a maximum amount of fermentable and non-fermentable sugars that is referred to as its percent extract or maximum yield. This number typically ranges from 60 to

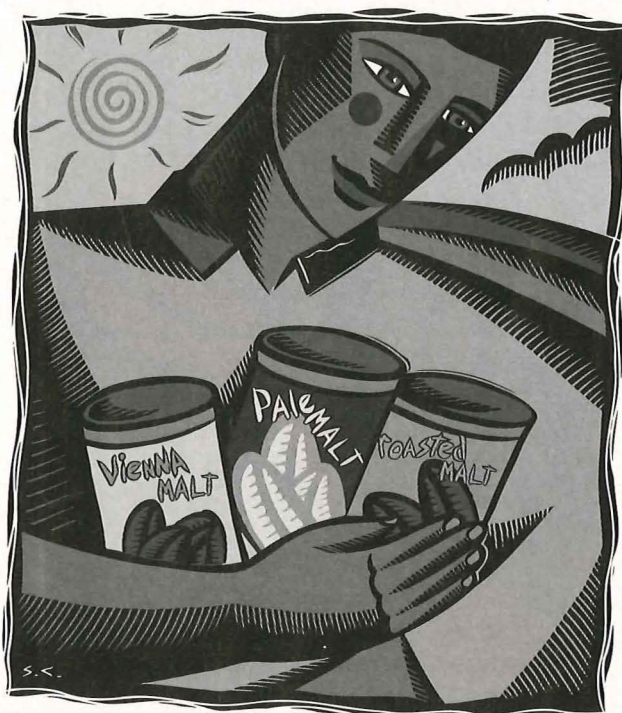
The reference for comparison is pure sugar (sucrose) because it yields 100 percent of its weight as soluble extract when dissolved in water. One pound of sugar will yield a specific gravity of 1.046 when dissolved in 1 gallon of water. To calculate the maximum yield for the malts and other adjuncts, the extract for each is multiplied by the reference number for sucrose: 46 points/pound/gallon (points/lb/gal).

For example, let's look at the 2 Row Lager Malt in Table 1. This base malt has an FGDB of 81.7 percent. So, if we know that sugar will yield 100 percent of its weight as soluble sugar and that it raises the gravity of the wort by 46 points/lb/gal, then the maximum increase in gravity we can expect from this malt, at 81.7 percent soluble extract, is 81.7 percent of 46 or 37 points/lb/gal.

The extract data for several malts are listed in Table 1. You may be wondering how useful the maximum yield number of a malt can be if you can never expect to hit it. The answer is to apply an efficiency factor to the maximum yield and derive a number we will usually achieve—a typical yield.

Extract Efficiency and Typical Yield

The maximum yield is just that, a value you might get if all the mash variables (e.g. pH, temperature, time, viscosity, grind, phase of the moon, etc.) lined up and 100 percent of the starches were converted to sugars. But even commercial brewers don't get that value from their mashes. Most brewers will approach 80 to 90 percent of the maximum yield (i.e., 90 percent of a malt's extract of 81.7 percent). This percentage is referred to as a brewer's extract efficiency and is the ratio of his yield to the malt's maximum yield (FGAI). Every brewery is unique and your



80 percent by weight, with some wheat malts hitting as high as 85 percent. For example, 80 percent extract means that 80 percent of the malt's weight is soluble in the laboratory mash. (The other 20 percent represents the husk and insoluble material.) In the real world, homebrewers will never hit this target, but it is useful for comparison.

Figure 1: Four Methods for Extract Representation

	Dry Basis	As-Is
Fine Grind	Fine-grind, dry	Fine-grind, as is
Coarse Grind	Coarse-grind, dry	Coarse-grind, as is

Table 1: Extract Analysis for Several Malts

The percentage of soluble extract by weight is given for several common malts with the equivalent value in points/pound/gallon (i.e., gallon*degrees/pound) given in parentheses.

Parameter	2 Row Lager Malt	2 Row Pale Ale	Munich Malt	Caramel 15	Caramel 75	Chocolate Malt	Roast Barley
% Moisture	4.4	3.9	4.0	7.9	4.8	3.5	3.3
% Extract, Fine Grind, As-Is (pts/lb/gal As-Is)	78.1 (36)	79.3 (37)	78.7 (36)	73.3 (34)	75.7 (35)	74.3 (34)	64.5 (30)
% Extract, Fine Grind, Dry Basis (points/lb/gal Dry)	81.7 (38)	82.5 (38)	82 (38)	79.6 (37)	79.5 (37)	77 (36)	66.7 (31)
% Extract, Coarse Grind, As-Is	77.1	78.5	77.6	—	—	—	—
% Extract, Coarse Grind, Dry Basis	80.6	81.7	80.9	—	—	—	—
F/C Difference	1.1	0.8	1.1	—	—	—	—
As-Is points/lb/gal at 80% Efficiency	29	29	29	27	28	27	24
Dry Basis points/lb/gal at 80% Efficiency	30	30	30	29	29	28	25

extract efficiency is dependent on your methods and equipment. I will show you how to calculate your efficiency in the next section.

In Table 1, we will assume an extract efficiency of 80 percent, which is considered good for homebrewers. A few points less yield (i.e. 75 percent efficiency) is still considered to be good extraction. A large commercial brewery would see the 5 percent reduction as significant because they are using thousands of pounds of grain a day. For a homebrewer, adding 5 percent more grain per batch to make up for the difference in extraction is a pittance. The last two lines of the table list the As-Is and Dry Basis points/lb/gal at 80 percent efficiency. The as-is value, which accounts for moisture, is preferred for estimating your yield, but it may not always be listed on an analysis. You can estimate the as-is value from the dry basis and percent moisture numbers on the malt analysis. If your extract efficiency is high, (near 90 percent), then you can figure on losing 1 point/lb/gal for every 3 percent moisture; if your efficiency is lower (about 75 percent), then you will lose 1 point/lb/gal about every 4 percent.

Calculating Your Efficiency

There are two different gravities that matter to a brewer. One is the extraction or boil gravity (BG), and the other is the post-boil or original gravity (OG). Most of the time, people refer to the OG because it determines the strength of the beer. When brewers plan recipes, they think in terms of the OG, which assumes that the wort volume is the final size of the batch, e.g. 5 gallons.

But when it comes to the extract efficiency, we want to think in terms of the boil gravity because that volume and gravity of wort is our actual yield. When all-grain homebrewers get together to brag about their brewing prowess or equipment and they say something like, "I got 30 (points/lb/gal) from my mash schedule," they are referring to their yield in terms of the amount of wort they collected.

You should realize that the total amount of sugar is constant, but the concentration (i.e. gravity) changes depending on the volume. To understand this, let's look at the unit of points/pound/gallon. This is a unit of concentration, so the unit is always expressed in reference to 1 gallon ("per gal-

lon"). Another way of writing this unit is gallon-degrees/pound. When mashing, you are collecting "x" gallons of wort that has a gravity of "1.0yy" that was produced from "z" pounds of malt. To calculate your mash extraction in terms of points/lb/gal, you need to multiply the number of gallons of wort you collected by its gravity and divide that by the amount of malt that was used. This will give you the gravity (gallon-degrees) per pound of malt used. Let's look at an example.

Grainbill for Palmer's Short Stout

(Yield = 6 gallons of 1.038 wort)

- 6.5 lb of 2 Row
- 0.5 lb of Caramel 15
- 0.5 lb of Caramel 75
- 0.5 lb of Chocolate Malt
- 0.5 lb of Roast Barley
- (8.5 lb total grain bill)

For our example batch, we will assume that 8.5 pounds of malt was mashed to produce 6 gallons of wort that yielded a gravity of 1.038. The brewer's total sugar extraction for this batch would be 6 gallons

Figure 2: Calculation of Potential Beer Gravity from Malt Bill

Malts	Max. points/lb/gal As-Is
6.5 lb of 2 Row	$.36 \times 6.5 / 6 = 39$
0.5 lb of Caramel 15	$.34 \times 0.5 / 6 = 2.8$
0.5 lb of Caramel 75	$.35 \times 0.5 / 6 = 2.9$
0.5 lb of Chocolate Malt	$.34 \times 0.5 / 6 = 2.8$
0.5 lb of Roast Barley	$.30 \times 0.5 / 6 = 2.5$
Maximum Yield (As-Is)	.50 points or 1.050

Table 2: Converting Malt Analysis Values to Practical Recipe Yields

The first column gives percent extract numbers as you might find them on a malt analysis in any of the four forms: fine grind/dry to coarse grind/as-is. The second column gives the equivalent points/lb/gal assuming 100 percent efficiency of extraction during brewing. The remaining columns tell the points/lb/gal assuming various different practical extraction efficiencies during brewing.

% Extract from malt analysis (by any of the four methods)	100% Efficiency points/lb/gal	85% Efficiency points/lb/gal	80% Efficiency points/lb/gal	75% Efficiency points/lb/gal
85	39	33	31	29
84	39	33	31	29
83	38	33	31	29
82	38	32	30	28
81	37	32	30	28
80	37	31	30	28
79	36	31	29	27
78	36	31	29	27
77	36	30	28	27
76	35	30	28	26
75	35	29	28	26
74	34	29	27	26
73	34	29	27	25
72	33	28	27	25
71	33	28	26	25
70	32	27	26	24
69	32	27	26	24
68	31	27	25	24
67	31	26	25	23
66	30	26	24	23
65	30	26	24	23
64	30	25	24	22
63	29	25	23	22
62	29	24	23	21
61	28	24	23	21
60	28	24	22	21

multiplied by 38 points/gallon = 228 points. Dividing the total points by the pounds of malt gives us our mash extraction in points/pound e.g. $228 / 8.5 = 27$ points/lb/gal. Comparing these numbers to lager malt's maximum 36 points/lb/gal (as-is) gives us a good approximation of our mash efficiency: $27 / 36 = 75$ percent.

If we look at the maximum points/lb/gal as-is numbers from Table 1 for each of the recipe's malts, we can calculate our actual mash efficiency (See Figure 2):

In this case, our mash extraction of 1.038 means our actual efficiency was $38 / 50 = 76$ percent. Table 2 lists the conversions of percent extract to points/lb/gal for efficiencies of 75, 80, 85 and 100 percent.

Planning Malt Quantities for a Recipe

We use the efficiency concept in reverse when designing a recipe to achieve a targeted OG. Here the question is: "How much malt do we need to produce five gallons of 1.050 wort?" To find out, let's go back to our Short Stout example.

1. First, we need to assume a brewing efficiency (let's say 80 percent) for our primary malt, which has a CGAI extract of 78 percent. Now we can calculate an anticipated yield.

$$78 \text{ percent} \times 80 \text{ percent} \times 46 \text{ (points/lb/gal/100 percent sucrose)} = 28.7 \text{ points/lb/gal}$$

2. Then we multiply the target gravity (50) by the recipe volume (5) to get the total amount of sugar the recipe will require:

$$5 \text{ gal} \times 50 \text{ points} = 250 \text{ lb-pts.}$$

3. Dividing the total points by our anticipated yield (28.7 points/lb/gal) gives the pounds of malt required:

$$250 / 28.7 = 8.7 \text{ pounds. (We'll call it 9 pounds.)}$$

4. So, 9 pounds of malt will give us our target OG in 5 gallons. Using the malt values for 80 percent efficiency in Table 1, we can figure out how much of each malt to use to make up our recipe. You can build a grainbill "top-down" or "bottom-up"—meaning that you can plan the bulk of your

Malt Modification in a Nutshell



One topic that new all-grain brewers will often hear about, and one that even experienced all-grainers may not have a clear understanding of, is malt modification. Here's a brief explanation.

The starches that a brewer wants to convert to sugars by mashing are locked within the seed in a protein-carbohydrate matrix in the endosperm. During malting, the grain germinates and enzymes in the seed begin unlocking this matrix to make the nutrients available for growth of the new plant. The purpose of malting is to allow germination to proceed just far enough to liberate the starch for the brewer to use without letting the plant use it all up first. The degree to which the starch is liberated is called the *modification*. The more the barley kernel is modified during malting, the easier it is for the enzymes to access and convert the starches to sugars during mashing. Thus, a small Fine/Coarse Grind Difference indicates that the starches are readily accessible in the coarse ground condition and that the malt is probably well modified. But the F/C Difference is not the whole story.

The most common indicator of malt modification is the Soluble to Total Protein Ratio (S/T ratio), also known as the Kolbach Index. To generalize, a ratio of 36 to 40 percent is a less-modified malt, 40 to 44 percent is a well-modified malt and 44 to 48 percent is a highly modified malt. Less-modified malts may require decoction mashing where boiling of portions of the mash and multiple temperature rests help to fully solubilize and convert the starches. Well-modified malts may benefit from multiple temperature rests during mashing, but can be fully converted using a single temperature rest. Highly modified malts can easily be converted using a single temperature rest.

fermentables from the base malt first and adjust the specialty grains to make up the rest, or you can plan your specialty grain additions first and use the base malt to complete the OG. I generally use the bottom-up approach and, for this example, I am going to use a half-pound of each specialty malt, and then calculate how much base malt I need to hit my target gravity.

Specialty Malt OG Contributions based on points/lb/gal, As-Is at 80 Percent Efficiency

Caramel 15	$.27 \times 0.5 / 5 = 2.7$
Caramel 75	$.28 \times 0.5 / 5 = 2.8$
Chocolate Malt	$.27 \times 0.5 / 5 = 2.7$
Roast Barley	$.24 \times 0.5 / 5 = 2.4$
10.6 points out of 50		

To calculate how much base malt is required, subtract the specialty malt contribution from the total, multiply that amount by the recipe volume and divide that by the base malt's 80 percent points/lb/gal number (29).

$(50 - 10.6) \times 5 \text{ gal.} \div 29 = 6.8 \text{ lbs of base malt, which I would round up to the nearest half pound for convenience (7 lbs.)}$

Thus, the grainbill for Palmer's Short Stout, based on these particular lots of malt and 80 percent extract efficiency is:

Grain Bill for Palmer's Short Stout

2 Row Lager malt	7 lbs.
Caramel 15	0.5 lbs.
Caramel 75	0.5 lbs.
Chocolate Malt	0.5 lbs.
Roast Barley	0.5 lbs.
For a total of	9 lbs.

Remember though that this is the OG—the post-boil gravity. When you are collecting your wort and are wondering if you have enough, you need to ratio the measured gravity by the amount of wort you have collected to see if you will hit your target after the boil. For instance, to have 5 gal-

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lons of 1.050 wort after boiling, you would need (at least):

**6 gallons of 1.042 (250 pts/6 gal.)
or 7 gallons of 1.036 (250 pts/7 gal.)**

Summary

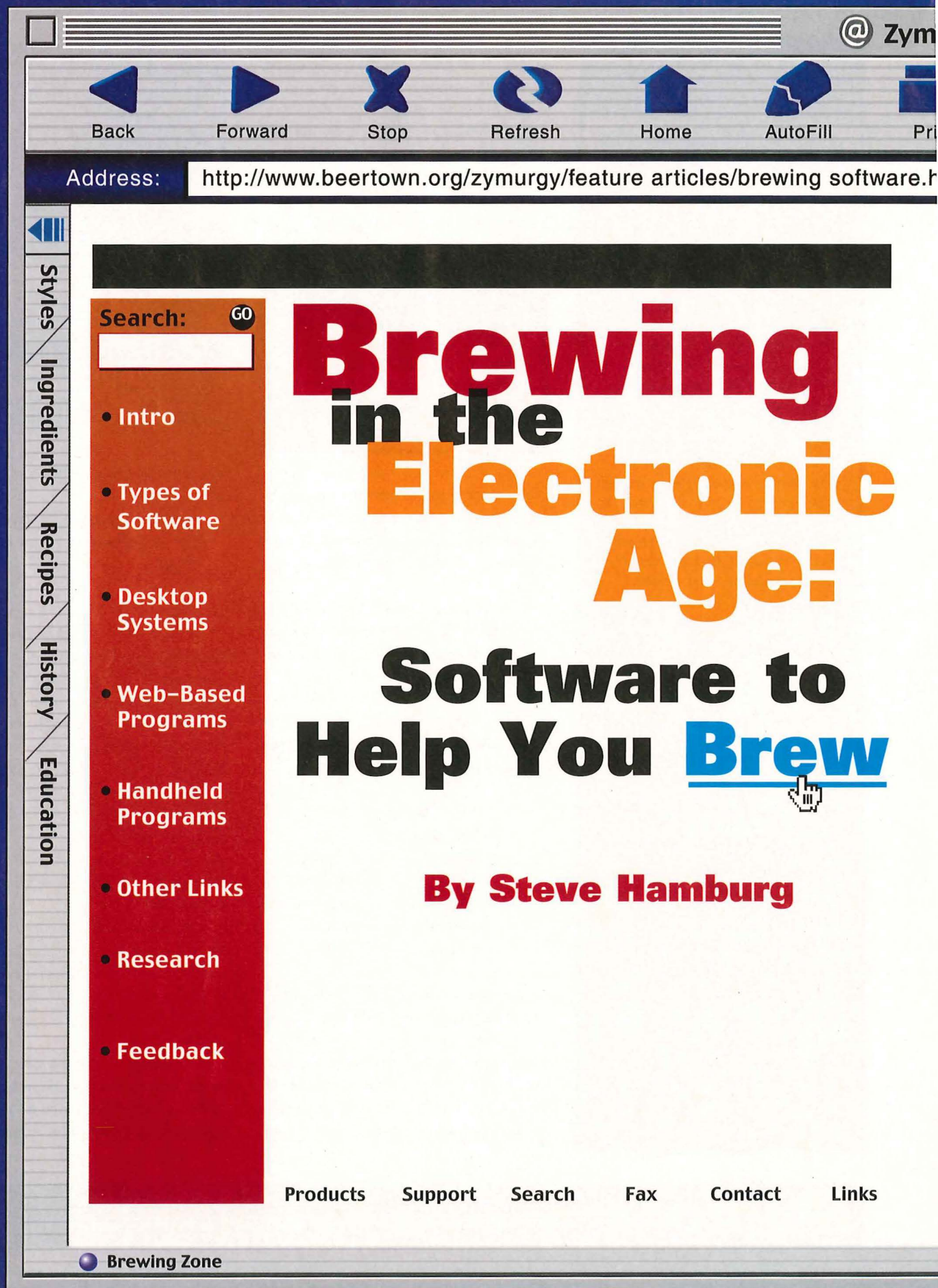
So there you have it: the key to understanding malt yield, extract efficiency and determining your grain bill for all-grain brewing. A malt analysis sheet will list the maximum yield as percent extract and we can convert that weight percentage to specific gravity points via the 46 points/lb/gal of sucrose. By comparing the collected wort gravity with maximum calculated yield, we can determine our extract efficiency, and by knowing our efficiency, we can calculate a grain bill for any wort we want to brew. Cheers!

(The author would like to thank Jason Petros of Beer, Beer, and More Beer for faxing several malt analysis sheets, and Brad Loucks, general manager of specialty malts, Great Western Malting Co., for technical support.)

John Palmer is an engineer for 3M Corporation, a BJCP judge and the author of *How To Brew—Ingredients, Methods, Recipes and Equipment for Brewing Beer at Home*.

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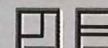
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Beer brewing is as ancient as civilization itself, the personal computer only a few decades old. Clearly, high-tech devices have never been required to make great beer. Yet even the ancient Sumerians realized good record keeping helped produce consistently good brews. And throughout history, brewers have embraced technology that improved beer quality and streamlined the brewing process.

Scales, thermometers and hydrometers were once considered radical innovations in brewing. Now all are standard equipment in even the most humble brew-house. Today fast, powerful and relatively inexpensive personal computers reside in over half of America's homes, so it was inevitable that we would adapt them to our passion. Indeed, our community has been far ahead of the general public in this regard.

Long before most of the world knew of the Internet or World Wide Web, homebrewers were active in USENET newsgroups. When online services like AOL were still in their infancies, Homebrew Digest and JudgeNet were already established avenues for exchanging beer and brewing knowledge. Computers were critical in spreading our hobby and putting us in touch with fellow beer geeks.

As personal computers became more accessible and affordable, homebrewers began using them to track brewing operations and analyze results. A few with programming skills applied their talents to their new craft and developed custom brewing software tools. Early on, these usually took the form of plug-ins to popular commercial software programs. But in due time, full-featured, stand-alone brewing applications would emerge.

Almost nine years ago, Ray Daniels and I reviewed six of these programs in *Zymurgy* (Vol. 17, No. 1, Spring 1994). Surprisingly, there are actually fewer programs available today and major developments in the general features in these products have been limited. What has changed significantly, howev-

er, is the overall reliability and performance of these programs and—more critically—the power, speed and storage capacity of the average personal computer. Further, the new generation of PCs has dropped precipitously in price. Brewing software, which was never that expensive to begin with, is now more affordable than ever. The prices are quite comparable to the cost of raw materials for a normal 5-gallon batch.

Modern brewing software exists almost solely for Windows-based systems. Macintosh computers, despite having a more intuitive operating system and comparable power, are surprisingly underserved. Only one of the programs examined for this article will also run under Mac OS and will do so only via Virtual PC.

Regardless of operating system, most brewing programs were designed with the power-brewer in mind. Basic tools like volume and temperature converters can certainly be used by all, but no program is a substitute for actual brewing experience and familiarity with raw ingredients and process. Even though the most complete of these applications provide quite comprehensive help, novice brewers are sure to be intimidated by the range of options, calculations and the breadth of brewing terms. But armed with more experience, virtually any brewer will find these programs to be quite helpful.

Ultimately, the most important consideration remains "Will this product or tool help me brew better beer?"

Almost without exception, the answer is yes.

Brewing software can definitely help you get better control of your brewing. If you have hesitated to buy brewing software because of concerns about accuracy, price and program stability—as we were in some cases during the first review nearly a decade ago—you no longer need be.

I have used all of the desktop/laptop programs and calculators mentioned here for many hours, often in the course of actual brewing. As I do not own a



handheld device, those products are mentioned below simply as a resource. I fully expect that someone else will evaluate them for a future article.

Types of Brewing Software

Brewing software can be classified into five broad types:

Complete desktop packages that supply a suite of tools to track and control virtually everything in your home or professional brewery. Use them to collect and edit recipes, track and regulate brewing sessions, maintain supply inventories, check style adherence, calculate gravities, color, IBU, hop utilization, mash efficiency and so on. Extensive guidance is supplied for program operation, brewing techniques, ingredients and styles.

Web-based programs that incorporate most of the features found in the large stand-alone programs. These typically offer a limited subset of features and calculators for free if you register and share your recipes with other Web site users. Pay an annual subscription and you get access to a more powerful set of calculators and database features.

On-line calculators and converters. Normally written in JavaScript, these tools include a range from simple metric-American conversions for weights and measures to very sophisticated calculators for mash temperature, hop bitterness and water chemistry. These are available for free and can be accessed via a variety of brewing and homebrewing Web sites.

Brewing calculators for handheld computers. These are not full recipe or brewing applications, but a subset of practical brewing calculators that operate well on a Palm or Windows CE device. These are available as free downloads or as shareware, the latter for a minimal registration fee (around \$5).

Locally installed brewing calculators and converters. Most often these are basic plug-ins or templates used in popular programs like Microsoft Excel. These utilities are typically free and are often disseminated via homebrew club or personal-interest Web sites.

Let's examine some of the choices, by category.

Desktop Systems

Your options here include one commercial program and a number of others distributed as *shareware*. Note

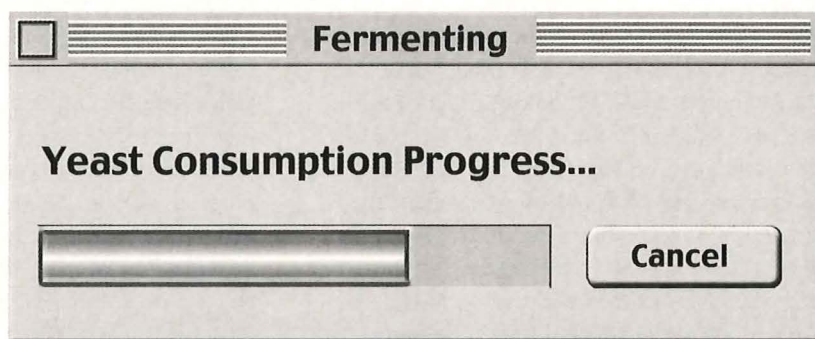


that the latter is not a specific type of software, but merely a distribution and licensing method. Users may evaluate shareware programs first before eventually paying an appropriate fee to use them. Users are encouraged to "share" these versions with friends and colleagues, so they initially have fewer restrictions on copying and exchange. Shareware programmers are often just as accomplished as commercial developers and their products may be of comparable quality. On the other hand, shareware programmers are rarely able to devote more

definitely a product designed for the experienced brewer, whether that person is a professional or amateur. Whether you produce 5-gallon or 5-barrel batches, this product can be easily adapted to your requirements.

For all its power, ProMash has a very simple interface, with almost every utility accessible via launch buttons that are logically grouped on the main system screen. The top row of icons controls recipes and brewing sessions, the middle rows provide access to 15 separate calculators and the bottom directs you to the six underlying databases (styles, grain, hops, yeast, water and extra ingredients—all extremely complete) that provide the raw materials for your beers.

The 15 calculators include a unit con-



than part-time attention to the ongoing development and support of their products. Commercial programs will typically offer more frequent program updates and higher levels of support.

All of these programs share a set of common features. At their heart is a recipe designer that lets you create all-grain, extract or partial mash beers in accordance with the latest BJCP guidelines. Select from a large default list of malts (including extracts), hops and yeast, or customize everything as you see fit. Once saved, you load the recipe and begin a brewing session where actual results are tracked, from dough-in through packaging and consumption. Where they differ is in user-interface design.

Not surprisingly, the Cadillac of this group is the commercial package, **ProMash**. This is a program so rich in features and calculators that my jaw dropped the first time I used it. The name says it all—this is

verter (U.S., Imperial and metric measurements, five temperature scales, gravity in SG and Plato, pressure in PSI and kPa), hop storage index, hop IBUs, water profiler, water needed, boil off, strike temperature, mash designer, CO₂, hydrometer adjustment, alcohol percentage, wort dilution and three calculators related to refractometer usage. All can be used in conjunction with an actual brewing session or simply for ad hoc informational purposes.

As complex and intimidating as it may seem at first, ProMash does not require that you use every bell and whistle. Experiment with some of your existing recipes and each time try to use one or two additional features. Chances are you will learn something significant that will help you in subsequent sessions. The copious help section is full of useful tips and there are additional program tips and tricks available via the product Web site.

At \$24.95, ProMash is well within the budget of any avid homebrewer. But before you commit, I highly recommend that you download and run the free evaluation version. This is limited to three recipe/nine brewing sessions and has some printing restrictions, but it should be more than adequate for a fair review. The system runs on Windows 95/98/ME/NT/2000/XT (also on Mac OS via Virtual PC or Linux using Wine). You'll also need a graphics card capable of displaying at least 256 colors and a scant 8 MB RAM and 3.5 MB of free disk space. For complete information on ProMash, visit its Web site at www.promash.com.

Those looking for an alternative to ProMash may actually be quite surprised by **SUDS**, the venerable shareware product with a user interface based on the Windows file explorer. The primary window is divided into two panes, the left containing a tree hierarchy displaying ingredients and beer style categories, the right showing expanded detail in one of four different views. Experienced Windows users should find it reasonably intuitive and easy to navigate, although it's not immediately apparent how one should begin. I recommend you start by customizing the list of raw ingredients before building a recipe, although this is not required. This is an inexpensive but deceptively powerful system that yields more of its bells and whistles the more you work with it.

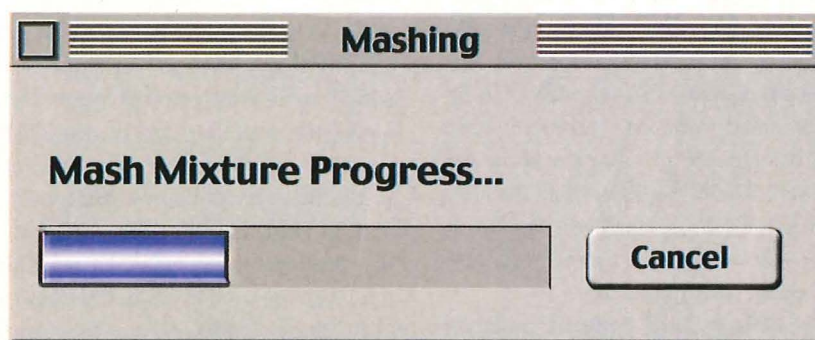
The program comes with quite sensible default values for malts and hops, which can be easily changed to correspond to the actual values for items in your inventory. If you normally use Wyeast liquid yeast strains, you'll have little to customize, as 17 common varieties are listed. But only two White Labs strains are listed by default and no other brands are present, so you'll definitely have some editing to do if Wyeast isn't your preferred brand. To build a recipe, first select a style and subcategory in the left pane and then hit the "Add" icon on the toolbar. In the right pane, spec out your beer by adding raw ingredients and process

details via a series of tabs, buttons, drop-down lists and data entry fields. The current version also lets you drag and drop ingredients from the left pane directly into your recipe. Once the recipe is built, hit the "Add" icon again to start and track an actual batch.

SUDS is a well-established program that has endured the test of time. There are more than 2,000 registered users, many who are active participants in the program's online support forum. The latest release is 6.1 and runs on Windows 9x/NT/ME/XP or 2000. The developer, Mike Taylor, also does a good

job with user support. This is quite a feat for a shareware product. And for a one-time-only \$20 fee for the full release, SUDS is quite a bargain. Complete product ordering information and downloads are available at the SUDS customer support Web site, <http://oldlib.com/suds/index.html>.

Another shareware program is the improbably named **StrangeBrew**, which, in spite of its name, isn't particularly weird at all. In fact, I'd highly recommend a name change, because this is a very elegant and powerful system that should be considered very seriously. Not only does it provide the usual



Brewing software can definitely help you get better control of your brewing. If you have hesitated to buy brewing software because of concerns about accuracy, price and program stability—as we were in some cases during the first review nearly a decade ago—you no longer need be.



facilities for recipe construction and inventory maintenance, it also has excellent utilities for budgeting your recipes right down to the cost per bottle, adjusted for bottle and batch size. Very slick. There's also an automated facility for generating generic homebrew competition entry forms.

You enter the system via a "Find Recipe" screen, which is split into two panes, somewhat like SUDS. In the left is a folder tree, divided by style, brewer name or custom folders. Select one of the styles, and a list of available recipes is displayed in the right window pane. You can open any existing recipes or start a new one by hitting a clearly labeled button. This opens a recipe window, which is clearly organized into tabbed items for recipe details, style information, miscellaneous ingredients, water use, carbonation and general comments. A very

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nice feature on the recipe tab is an image of a beer in a mug. As you adjust your recipe the mug displays the approximate color that would result from the recipe. The only problem I encountered with the program was a non-fatal "Access Violation" message encountered while attempting to filter the recipe lists. A pain, to be sure, but given the overall quality of the rest of the system, it can be easily overlooked.

StrangeBrew is priced quite reasonably at \$15 when you register your copy and the developer donates 20 percent of all proceeds to support the Homebrew Digest (HBD) server fund. You can get a free trial of the full product for 90 days, whereupon selected features are disabled unless you register the product. Visit the Web site (www.strangebrew.ca/) for product information and downloads. At the very least, you'll want to take an online tour of the system that includes examples of all the main screens. The site also contains a user forum, a list of known bugs and a form for suggesting product enhancements.

The **BrewWizard Recipe Calculator** is another good basic recipe formulator that is also sold as shareware. It is probably the



best program available for novice brewers, as it contains very thorough instructions for brewing your first batch. It also includes tools for water treatment, hop utilization, a malt formulator that will help you hit target gravities and beer color and a good troubleshooting guide. Given its feature set and ease of use, it's no surprise it was given a five-star rating by ZDnet. Cost of the basic program is \$25, but a fuller version for \$59 includes an encyclopedia of brewing with information on more than 140 topics. Another \$16 gets you a custom bottle-labeling program as well. The latter add-ons are nice, but certainly not required. If you are looking for a very easy-to-use system that packs a lot of punch in a small package, BrewWizard is certainly for you. The latest version (1.61) can be downloaded directly from the Web site at <http://members.aol.com/brewwizard>.

The **Home Brew Recipe Calculating Program** (HBRCP) is a \$15 shareware application written in Foxpro and that

Web-based programs have become a much more realistic alternative for computer owners who also have high-speed broadband data connections.



seems to be the source of its greatest problem. Although it has all the features one would want in a recipe program and is among the most thorough in terms of style and raw ingredient information, the interface is the least Windows-like. Indeed, it appears to be cobbled together and was the only program reviewed that routinely locked up. If you are used to normal Windows (or even other operating system) conventions, you'll definitely struggle to traverse the system and play with its many features. Considering the value and quality of the other programs mentioned here, there's little reason to muddle through this product's idiosyncrasies. But if you're interested in a look, downloads are available at www.uberbeergeek.com/bih/hbrcpweb.htm.

Web-Based Programs and On-Line Calculators

Web-based programs have become a much more realistic alternative for computer owners who also have high-speed broadband data connections. If your primary Internet access is still via a 56K dialup line, you can use these programs or toolsets, but you'll likely find it a pain to have to establish a connection each time you want to use them. And there's also the issue of performance.

BeerTools.com is an excellent online resource that offers a lot of powerful features for free and an even bigger set if you're willing to subscribe annually for \$14.95. At its heart are three main tools, the Recipe Generator, Recipe Calculator



and Finished Beer Analysis. Basic free membership gives you access to the online recipe database (a collection of recipes added by other subscribers) and permits you to build and save a single recipe with a limited (but still fairly extensive) number of grains, hop varieties and adjuncts. BeerTools is highly recommended if you are still hesitant about committing to a desktop package.

The **Beer Recipator** is an interactive set of Web pages that you can use to build recipes online or perform typical brewing calculations or conversions. It also contains an extensive set of existing recipes built with the Recipator. Everything here is free, as long as you're willing to share your recipes online. If you're shy, you can still borrow freely from a sizable list of previous recipes (almost 2,500 across all beer styles, but no cider or mead). There's also a threaded discussion group and downloadable JavaScript applets available on the site. The address is <http://hbd.org/recipator/>.

ProBrewer.com is a new online resource for the beer industry that's part of the larger Realbeer.com family. It offers eight free JavaScript tools, three brewing calculators and five unit converters. The former include hop bitterness, water chemistry and beer specification calculators all built by hop expert Glenn Tinseth; the latter converters for volume units, mass units, temperature, percent alcohol and volume flow. (www.probrewer.com)

Lee's Brewery is a personal homebrew site that offers links to a number of the desktop products mentioned above, plus online calculators and downloadable tools. To use the online calculators, your browser must be Java enabled. Note that some ad and spam filtering programs may disable some of these tools, so be sure to temporarily disable them or add the site to the filter's list for custom handling. (www.leesbrewery.com/software.htm).

Handheld Programs

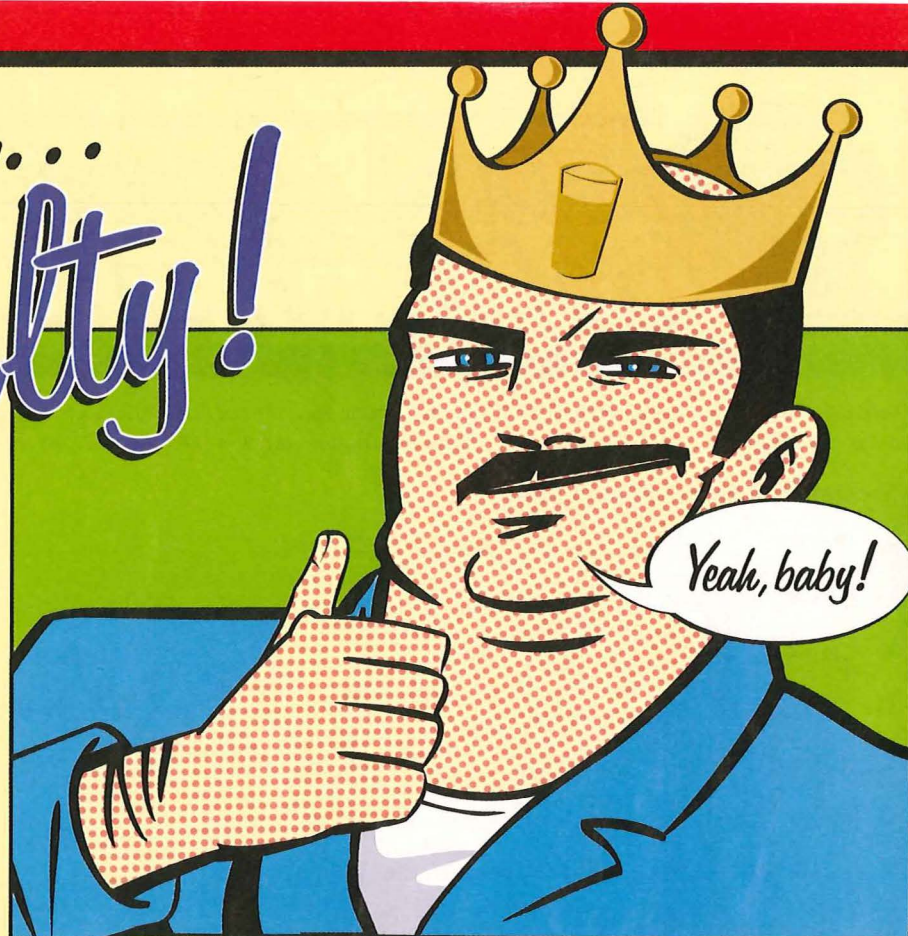
One shareware developer, operating under the guise of the Drunken Villain Brewing Company, has two brewing products available for Palm OS 3.5 and up. They are **BrewGeek**, which (continued on page 61)



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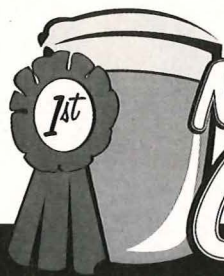


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1. Name _____
2. Additional Brewer(s) _____
3. Address _____
4. City _____ State/Province _____ Zip/Postal Code _____
5. Country _____ Phone (H) (_____) _____ (W) (_____) _____
6. E-mail _____
7. Homebrew Club (Please spell out full name of the club. Do not abbreviate.) _____
8. AHA Membership Number (if you are already a member) _____
9. Join the AHA and save on entry fees! Or renew your membership (enclose a separate \$38 check) ☐ New Membership ☐ Renewal
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☐ AHA Member AHA members pay \$8 per entry : _____ no. of entries x \$8 = \$ _____ total
☐ Non-member Non-members pay \$12 per entry: _____ no. of entries x \$12 = \$ _____ total
11. If you are a BJCP judge, please include your BJCP Number here _____

Section B: Entry Information

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

If you have entered in any of the following categories 19e, 20c, 21, 22, 23b, 24, 25, 26, 27, 28b, 28c, 29 refer to part II of the Rules and Regulations and the NHC Style Guidelines at www.beertown.org for instructions on filling out the spaces below. The judges will use this important information for evaluating entries in these categories. **Leave these spaces blank if you have not entered the above categories.** Entrants of Historical Beers are asked to provide the historical beer style and information on the style profile and history as an aid to judges.

Classic Style _____

Special Ingredient(s) _____

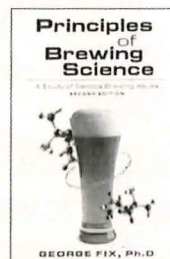
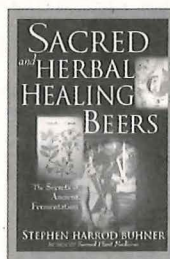
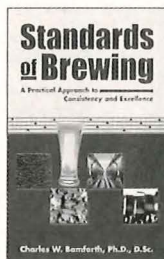
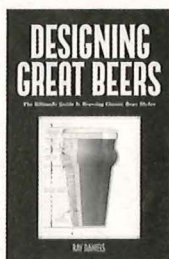
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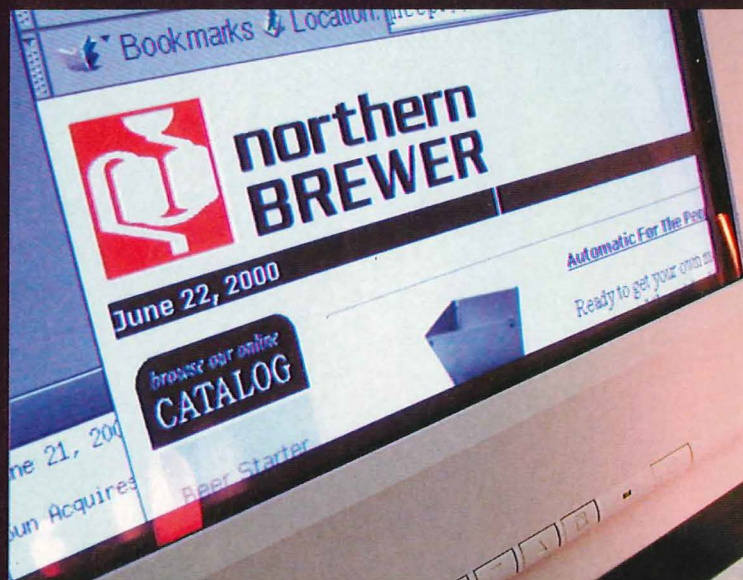
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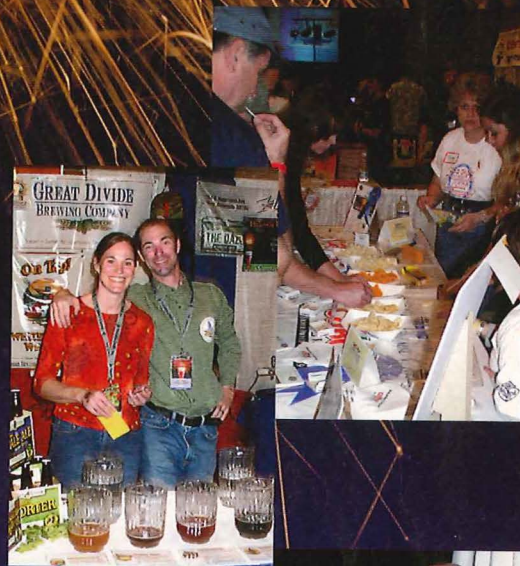
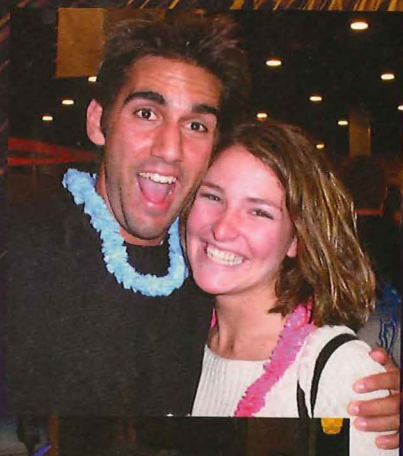
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After 21 gigantic craft beer gatherings, the Great American Beer Festival continues to find fresh ideas and vitality. Nearly 400 breweries entered more than 1,800 beers in 58 categories in the world's most rigorous beer competition. New winners were cast into the limelight and some perennial winners disappointed by the upstarts. In short it was another great year for the *Greatest American Beer Fest*.

GABF founding father Charlie Papazian has watched the craft beer industry in the U.S. grow feverishly, hit a tumultuous slowdown and then gradually regain stability. But while many other trends have come and gone, craft brewing—and its biggest annual showcase—have shown staying power.



Charlie Papazian with a representative from Large Brewing Company and Brewmaster of the Year Anheuser-Busch, Inc. of Fort Collins, CO.



Charlie presents the Small Brewing Company and Brewmaster of the Year award to Kevin McNerney of Sweetwater Brewing Company of Atlanta, GA.



Charlie with Jason Courtney and Sarah Veits from Lubbock, TX's Hub City Brewery, winners of the Small Brewpub and Brewmaster of the Year award.



Charlie and Dan Pedersen of BJ's Restaurant & Brewery, winners of the Large Brewpub and Brewmaster of the Year award.

GABF at 21: Still Learning New Tricks

"Given the assaults in the beverage industry overall, craft brewing has really established a firm foundation for itself," he says, adding that the industry is "holding its own very well." This growth history is mimicked by the GABF, which in its heyday squeezed in as many as 450 breweries, but now, at just under 400, still offers more variety and excellent tastes than ever before.

Doing It With Styles

If a Paris fashion show gives us a glimpse of next year's garments, the beers of the GABF represent the latest and greatest in craft beers: you can chart industry directions by the fashions of the festival. For instance, this year fruit flavored beers



Charlie with (L to R) Rob Widmer of Widmer Brothers Brewing of Portland, OR, winner of the Mid-Size Brewing Company and Brewmaster of the Year award, Gerrard Lemmens and Scott Desserault of Yakima Chief, Inc.



(L to R) Sue Thompson from Miller Brewing Company, author Michael Jackson and Garrett Oliver from Brooklyn Brewery judge entries at the GABF Judge Competition Media Event.



Eager festival-goers ascend the stairs at the Colorado Convention Center in Denver, CO for Saturday's Connoisseur Tasting.



Two of the more than 2,500 volunteers that generously gave their time to this year's Great American Beer Festival® and made it such a huge success.

**by Matt
Stinchfield**

were down to 37 entries from 51 just two years ago. Belgian beers are showing up more often now, with 111 entries in four categories, compared to just 65 in 2000.

"Belgian styles are the hot item," says Charlie Papazian. "That's my take." The sour styles of Belgian and German beers were more evident this year—being served with greater frequency at the festival and taking home awards. Sour red ales, sour fruit ales, a wild grape flavored lambic-styled ale and the near extinct style of Berliner-weiss all took home prizes. This

was augmented by a healthy one-upsmanship evident between daring brewers like Phil Markowski of Southampton Publick House and Tomme Arthur of Pizza Port Solana Beach, each of whom showed up with diverse experimental beers.

The number of Bohemian and European-styled pilseners hasn't changed much in the past three years, while the Kölsch beers have been declining gradually. Coffee and vegetable specialty beers were up. Barleywines have been tumbling for the past several years, in part due to an increasing

number of entries in the *Other Strong Ale or Lager* category.

A few years ago, when beers finished in whiskey barrels began showing up with more frequency, brewers had to enter the *Experimental Beer* category. But the interest level was high and some pundits speculated that enough brewers were fermenting or conditioning beer in wood that it wasn't really experimental anymore. This year a new category was added for wood-aged beer. Paul Gatza, AHA director and former manager of the GABF judging, is excited about *Wood- and Barrel-Aged Beer* as it marks the first time a category represents "a process instead of a style." The wood beer category received 26 entries this year.

Gatza was also excited about possible new categories at future GABFs. Brewers may be able to look forward to an organic beer category. Belgian-style beers, previously lumped into a single category, now represent four separate categories. This responsiveness to the evolution of styles is one of the GABF's great strengths.

He also responded to the observation that many winning pale ale entries are actually sold as India pale ales at their breweries. He admitted that brewers do sometimes "shop" to find the best category in which to enter, but what really matters, he says, is the objective characterization of the entries. During his involvement in a Strong Bitter judging session Gatza said he and other judges discounted overly hoppy examples.

Juggling the Judging

For the first time in the history of the GABF, judging was shown to an audience. The panel consisted of three brewers, two technical experts and a beer writer. The brewers, Brooklyn's Garrett Oliver, Steelhead's Teri Fahrendorf and Interbrew's Paul Buttrick, all hailed from medal-winning breweries. Lyn Kruger, president of the Siebel Institute of Technology, presided as judge captain and sat beside Sue Thompson, sensory manager for Miller Brewing Company. Michael Jackson rounded out the cast.

The media judging event was a simulation of a first round American IPA judging, and not part of the actual scoring of beers.

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But in all other ways, it was demonstrative of the actual judging procedures.

The point of the beer judging exposition was to demonstrate once and for all that GABF awards are based on the merits of the appearance, aroma, taste and other palate sensations of the entries, as compared to the style guidelines. "There is no judging as rigorous as the Great American," stated an emphatic Jackson after the judging. "I should know," he added. "I've judged in Britain, Australia, Russia..."

GABF judge manager Chris Swersey handled the pressures of overseeing the evaluation of more than 1,800 beers, counseled stewards and judges, and answered questions from the press unerringly. Prior to the judging simulation, he described the three-part process as one of standardization, sampling of the entries and an animated discussion. The celebrity judges delivered as promised, with the animated discussion portion being, at times, somewhat charged.

One discussion centered on whether the beers sent to the next round all represented examples on the higher side of the allowable hop bitterness. "The palate of the public and the judges has changed," said Fahrendorf, referring to taste for hops that the beer consumer has adopted over the last few years.

In another exchange, Oliver observed, "There's a peach ester here." Some of the panelists seemed to decry fruitiness. The portion of the guidelines dealing with fruitiness was reread for the group. "Moderate to high levels of fruitiness," said Kruger. "What's the matter with fruity?" pushed Jackson. "I think the hops are somewhat cheesy," opined Kruger. "You think everything's cheesy!" Jackson later said. Whether it was staged for television we may never know. The drama couldn't defeat the rigors of the established judging system, as in the end, all six judges agreed to the selection of semifinalists.

Swersey described several minor changes to the judging that were made this year, his inaugural as judge manager. The

first was the pre-designation of a judge captain at each table. The captain was assigned the role of managing the style review, collating the tasting notes and completing a new form called the Entry Summary Form. The summary form is designed to give the entering brewer a "snapshot" view of how their beer fared.

Swersey said that despite the rigors of GABF judging, it is not uncommon to receive negative reviews from brewers who didn't win. Some of those complaints have stemmed from the scoresheet, which was previously called the Evaluation Form. These have since been renamed to Tasting Notes.

With all its evolution and innovation, the GABF is still the best place for brewers to have their beers tasted and judged by panels of their peers. In the end, the GABF gives the very best bragging rights for a medal. For consumers, it is without question the place to taste the largest variety of beers at a single event, and after 21 continuous events, it is undeniably here to stay.

Matt Stinchfield is a freelance beer writer, beer travel guide, brewery safety consultant and editor for *Brewing News*. When he's not traveling the world in search of good beer, he can be reached at matts@brewingnews.com.

GABF Medal Winners List

Category 1: Non-Alcoholic (Beer) Malt Beverages - 4 Entries

Gold: O'Doul's Amber, Anheuser-Busch, Inc. - Fort Collins, CO
Silver: Old Milwaukee NA, Stroh Brewery Company - San Antonio, TX

Category 2: American-Style Lager/Ale or Cream - 25 Entries

Gold: Red Dog, Plank Road - Milwaukee, WI
Silver: Hamm's, Hamm's Brewing Company - Milwaukee, WI
Bronze: Genesee Cream Ale, High Falls Brewing Company - Rochester, NY

Category 3: American-Style Wheat Beer - 46 Entries

Gold: Raw Wheat, Blind Tiger Brewery & Restaurant - Topeka, KS
Silver: Desert Wheat, P.H. Woods Restaurant & Brewery - Moreno Valley, CA
Bronze: Shiner Winter Ale, The Spoetzl Brewery - San Antonio, TX

Category 4: Fruit And Vegetable Beer - 37 Entries

Gold: Magnolia's Peach, BJ's Restaurant & Brewery - Boulder, CO
Silver: Belgian Red, New Glarus Brewing Company - New Glarus, WI
Bronze: Little Pookie's Old Ale, Steelhead Brewing Co. - Eugene, OR

Category 5: Herb and Spice Beer - 35 Entries

Gold: Upland Wheat Ale, Upland Brewing Company - Bloomington, IN
Silver: Mocha Joe, Sports City Café & Brewery - La Jolla, CA
Bronze: Lemongrass Wheat, Outer Banks Brewing Co. - Kill Devil Hills, NC

Category 6: Coffee Flavored Beer - 15 Entries

Gold: Maxwell's Dry Stout, Basil T's Brew Pub & Italian Grill - Red Bank, NJ
Silver: Cambridge Espresso Stout, John Harvard's Brew House - Cambridge, MA
Bronze: Jamaican Blue Porter, Big Rock Chop & Brew House - Birmingham, MI

Category 7: Specialty Beer - 9 Entries

Gold: Ashman's Abbaye Dubbel, Flossmoor Station Brewing - Flossmoor, IL
Silver: Ginger Shandy, McCoys Public House & BrewKitchen - Kansas City, MO
Bronze: Maplenut Brown Ale, Tommyknocker Brewery - Idaho Springs, CO

Category 8: Rye Beer - 14 Entries

Gold: Rock Chuck Rye, Snake River Brewing of Lander - Lander, WY
Silver: Tailwind Rye, Blind Tiger Brewery & Restaurant - Topeka, KS
Bronze: Catcher in the Rye, Rock Bottom Brewery - Arlington, VA

Category 9: Specialty Honey Beer - 20 Entries

Gold: Star Spangled Ale, Hops Restaurant, Bar and Brewery - Tampa, FL
Silver: Honey Blonde, SLO Brewing Company - Paso Robles, CA
Bronze: Ray's Honey Rye, Boscos Brewing Company - Memphis, TN

Category 10: Experimental Beer - 32 Entries

Gold: Berliner Weisse, Southampton Publick House - Southampton, NY
Silver: Juniper Rye, BJ's Restaurant & Brewery - Chandler, AZ
Bronze: Raspberry Tart, New Glarus Brewing Company - New Glarus, WI

Category 11: Wood- and Barrel-Aged Beer - 26 Entries

Gold: Terminal Bourbon Stout, Rock Bottom Brewery - Chicago, IL
Silver: Dragon's Milk, New Holland Brewing Company - Holland, MI
Bronze: Old Conundrum Barley Wine - J.D. - Flossmoor Station Brewing Company - Flossmoor, IL

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Category 12: Smoke-Flavored Beer - 12 Entries

Gold: BJ's Rauchbier, BJ's Restaurant & Brewery - Portland, OR

Silver: Pelican Smoked Porter, Redfish New Orleans Brewery - Boulder, CO

Bronze: Alaskan Smoked Porter, Alaskan Brewing Company - Juneau, AK

Category 13: German-Style Pilsener - 35 Entries

Gold: Hops Pilsener, Hops Restaurant, Bar and Brewery - Tampa, FL

Silver: Goose Island Pils, Goose Island Beer Company - Chicago, IL

Category 14: Bohemian-Style Pilsener - 38 Entries

Gold: Cleveland Chophouse Bohemian Pilsener, Cleveland Chophouse & Brewery - Cleveland, OH

Silver: Barmen Pilsener, Sandlot Brewery at Coors Field - Denver, CO

Bronze: BoHo Pilsner, Nodding Head Brewing Company - Philadelphia, PA

Category 15: Münchner-Style Helles - 25 Entries

Gold: Helles in a Handbasket, Hub City Brewery - Lubbock, TX

Silver: Helles Lager, Firestone Walker Brewing - Paso Robles, CA

Bronze: French Creek Helles, Sly Fox Brewhouse & Eatery - Phoenixville, PA

Category 16: European-Style Pilsener - 21 Entries

Gold: Tenaya Creek Pilsner, Tenaya Creek - Las Vegas, NV

Silver: Hermanbrau, Sandlot Brewery at Coors Field - Denver, CO

Bronze: Henry Weinhard's Private Reserve, Henry Weinhard's Brewing - Milwaukee, WI

Category 17: American-Style Light Lager - 27 Entries

Gold: Lone Star Light, Lone Star Brewing Company - San Antonio, TX

Silver: Schaefer Light, Schaefer Brewing Company - San Antonio, TX

Bronze: Rainier Light, Rainier Brewing Company - San Antonio, TX

Category 18: American-Style Lager - 28 Entries

Gold: Busch, Anheuser-Busch, Inc. - Fort Collins, CO

Silver: Budweiser, Anheuser-Busch, Inc. - Fort Collins, CO

Bronze: Old Style, Heileman Brewing Company - San Antonio, TX

Category 19: American-Style Premium Lager - 21 Entries

Gold: Schlitz Malt Liquor, Schlitz Brewing Company - San Antonio, TX

Silver: Monterey Lager, Spanish Peaks Brewing Company - King City, CA

Bronze: Coors Original, Coors Brewing Company - Golden, CO

Category 20: American-Style Specialty Lager - 21 Entries

Gold: Schmidt's Ice, Rainier Brewing Company - San Antonio, TX

Silver: Red Bull, Schlitz Brewing Company - San Antonio, TX

Bronze: St. Ides Malt Liquor, St. Ides Brewing Company - San Antonio, TX

Category 21: Vienna-Style Lager - 29 Entries

Gold: Dos Czechies, Hub City Brewery - Lubbock, TX

Silver: Dos Rios, Glenwood Canyon Brewing - Glenwood, CO

Bronze: Dockside Amber Lager, Wagner Brewing Company - Lodi, NY

Category 22: American-Style Amber Lager - 34 Entries

Gold: Über Brau, Big Horn Brewing Company - Lakewood, WA

Silver: Wilhelm Sebald's Oktoberfest Bier, Spanish Springs Brewing - The Villages, FL

Bronze: August Schell Firebrick, August Schell Brewing Company - New Ulm, MN

Category 23: German-Style Märzen/Okttoberfest - 45 Entries

Gold: Oktoberfest, Empire Brewing Company of Rochester - Rochester, NY

Silver: Trout Brook Oktoberfest Lager, Trout Brook Brewing Company - Hartford, CT

Bronze: Great Dane Oktoberfest, The Great Dane Pub & Brewing Co. - Madison, WI

Category 24: European-Style Dark / Münchner Dunkel - 13 Entries

Gold: Voodoo's Child, Red Star Brewery & Grille - Greensburg, PA

Silver: Dunkel, Moosejaw Pizza and Brewing - Wisconsin Dells, WI

Bronze: Obscura, Mammoth Brewing Company - Mammoth, CA

Category 25: American Dark Lager - 10 Entries

Gold: Henry Saxer Dark Lager, Portland Brewing Company - Portland, OR

Silver: Leinenkugel's Creamy Dark, Jacob Leinenkugel Brewing - Chippewa Falls, WI

Bronze: Shiner Bock, The Spoetzl Brewery - San Antonio, TX

Category 26: German-Style Schwarzbier - 14 Entries

Gold: Schwarzbier, Empire Brewing Company of Syracuse - Syracuse, NY

Silver: Black Forest Schwarzbier, Squatters Pub Brewery - Salt Lake City, UT

Bronze: Springfield Schwarzbier, John Harvard's Brew House - Springfield, PA

Category 27: Bock - 27 Entries

Gold: Saxer Bock, Portland Brewing Company - Portland, OR

Silver: Get Off My Bock, Blue Corn Café And Brewery - Albuquerque, NM

Bronze: Mactavish's Excellent Barvarian Adventure, Sandlot Brewery at Coors Field - Denver, CO

Category 28: German-Style Doppelbock - 14 Entries

Gold: Samuel Adams Double Bock, Samuel Adams Brewing Company - Boston, MA

Silver: Liberator Doppelbock, Angelic Brewing Company - Madison, WI

Bronze: Broken Keg Icebock, Pizza Port Brewing - Carlsbad, CA

Category 29: Golden or Blonde Ale - 47 Entries

Gold: Goose Island Summertime, Goose Island Beer Company - Chicago, IL

Silver: Sweetwater 420 Extra Pale Ale, Sweetwater Brewing Company - Atlanta, GA

Bronze: Alaskan Pale, Alaskan Brewing Company - Juneau, AK

Category 30: German-Style Kölsch / Köln-Style Kölsch - 39 Entries

Gold: Capitol Kölsch, Capitol City Brewing Company - Washington, DC

Silver: # 10 Kölsch, Wolf Pack Brewing Company - West-Yellowstone, MT

Bronze: Golden Arm, Piece Brewing - Chicago, IL

Category 31: Classic English-Style Pale Ale - 38 Entries

Gold: Annadel Pale Ale, Third Street Aleworks - Santa Rosa, CA

Silver: Urban Wilderness, Sleeping Lady Brewing Company - Anchorage, AK

Bronze: Denver Pale Ale, Great Divide Brewing Company - Denver, CO

Category 32: English-Style India Pale Ale - 25 Entries

Gold: IPA, Firestone Walker Brewing - Paso Robles, CA

Silver: SLO Progress, SLO Brewing Company - San Luis Obispo, CA

Bronze: Newcomb's IPA, McCoys Public House and-BrewKitchen - Kansas City, MO

Category 33: American-Style Pale Ale - 93 Entries

Gold: Rye Pale Ale, Terrapin Beer Company - Athens, GA

Silver: Piranha Pale Ale, BJ's Restaurant & Brewery - Portland, OR

Bronze: IPA, SLO Brewing Company - San Luis Obispo, CA

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Category 34: American-Style India Pale Ale - 94 Entries

Gold: Drake's IPA, Drake's Brewing - San Leandro, CA
Silver: Ponderosa IPA, Prescott Brewing Company - Prescott, AZ
Bronze: Scarlet Fire, Big Time Brewing Company - Seattle, WA

Category 35: American-Style Amber / Red Ale - 72 Entries

Gold: Hoptown Paint the Town Red, Hoptown Brewing Company - Pleasanton, CA
Silver: Ruedrich's Red Seal Ale, North Coast Brewing Company - Fort Bragg, CA
Bronze: Amber Waves Ale, Capitol City Brewing Company - Washington, DC

Category 36: Bitter - 23 Entries

Gold: Full Suspension Pale Ale, Utah Brewers Cooperative - Salt Lake City, UT
Silver: 8th Street Ale, Four Peaks Brewing Company - Tempe, AZ
Bronze: Blue Heron Pale Ale, Bridge Port Brewing Company - Portland, OR

Category 37: (Extra Special) Strong Bitter - 46 Entries

Gold: Crooked River ESB, Frederick Brewing Company - Frederick, MD
Silver: Best Bitter, Boundary Bay Brewery - Bellingham, WA
Bronze: Sweetwater Tavern Pale Ale, Sweetwater Tavern & Brewery - Centreville, VA

Category 38: Scottish-Style Ale - 24 Entries

Gold: McAllister's Ale, Smiling Moose Brewpub & Grill - Greeley, CO
Silver: Laughing Lab Scottish Ale, Bristol Brewing Company - Colorado Springs, CO
Bronze: Hope & King Scotch Ale, Minneapolis Town Hall Brewery - Minneapolis, MN

Category 39: Irish-Style Red Ale - 29 Entries

Gold: Henry Weinhard's Amber Ale, Henry Weinhard's Brewing - Milwaukee, WI
Silver: Lumberjack Red Ale, Rock Bottom Brewery - Bellevue, WA
Bronze: Irish Red, Hub City Brewery - Lubbock, TX

Category 40: English-Style Brown Ale - 40 Entries

Gold: Grog, Nodding Head Brewing Company - Philadelphia, PA
Silver: Old Elk Brown Ale, Walnut Brewery - Boulder, CO
Bronze: Buster Nut Brown, SKA Brewing Company - Durango, CO

Category 41: American-Style Brown Ale - 31 Entries

Gold: Kick-Ass Brown, C.H. Evans Brewing Company - Albany, NY
Silver: Bailey's American Brown, Hub City Brewery - Lubbock, TX
Bronze: Slow Down Brown, Il Vicino Brewing Company - Albuquerque, NM

Category 42: German-Style Brown Ale - 24 Entries

Gold: Widmer Alt, Widmer Brothers Brewing - Portland, OR
Silver: Old Town Brown, Chicago Brewing Company - Las Vegas, NV
Bronze: Southampton Secret Ale, Southampton Public House - Southampton, NY

Category 43: German-Style Wheat Ale - 65 Entries

Gold: DeGroen's Weizen, Baltimore Brewing Co/DeGroen's Beer - Baltimore, MD
Silver: Barley's Boulder Gold Hefeweizen, Barley's Casino & Brewing Company - Henderson, NV
Bronze: Penn Weizen, Pennsylvania Brewing Company - Pittsburgh, PA

Category 44: Belgian- & French-Style Ale - 38 Entries

Gold: Allagash White, Allagash Brewing Company - Portland, ME
Silver: Artisan Saison, Rocky River Brewing Company - Rocky River, OH
Bronze: Spring Saison, Engine House #9 Restaurant & Brewery Tacoma, WA

Category 45: Belgian-Style Sour Ale - 13 Entries

Gold: La Folie, New Belgium Brewing Company - Fort Collins, CO
Silver: Lip Burner Lamb-Beak, Bitter End Bistro & Brewery - Austin, TX
Bronze: Flanders Red Ale, Southampton Public House - Southampton, NY

Category 46: Belgian-Style Abbey Ale - 33 Entries

Gold: Double O2 Bear, Big Bear Brewing Company - Coral Springs, FL
Silver: Daisy Chain, Chicago Brewing Company - Las Vegas, NV
Bronze: Tripel, Iron Hill Brewery & Restaurant - West Chester, PA

Category 47: Belgian-Style Strong Specialty Ales - 27 Entries

Gold: Temptation, Russian River Brewing Company - Guerneville, CA
Silver: Millennium Grand Cru, BJ's Restaurant & Brewery - Portland, OR
Bronze: Trouble, Rock Bottom Brewery - Bethesda, MD

Category 48: Robust Porter - 51 Entries

Gold: Edmund Fitzgerald Porter, Great Lakes Brewing Company - Cleveland, OH
Silver: Cutthroat Porter, Odell Brewing - Fort Collins, CO
Bronze: Pig Iron Porter, Iron Hill Brewery & Restaurant - Media, PA

Category 49: Brown Porter - 33 Entries

Gold: Sweetwater Exodus Porter, Sweetwater Brewing Company - Atlanta, GA
Silver: Pioneer Porter, Fredericksburg Brewing Company - Fredericksburg, TX
Bronze: Black Butte Porter, Deschutes Brewery - Bend, OR

Category 50: Classic Irish-Style Dry Stout - 21 Entries

Gold: Blarney Sister's Dry Irish Stout, Third Street Aleworks - Santa Rosa, CA
Silver: McDoogin's Irish Stout, Thirsty Dog Grille and Brewery - Akron/Canton, OH
Bronze: Lord Stanley, Steelhead Brewing Co - Irvine, CA

Category 51: Foreign-Style Stout - 20 Entries

Gold: Black Hole XXX Stout, Chelsea Brewing Company - New York, NY
Silver: Zonker Stout, Snake River Brewing Company - Jackson, WY
Bronze: Gaston's Swollen Delta Stout, Redfish New Orleans Brewhouse - Boulder, CO

Category 52: Sweet Stout - 14 Entries

Gold: Collaborator Milk Stout, Widmer Brothers Brewing - Portland, OR
Silver: Cream Stout, Redwood Brewing Co - Flint, MI
Bronze: Subjugator Stout, P.H. Woods Restaurant & Brewery - Moreno Valley, CA

Category 53: Oatmeal Stout - 26 Entries

Gold: Sinner's Stout, Angelic Brewing Company - Madison, WI
Silver: Black Seal Stout, Rock Bottom Brewery - Long Beach, CA
Bronze: Wild Goose Oatmeal Stout, Frederick Brewing Company - Frederick, MD

Category 54: Imperial Stout - 29 Entries

Gold: Old Rasputin, North Coast Brewing Company - Fort Bragg, CA
Silver: Raven Maniac Stout, Prescott Brewing Company - Prescott, AZ
Bronze: No Disput'n Putin Russian Imperial Stout, Michigan Brewing Co. - Webberville, MI

Category 55: Old Ale / Strong Ale - 26 Entries

Gold: Merry Prankster, Rock Bottom Brewery - Portland, OR
Silver: Celebration Brown, Island Brewing Company - Carpinteria, CA
Bronze: Cabin Fever, Boundary Bay Brewery - Bellingham, WA

Category 56: Strong Scotch Ale - 18 Entries

Gold: Fat Bastard, Silver City Brewing Company - Silverdale, WA
Silver: Prescott's Wee Heavy, Bitter End Bistro & Brewery - Austin, TX
Bronze: Wee Heavy Ale, Capitol City Brewing Company - Arlington, VA

Category 57: Other Strong Ale or Lager - 29 Entries

Gold: Decade, Big Time Brewing Company - Seattle, WA
Silver: Dragonstooth Stout, Elysian Brewing Company & Public House - Seattle, WA
Bronze: Hopasaurus Rex, Steelhead Brewing Co - Eugene, OR

Category 58: Barley Wine-Style Ale - 35 Entries

Gold: Auld Gnarley Head Barleywine, Wild Duck Brewery & Restaurant - Eugene, OR
Silver: Old Boulder, Boundary Bay Brewery - Bellingham, WA
Bronze: Old Herb Barleywine, Southampton Public House - Southampton, NY

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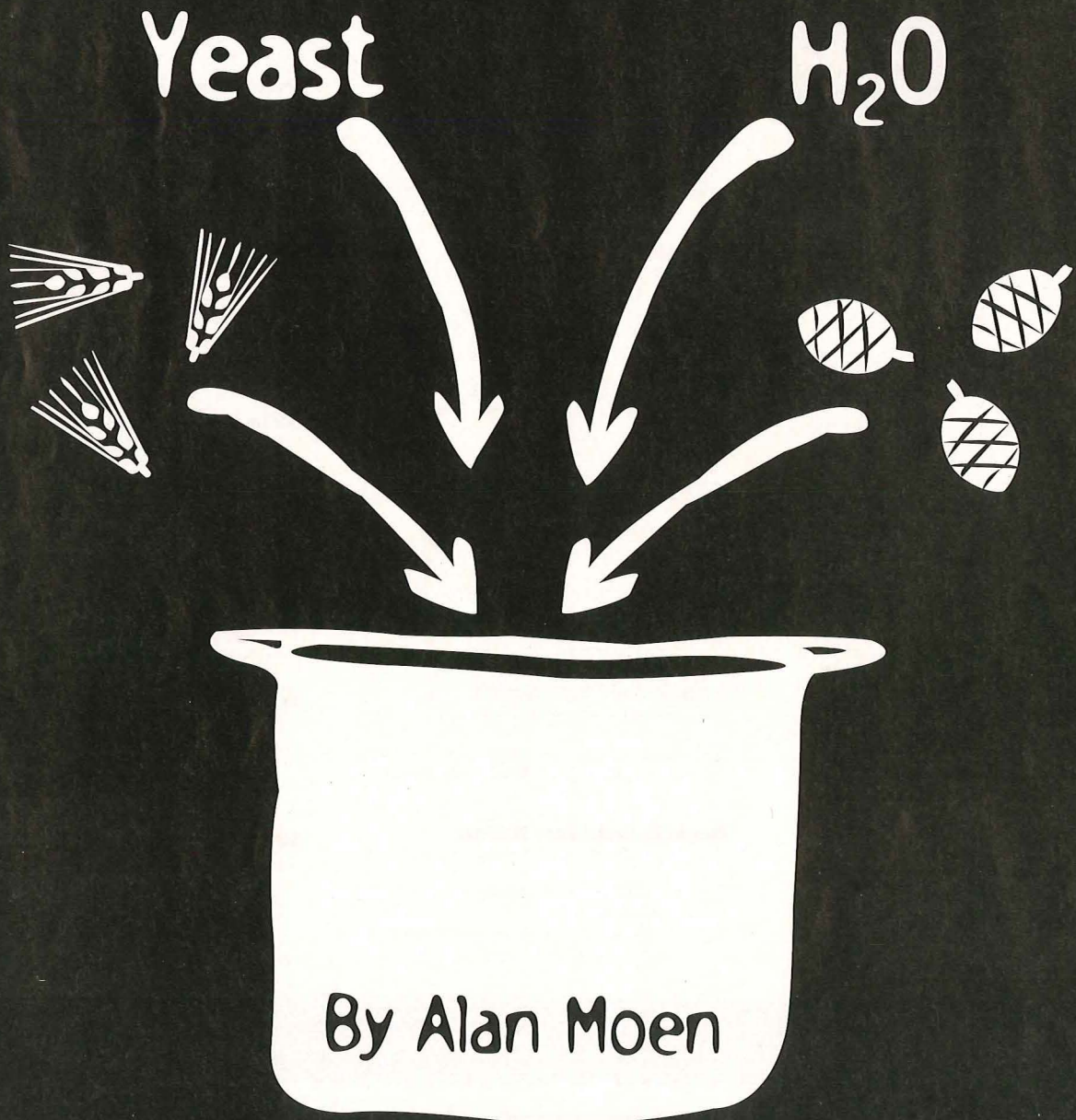
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Some of the non-technical practices I had learned to disparage over the years were actually not so backward after all, having produced many good brews.

I've made beer for more than 20 years.

During this time, I've watched the development of the homebrewing hobby come a long way, from crude to complicated.

I confess that my first batch was born of one part enthusiasm, one part good intentions and one part nearly complete ignorance. My recipe consisted of a can of malt extract, 10 pounds of corn sugar and dried yeast obtained from a homebrew shop (at least it wasn't Fleischmann's). I fermented my homebrew in a 10-gallon plastic tub (at least it was food-grade plastic).

Later, I learned to cut out the sugar. Later, I added some grain to the extract. Later, I learned to do a full grain mash. Still later I added liquid yeast and fresh hops. Finally I began using glass and then stainless steel for a fermenter. I felt by this time that I was really making great beer. The funny thing was, some of the non-technical practices I had learned to disparage over the years were actually not so backward after all, having produced many good brews. In fact, in the entire 6,000-year history of brewing, "brewing science" is no more than a few hundred years old.

In the days before hydrometers or thermometers, beer was brewed and consumed often throughout the civilized world. Although bacterial contamination was probably common in ancient brews, there's no reason to believe that good beer wasn't made as well. The quality of beer was important enough that bad brewers were imprisoned or even executed in England in the 16th century. Concern for quality control in brewing produced the famous Reinheitsgebot laws of 1516. Brewing was a respected craft that required the personal knowledge and experience of the brewer without the advantages of today's scientific instruments.

In this age of digital technology, we've gained much control over the brewing process. But we may have lost sight of the more subjective part of brewing that our predecessors evidently mastered so well. So for the moment at least, set your hydrometer aside and try to look at brewing from an older point of view. Here are some of the conclusions I've made as a result of doing this over the years—what really made a difference in my beer and what didn't.

Open Fermentation is Best

I think that brewing (particularly ales) is better done in an open container. When homebrewers began to use closed systems for brewing years ago (most seem to use a blow-off tube in a 6-gallon

glass carboy these days), they discovered two things. First, their yeast wasn't getting enough air to ferment actively (although the amount pitched is a crucial factor here). Second, hops—and their resins—tend to be ejected by the blow-off tube and frequently don't spend enough time in contact with the beer.

Some of the best breweries I know (Sierra Nevada, Samuel Smith, Hale's Ales) all practice open fermentation. Mike Hale actually has mirrors positioned above his tanks in his namesake brewery in Seattle so that visitors can see the wort bubbling away.

Plastic Works Fine

Yes, we all know that plastic absorbs odors, but food-grade plastic actually works quite well as a fermentation vessel for making beer. I've used plastic for 20 years (as well as glass and stainless steel), and never had a real problem with it as long as it was properly cleaned and sanitized. Also, it should never be used for anything else but beer. Lightweight plastic is a dream to work with compared to glass, and much cheaper than stainless steel. Don't knock it if you haven't tried it lately!

A Place for Beer

Like people, beer develops best in a stable environment. Without temperature-controlled tanks, ancient brewers had to rely on ambient temperatures for brewing. They no doubt found that cool, dark places such as caves or cellars were ideal for fermentation. For years when I lived in apartments, I lacked a suitable place to make beer, and my beer suffered for it. Once I owned a real cellar, the beer improved considerably.

But what else is going on in that cellar or basement can affect your brewing, too. The yeast from other fermentations (wine, cider) may affect (and infect) your beer. A friend of mine bought an old farm with a "cold room" that had been used for storing milk, and began to brew his beer there. Meanwhile, his wife started making cheese in the same room. Lo and behold, every batch of beer became infected with lactobacillus.

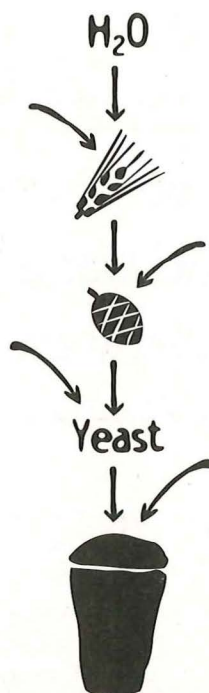
The Rule of Thumb

Pete Slosberg, in his autobiography *Beer For Pete's Sake*, mentions that the phrase "rule of thumb" comes from ancient brewing traditions before the invention of the thermometer. Brewers measured the wort's temperature by dipping a thumb or finger

into the cooling wort. When it felt like the correct temperature (close to body temperature), they added the yeast and could be fairly confident about getting a proper fermentation. (*Beer for Pete's Sake*, Siris Books, 1998, p. 54).

With all due respect, I think it's more likely that the term comes from measuring practices by early carpenters and builders. Feet, inches, cubits, etc. were all based on using parts of the human body as units of measure, so why not thumbs?

But testing wort temperature before fermentation with your thumb or finger (the sanitation police will get me for this) isn't such a bad idea. The beer should feel cool, not cold (unless you're making a lager). If



it's lukewarm or warm at all, it's probably too hot for the yeast and should be chilled further. With our body temperature at 98.6° F (37° C), it's amazing how cool 80° F (25.3° C) feels. Wait until the beer feels very cool (which will likely be in the 65 to 70° F (19-21° C) range) before pitching your yeast.

Smell, Look, Taste

Using your finger to check the temperature of wort is one way of using your senses to evaluate beer. But there are many other ways, too. One thing I've learned as a winemaker is to pay constant attention to my wine—smell it, taste it, watch the color. Of course, using a hydrometer or pH meter is handy, too, or even doing a titration to test

Damn the Computers, Full Brew Ahead!

While calculators and computers can be handy when you want to put a fine point on your recipe formulation efforts, the degree of control offered by most homebrew setups doesn't match the precision of those computerized calculations. The handiest devices for the homebrewer who wants to get on with the mash are Dr. Bob Technical's wheels of beer. These circular slide rules allow quick and easy calculation of grist bill and hop additions without the use of batteries, electrons or CPUs.

Even better, they are made of wort-proof plastic so that brew-room goofs don't short out your recipe calculations before you've made it to the final boil. Here are some other ideas for simple, non-electronic brewing.



**Dr. Bob's
Wheels**

Guesstimates are Cool

Let's face it, the difference between a half and two-thirds of a pound isn't all that big—

especially when you are adding it to a much larger grist bill. Hops and malts commonly come in pre-measured amounts like 1 ounce or 5 pounds. Rather than wasting time with a scale when you need a half-ounce of hops or 3 pounds of grain, you can often safely eyeball the quantity straight from the package.

Brew by Proportion

Another substitute for detailed measurements are proportions based upon a common measuring vessel. A bowl or large scoop might hold a

pound-and-a-quarter to a pound-and-two-thirds with casual filling. Using this alone, you could routinely measure out five or six containers of base malt and then supplement it with specialty malts: one scoop of crystal malt to make a pale ale, one-half to three-quarters of chocolate malt for a porter and so forth. Systems like this allow quick and easy recipe formulation as you brew.

Practice Makes Perfect

Once you have been brewing for a while, you notice things that tend to be the same every time you brew. For instance, you probably know about how full your boil kettle is when you have 5 gallons of beer in it. Many brewers have a good feel for how many "glugs" of bleach they need to sanitize a fermenter. And how many people really look at those carbonation charts when force-carbonating in a soda keg? Use your knowledge and experience and you can speed your brewing day.

Your Own Rules of Thumb

Every brewer has to work out his own water chemistry based upon the water he or she brews with. But in most cases, once you have worked out the kind of treatment you need for pale hoppy beers and dark or malty beers, you've got the information you need for most of your future beers. Based upon past experience, brewers may get into the habit of tossing in either a bit of gypsum or a bit of calcium chloride for every batch: the difference depends on what kind of beer you are making. (Gypsum for pale and hoppy beers, calcium chloride for dark or malty beers.)

—Ray Daniels

the acidity, but no one will be doing that with the finished product. Your senses can tell you a lot about what's going right or wrong throughout the entire process.

In beer, this is even more important. Off odors (H_2S , mercaptans, DMS, excess diacetyl, stale hops, vegetal aromas) are a dead giveaway that something's wrong. In most cases, it might already be too late to rectify the situation, but it's better to dump the beer than hope that a miracle will take place and the beer will improve in time. The

The phrase "rule of thumb" comes from ancient brewing traditions before the invention of the thermometer. Brewers measured the wort's temperature by dipping a thumb or finger into the cooling wort.

exception is sulfur odors (such as in a lager), which are usually produced by the yeast and tend to fade with additional conditioning, especially at cool temperatures.

Color and clarity are also something to watch. Obviously, if you're trying to make amber ale and your beer looks like stout, you've used too much dark malt. If the beer remains stubbornly cloudy, it may have excess protein. On the other hand, if it's crystal clear, that could be a signal of a problem, too—as homebrew judges can well attest, wild yeast infections tend to produce the best looking beers of all!

Tasting your beer at all stages is important. The cooled raw wort will give you a good indication of what the future beer will be, although it takes time to learn whether you've overhopped it or given it too much malt. A well-made wort will have a depth and balance of flavors even before the yeast begins to work on it. Don't be afraid to try it often as it matures.

Speaking of yeast, smell that too before you pitch, especially if you're repitching third or fourth generation slurry. Yeasts can easily mutate, and often broadcast their changes in their aroma before they become active in the wort. If you're not sure your yeast is clean, don't use it.

I taste my beer before, during and after fermentation. In a way, the "aftertaste" is the most important one, since it's crucial not to keg or bottle most brews until they have conditioned properly in secondary fermentation. Beer that's ready for the final stage is like a performer in a dressing room, getting ready for the show. Don't shove them out on stage too soon!

It's Only Beer

Having brewed, judged, drunk and written about this magical beverage for a long time now, every once in a while I have to stop myself from being too serious about it. As wonderful as beer can be, it's still just something to drink. I've had bad beers made by good people (and vice versa) enough to know that beer isn't the most important thing in life. Put your brewing in perspective: use it to celebrate life, to enjoy with friends and family, at special occasions and events. The best beer in the world is a bitter brew indeed (not that I don't like bitter brews) if one must always drink it alone.

Beer, many scholars say, brought us civilization. We need to return the favor by drinking in a civilized way. You can be a sorry drunk on esoteric Trappist ale as surely as you can on Budweiser (although the former is definitely the better way to go). Take some time and enjoy what you've made, even if it's not world-class or perfect. And keep your hydrometer to yourself.

Alan Moen still brews after all those beers in Entiat, Wash.

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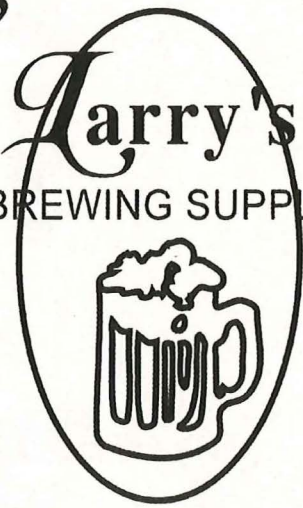
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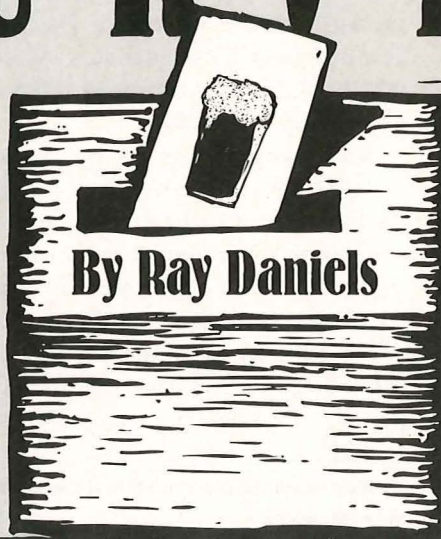
ZYMURGY'S



BEERS



SURVEY



Sure, you are a homebrewer, but that doesn't mean that every beer you drink is one you made yourself. Heck the pro brewers don't limit themselves to drinking only what they brew, so why should you? Over the years, you've probably tried scores of different commercial brews and the more studious of you have even kept lists that now number into the thousands. But no matter whether you are a casual consumer or a serious student of suds, we are all homebrewers and that means **we know good beer.**

That's the beauty of a *Zymurgy* best-beer survey: we're polling folks who know what the heck they are talking about when it comes to beer. Not to be too arrogant about the merits of homebrewing

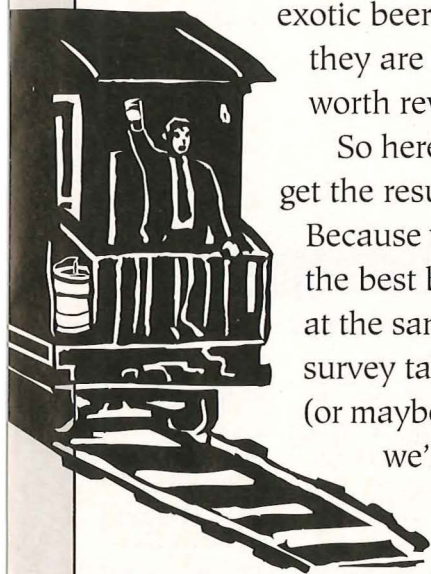
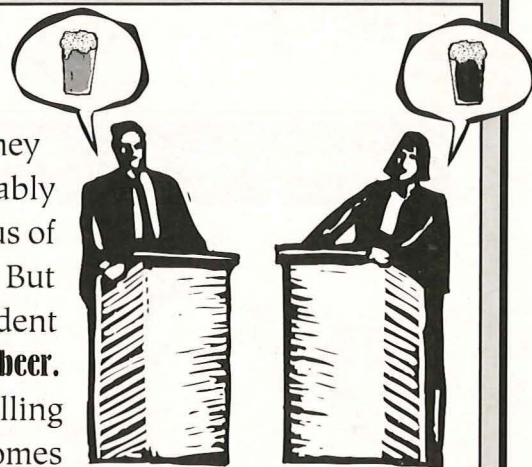
here, but we simply are not a bunch of Joe-six-packers who think that Heineken is an exotic beer. As a result, the top beers from this survey are likely to be great, indeed they are likely to be **world-class brews.** As such, they'll be something worth noting, worth rewarding and certainly worth emulating.

So here's the plan. We're polling you about the **best beers in America.** But when we get the results tabulated, we're going to keep them under our hat for a while. Why? Because we are homebrewers, that's why! After all, if we are going to find out what the best beers in America are, then **we want to give you recipes for brewing them yourself** at the same time that we announce the results. So, once we have the results of the survey tabulated, each of the top beers will be assigned to a capable homebrewer (or maybe two) for research and recipe development. In the July-August 2003 issue we'll run the complete tabulation of top beers and stories on how to brew the best of the best so that you too can give these beers a try at home.

To get all this done, you have to get your votes in promptly. **Please complete all voting by March 15** as anything received after that date will be trashed. **You can vote for up to 20 beers,** but if you vote for more than that, they won't count. And you don't have to vote for 20—just vote for those that deserve your undying devotion, the beers you would take with you for a year at the cabin, the beers you would feel lost and empty without, the beers that you wish you had made first so that you could ride their tasty coattails to fame and fortune.

To vote, write down the proper names of the beers (spelling counts!) and send them in along with your name and address or member number. You can vote by e-mail or plain old snail mail. Send e-mails to bestbeervote@aob.org or via U.S. postal service to Zymurgy's Best Beer Vote, Association of Brewers, PO Box 1679, Boulder, CO 80306-1679.

Come on, you know you want to . . . vote!



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For Geeks Only

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

A Primer on Process Control and Controllers

By Nate Wahl

Brewing incorporates a number of processes that may be controlled by electronic devices called controllers. These devices receive a signal from a sensor or measuring device (e.g. a thermometer), compare the signal to a required value set by the operator (e.g. desired mash temperature) and produce an outgoing signal that is used to adjust the process (e.g. turn on a heater).

Controllers are in widespread use these days and can easily be incorporated into homebrewing systems. In this issue and the next, we discuss electronic process controllers and their use. This issue covers the basic types of controllers and their operation. In the next issue, we'll look at practical implementation of their use in brewing.

What is a Controller?

Controllers come in various forms. All focus on a setpoint or target value that is compared to some measurement of the process.

A simple controller may be an on-off device, where the controlled portion of a process is merely switched on or off by means of monitoring another related parameter which drives the process. In other words, a simple controller looks at a variable, and decides whether or not to change a process input to keep that variable at or near a setpoint.

For homebrewing, the variable that we primarily want to look at is temperature,

whether it is the temperature of a mash (or actually the fluid moving into or out of the mash), a hot liquor tank, a fermentation chamber of some sort or a lagering/serving system.

A PID (proportional, integral and derivative) controller is more complicated, but the intent is that it is much better at maintaining a temperature at or near a setpoint, and capable of controlling the system to achieve smooth, rapid temperature changes (particularly heating for mashes) without harmful fluctuations, overshooting or hunting around the setpoint.

Each PID incorporates a different control logic and when combined, they make for an effective control circuit. We'll look at these three in a moment, but first let's explore the different kinds of controllers, how they work, what they control, and their advantages and disadvantages.

Simple Controllers

Simple controllers respond to measurement input by sending a simple "on" or "off" output without application of any additional logic. The difficulty here comes when a control switches off at exactly the same point it switches on, causing the output to be constantly going on and off with every small temperature change around the setpoint. This would result in unnecessary wear and tear on the equipment, and tem-

perature constantly swinging back and forth. To solve this problem, a simple on-off control also has a value for something known as deadband.

By adding a deadband, or a few-degree difference between when the circuit is activated and then becomes inactive as the system responds, these problems are reduced or eliminated. However, a new problem is induced; the temperature is now slowly but constantly swinging around the setpoint by the amount of deadband. For devices like refrigerators and freezers this is normally not a problem; but in the case of mash temperature, a few degree deadband could result in undesired saccharification changes. Yeast is also purportedly suspect to temperature swings when fermenting, although the mass of the wort would tend to even things out.

For home heating, your thermostat actually has a little heater inside it that forces the heat system to turn off a while before the upper (deadband) desired tem-



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

perature is reached. This prevents overshooting, which allows the heat added to the house to even out. The further from the setpoint the room temperature is, the quicker the thermostat will cool down, and the sooner the heat will come on.

The effect of this little heater is to even out the cycles that the thermostat makes, and hence the wear of constantly starting and stopping a furnace is eliminated. The house stays more evenly heated, and instead of changing how often the heat system comes on with increased load (colder outside), the system just runs for a longer time each cycle (room temperature sags an imperceptible amount to cause this change to occur).

More Sophisticated Controllers

Beyond sending a simple and immediate on/off signal in response to input, controllers can apply some logic to create moderated or variable output. The way that they do this depends on the type of device being controlled: some devices themselves will operate at variable settings while others only function in "on" or "off" mode.

A refrigerator is either on or off; there is no partial "on" state. In a case like this, a controller creates a proportional response by varying the amount of time that the unit runs in response to the temperature input. The more losses the unit has to make up for, the larger proportion of the time the unit will be running.

Similarly, with some digital controllers, the output is on a percentage of a fixed time period, depending on the amount of load the system sees. So, for example, if this time period is set at 10 seconds and the

system load is 40 percent of maximum capacity, the controller will cycle its output on for four seconds and off for six seconds. It then checks system load again, and changes its output times accordingly. If the load went up to 63 percent, the unit would cycle on for 6.3 seconds, and then be off for 2.7 seconds, etc. What is happening here is that the on/off device is imitating its variable output cousin.

Some heating/cooling devices can be run at partial settings, so there are controllers that can send a partial output. In the variable output controllers, if system load is 44 percent of the device capacity, the controller output gives 44 percent of signal out. So, if it is controlling a throttle valve on a HEARMS that needs a 0 to 10 volts direct current (VDC) signal to go from full closed to full open, it would be putting out 4.4 VDC, and the valve would go 44 percent open. More demand equates to more output, up to the capacity of the system.

The advantages of on/off control are the simple nature of the controlled devices; a heat or cooling source is turned on or off by a relay or an SSR or other electrical switch; a solenoid valve is either opened or closed (which is all most solenoid valves do, by the way; very few of them are capable of throttling).

The disadvantages of on/off control are that the controlled device is always cycling on and off, which in many cases can lead to more rapid wear of the components. In addition, by its nature, the effect of the controlled device is that temperatures are always swinging around at least a little bit at the control point. Overall, it may not make much difference in the temperature of the whole system if the system itself moderates the temperature swings or the total cycle time is kept short enough.

Wisely choosing the cycle time, if applicable, can do a lot to balance the advantages and disadvantages of the two methods.

The advantages of the variable, or analog output, controllers are that the output is smoothly changed, and the resulting controlled temperature is not cycled; at least not if the controller is properly tuned, that is.

The disadvantage of variable control is that the devices that are being controlled are more complex by their nature; a valve must

be moved to a certain position, a way must be available to control a heat source output, etc. These devices are also typically more expensive, and can be finicky!

Basically, from a homebrewer's point of view, the simplicity in on/off control usually wins over the advantages over variable control. Controllers that vary their output on time percentage more closely approach the variable control in practice. However, either way may work, and it depends on the situation and parts availability as to what is the best solution.

Proportional Controllers

The proportional controller has the desired temperature (setpoint) input, and compares the setpoint to the actual temperature. From there it sends a particular output that is proportional to the amount of this deviation. For instance, a controller could be set up to maintain 150 degrees; at 150 degrees, its output would be half of full output (50 percent).

As the temperature drops, for instance, the controller would increase its output an amount proportional to the difference. If, say, the actual temperature dropped to 148 degrees, the controller may increase its output from 50 percent to 60 percent. Similarly, if the temperature drops to 146 degrees, the output would increase to 70 percent, and so on.

Likewise, if the actual temperature rose to 156 degrees, we can see that the controller output would drop to 20 percent; and at 160 degrees the controller output would be full off, or 0 percent.

While proportional control works well for some processes, it is not ideal in our case. Since it may not be possible to hold temperature at the setpoint at 50 percent system capacity, the actual temperature may settle out somewhere else near the setpoint, where the demand of the system (load) equals the capacity of the system (percent of max heat), as determined by the controller output.

Technically speaking, proportional control works well where a simple control solution is required, as long as it is acceptable that there may be an offset between the desired temperature and the actual temperature held; and that this offset will change depending on system load ratio. (Load ratio



can be defined as the amount of actual heat/cooling needed to maintain temperature, divided by total system heat/cooling capacity of the system.)

The amount by which a proportional control adjusts its output for a given temperature change is known as the "gain" of the circuit. The proportional band is the amount of temperature change between when the controller is at minimal output and maximum output. A smaller band yields finer control, but the control may become erratic and cycle around the setpoint. Too large a band results in a potentially larger offset.

The proportional setting should be set so that the controller can adjust to a stable temperature close to the setpoint without drifting around.

Integral Controllers

As we can see from above, a proportional control will have an offset from the setpoint value. An integral function helps a controller hold a target temperature more closely, without an offset, by adjusting the output of the proportional controller up or down. Integral controllers typically use this signal as a base and modify it, as we will discuss below. These controllers are typically referred to as PI controllers. Rarely is integral control used on its own.

The way that an integral circuit does this is to determine the difference between the indicated temperature and the setpoint; it then adds to or subtracts from the proportional output until the difference is zero; at that point it stops changing the signal. (The signal is actually electronically "summed" with the proportional circuit output.)

What these circuits do is determine the difference (offset), and continue to change the proportional signal. The larger the offset is, the more rapidly the proportional signal is modified; and, the longer the offset exists, the more the proportional signal is kept increasing or decreasing. This action is called integral.

The total output signal is increased/decreased based on an error (the error is integrated, or is based both on how large it is and how long it stays there; the proportional signal, error and time components are *integrated* into the controller output.)

What that means to us is that if the temperature is not at setpoint, the integral circuit will boost the proportional gain. The further the temperature is from setpoint, the harder the control attempts to return it, and the longer the offset exists, the more the control signal is adjusted.

The value for integral signal action is in units called "repeats per minute." While the definition can be more complex, to explain it is fairly simple. If an error exists, a certain signal modification is applied, and keeps getting reapplied as many times per minute as has been set by the controller user input. So, for explanation purposes, for a 1-degree error the controller may increase the signal 0.1 volts; it does so however many times per minute the operator has set the controller integral value.

Obviously, the benefit of integral control is that you can actually hit and hold your target temperature. With too little integral, the setpoint is never achieved; with too much, the system can hunt around the setpoint, cycling back and forth above and below the desired temperature.

On systems where there is a considerable delay between where the heat is input and the temperature is sensed, integral control can also cause large overshoots, as it keeps trying to correct the offset and has overshoot by the time the setpoint is seen; so a large error in the opposite direction is needed to remove this overcompensation. Remember, integral keeps adding as long as there is an offset present.

The integral setting should be set so that any offset is quickly removed, but without the temperature hunting around the setpoint.

Derivative Control

Derivative is an inverse time function; it depends on a rate of change to operate. That sounds complex, but the action can be easily explained.

Derivative controls watch the input (temperature), determine how fast it is changing and modify the controller output signal (typically passed from the proportional plus integral circuits) to accommodate. Thus the mystical "PID control" that we've heard so much about.

If temperature is coming up to setpoint very fast after a setpoint change, the deriv-

ative action will serve to lower the controller output to prevent overshooting the setpoint.

Or, if temperature is stable, and then starts drifting downwards, integral control should eventually bring it back to setpoint; however, if the change is rapid, that could take a while and it could get far from the setpoint. Derivative control can kick the controller output up to get the system back on course, because it is rate based.

Derivative control, therefore, can have obvious benefits in a system where temperatures can move quickly. The problem with derivative control is that by its very nature, it can sometimes be too fast, and therefore may create an unstable system. Derivative control must be used in small amounts, or the corrections it makes may change the system so rapidly that it over responds, and temperature can swing wildly. The temperature swings can get bigger and bigger. (This is known as divergent swings in industrial settings.)

Too large of a derivative setting is particularly problematic in systems where a delay between the signal change and the resulting temperature change is long. This would be the case where the whole grain bed would have to be heated up before the measured output begins changing.

The derivative setting should be kept small, so that if the temperature changes rapidly the controller output is adjusted somewhat, but must be kept low enough that temperature control remains stable at all times.

Getting Practical

This introduction to controllers and their operation sets the stage for us to look at the application of controllers to brewing equipment. In the next installment, we'll examine issues related to practical operation of these devices in the making of better beer.

Nate Wahl has been homebrewing for six years, and cranks out all-grain brews on a PID-controlled HERMs system that "will absolutely nail a mash step within a degree, every time." In real life, he is a Computer Based Training and Technology Instructor involved with a curriculum that covers all aspects of engineering. Contact him at cruiser@coastalwave.net.

Bitter about a Balancing Act

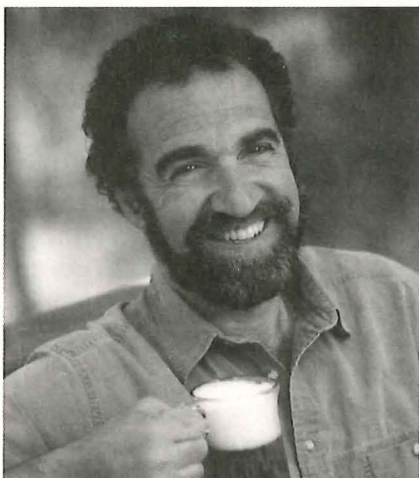
I need to share a perception I have. Now don't jump all over me after you've read this. I may be off target, but I have a hunch what I want to discuss is something worth mentioning.

I love the taste of beer when it suits my vision of perfection. There are many styles I enjoy: dark, light, ale, lager, lightly hopped, aggressively hopped, malty, full bodied, light bodied. My mood swings. I eat different foods. And the beers I prefer drift along with the moments in my life.

Let me give you a hint at what direction I'm heading: Bigger is not better. No, I'm not talking about alcohol content. My observations have to do with the balance of beer flavors. Let's get to the point.

I love India Pale Ales as one of the styles regularly enjoyed. Stating the obvious: "All IPAs are not created equal," leads me further into this discussion. Only recently have I realized that there must be an underlying reason why beer lovers such as myself and other close friends mysteriously prefer a certain balance of hop character in our IPAs (and every other beer). Indefinable? Well, somewhat, but I've been making beer regularly for 30 years. When I come across a beer that has wonderful hop balance at a brewery or brewpub or from a homebrewer, I always ask "What kind of hops?"

Here's my assessment: That aggressive, harsh bitterness evident in many versions of beer styles brewed by American craft and homebrewers is more often than not attributable to the use of high alpha hops (yes, I know that water composition and other factors influence the perception of bitterness too). Furthermore that assaulting hop bitterness is difficult to balance with malt and other fermentation characters. What results are so many beers with a degree and quality of hop bitterness that more often than not is quite aggressive.



Now that I've got your ire up, hear me out. I love hop bitterness. I take my espresso by the single shot without additives. But without getting into technical terminology about cohumulones (worth knowing about if you are brewing beers with more than 25 bitterness units) there is a certain quality of bitterness the use of high alpha acid hops contributes to all beers. I believe achieving the same level of bitterness using lower alpha acid hops makes a world of difference in balance and drinkability.

Two points I want to make here. The level of bitterness doesn't need to change. The quality of bitterness will enhance the quality of your homebrew. I don't think you will be any less of a hophead by making a switch.

Another point: Low alpha acid hops are commonly referred to as "flavor and aroma" hops. That's a marketing tag for this age of brewing. Those lower alpha acid hops are every bit a bittering hop as those high alpha hops. Here we go with another salvo: Is the reason to use high alpha hops for "bittering" a cost-cutting measure? If so, you've got to be kidding me. This is a mindset of an accountant at a large brewing company, not that of a homebrewer who cares about total quality. Calculate the cost savings of using

a 4- or 5-percent alpha hop compared to a 10- to 15-percent alpha hop. Compare that to the cost of everything else, including your precious time. Using high alpha hops as a cost-cutting measure, thinking that it really does not affect the quality of the final product, is dangerously wrong. It most certainly does in my opinion. While it may not make a whole lot of difference in quality for the mass-produced light lagers that do not have any hop character anyway, it certainly does make a difference for the crafted beers homebrewers are making. High alpha acid hops are cultivated for the needs of the largest brewing companies in the world. They aren't developed for the use of homebrewers or craft brewers. That, I believe, is fact. If you use the hops the large brewers use then you ultimately are left with no other choice.

Okay, I admit I'm trying to think outside the box here. Why do we do the things we do? Do we revisit our reasons? What we may consider a unique American tradition may have been a faulty digression that no one was really paying much attention to at the time. High alpha acid hops are developed and grown for more profitability, processing into extracts and to save money for the large brewing companies producing light lagers with little or no hop character.

With regard to hops, what we are endangering is the great variety of low alpha hops that produce wonderfully unique flavors, aromas and balance without impact. Why are they endangered? Because we believe it doesn't make a difference to use high alpha for bittering and we ignore the use of hops that often lend much more character and drinkability. Great hop varieties are an endangered plant/food "species." If we don't use them then growers don't grow them. Choice becomes more and more limited; we are left to whatever the large brewers use.

Final thoughts: I (continued on page 52)

PHOTO BY MICHAEL LICHTER

JANUARY

10 Big Beers, Belgians & Barleywines Festival. Vail, CO. **AHA/BJCP SCP.** Homebrew competition for big beers, Belgians and barleywines. Sponsoring Club: High Point Brewing. Deadline: 12/1-1/3. Fees: \$5. Awards Ceremony: 1/10. Contact: Laura L. Lodge. Phone: 970-524-1092, 970-949-0600. E-mail: BigBeersFestival@hotmail.com

18 8th Annual Big Bend Brew-Off. Tallahassee, FL. **AHA/BJCP SCP.** This one-day competition is for all categories of beer, mead and cider. Sponsoring Club: North Florida Brewers League. Deadline: 12/31-1/11. Fees: \$6. Awards Ceremony: 1/18. Contact: Larry Agee. Phone: 850-576-0540. E-mail: la2532@aol.com Web: www.nfbl.org

18 Winter Warmer 2003. Sandwich, MA. **AHA/BJCP SCP.** The event is a chili cook-off & homebrew competition. Field is limited to six categories, (5) Scottish Ales, (7) India Pale Ales, (10) Brown Ales, (15) Porters, (16) Stout, & (22) Spice, Herb and Vegetables. Sponsoring Club: Cape Cod Lager & Ale Makers. Deadline: 11/17-1/13 Fees: \$5. Awards Ceremony: 1/18. Contact: Jon C. Coster, Jr. Phone: 508-420-5860, 508-360-7163. E-mail: Drksnake91579@aol.com

25 Bitter & English Pale Ales Club only Competition. Rochester, MN. **AHA Club-Only Competition. AHA/BJCP SCP.** All AHA Registered clubs are welcome to participate. One two-bottle entry per club. Winning entries earn points toward the AHA Homebrew Club of the Year Award. Sponsoring Club: Minnesota Timberwolves. Deadline: 1/20. Fee: \$5. Awards Ceremony: 01/25. Contact: Leo Vitt. Phone: 303-447-0816 x 121, 507-285-0468. E-mail: lvitt4@yahoo.com Web: www.beertown.org/AHA/Clubs/clubcomp.htm

25 Meadlennium 2003. Orlando, FL. **AHA/BJCP SCP.** Sponsored by Central Florida Home Brewers, this competition is one of the only mead-only competitions in the USA. Deadline: 1/3-1/21. Fee: \$6. Awards Ceremony: 2/2. Contact: Ron Bach. Phone: 407-696-2738, 407-262-7422 x 7043. E-mail: bachian@juno.com Web: www.cfhb.org

FEBRUARY

1 The Coconut Cup. Coral Gables, FL. **AHA/BJCP SCP.** Competition for all categories, with special award for best beer using coconut. Sponsoring Club: Miami Society of Homebrewers. Deadline: 1/13-01/24. Fees: \$6. Awards Ceremony: 02/01. Contact: Jacob Miller. Phone: 305-446-6692. E-mail: jakem1@ix.netcom.com Web: www.hbd.org/mash/coconut.html

3 War of the Worts VIII. Montgomeryville, PA. **AHA/BJCP SCP.** Sponsoring Club: The Keystone Hops. Deadline: 1/20-2/03. Fees: \$6 1st entry, \$5 add. Awards Ceremony 2/08. Contact: Jason Harris. Phone: 215-855-0100. E-mail: jason@keystone-homebrew.com Web: www.keystonehomebrew.com

8 10th Annual Peach State Brew-off. Atlanta, GA. **AHA/BJCP SCP.** Sponsoring Club: Covert Hops Society. Deadline: 1/18-1/25. Fees: \$6. Awards Ceremony: 2/8. Contact: Chris Collier. Phone: 770-436-6932, 404-653-1558. E-mail: coverthops@yahoo.com Web: www.coverthops.com

8 Mill Creek Classic. Salem, OR. **AHA/BJCP SCP.** Sponsoring Club: Capitol Brewers of Salem Oregon. Deadline: 1/27-2/1. Fees: \$6 for 1st, \$5 add. Awards Ceremony: 2/8. Contact: Kevin LaDue, Sandy LaDue and Harvey Twombly. Phone: 503-581-4190, E-mail: keladue@aol.com

9 Fur Rendezvous Homebrew Competition. Anchorage, AK. **AHA/BJCP SCP.** All BJCP styles accepted. Sponsoring Club: Great Northern Brewers Club. Deadline: 2/7-2/8. Fees: \$4. Awards Ceremony: 2/9. Contact: Fil Spiegel. Phone: 907-276-7678, 907-563-7977. E-mail: feli@gci.net

16 6th Annual Eastern Connecticut Homebrew Competition. Willimantic, CT. **AHA/BJCP SCP.** Sponsored by Hop River Brewers. Deadline: 02/09. Fees: \$5. Awards Ceremony 02/16. Contact: Paul T. Zocco. Phone: 860-456-7704. E-mail: zoks.homebrewing@snet.net Web: www.homemadebrew.net

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

JULY 2001

7th Annual Commander Saaz Interplanetary Homebrew Blastoff, 103 entries
Steve Mitchell of Grant, FL.

MARCH 2002

Hurricane Blowoff 2002, 161 entries - Phil O'Ryan of Tampa, FL.

JUNE 2002

O.C. Fair Homebrew, 147 entries - Jeff Toland of San Juan Capistrano, CA

JULY 2002

8th Annual Commander Saaz Interplanetary Homebrew Blastoff, 245 entries
Wes & Nancy Sampson of Ocoee, FL.

AUGUST 2002

Colorado State Fair Homebrew Competition, 64 entries
John Indelicato of Colorado Springs, CO.
Kentucky State Fair, 88 entries - Roger Young, of Taylorsville, KY.
Montgomery County Fair, 70 entries - Mel Thompson of Germantown, MD.
Mt. Brewer Open, 116 entries - Gordon Strong of Beavercreek, OH.
Western Washington Fair, 108 entries - Jonny Miner of Seattle, WA.

SEPTEMBER 2002

4th Annual Palmetto State Brewer's Open, 180 entries - Bernie Kessel of Weaverville, NC.
The 8th Annual Brewer's Dream Homebrew Competition, 56 entries
Scott Lasky of Vernon Hills, IL.
Autumn HOMEBrew Review, 113 entries
Susan Ruud & Ray Taylor of Harwood, ND.
Santa Cruz County Fair Homebrew Competition, 58 entries -
Craig Agnor & Seth Johnson of Santa Cruz, CA.
Tulare County Fair, 16 entries - Julian Lucero of Visalia, CA.

OCTOBER 2002

7th Annual Music City Brew Off, 206 entries - John Campbell of Kingston Springs, TN.
Oktoberfest Zinzinnati, 133 entries - Eddie Vandegrift of Lee's Summit, MO.
Schleswig Bier Contest, 65 entries - Wayne Simerly of Omaha, NE.
Second Annual OBC Fall Classic - 107 entries - Dave & Mandy Hayes of Forest Grove, OR.
SE Alaska Autumn Pour, 62 entries - D.G. "Scorch" Burnet of Juneau, AK.

NOVEMBER 2002

Novemberfest, 147 entries - Seth Johnson of Boulder, CO.

AHA SCP = American Homebrewers Association Sanctioned Competition Program. **BJCP** = Beer Judge Certification Program. The Calendar of Events is updated weekly and is available from the Association of Brewers: info@aob.org or www.beertown.org on the Web. To list events, send information to **Zymurgy** Calendar of Events. To be listed in the March/April Issue (Vol. 26, No. 2), information must be received by January 4, 2003. Competition organizers wishing to apply for AHA Sanctioning must do so at least two months prior to the event. Contact Kate Porter at kate@aob.org; (303) 447-0816 ext. 123; FAX (303) 447-2825; PO Box 1679, Boulder, CO 80306-1679.

MARCH

21-23 Kansas City Bier Meister's 20th Annual. Lenexa, KS. **AHA/BJCP SCP.** Kansas City Bier Meisters 20th Annual Homebrew Competition and Banquet, special activities: Brewer's Breakfast, Kansas Pub Crawl. Special guest speaker: Charlie Papazian, Sponsoring Club: Kansas City Bier Meisters. Deadline: 1/15-2/8. Fees: \$6 for 1-5 entries, \$5 for 7 or more. Awards Ceremony: 2/22. Contact: Jackie Rager & Robin Beck. Phone: 913-894-9131, 913-451-9255. E-mail: jrager@swbell.net Web: kcbeermeisters.org

1 AHA TechTalk Homebrew Competition. Denver, CO. **AHA/BJCP SCP.** Foam on the Range hosts the first annual AHA TechTalk Competition. Entries accepted in Categories 6A, 6B & 6C American Pale Ales as well as Category 10D American Brown Ale. Must be an AHA member to enter. Deadline: 2/03-2/26. Fees: \$5, 1st entry; \$4 add. Awards Ceremony: 3/01. Contact: Jon Douglas. Phone: 303-766-6747. E-mail: events@foamontherange.org Web: www.foamontherange.org

3 Washoe Zephyr Zymurgists Homebrew Competition. Reno, NV. AHA/BJCP SCP. Sponsoring Club: Washoe Zephyr Zymurgists. Deadline: 2/8-2/22. Fees: \$6 first, \$4 add. Awards Ceremony: 3/02. Contact: John C. Tull. Phone: 775-784-4804, 775-329-2537. E-mail: johnctull@fastmail.fm Web: 134.197.55.114/vzz/vzz-comp 2003.html

8 9th Annual Boston Homebrew Competition. Watch City Brewing Company. Waltham, MA. BJCP SCP. BHC9 is an MCAB6 qualifying event, as well as part of the New England Homebrewer of the Year circuit. All BJCP categories including Mead and Cider will be

judged. Best of Show and Brewmaster's Choice (you get to brew your recipe at Watch City!) prizes will be awarded. Sponsoring Club: Boston Wort Processors. Deadline: 2/01-2/21. Fee: \$5. Awards Ceremony: 3/8. Contact: John Doherty. Phone: 508-923-6376. E-mail: dohertybrewing@yahoo.com Web: www.wort.org

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

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



World of Worts (from page 50)

concede that high alpha acid hops and their aggressive character do have a following among many homebrewers. But returning to our craft roots and examining our premises could help increase what's called the balance and drinkability of your homebrew. I don't want it suggested that this is "watering down" the character of homebrew to appeal to the masses. I am contending that we may be drifting away from giving homebrewers the choice of a smoother, balanced beer with still, plenty (and I emphasize plenty!) of character.

So here's a taste of what I'm passionate about.

PAX - Pale Ale Xtra

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

- 8.0 lb (3.6 kg) light or light amber malt extract syrup
- 0.5 lb (225 gm) crystal malt (55° L)
- 1.0 lb (454 gm) crystal malt (10-15° L)
- 3.0 oz (84 gm) of a 5% alpha hop such as Goldings, Fuggles or Cascade (15 HBU/420 MBU) whole hops (60 min)
- 1.5 oz (42 g) 5% alpha hop such as Goldings, Fuggles or Cascade (15 HBU/420 MBU) whole hops (15 min)
- 1.0 oz (28 g) Cascade hop pellets (dry hopping)
- 0.25 tsp (1.2 ml) powdered Irish moss
- 0.75 cups (180 ml) corn sugar (priming bottles) or 0.33 cups (80 ml) corn sugar for kegging

Wyeast American Ale Yeast #1056 or White Labs English Ale Yeast

- Target Original gravity: 1.065 (16° B)
- Approximate Final gravity: 1.014 - 1.018 (3.5-4.5° B)
- IBU's: about 50
- Approximate color: 14 SRM (28 EBC)
- Alcohol: 6% by volume

Brewer's Specifics

Add crushed crystal malt to 2.5 gallons of water, raise temperature to about 150° F (65.5° C) and hold for about 30 minutes. Then strain out the grain from the crystal malt extract you have just made. Add malt extract syrup to the hot crystal malt liquid. Bring to a boil and add "60-minute hops." Boil for 45 minutes. Then add "15-minute" hops. Boil for 5 minutes and then add Irish moss. Boil for 10 more minutes. After a total wort boil of 60 minutes turn off the heat, strain out and sparge hops and direct the hot wort into a sanitized fermenter to which 2.5 gallons (9.5 L) of cold water has been added. If necessary add more cold water to achieve a 5-gallon (19 L) batch size. Pitch a good dose of healthy active ale yeast when temperature of wort is about 70° F (21° C), then primary ferment at temperatures between 65 and 70° F (18.5 to 21° C) for about four to six days. Rack from your primary to a secondary and add the hop pellets for dry hopping. If you have the capability, "cellar" the beer at about 55° F (12.5° C) for 7 to 10 days.

- Prime with sugar and bottle or keg when complete.

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

HOMEBREW BITTERING UNITS (HBUs)

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

INTERNATIONAL BITTERNESS UNITS (IBUs)

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

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

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

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

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

BY JIM HOMER

For this issue we have an assortment of styles: Helles, Scottish Ale, IPA, Altbier and Framboise.

The third time was the charm for Mark Messmer and his "Helles III 3rd Time a Charm." He doubled the amount of Vienna malt and increased the yeast starter from the first two attempts at making a Münchner Helles and now has a silver medal for his efforts.

Dean Fikar based his recipe on "McFormanek's Scottish Ale" which Joe Formanek used to take third in the 2001 Master's Championship of Amateur Brewing III. Dean increased the smoked malt to earn his bronze medal. The recipe has the unusual step of doing a decoction mash, which Dean feels stabilizes the flavor and adds maltiness.

Bronze winner Paul Long started brewing in June 2001, picking up his first national medal less than a year later. He jumped in with both feet by starting with all-grain brewing. We have his IPA recipe.

Russ Bee studied the book *Altbier* by Horst D. Dornbusch to develop his silver-medal-winning altbier recipe. This is one of his favorite beers—he has brewed this recipe about 12 times in the last four years. Like the Scottish from Dean, this is another decoction mash beer. Russ said, "I am a big believer in decoction mashes for German beers. [It] gives you flavors you don't get with infusion mashing."

The Framboise from Steve Piatz took four years from brewing to judging. Steve has tried to replicate the traditional lambic brewing process. He cools the wort overnight just as they do in the coolships, and ages his hops in the attic. Instead of a wood cask, he places an oak stave in the fermenting beer. Steve has brewed 15 lambic-style beers since he started making the style in 1996.

European Pale Lager



SILVER MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Mark Messmer, Sycamore, Ill.

"Helles III 3rd Time a Charm"

European Pale Lager-Münchner Helles

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

- 6.0 lb (2.72 kg) Belgian Pils
- 2.0 lb (0.9 kg) Belgian Vienna
- 0.5 lb (230 g) Carapils
- 0.5 lb (230 g) Wheat Malt
- 0.5 tsp (2.5 ml) calcium carbonate
- 0.25 tsp (1.2 ml) calcium sulfate
- 1.0 tsp (4.9 ml) calcium chloride
- 1.0 oz (28 g) Saaz whole hops, 3.7% alpha acid (60 min)
- 0.5 oz (14 g) Saaz whole hops, 3.7% alpha acid (15 min)
- 0.5 oz (14 g) Saaz whole hops, 3.7% alpha acid (3 min)
- 0.75 gal (2.84 l) starter of Wyeast 2124 Bohemian Lager Yeast
- 1.0 tsp (4.9 ml) Irish Moss

- Original specific gravity: 1.050
- Final specific gravity: 1.014
- Primary fermentation: 11 days at 53° F (12° C) in glass
- Secondary fermentation: 21 days at 52° F (11° C) in glass

Brewer's Specifics

Mash all grains at 130° F (54° C) for 30 minutes, 150° F (66° C) for 30 minutes then 156° F (69° C) for 20 minutes. Boil for one hour.

Judges' Comments

Clean lager nose. Rounded maltiness. Good hop level—slightly high. Maltiness very pleasant, rounded. Slightly fruity. Some oxidation notes?

Scottish Ales



BRONZE MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Dean Fikar, Fort Worth, Texas

"Jannice's Scottish Export 80"

Scottish Ales-Export 80

Ingredients for 6.5 U.S. gallons (24.60 L)

- 10.5 lb (4.8 kg) Maris Otter Pale
- 4.5 lb (2.0 kg) Briess Pale Ale
- 1.5 lb (0.68 kg) Belgian Aromatic
- 15.4 oz (431 g) Durst Wheat
- 7.7 oz (216 g) Carafoam
- 7.7 oz (216 g) Belgian CaraMunich
- 7.0 oz (196 g) roasted barley
- 2.7 oz (76 g) peated malt
- 0.8 oz (22 g) Home Smoked Malt
- 1.0 oz (28 g) East Kent Golding whole hops, 5.3% alpha acid (60 min)
- 0.5 oz (14 g) East Kent Golding whole hops, 5.3% alpha acid (10 min)
- 1.5 qt (1.42 L) starter of White Labs WPL 028 Edinburgh Ale Yeast

- Original specific gravity: 1.064
- Final specific gravity: 1.022
- Primary fermentation: 12 days at 65° F (18° C) in steel keg
- Secondary fermentation: 100 days at 65° F (18° C) in steel keg

Brewer's Specifics

Decoction mash, main mash rests 154° F (68° C) for 60 minutes, 165° F (74° C) for 10 minutes. Boil for 75 minutes.

Judges' Comments

Malt sweetness predominates, roasty malt strong, sweetness in finish. Good beer but light body detracts, leaves you looking for something more. Malt dominated same spice and smoke with hints of toast, some roast.

India Pale Ale



BRONZE MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Paul Long, Newberg, Ore.

"IPA 18"

India Pale Ale

Ingredients for 7.5 U.S. gallons (28.4 L)

- 6.0 lb (2.7 kg) 2 Row
- 5.0 lb (2.25 kg) Munich
- 0.5 lb (225 g) Carapils
- 0.7 lb (315 g) Caramunich
- 2.4 oz (67 g) Chocolate
- 0.6 oz (17 g) Columbus whole hops, 15.7% alpha acid (90 min)
- 1.5 oz (42 g) Cascade whole hops, 6.1% alpha acid (15 min)
- 1 oz (28 g) Cascade whole hops, 6.1% alpha acid (5 min)
- 0.6 oz (17 g) Cascade whole hops, 6.1% alpha acid (dry)
- 0.6 oz (17 g) Simco whole hops, 15.7 alpha acid (dry)
- 20 oz (600 ml) starter of Wyeast 1056 American Ale Yeast

- Original specific gravity: 1.063
- Final specific gravity: 1.015
- Primary fermentation: 7 days in glass

Brewers' Specifics

Mash all grains at 152° F (67° C) for 90 minutes. Simco hops are from Eastern Washington; they are a high alpha aromatic hop.

Judges' Comments

Flavor profile balanced and with low malt and high hop. Hop flavors short lived. Some dark malt flavor comes through as well. Interesting beer; the "piney" nose seems to detract from the flavors. Well made. Smooth blend of sweet, neutral malt with massive hop flavor. (Columbus?) Bitterness is high but unobtrusive. A bit salty.

Düsseldorf Altbier



SILVER MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Russ Bee, Rockwall, Texas

"Klipfel's Alt"

Düsseldorf Altbier

Ingredients for 24 U.S. gallons (90.9 L)

- 34.0 lb (15.3 kg) Durst Pils
- 4.0 lb (1.8 kg) Carahell
- 4.0 lb (1.8 kg) Vienna
- 6.0 lb (2.7 kg) Light Munich
- 8.0 oz (227 g) Black Patent
- 1.0 T. (14.8 ml) calcium chloride
- 8.0 oz (227 g) Spalt pellet hops, 3.6% alpha acid (75 min)
- 3.0 oz (85 g) Hallertauer pellet hops, 4.4% alpha acid (60 min)
- 2.15 oz (60 g) Hallertauer pellet hops, 4.4% alpha acid (30 min)
- 1.0 pt (0.47 L) starter of Wyeast 1338 European Ale Yeast for 5 gallons

- Original specific gravity: 1.050
- Final specific gravity: 1.014
- Primary fermentation: 19 days at 60° F (16° C) in glass
- Secondary fermentation: 17 days at 38° F (3° C) in glass

Brewer's Specifics

Double decoction of all grains, main rests 144° F (62° C) for 20 minutes, 150° F (66° C) for 20 minutes, 156° F (69° C) for 60 minutes. Boil for 75 minutes.

Judges' Comments

Full malty and hop flavor, soft midrange and assertive bitterness lingering with the sweetness in the finish with some low chocolate or roasty flavors. I would like a bit more emphasis on the Munich grainy character and the finish is not as dry as it could be.

Fruit Lambic-style Ale-Framboise



BRONZE MEDAL

AHA 2002 NATIONAL HOMEBREW COMPETITION

Steve Piatz, Eagan, Minn.

Fruit Lambic-style Ale-Framboise

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

- 3.0 lb (1.36 kg) NW Dry Wheat Extract
- 3.0 lb (1.36 kg) M&F Light Dry Extract
- 3.5 oz (100 g) MaltoDextrin
- 4.0 cans Oregon Fruit Products Raspberry Puree, each can 3.1 lb (1.4 kg)
- 3.5 oz (100 g) Old whole hops (90 min)
- Dregs from old batch of Lambic Wyeast 1968 London ESB Yeast Wyeast 3526 Brettanomyces lambicus
- 2.92 oz (82 g) corn sugar for priming
- Danstar Windsor Ale Dry Yeast for priming

- Final specific gravity: 1.009
- Primary fermentation: Three years in plastic.
- Bottle condition for one year.

Brewer's Specifics

The hops were a mixture of home grown Mount Hood and Cascade aged in the attic for two or three years. Boil for 90 minutes. After boiling, allow to cool overnight in open container. Pitch with dregs from old 1996 batch of homebrewed Lambic-style ale, and Wyeast 1968. Insert an oak stave that has been in other batches of lambic. The 1996 batch was brewed with the dregs from commercial lambics and Yeast Labs Pediococcus and brettanomyces lambicus. After 16 months add three cans raspberry puree and Wyeast 3526. Twenty-two months after brewing, add last can of raspberry puree.

Judges' Comments

High acetic sourness. Some fruit sweetness to balance. Strong sourness lasts through finish. Like a well-aged vinegar. Could use some more complexity like Brett in flavor. Some (continued on page 62)

BY RAY DANIELS

Hop and Malt Supply Outlooks

As of this writing, the crops for both barley and hops are in for 2002 and brewers now have some idea what to expect in terms of supplies and prices next year. We have good news and bad news.

On the good news side, the hop crop in the U.S. was good, with average yields and average alpha acids. The total acreage planted was down considerably this year as hop growers try to overcome a world-wide over-supply of bittering hops. But on the aroma hop side, where most homebrewers and craft brewers get their hops, things seem pretty healthy. Supplies are good, but not overly abundant and quality was deemed to be "the best in years" by Ralph Olsen of HopUnion.

The bad news comes on the barley side where North American crops fell far short of expectations due to dry growing conditions. Much of the barley that was produced does not meet the quality standards of the big brewers, so there is going to be a huge scramble (and price increase) for the good stuff. Everyone is going to be dealing with malts that have higher than normal levels of protein and beta-glucans with lower levels of starch. The net result when these malts get to the market will be lower extracts—meaning you'll need more grain for the same amount of gravity—and slower run-offs for all-grain mashes with a greater likelihood of protein haze in the finished beer.

The silver lining is this: homebrewers can still afford European malts, which have not been hit by this problem.

Missouri's Other Brewery Has a Team of Horses, Too

The opening parade for Missouri's 100th anniversary State Fair was the scene



Missouri's other horse-drawn beer cart. Boulevard Brewing's pony-drawn beer wagon debuted last summer. According to the driver, these ponies could "walk underneath" the Clydesdales that draw a certain other brewery's wagon.

for the August debut of Boulevard Brewing Co.'s two-pony team hitch and beer wagon. The fair is held each year in Sedalia, Mo., about 70 miles east of Kansas City.

Kansas City's Boulevard Brewing wasn't the only representative from Missouri's brewing trade. St. Louis-based Anheuser-Busch and its world famous Clydesdales cantered away with the trophy for the parade's Horse Division. Bob Sullivan, Boulevard's vice president of sales and marketing and driver of the brewery's parade entry, reported that, "Our ponies were a bit in awe of the Clydesdales. Rosie and Nellie could easily walk underneath the belly of one of those giants."

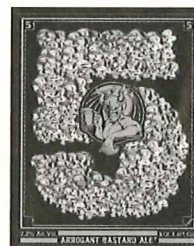
Together, Boulevard's two mixed-breed ponies weigh about half as much as one Clydesdale. But the difference in the size of the breweries' equine teams is dwarfed by the disparity in their production. According to Sullivan, "By 6 a.m. on January 1, A-B had brewed as much beer as we will in all of 2002." While responsible for Boulevard's strategic marketing and sales direction, Sullivan also has to clean up after the ponies. "One of the benefits of working for a small brewer is that the job

responsibilities don't get too narrow in scope," he quipped.

Boulevard Brewing Co. is Missouri's second largest brewery, and the largest specialty brewer in the Midwest. The company sells its beers throughout Missouri, Kansas, Oklahoma, Arkansas, Nebraska, Iowa, South Dakota, Wyoming and parts of Illinois.

Arrogant Bastard Ale Responds to Allegations

San Marcos, Calif.'s Stone Brewing Co. recently responded to allegations that its Arrogant Bastard Ale has "too much flavor" by choosing to add insult to injury with the release of six different 3-liter bottles to mark the "5th Anniversary of the Arrogance" (aka "5th Birthday of the Bastard").



November 1997 was the first time Arrogant Bastard Ale was released upon an unsuspecting public and thus November 2002 marks the fifth year of its existence. In keeping with the Arrogant tradition, Stone Brewing staff members recommend that the best way to celebrate the Bastard's fifth birthday is by buying yourself a gift. True Bastards understand this. It is believed that only Arrogant Bastards with the highest self-image will buy themselves the entire "six-pack."

As part of the birthday celebration, the Bastard has poured rampant invective on six different 3-liter bottle labels. "The different designs and text on each of the bottles is sort of like that chocolate stuff you pour on your ice cream that hardens into a shell,"

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PHOTO COURTESY OF BOULEVARD BREWING CO.
LABELS COURTESY OF STONE BREWING CO.

explains Stone bastard-in-chief Greg Koch. "Only you can't eat them. Oh, and they're not really sweet or chocolaty either...more bitter really. But they are tasty!"

Bitter indeed. Perhaps that is an understatement. The following snippet of text taken from one of the 3-liter bottle designs sets the tone for the series: "Numbskull, gaping gobemouche, simpleton, unwashed masses, pedestrian, feeble, narrow minded and pathetically blathering idiots are just some of the words we have used to refer to the unworthy. Many of you have laughed and scorned along with us. Yet many more still stare in bewildered befuddlement while embracing their ignorance with such resolve that they remain oblivious as to our very existence."

Five new Arrogant Bastard Ale designs and one Double Bastard Ale design will be released in very limited quantities. The bottles are big, but the Bastard inside is even bigger. Staff scientists at the brewery estimate that a single, massive six-pack of Bastard 3-liters would contain approximately five times the flavor of all the fizzy yellow beer produced nationwide in a single year. Arrogant Bastard Ale supporters are urged not to let this kind of power fall into the wrong hands.

Arrogant Bastard Ale is 7.2 percent abv and is available year-round in draft and 22-ounce bottles. A new 3-liter bottle edition is released in limited quantities each November. This is the first year different bottle designs are being released simultaneously. Double Bastard Ale is 10 percent abv and is released only in limited quantities each November in 22-ounce bottles and, some years, even more-limited 3-liter bottles.

For more info, go to www.stonebrew.com, or www.arrogantbastard.com or call the brewery at (760) 471-4999.

Juneau History Inspires Annual Release of Alaskan Smoked Porter

The release of Alaskan Brewing Company's 2002 Smoked Porter carries on a rich tradition of smoked malts in Alaska. From the Russian settlers to the German and Czech brewmasters of the gold rush, many brewers dried and roasted their malt over fire, creating a distinct smoked character.

Alaskan Brewing Company recaptures this historic taste in its critically acclaimed Alaskan Smoked Porter. The Alaskan Brew Crew uses alder for smoking and a commercial smokehouse at Juneau's Taku Smokeries to prepare the malt.

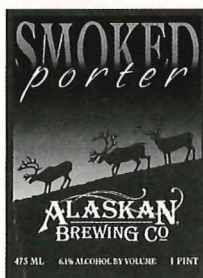
"Some breweries in Alaska had their own malting companies," says Geoff Larson, brewmaster and co-founder of Alaskan. "They would roast or dry their own malts over fire, hence the smoky flavor and aroma."

Alaskan Smoked Porter is one of the most award-winning beers in the country with 11 medals to its credit from the prestigious Great American Beer Festival as well as numerous international awards. Brewed only once each year in small amounts, this limited edition beer can be successfully aged.

Aging allows a unique blend of plum, raisin and sherry notes to emerge as it continues to develop in the bottle. Popular for the unique smoky flavor of indigenous alder wood when first brewed, Alaskan Smoked Porter has been credited with starting a revival of smoked beers in the United States.

Interest in Alaskan Smoked Porter, with its numerous awards and the cult-like following around the country, led other breweries to brew their own smoked beers using regional hardwoods. It also inspired Larson to team up with veteran beer writer Ray Daniels to author a Brewers Publication style series book, *Smoked Beers*, released in 2001. It received a silver medal from the North American Guild of Beer Writers' Quill & Tankards awards.

Celebrating 16 years of brewing world class beer, the Juneau-based brewery produces Alaskan Amber, Pale, ESB and Stout year round. Alaskan Winter Ale and Smoked Porter make regular fall and winter appearances in limited amounts. Distribution extends throughout the Pacific Northwest, encompassing Alaska, Washington, Oregon, Idaho, Montana, Wyoming, northern California and northern Nevada.



An IPA for me, Father . . .

Once again laying claim to being the hippest church, Catholics in several communities have taken to meeting in local pubs. *Modern Brewery Age* recently reported a regular weekly meeting by Catholics in Coral Gables, Fla. at John Martin's Pub. Of course



members of the group drink beer, but reportedly no one gets drunk—and sources claim that more soda than beer is consumed by the faithful.

Apparently the Florida group is part of a larger trend that began in Chicago, according to Miles Codias, young adult coordinator for the Archdiocese of Miami. "It's a way for people to feel comfortable while receiving pure Catholic teaching, rather than learning it at church, and just chill out." During the meetings, the groups get time to socialize in addition to the formal program.

An Unthinkable Oktoberfest?

One wouldn't think that you could put on an Oktoberfest with out the signature attraction—namely Oktoberfest beer—but in Alabama, it happens. That's right, travel



to Cullman, Ala. for Oktoberfest and you'll find bratwurst, lederhosen and oom-pah bands, but not a drop of beer!

Although the town has been dry for decades, it was nonetheless founded by a German, John. G. Cullmann, in 1873, and so the locals decided it only suitable to celebrate the annual festival in his honor. In place of the usual refreshments, attendees will find root beer and "OktoberZest"—a non-alcoholic spiced apple cider.

Although there have been electoral efforts to rescind the ban on alcohol in Cullman for many years, they continue to fail—the most recent one by 500 votes among 5,000 voters or about 10 percent. One local notes: "Beer tends to make people laugh, sing and holler." (continued on page 61)

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
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
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
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
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
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
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
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Brew News (from page 56)
**Hammer and Nail Gets . . .
the Hammer and Nail!**

In the bad name department: a micro-brewery called "Hammer and Nail" Brewers in Oakville, Conn. was recently nailed shut when its property was seized by the state for back taxes. Apparently the business owed a big chunk to the water department . . . and you know how hard it is to make beer without water.

Honesty May Not Taste Good

Carlsberg Brewery, one of the largest brewers in Europe, introduced canned beer in its homeland last summer, but apparently things didn't go so well. By summer's end, the brewer had recalled and discarded 3.3 million cans of beer due to quality problems. In America, a company announcing a recall of a food product would probably spin it to sound inoffensive, but not so in Denmark. The company spokesperson said the beer was being trashed because it "stank and tasted sour and was cloudy." Right, then. Time to have a Heineken.


If Canned, Then Cool in No Time

According to recent press releases written by folks who drink WAY too much caf-

feine at work, the Amazin' Beer Chiller chills 12- and 16-ounce cans of beer from room temperature in TWO MINUTES using just a little ice and water! Featuring PATENTED XTR Technology, this battery-operated invention spins cans in ice cold water. This creates a vortex within the can that exposes all of the beer to the chilled aluminum skin AS FAST AS POSSIBLE! (They put those capital words in there—see what we mean about the caffeine?)

The spin keeps whirling with: "Best of all, you can open your beer RIGHT AWAY with absolutely NO FOAMING!" (We wonder if foaming is normally a problem in canned beers—it has been years since we had one.) "And if you like your beer REALLY, REALLY COLD, take a can out of the refrigerator and put it in the Amazin' Beer Chiller." Ah, now there's a feature that will appeal to American canned beer drinkers!

Still we hear there are some good beers in cans these days—and we know that every now and then cans are all you've got. So if you want to learn more, SEE THE WEB SITE at www.beerchiller.com. (Sorry, those caps are ours; we couldn't resist.)

Ray Daniels is the editor-in-chief of Zymurgy magazine. 

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Brewing Software (from page 30)

includes a collection of calculators plus hops and grain databases, and **BrewLog**, a more complete recipe storage system that also has a few calculators. Both are available for 30-day free trials and then only \$5 apiece if you like them. For information and downloads, visit:

- www.palmbld.com/software/pc/BrewGeek-2002-7-26-palm-pc.html
- www.palmbld.com/software/pc/Palm-Brew-Mate-BrewLog-2002-5-23-palm-pc.html

The developer of **ProMash** also offers a limited set of facilities for Windows CE and Palm Pilots. They are not full recipe formulators or brewing session applications, but they are helpful calculators that lend themselves to smaller devices and are practical extensions of the larger ProMash product. Use them for first-strike temperature calculations, hydrometer corrections

or to quickly find the alcohol percentage of any brew. The best thing is, they are available completely free of charge and can be downloaded direct from the ProMash Web site.

Mike Taylor of SUDS also offers **SUDSLITE**, a Pocket-Excel template file for Windows CE version 2.0 or higher. It is supplied free for paid SUDS users, or for \$10 if used stand-alone.

The **StrangeBrew** site provides links to two free databases for Palm Pilots, one for hop varieties, the other for Wyeast strains.


No Reason to Wait



The review of brewing software that ran nine years ago in these pages concluded that none of the available programs could be recommended without reservation. In the intervening years, great progress has been made in

both operating system stability and programming quality for brewing software. On top of the mere operating issues, the quality of the calculations has also probably improved considerably through a long process of peer review and constant developer refinements. As a result of all these factors, the packages available today offer brewers myriad resources for electronic management of their brewing activities. Thus the time to wait is over; time to join the 21st century and put your computer to good use for the betterment of homebrew.

Cheers!

Steve Hamburg has worked in the software industry since 1979 and has been a homebrewer since 1984. He has long been active in participating in and organizing beer and homebrewing events with the Chicago Beer Society and the American Homebrewers Association. 

Statement of Ownership, Management, and Circulation (Required by Title U.S.C. 4369)

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i.	Total (Sum if g, h, (1) and (h) 2)	11,427	11,127
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Winners Circle (from page 54)

wheat. Raspberry not present. Could use more fruit flavor/aroma to balance sourness. Additional carbonation would improve presentation. Intense sourness with bit of raspberry in aftertaste, could use Brett to balance out the sourness and provide the refreshingly dry finish that's needed. Some oak might help.

Winner's Circle Correction

In the September-October edition of *Winner's Circle* the grain bill for Homebrewer of the Year, Curt Hausam's "More Likea Stout" Porter contained one error. The Hugh Baird pale ale malt should have been 40 pounds, not 20 pounds as reported.

—Editor

Jim Homer is a national judge in the Beer Judge Certification Program. He joined the AHA in 1980 as member No. 763, and is a graduate of Charlie Papazian's homebrew class.

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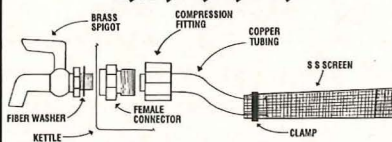
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That Was My Barleywine

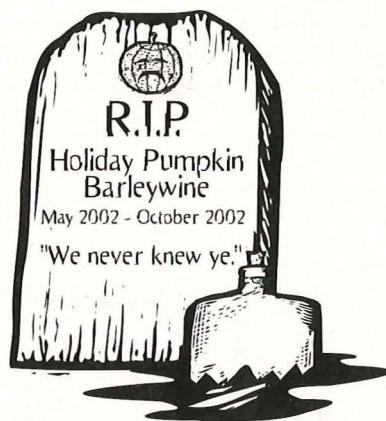
So you spend twice the money on ingredients and you pull a muscle grinding all that grain. You max out the capacity of your buckets and kettles and then you have to wait for a year before drinking it. The life of a barleywine brewer is tough. But the rewards, usually, correspond with the effort.

She wanted a pumpkin ale. I wanted a barleywine. So the idea was hatched to brew a holiday pumpkin barleywine, a holy barley pumpkinwine, er, something like that. At least I could imagine it in my brewer's mind.

There were a few problems, though. Just try to find the fermentable sugar content of pumpkin in your recipe books. Carving pumpkin or dinner pumpkin? Orange or white? Big or small? I settled on some small, rather pathetic looking specimens that were labeled "sweet" at the local farmer's market. Two little squash, so meager that I thought surely the flavor of this brew would come from the spices, not the token gourds.

I tasted the small pumpkins after roasting them in the oven. They didn't taste sweet. So I made a barleywine that didn't require much additional starch or sugar. Whoops. Later I thought back to George Washington and Thomas Jefferson, patriots who made beer from pumpkins. Yes, there had to be some fermentables in there, and doubtless there were. Please trust me when I say that pumpkin, even if it doesn't taste too sweet, has plenty of fermentable sugars.

So what started out as a big, big barleywine became a whole lot bigger with those pumpkins. I chose a sturdy yeast, grew a starter culture and away she went. Some cloves, some freshly ground cinnamon and a dash of nutmeg would give it the Thanksgiving day flavors. I imagined a pumpkin pie aperitif—soothing and warming—so creamy it wouldn't require ice cream or whipped cream. A winter's delight for next year.



Months later, things were looking pretty good. The brew had fermented out nicely and I decided it would have to be bottled with Champagne yeast and left to rest for the remainder of the year.

In fact, I was thinking about bottling it any day. But first I had a couple of other bottles to put up, just some counterpressure filling off my kegs. I went into my brew room to get a few bottles for cleaning and sanitizing. I shuffled through a box of bottles, and in doing so, a very weighty champagne bottle tumbled from the box toward my carboy of conditioning barleywine.

As I stood helpless, hapless and horrified, the bottle crashed down onto the shoulder of the carboy and shattered it neatly into a million razor-sharp slivers. I watched in disbelief as nearly every drop of the brew splashed out onto the rug. My *landlord's* rug. The Berber carpet.

Then it hit me. The smell of pumpkin pie spices, pumpkin itself, plus beer and alcohol. I was in shock. I simply wouldn't believe it. All the effort to brew it, the pumpkins in the oven, the precious clarity...and worst of all, perhaps, it was the first and only carboy I'd ever broken in all my years as a homebrewer. My perfect record, shattered, so to speak.

It was so real and so irreparable, but I could not believe it had just happened. At

length I had to accept the truth—my pumpkinwine was dead. Begrudgingly I began picking up the glass and throwing it into a bucket. I tossed a couple of towels down to try to soak up the mess. In the shattered remains of the bottom of the carboy lay a shallow pool of bright brew resting calmly now on the yeast sediment below.

I knelt down and leaned gently over the remains. A tear came to my eye. This was not of grief, but the alcohol rose up and stung my eyes. I leaned further, pushing my lips outward, watching for slivers of glass. I slurped a gracious kiss of dead barleywine from the ruins.

It was redolent with spices and burning hot alcohol. I soon realized that had it not been for this fateful breakage, this brew would have caused dozens of head-thumping mornings, kidney damage and perhaps even blindness and lockjaw. How any yeast could survive to produce such a surely flammable liquid was beyond me. But in any case, the grapes were indeed soured and the brew that had flowered in my imagination had floundered in the depths of oily solvency.

My only task remaining was to rent a steam cleaner and clean the carpet four times. After that, to rid my senses of the volatile aromas, I had to borrow an ozone-deodorizing machine from a friend.

Now the brew room is back in shape—you can't even smell the cloves. Two big gravity meads are merrily bubbling away. One has pomegranate juice in it, with an unknown amount of fruit sugar; the other has 10 spices and herbs. You'd think I would have learned by now. Well, we'll see.

Matt Stinchfield is a freelance beer writer, beer travel guide, brewery safety consultant and editor for *Brewing News*. When he's not traveling the world in search of good beer, he can be reached at matts@brewingnews.com.

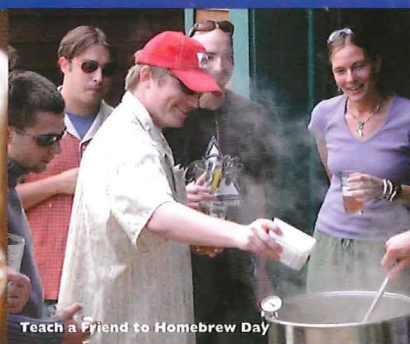
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